60__decibels

Why off-grid energy matters

An Impact Performance Report

Written by Kat Harrison, Shahnaz Khan, Tom Adams, Sasha Dichter

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About 60 Decibels

We're an impact measurement company, best known for our Lean Data℠ approach spun out from Acumen in 2019. We've pioneered the use of (mostly) phone-based surveys to measure social impact across the world. Our targeted, repeatable approach to gathering customer[1] insights and social impact data has been used by more than 300 of the world's leading impact investors, companies, foundations, corporations, NGOs, and public sector organisations. If you want to geek out on our methods, including our history, (and there's a little geek in all of us) please visit 60decibels.com.

Sponsored by CDC Plus, which is funded by UK Aid from the UK government

Co-sponsored by Acumen, Efficiency For Access Coalition, Shell New Energies

Written by Kat Harrison, Shahnaz Khan, Tom Adams, Sasha Dichter

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CDC Investment works

ACUMEN CHANGING THE WAY THE WORLD TACKLES POVERTY

EFFICIENCY FOR ACCESS

UKaid

1
We sometimes talk to suppliers, employees and agents too, but we're focusing on the voice of the customer in this report.

Contents

“To me, the solar product is one of my best assets.”

A Thank You From 60 Decibels

We want to begin by thanking those who made this report possible. Firstly, to CDC Group, who are the main sponsor of this report. Beyond finance, they have provided sage advice, constructive critique, and lots of enthusiasm. We'd also like to thank our co-sponsors: Acumen, Efficiency for Access Coalition, and Shell New Energies, who similarly provided advice, input, and ideas based on their decades of collective knowledge of the energy sector.

We appreciate our friends who provided review and contribution, particularly experts at the global association for the off-grid solar energy industry (GOGLA), Clean Cooking Alliance, African Minigrid Developers Association, Power Africa, and Value for Women.

A big thank you to the investors and foundations who saw the importance of supporting their portfolio companies to work with us to learn more about their customers' experience: Acumen, Carbon Trust, CDC Group, CLASP, DOEN Foundation, Global Partnerships, GSMA, KawiSafi Ventures, Private Infrastructure Development Group (PIDG), Roots of Impact, SNV, USAID, and The World Bank.

We also feel tremendous gratitude for the companies we get to work with. They are changing lives by bringing modern energy to some of the toughest places on the planet. Thank you for wanting to take part in Lean Data studies and for caring in the way you do about your customers and your impact. For that we'll be eternally grateful.

Most importantly, to all the customers who took part in our surveys – the vast majority of whom will, unfortunately, may never read this report – we thank you for your time, your honest feedback, and your extraordinary comments. Without you, this report literally would not exist. We have done our best to faithfully represent your voices in this report, in the hopes that what we collectively learn from the results can lead to more positive change in the world.

A Few Words From CDC Group

CDC is committed to promoting the overall sustainability of the energy access space, which can only come through deep impact and financial viability. While the positive developmental impact of providing energy access may seem obvious to those working in the sector, it's important to continually develop the data to better understand and quantify the role of energy access in the complex development equation.

As investors, we have found the 60 Decibels Lean Data approach to be a powerful tool in expanding our knowledge base, providing insights on the impact performance of specific companies we invest in compared against others in the sector. This is why we are pleased to support the work 60 Decibels is doing to develop and promote the use of impact benchmarks.

Looking at benchmarks and detailed impact performance for specific companies and sub-sectors can help us become better investors. While impact and financial sustainability can appear to have competing objectives, this doesn't have to be the case. For example, continually improving product design and quality, sales practices and customer service, will lead to more satisfied customers, which in turn can underpin the sales growth and customer payment performance needed for financial success. When companies can achieve improvements in indicators such as CES and NPS it should boost impact and help the company's bottom line.

We should also recognise that this may not always be the case. While we welcome the call for more financial innovation to increase affordability and reach, longer contracts and lower deposits may increase business risks or at least increase companies' working capital financing needs. That's a big ask for a sector that, despite, its remarkable achievements to date, has yet to reach overall financial sustainability. If we want energy access companies to expand their reach to the very bottom of the pyramid as we try to meet SDG7, donors and governments should be prepared to provide well-targeted subsidies to help fill the gap alongside investors that can finance the more commercial market segments.

Geoffrey Manley, Director, Head of Energy Access and Efficiency

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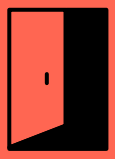
Contributions to the report also made by other members of the CDC Group team: Julia Tobias, Nabeela Khan, Andre Vassilev, Ellinor Jensrud, and Paddy Carter.

Introduction



What To Expect In This Report

Whether you have deep expertise in off-grid energy or you're just getting involved in the sector, we hope this report has something for you.

This is an impact report rooted in the voice of the customer. Here you will find data drawn from almost 35,000 interviews of customers served by 49 off-grid energy companies.[2] These companies work across 17 countries, from as far west as Haiti and as far east as India.[3] The most represented region is sub-Saharan Africa, where the off-grid energy sector is largest and arguably most dynamic, followed by South Asia.

The companies we worked with are providing a range of off-grid energy products including cookstoves, appliances,[4] solar home systems, solar lanterns, and mini-grids. Some companies exclusively provide consumer financing or smart metering, and many provide a combination of goods and services.

Why off-grid energy matters

We suspect that if you're reading this, you're likely familiar with the scale and significance of the global energy divide: 860 million of the world's population lack access to electricity and a massive 2.6 billion do not have access to clean cooking facilities.[5] Energy plays a role in virtually every area of social impact or global challenge: security, climate change, food production, health, and jobs. Energy underpins our ability to consume goods and services that make our lives more convenient and enjoyable.

The importance of energy is underscored by its prominence in the Sustainable Development Goals (SDGs). SDG7 highlights a global effort to ensure access to affordable, reliable, sustainable, and modern energy for all.[6] In many ways, it's this very degree of significance, in the well-being of both people and planet, that makes it so important to understand the actual impact of those companies on customers' lives.

What might you learn by reading this?

You could spend the next hour of your life doing something entirely different: clearing your inbox, going for a run, or listening to podcasts to your heart's content. But if you choose to spend it reading this report, we promise you'll learn some pretty interesting things. For example, who off-grid energy companies are reaching (by income profile, by gender); what customers value most about energy access; how satisfied different company customers are with the products and services they are using; and what aggregated 'impact performance' means in practice.

Whether you're an investor, funder, entrepreneur, policy-maker, or casual observer of the sector, we

Companies In The 60 Decibels Energy Database:

ARED, Arnergy, Azuri, Baobab+, BBOXX, BioLite, BURN, d.light, Devergy, Easy Solar, Ecozen, Emel Solar, Fenix, Frontier Markets, Futurepump, Green Energy BioFuels, Greenlight Planet, Greenway, HelloSolar, Husk Power Systems, Kalangala Infrastructure Services (KIS), KopaGas, Lendable, Lumos Global, M-KOPA, Mobisol, Nizam, OffGridBox, Oolu Solar, Orb Energy, Pawame, PEG Africa, Pollinate Group, PowerGen, Promethean Power Systems, REDAVIA, Raj Ushanga House (RUH), RVE. SOL, SELCO India, Simusolar, Solar Panda, SolarNow, SparkMeter, Standard Microgrid, SunCulture, SunnyMoney, Ultratec, Winock Solar, Winsol Green Power Engineering.

2
There are 73 company projects in the benchmark. Some companies are working in multiple countries and/or selling multiple products/services. We've separated results for greater depth.

3
Cote d'Ivoire, Ethiopia, Ghana, Haiti, India, Kenya, Madagascar, Malawi, Nepal, Nigeria, Pakistan, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia.

4
Specifically solar TVs, off-grid refrigerators, solar water pumps.

5
IEA, 2018: https://www.iea.org/reports/sdg7-data-and-projections

6
World Energy Outlook Special Report, International Energy Agency, 2017: https://webstore.iea.org/download/summary/274?fileName=English-Energy-Access-Outlook-2017-ES.pdf

hope you'll find these insights and data points valuable. Whatever you think, we'd like to hear from you. More on how to share your feedback with us at the end of our story.

What's new in this report?

Some discerning readers will recall that we published an Energy Impact report whilst still part of Acumen in early 2018.[7] That report was the first time we shared results from our work with companies in the Acumen energy portfolio.

This report builds on that analysis and goes further. It features a much larger number of companies – drawn not just from one, but nine different funders' portfolios – and it covers a wider variety of energy products and services.

As with all our reports, the data we've gathered contains a combination of social performance indicators,[8] customer feedback, and broader market insights. Many of these are indicators we've been collecting for years, but there is a smattering of new ones as well. We've added these new indicators either when we've learned something new from customers about what is most important to them, or when we identify topics that the sector is keen to understand better. For example, the potential negative impacts of over-indebtedness.

Notwithstanding some recent tweaks, we have, broadly speaking, been asking a standard set of questions and collecting a consistent range of indicators from 2016 to 2019.[9] This consistency allows us to provide comparative results of the impact performance of these companies – a social impact benchmark. It all comes together in an exciting new index of off-grid energy impact that you'll find on page 28.

Most importantly, much of the data is new. Social impact doesn't stay still, it changes as societies change, as technology evolves, and as businesses grow. We believe that investors and enterprises need to be aware of and adapt to these changes as they occur. Just as we look continuously at operational and financial performance to understand the ebbs and flows of profitability, margins, and cash balances, we can now take a similar approach, and bring a similar mindset, to managing impact performance.

Sub-Sector Definitions:

Solar Lantern
A portable lamp or light powered through a photovoltaic (PV) panel – sometimes called 'pico-PV'.

Solar Home System
A stand-alone system normally with multiple lights and capacity for additional services – with larger panels than solar lanterns.

Mini-Grid
A generation and distribution system serving multiple customers, often in rural areas.

Appliance
An electrical device such as a refrigerator or a television that can be powered by a standalone solar home system or mini-grid for use by the ones in this report.

Clean Cooking
More fuel efficient and/or lower emission (cleaner) biomass cookstoves, as well as alternative fuel-based cooking appliances using LPG liquid biofuels and other fuels.

7
https://acumen.org/energy-impact-report/

8
Technically the data presented is a combination of both metrics and indicators (i.e. measures derived from multiple metrics). We don't worry too much about this, and use the words metrics, indicators and measures interchangeably.

9
Where we've worked with companies for multiple years, we've only included the most recent findings, though the insight we've gained from the over 150 projects in the off-grid energy sector has shaped our work and the information shared in this report.

The beauty of benchmarks

We are big believers in benchmarks. Indeed, for us, a data point without something to compare it to is like a rocket without fuel: you're ready for take-off yet find yourself firmly rooted to the ground.

We have found, time and again, that the ability to effectively compare the impact performance of companies brings this data to life. It makes impact performance tangible and relevant to the people running companies or investing in them. By showing funds and firms how they stack up against their peers, they can have objective conversations about how to maximise the social impact experienced by their customers. Grounded in this data, we can set targets and seek improvements based on specific yardsticks of what best-in-class impact performance looks like. This is what it looks like when data leads to action.

How this report is structured

We begin our story by explaining the core indicators in the report and describe how they align to the Impact Management Project's dimensions of impact. While this bit of the report is a bit heavy on technical definitions, grounding yourself in these data definitions will make it easier to understand the analysis and how we communicate our findings.

Next, we explain the impact of the off-grid energy sector at large, before setting out our benchmarks and introducing the new 60dB Impact Index.

From impact, we switch to insights, pulling out some of the big-picture trends behind the data; investigating wider customer feedback about preferences, usage, and aspirations; and diving into what we've learned specifically about each sub-sector.

We end with suggested actions based on our findings. After all, data is only as useful as the decisions it leads to.

Like any good story, this one will include a few heroes (every story needs a protagonist or two): individual entrepreneurs and investors who are building and supporting some of the world's most exciting impact-orientated organisations. And, for fun, you'll meet a handful of our superheroes, pioneers who, in a generally impactful field, are creating especially outsized impact. Right now, the world sure needs more of these.

And, finally, what is this not?

This report looks first and foremost at impact and customer experience. Specifically, we focus on certain kinds of impact: the changes experienced by households when they purchase and use modern, off-grid energy.

Given the scope of this report as it was commissioned, we did not systematically collect data on the financial or operational performance of companies. Nor have we looked at the impacts (positive or negative) created in the production or distribution of products.[10]

We're aware that this means the report has some shortcomings, ones we're determined to address going forward. For example, it means we're not able to say anything about any trade-offs, or absence thereof, between impact and financial performance, nor do we have data about scale measures of impact such as lives reached.

However, what you will get is a deep, bottom-up analysis of what we learned, customer by customer and interview by interview, about what it means to own a modern off-grid energy product: the impact on attitudes, behaviours, and quality of life.

Thanks for joining us on this journey.

10
Positive impacts might include the creation of good jobs. Negative impacts might include the environmental emissions involved in producing these products, or physically getting them to their final point of sale ('embodied energy').

“My life has changed

because

I can save some money now.”

10

Things You Should Know About The Impact Of Off-Grid Energy

01.
The social impact of energy access is real.

The consistent message we hear from customers is that energy access is making a positive difference in their families' lives. 88% of customers told us that the quality of their life had improved thanks to the energy product or service they bought. That figure compares well to customers and suppliers in other sectors we've worked in: agriculture (82%), education (78%), financial inclusion (70%).

02.
Energy access can contribute to income generation.

Nearly one-fifth of customers are using their energy product or service for income-generating activities. This is a good start, and we hope this number will grow as personal energy consumption needs are increasingly met, allowing more 'spare' energy to be used for other purposes.

03.
Solar lanterns currently provide the most impact bang-for-your-buck.

Somewhat surprisingly, the impact they create[11] is often greater than that of higher-capacity systems. This is not because the quantity or quality of light they provide is better – indeed it is typically more basic – but that these small but mighty products are the first step up the modern energy staircase. It is when customers take this first-step that the greatest marginal impact occurs.

04.
Use of kerosene and other traditional fuels for lighting is dropping.

There's variation by geography, but families who gain energy access are reducing their reliance on, or completely stopping use of, dirty, expensive, and dangerous prior fuel sources. This is good news for their health, reducing their exposure to fine particulate matter (PM2.5) by as much as 50-80%; and good news for the environment, reducing their CO_2e[12] emissions by close to half a tonne per year.[13]

05.
The sector is not as inclusive as it could be, potentially limiting progress towards SDG7.

Despite the growing availability of financing, a little over a third (37%) of off-grid energy customers live in poverty.[14] This compares to 60% across the countries where our projects were undertaken. These data suggest that whilst off-grid energy offers tremendous promise to bridge the global energy divide, to do so we need to see more accessible financing options, lower prices, smarter subsidy, and wider distribution.

11
In absolute as well as relative (to their cost) terms.

12
CO_2e, or carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO_2 that would create the same amount of warming.

13
An average of 461kg of CO_2e averted by each household, including those not using kerosene in baseline.

14
Using the World Bank international relative poverty line of households living on $3.20 per person, per day or less (2011, PPP prices).

06.
As companies grow, they move upmarket.

Companies appear to focus less on the poor, as a proportion of their customer base, as they grow. Importantly, these bigger companies may still reach larger absolute numbers of low-income customers. But we think responsible investors, and governments looking to utilise subsidy, should be attentive to this trend so that the most vulnerable, hardest-to-serve customers are not left in the dark.

07.
Mini-grids serve the highest proportion of low-income families.

This is likely due to the nature of the mini-grid business model, which requires a high density of connections to cover the fixed costs of setting up a localised grid. Because of this, we think mini-grids will need to play an important role in the off-grid energy sector if we are to succeed in achieving SDG7: clean, safe, and affordable energy access for all.

08.
The sector could do more to engage women.

68% of energy customers are men, in 58% of households it was a man who first heard about the energy product or service, and in 61% of cases a man made the decision to buy alone. This trend may not be unique to the energy sector, but it is something to be aware of and to try to influence. These gender dynamics may affect perceptions of who owns these valuable products, who can use them, and which uses get prioritised when there are competing demands within a household.

09.
Product quality and customer service still needs to improve.

The percentage of customers reporting challenges using their energy product is high (34%). Moreover, for most companies, after-sales support is not adequately resolving these issues. This results in customer frustration, and it means that the full impact potential of these products is not being realised. Furthermore, since most sales come via word-of-mouth, poor customer experience negatively affects both the top and bottom lines.

10.
Over-indebtedness is a small but significant issue.

While over-indebtedness is still only hitting a small proportion of customers, the negative impacts they experience are significant. 4% of families we spoke to said that their energy payments were a ‘heavy burden’ and 5% are forced to regularly cut back their food consumption in order to make payments. Underneath these averages, we found a small number of companies whose customers report much higher incidence of burden (as high as 33%). These findings support the importance of creating strong consumer protection practices for off-grid energy customers.

About The Data In This Report

This report is full of numbers, so to kick us off, let's get grounded in what data we collect, how we collect it, and why we cut and classify it the way we do.

Where does the data in this report come from?

We've conducted nearly all our interviews with off-grid energy customers by phone.[15] We undertook these interviews in one of two ways. Either we conduct a single survey – typically 6-12 months after a customer purchased their product or service – or we perform a baseline, within 4 weeks of the initial purchase, with a follow-up 4-5 months later. To select the customers we survey, our clients provide us with a database of contact details.[16] From this larger list we randomly select a sample and call until we reach a sufficiently large and representative sample.[17] [18]

How do we aggregate this data?

In this report we'll often refer to aggregated sector- or product-level results (e.g. "90% of customers told us that the quality of their life had improved"). These numbers are simply the averages of all relevant company results. We haven't added any weightings based on company size or geography.

Data categorisation

We take pride in making the data we collect easy to interpret, beautiful to look at, and simple to understand and act upon. We also align our data with emerging standards of best practice in our space, such as the Impact Management Project (IMP). We're big fans of the IMP because it's a simple, intuitive, and complete way of conceptualising impact, and because of the robust,

Who Did We Interview?	
Number Of Interviews	34,791
Number Of Individual Respondents	25,497
Sample Size By Sub-Sector	Solar Home System: 12,321, Solar Lantern: 1,678, Mini-Grid: 2,445, Clean Cooking: 3,761, Appliances: 4,763, Other: 529
% Female	32%
Average Age (Range)	39 (18-89)
Average Household Size	5.9
Highest Education Level Of Anyone In The Household	No Education: 4%, Primary School: 14%, Lower Secondary: 19%, Upper Secondary: 30%, Tertiary Education (University, Polytechnic): 34%
Geography	East Africa: 61%, West Africa: 16%, South Asia: 14%, Southern Africa: 4%, Global: 3%, North America & Caribbean: 1%
Access To Grid Electricity	Southern Africa: 10%, East Africa: 13%, West Africa: 35%, North America & Caribbean: 44%, South Asia: 47%
Disability Prevalence	3%
Average Response Rate[19]	65%

15
Some folks feel more or less strongly about the effectiveness of different ways to survey. We like all kinds of approaches, whether in-person, by phone, email, or even SMS, but the one we use the most is phone surveys. Each has their own pros and cons which we've tested and described in the following report https://acumen.org/wp-content/uploads/2015/11/Innovations-in-Impact-Measurement-Report.pdf.

16
This is usually a database of all the phone numbers a company has. These databases are built by the companies in a variety of ways, typically at the point of purchase/registration.

17
With a randomised sample, representativeness is determined by the responsiveness of the population to the survey. The higher the response rate is, the more confident we can be that the customers we've talked to are representative of the broader customer base. In energy, this response rate, on average, is 65%.

18
We aim for a sample size that will give us a confidence level above 90% with a 5% confidence interval.

19
Response rate refers to the percent of successful interviews made compared to attempts made.

IMPACT MANAGEMENT PROJECT

○ **Who**

□ **What**

≡ **How Much**

+ **Contribution**

△ **Risk**

multi-stakeholder approach that was taken to develop it.[20]

The IMP introduces five dimensions of impact: Who, What, How Much, Contribution, and Risk. These dimensions help you check that you haven't missed any ways of thinking about, and ultimately measuring, the positive and negative changes that are occurring as a result of an intervention.[21] Below we provide a quick description of each dimension, along with a list of our measures that fit under each of the categories.[22]

○

The **Who** of impact looks at the stakeholders who experience social and environmental outcomes. All things equal, the impact created is greater if a particularly marginalised or underserved group of people is served, or an especially vulnerable part of the planet protected. For the who of impact, we tend to work with our clients to understand **poverty levels, gender and disability inclusivity.**

□

What investigates the outcomes[23] the enterprise is contributing to and how material those outcomes are to stakeholders. We collect most of this what data using qualitative questions designed to let customers tell us in their own words the outcomes they experience and which are most important to them. You'll read more about those in the section on the social impact of off-grid energy that follows. In addition to this qualitative information, we have developed an indicator, which we include in nearly all our projects, to assess the significance of any changes that occur. We call this our **Quality of Life** indicator. It assesses the percentage of customers saying their quality of life has very much improved because of access to their new off-grid product or service.

≡

How Much looks at the degree of change of any particular outcome. After listening to tens of thousands customers we've learned that for off-grid energy customers, the most important outcomes include: **income generation, movement up the energy staircase,**[24] **changes to expenditure on energy, reduced kerosene use, reduced CO_2e emissions, time savings, increased hours of study time and changes in perceptions to personal safety and health.**

+

Contribution seeks to understand whether an enterprise's and/or investor's efforts resulted in outcomes that were better than what would have occurred otherwise. In formal evaluation this is often studied using experimental research such as randomised control trials. Given the time and cost of gathering these data, this

20
During which we were thrilled to lead the IMP's impact measurement stakeholder 'huddle' used to inform these dimensions and have contributed case studies https://impactmanagementproject.com/wp-content/uploads/Impact-Management-Case-Study-in-Off-Grid-Energy.pdf as well as how to guides https://impactmanagementproject.com/stakeholder/using-self-reported-data-for-impact-measurement/

21
Even with this large data of impact measures, there are aspects of impact, as listed in the IMP's dimensions, that we have not been able to collect or share, yet. In particular there is no data on three elements of the how much dimension.

22
If you are interested to learn more about the IMP, take a look at Impactmanagementproject.org.

23
An outcome is an aspect of social, environmental or economic well-being. e.g. an improvement in health, a reduction in CO_2e, or a better job.

24
This identifies if customers are having more of their energy needs met.

is not our typical practice.[25] We instead typically ask customers to self-identify the degree to which the changes they experience result from the company in question.

We couple this subjective self-assessment with objective data. We ask customers whether this was the **first time they accessed** a product of technology like the one from the company, and we ask how easily they could **find a good alternative**. If a customer is, for the first time, accessing a product they could not easily find elsewhere, we consider that the product or service in question has made a greater contribution to the outcomes we observe.

△

Impact **Risk** tells us the likelihood that impact will be different than expected. We are admittedly still in the early days of figuring out how best to measure impact risk – it's an especially complex area. That said, where customers experience challenges using their product or service, we do think that this correlates with a higher risk that impact does not happen (i.e. if a product or service is not in use then there's no impact). Hence, we look at **challenge rates** (the percent of customers who have experienced challenges using a product or service), and **resolution rates** (the percent of customers who experienced challenges and did not have them resolved) as customer-based proxies for impact risk.

Investigating customer experience alongside impact

Finally, while much of our impact data aligns to the IMP, we also gather a lot of data about customer experience more generally. We find that these data provide valuable insights for companies to inform their sales and business performance. These data often also correlate positively with social impact. Most importantly, the answers to these questions can illuminate the 'why' that underpins the social impact data we collect. This information makes it easier for companies to address the gap between their current and potential social impact.

We will devote a whole section of this report to exploring customer feedback, much of which comes in the form of qualitative data. Three of our favourite customer experience indicators are the **Net Promoter Score® (NPS), Customer Effort Score (CES) and perception of value for money.** Check out the indicator glossary on page 80 for more info.

Right! Now that you're up to speed with the data that underpins this report, let's dig in.

25
We do gather this data from control groups on a case-by-case basis, however it is not standard practice in the work that we do and therefore is not reflected in the data in this report.

“My income has improved so I can use that amount for my family

like buying food and exercise books for my children.”

Part 01:

Impact


BioLite

The Impact Of Off-Grid Energy

An impactful sector

It bears repeating: energy access is making a significant, positive difference in families' lives across the world. When asked about the impact energy access had made to their lives, 88% of people we talked to said that the quality of their, and their families', lives had improved thanks to their energy product or service. More than half (55%) said their lives had 'very much improved' when asked if they'd seen a change in their quality of life, with a further 33% saying their lives 'slightly improved'. To put this 55% number into perspective, it is higher than what we see in our work in other sectors: 44% in agriculture, 43% in education, 33% in financial inclusion, and 17% in health.

But whilst that 88% headline is impressive, we also saw considerable variation. Some companies had no customers say that their lives got better, whilst for some companies 100% of customers said they had experienced improvements. Investing in energy companies is, therefore, not a guaranteed way to create impact.

Drivers of impact

There is no one better to answer this question than the customers who use these products and services themselves. Table 1 lists the top types of impact that customers say are associated with each sub-sector: the What.[26] Not surprisingly, 'access to better lighting' is at the top of the list for all lighting products, followed by better reliability and savings.

In terms of quantifying the How Much of many of these indicators, we found the following:

Table 1: What Impacts Are Most Important To Customers

Product Type	Top Positive Change	2nd Positive Change	3rd Positive Change
Solar Lanterns	Access to (better) lighting	Reduced energy expenditure	Reliability
Solar Home Systems	Access to (better) lighting	Health improvements	Reduced energy expenditure
Mini-Grids	Access to (better) lighting	Reliability	Access to appliances e.g. radio, TV
Solar TVs	Families are better informed	Improvements to family connectedness	Ease & convenience of having a TV at home
Off-Grid Refrigerators	Increased income	Health improvements	Increased productivity e.g. sales
Solar Water Pumps	Reduced agricultural input expenditure	Increased income	Greater resilience
Clean Cooking	Reduced fuel consumption	Time savings	Health and well-being improvements

26
We gather these results with open-ended questions. We then code the answers. This coding is a process whereby we categorise non-numerical information, allowing us to group common results and share numerical assessment of qualitative information.

- 72% of customers climb the energy ladder, meaning they have gained access to new energy sources that are more reliable, brighter, and safer.
- 18% of customers report that they use their new energy for income-generating activities. The most common uses were power for bars, restaurants, shops or kiosks. For solar water pumps, the use was linked to agriculture, and for TVs, business customers often ran video halls. We see productive use increase as system sizes get bigger: portable/multi-light products (0.5-10.9 Wp) 8%, solar home systems (11-49.9 Wp) 13%, large solar home systems (50+ Wp) 26%. Business owners who used their energy product at work saw an extra $13.36 in their pockets each week.[27]
- Customers using modern lighting switch from kerosene,[28] improving their health[29] and reducing their CO_2e and black carbon emissions by 461kg per year. This is equivalent to one-tenth the CO_2e produced by an average car in a year,[30] for as little as little as $5 (for some of the cheapest lanterns).[31] These results are most pronounced in East Africa, where a larger proportion of the population uses kerosene lamps as their prior source of lighting.[32]
- 48% of users reported improvements in their health.
- Parents reported that their children studied for close to 20 minutes extra each day because of better light.
- Finally, while not always mentioned amongst the most important impacts, 86% of customers feel safer in their homes,[33] and communities experience fewer household accidents (fires and burns).

27
These are mostly micro-businesses employing a couple (2.1) of employees.
28
38% of customers were using kerosene before, of which 87% totally eliminate usage.
29
In 2016-2017 we did some research with folks at UC Berkeley to deploy sensors to measure particulates in the home. We saw that introducing solar lanterns to replace kerosene lanterns dramatically reduced exposure to fine particulate matter by 73% for schoolchildren and 50% for adults.
30
https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle
31
This is just for lighting products and services – cooking is a bit more complex.
32
53% of customers used kerosene lamps for lighting before their energy product purchase compared to 18% in South Asia, 10% in Southern Africa, and 5% in West Africa.
33
This is a separate question to quality of life, but customers talk about safety often when they tell us what impacted their quality of life improvements.

Areas for improvement

While most impacts we see are positive, the sector has scope for improvement in four key areas.

01.
High incidence of challenges reported.
To start with, it's a high growth sector, and in that context, many companies appear to be having product teething issues. More than a third (34%) of customers reported experiencing some challenges using their product or service - higher than other sectors in which we work, including agriculture (28%), financial inclusion (30%), and education (31%). The challenges are usually caused by technical faults, mismatched expectations, and/or misuse.

02.
Most challenges are not getting resolved.
Moreover, two-thirds (67%) of customers with challenges had not had their issue resolved. This means there is a high number of customers, many of them low-income, with expensive, non-functioning pieces of equipment in their home, business, or field.[34] Nor do customers believe that companies deliver good customer service more broadly. Customer Effort Scores show a high degree of variation, but the average is 3.3.[35]

03.
Customers experience a burden making payments.
As anyone familiar with the sector knows, financing mechanisms, including pay-as-you-go (PAYG), are making modern energy increasingly accessible. In fact, 67% of customers we spoke to were accessing credit for the first time. But, like any credit system, there can be unintended consequences. Even if customer repayment rates for PAYG companies are high, these numbers can obscure the difficultly for some customers of staying on top of their payments.

We found that 4% of families we talked to say their payments were a 'heavy burden,' with an additional 28% saying payments were 'somewhat of a burden' (and we wonder if, since admitting to financial hardship might be difficult, the actual rate might be higher). Further, these averages disguise considerable variation: for some companies, as many as one-third of customers found payments to be a 'heavy burden.' Moreover, women seem to have it worse than men: 35% of women found payments to be a burden ('somewhat of' or 'heavy') versus 30% of men.

As many as 7% of customers took out another loan to help make these repayments, and we found that struggles with repayment can lead to genuine hardship: more than two thirds of these families struggling to make payments[36] had to regularly cut back on food consumption in order to afford these payments.[37]

04.
Inequitable access.
We know that the hundreds of millions of customers who lack access to reliable grid electricity are the target market for off-grid energy. Despite the great strides that have been made, both in terms of product development and access to credit, the poorest customers still have less access than their wealthier peers.

37% of the energy customers we surveyed live below the $3.20 per person per day poverty line,[38] a much lower proportion than in the population as a whole in these markets (60%).

Similarly, gender access is also unequal: 68% of companies' customers are men. While that doesn't mean that women in the household don't use or access the product or service, it tells us something important about who is the likely owner of these assets, who decides how they are used, and who may be shaping design and demand.

34
At times the incidence of product challenges can be eye-wateringly high: for one mini-grid company, 78% of customers reported challenges, and 88% of them said their challenge was unresolved.

35
On a scale of 1 to 5 where 5 is highest and 1 is lowest. See page 80 for our indicator glossary.

36
Equalling 5% of all families purchasing energy products

37
For one company such behaviour was undertaken by more than a quarter of its customers.

38
All poverty rates are calculated to PPP, 2011 prices.

Impact and gender

We have continued to track the gender of the customers we speak to, as well as who is making the decisions to purchase energy, and any differences in experience or impact between genders.

The sector appears to continue to cater more towards men than women. 68% of energy customers are men, and in 58% of off-grid customer households, it was the male adult who first heard about the energy product. It was the male adult alone who made the decision to purchase the energy product in 61% of homes.[39] Male customers also felt they had more options with regards to a good alternative compared to women.

Interestingly female customers had a higher average NPS than men – by as much as 20 points. We also found that there appears to be a greater impact on women's lives. For example, 64% of female solar lantern customers say that their life has improved very much compared to 56% of men.

Our first data on disability

In the past year, we've explored inclusiveness in relation to disability, by collecting data on the energy access of customers who identify as having disabilities. Among households consuming new energy sources, we found that there was a 3% disability prevalence. This compares to 4% across the populations these companies are working in. The highest prevalence was for Easy Solar in Sierra Leone, with a disability rate of 6.2%, compared to the national average of 2.5%. This is the result of conscious effort and partnership: Easy Solar partners with E-Nable, an organisation supporting amputees from Sierra Leone's civil war, to reach some of the most neglected communities in Sierra Leone.

"Electricity was too expensive. I used to pay 60,000 shillings per week but now I spend about 20-25,000 shillings per week."

39
This does vary by region where culture plays a part in determining gender roles within the home.

The Impactful Sector

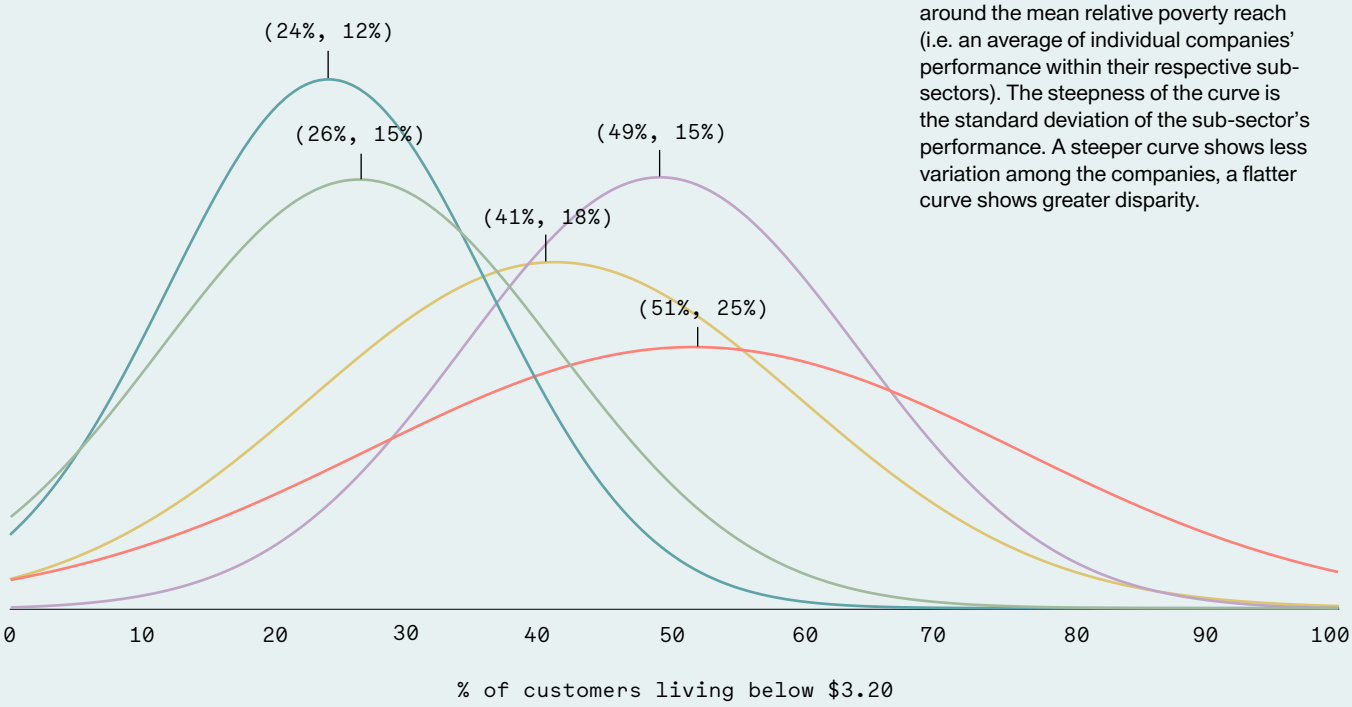
Just how impactful are off-grid energy companies on average? We've discovered the following about the sector, as well as the sub-sectors within it, regarding who they impact, how much change they create, and how unique these products and services are.

Key:

Solar Lanterns | Solar Home Systems | Mini-Grids | Appliances | Clean Cooking

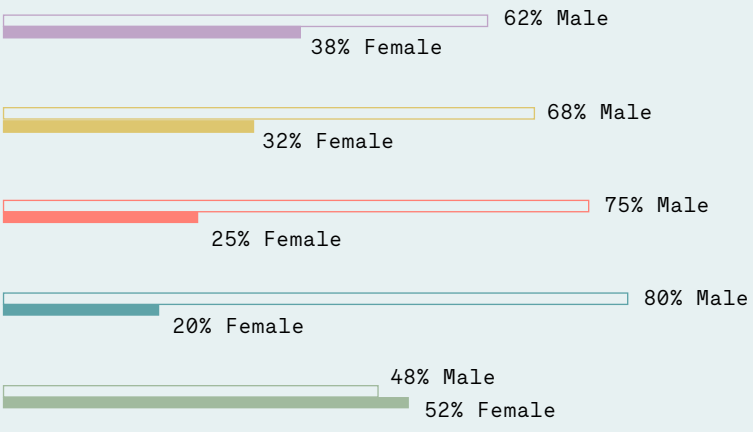
Sub-Sector Poverty Distribution

(Mean, Std Dev)



Each sub-sector bell-curve is centred around the mean relative poverty reach (i.e. an average of individual companies' performance within their respective sub-sectors). The steepness of the curve is the standard deviation of the sub-sector's performance. A steeper curve shows less variation among the companies, a flatter curve shows greater disparity.

Gender Of The Person Who Made The Purchase



Proportion Of Customers Who Report That Someone In Their Households Has A Disability

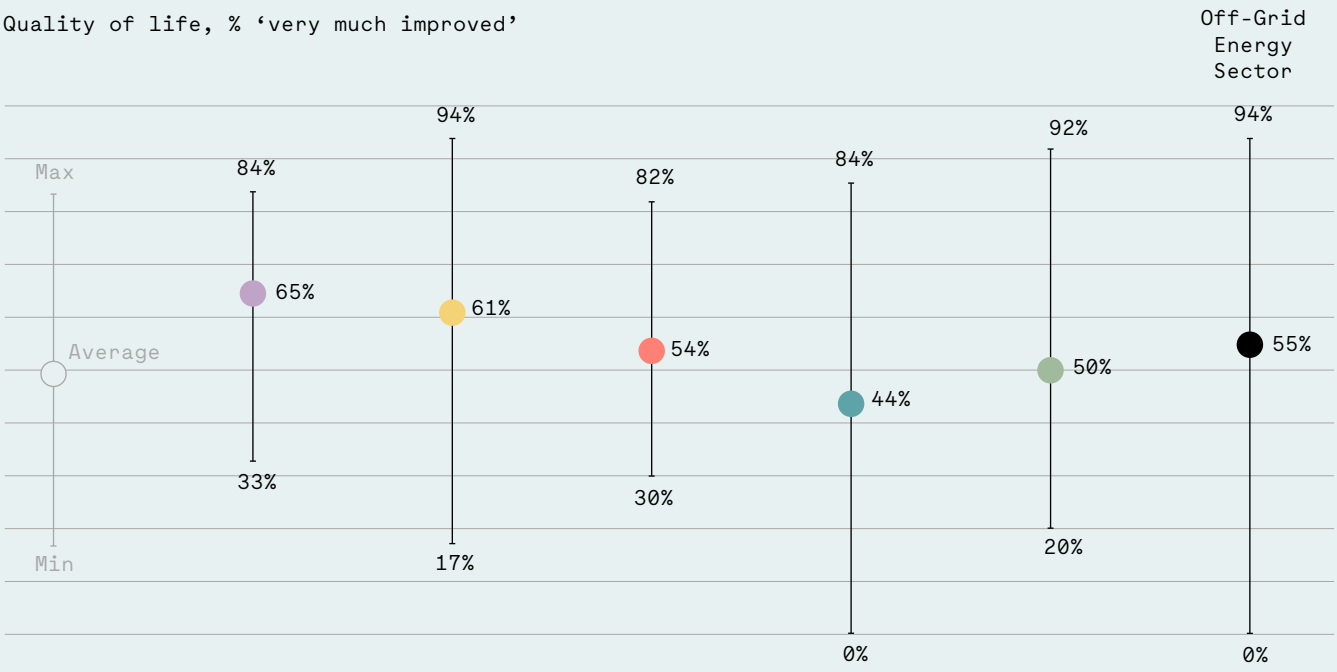
3%

Disability Reach

Compared to 4% in populations served

How Material Is The Impact Of Off-Grid Energy Companies

Quality of life, % 'very much improved'



These lines show the highest, lowest and average performance within a sub-sector of companies whose customers reported that their lives had 'very much improved' as a result of the product or service.

Average Outcome Changes

72%

of customers climb the energy ladder

18%

of customers report that they use their new energy for income-generation activities

461kg

Average household CO_2e emission reduction (Lighting companies only)

48%

of users reported improvements in their health

20mins

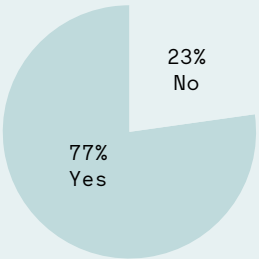
Extra study time per day (Lighting companies only)

86%

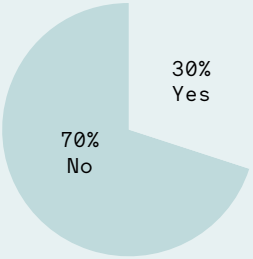
of customers feel safer in their homes

First Time Access And Access To Alternatives

Customer First Access To Energy Product Or Service



Customer Access To Good Alternatives



Benchmarking & The New 60dB Impact Index

No doubt, if you're an expert in the off-grid energy space, much of what you've read so far will sound familiar. And that's a good thing – we shouldn't always be surprised by new data. Instead it should sharpen our understanding, bringing us up to date with the latest, most accurate information.

That said, where we believe the data we've gathered can generate genuinely fresh insights and create new value, we use it to benchmark performance.

The value of benchmarks

Benchmarking of impact is, in our view, the next big leap forward for impact measurement, one that is vital for impact-seeking organisations to reach their full potential. Benchmarks provide us with a standard to judge performance, understand what is possible, see opportunities and gaps, and, on our best days, push us to improve.

Just as we cheer when we see the first person run a sub-two-hour marathon, we should also cheer when an off-grid energy company sets a new standard for what is possible in creating transformative impact for customers.

This is the aspect of these data we're most excited about. It's also the reason we feel it's so important to make gathering impact data part of the regular operating cycle of every impact-seeking organisation and impact investor. Our collective aspiration should not be just to **prove**, at one point in time, that something is working or impactful once, and then forget about it. We can do better than that. Let's seek to understand how things change over time, and how individual organisations can actively **improve** their impact performance.

Synthesising multiple metrics

Even with the ability to benchmark responses to individual questions, aggregating performance against a plethora of metrics is always a challenge. However, the value of doing so is that it allows simplified and aggregated comparison. Such clear-eyed comparison can be both a powerful indicator of, and incentive for, improved performance.

In this report we have created a formal composite index for the first time: our 60dB Impact Index. Like other indices (e.g. The Human Development Index), our 60dB Impact Index provides a single measure to capture multiple dimensions of the impact of energy access.

Indicators used for our 60dB Impact Index:
Who
Our inclusivity ratio and % of customers beneath $3.20.
Contribution
First access and no access to good alternatives.
What
Customers reporting that their lives have "very much improved".

Creating our index

To create our index, we followed a two-step process. First, we normalised each metric included on a scale of 0 to 1. We did this by creating 'goalposts' – the highest and lowest performance for each data point within our database – and then compared each metric to this range.[40] The resulting number is therefore 1 for a company performing the highest for that indicator, and 0 for a company that is at the minimum value.

Second, with each metric converted to this 0 to 1 scale, we averaged them – first within a dimension, and then across dimensions, using a geometric mean (equally-weighted). This combined number gives us the 60dB Impact Index score. For a detailed example of how this is calculated, please see the appendix.

Comparing apples to apples

The 60dB Impact Index gives a view of comparative impact and serves as a singular benchmark that allows us to compare performance across companies.

However, even within a single sector, products and services differ enough that we have to make some trade-offs in terms of how many impact dimensions we can currently use in our index. This is primarily because the types of outcomes for the How Much category vary significantly from sub-sector to sub-sector. For example, hours of light are only relevant to home systems, lanterns, mini-grids, and a handful of appliances; time savings and product stacking are most important to cooking. We have not included Risk in any of our indices because we are still working on ways to fully capture and measure this dimension. We expect to include Risk in future indices.

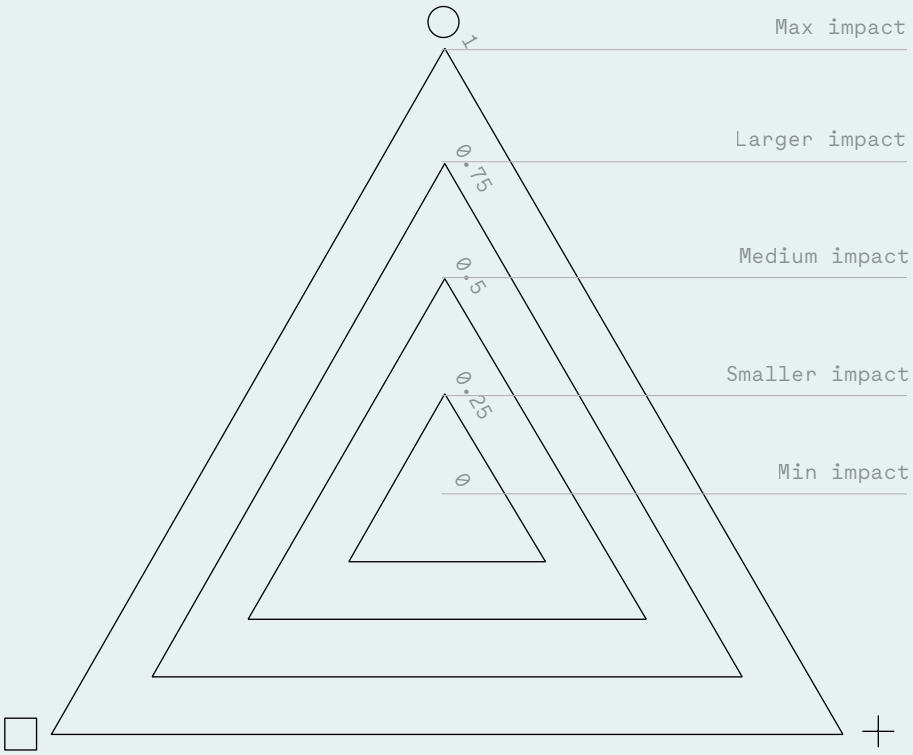
Because of these challenges, we've created our initial overarching index with data from three dimensions: Who, What, and Contribution.

40
The equation, for those wanting to get into the nitty-gritty, is simply:

$$\text{Dimension Index} = \frac{(\text{actual value} - \text{minimum value})}{(\text{maximum value} - \text{minimum value})}$$

60dB Impact Index

Who What Contribution

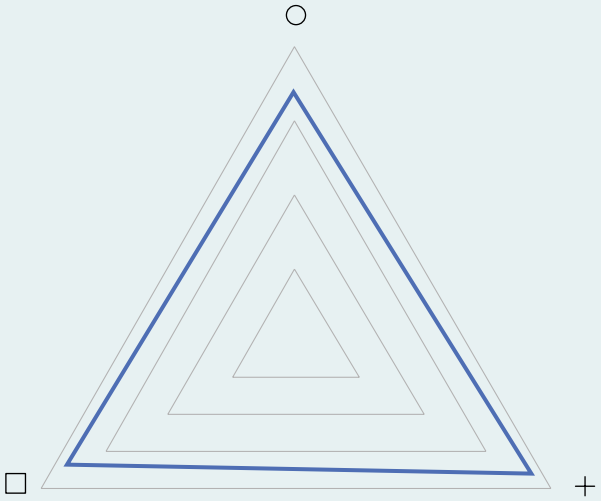


How To Read Our Impact Pyramids

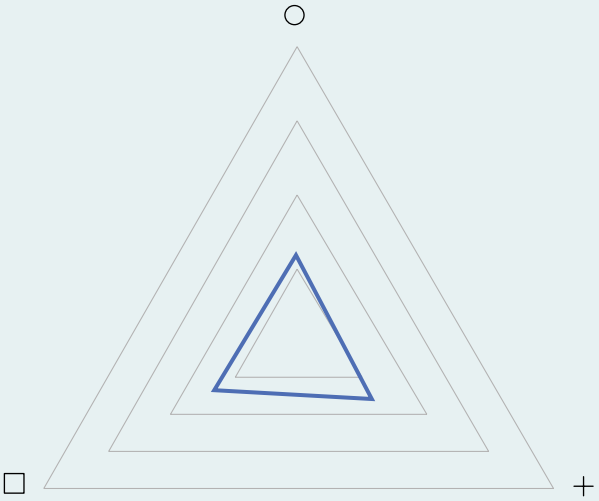
Each pyramid shows performance across the three composite dimensions of our index. The index scale goes from zero (minimum impact) to 1 (maximum impact). The size of the shapes represent the overall impact performance against our index. The bigger the pyramid the better!

The filled pyramids in grey show the average performance of the off-grid energy sector. The unfiled pyramids in coloured lines show an individual sub-sector.

Example Of Larger Impact



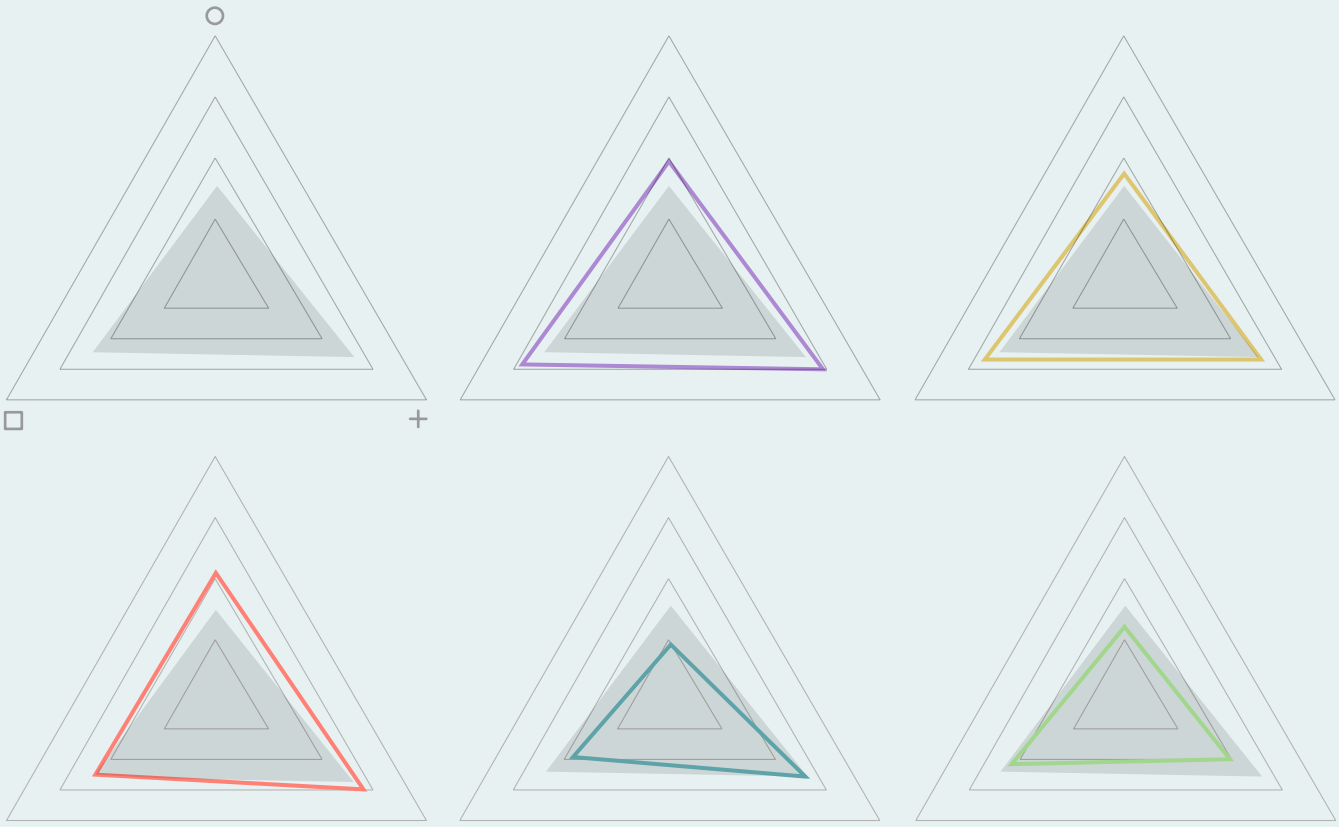
Example Of Smaller Impact



Key

- Energy Sector Average
- Solar Lanterns
- Solar Home Systems
- Mini-Grid
- Appliances
- Clean Cooking

	Who	Contribution	What	60dB Impact Index
Energy Sector Average	0.39	0.65	0.59	**0.54**
Solar Lanterns	0.48	0.73	0.69	**0.64**
Solar Home Systems	0.44	0.66	0.65	**0.58**
Mini-Grids	0.53	0.69	0.57	**0.60**
Appliances	0.23	0.64	0.47	**0.44**
Clean Cooking	0.30	0.50	0.54	**0.45**



What We Learn

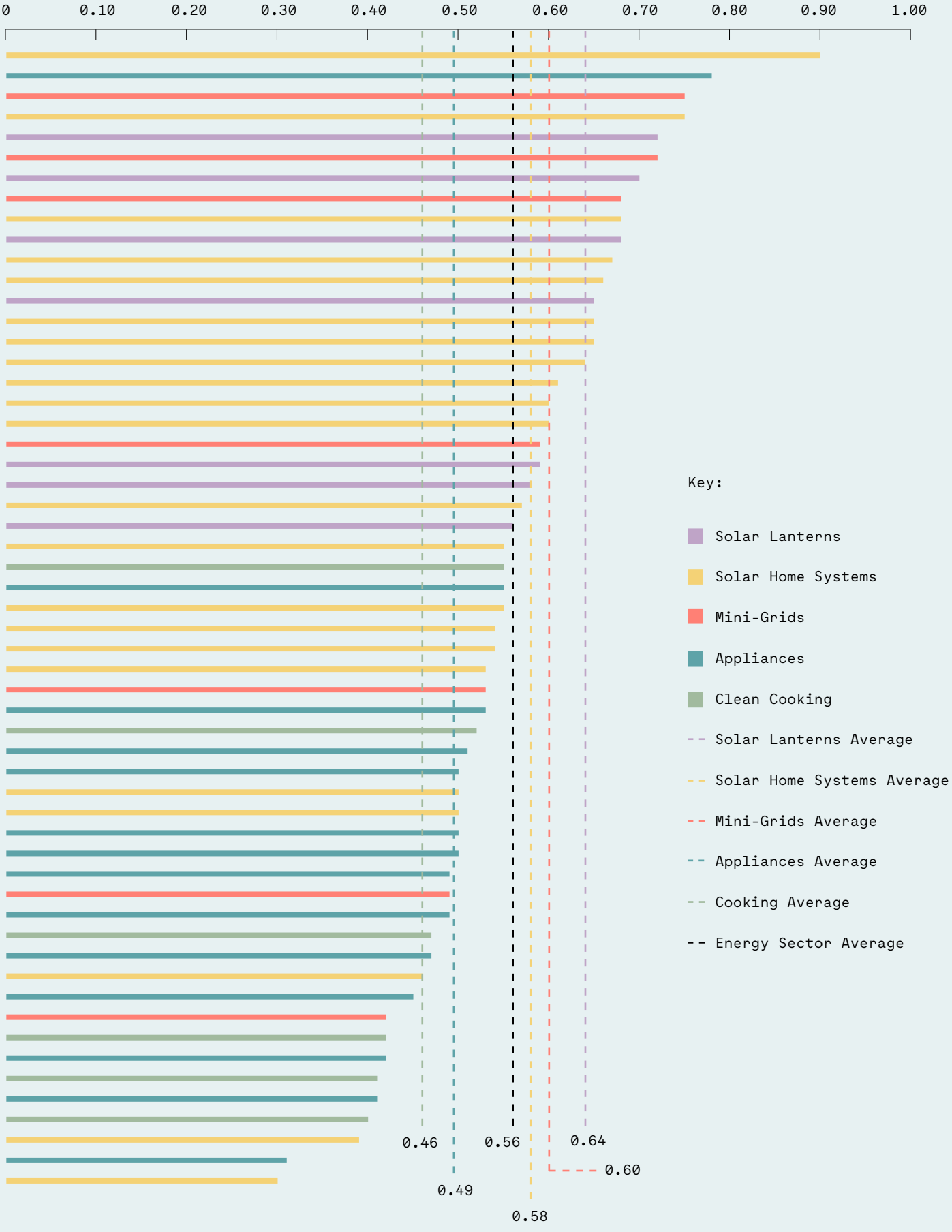
Representing the data in index form makes it even clearer why measuring and comparing impact both at the level of the sub-sector (e.g. solar lantern, mini-grid) as well as company-by-company is so important. Between the sub-sectors, we see a spread of some twenty points.[41] Looking at the companies, the variation is wider still: some sixty points separate top from bottom.

Context of course matters, and this makes the story of our index's top performer – scoring an incredible 0.9 – all the more impressive. This company is working in a lower-middle income country with an established energy market. Despite this, the company has been successful in serving customers living in poverty who previously did not have access to off-grid energy. We're hugely encouraged by this. It demonstrates that with a commitment to impact, coupled with the capability to design and deliver a first-class product or service, it is possible to set new standards of performance for a whole sector.

The index shows the generally high scores of lanterns and mini-grids, and the dependability of solar home systems. Appliances and cookstoves are currently a little behind in our index. That said, one appliance company is ranked number two, reminding us that there is scope for any individual company to buck the overriding trends.

41
Each 0.01 on the index is considered a point.

60dB Impact Index, All Companies Ranked



“It’s a very reliable system that I believe

everyone needs.”

Part 02:

Insights

Scale, Time, & Geography

So far, we have focused on impact numbers and relative performance vs. benchmarks. We feel like we're off to a good start on our journey! The good news is, there's more.

As we dug into our data, we began to see some emerging themes. In this next section we'll identify and elaborate on these themes, focusing on:

- **The role of time and place in impact**
- **Looking at customer feedback**
- **Exploring the specific impact of the sub-sectors**

Growth and impact

Whether or not scale affects impact is an especially fascinating question. Perhaps not surprisingly it's also a particularly nuanced one without hard and fast rules.

Clearly, when companies that are providing critical goods and services grow, many good things happen: they reach more customers, access improves, and, in most cases, larger companies are often more financially resilient, meaning we can expect them to be here for the long-term.

But beneath these headlines, we'd like to know whether the impact profile of companies changes as they grow.

	Relative Poverty	Income Inclusivity	Quality Of Life (Very Much Improved)	First Access	No Access To Alternatives	Ease Of Use (No Challenges Experienced)	NPS	CES
Validate[42]	42%	0.23	53%	77%	65%	62%	44	3.4
Prepare	46%	0.27	54%	81%	70%	70%	50	3.4
Scale	30%	0.22	57%	75%	74%	66%	44	3.2

42
No companies we've conducted Lean Data with consider themselves to be in Blueprint stage.

For example, do companies hone their product-market fit and create more impact for every product sold? Do they shift upmarket – whether as a response to customer demand or investor pressure – and shift away from serving the most marginalised?

To note, what we share in this section are emerging hypotheses. Even with the dozens of companies we've studied our sample size is relatively small. With more data, the trends we're seeing might shift.

Caveats aside, these emerging conclusions are quite powerful, and they have the potential to be controversial. We hope that they engender active discussion and debate, all of which will, we believe, will lead to richer insight and more motivation to collect and analyse these sort of data – so we can arrive at even more robust conclusions.

Comparing social impact by stage of company

The first question we posed was: how do our indexed social impact indicators differ by stage of company? To answer this question, we categorised companies using the tried-and-tested framework first described in From Blueprint to Scale, allotting companies to one of four growth categories: Blueprint, Validate, Prepare, or Scale.[43] We then analysed social impact by company stage.

As a reminder, this analysis, by design, does not directly account for the number of customers served. Needless to say, reaching more customers is likely a good thing. What we aim to analyse here is what happens to other social impact indicators as companies mature.

The good news: things start out well

In the early stages, company growth correlates positively with improved social impact results. Focusing on companies in the Validate and Prepare stages, those in the Prepare stage reach a larger proportion of lower-income customers, have higher quality of life improvements, and lower challenge rates. They also have a higher NPS. Put another way, a higher proportion of marginalised customers are being reached, and the impact per customer and customer experience, seem to be improving.

Growth affects income inclusivity/poverty reach

Comparing companies in the Prepare and Scale stage, the improvements (in quality of life, challenge rate) slow down or stop, some measures decline, and the proportion of customers in poverty gets considerably worse: 46% for companies in Prepare versus 30% for companies in Scale. This leads us to question what is shifting with respect to serving the most impoverished as companies mature and grow.

One explanation is that many companies in the Scale stage have shifted their product mix to incorporate larger, higher margin products. If this simply means that their product range is expanding and customers have more options, then that is surely a good thing. But if this means that, over time, the strongest and best-performing companies slowly shift away from low-income customers, then we run the risk of leaving behind tens or even hundreds of millions of off-grid customers.

The takeaway conclusions from this analysis for overall social impact are still emerging. Of course, more products sold may well mean that the absolute impact of these growth businesses is increasing.[44] But it's concerning to see the aggregate social impact per customer flatten out or even drop.

Company impact over time

We also see a similar pattern when looking into projects we've conducted with the same company over multiple years. For only one of these companies did we see an improvement in poverty reach (by 1%) and for another the number stayed constant. With the rest, we saw decreases ranging from 2% to 21%. Our quality of life rating also decreased for 10 out of 13 of these multi-year projects.

There are likely some interdependencies embedded in these data. For example, lower-income families often see the biggest impacts from access to energy: they have fewer choices and are often starting at a lower base level of access. So, if fewer low-income customers are being reached, it seems natural that reported change in quality of life would decrease as well.

43
From Blueprint to Scale: https://acumen.org/wp-content/uploads/2017/09/From-Blueprint-to-Scale-Case-for-Philanthropy-in-Impact-Investing_Full-report.pdf. We did this categorisation by asking both the companies and their investors what categories the companies fit in, and then sense-checked the results.

44
For example, if you are a company selling 1 million products and 10% of your customer base lives in poverty you are still reaching more people living in poverty in absolute terms than a company selling 1,000 products with a 100% poverty reach.

A victim of its own success?

It's also possible that some of the changes we see over time are linked to the positive overall developments in markets. As customers get greater access and more choice, some of the impacts for any given product may naturally decline.[45] This may be linked to the phenomenon of rising expectations – as we get used to something, our standards for what is impactful change. Such expectation shifting is especially relevant for any subjective assessments of impact. This should not be viewed as a criticism of such measures, but rather it speaks to the fact that impact is not static and shifts as societies shift.

Indeed, in the extreme (and we're a long way away from this in the off-grid energy space), successful impact enterprises and investors may end up eliminating the negative impact or solving the social issues altogether.[46] Therefore, we should expect that companies and investors aiming to continue to drive outsized impact may have to adapt and innovate to do so.

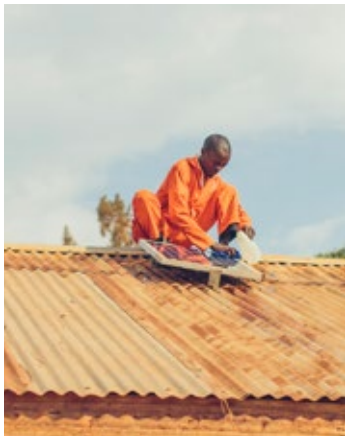
Impact across and within different geographies

Probably unsurprisingly, geography can play an important role in the What and How much of impact. For example, baseline sources of energy vary to a large degree by geography. Kerosene lamp use for lighting is higher in East Africa than in India, where there is a higher grid-electrification rate and greater prevalence of battery-powered torch use. As a result, we see larger impacts on CO_2e reduction among the companies working in East Africa than India.

We see variations in the Who too. National poverty rates differ by country, and, as a corollary, so does the opportunity to serve lower-income customers. This is why we consider income inclusivity – comparing poverty rates of customers to national averages – alongside poverty rates. If 40% of a country's population lives below $3.20 per day, then 40% of an inclusive company's customers would live below $3.20 per day.

But even within the same geography we can observe wide-spread impact performance on income inclusivity. In charts A, B, C, showing data for India, Kenya and Nigeria, each dotted line represents a single company's customer base, and the bold line shows the country average. Companies whose line lies above the country line are more inclusive of low-income customers relative to the population and vice-versa.

"The connection has good service and the brightness of the light is high. We don't get 24 hours government electricity so with this connection, I don't face any problems."



45
From 2016 to 2019 the proportion of customers accessing either solar home systems or solar lanterns for the first time fell, from 85% to 71% and from 88% to 69% respectively.

46
In such circumstances we would rightly celebrate when their net annual social impact fell to zero!

Inclusivity Charts

Chart A: Business Inclusivity Of Companies In Kenya

29% of Kenyan customers live beneath $3.20 a day, compared to 47% in the wider population.

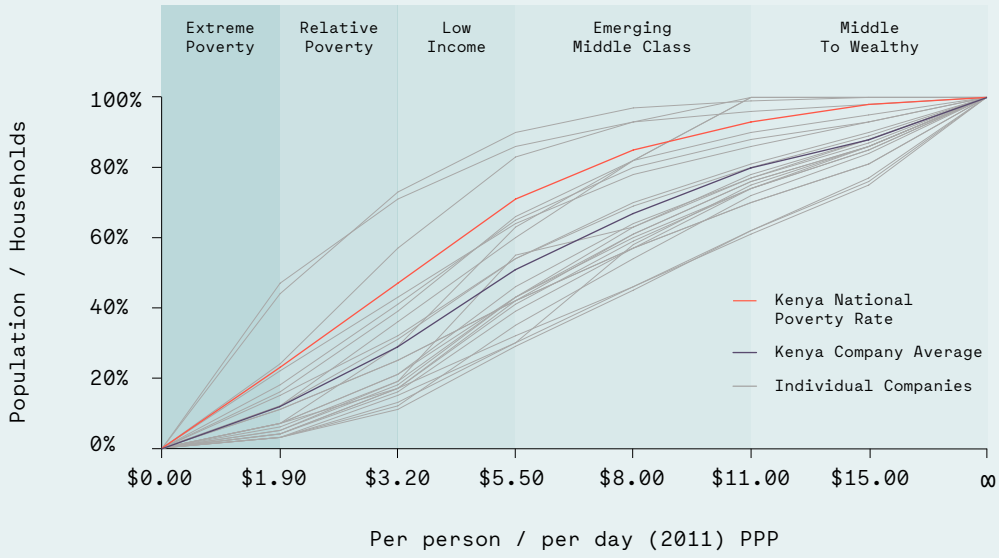


Chart B: Business Inclusivity Of Companies In India

36% of Indian customers live beneath $3.20 a day, compared to 57% in the wider population.

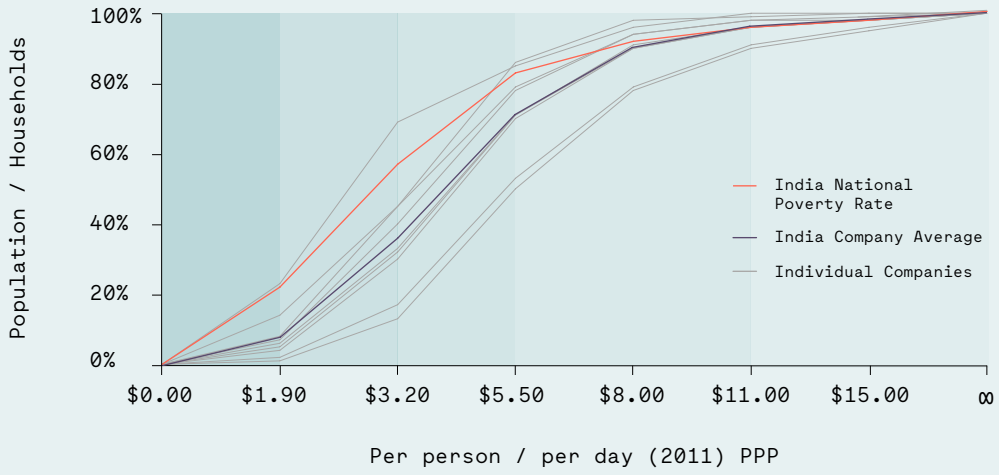
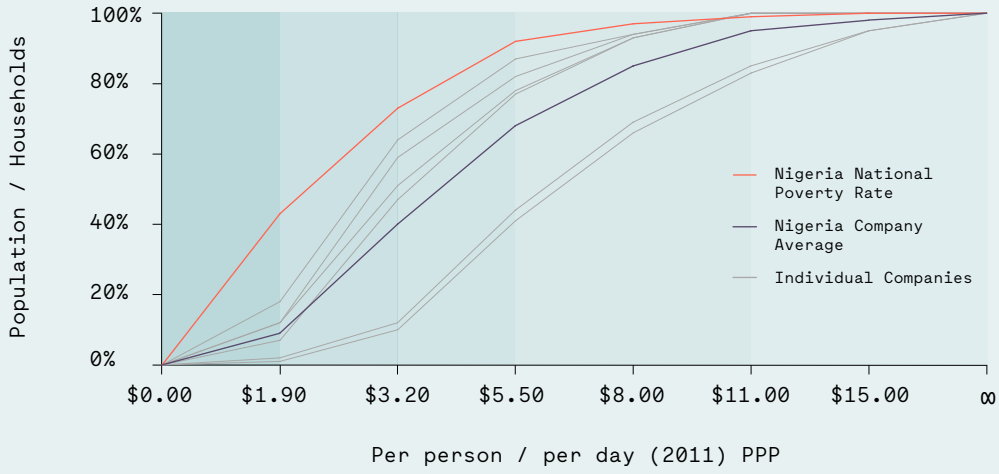


Chart C: Business Inclusivity Of Companies In Nigeria

40% of Nigerian customers live beneath $3.20 a day, compared to 73% in the wider population.



Customer Experience & Feedback

Up until now we've focused mainly on impact: who is being served, how their lives are changing, and how important they say these changes are to them. This kind of impact measurement is the backbone of what we do at 60 Decibels.

That said, we're also keen on hearing overall feedback on people's experiences with these products and services. Indeed, for most of the work we do, we gather both feedback and social impact data. We've found that this mix of data brings customer voice to life for everyone. It helps companies and the investors who support them act on what customers are saying and improve their experience of products, services, and impact.

In this section, we focus on customers' perceptions and feelings about these products and services. We highlight how customers use these products and share what they love most, and least, about them. We even begin to look at customers' aspirations for energy access and usage in their futures.

Product value

To conduct this analysis, we focused on the customers who self-identified as having the strongest positive feelings about the products. These are customers categorised as 'Promoters' using the NPS.[47]

Promoters represent just over half (55%) of the customers we spoke to.

Promoters overwhelmingly identify general quality as the most important product characteristic. But there are also instances where specific benefits stand out (such as time or monetary savings), and they also frequently highlight their experience interacting with the company as important.

Unhappy customers

In a similar vein, we want to highlight why the 'unhappy' customers feel the way they do. To understand this, we analysed the customers who are 'Detractors' based on the NPS.[48] Detractors represent 12% of the total customer base we spoke to. Detractors' responses are the reasons they wouldn't recommend the energy product to a friend or, worse, what they are actively telling friends and family, encouraging them not to purchase one of these products.

These data are more varied than the results for Promoters, but they tend to focus more on price and customer service. Interestingly, product quality, which was a top positive reason given by promoters, is not a major issue for any product other than solar water pumps. That data, coupled with the data from Promoters, suggests that, overall, quality of off-grid products is meeting or exceeding customers' expectations.

Challenges experienced

While much of this report has been about the positive story of off-grid energy, it is still an emerging sector that is experiencing the customary growing pains that occur with new products and services.

The 25,000+ customers we spoke to were undoubtedly very happy with their energy products and services. They were also quick to tell us where these products or services had come up short – leading to frustration or dissatisfaction and often resulting in less impact than would be possible were these issues addressed. The table on page 42 highlights the main challenges faced by the customers we spoke to. Clearly, battery issues top the list across all products except for cookstoves.

Future aspirations

Over the last few years, the off-grid energy sector has made huge progress in providing energy access to many. There are still many more people to reach, of course, but for those with access, attention has turned to how to encourage and support energy usage.

To get a sense of these future aspirations and customer needs, we asked customers what energy products and appliances they may be interested to purchase in future.

Customers said they wanted: a solar water pump (54%), a solar home system[49] (37%), a clean cookstove (36%), a fan (23%), a radio (18%), a refrigerator (11%).

47
Promoters respond with either a 9 or 10 when asked to rate their likelihood to recommend a product or service to a friend or family member on a scale of 0 to 10 (where 10 is most likely and 0 is least likely).

48
Detractors are people who said their own likelihood to recommend a product or service was 6 or less on a 0 to 10 scale.

49
Either as a first system for those without, or an additional one for those with one already.

The difference between feedback and impact

There is sometimes confusion about the difference between impact measurement and feedback. Specifically, and since they both generally involve surveys, where one ends and the other begins.

This confusion can often lead people to dismiss one of these important data sources as better or worse than the other. We've heard people say that customers' subjective opinions are somehow less relevant than cold hard 'truths' about impact.

Our view is different. We have found that what customers share as feedback and what they say about impact are important and highly interrelated. Gathering these data together helps organisations be more responsive and, over time, helps them create more impact. And that's really the point, isn't it?

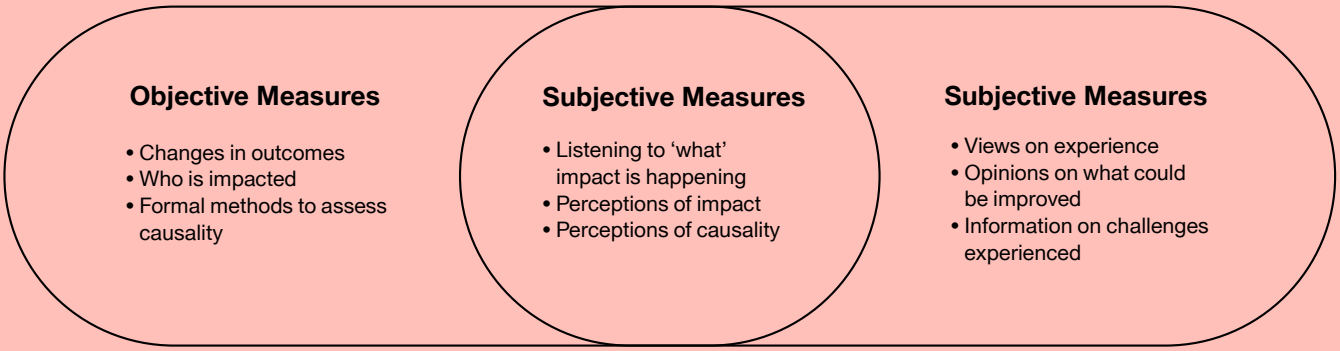
Figure D, below, illustrates the relationship, and the overlaps, between impact measurement and feedback.

It shows that feedback, which is about opinions, plays no formal role in assessing objective impact measures such as the poverty levels of customers or the quantified change in outcomes such as expenditure, CO_2e emissions, or educational test scores.

Feedback does, however, play an important role in listening to, and defining, what impacts customers say matter to them. It also can be used to collect data on subjective measures of impact, such as whether perceptions of safety have improved. Because social issues are about people, these kinds of subjective assessments are, in our view, every bit as relevant as objective data.

Feedback plays an additional, vital role in understanding why impact is happening. User views on experience, opportunities for improvement and areas of challenge are critical for organisations that are keen to learn and improve the impact they deliver. This is why we're huge fans of both feedback and impact measurement, and believe they are at their best when used together.

Figure D



NPS differences by geography and scale

Here's something interesting: NPS varies by geography, with the highest rates amongst the companies we worked with in South Asia (50). We don't have enough data to know whether this reflects difference in product and service quality or a difference in consumer expectations. That said, knowing 'baseline' NPS for a given region or geography, just like knowing the local poverty rate, will help us refine our performance benchmarks over time.

We've also seen considerable variation in NPS across geographies for the same company. For example, the NPS for one company's customers, with the same product being sold, was 54 in one country and 0 in another.

Clearly, NPS is about much more than the product itself: customer needs and expectations, the appropriateness of a product for the local context, as well as things like the behaviour of sales agents and staff, customer service, or payment plans.

The NPS is also positively correlated with company stage. While early-stage companies offering new products have the potential to address a significant unmet need, the data show that they tend to have a lower average NPS. Our hypothesis is that these companies' impact potential is not being fully realised because of issues with product-market fit, the quality of product design, reliability, customer service or after-sales support. Given these correlations, it's also not surprising that we see NPS trends by sector: higher NPS for solar lanterns, solar home systems and clean cooking products (which have all been around for longer); lower NPS for mini-grids and appliances.

What The Promoters Say

Product Type	Top Reason for Promoting	2nd Reason	3rd Reason
Solar Lanterns	Quality of product	Reliability	Access to quality & reliable lighting
Solar Home Systems	Quality of product	Access to quality & reliable lighting	Customer service
Mini-Grids	Affordable price	Customer service	Reliability
Solar TV's	Quality of product	Ease of product acquisition	Company
Off-Grid Refrigerators	Quality of product	Durability	Reliability
Solar Water Pumps	Saves time	Financial Benefits	Improved access to water
Clean Cooking	Quality of product	Affordable price	Easy to use

What The Detractors Say

Product Type	Top Issue	2nd Issue	3rd Issue
Solar Lanterns	High price/payment method	Battery	Product quality
Solar Home Systems	Poor customer service	Generic problem with product	Battery
Mini-Grids	Expensive/poor payment plan/ unclear payment terms	High price/payment method	Power loss/blackouts
Solar TV's	Issues with product e.g. signal issues, channel availability, battery	Poor customer service	Difficulty acquiring product
Off-Grid Refrigerators	Poor customer service	Generic problem with product	–
Solar Water Pumps	Product quality	–	–
Clean Cooking	High price/payment method	Not enough access to company	–

Challenges Experienced

Product Type	Top Challenge	2nd Challenge	3rd Challenge
Solar Lanterns	Battery issues	Poor quality/ Faulty product	Lighting/bulb Problem with appliance e.g. radio
Solar Home Systems	Battery issues	Problem with appliance e.g. radio	Lighting/bulb
Mini-Grids	Service issue e.g. blackouts	High price	Lighting/bulb
Solar TV's	Connection/signal	Battery issues	Problem with appliance e.g. TV, radio
Off-Grid Refrigerators	Battery issues	Payment	Poor Quality/ Faulty Product
Solar Water Pumps	Poor Quality/ Faulty Product	Battery issues	= Low water pressure = Spare parts needed
Clean Cooking	Slow to ignite	Food takes a long time to cook	Discomfort with smoke/ annoyance with soot in home

Promoters Say:	Passives Say:	Detractors Say:
“Getting fuel is very difficult due to hard economic times, we have to try and save the little we have and the cookstove does exactly that so I highly recommend.”	“I cannot use a bigger pot on it. If I am cooking a larger quantity of food, the gel might finish before I’m done cooking.”	“Please be flexible with us when it is time to pay. Do not be in a hurry to cut our system. Give us two days before cutting us.”
“It has been of great help to my wife and the little baby in that they have never experienced any coughing from this solar home system.”	“We are enjoying using the energy because it feels like we are connected to grid electricity. However, we have not seen some of the promises we were told such as batteries for using fridges.”	“The service fixers take a long time to respond to emergencies, thus it makes us stay a couple of days without electricity.”
“It’s a very reliable system that I believe everyone needs, especially in this area where the power goes off almost the whole day. At least if you have the system, it really helps even in your business.”	“The solar home system is very good although it is a little bit expensive. Additionally, during cloudy days, still my solar home system can charge and provide me with light.”	“The system works very well. However, for payment, I ended up paying more than I had initially been told. The agent lied to me.”

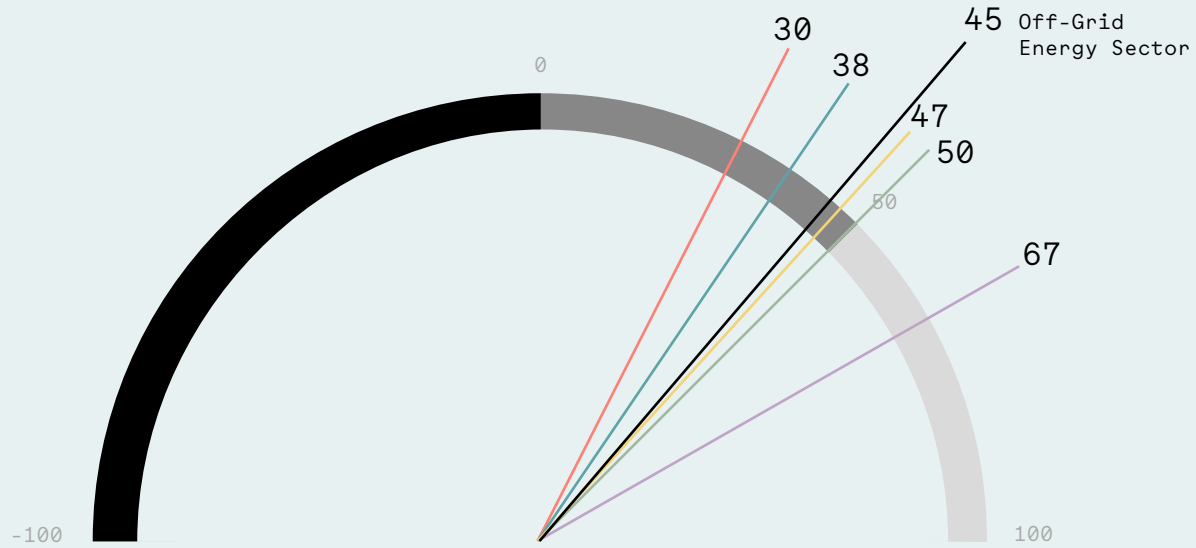
Fabulous Feedback

Are customers thrilled with their products, are they likely to recommend, do any problems they experience get solved? Delighting customers is critical to scaling companies, but more than this, a company's impact is undermined if its customers aren't satisfied or any broken products don't get fixed.

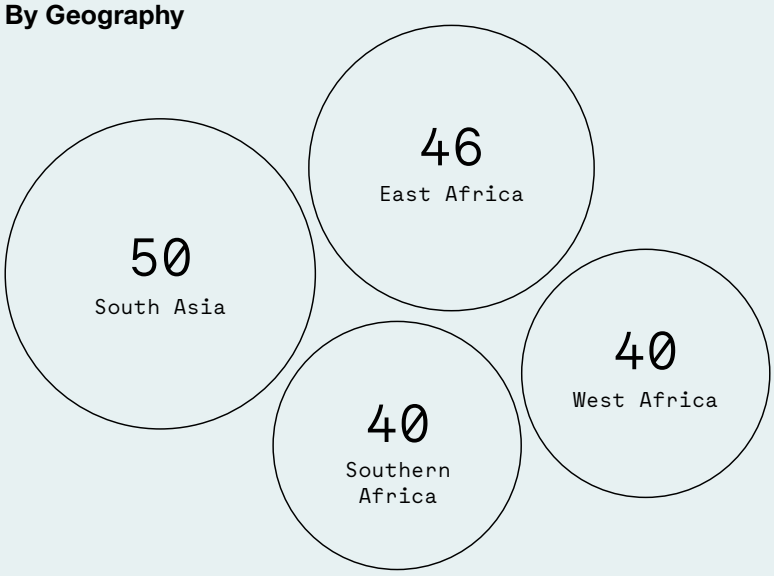
Key:

Solar Lanterns | Solar Home Systems | Mini-Grids | Appliances | Clean Cooking

Net Promoter Score



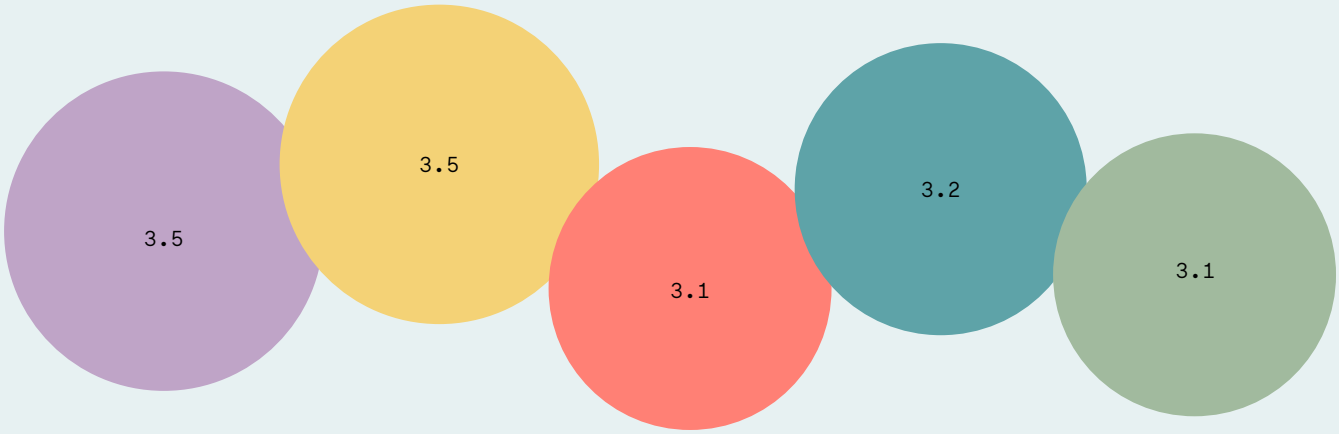
NPS Differences By Geography



The NPS is used the world over to gauge customer loyalty. NPS is measured by asking customers to rate their likelihood to recommend a product or service to friends or family on a scale of 0 to 10. The NPS is the percent of customers rating 9 or 10 ('Promoters') minus the percent of customers rating 0 to 6 ('Detractors'). Those rating 7 or 8 are 'Passives'. The score can be anything from -100 to 100.

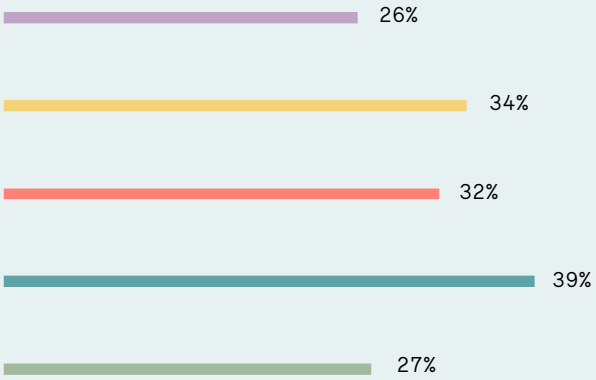
Customer Effort Score

The CES captures after-sales care and customer service. Customers who have experienced a challenge are asked the extent to which they agree that “the company made it easy for me to handle my issue” and offered five options: disagree, somewhat disagree, neither agree nor disagree, somewhat agree, and agree. These responses are turned into numbers from 1 to 5 and the CES is the average score.



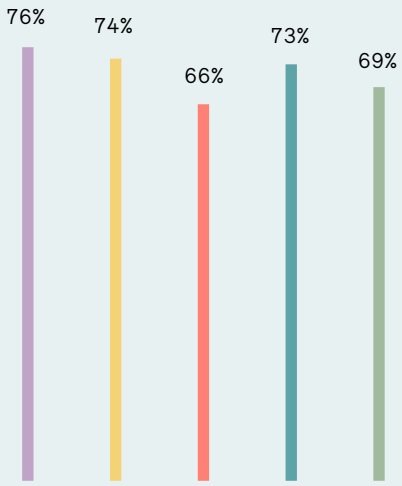
Challenge Rate

The percentage of customers who report experiencing a challenge using their energy product or service.



Value For Money

The percentage of customers saying they rate the value for money of their product or service as ‘very good’ or ‘good’.



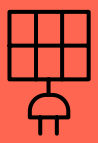
Part 03:

Sub-Sector Performance

Now that we've looked at the off-grid energy results in aggregate, let's dig a little deeper. This section of the report shares detailed results for each of the off-grid energy sub-sectors. We investigate what each product or service does best relative to the other sub-sectors, the spread of performers within each section, and areas for improvement where we've found them. This section also includes a range of case studies highlighting outstanding performance against one or more impact measures. These are our superheroes.

Solar Lanterns

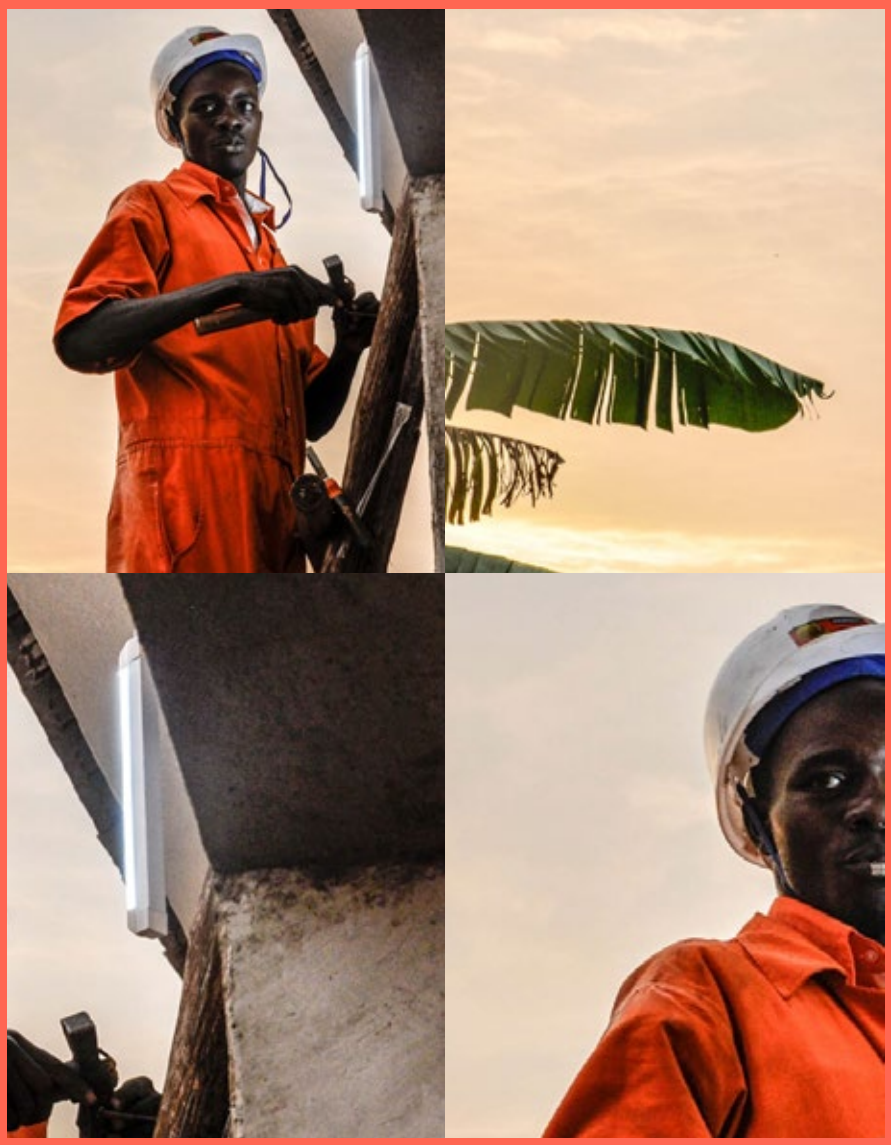
Solar Home Systems



Mini-Grids

Appliances

Clean Cooking



Solar Lanterns

Solar lanterns are amazing little things. They provide arguably the biggest bang-for-your-buck in terms of quality of life impacts and customer satisfaction. This is especially the case in regions at the earliest stages of off-grid energy penetration.

The low-cost, simple nature of solar lanterns is not detracting from the impact they are generating. To the contrary, solar lanterns show the highest increases in customers' light hours use and substitution impact on traditional energy sources like kerosene. This is because lanterns are often customers' first new energy product, resulting in the greatest substitution impact on expensive, polluting and inferior energy alternatives.

This means that solar lanterns also have major positive impacts on health. This is important: 67% of kerosene-using families tell us they experienced health issues because of kerosene. There was talk of coughing, chest problems, and eye irritations. The good news is that, of the customers that reduce or even eliminate their kerosene lamp use after purchasing their solar product, 97% say they notice health improvements.

Indeed, solar lanterns are the highest performing across most impact indicators. They are the second-best performing product type in terms of reaching low-income customers and reach the most people across all the product types except clean cooking products. You can see why solar lanterns pack a huge impact punch.

There are links to education too. We all know that, even at the best of times, it's tricky to encourage kids to do their homework. But good lighting can make that job easier. Parents we talked to from one company before they got the solar home system and months after estimated differences in their children's study time of 1 hour extra each day.[50]

"We are no longer using kerosene which is expensive and not readily available in our area. We are not using candles either which can cause fires."

50
Whether extra study hours lead to improved educational outcomes is a whole other question. Results from research we did with Stanford University in 2016-2018 found that in Zambia there were perhaps other more important elements that lead to changes in education outcomes such as reduced school fees and improved school supplies.

Superhero In Action

SunnyMoney

Who Are SunnyMoney?

Non-profit SolarAid created social enterprise SunnyMoney in 2008 to catalyse markets for solar products in under-served rural areas. Currently active in Malawi and Zambia, they have a strong track record in innovating to reach low-income families.

Top Indicators

Ranked 2nd in the whole database for extreme poverty reach, 3rd for relative poverty reach, 6th for quality of life.

Index Performance

1 out of 7 for solar lanterns, 5th in the whole database.

What We Can Learn From Them

“We focus on delivering suitable solutions in rural areas. Our distribution network invests in building local capacity and creating awareness rather than just selling. We make our product portfolio responsive to customer needs - whether it is launching the world’s first $5 solar light, being the first to test PAYG for lanterns or selling home systems to respond to demand where there is no-one else to fill it.” – John Keane, CEO.

Solar Lanterns Key Data

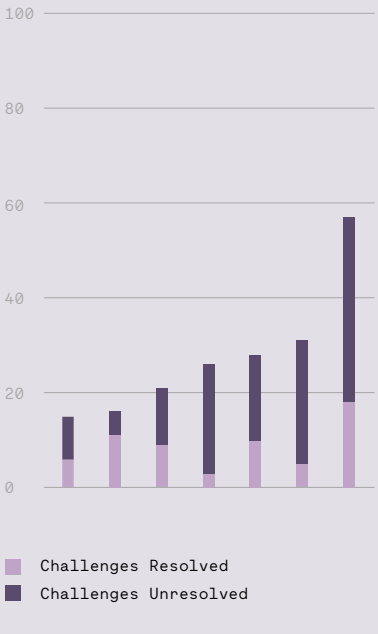
1,678 Customers
8 Companies
8 Countries

Company #	Product Category	60dB Impact Index*	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
1	Solar Lanterns	**0.72**	0.86	77%	39%	–	84%
2	Solar Lanterns	**0.70**	0.67	59%	74%	–	74%
3	Solar Lanterns	**0.68**	0.55	38%	29%	3.5%	78%
4	Solar Lanterns	**0.65**	0.85	40%	36%	3.1%	77%
5	Solar Lanterns	**0.59**	0.61	33%	22%	–	62%
6	Solar Lanterns	**0.58**	0.65	48%	45%	–	68%
7	Solar Lanterns	**0.56**	0.58	38%	56%	–	33%
8	Solar Lanterns	**–**	0.84	58%	5%	–	46%
	Average	**0.64**	**0.70**	**49%**	**38%**	**3.3%**	**65%**

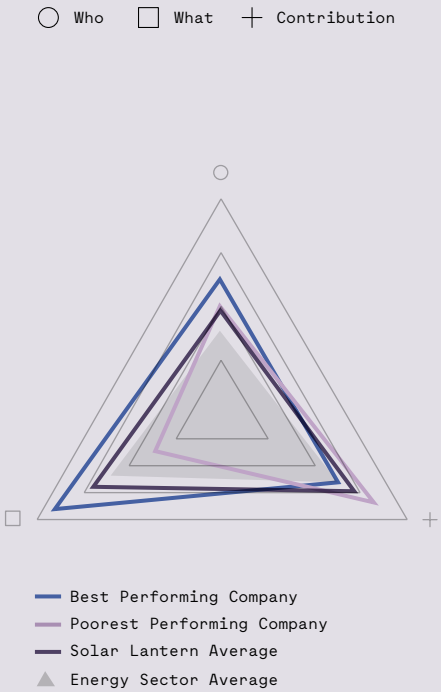
*
No index score reflects one or more missing data points from Index calculation.

NPS Ranked

Challenge Rates And Issue Resolution (%)



Impact Index Performance: Solar Lanterns



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
76%	68%	28%	66%	3%	3.9	86%	69
75%	93%	31%	84%	–	2.6	87%	59
85%	85%	15%	60%	–	–	98%	89
80%	67%	21%	55%	–	3.6	38%	73
72%	92%	15%	30%	–	4.0	81%	59
52%	82%	26%	87%	4%	3.5	81%	48
100%	74%	18%	–	82%	2.8	66%	55
100%	–	57%	68%	100%	3.9	74%	83
80%	**80%**	**26%**	**64%**	**47%**	**3.5**	**76%**	**67**

Solar Home Systems

Solar home systems are the ‘engine’ of the sector. They provide more energy capacity for those living without grid access or with unreliable power. They’ve also attracted large amounts of capital in the last few years and have seen significant growth in their customer base. These systems are getting more efficient and more affordable, and product diversification means that families can move in smaller steps up the energy staircase – adding more power and, over time, appliances. These solutions perform well across the board in terms of customer experience and social impact.

However, linked to their predominance in more established markets, they appear to make a lower contribution to social impact. Compared to the other sub-sectors, customers purchasing solar home systems believe they have the greatest access to ‘good’ alternatives. Additionally, many customers had already moved on from kerosene prior to getting their home system, limiting the impact these systems had for health and environmental benefits.

“When there is light, my house is filled with joy and laughter.”

Superhero In Action

Easy Solar

Who Are Easy Solar?

Easy Solar distributes solar lanterns and solar home systems to households and businesses in Sierra Leone through financing. Because mobile money isn't so prevalent in the country as other regions, the company sells mostly through cash repayments using a network of community-based agents and shops.

Top Indicators

Ranked 2nd for NPS for solar home systems, 3rd for NPS for solar lanterns, 3rd for CES for their solar home system customers in the whole database.

Index Performance

3 out of 22 for solar home systems, 3 out of 7 for solar lanterns.

What We Can Learn From Them

"Don't underestimate the power of constantly engaging with and listening to your customers. Easy Solar's most valuable asset is our agent and shop network. They are the main touchpoint for our customers, physically interacting with them on a weekly basis. Supported by our call centre, this means we have a constant line of sight to gauge customers' desires and frustrations. Initially our distribution network was designed to facilitate frequent cash collection, but increasingly this has expanded to them being the first port of call for marketing, customer care, and after-sales. Regardless of how your company is set up, be intentional about the customer experience and continually keep track of how you are measuring up, by setting clear 'service-oriented' targets for all your customer-facing teams." - Nthabiseng Mosia, Co-Founder & CFO/CMO.

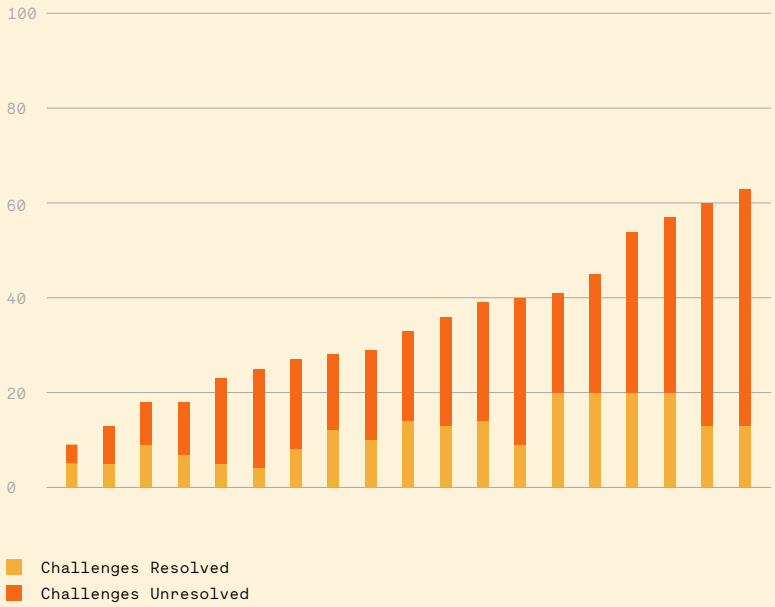
Solar Home Systems Key Data

12,321 Customers
24 Companies
15 Countries

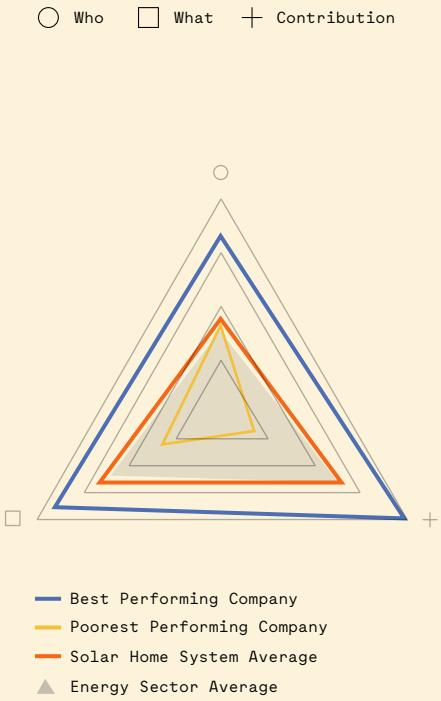
Company #	Product Category	60dB Impact Index*	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
9	Solar Home System	**0.90**	1.54	72%	63%	0.8%	84%
10	Solar Home System	**0.75**	0.85	68%	10%	–	73%
11	Solar Home System	**0.75**	–	–	58%	–	42%
12	Solar Home System	**0.68**	0.59	42%	23%	6.2%	70%
13	Solar Home System	**0.67**	–	–	26%	9.1%	89%
14	Solar Home System	**0.66**	0.75	64%	2%	–	67%
15	Solar Home System	**0.65**	0.81	38%	48%	–	82%
16	Solar Home System	**0.65**	0.91	42%	37%	–	72%
17	Solar Home System	**0.61**	0.52	31%	22%	0.0%	75%
18	Solar Home System	**0.60**	0.47	20%	38%	–	89%
19	Solar Home System	**0.60**	0.92	63%	30%	–	51%
20	Solar Home System	**0.57**	0.55	47%	67%	–	47%

*
No index score reflects one or more missing data points from Index calculation.

Challenge Rates And Issue Resolution (%)



Impact Index Performance: Solar Home Systems



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
99%	99%	57%	65%	3%	1.7	98%	28
87%	91%	17%	50%	–	–	87%	70
67%	27%	–	–	–	–	–	37
92%	88%	13%	60%	–	4.5	98%	92
84%	74%	25%	84%	–	4.1	40%	83
87%	69%	–	–	–	–	77%	30
59%	79%	48%	–	–	–	92%	24
84%	70%	27%	71%	10%	3.0	92%	41
91%	63%	28%	–	12%	3.5	85%	59
82%	65%	23%	77%	6%	3.9	89%	57
89%	53%	39%	63%	6%	4.0	67%	72
77%	86%	63%	79%	–	3.3	73%	26

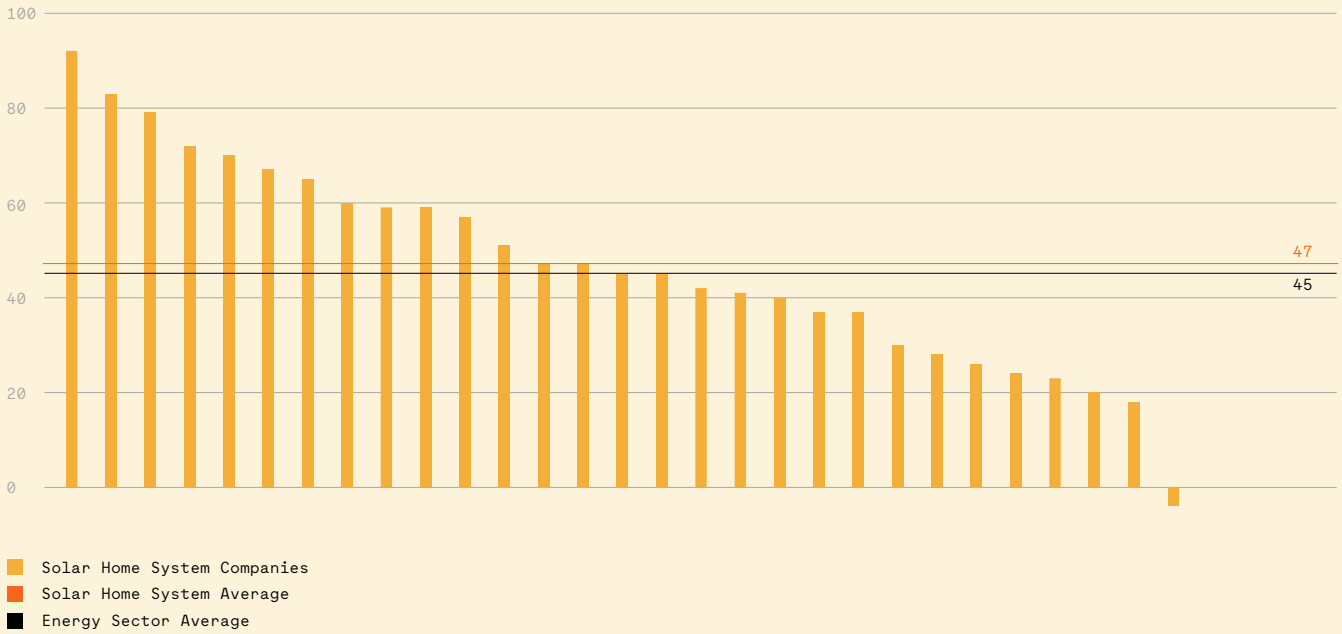
Continued

Solar Home Systems Key Data Continued

12,321 Customers
24 Companies
15 Countries

Company #	Product Category	60dB Impact Index	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
21	Solar Home System	**0.55**	0.51	23%	–	–	78%
22	Solar Home System	**0.55**	0.36	15%	76%	7.1%	72%
23	Solar Home System	**0.54**	0.61	51%	24%	–	48%
24	Solar Home System	**0.54**	0.77	59%	24%	–	44%
25	Solar Home System	**0.53**	0.75	39%	9%	–	45%
26	Solar Home System	**0.50**	0.53	24%	31%	7.7%	60%
27	Solar Home System	**0.50**	0.37	16%	30%	4.4%	66%
28	Solar Home System	**0.46**	0.47	27%	24%	0.5%	51%
29	Solar Home System	**0.39**	0.25	11%	16%	–	41%
30	Solar Home System	**0.30**	0.58	45%	20%	4.2%	29%
31	Solar Home System	**–**	1.23	82%	21%	–	94%
32	Solar Home System	**–**	2.10	40%	19%	13.0%	62%
33	Solar Home System	**–**	1.50	31%	33%	–	39%
34	Solar Home System	**–**	1.10	57%	47%	–	–
35	Solar Home System	**–**	2.10	40%	9%	3%	83%
36	Solar Home System	**–**	0.70	35%	32%	–	85%
37	Solar Home System	**–**	0.76	32%	33%	–	17%
38	Solar Home System	**–**	0.48	28%	57%	–	26%
	Average	**0.59**	**0.82**	**41%**	**32%**	**5.1%**	**61%**

NPS Ranked



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
75%	46%	19%	–	11%	4.1	35%	79
92%	69%	28%	56%	8%	3.9	92%	47
91%	57%	–	55%	–	–	53%	18
–	54%	40%	78%	–	3.3	70%	37
66%	77%	2%	–	0%	5.0	78%	59
69%	81%	69%	–	0%	4.3	100%	60
51%	92%	60%	79%	15%	2.6	66%	65
89%	45%	54%	63%	19%	2.8	60%	51
87%	48%	38%	–	–	–	62%	-4
36%	36%	29%	64%	16%	3.7	68%	45
100%	24%	18%	61%	–	2.2	47%	67
94%	–	36%	64%	4%	4.4	67%	47
84%	82%	45%	–	5%	2.9	76%	40
44%	88%	28%	–	–	3.5	–	–
65%	–	33%	57%	3%	2.8	45%	20
84%	–	41%	51%	2%	3.0	98%	45
81%	79%	–	–	–	–	–	23
93%	–	9%	45%	2%	5.1	89%	42
79%	**67%**	**34%**	**64%**	**7%**	**3.5**	**74%**	**47**

Mini-Grids

Mini-grids are currently the most income-inclusive off-grid energy solution. This makes sense: to cover their high fixed cost base, each mini-grid must surpass a minimum revenue and usage threshold, all from a localised customer base. Not surprisingly, we see mini-grid companies working hard to connect as many people as possible, across the income spectrum, in a given geographic area. They're also working to encourage productive use of power, since that can increase incomes and, over time, demand for more power.[51]

Mini-grids also offer more flexibility for customers, who can truly pay as they go – meaning they can start or stop payments when needed. Freedom to adjust spending provides flexibility for families with low, seasonal, or irregular incomes. Contrast this with solar home systems, whose customers typically cannot stop payments for a month if they need to,[52] irrespective of their cash on hand or usage of the product.

However, mini-grids have not yet been able to generate aggressive growth in their customer base. This is likely because of the large fixed cost of installing these systems, which have led to challenging economics, as well as the community buy-in required to set up each successive system, which can slow roll-out.

To address this, blended or patient capital, as well as subsidy, may be required, especially for rural connection. This sort of strategy has already been used for most rural electrification efforts in countries with more established grid-based electricity.

"Ever since I got connected, I can watch football matches. My kids can also study throughout the night."

51
By contrast solar home system companies can worry less about localised penetration levels and can more easily sell to relatively wealthier customers in a town or village and move on.

52
Some companies offer payment holidays to provide more flexibility.

Superhero In Action

Standard Microgrid

Who Are Standard Microgrid?

The company provides prepaid energy services through decentralised mini-grids in Zambia. Standard Microgrid's proprietary grid management system provides basic power needs to their customers.

Top Indicators

Ranked 1st in the database for first access, 3rd for Customer Effort Score.

Index Performance

2 out of 7 of the mini-grid sub-sector.

What We Can Learn From Them

"The value of energy changes drastically based on its end use, so aligning customer value with cost to deliver is crucial to the ability for rural electrification to deliver on its immense promise." – Caleb Cunningham, CFO.

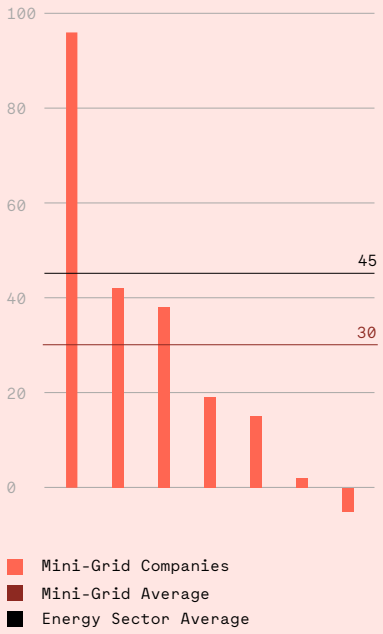
Mini-Grids Key Data

2,445 Customers
7 Companies
5 Countries

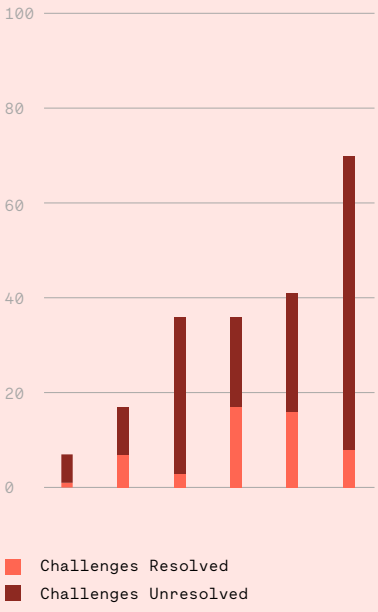
Company #	Product Category	60dB Impact Index*	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
39	Mini-Grid	**0.75**	1.22	82%	10%	–	82%
40	Mini-Grid	**0.72**	0.77	58%	39%	0.0%	73%
41	Mini-Grid	**0.68**	1.55	71%	24%	–	48%
42	Mini-Grid	**0.59**	1.01	70%	17%	0.8%	30%
43	Mini-Grid	**0.53**	0.50	31%	–	–	30%
44	Mini-Grid	**0.49**	0.38	20%	31%	–	63%
45	Mini-Grid	**0.42**	0.58	29%	26%	3.6%	50%
	Average	**0.60**	**0.86**	**51%**	**25%**	**1.5%**	**54%**

*
No index score reflects one or more missing data points from Index calculation.

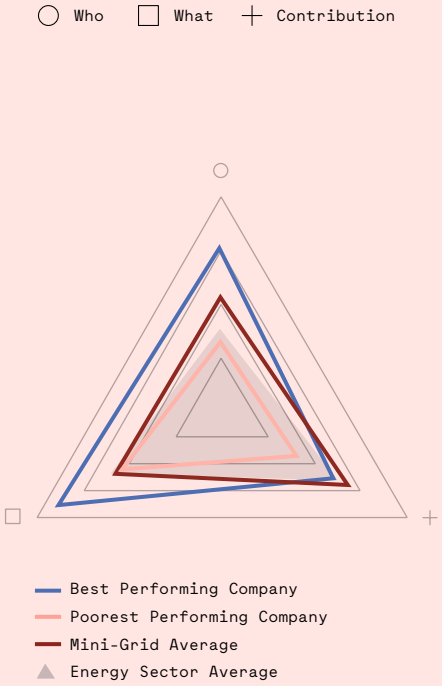
NPS Ranked



Challenge Rates And Issue Resolution (%)



Impact Index Performance: Mini-Grids



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
100%	41%	17%	61%	19%	4.7	99%	96
100%	72%	70%	88%	17%	2.7	64%	19
71%	90%	14%	–	6%	1.3	81%	-5
95%	78%	36%	52%	–	3.0	36%	38
99%	74%	7%	84%	70%	4.0	43%	42
38%	94%	36%	92%	18%	2.2	73%	15
65%	43%	41%	60%	–	3.4	66%	2
81%	**70%**	**32%**	**73%**	**26%**	**3.1**	**66%**	**30**

Appliances

More companies are developing solutions to allow customers to take better advantage of improved energy access. Given the varied nature of these appliances, this sector tends to show the widest range of impacts.

Solar-powered televisions

Customers with TVs powered by solar energy report higher levels of engagement and awareness in areas such as politics (89%), current affairs (92%), and general knowledge (96%).[53] Solar TVs also decreased stress for 79% of the families we talked to. These families talked about less boredom and better entertainment. They mentioned more time spent relaxing and increased happiness in the family. 83% said that their family was more connected because of the TV.[54]

Solar water pumps

Solar water pumps are helping farmers increase agricultural productivity and earnings by helping them irrigate more land with these pumps. Prior to buying a pump, nearly half (47%) of customers were using a bucket and/or watering can to irrigate their land. This work was time-consuming and slow: farmers we spoke to were spending 8.8 hours a week collecting water, yet they could irrigate only 1.6 out of their 5.2 acres of land. Having a solar water pump meant that 25% could irrigate a larger area of land. Another 43% were using expensive fuel-based pumps. Overall, 67% of users said they had increased their yields, and 10% of these farmers increased their income due to a combination of greater efficiency, lower costs, and ability to produce year-round.[55, 56]

Off-grid refrigerators

Owners of off-grid refrigerators[57] are chilling a range of products: dairy (75%), drinks (72%), fruits and vegetables (46%), medicine (29%), and pre-cooked food (23%). However, the cost and payment schedules for these refrigerators are a heavy burden for customers. An alarming 65% of solar refrigerator customers took out another loan to make payments on their fridge. 55% of customers said they sometimes cut back on consumption to make payments, and 47% have had to make 'unacceptable sacrifices' to make payments. This is concerning as it points to the potential adverse effects of rushing to provide more expensive products to those unable to afford them yet.

"My life has changed, I can now cater for my family needs as my crops give me food and income which is an improvement when compared to when I didn't have the pump."

53
There was little variation between what men and women were watching on TV, with the exception of sports – more men were enjoying this.

54
You can find more insights and analysis in the Use & Impact of Solar TVs report (2020), by 60 Decibels & Efficiency for Access Coalition.

55
We want to mention the potential negative implications on water access with using solar water pumps. We don't know enough about this, but it's something important to find out more about at a community level. 78% of SWP customers are using boreholes/wells as their water source. Extracting more water for themselves might affect community access to water.

56
You can find more insights and analysis in the Uses & Benefits of solar water pumps report (2019), by 60 Decibels & Efficiency for access Coalition: https://efficiencyforaccess.org/publications/use-and-benefits-of-solar-water-pumps

57
It's worth noting that this was our smallest sample: we spoke to a total of 178 customers of 3 companies.

Superhero In Action

SolarNow

Who Is SolarNow?

SolarNow started in 2011 in Uganda. They sell solar home systems and appliances including solar TVs, water pumps, and off-grid refrigerators through flexible financing. And they're now offering all this in Kenya too.

Top Indicators:

1st in database for first access, 2nd for no access to alternatives for their off-grid refrigerator, 1st for value for money for their solar home system.

Index Performance:

3 out of 14 for the appliance sector.

What We Can Learn From Them:

"It is critical to iron out the smallest details of the client service model before scaling up the operations. The smallest gaps or overlaps in responsibilities create major business risks when you scale. Think of "Who owns the client relationship? Who does the credit assessment? Who is responsible for training the client? Are all incentives aligned with the responsibilities?" – Willem Nolens, CEO.

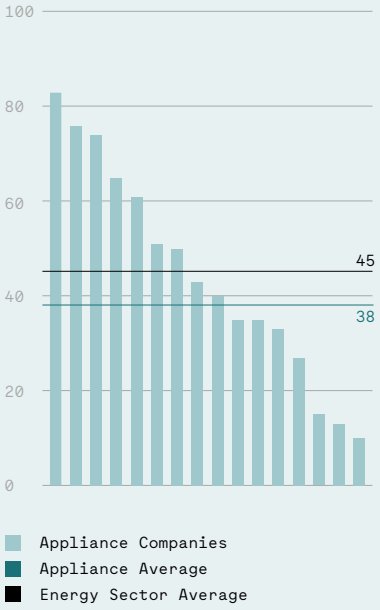
Appliances Key Data

4,763 Customers
14 Companies
4 Countries

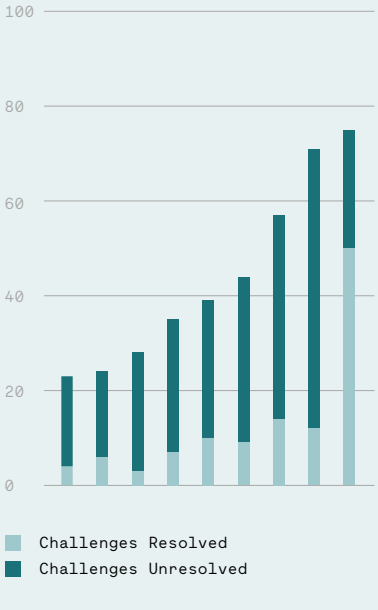
Company #	Product Category	60dB Impact Index*	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
46	Appliances	**0.78**	0.86	59%	25%	2.0%	84%
47	Appliances	**0.55**	0.48	18%	31%	0.0%	52%
48	Appliances	**0.53**	0.53	24%	–	0.0%	69%
49	Appliances	**0.51**	0.43	18%	31%	2.0%	62%
50	Appliances	**0.50**	0.30	11%	22%	22.0%	56%
51	Appliances	**0.50**	0.38	16%	38%	0.0%	80%
52	Appliances	**0.50**	0.57	34%	32%	0.0%	42%
53	Appliances	**0.49**	0.53	31%	–	0.0%	63%
54	Appliances	**0.49**	0.57	34%	22%	0.0%	29%
55	Appliances	**0.47**	0.41	17%	23%	0.0%	56%
56	Appliances	**0.45**	0.36	16%	13%	4.4%	43%
57	Appliances	**0.42**	0.56	33%	19%	0.0%	3%
58	Appliances	**0.41**	0.33	15%	2%	–	14%
59	Appliances	**0.31**	0.45	20%	31%	0.0%	22%
60	Appliances	**–**	0.69	31%	12%	–	48%
61	Appliances	**–**	0.26	11%	6%	–	57%
62	Appliances	**–**	0.28	12%	21%	–	44%
63	Appliances	**–**	0.29	11%	2%	–	9%
64	Appliances	**–**	–	–	14%	0.0%	0%
65	Appliances	**–**	0.95	66%	13%	–	53%
66	Appliances	**–**	–	–	–	–	–
	Average	**0.49**	**0.49**	**25%**	**20%**	**2.2%**	**44%**

*
No index score reflects one or more missing data points from Index calculation.

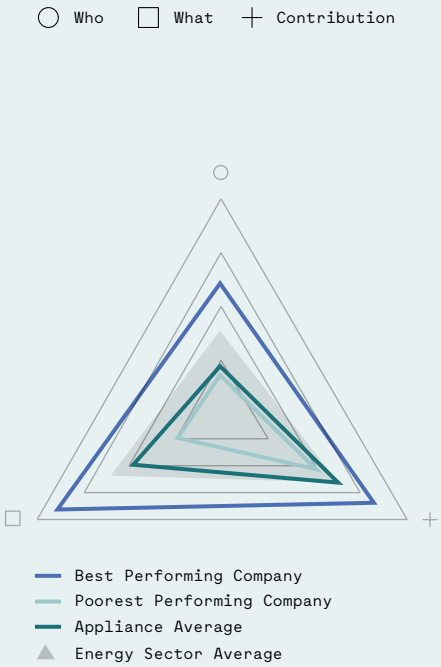
NPS Ranked



Challenge Rates And Issue Resolution (%)



Impact Index Performance: Appliances



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
–	91%	8%	–	11%	3.1	89%	83
–	77%	32%	–	0%	2.5	84%	27
51%	93%	47%	–	45%	3.3	87%	–
72%	79%	35%	80%	3%	3.4	79%	40
–	89%	44%	–	0%	–	33%	0
83%	36%	71%	83%	0%	2.1	83%	13
65%	81%	24%	75%	–	–	55%	35
20%	94%	14%	–	16%	3.5	73%	61
88%	77%	28%	88%	6%	1.7	61%	9
79%	66%	44%	79%	2%	3.3	87%	35
94%	82%	56%	–	81%	3.0	90%	76
–	90%	29%	–	9%	–	46%	10
89%	85%	75%	33%	65%	4.2	70%	0
–	50%	39%	75%	–	–	84%	15
100%	–	56%	–	–	–	88%	33
100%	–	9%	–	–	–	54%	51
99%	–	43%	–	–	–	–	65
–	47%	23%	84%	–	2.9	64%	43
50%	43%	57%	75%	11%	4.0	67%	50
100%	–	44%	100%	–	4.3	100%	74
–	–	–	–	–	–	–	–
78%	**74%**	**39%**	**77%**	**19%**	**3.2**	**73%**	**38**

Clean Cooking

In terms of addressing a global need, the cooking market is arguably larger than the market for off-grid energy. It has also faced the most challenges with uptake and adoption.[58] The big challenge for cookstoves is that to deliver much of their social impact, a customer must significantly reduce use of their old stoves – a process called 'stacking'.[59] Reducing stacking is not as simple as it seems. It requires behaviour change that may be influenced not just by practical considerations such as time and cost, but by culture and tastes too.

Although nearly three-quarters (73%) of cookstove customers did most of their cooking on their cleaner stove, more than half (51%) of all customers were still stacking.[60] These practices continue even though four fifths (81%) of users report time savings due to the new stoves (particularly in terms of fuel collection).

Compared to other off-grid energy sectors, clean cooking companies are doing the best at reaching a higher proportion of women (49%). Conversely, clean cookstoves perform the worst in terms of reaching low-income customers.

"The burden of gathering wood has reduced, before every two days we had to go to collect wood, but now, we go just twice a week."

58
https://www.washingtonpost.com/opinions/these-cheap-clean-stoves-were-supposed-to-save-millions-of-lives-what-happened/2015/10/29/c0b98f38-77fa-11e5-a958-d889faf561dc_story.html

59
Or else they fail to generate the health benefits from decreased smoke in the home.

60
We saw customers continued to use their traditional stove for cooking tasks such as evening meals, where more people are being fed, or keeping food warm.

Superhero In Action

Greenway

Who Is Greenway?

Greenway is a last-mile distribution enterprise delivering product solutions for developing world consumers, including clean cookstoves.

Top Indicators

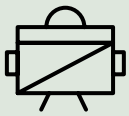
Ranked 2nd in the database ease of use of their product, 2nd in the cookstove sector for NPS.

Index Performance

2 out of 6 of the cooking sub-sector

Customer Quotation

“Before when we used the mud-stove, we used more wood, but now using the Greenway cookstove, we use less and it has increased my income by half.”



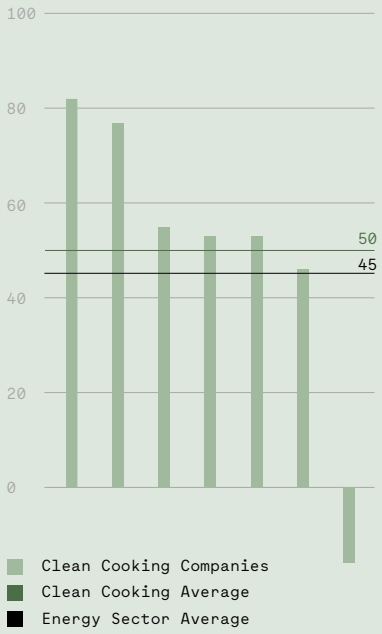
Clean Cooking Key Data

3,761 Customers
7 Companies
4 Countries

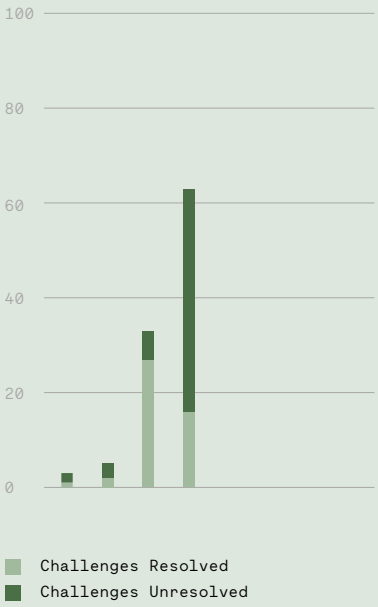
Company #	Product Category	60dB Impact Index*	Inclusivity Ratio	Relative Poverty	Female Customers	Disability Prevalence	Quality Of Life
67	Cooking	**0.55**	0.68	43%	63%	–	50%
68	Cooking	**0.52**	0.62	44%	19%	–	53%
69	Cooking	**0.47**	0.28	14%	66%	0.0%	92%
70	Cooking	**0.42**	0.26	10%	23%	–	54%
71	Cooking	**0.41**	0.50	32%	76%	–	46%
72	Cooking	**0.40**	0.51	31%	57%	–	20%
73	Cooking	**–**	0.22	9%	62%	–	38%
	Average	**0.46**	**0.44**	**26%**	**52%**	**0.0%**	**50%**

*
No index score reflects one or more missing data points from Index calculation.

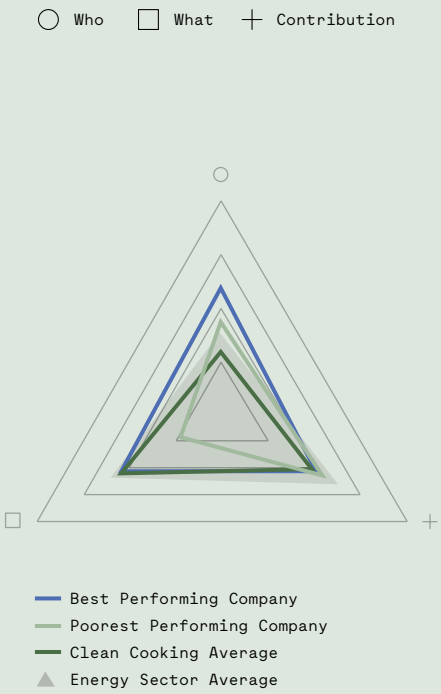
NPS Ranked



Challenge Rates And Issue Resolution (%)



Impact Index Performance: Appliances



First Access	Access To Alternatives	Challenge Rate	Unresolved Challenges	Productive Use	CES	Value For Money	NPS
44%	80%	18%	–	0%	–	43%	55
93%	27%	3%	58%	2%	3.6	74%	77
69%	42%	63%	75%	15%	3.2	99%	53
68%	80%	5%	69%	2%	2.9	92%	53
37%	64%	33%	19%	–	4.0	57%	82
43%	86%	21%	–	2%	2.0	56%	46
–	76%	49%	–	59%	–	62%	-16
59%	**65%**	**27%**	**55%**	**13%**	**3.1**	**69%**	**50**

Closing Thoughts

Data & Decisions

We're often asked what kinds of decisions companies and their investors make with our data. This is a hugely appropriate question, since data alone does not create impact (would that it did!). Data isn't lighting anyone's home or reducing the poisonous fumes a child breathes. But, when companies engage with the data, it can help them to better serve their customers, whilst also helping investors to direct their capital most effectively.

Gladly we're seeing the data we share get used every day. Companies are using the customer data we're collecting to make product design changes, operational adjustments, reframing of marketing message, and improvements in after-sales support. Data is helping these companies reallocate people and investment into areas where they can do the most good. That's a good thing.

Our hope is that this report helps amplify these sorts of actions, by empowering companies and capital providers with a set of shared recommendations that, according to our data, would make the largest positive difference in the impact created through the provision of off-grid energy. Here are the top actions we'd recommend based on our analysis.

01.
Continue to invest in product affordability
One of the themes from our data is that the poorest and most vulnerable still represent a minority of the total customer base for off-grid energy. The most obvious way to address this is with more affordable products, by making products that are already within reach deliver more value for money, and by making PAYG flexible enough to meet the reality of customers' irregular or seasonal incomes. Companies we have been working with are designing new low-cost, high-quality products; lowering deposit levels; offering patient financing of their own; or pioneering flexible financing such as payment holidays during otherwise expensive or stressful times (e.g. when school fees are due) and allowing over-payments when customers have more money at hand (e.g. after harvest). We'd like to see more of these initiatives pioneered by firms to encourage greater accessibility whilst maintaining a keen focus on financial viability.

02.
Keep an eye on over-indebtedness
Whilst the prevalence of customers who find their payments to be a 'heavy burden' was relatively low, at 4%, this number could increase quickly as companies sell and market more aggressively. Consumer protection laws and ongoing data collection to monitor customer hardship will help the sector grow in a responsible fashion, in ways that limit negative impacts on the very customers these companies aim to serve.

03.
Deepen focus on gender
Whilst many of the firms we studied have made significant commitments to improve their gender inclusivity, as a sector overall there is scope for a greater understanding of, and response to, gender inequalities. Our data suggests there may be a good impact and business case for doing so. The impact of these products on women appears to be greater, and that women have higher NPS scores suggests that targeting women could have positive impacts on sales.

On how to improve gender outcomes, we sought some advice from Value for Women who recommend a range of actions that include:

- Finding a balance of men and women amongst sales agents.
- Arming sales agents with gender sensitive information.
- Defining market segments across gender and responding with varied products/services.
- Ensuring financing options are equally accessible to both sexes (e.g. land-based collateral requirements can be a barrier for women compared to men).

"The solar home system gives safe and healthy light. My children have improved their performance at school and the whole family is happy."

04.
Address customer challenges
We have discussed customer challenges a lot in this report. While product reliability in the off-grid energy space has improved a lot in recent years, we still have a long way to go. Some of these problems may be with the products themselves, while some are issues with customer understanding and / or company after-sales support. The three types of challenges customers reported most frequently were technical faults, mismatched expectations, and product misuse.

The most obvious recommendation is that companies continue to invest in improved product quality. This will build trust in the market and, as important, is the best way of protecting against impact risk: a broken solar product does not create any positive social impact.

In addition, as the off-grid market matures, creating a strong culture – and supporting operating model – of strong after-sales support will be critical. Many companies are doing this well, and some of the best practices we've observed in this area include:

- Building a professional call centre that can be contacted freely at hours, and in a language, that suit customers.
- Clearly signposting and proactively encouraging customers, perhaps via SMS, to call if they face any challenges.
- Conduct a courtesy check-in call a week or two after purchase or installation and ensure customers know if they have a local agent and how to find them.
- Create a customer care promise supported by internal issue resolution policies.
- Proactively track experience and celebrate and incentivise staff when positive feedback is gathered (in one case we've seen sales team bonuses linked to customer NPS results).

05.
Invest in the viability of mini-grids, supported by stronger partnerships
As we've shared throughout this report, mini-grids show the most potential of inclusivity and impact as they grow. That said, they are dwarfed, in terms of customer reach, by solar lanterns and solar home systems. We believe that mini-grids could be an important part of the long-term solution for off-grid energy customers, but this will only happen with strong partnerships between business, investors, and the public sector, supported by concessionary capital to allow companies to serve the hardest-to-reach customers and community.

Conclusion

We've covered a lot of ground on this journey. Thank you for taking it with us! We've shared our customer-led view of an entire sector, one that spans countries and continents, and captured the voices of 25,000 customers, each of whom took 15 to 25 minutes out of their busy days to tell us about their experience.

We hope that this report faithfully captures what these people shared with us, and that we've found a way to organise and represent what they told us in ways that are useful to you.

The data in this report show that, in the majority of cases, companies providing off-grid energy, are fulfilling their promise of bringing safe, clean, affordable modern energy to the customers these companies serve. And that when they do, they positively and meaningfully impact their lives. This outsized impact helps explain why the sector has attracted and should continue to attract so much interest from global corporations, investors, governments, foundations, and donors.

We hope you've also seen that, underneath these headlines, the data also show a varied pattern of impact, with nuances between companies, geographies, and sub-sectors. That is why we also hope that those who operate businesses or deploy capital continue to work to improve their impact.

By this we don't simply mean to continue growing revenues and scaling operations – though this is clearly important. That focus on top-line growth must be combined with a clear, day-to-day approach to actively managing impact. This means understanding how companies' impact stacks up against their peers, and implementing new product, pricing, marketing, or investment decisions that support improving the positive impact created (and decrease the risk of any unintended negative impacts) of every product or service delivered to every customer.

This is why we hope you also found the benchmarks and introduction of indices in this report particularly exciting. Indices like these, based on data drawn from customers, will be the north star of the work of 60 Decibels over the coming years. We aim to create richer, deeper benchmarks of impact performance, across multiple sectors and geographies, so that users of these data can understand precisely their own impact performance and be able to improve this performance over time. This will be at the heart of a new trend of impact performance management, which has the power to change the sector as we know it, and in doing so act as a multiplier for impact.

We hope you'll continue to join us on this journey, if you're an investor or enterprise perhaps by repeating or taking part in your own Lean Data adventure, or simply by reading our work and providing feedback.

We're always eager to listen.

“I can make enough money from my business because I have more customers now.”

“I am very happy because my kids can now enjoy good lighting and can study without a problem.”

Appendix

Appendix

I mean, who doesn't like a good appendix. No seriously, there's some good stuff in here...

Glossary Of Indicators

Access To Good Alternatives
The percent of customers saying they could not easily find a good alternative to the product/service they bought.

Carbon Emissions Averted
The annual household carbon emissions averted from replacement of kerosene lamps in tonnes. This is calculated by looking at the volume and types of kerosene lanterns used regularly before a household purchased a product. We look at carbon dioxide and black carbon – calculated in carbon dioxide equivalent – the top two climate warmers, and both emitted by kerosene lamps. This is relevant for lighting products only. We are developing calculations for cookstove and diesel generator use.

Challenge Rate
The percent of customers who have experienced challenges using their energy product or service. We sometimes refer to this as ease of use – this is the inverse of this metric – i.e. the percent of customers who have not had a challenge.

Change In Energy Expenditure On Baseline Sources
The change in spending on energy pre- and post-purchase of an energy product. We calculate this in cases when we conduct two surveys of customers, one when they are new customers and one ~6 months later. This does not include spending on the new energy product or service we are surveying customers about, e.g. cash payment for new product or service or financing repayments for a solar home system or fees for mini-grid access. Converted from local currency to US dollar, but not using PPP.

Change In Kerosene Use
The percent of families reducing or eliminating kerosene lamp use after purchasing their new modern energy access. This refers only to families who were using kerosene before. And it is relevant for lighting products but not appliances or cookstoves, in general.

Change In Perception Of Safety
The percent of families who say they feel safer in their homes as a result of their energy product.

Customer Effort Score (CES)
This measure captures the after-sales care and customer service. Customers who have experienced a challenge are asked to what extent they agree with the statement: [Company] made it easy for me to handle my issue. Customers disagree (1), somewhat disagree (2), neither agree or disagree (3), somewhat agree (4), agree (5). The CES is the average score between 1 and 5.

It is an important driver of uptake, adoption, and referrals, as well as of impact.[61]

Disability
We use the Washington Group questions on disability, which look at disability across six themes.[62] The disability prevalence rate shows the percent of households who have someone who 'cannot do at all' or has 'a lot of difficulty' doing any of the activities in the six themes.

Electrification Rate
The percent of customers, or the population, connected to grid electricity.

Energy Ladder
The percent of customers moving from worse provision of energy to better. For example, moving from a kerosene lamp to a solar lantern, or from a solar lantern to a solar home system.

Energy Staircase
This is a broader definition of energy access recognising that families may purchase a suite of products or services to meet their needs. Purchasing a second solar lantern is likely to have benefits and provide more energy services to a family, but would not be a move up the ladder in terms of source.

61
Research published in the Harvard Business Review suggests that the CES may be an even stronger indicator of customer loyalty and retention than the NPS. And what's more, it may be key to increasing uptake and ARPU (average revenue per user), and enhancing referrals, thereby reducing customer acquisition costs. https://hbr.org/2010/07/stop-trying-to-delight-your-customers

62
Hearing, sight, memory, mobility, self-care, and communication. You can read more here: http://www.washingtongroup-disability.com/

First Access
The percent of customers saying they did not own or have access to the relevant technology before their recent product or service purchase.

First Access To Credit
The percent of customers who accessed financing or credit for the first time when purchasing their energy product or service.

Gender Inclusivity
The percent of customers[63] who are women; the percent of customers making purchase decisions in the household who are women; the users of the product/service within the home.

Health Improvement
The percent of customers who see an improvement in the health of themselves and their family as a result of moving to modern sources of energy. We explore this mostly in relation to a movement away from kerosene lanterns for lighting.

Hours Of Study Time
The change in time children spend doing homework pre- and post-purchase of lighting product or service.

Income Generation
The percent of customers who use their energy product or service for income-generating activities, either at a place of work and in the home. This is also sometimes referred to as 'productive use'.

Income Inclusivity
We compare the poverty levels of company customers to national poverty lines in the countries they are working in. This allows us to assess how representative their customer base is in comparison to the market they are operating in.

$$\sum_{x=1}^{3} \textbf{(Organisational Poverty Line \$x)/(Country Poverty Line \$x)/3}$$

Where X= 1, 2 and 3 are $1.90, $3.20 and $5.50 respectively.

Indebtedness
The percent of customers who report that repayments for their energy product are a 'heavy burden' for the family;[64] the percent of customers who say they cut back on consumption 'regularly' because of repayments;[65] the percent of customers telling us they 'regularly' have to make unacceptable sacrifices to make repayments.[66]

Light Hours
The change in hours of light a family uses pre- and post-purchase of a lighting product or service.

Net Promoter Score® (NPS)
The NPS is used the world over to gauge customer satisfaction and loyalty. NPS is measured through asking customers to rate their likelihood to recommend a product or service to friends or family on a scale of 0 to 10, where 0 is least likely and 10 is most likely. The NPS is the percent of customers rating 9 or 10 out of 10 ('Promoters') minus the percent of customers rating 0 to 6 out of 10 ('Detractors'). Those rating 7 or 8 are 'Passives'. The score can be anything from -100 to 100.

Quality Of Life
The percent of customers saying their quality of life has improved because of access to their new off-grid product or service. For benchmarking, we look at those saying their quality of life has 'very much improved' i.e. a meaningful change, but in this report we also have mentioned quality of life improvements more broadly which also includes those saying their lives have 'slightly improved' because of the product or service.

Poverty Levels
The percent of customers living below different poverty lines. We use the Poverty Probability Index® (PPI), a standardised tool developed by Grameen Foundation, now housed at Innovations for Poverty Action. The PPI identifies the likelihood of customers living at different internationally recognised income levels. We use the World Bank relative poverty line of $3.20 per day and the extreme poverty line at $1.90 per day, using 2011 PPP.

Time Savings
The change in time spent cooking; the change in time spent gathering fuel for cooking pre- and post-purchase of cleaner cooking products or services.

Unresolved Issues
The percent of customers who experienced challenges and had not had them resolved.

Value For Money
The percent of customers saying they rate the value for money of their product or service as 'very good' or 'good' (other options: 'very poor', 'poor', 'fair').

63
We use 'customers' to refer to the registered person the company has in their contact database. There are often many more users of the products in the household.
64
Other answer options: somewhat of a burden, not a problem.
65
Other answer options: sometimes, rarely, never.
66
Other answer options: sometimes, rarely, never.

60dB Impact Index Worked Example

The formula for calculating the index is:

$$\frac{\textbf{(actual value – minimum value)}}{\textbf{(maximum value – minimum value)}}$$

Imagine a company with the following impact performance compared to the minimum and maximum performance in our database:

	What	Who		Contribution	
	Quality Of Life	**Poverty Reach At $3.20**	**Inclusivity Ratio**	**First Access**	**No Access To Alternatives**
Company X	68%	26%	0.76	52%	82%
Min Value	0%	19%	0.22	20%	24%
Max Value	94%	87%	2.1	100%	99%

What Index (0.72) = $\frac{\textbf{68\% – 0\%}}{\textbf{94\% – 0\%}}$

First Access Index (0.40) = $\frac{52\% – 20\%}{100\% – 20\%}$

No Access To Alternatives Index (0.77) = $\frac{82\% – 24\%}{99\% – 24\%}$

Contribution Index (0.59) = **Average of 0.40 and 0.77**

Income Inclusivity Index (0.29) = $\frac{0.76 – 0.22}{2.1 – 0.22}$

Poverty Reach Index (0.1) = $\frac{26\% – 19\%}{87\% – 19\%}$

Who Index (0.2) = **Average of 0.29 and 0.1**

60dB Impact Index In Energy (0.5) = **Average of 0.72 and 0.59 and 0.2**

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hello@60decibels.com

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