



October 2026

Building Resilience: A case study collection on clean energy and climate resilience

How clean energy companies
strengthen economic, physical,
and social resilience for the
customers they serve.



Hardest to Reach

Background

Acumen has spent more than 25 years investing in distributed renewable energy (DRE) and electrification across sub-Saharan Africa, supporting enterprises that expand access to reliable, affordable energy while strengthening climate resilience. Through initiatives including KawiSafi, Pioneer Energy Investment Initiative (PEII+), and the Hardest-to-Reach (H2R) Initiative, Acumen has deployed capital across the energy access continuum — from early-stage innovation to growth-stage scale — building a portfolio that spans off-grid electricity, productive use of energy, clean mobility, and climate adaptation solutions. This experience provides a unique perspective on how DRE companies create resilience for customers.



Introduction

Weathering the shock: Evidence from the field.

Climate disruption is already reshaping livelihoods. Floods interrupt transport, heat reduces working hours, droughts undermine agricultural production, and disrupted infrastructure raises the cost and uncertainty of earning a living. For low-income households and small businesses, these are not isolated events but recurring pressures on income, food security, and health.

DRE and electrification are often framed as access stories, or climate-mitigation ones. However, our experience has reinforced a simple but important insight: DRE and electrification make communities more resilient to a more volatile climate. Over the past 25 years, Acumen has invested \$116 million across 53 electrification and DRE companies in several markets, supporting enterprises at different stages of growth. Along the way, we have observed that these businesses deliver far more than just energy access. They enable farmers to irrigate through drought, help market vendors reduce food spoilage, lower transportation costs for informal workers, and expand opportunities for households and small businesses to adapt to an increasingly uncertain climate. Alongside these economic

gains, we have also seen a subtle but equally important pattern: energy access strengthens the social fabric that households and communities depend on in times of stress, through more reliable lighting, safer homes, and the basic services that hold daily life together when other systems fail.

As conversations around how to adapt to a changing climate grow, DRE and electrification have an increasingly important role to play. By investing in resilient enterprises that strengthen livelihoods, reduce vulnerability, and expand opportunity, we can help ensure that communities are better equipped to not only withstand climate shocks but to build more stable futures.

Drawing from 11 studies reaching 2,327 people across four regions, and two continents, we examine a critical question: how does DRE and electrification strengthen resilience for customers?

Across the case studies, three patterns emerge as the strongest resilience builders:

Resilience Builder 1

Resilience is strongest when energy protects or grows income.

The clearest pathway to resilience is economic. When a product or service cuts costs, increases productivity, preserves inventory, or enables

more predictable earnings, customers are better able to absorb and recover from shocks — from e-mobility's lower fuel costs to irrigation's steadier harvests to cold chain's reduced spoilage.

Resilience Builder 2

Technology works best when it is bundled with service, support, and protection.

A product alone does not make someone resilient. The strongest outcomes occur when hardware is paired with financing, maintenance, training, market linkages, customer support, and transparent terms. Resilience is built through systems, not devices.

Resilience Builder 3

Solar home systems play a key role in strengthening social resilience.

Because social resilience is a core part of community resilience overall, building truly resilient communities starts with meeting basic household needs. Achieving fully resilient communities therefore requires layering multiple energy services on top of one another to meet all the pillars of resilience.

Defining Resilience

Adaptation is what people and systems do to prepare for and respond to climate stress — the ecological, social, or economic shifts that help them adjust. **Resilience** is the result: the condition in which a person or enterprise can anticipate climate threats, adapt where possible, absorb disruption as needed, and recover swiftly.

Adaptation — the tool

A solar pump, an off-grid home system, or a cold-storage unit. Put simply: installing the technology that lets you keep going when conditions worsen.

Resilience — the outcome

A farmer who keeps producing through erratic rainfall; a vendor who preserves stock and recovers quickly after a shock. Put simply: knowing you can weather the next shock and keep going.

Distributed energy is more than an energy access solution. It is also a resilience solution.



The Framework

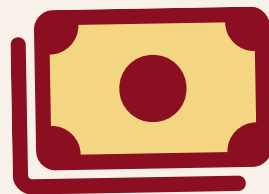
Acumen measures customer resilience across three pillars: economic, physical, and social. However, different energy technologies build resilience unevenly across these pillars. Some strengthen certain pillars more than others.

A recent 60 Decibels report examined how energy technology users perceive their resilience to climate shocks. 57% of customers said their ability to face an unexpected climate event has improved when averaged across their perceived preparedness, ability to cope, ability to recover, and time to recover. This report explores the mechanisms behind that improvement.¹

Figure 1: The three pillars of customer resilience in distributed energy and electrification

Economic

The ability to sustain and grow income, manage operating costs, build savings, and recover financially after a shock.



Physical

Direct protection from climate volatility — e.g., shifting from rain-fed farming to solar irrigation.



Social

The preservation of dignity, agency, safety, and time — reducing physical strain and expanding control over how people live and work.



¹ 60 Decibels: Tom Adams et al, *Why Off Grid Energy Matters 2026*

Case Studies

Building resilience across the energy ladder.

Across a sample of Acumen's electrification and DRE portfolio are four technologies and four ways of strengthening customer resilience from first-time household electricity to productive use in mobility, farming, and food preservation. The four case studies that follow show how these technologies and business models build resilience and what customers report.



Yellow, Malawi

Case Study 1: E-Mobility

Reducing the strain of
work in a hotter climate.

The Challenge

Transport is usually framed as an emissions challenge. But for millions of low-income workers in India — small traders, delivery workers, mobile vendors, and waste workers — affordable transport is also a resilience issue. They rely on bicycles, tricycles, and carts which are cheap, but physically punishing. As heat waves grow more frequent and intense, manual transport limits working hours, deepens fatigue, and erodes already-thin incomes.

The Solution

eBik provides purpose-built e-bikes and retrofit kits that convert manual carts into electric vehicles, serving underserved users in cities and rural markets for whom conventional motorized transport is too expensive. By reducing the physical effort required to move people, goods, and materials, eBik helps workers travel faster, complete more jobs, and sustain income with less exhaustion, even as heat makes manual work harder.

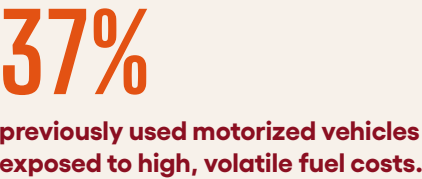


Resilience Outcomes Scorecard

Economic

Faster, cheaper mobility lets workers complete more trips while cutting daily costs.

What customers say



Physical

More reliable mobility lets workers keep working on the days a shock hits. During a heat wave, for example, it keeps them connected to routes and customers when conditions turn.

What customers say

While definitive metrics are unavailable, anecdotal evidence volunteered by customers indicates that during heat waves, eBik's electric bikes allow users to continue working.

“It was very hard to work in the heat with a manual rickshaw, but with this electric one, I can work more hours even when the weather is bad.”

— eBik customer

Social

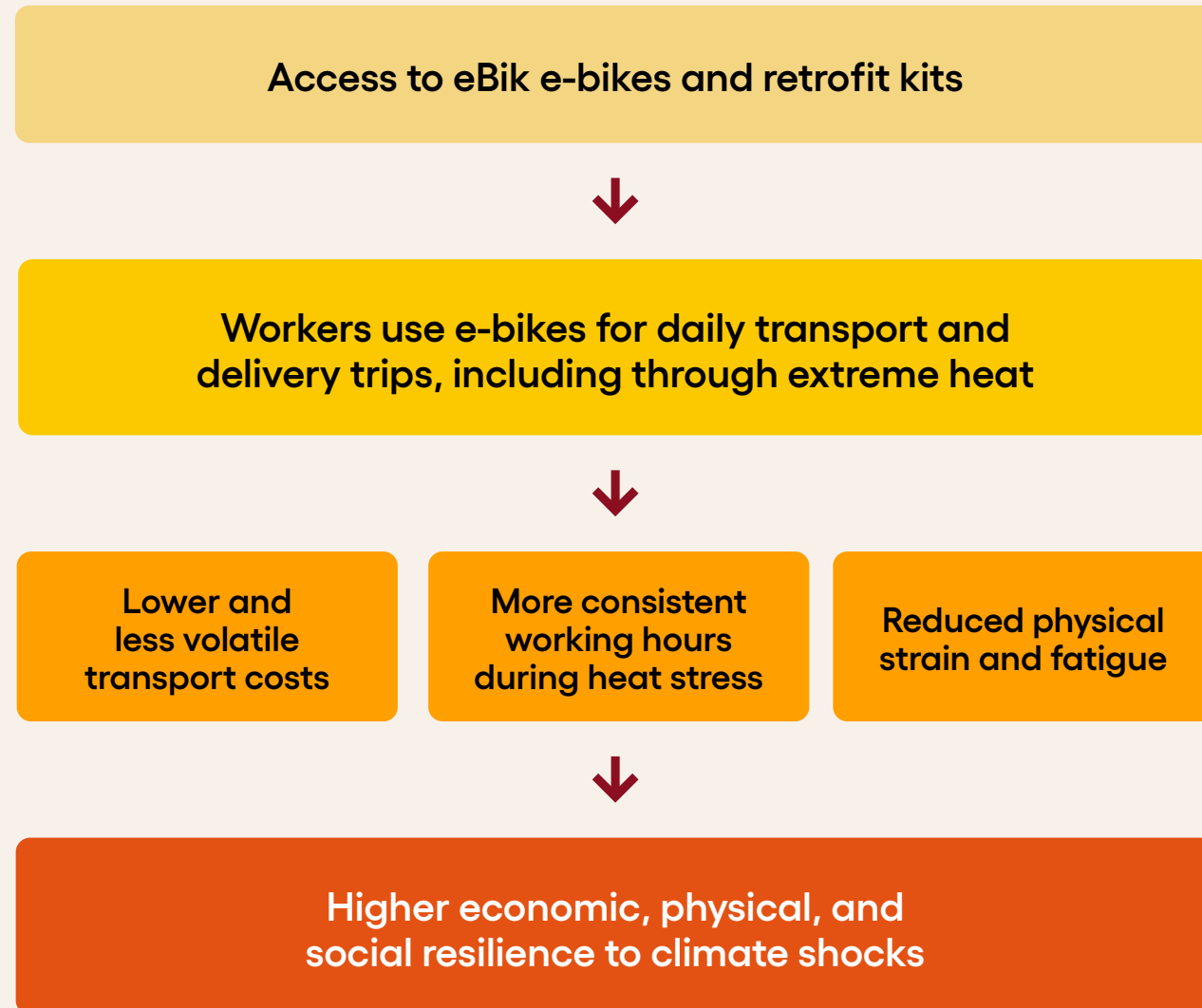
Electric assist eases the burden of manual transport, sustaining productivity with less exhaustion. Saved time and reduced fatigue accumulate into a stronger baseline of health and energy, so people are not already depleted when a shock arrives. This also gives them greater control over daily life and more agency in how they respond to climate shocks.

What customers say





Chart 1: How electric mobility converts cost savings into resilience



What this shows

Electric mobility can turn transport from a source of vulnerability into a more stable foundation for income. By lowering costs, easing fatigue, and making work manageable in extreme heat, eBik helps workers hold onto their livelihoods under harder climate conditions.

“Overall, it has significantly eased my physical strain, allowing me to cover longer distances and earn more. I used to earn only ₹200-₹300, but now I make ₹500-₹1000, and it also saves me a lot of time.”

— eBik customer

Case Study 2: Irrigation

Increasing production
and reliability through
bundled hardware
and services.

The Challenge

For smallholder farmers, water access is often the difference between one harvest and two — between a profitable season and a failed one. Less than 7% of Africa's farmland uses irrigation, leaving most smallholder farmers dependent on rain.² As climate change makes drought, heat, and rainfall less predictable, rain-fed agriculture grows less reliable. For households already on thin margins, a delayed rainy season or prolonged dry spell can cut yields, disrupt income, and weaken the ability to recover.

The Solution

In Kenya, SunCulture pairs solar irrigation systems with the support farmers need to use them well, bundling pumps with installation, agronomic support, flexible payment plans, and weather, health, and life insurance. The company has also launched input financing, which it is now scaling, and piloted a platform that links farmers to markets.

² World Bank Group: Amal Talbi et al, *Nourish and Flourish: Water Solutions to Feed 10 Billion People on a Livable Planet*, 2026



Resilience Outcomes Scorecard

Economic

Reliable water lets farmers grow more, protect crops, and earn across more seasons.

What customers say

87%

see higher yields & income

73%

have access to emergency funds to manage expenses

Physical

Solar irrigation cuts dependence on erratic rainfall, sustaining cultivation when rains are late or weak.

What customers say

84%

of customers are first-time irrigation users.

Customers report farming across all seasons and growing a wider range of crops year-round.

“The ways of farming have significantly improved because I can comfortably farm all the seasons in the year. Thus there is also an increase in production, which has led to more income. Lastly, we are able to farm different kinds of crops all the time.”

— SunCulture customer

Social

Less labor-intensive irrigation saves time and reduces fatigue, enabling greater control over how people live and react to climate shocks.

What customers say

While definitive metrics are unavailable, anecdotal evidence volunteered by customers indicates the presence of social resilience.

“I used to have back pain and waist issues because of carrying water from the well to the farm, but now I just pump automatically and water goes into my farm.”

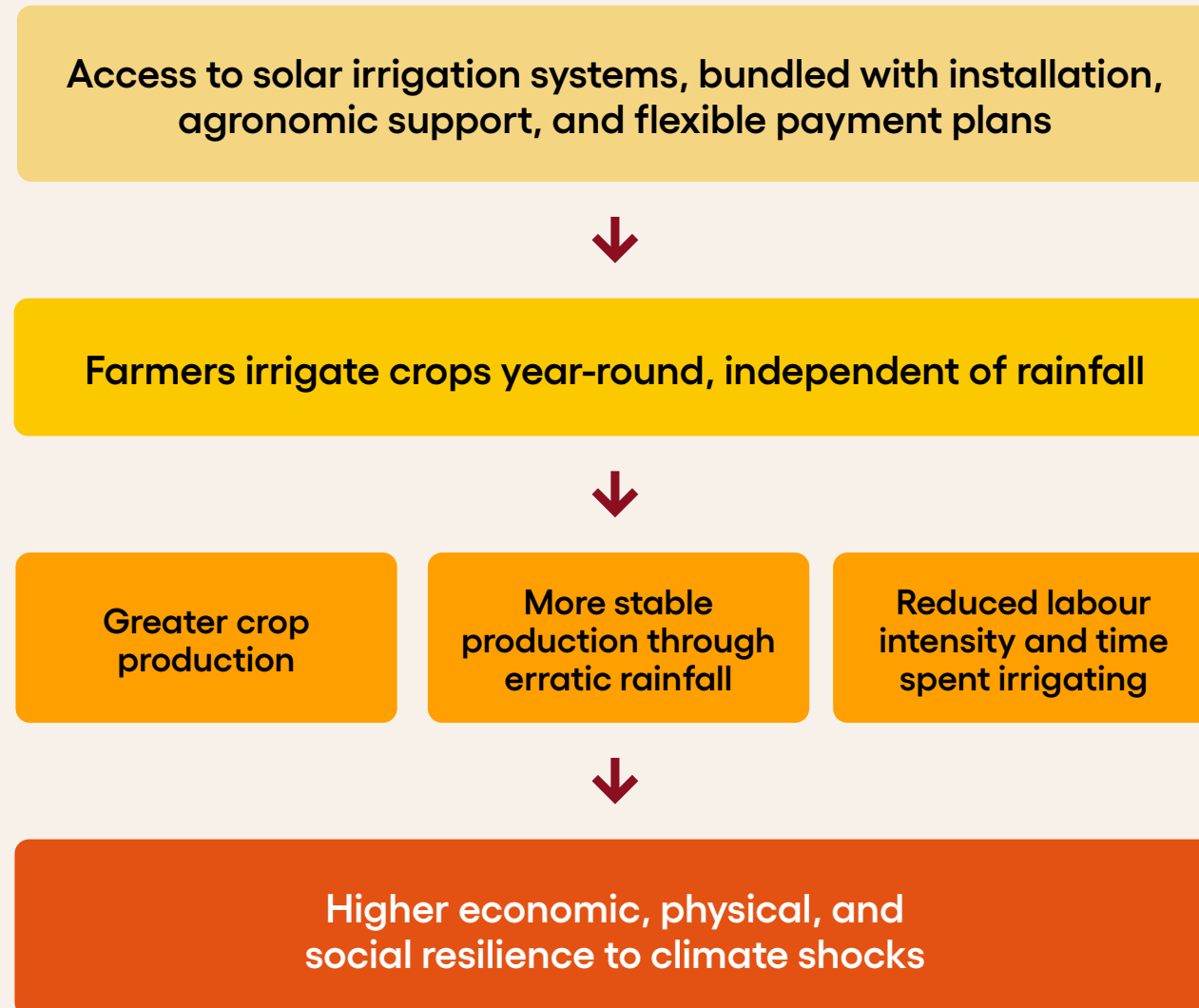
— SunCulture customer

“Irrigation is now less labour intensive which means that in some cases I don't even have to be there since someone just needs to turn on the system unlike before when I had to guide the pipes. This has allowed me to have more time on my hands for relaxation as well as engage in other activities.”

— SunCulture customer



Chart 2: The irrigation resilience pathway



What this shows

Solar irrigation is one of the most direct resilience tools available to smallholder farmers. SunCulture shows the payoff comes not from the pump alone, but from the financing, support, and services that turn water access into stronger production, income, and recovery capacity.

“I love that I am able to plant regardless of whether it rains or not.”

— SunCulture farmer

Case Study 3: Cold Chain

Preserving value and stabilizing incomes through solar-powered cold storage.

The Challenge

In climate-vulnerable markets, food loss is an income problem as much as a logistics one. Across parts of Africa, roughly 50% of fish never reaches market due to poor storage and fragmented logistics.³ When perishables spoil before sale, producers lose income, businesses lose inventory, and communities lose food that costs more to replace each year.

The Solution

In Kenya, Keep IT Cool runs an integrated, solar-powered cold chain combining aggregation, processing, refrigerated transport, and market linkages in one system. It buys fish and poultry from smallholder farmers and fisherfolk, then connects supply directly to markets through temperature-controlled logistics and a network of refrigerator-equipped shopkeepers. This replaces fragmented, loss-prone supply chains with a more reliable one, helping producers preserve freshness, reach consistent buyers, and depend less on immediate low-price sales.

³ World Bank: Toby Peters, *Cold-Chains in Developing Economies: A Techno-Socio-Economic Structural Development Challenge* 2019



Keep IT Cool, Kenya

Resilience Outcomes Scorecard

Economic

Cold storage and reliable purchasing cut spoilage, lift sales, and help producers capture more value.

What customers say



“I don't have the cost of transporting the fish because they buy them at the lake, which makes the profit even better.”

— Keep IT Cool customer

Physical

Aggregation, refrigerated transport, and shopkeeper networks give producers steadier routes to market, which persist in times of extreme heat that would otherwise increase post-harvest losses.

What customers say



Social

Solar freezers and cold logistics ease the burden of handling perishables under heat and time pressure.

What customers say

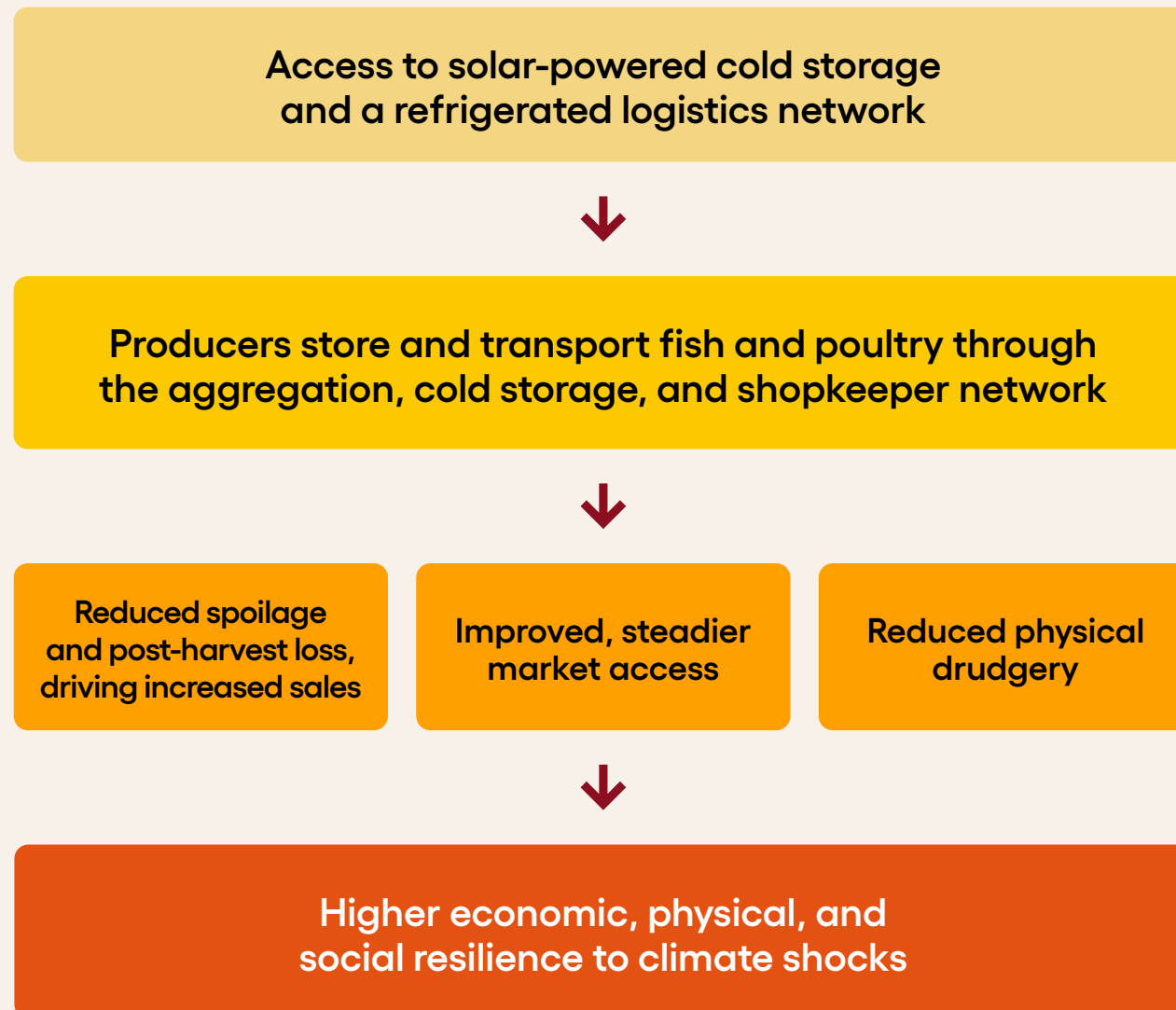


“Keep IT Cool buy chickens at good prices and they come directly to the farm to collect the chickens, so there is no need of transporting them to Nairobi. This actually saves me time and transport costs and makes my work easier.”

— Keep IT Cool customer



Chart 3: How solar-powered cold storage converts into resilience



What this shows

Keep IT Cool shows cold chain working as a resilience system, not a standalone asset. By combining solar cooling with aggregation, logistics, and market access, it reduces spoilage, raises incomes, and steadies livelihoods for producers in climate-exposed value chains.

“Before, I had no proper refrigeration, so my fish could not last for long. I would sell them at a throw-away price. But since Keep IT Cool came to the market, we no longer incur great losses because they buy fish in bulk.”

— Keep IT Cool customer

Case Study 4: Household Solar

Basic electricity access as
a resilience intervention.

The Challenge

Across many markets, low-income households remain under-electrified while also facing high exposure to climate and economic shocks. Without reliable electricity, families often depend on costly, unsafe, and polluting energy sources such as kerosene, candles, batteries, and diesel generators. This affects more than daily convenience. Without basic power, households have fewer ways to stay informed, maintain communication, extend productive hours, or redirect limited income toward essentials. In this context, the absence of electricity is not just an energy gap. It is a constraint on resilience.

The Solution

Solar home systems are often seen as the most basic tier of energy access. Yet in low-income and climate-vulnerable settings, even entry-level systems that provide lighting, phone charging, and small appliance use can serve as foundational resilience infrastructure. Drawing on customer data from five Acumen-supported companies — MyJouleBox, KIMS, RDG, Yellow Solar, and d.light — the evidence shows that solar home systems consistently bring electricity to households with few or no alternatives, while reducing energy costs, improving safety and health, and strengthening access to communication and information.



Resilience Outcomes Scorecard

Economic

Solar home systems reduce spending on kerosene, batteries, paid charging, and other costly substitutes, freeing up cash for essentials.

What customers say

84.5%

of MyJouleBox and d.light customers report increased income.**

67%

report lower energy spending across several markets.*

“I don't need to borrow money from relatives for lighting needs as before — all because there were some surprise expenses like the unexpected hike in paraffin prices or if the paraffin spilled and we needed to buy more. Now I only pay a specific amount that is known monthly for the Solar System.”

— KIMS customer

Physical

First-time access to products gives households improved access to reliable lighting and phone charging, reducing dependence on fragile or unsafe alternatives. These distributed renewable energy systems are also more resilient to disruption from floods and storms than fixed infrastructure.

What customers say

74%

of customers are accessing these products for the first time across portfolio markets.*

Social

Better lighting, reduced exposure to polluting fuels, and stronger information access improve safety, health, and preparedness.

What customers say

92%

report improved safety in several markets.*

73%

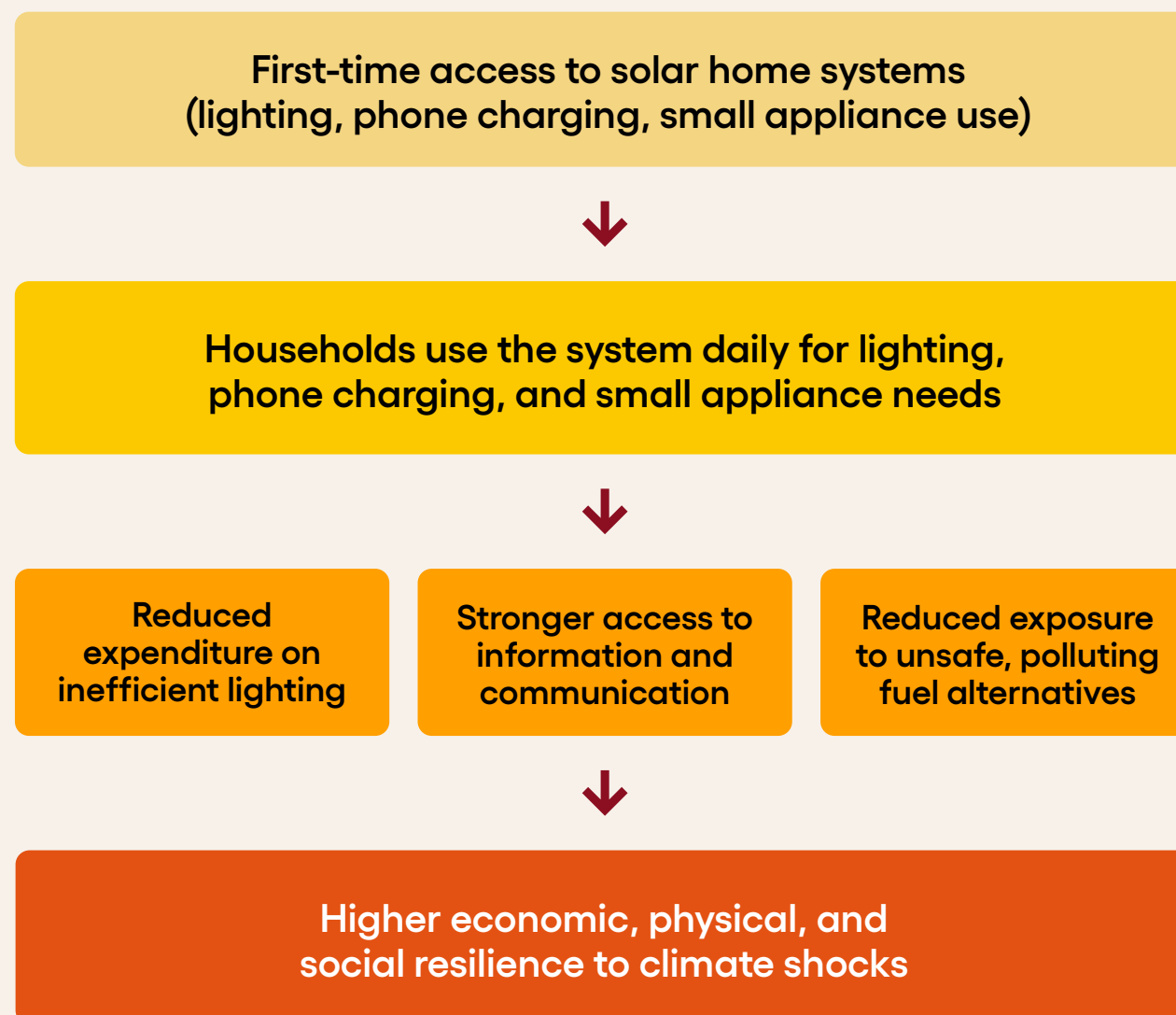
report improved access to clean air and hence, improved health.

* Averaged across five companies: RDG, d.light, Yellow solar, MyJouleBox, and KIMS

** Averaged between two of the five companies: d.light and MyJouleBox



Chart 4: How first-time energy access builds resilience



What this shows

Solar home systems are not only an entry point to energy access. They are also a foundation for resilience. Across this portfolio, they help households reduce costs, improve safety and health, stay connected, and maintain greater stability during disruption. While income impacts vary by market, the overall effect is clear: even basic electricity access can help low-income households better absorb shocks and recover more quickly.

“We never had a reliable source of power for lighting and charging phones, now we no longer rely on charging booths and we don’t have to pay for individual phone charging, and we have been able to save money.”

— RDG customer

What next

Lessons from across the energy ladder

Across the case studies, one lesson stands out: **one technology does not make an individual resilient.**

Bundled services help build resilience

A solar pump, an electric vehicle, a cold room, or an off-grid energy system can all be powerful enablers. But resilience comes from the wider system around each technology: finance, reliable service, aftersales support, productive use, market access, and customer protection. That insight matters across the energy ladder, from household access to productive use of energy. The companies producing the strongest customer resilience outcomes tend to share several characteristics:

- they solve a real and immediate livelihood constraint
- they reduce volatility in income or costs
- they bundle technology with enabling services
- they treat customers with dignity and transparency

Strong customer service helps build resilience

This pattern holds across the wider sector too: 60dB's 2026 report found that customers who experience an unresolved product or service challenge report significantly lower gains in quality of life, safety, health, and energy spending, regardless of subsector. Ease of use, not just access, is what converts a technology into resilience.⁴

Customer resilience relies on company resilience

In addition, customer resilience is inextricably linked to company-level resilience. When a shock hits, a company's survival depends on whether its customers still have enough reserves to keep paying for their products and services. More resilient customers support more durable demand, more reliable repayment, and stronger continuity.

Furthermore, a company failure cascades straight into the lives of customers, cutting off the energy services their livelihoods depend on and removing the resilience the energy service created.

4 60dB: Tom Adams et al, *Why Off Grid Energy Matters 2026*



Conclusion

Climate disruption will continue to shape lives and livelihoods across the Global South. The question is not whether shocks will come, but whether communities will be prepared to absorb them.

Across the technologies covered in this report — e-mobility, irrigation, cold chain, and SHS — the evidence points to a consistent pattern: electrification and DRE have a critical role to play in achieving resilience for the households and small businesses most exposed to climate shocks. Whether through the reduced fatigue and steadier earnings of e-mobility, the reliable harvests made possible by solar irrigation, the preserved value of solar-powered cold chain, or the foundational stability of first-time electricity access, each technology gives customers a stronger footing against a more volatile climate. Across Acumen's portfolio, these solutions are already helping customers lower costs, stabilize income, and recover faster after disruption.

These findings carry a practical implication for how the sector invests and builds. Investing in any of these technologies through the singular lens of mitigation or emissions control underplays their potential and minimizes their vital role as effective, resilience-building products and services for communities on the front lines of climate change. It is important to pair these technologies with financing and service models built for the realities of climate-exposed communities. Sustaining these gains will depend on continued investment not just in the hardware, but in the businesses that keep it working.



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