



ACUMEN
2018

ACCELERATING ENERGY ACCESS: THE ROLE OF PATIENT CAPITAL

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Lead Authors: Leslie Labruto and Esha Mufti

Table of Contents

FOREWORD	02
EXECUTIVE SUMMARY	04
INTRODUCTION	06
1. ENERGY SNAPSHOT: ACUMEN'S TRACK RECORD FOR INVESTING IN ENERGY ACCESS	08
2. THE PIONEER GAP: HOW HAS THE INFLUX OF CAPITAL AFFECTED ENTREPRENEURS?	12
3. NEED FOR CAPITAL: FILLING GAPS IN OFF-GRID ENERGY MARKETS TODAY	16
4. THE BIG PICTURE: WHAT IS THE OPTIMAL MIX FOR SCALING ENERGY ACCESS COMPANIES?	26
5. REACHING THE POOR: USING PATIENT CAPITAL TO ACCELERATE IMPACT	38
6. BEYOND CAPITAL: WHAT DO ENERGY ACCESS STARTUPS NEED?	46
7. FACILITATING EXITS: SENDING THE RIGHT MARKET SIGNALS	48
8. CONCLUSION: WORKING TOGETHER TO CATALYZE ENERGY ACCESS	56
APPENDIX	58

Jacqueline Novogratz FOUNDER & CEO

Dear Reader,

I am pleased to share Acumen's *Accelerating Energy Access: The Role of Patient Capital* report with you. Over the last decade, Acumen and a handful of other investors have helped startups bring energy access to 360 million people. That's almost half the total number of people who have gained access during that time. Today, there are more entrepreneurs working on this challenge than ever before, and they are attracting growing amounts of capital. In 2017 alone, energy companies raised \$300 million when compared to \$50 million in 2012. However, as we will demonstrate in this report, this influx of capital has not closed the funding gap, especially for companies in critical early stages of development.

If we want to solve the energy access challenge in the next 15 to 20 years, we need to build innovative ways to reach people still living in the dark, most of whom are low-income. Despite proven successes in off-grid energy in recent years, investors are unwilling to fund early-stage companies that are addressing the needs of these communities. These companies operate in fragile or underdeveloped markets, and require patience to develop sustainable business models that can operate in challenging places. So, when we think about Acumen's work today, and whether there is still a need for early-stage, patient capital in off-grid energy, the answer is clear: a resounding yes.

Entrepreneurs who use the market as a listening device to serve and transform the lives of low-income customers play a critical role in closing the energy access gap. These companies need investors who are risk tolerant and patient to stay true to their mission. Patient capital allows companies to understand demand, ensure affordability, and grow thoughtfully, recognizing the challenges every company faces.

Our intent with this report is to share what Acumen has learned about capital – the needs, the optimal mix, and the role that patient capital plays in off-grid energy.

For the first time in history, bringing affordable electricity to every human on earth is within our reach. However, the energy access ecosystem still requires more building, more coordination, and more capital if we are to achieve United Nations Sustainable Development Goal Seven of achieving universal energy access by 2030.

We hope to inspire people and organizations to recognize that only if we work together and step up to this challenge, will we be able to bring modern lighting, power, and clean cooking to all people across the world.

Thanks to all of you who have supported Acumen’s work and the off-grid energy sector to date. We wouldn’t be here without you.

A handwritten signature in black ink, appearing to read 'Jacqueline Novogratz', with a stylized flourish extending to the right.

Jacqueline Novogratz
Founder and CEO, Acumen

EXECUTIVE SUMMARY

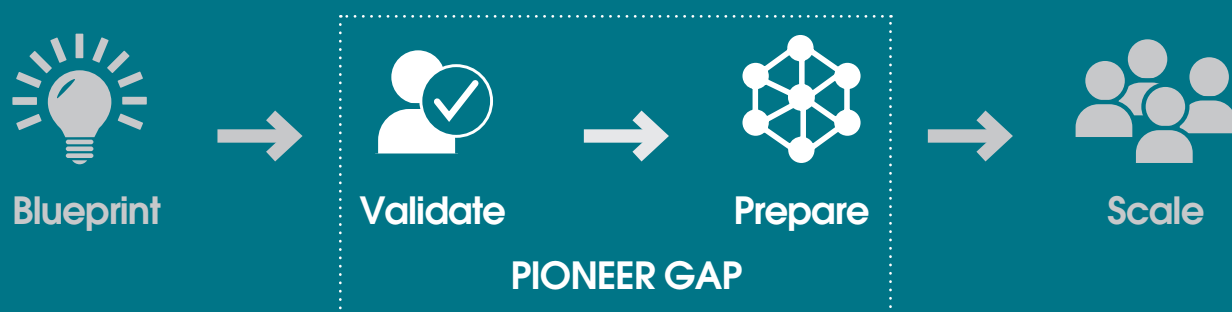
We will not realize the United Nations Sustainable Development Goal of access to clean, affordable energy for all by 2030 at the current rate of progress, according to the latest data. The stakes are high: more than one billion people live without access to electricity, and three billion people cook in ways that harm their health and the environment, and drain their household savings.

There is, however, ample cause to hope: of the more than 800 million people who have gained access to energy over the last decade, 360 million—or 45 percent—have gained access because of path-breaking startups.¹ These companies have harnessed the potential of off-grid energy to bring clean, affordable electricity to people who previously relied on dirty fuels like kerosene for their lighting needs. Clean cooking companies have developed products that burn biomass and charcoal more cleanly and efficiently, leading to reduced household emissions and deforestation, and improved household savings.

Patient investors who saw tremendous potential early on have backed these pioneering energy companies, and they are proving that they can help solve the challenges of energy access for those living off the grid. In 2017, over \$300 million was invested into the off-grid sector compared to \$50 million in 2012, and total sales in the sector are nearly \$4 billion today.

Acumen has been investing in this market for the last 10 years. Given the increased capital flows, we believed the time was right to ask if entrepreneurs now have access to the right types, amount, and mix of capital to grow their businesses. To answer this question, we interviewed 15 energy access CEOs from Acumen's portfolio, worked with external advisors, and reviewed peer research. We focused on the “pioneer gap,” where companies have experienced the greatest challenge attracting financing. These companies are too big for seed capital and too small for commercial capital, a conclusion that came out of *From Blueprint to Scale: The Case for Philanthropy in Impact Investing* by Monitor Group and Acumen in 2012.

Figure 1: **Stages of Growth from Blueprint to Scale**



Our research indicates \$210 million in early-stage equity is required annually to close the energy access gap, while less than \$16.5 million has been deployed annually, on average, over the last five years.

We found that, despite a six-fold increase in capital invested over the last five years, the pioneer gap still exists in the energy access market. A majority of the capital invested has been debt or concentrated in a select few companies with proven business models. Meanwhile, 93 percent of our energy access CEOs operating in the pioneer gap stated that they continue to face significant challenges in accessing investment capital. With more than 200 other companies in the off-grid sector operating in the pioneer gap, the market is clearly falling short.

Next, we evaluated the important role patient capital can play in filling the pioneer gap.² Patient capital is early-stage equity or debt focused on generating social and financial returns. Alongside grant capital, patient capital can support new business models to build markets and scale impact. For this report, we focused on equity because Acumen has primarily invested equity in early-stage energy startups. Our research indicates \$210 million in early-stage equity is required annually to close the energy access gap, while less than \$16.5 million has been deployed annually, on average, over the last five years.³

While grants can also help companies in the pioneer gap develop, validate, and establish new business models, patient capital plays an important role in attracting and unlocking the additional investment capital—equity and debt—needed to scale off-grid energy companies. For example, because of the \$22.1 million of patient capital we invested in our 20 early-stage energy access companies, these companies have raised more than \$219.5 million in investment capital in subsequent fundraising rounds, or 10x the capital we initially invested.

Lastly, we found that the sub-sectors we invest in—solar home systems, mini-grids, and clean

cooking—need different types, amounts, and mixes of capital because they are at different stages of maturity and have different business model challenges.⁴

With the right infusion of capital and support, off-grid solutions could bring lighting and power to an additional 620 million people by 2030—that's 60 percent of the total number of people living without access to energy today. Our hope is that this report will serve as a public resource for investors, entrepreneurs, policymakers, and other stakeholders to work together to increase the availability of capital across the sector, with a focus on the patient capital needed to close the pioneer gap.

Acumen's portfolio companies have raised more than \$219.5 million in investment capital in subsequent fundraising rounds, or 10x the capital we initially invested.

INTRODUCTION

More startups than ever before are pioneering new technologies and business models to provide energy access to the more than one billion people living without electricity and three billion cooking with dirty fuels. These social enterprises are operating in some of the most difficult and fragile markets in the world and, despite these challenges, the off-grid sector has seen a dramatic increase in investment over the last five years, reaching over \$300 million in 2017.⁵

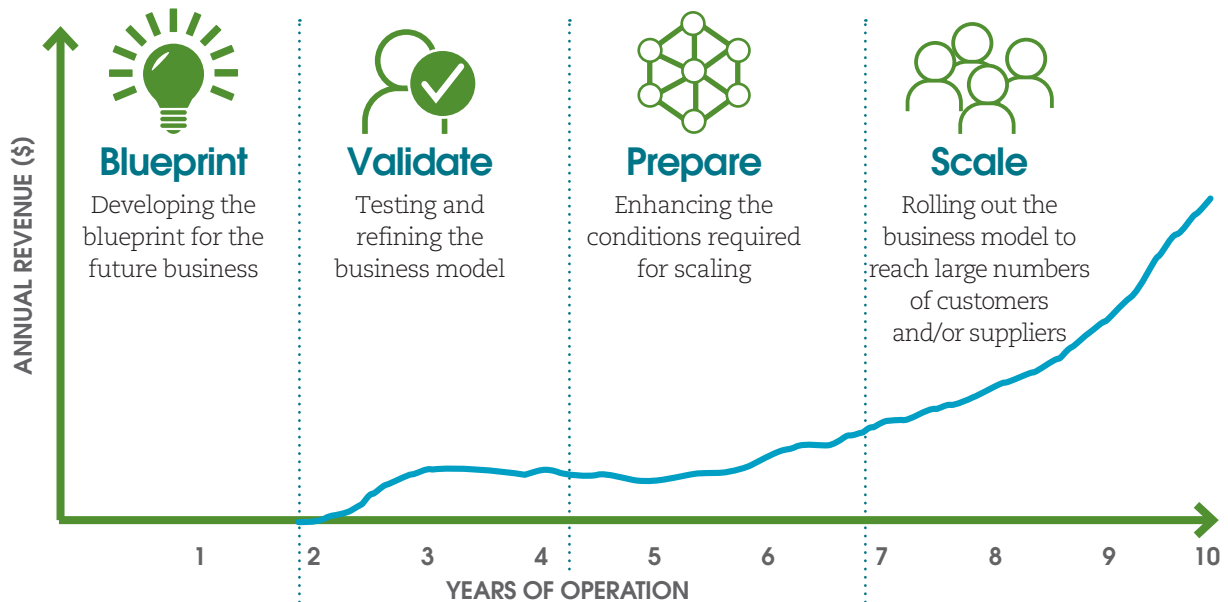
Reflecting on this exciting growth, we wanted to take a step back and analyze how this influx of capital has impacted the off-grid energy market. In particular, we wanted to evaluate whether the “pioneer gap” that we introduced with the Monitor Group in 2012’s *From Blueprint to Scale: The Case for Philanthropy in Impact Investing* is finally beginning to close.⁶ This gap is where social enterprises struggle to access the right kind of capital to validate their business models and prepare for scale. In addition, we wanted to evaluate whether there is still a need for patient capital in the form of early-stage equity to fill the pioneer gap.

We define patient capital as investment capital with a long-term investment horizon of seven to 12 years, a high tolerance for risk, and a goal of maximizing both social and financial returns. Patient capital can be debt or equity but, in this report, we focus on equity because Acumen has mostly invested equity in off-grid energy. Although grants are the most patient type of capital, they are simply referred to as grants in this report.

To analyze the pioneer gap and the role of patient capital, we interviewed 15 CEOs in Acumen’s energy portfolio, asking a standard set of questions on their fundraising history, the availability and use of various forms of capital in the sector, the challenges they’ve faced as their companies have grown and evolved, and the overall support they need to maximize their impact and build commercially viable businesses. In addition, we analyzed more than 1,000 data points from our companies’ financial and operational performance to identify what it takes to create a scalable business model in the off-grid energy sector. Lastly, we reviewed research by peer organizations to better understand the overall need for capital in the off-grid energy sector and the optimal mix of capital for solar home system, mini-grid, and clean cooking companies.

These social enterprises are operating in some of the most difficult and fragile markets in the world and, despite these challenges, the off-grid sector has seen a dramatic increase in investment over the last five years, reaching over \$300 million in 2017.

Figure 2: Stage of Company Growth and Respective Capital Needs



KEY ACTIVITIES	<p>Understand customer needs</p> <p>Develop initial customer proposition, business plan, core technology and/or product</p>	<p>Conduct market trials</p> <p>Test business model assumptions</p> <p>Refine business model technology and/or product as required</p>	<p>Stimulate customer awareness and demand</p> <p>Develop supply chain</p> <p>Build operational capacity to scale; systems, talent, plant, etc.</p>	<p>Move into new geographies and segments</p> <p>Invest in assets and talent</p> <p>Enhance systems and processes</p> <p>Respond to competitors</p>
KEY NEEDS	<p>Innovation capacity and talent networks</p> <p>Strategy development and business planning</p> <p>Seed funding</p>	<p>Operationalize model and focus on cost, value and pricing</p> <p>Innovation capacity</p> <p>Funds to facilitate market trials and refinement</p>	<p>Marketing strategy and execution</p> <p>Supply chain design, system implementation, and talent</p> <p>Capital for marketing, fixed assets, and inventory</p>	<p>Realize scale efficiencies</p> <p>Stakeholder and risk management</p> <p>Funds to support expansion</p> <p>Competitive strategy</p>
OPTIMAL AMOUNT	\$10,000 - \$1M	\$250,000 - \$5M	\$3M-10M	\$10M+
CAPITAL PROVIDERS	Grant providers, R&D funding, governments, treasury	Grant providers, early-stage equity, early-stage debt	Grant providers, early-stage equity, early-stage debt	Private equity, commercial debt



1

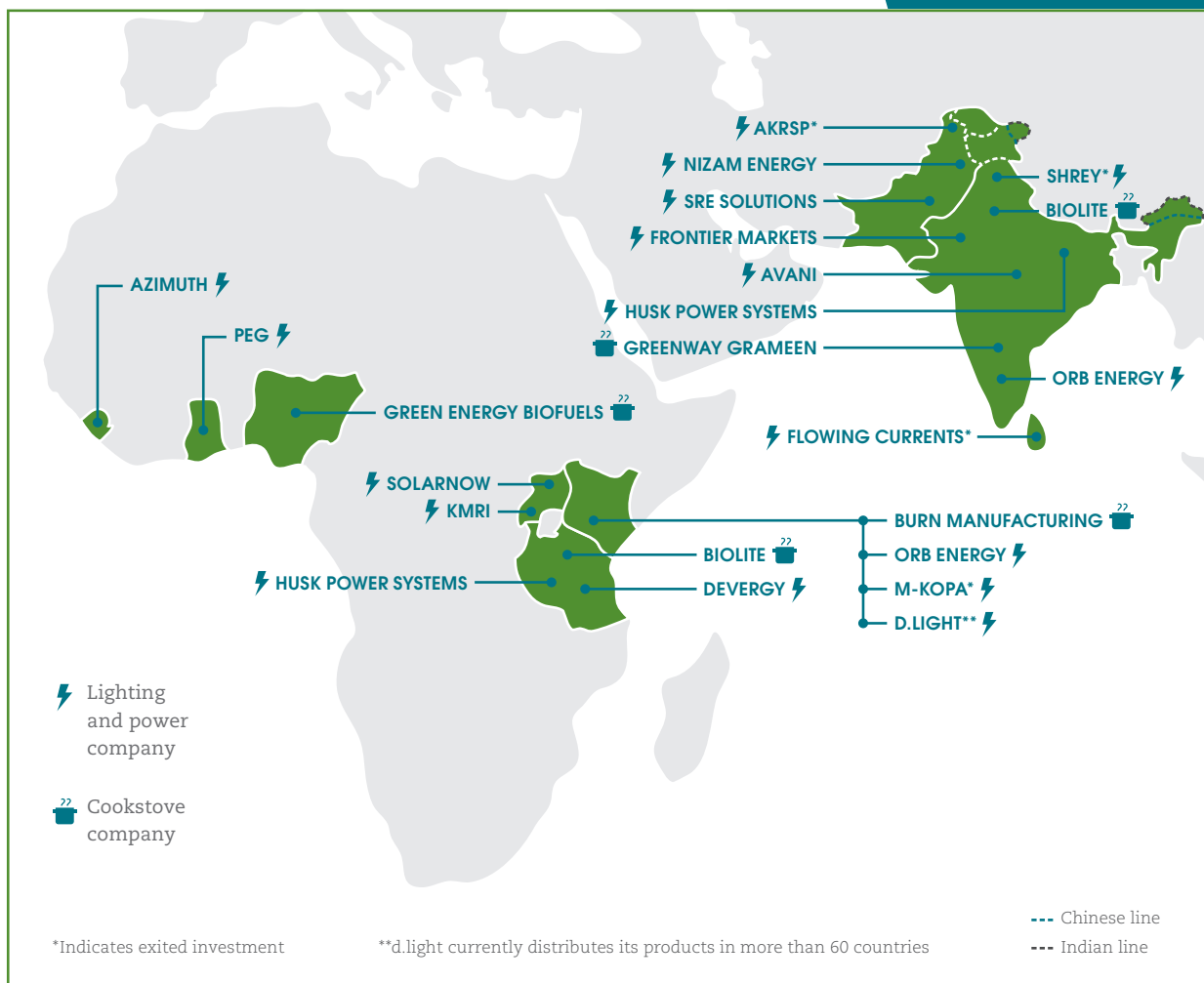
ENERGY SNAPSHOT:

ACUMEN'S TRACK
RECORD FOR
INVESTING IN
ENERGY ACCESS

Customers of Frontier Markets, India.

ACUMEN'S ENERGY ACCESS PORTFOLIO AT A GLANCE

Figure 3: **Geographic Distribution of Acumen's Energy Access Portfolio**



Map Source: United Nations Geospatial Information Section

ACUMEN'S ENERGY ACCESS PORTFOLIO STATISTICS



**\$22.1
MILLION**
INVESTED

Acumen's ability to research and understand the role of capital in off-grid energy is possible because of our partners who have provided us with philanthropic and grant capital to invest in the sector, peer investors, off-grid energy stakeholders, and, of course, the entrepreneurs. As of January 2018, Acumen and its companies have made the following progress providing off-grid energy access:



8
COUNTRIES

INDIA, GHANA,
KENYA, NIGERIA,
PAKISTAN, SIERRA LEONE,
TANZANIA, AND UGANDA



1.3x
AVERAGE
RETURN MULTIPLE
SINCE 2006

36%
AVERAGE COMPOUNDED
ANNUAL GROWTH RATE
(CAGR) IN REVENUE
FOR OUR PORTFOLIO
COMPANIES SINCE 2014

20
COMPANIES
16 CURRENT, 4 EXITED

\$219.5
MILLION
IN FOLLOW-ON
CAPITAL LEVERAGED

86

MILLION LIVES

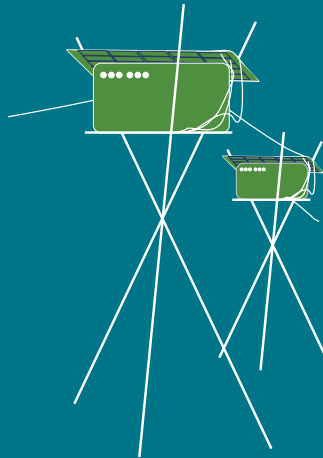
IMPACTED BY OUR PORTFOLIO COMPANIES



815k

COOKSTOVES

SOLD BY OUR
PORTFOLIO COMPANIES



35%

OF ENERGY CUSTOMERS
LIVE BELOW THE 2017
WORLD BANK
INTERNATIONAL RELATIVE
POVERTY LINE OF
LESS THAN \$3.10/DAY



474k

SOLAR HOME SYSTEMS

SOLD BY OUR
PORTFOLIO COMPANIES

78k

MINI-GRID

CONNECTIONS

ESTABLISHED BY OUR
PORTFOLIO COMPANIES

72%

OF CUSTOMERS LIVE
ON LESS THAN \$6 A DAY



19.4M

SOLAR LANTERNS

SOLD BY OUR
PORTFOLIO COMPANIES



58 MILLION PEOPLE

HAVE ACCESS TO MODERN
ENERGY FOR THE FIRST TIME



TABLE

2

THE PIONEER GAP:

HOW HAS THE INFLUX OF CAPITAL AFFECTED ENTREPRENEURS?

Employees of Orb Energy, India.

When we interviewed the CEOs across our portfolio, 93 percent of whom are operating in the pioneer gap, they unanimously agreed that access to finance is the paramount challenge facing their businesses.

Although there is more capital in the off-grid energy space today than five or 10 years ago, off-grid companies at all stages of growth are still undercapitalized. When we interviewed the CEOs across our portfolio, 93 percent of whom are operating in the pioneer gap, they unanimously agreed that access to finance is the paramount challenge facing their businesses. This is reinforced when looking at the current trends in capital flows.

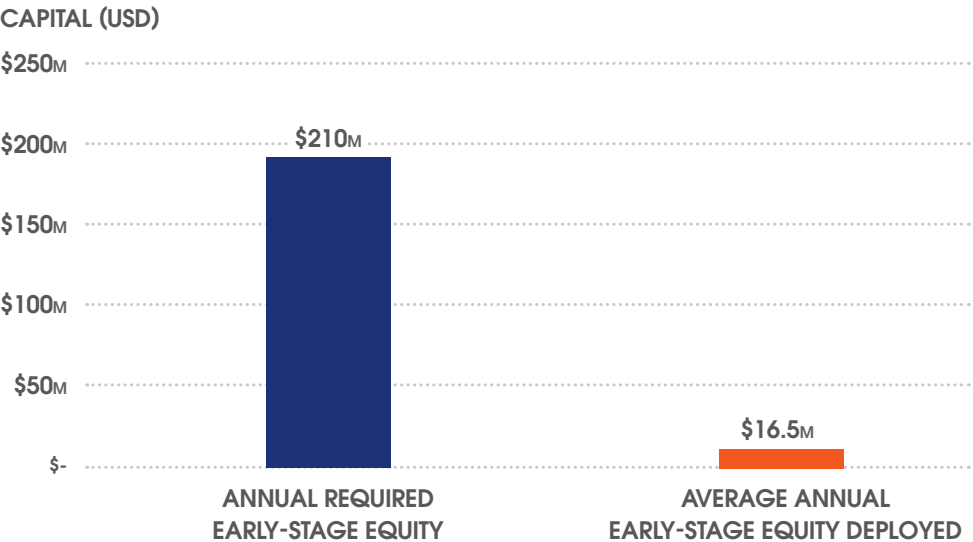
To calculate the total amount of early-stage equity needed to get companies through the pioneer gap, we evaluated research from the solar home system, mini-grid, and clean cooking sub-sectors. We found that we need to invest \$11.4 billion annually, of which \$4.2 billion is equity, to help achieve universal energy access by 2030, United Nations Sustainable Development Goal (SDG) Seven.⁷

Assuming early-stage equity is five percent of the sector's total equity needs of \$4.2 billion, it means \$210 million in early-stage equity is required

annually to get existing and future companies through the pioneer gap. Yet, less than \$16.5 million has been deployed annually on average over the last five years.⁸ This lack of early-stage equity leaves the sector at risk for missing SDG Seven by an even greater margin than anticipated.⁹ If new, pioneering companies cannot raise enough capital to prove their business models, they will not scale and we will lose one of the most powerful opportunities to provide energy to the millions of people living off the grid.

Assuming early-stage equity is five percent of the sector's total equity needs of \$4.2 billion, it means \$210 million in early-stage equity is required annually to get existing and future companies through the pioneer gap. Yet, less than \$16.5 million has been deployed annually on average over the last five years.

Figure 4: Total Early-Stage Equity Gap in Off-Grid Energy Access Market

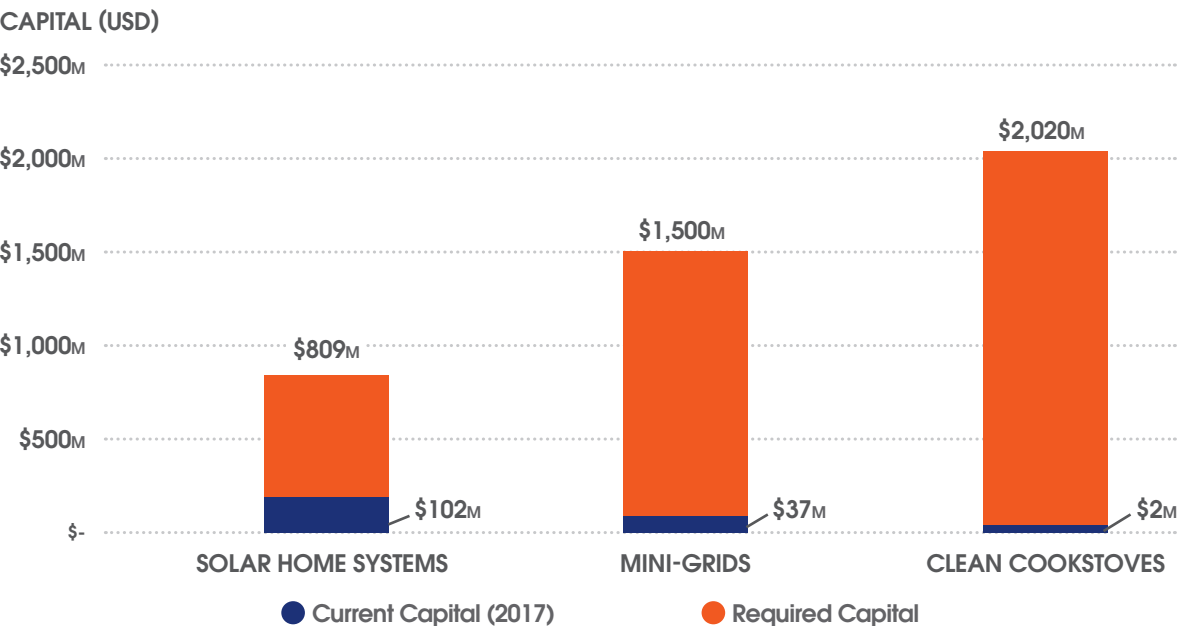


There are more than 200 off-grid energy companies across Africa and Southeast Asia in the Validate and Prepare stages of growth, operating in the pioneer gap where

they struggle to access the capital they need to grow. The total equity needs, including early-stage and later-stage equity, by sub-sector range from \$800 million additional

equity required for solar home system companies to over \$1.5 to \$2 billion needed for the mini-grid and clean cooking companies, respectively.

Figure 5: Annual Required vs. Current Mix (2017) of Equity by Sub-Sector



For example, 67 percent of equity investments—or \$518 million of \$733 million total equity invested in the solar home system sub-sector since 2012—has been invested in just four companies.

The capital being invested is concentrated and skewed toward a select few companies with proven business models. For example, 67 percent of equity investments—or \$518 million of \$733 million total equity invested in the solar home system sub-sector since 2012—has been invested in just four companies. This leaves all other solar home system companies competing for the remaining scattered amounts of early-stage

equity. For the mini-grid sector, equity investments are slowly increasing but are still 40x less than we need for these companies to scale. In the clean cooking sector, we find the bleakest prospects for companies trying to raise capital: less than \$2 million in total equity was invested in clean cookstoves companies in 2017. Entrepreneurs are left to find small amounts of capital from fragmented capital markets.



Mini-grids of Microdip, India.



3 NEED FOR CAPITAL:

FILLING GAPS IN
OFF-GRID ENERGY
MARKETS TODAY

A customer of Easy Solar, West Africa. Courtesy of Easy Solar.

Over the last 11 years, Acumen has led the first equity rounds on 15 out of our 20 energy access investments. Over 90 percent of the 15 CEOs indicated that other investors required earlier risk capital—such as a patient capital—before being willing to make an investment. Additionally, these CEOs indicated that other investors wanted to see robust annual

revenue growth of greater than 25 percent prior to considering an investment. This is logical but puts energy access entrepreneurs in a difficult place: investors want to see revenue growth to make an investment, but entrepreneurs need capital and time to find the optimal business model that meets customer needs to generate that growth. Although patient capital

isn't the only type of equity in the market, it often serves as a catalyst, taking on the risk and creating the time needed to prove business models for later-stage investors.

Table 1 identifies the different types and profiles of equity providers in the off-grid energy access market:

Table 1: Types and Profile of Equity Providers in the Off-Grid Energy Access Market

	Seed Equity	Early-Stage Equity	Private Equity
Description	Family and friends, seed investors	<p>Patient capital investors (seeking impact return and financial return in service of creating sustainable models)</p> <p>Venture capital investors (seeking financial returns)</p>	<p>Financial return-focused, later-stage investors</p> <p>Strategic corporate investors</p>
Average Ticket Size	\$1,000 - \$1M	\$250K - \$5M	\$5M - \$100M
Risk Profile	High	Medium to high	Medium
Stage	Blueprint, Validate	Validate, Prepare	Scale
Examples	High net worth individuals, angel funds	Acumen, Omidyar Networks, Bamboo Capital Partners, Energy Access Ventures, Investisseurs & Partenaires (I&P)	Helios, Investec, Apis Partners, Shell New Energy Ventures

Over the last 11 years, Acumen has led the first equity rounds on 15 out of our 20 energy access investments. Over 90 percent of the 15 CEOs indicated that other investors required earlier risk capital—such as a patient capital—before being willing to make an investment.

Why is patient capital needed?

Like all early-stage startups, off-grid energy companies need time to understand customer behavior and preferences. However, unlike most startups that target middle- or high-income customer segments, the majority of people living without electricity and cooking with dirty fuels today are poor. As a result, these companies face additional obstacles. They need to find the right price points and financing solutions to ensure their energy products and services are truly affordable and not pushing customers into debt. They operate in underdeveloped or unstable markets with few, if any, investors. And, in the case of clean cooking companies and mini-grid companies in rural areas, they confront the challenge of changing long-held cultural behaviors.

Patient capital provides off-grid energy startups with the key benefits of equity well understood in developed capital markets: equity is used to fund core operations, hire talented staff, and put systems and processes in place as companies find the right business models, price points,

and financing options to serve customers. Whereas debt requires structured repayments that can constrain a company's cash, equity provides capital with no fixed repayment schedule thereby providing the company with flexibility to make the necessary investments for growth.

Unlike in developed capital markets, off-grid energy startups in emerging markets are often funded with grant capital. Grant capital is the least expensive type of capital for an entrepreneur as it charges no interest and funders do not take a position as shareholders in the company. In general, grants are provided by funders who want to maximize social returns, which means they also are focused on reaching the poor and underserved. Grants can also be used to fund operations, therefore playing a similar role to equity. That being said, grants do not have the signaling effect of patient capital, meaning that they often do not position companies for subsequent equity raises.

We increasingly hear from grant makers that the biggest obstacle their grantees face to scale is

access to finance. For example, the Founder and Director of the Ashden Awards, Sarah Butler-Sloss, said:

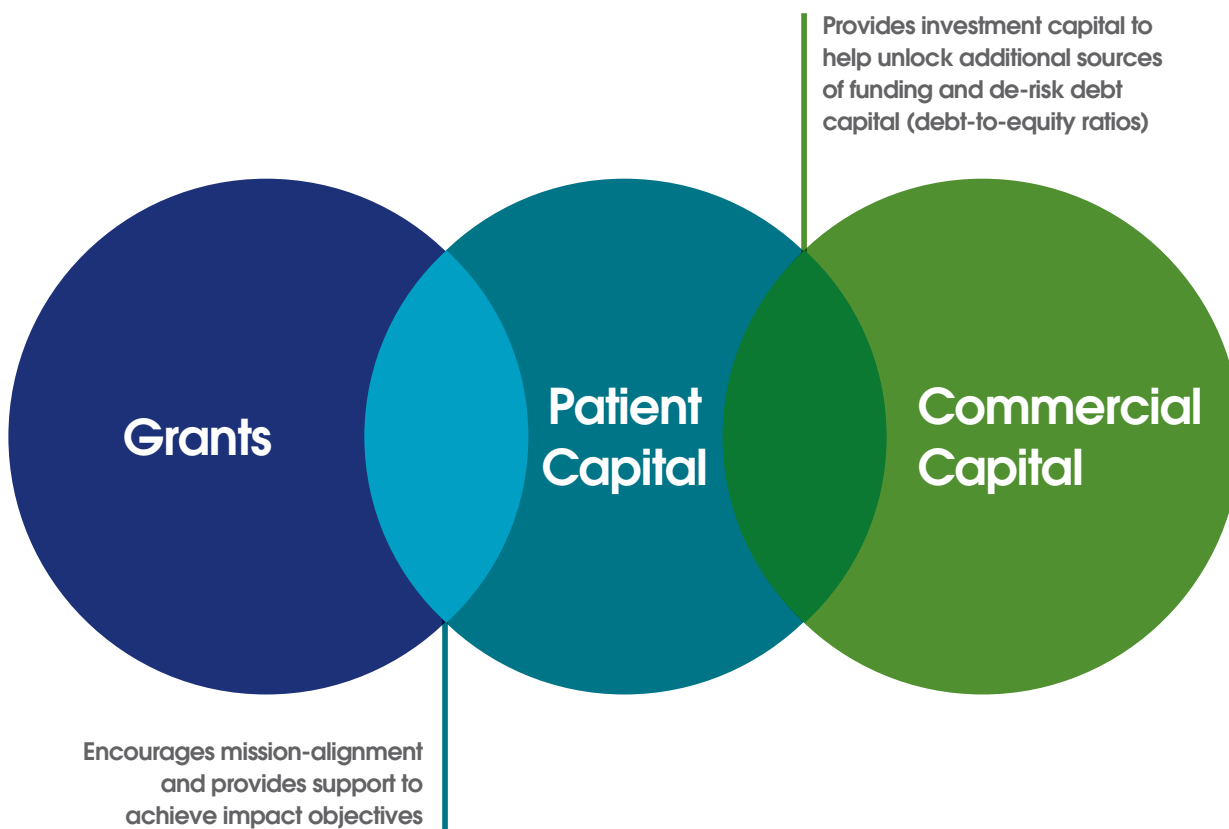
"Whether it is a cookstove company in India or a pay-as-you-go company in Tanzania, the need for more patient capital and concessionary finance, as well as straightforward finance at the right size, is crucial but very hard to find. Our winners are generally at an early growth stage. The sector is too nascent for the local banks to understand, so a local loan is very unlikely. And the large investors such as the development agencies and development banks don't know how to deal with the smaller ticket size. It is easier to raise over \$100 million than to raise under \$2 million. For this sector to survive, to grow and to scale up it needs soft, patient or concessionary capital at the right size and plenty of it."

"Whether it is a cookstove company in India or a pay-as-you-go company in Tanzania, the need for more patient capital and concessionary finance, as well as straightforward finance at the right size, is crucial but very hard to find."

—SARAH BUTLER-SLOSS
FOUNDER AND DIRECTOR
OF THE ASHDEN AWARDS

Grants can also be used to fund operations, therefore playing a similar role to equity. That being said, grants do not have the signaling effect of patient capital, meaning that they often do not position companies for subsequent equity raises.

Figure 6: Distinguishing Factors of Patient Capital



Patient debt lenders also play an important role in funding companies, as debt can finance the cost of carrying inventory and cover money owed to the companies by customers. Off-grid energy companies need debt to be

able to offer long-term payment plans for products on credit. Lenders take on less risk than equity investors and need to see a certain amount of equity in a company to ensure a strong capital base to support the company and

the repayment of its loans. In fact, 87 percent of CEOs say Acumen's investment capital directly helped unlock both debt and equity in their companies.

SunFunder:

The Role of Debt in Off-Grid Energy Companies

Figure 7: SunFunder Portfolio Overview

FULL TRACK RECORD

\$38.7M
CUMULATIVE SOLAR
LOANS CLOSED

<1%
PAYMENT LOSS
FROM BORROWERS

37
BORROWERS SERVICED

100%
ON-TIME DEBT SERVICE
TO OUR INVESTORS

104
LOANS DEPLOYED

2017 INVESTMENT ACTIVITY

\$20.0M
SOLAR LOANS
CLOSED IN 2017

\$1.3M
AVERAGE TICKET
SIZE CLOSED IN 2017

+107%
YOY GROWTH
IN OUTSTANDING
PORTFOLIO

9
NEW
BORROWERS

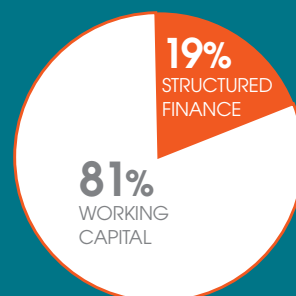
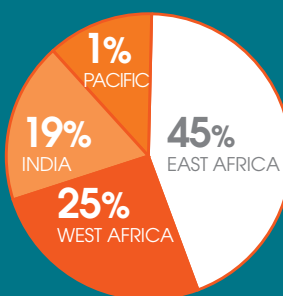
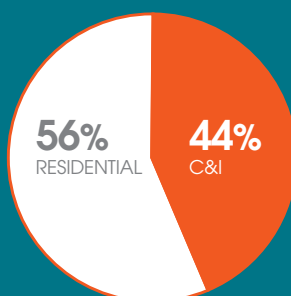
ACTIVE PORTFOLIO AS OF DECEMBER 31, 2017 AS % OF TOTAL PRINCIPAL AMOUNT

In traditional markets, local banks often provide debt for working capital, construction, and loans. However, many local banks in countries where off-grid companies operate are unfamiliar with their business models and uncertain about or unable to offer lines of credit.

SunFunder provides debt financing for solar companies and projects in emerging and frontier markets. It is one of the few debt providers serving energy access enterprises and has built a robust track record, having worked with nearly 40 solar companies since starting in 2012.

For SunFunder's solar company borrowers, this early-stage debt financing is key for them to reach scale. Working through its due diligence requirements can support the financial controls that entrepreneurs need in place for the long-term, which are often the lender's conditions for disbursement.

For early-stage companies, raising debt and equity can be closely linked to their ability to stay healthy and thrive. SunFunder and other debt providers play a critical role in financing working capital and complement equity providers to ensure companies have the investment capital they need to scale.



When companies seek out debt capital, lenders need to see anywhere from 1:1 to 5:1 debt to equity ratios to consider lending. Of course, lenders will also assess the size, maturity, profitability, track record, quality of management, business model, and the structure of the debt facility itself. They will always look at a company's ability to service debt and, where cash flows are tight, more equity is typically required. Lenders also assess the quality of equity investors to see from whom the company has been able to raise capital. As we see below, Acumen has been part of a consortium of investors that has helped unlock

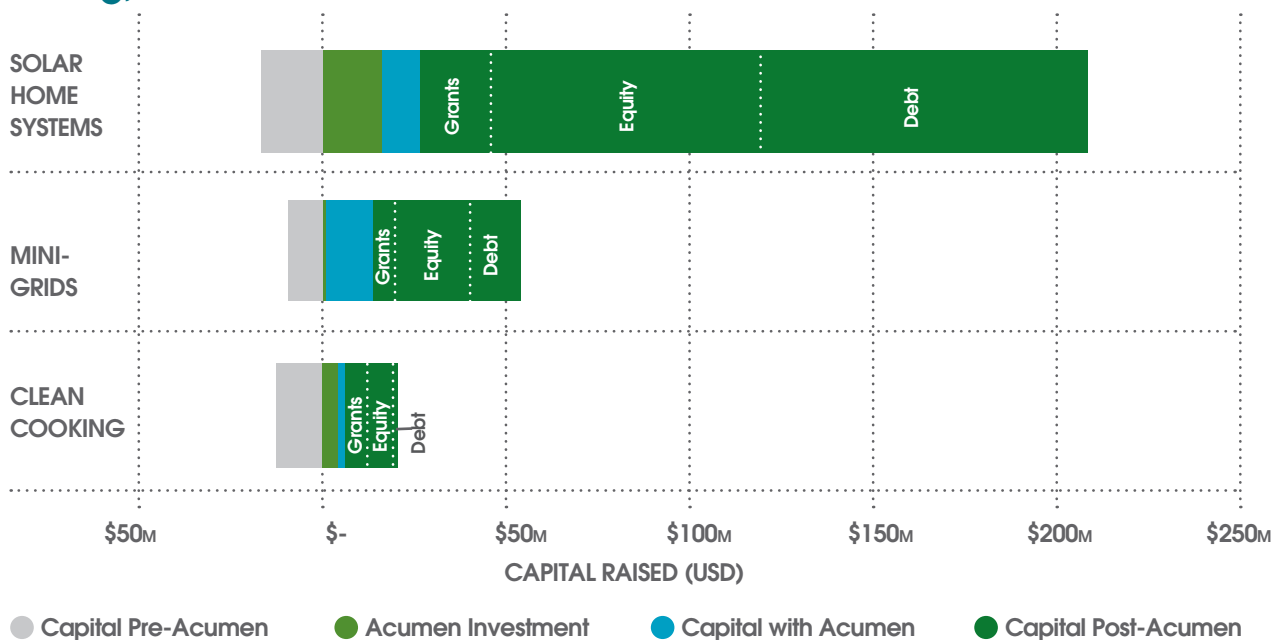
In total, Acumen's energy companies have raised \$219.5 million in subsequent fundraising rounds—or 10x Acumen's initial investment capital—demonstrating the power of early-stage equity, or patient capital, to catalyze the capital market.

capital: \$180.9 million in the solar home system sector, \$24.7 million in mini-grids, and \$14.4 million in clean cookstoves.

In total, Acumen's energy companies have raised

\$219.5 million in subsequent fundraising rounds—or 10x Acumen's initial investment capital—demonstrating the power of early-stage equity, or patient capital, to catalyze the capital market.

Figure 8: Capital Raised by Acumen Portfolio Before, During, and After Acumen's Investment



In Figure 8, we see that nearly 90 percent of follow-on capital raised by solar home system and mini-grid companies was in the form of debt and equity following Acumen

and our co-investors' investment. In contrast, only 64 percent of follow-on capital for clean cooking companies was in the form of debt and equity, and 36 percent was in

the form of grants needed to support continued market development.

CASE STUDY



A customer of BURN Manufacturing, East Africa.

BURN Manufacturing:

Demonstrating the Importance of Patient Capital Equity

BURN Manufacturing produces fuel-efficient charcoal cookstoves for the East African market. The company's business model encompasses the design, manufacturing, and sale of cookstoves that burn charcoal as well as wood. In 2014, BURN raised debt from General Electric and the Overseas Private Investment Corporation (OPIC). BURN's CEO Peter Scott knew that he needed equity,

rather than debt, to fund core operations. However, he did not have any interest from equity investors to support his vision of reducing poverty and protecting the environment by delivering locally manufactured, fuel-efficient cookstoves. The company therefore accepted what was available. "Almost all the money we raised was the only money that was available," said Scott.

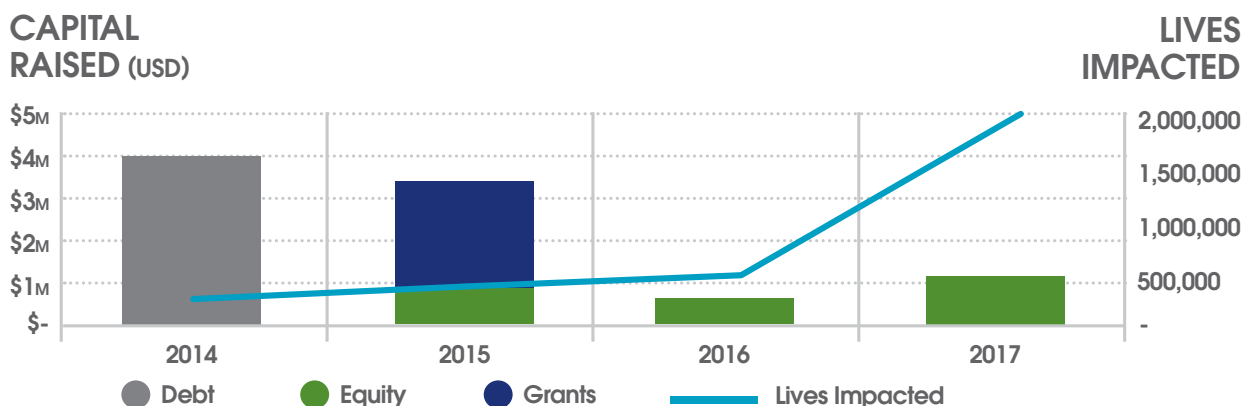
The debt investment from General Electric and OPIC was used to fund core operations, product research and new design, all functions better covered by equity and grants. BURN also received a \$500,000 Spark Fund grant from the Global Alliance for Clean Cookstoves for the construction of its manufacturing plant.

A few years later, Acumen invested \$1.5 million of patient capital in the form of equity in partnership with Unilever in a series of tranch investments. Acumen also joined the board and provided strategic finance advice to help the company undertake a painful but necessary debt restructuring process. Had BURN been unable to restructure this debt, it would have been obligated to divert a significant portion of its operating income to meet debt service, severely impairing the

company's potential for success. Had BURN simply raised grants, the company may not have received the support it needed to restructure its debt.

An improved mix of capital—including equity, debt, and grants—has given the management team a greater degree of flexibility to fund core operations, iterate its business model, and stay focused on serving the poor, while attracting follow-on investment capital needed to scale. BURN recently launched the wood-burning Kuniokoa, which incorporates learnings from its initial product, the Jikokoa charcoal stove, and is actively raising capital in the market. BURN's experience highlights the role patient capital equity can play during critical early stages of growth as well as the danger of using debt to fund core operations.

FIGURE 9: Capital Raised and Impact Profile
BURN Manufacturing





Margaret Gbedema, customer of PEG Africa, West Africa. Credit: Martin Wright

PEG Africa:

Patient Capital Equity Unlocking Debt

PEG Africa was the first company in the pay-as-you-go (PAYG) solar market to have a strategy to license the hardware and software from more established players in the sector, as well as focus on distribution and financing. Since its inception, PEG Africa has emerged as one of the leading players in the off-grid solar market in West Africa. It currently has a network of approximately 350 direct sales representatives and 55 service centers and

retail locations in Ghana and Cote d'Ivoire.

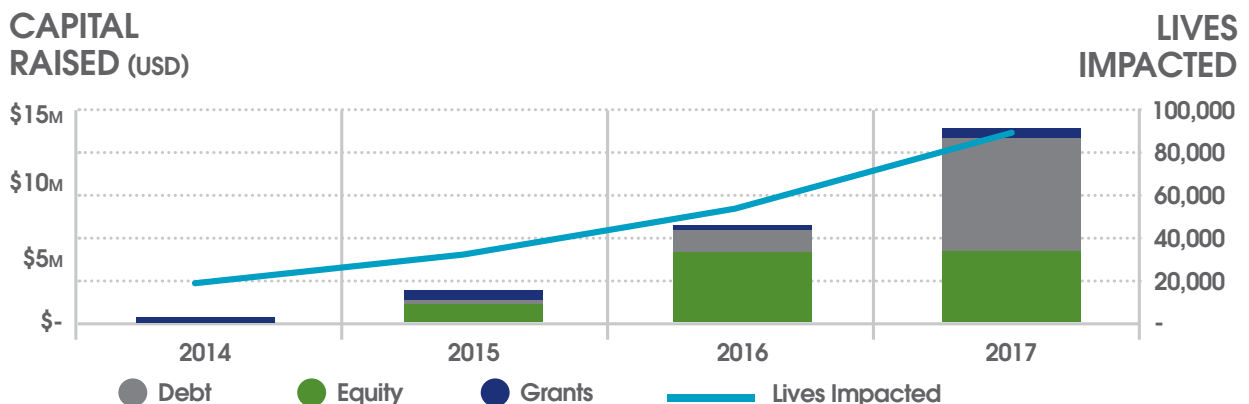
In 2017, Acumen invested \$1 million in equity as part of the company's Series B round to raise equity to support:

- + Inventory (i.e., solar home system) purchases to support expansion in Ghana
- + Expansion into new West African markets
- + Core operations (e.g., staff salaries)

PEG Africa is a great example of how a company can use various forms of capital to support its growth through the pioneer phase and how early-stage equity can de-risk future debt investments. PEG relied on a mix of grants from donors and early-stage equity, provided by patient and venture capital providers, to build its distribution network and begin validating its business model for solar home systems in a new geography, Ghana, between 2014 and 2015. The company then raised debt capital in 2016 from SunFunder as lenders became more comfortable with the business model and were further reassured by the presence of equity on the company's

balance sheet. Debt financing is now used to support product purchases, freeing up other sources of capital for expansion and customer acquisition. In 2017, PEG needed to raise at least \$1 million in new equity to be considered for additional debt financing, as their existing debt to equity ratio was considered too high to take on more debt. Acumen stepped in at this critical juncture to lead the Series B, unlocking PEG's access to debt. In 2018, PEG Africa, with support from SunFunder, ResponsAbility and Oikocredit, completed an \$8 million multi-currency debt round—the first such offering in the off-grid sector, underscoring the value of equity as a tool to secure additional capital.

FIGURE 10: Capital Raised and Impact Profile
PEG Africa



4

THE BIG PICTURE:

WHAT IS THE
OPTIMAL MIX
FOR SCALING
ENERGY ACCESS
COMPANIES?

A customer of d.light, India.

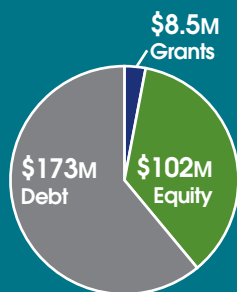
Overall, our CEO interviews support the research that shows the current capital mix available does not provide enterprises with access to the right types of capital to validate or prepare their business models for scale.

To deepen our analysis, we evaluated the capital gaps in the off-grid energy sub-sectors we invest in: solar home systems, mini-grids, and clean cooking. We found that each of these sub-sectors are at different stages of maturity and face distinct business model challenges. Each require different combinations of grant, equity, and debt, proving the urgent need for patient capital. We leveraged research from Sustainable Energy for All's 2017 Energizing Finance report to determine the optimal mix of capital and compared it to the current mix deployed, which we derived from data from the Global Alliance for Clean Cookstoves, Dalberg, and the International Energy Agency.¹⁰ Overall, our CEO interviews support the research that shows the current capital mix available does not provide enterprises with access to the right types of capital to validate or prepare their business models for scale.



An employee of BURN Manufacturing, East Africa.

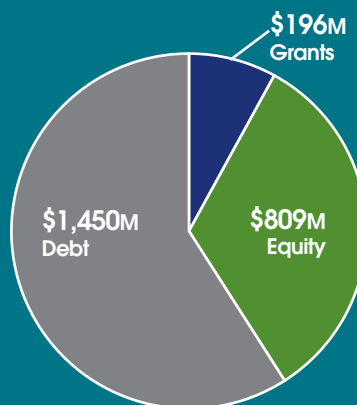
Figure 11: Current and Required Mix of Capital



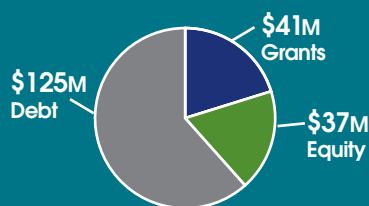
**Current
\$284M**



**Solar Home
Systems**



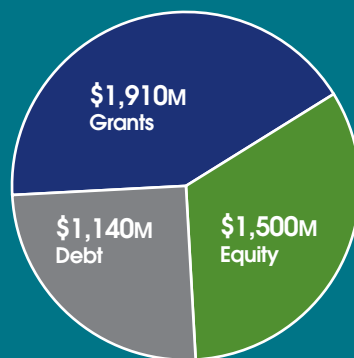
**Required
\$246B**



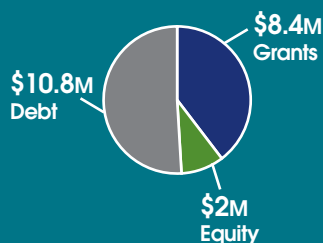
**Current
\$203M**



Mini-Grids



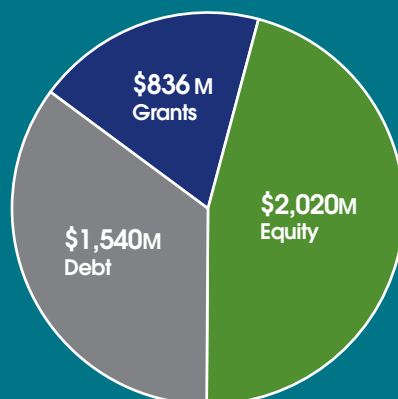
**Required
\$4.55B**



**Current
\$21.20M**



**Clean
Cookstoves**



**Required
\$4.40B**



A home of a SRE Solutions customer, Pakistan.

With billions in additional investment needed to achieve universal energy access, the problem may seem daunting. However, if entrepreneurs use the limited capital available more

effectively and efficiently and capital providers identify where their capital can be most catalytic in scaling each of the off-grid sub-sectors, we believe that is a step in the right direction.

CASE STUDY



Employees of Husk Power Systems, India.

Husk Power Systems:

Using the Right Mix of Capital

In 2007, two ambitious entrepreneurs succeeded in producing gas from rice husks, a readily available product of agricultural waste. From this gas, they generated electricity, bringing power and light to a remote village in northeastern India for the first time. Based on their initial success in developing the core technology of rice husk gasification—

in other words, their blueprint idea—the entrepreneurs founded Husk Power Systems with the goal of delivering clean, biomass-based electricity to Indian villages without access to the grid.

Acumen led the pre-Series A investment round with \$375,000 in 2010 and invested an additional \$1 million in equity in a \$5

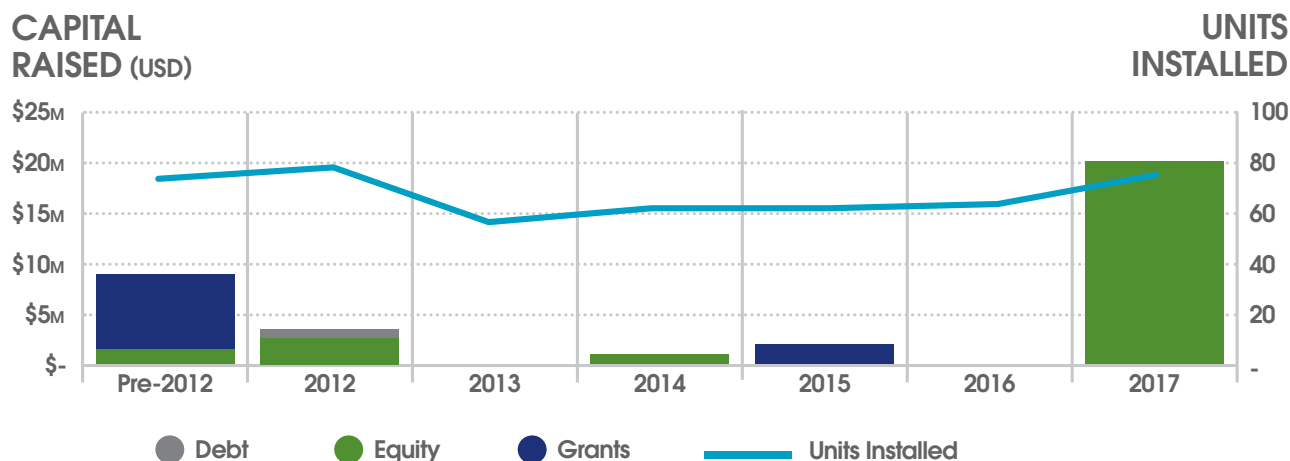
million Series A round in 2012. The purpose of the Series A was to experiment with Husk’s gasification solution in Bihar’s low-income communities and test alternative lines of business that were expected to add new revenue streams for the company.¹¹

Patient capital equity, alongside grants from entities like Shell Foundation, gave the entrepreneurs freedom to find a robust business model with the right source of power to best serve low-income communities. These types of capital also provided the company time to pivot and evolve its business model based on shifting market dynamics. With solar prices in India rapidly declining while the price of rice husks was increasing,

the unit economics of purely rice husk-based gasification plants became uncompetitive with other forms of electricity generation. As a result, Husk Power Systems pivoted to a biomass-solar hybrid generation model.

The CEO of Husk stated, “(Acumen’s) risk capital was key for the company to evolve. As a pioneer in the industry, a company needs capital to survive the downturns and attract additional capital.”

Husk used equity and grants to learn and find the right business model to scale. The company recently closed a \$20 million equity round in 2018 and is in the process of closing a debt round.



Over 30 solar home system companies are in the Validate and Prepare stages of growth. They are facing the pioneer gap where they struggle to raise the capital needed to accelerate the growth of affordable, clean solar energy across multiple geographies.

TABLE 2: Financing Status of Solar Home System Companies

	WHERE WE ARE NOW	WHERE WE NEED TO BE
Grants	Lack of grant capital to seed companies in new markets and pilot new products	New companies and products funded to deliver market solutions to underserved populations
Debt	Inventory financing challenges, yielding lack of product for customers	Cash flow cycles for company to manage and scale sales of product to new customers
Equity	Constrained funding for core operations and inability to attract additional investors	Well-funded core operations to scale and reach additional customers

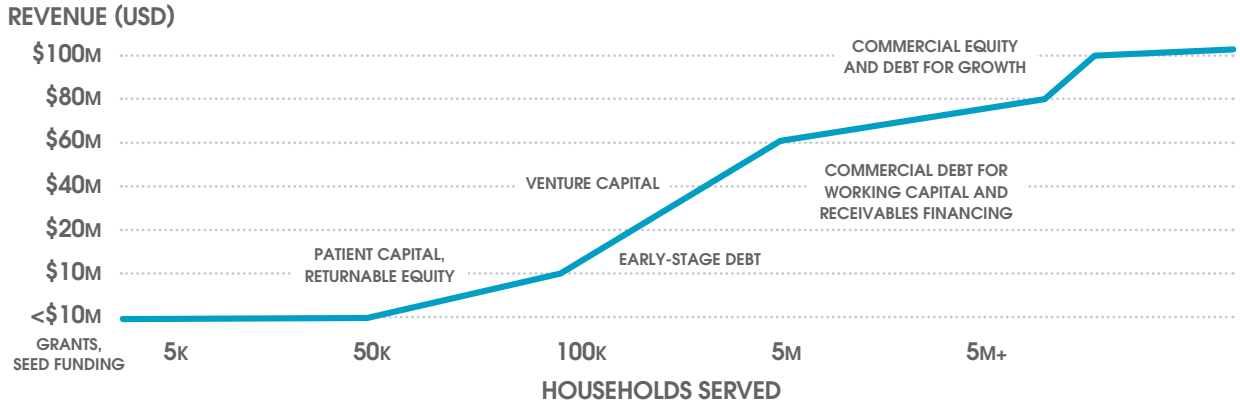
The solar home system sub-sector has seen incredible growth in the last decade and proven that companies can be profitable while serving the poor. As we see in the pie chart on page 13, solar home system companies have the right mix of capital, just not enough overall.

Of the \$1.6 billion invested in off-grid energy since 2012, 85 percent went to solar home system companies.¹² The number of annual transactions increased from 15 to 79 between 2012 and 2016, but the average transaction size has also increased, reflecting investors’ preferences to write larger checks in later-stage companies. In fact, the top 10 companies received 87 percent of investment capital since 2012.¹³ Early-stage companies expanding proven business models in highly risky, fragile markets remain underserved.

Over 30 solar home system companies are in the Validate and Prepare stages of growth. They are facing the pioneer gap where they struggle to raise the capital needed to accelerate the growth of affordable, clean solar energy across multiple geographies. More mature companies that have successfully overcome the pioneer gap also lack adequate access to capital. They have the track record to attract commercial equity and debt, yet the demand for capital far exceeds the supply. This later-stage capital is needed to fund the cohort of first movers who are now scaling their businesses across geographies, introducing new product lines, and providing credit to their customers.



Figure 13: Optimal Mix of Capital
Solar Home System Companies



CAPITAL TYPES	GRANTS, GOVERNMENTS AND ANGEL INVESTORS	MISSION-ALIGNED INVESTORS	VENTURE CAPITAL AND RISKY DEBT	COMMERCIAL DEBT AND PRIVATE EQUITY
AMOUNT	\$25K - \$3M	\$250K - \$2M	\$2M - \$10M	\$10M +
RETURN PROFILE	Concessional	0 - 10%	10 - 15%	15 - 20% +
KEY OUTCOMES	Pilots completed, early customer base of 200 established, key hires identified, customer management process outlined	Customer base above 1,000, key supplier relationships formalized, key hires completed	Expansion to new territories, systems and processes formalized, additional hires completed	Formalized customer journey implemented, systems for staff recruitment and retention in place, credit and financial departments formalized, expansion to new countries, scaling product offerings to customers
EXAMPLE PROVIDERS	USAID, Shell Foundation	Acumen, Persistent Energy Capital	Energy Access Ventures, Electrifi	Helios, Apis Capital Partners

Companies in the mini-grid sub-sector require large capital investments to build the infrastructure that delivers electricity to specific, and often remote, areas. Revenues must cover the costs to operate, and there typically isn't enough revenue available to pay back high initial capital costs. Off-Grid Catalyst Advisors estimates that a mini-grid company needs about \$30 million in capital in the form of grants, debt, and equity to reach 40,000 customers, which most companies struggle to access. As the sub-sector stands today, there is not enough capital nor the right mix available.

Subsidies have shaped grid infrastructure in markets around the world by reducing connection costs for customers, especially for rural customers. Subsidies can cover 30-50 percent of project costs.¹⁴ Yet, we found that less

than \$120 million in subsidies are available globally for mini-grid companies compared to the \$50 billion in subsidies provided to traditional utilities in emerging markets.¹⁵ Until subsidies are made widely available to mini-grid companies, early-stage equity in the form of patient capital is the only capital enabling mini-grid companies to learn about customer usage behavior, navigate unclear regulations, lower costs through volume and experience, and deliver energy in some of the hardest-to-reach markets. CEOs in our mini-grid portfolio reported a need for resources and time to address key challenges, like understanding their customers' usage patterns and building the capacity to service them, in these models.

The amount of equity to support operations for companies showing viable business models

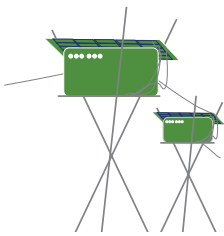
in the mini-grid sub-sector totals less than one fifth of the debt available. Venture capitalists have been dissuaded by mini-grids given the uncertain return profiles and risks, including construction and permitting costs, follow-on capital requirements, and need to increase revenue per user. Companies that have shown early market traction need early-stage equity to hire staff, fund operational costs related to grid installation and customer service, and unlock debt.

Once the company understands customer usage and gains traction with its customer base to cover some expenditures, there will be compelling evidence to drive the case not only for subsidies and regulatory change, but also for debt that provides the leverage to make the investment viable for commercially oriented investors. Interestingly, we see commercial loans in emerging markets appearing with more frequency.

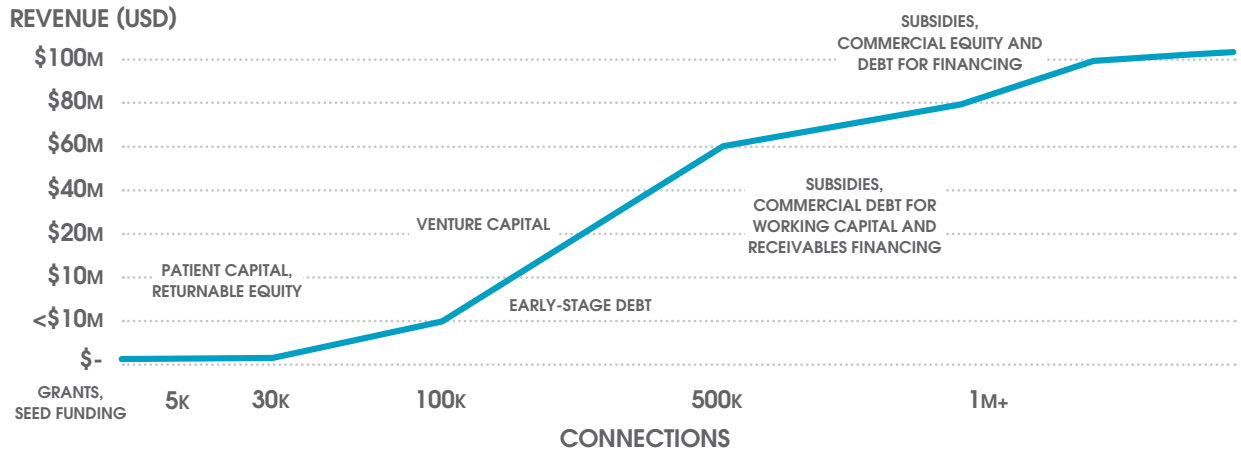
Over the last five years, loan facilities to support project finance for mini-grid companies in emerging markets have surpassed \$500 million. However, these loans tend to have high interest rates, short repayment periods, foreign currency denominations, and high collateral requirements, and may not be suitable for the stage of growth for most mini-grid companies. Governments, donors, banks and private investors have an opportunity to create new financing products, especially in local currencies with longer-than-usual timelines for repayment to fund mini-grid models to reach remote areas with electricity access.

TABLE 3: Financing Status of Mini-Grid Companies

	WHERE WE ARE NOW	WHERE WE NEED TO BE
Grants	Financially unviable unit economics	Subsidy for connection and operating costs for companies providing electricity in rural communities
Debt	Bottleneck in access to cash to construct projects	Adequate capital to cover plant construction and other project costs
Equity	Limited ability to fund critical operating costs, such as staff costs	Available cash for distribution, sales, and marketing costs and expansion to new regions



**Figure 14: Optimal Mix of Capital
Mini-Grid Companies**



CAPITAL TYPES	GRANTS, GOVERNMENTS AND ANGEL INVESTORS	MISSION-ALIGNED INVESTORS	VENTURE CAPITAL AND RISKY DEBT	COMMERCIAL DEBT AND PRIVATE EQUITY
AMOUNT	\$500K - \$10M	\$2M - \$10M	\$5M - \$25M	\$10M - \$500M
RETURN PROFILE	Concessional	0 - 10%	10 - 15%	15 - 20% +
KEY OUTCOMES	Prove technology, secure permits, show demand for electricity	Understand customer ability and willingness to pay, prove unit economics	Lower customer acquisition costs, streamline operations and costs	Standardized product with customer base established, replicate projects at additional sites, reputable relationship with financing institutions
EXAMPLE PROVIDERS	DOEN Foundation, UK-DFID	Acumen, FACTOR(e)	Engie Rassembleurs d'Energies, Total Energy Ventures	Stanbic, LGT Capital Partners

The clean cooking sub-sector has 12 to 15 companies that have designed clean cookstoves and proven an initial product-market fit. These pioneers need early-stage equity in the form of patient capital to grow as they build distribution networks to sell and service a remote, dispersed customer base.

The clean cooking sub-sector has 12 to 15 companies that have designed clean cookstoves and proven an initial product-market fit. These pioneers need early-stage equity in the form

of patient capital to grow as they build distribution networks to sell and service a remote, dispersed customer base. Training customers also requires patient capital since it is a costly

TABLE 4: Financing Status of Clean Cookstove Companies

	WHERE WE ARE NOW	WHERE WE NEED TO BE
Grants	Lack of R&D funds to design products, test product-market, and pilot in new markets	Well-funded R&D to develop quality products meeting customer demand, enabling high-risk business model innovation
Debt	Limited funding for inventory, long-term assets, and product orders	Adequate capital to finance inventory, manufacturing costs over long cash cycles, and long-term assets such as fuel cylinders
Equity	Inability to fund core operations	Available cash to fund high-quality staff and activate new markets through sales, distribution, and marketing efforts

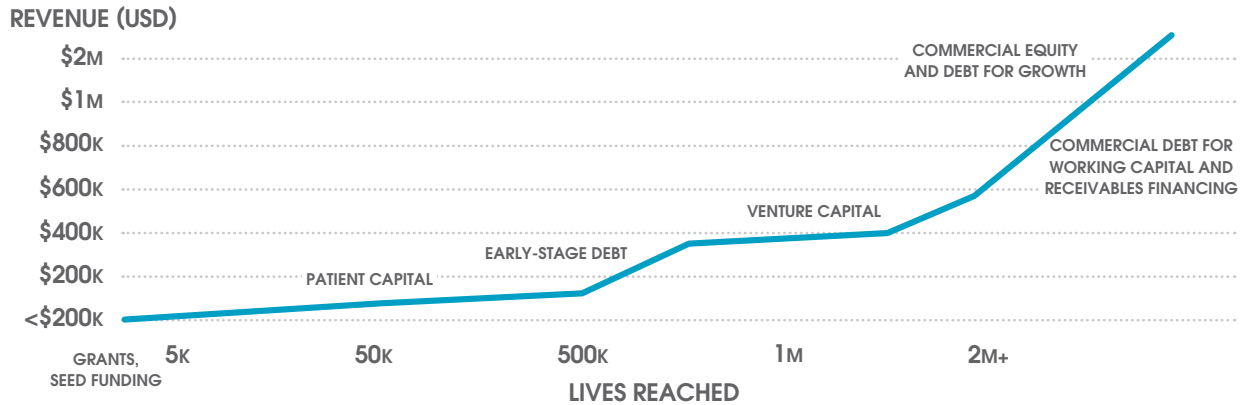
proposition but essential to shift cooking customs. At the same time, these companies cannot scale the market alone. We are seeing the emergence of new but unproven business models gaining initial market traction, including payment-enabled technologies and innovative after-sales models that encourage behavior change.

The sector also faces an immediate need for grants to support research and development (R&D) into additional products, customer needs, preferences, and behaviors when switching to a higher-tier clean cookstove. For example, cookstove companies need to run over 1,000 cycles of heating and cooling tests just to ensure product quality and safety. Grant capital can support these R&D activities as well as piloting products in new markets and strengthening consumer education about the benefits of clean cookstoves.

Established and growing companies with a demonstrated product-market fit also lack access to debt. In 2017, clean cookstove companies accessed \$10.8 million in debt capital where \$1.5 billion is required. More risk-tolerant debt with longer repayment terms is required to fund the purchase of gas cylinders, manufacturing equipment, or processed fuels such as wood pellets or ethanol. These purchases have relatively extended payback periods of 12-24 months and require flexible capital.¹⁶



Figure 15: Optimal Mix of Capital
Clean Cookstove Companies



CAPITAL TYPES	GRANTS, GOVERNMENTS AND ANGEL INVESTORS	MISSION-ALIGNED INVESTORS	VENTURE CAPITAL AND RISKY DEBT	COMMERCIAL DEBT AND PRIVATE EQUITY
AMOUNT	\$100K - \$1M	\$250K - \$2M	\$1M - \$3M	\$3M +
RETURN PROFILE	Concessional	0 - 10%	\$5M - \$100M	15 - 20% +
KEY OUTCOMES	Prototyping of products, early pilots funded, pathway of product offerings identified	Refinement of product-market fit, customer insights generated, customer base above 500	Key distribution relationships in place, customer feedback system, key hires completed	Scaling manufacturing capabilities, additional distribution channels identified, product expansion into new markets (pilots funded by grants), product offered expanded
EXAMPLE PROVIDERS	Government foreign aid, Osprey Foundation	Acumen, AHL Lundeen	GE Ventures, OPIC	Deutsche Bank

A photograph showing three men working on a micro-grid setup in a field. One man in a red shirt is standing on a ladder, another in a black shirt is also on a ladder, and a third in a light-colored shirt is on the ground. They are working with a white container and various cables. The background is a lush green field with trees.

5

REACHING THE POOR:

USING PATIENT
CAPITAL TO
ACCELERATE
IMPACT

Devergy employees setting up a micro-grid, Tanzania.

Off-grid energy entrepreneurs need to stay focused on low-income customers and their needs. Patient capital gives these entrepreneurs the capital, time, and support to find the right business models to serve those customers.

Most of the people living without access to lighting, power, and clean cooking are living below the poverty line. Off-grid energy entrepreneurs need to stay focused on low-income customers and their needs. Patient capital gives these entrepreneurs the capital, time, and support to find the right business models to serve those customers. They need to be able to pivot these models when necessary without the pressure to scale too quickly or realize profitability too soon; pressures that might come from other types of investors.

In addition, an essential element of success for these entrepreneurs is creating a cost-effective way to understand their companies' impact on the target customer. Acumen uses Lean DataSM, our platform to capture the customer voice and measure and manage customer impact. Through Lean Data, we work with our entrepreneurs to gather data and create insights into customer preferences and behaviors and assess whether our capital is truly catalyzing markets for the poor. Ninety-three percent of our CEOs said Acumen's commitment to customers through Lean Data and

the capital we provided were our greatest value-adds. Lean Data is used by energy companies both to understand the social impact of their products and services, as well as to get real-time feedback from customers to refine those products and their business models. Using aggregated results from Lean Data surveys across our portfolio, we released our Energy Impact Report in January 2018 to share insights on the impact of our energy portfolio with a first-of-its-kind benchmark for impact performance in the energy sector.

In addition, an essential element of success for these entrepreneurs is creating a cost-effective way to understand their companies' impact on the target customer. Acumen uses Lean DataSM, our platform to capture the customer voice and measure and manage customer impact.



The Social Performance Index

is based on our three impact dimensions (each based on one or more social performance indicator), equally weighted, for each company:



Breadth of Impact
measured by number of lives impacted/people reached



Depth
based on three specific indicators, equally weighted:

- + Quality of life improvements
- + Change in energy spending
- + Access to alternative products/services the company is providing



Poverty Focus
measured by % of customers living below \$3.10 per day



The Financial Performance Index

is based on two financial performance indicators, equally weighted, for each company:



Compounded Annual Growth Rate (CAGR)



2016 Absolute Revenue



Customers of Avani Bio Energy, India.

To better understand the relationship between impact and financial returns, we built on the Energy Impact Report by developing financial performance and social performance indices and looking at each company in our portfolio.

These indices are based on key underlying indicators. We ranked and mapped our companies in order of financial and social impact performance. Companies performing the best in both are in the upper right quadrant. Note, this chart shows

the companies ranked, not the extent of progress or detail of performance on either scale.

Figure 16: Financial and Impact Performance of Acumen's Portfolio



While there have been questions about whether there are trade-offs between impact and financial performance, we have long suspected that with respect to individual investments the answer is, it varies.

In Figure 16, we find that some companies do very well on both axes, some better on one than another, while others seemingly struggle to create either impact or strong returns relative to other companies in our portfolio. While there have been questions about whether there are trade-offs between impact and financial performance, we have long suspected that with respect to individual investments the answer is, it varies. What that variation may mean is that it will be hard to build a whole portfolio without any trade-offs.¹⁷

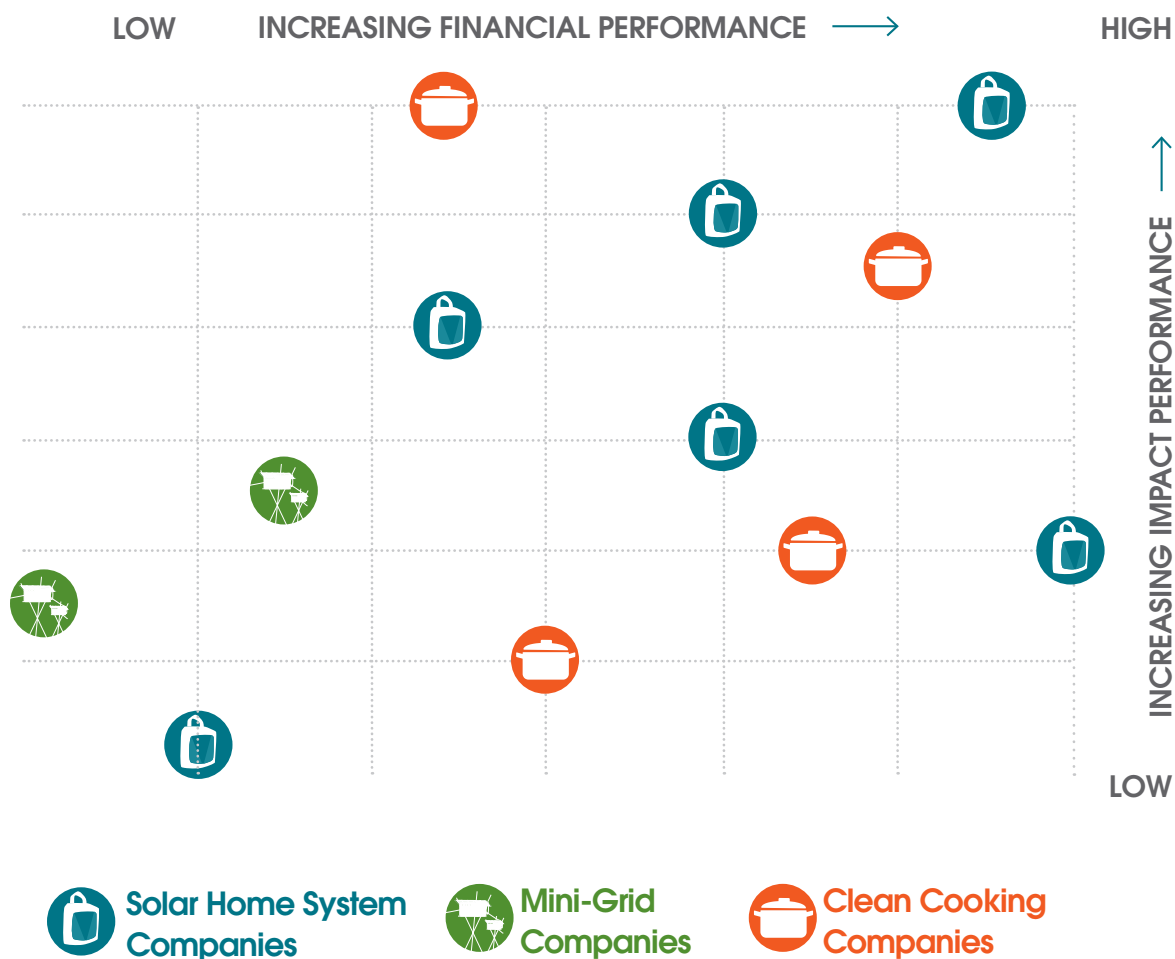
If we start to look at trends with respect to companies' stages of development, there might be emerging frontiers of social and financial performance. This can set our expectations with regards to what kind of social and financial returns are feasible at different stages of company development. It can also help guide decisions about additionality and risk tolerance for social and financial returns between investors. For example, it may be relatively easier to be near the top-right of the chart if you

invest in later-stage companies reaching scale, but those investing in earlier stage companies at the Validate stage are taking on more financial and social risk. Later-stage growth comes with an increase in revenue, a growing customer base, and ideally profitability.

Using the same data set, we are seeing interesting trends by sub-sector, many of which reinforce what we hear anecdotally when talking to our entrepreneurs about their experiences.



Figure 17: Financial and Impact Performance by Sub-Sector



For instance, our two mini-grid investments are near the bottom left of our chart, suggesting they are facing greater challenges in achieving financial success and social impact in comparison to the rest of our portfolio. However, the data beneath the overarching indices shows that mini-grids have

high potential to reach the poor and provide income-generating opportunities. We're therefore confident that there is long-term potential for these companies to move toward the top right if they can reach greater breadth of impact and improved financial performance.

We will continue to analyze the relationship between social and financial performance over time and, as we collect more data points and conduct more robust analysis, use what we learn to inform our investing strategy and how we construct our portfolio, as well as help inform our peers.

CASE STUDY



Employee of SolarNow, East Africa.

SolarNow:

Using the Right Mix of Capital

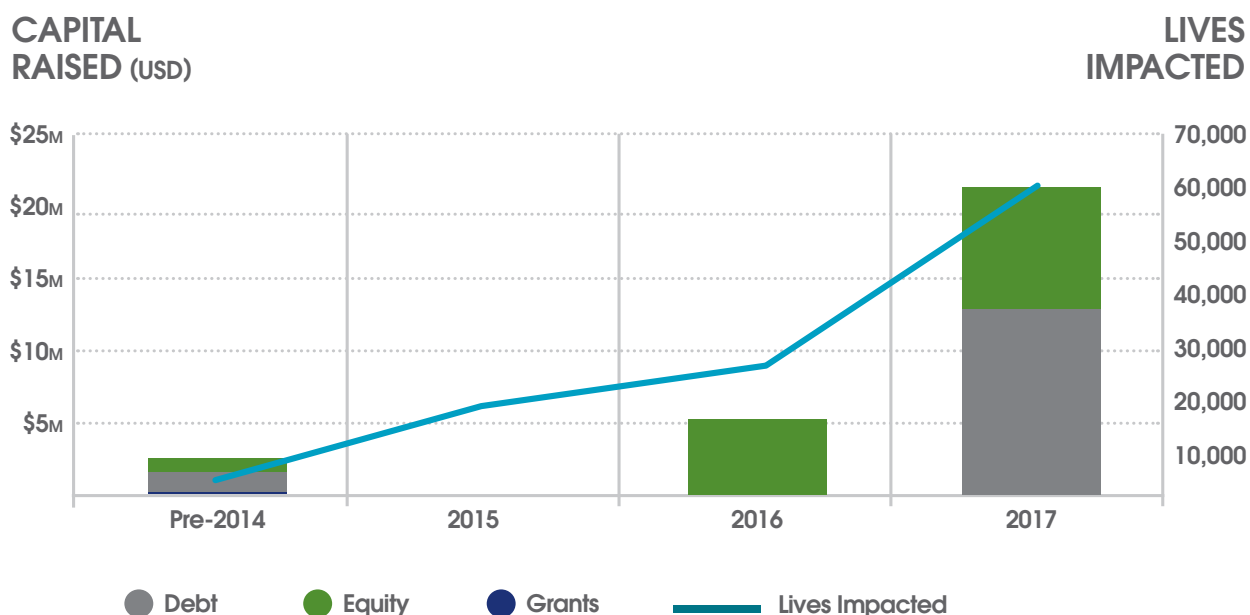
When SolarNow, a solar home system company in Uganda, reviewed the results from Lean Data, the company saw a dissatisfied set of customers facing some real challenges with their systems. Willem Nolens, SolarNow's CEO and Founder said

at the time: "This data was a real eye-opener. I was shocked by some of the nightmares we made our clients go through." In response to the results, the SolarNow team spent the last two years building a comprehensive process for training

sales staff, equipping them to work more effectively, providing a great installation service at their customers' homes, and conducting regular check-in calls from its customer service center. SolarNow also offers a free customer care line that clients are told about at installation and on check-in calls and reminded of with a sticker on their system. SolarNow has

shown its customers it cares about their experience and built a system to deliver on that. SolarNow, which Acumen invested equity in in 2014, has since outperformed our portfolio average in ease of use, customer satisfaction, and customer effort and recently closed an eight-figure debt and equity fundraising round to scale.

FIGURE 18: Capital Raised and Impact Profile
SolarNow





6

BEYOND CAPITAL:

WHAT DO
ENERGY ACCESS
STARTUPS NEED?

Employees of Kopatech, West Africa.

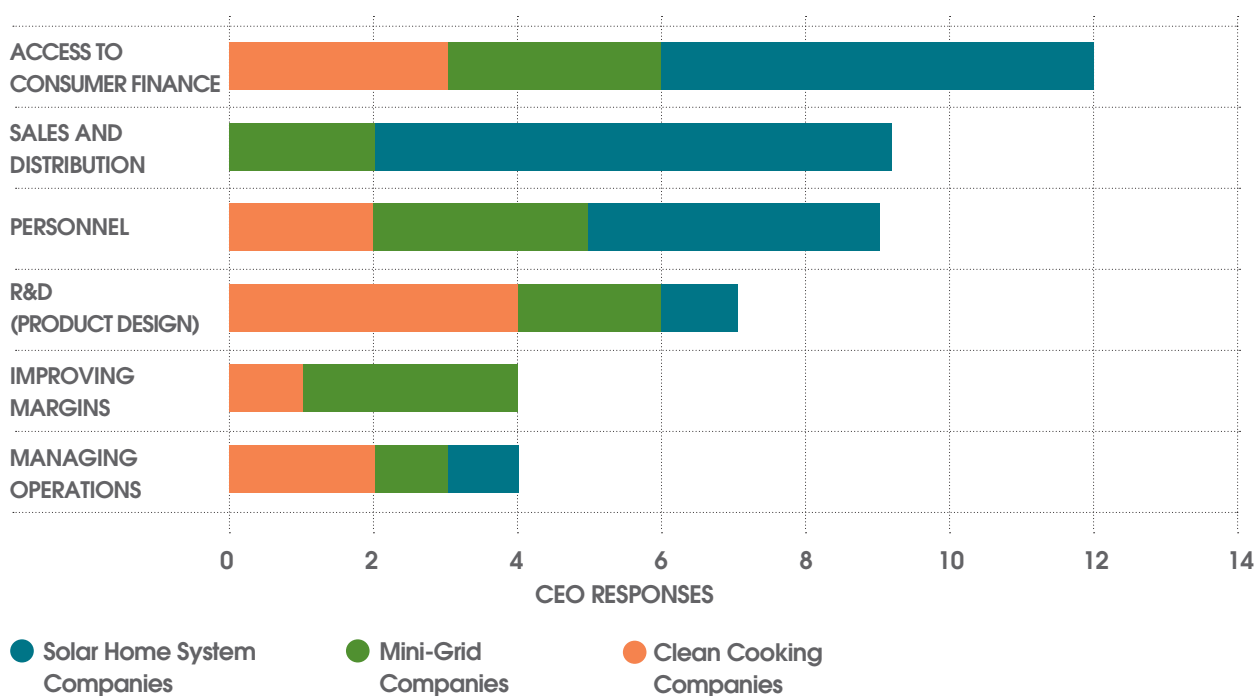
When we asked our 15 Acumen CEOs to rank their top three challenges, 80 percent ranked access to consumer finance as the biggest challenge, and 60 percent ranked improving sales and distribution and hiring personnel as other key challenges.

Energy startups need more than just capital. As companies work to understand their customers, create the best product to fit the market, and build the right infrastructure

and systems to scale their business models, other forms of support are required to achieve scale. When we asked our 15 Acumen CEOs to rank their top three

challenges, 80 percent ranked access to consumer finance as the biggest challenge, and 60 percent ranked improving sales and distribution and hiring personnel as other key challenges. We see sub-sector trends emerge in the responses as well. For example, all clean cooking CEOs ranked research and development (R&D) as a major factor inhibiting growth. Additionally, 75 percent of mini-grid CEOs ranked hiring personnel as a top challenge, expressing difficulty especially in remote locations where mini-grids operate.

FIGURE 19: CEO Survey of Greatest Business Challenges Inhibiting Growth



Using this data from CEOs and senior management, Acumen and other hands-on investors,

along with technical assistance providers, can provide support

to the areas where entrepreneurs stress the greatest need.



7

FACILITATING EXITS:

SENDING THE RIGHT
MARKET SIGNALS

A customer of d.light, East Africa. Credit: Martin Schoeller

Acumen has exited four energy companies, in which we had invested \$2.3 million. The exits returned \$2.9 million, showing a 1.3x return.

Unlike well-developed markets, there is no playbook for exits in off-grid energy: the cash cycles are long and sometimes uncertain, and there is a limited capital market for secondary buyers. There is, however, an increased pressure for equity investors to exit their investments. More exits present an opportunity to build the full scope of the capital market. Exits mobilize larger pools of untapped capital and provide a signal to untapped investors that the market can generate returns.

Three factors that complicate exits for investors include (1) the length of time pioneer companies take to validate their business models and prepare for scale to attract the next stage of investors, (2) the relatively small number of follow-on investors currently in the space, and (3) the large and continual need for capital for these business models as they scale. From an investor's perspective, equity investments are more challenging to exit than debt investments, which are "exited" once the investee repays the agreed upon principle and interest on a pre-agreed schedule.

There are several options for how an equity exit may take form in the energy access sector.



A Devergy customer in her shop, Tanzania. Courtesy of Devergy.

Table 5: **Methods for Exiting an Equity Investment**

PRIVATE TRANSACTIONS		
Method	Buyer	Description
Corporate acquisition	FINANCIAL TRANSACTION Limited partnership funds Special purpose acquisition company	Company sells an equity stake to a new or existing shareholder Existing equity holders are compensated for their shares at a price negotiated between investee management
	STRATEGIC TRANSACTION Competing firms Suppliers or buyers looking for supply chain integration Companies seeking geographic/ product diversification	Transaction may be initiated by either the buyer or the seller
Secondary equity sale	Financial or strategic investors	Investor's shareholding stake is sold via a private transaction May occur between two existing investors or between an existing investor and an incoming investor Often initiated by seller, and is subject to varying internal corporate approval procedures
Share buyback	Management or founders	Company or management buys back the shares of the company Can be triggered by pre-agreed terms such as redemption rights, repurchase schedules, or put options, negotiated by the investors and the investee at the time of investment
PUBLIC TRANSACTIONS		
Method	Buyer	Description
Initial Public Offering (IPO)	Institutional and retail public market investors	Company lists its shares on a stock exchange, providing existing shareholders with the ability to realize their investments via the public market

Initial public offerings (IPOs) may not be a viable method for most companies in the energy access sector at this point because the typical size of companies seeking them are larger than where even late-stage energy access companies are today. In addition, microfinance is the only sector in which impact investor-backed IPOs have been successful to date. Exit strategies that target sales to existing management are less likely to succeed given companies need to preserve capital for growth. It is challenging and often unsuitable to the company for management to buy back existing shares while additional funds are required to finance growth initiatives, such as new market entry or product launches.

Acquisitions and equity trades have a higher likelihood of succeeding. Later-stage growth funds have an opportunity to complete equity trades or share buyouts of early-stage investors. These boost market confidence that exits are possible, encourage more early-stage investors to come in, and prove that capital in this sector can be cyclical, rather than linear.

Commercial investors with more than \$100 million in assets under management such as DBL Partners and Generation Investment Management have also demonstrated interest in energy access companies and recently led large investment rounds in Off Grid Electric and

M-KOPA, respectively. In addition, large energy conglomerates such as Total and ENGIE have been increasingly active in deploying their own impact-oriented venture funds. These strategic investors have started to play a larger role in the sector, leading to consolidation. For example, ENGIE recently acquired Fenix, a pioneering company in East Africa's home solar market, and Mobisol, a Berlin-based off-grid energy company, recently acquired Lumeter, a leading pay-as-you-go software provider in sub-Saharan Africa.



A demonstration to customers of Greenway Grameen, India.

MAPPING EXITS:

WHAT HAS AND HAS NOT WORKED IN ACUMEN'S EXITS

Acumen has exited four energy companies, in which we had invested \$2.3 million. The exits returned \$2.9 million, showing a 1.3x return.¹⁸ One of these companies is M-KOPA, a Kenya solar home system company that offers pay-as-you-go financing. Acumen invested in 2012 providing both equity and debt financing. The \$75,000 equity investment comprised a portion of the company's Series A round, and the debt investment was used to support the company's working capital needs. The \$1 million debt investment was repaid the following year. M-KOPA went on to successfully raise a \$10 million debt round, led by Commercial Bank of Africa and the Bill & Melinda Gates Foundation, and attracted approximately \$5 million in follow-on equity. Acumen was approached by another impact investor to who wanted to buy our shares in M-KOPA as a strategic investment. The company felt it was a good opportunity for Acumen's shares to be bought as part of a larger round, so the sale was completed. Since then, M-KOPA has raised over \$120 million in debt and equity and, as of January 2018, has connected

more than 600,000 homes to affordable solar power.

M-KOPA's experience is the exception, however, not the rule. To highlight a divergent case, we've faced challenges exiting a company and selling our shares to impact-oriented later-stage investors. In 2011, Acumen invested \$1.15 million in Orb Energy, a provider of solar home systems in India and Kenya. Acumen had been with Orb Energy through the fast-changing Indian regulatory environment and its expansion from India into East Africa. In 2017, Orb started conversations with large financing institutions to initiate a bigger fundraise. Orb was looking to use the capital to grow its in-house financing offerings for small Indian enterprises and expand its Kenya operations. Acumen and Orb's CEO saw an opportunity to sell Acumen's 7 percent stake, given the company had been profitable for multiple quarters. Together, Orb's CEO and Acumen discussed the option with two large financing institutions, but they were resistant to buy Acumen's shares on a secondary sale basis because they desired to create direct

impact with their capital, not buy existing shares. Later-stage investors, especially those who are mission-aligned, must recognize the necessity of supporting exits in the sector to show new investors it is possible to monetize returns in this market.

We initially envisioned that off-grid energy companies would require approximately seven years of patient capital and support to validate their business models and prepare for scale. We are increasingly extending these investment horizons given the lack of later-stage capital available, able, or willing to purchase secondary shares. This negatively impacts the whole sector as there are limited exits to highlight the returns this sector can generate.

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FACILITATING EXITS:

HOW INVESTORS CAN WORK WITH COMPANIES FROM THE START

For the off-grid energy market to reach its full potential, a one-way flow of funds from investors to companies is not sustainable. A measured push for more exits would propel the

sector forward by allowing it to develop deeper, more liquid equity markets. However, many later-stage investors have impact requirements, restricting their capital from being used

for secondary sales. While this remains a sector-wide challenge requiring further analysis, we have identified some ways to facilitate more exit transactions.



Customers of Frontier Markets, India.

Investors Can Work Together By:

+ *Communicating pathways for exits*

Conversations about exits should start at the due diligence phase, with the company and investors identifying potential exit opportunities together. Once an opportunity is identified, adequate lead time of approximately 24 months should be planned to structure the exit and 12 months to execute the exit.

+ *Identifying potential exit opportunities during each fundraising*

Management teams and boards can join networks to proactively identify investors who may want to purchase secondary shares. At each board meeting, continual updates on exit opportunities should be discussed especially when a company is bringing in new capital, which may be willing to purchase secondary shares.

The Sector More Broadly Can Support Exits By:

+ *Mapping average return multiples*

As more exits occur, there is an opportunity for investors, companies, researchers, and academics to work together to better track return multiples, so potential future investors have a better understanding of expected returns.

+ *Creating a secondary sales market*

Development finance institutions and other investors with significant capital have an opportunity to create a secondary sales market for early-stage investors by creating funds structured to help prove the full viability of the market.

As more opportunities for exits arise, we will continue to analyze our own exits and work with other investors across the capital spectrum to build a more robust market for energy enterprises.

8

CONCLUSION:

WORKING TOGETHER
TO CATALYZE
ENERGY ACCESS



A customer of Biolite, India.

With many success stories and failures from which to learn, it is our chance to accelerate this momentum with the capital available. Investors, as well as grant providers, have an opportunity to reflect on the type of capital invested thus far and work together to deploy it in even more effective and catalytic ways.

We can't imagine a more exciting time to be working in off-grid energy. A wide variety of funders, policymakers, and entrepreneurs are working to bring lighting, power and clean cooking to millions through energy startups. With many success stories and failures from which to learn, it is our chance to accelerate this momentum with the capital available. Investors, as well as grant providers, have an opportunity to reflect on the type of capital invested thus far and work together to deploy it in even more effective and catalytic ways. To encourage untapped investors to enter the market, we can start to show that returns are possible if we have more exits to celebrate in the sector.

This report is part of a growing body of work within the sector to identify the different forms of capital and the optimal mix of financing needed for solar home system, mini-grid, and clean cooking companies to reach scale. We've found that the right type of capital is important and the wrong mix can set a company back.

We hope that it's clear from this report that the pioneer gap still looms large for off-grid energy startups and patient capital continues to have an important role to play in accelerating energy access and building markets for the poor.



APPENDIX

AT A GLANCE

Acumen's Energy Access Investing History



Husk Power Systems products, East Africa.

2006

Acumen explores energy as a sector for investing in India, East Africa, and Pakistan by evaluating potential deals but not making any investments.

2007

Acumen makes its first major equity investment in the energy access sector in **d.light**, a solar lantern company based in East Africa.

2008

Acumen makes its first major equity investment in the mini-grid sub-sector in **Shrey**, a micro-hydro company based in India.

2010

Acumen makes its first major debt investment in the mini-grid sub-sector in **Husk Power Systems**, a biomass company based in India.

2011

Acumen makes its second major equity investment in the off-grid products sub-sector in **Orb Energy**, a company selling solar home systems in India.

2012

Acumen opens its West Africa office in Accra.

Acumen invests in **M-KOPA**, a solar home system company with mobile pay-as-you-go financing options for customers.

Investing Strategy Over Time

Acumen's investing history has a lot of "firsts" as we experimented with new business models, technologies, and sub-sectors in new geographies through calculated bets. Each milestone, including select investments, has

yielded new insights informing our investing strategy over the last decade. In 2017, we launched the Pioneer Energy Investment Initiative (PEII) and are focused on investing in: (1) solar home system companies in new

markets; (2) mini-grid and mini-grid enabling companies; and (3) energy innovations in productive use, enablers like financing, and innovations in clean cooking.¹⁹

2013

Acumen learns micro-hydro was not the route forward to serve the poor given high capital expenditure (capex) and regulatory barriers.

Husk Power Systems decides to pivot to a solar hybrid model based on changing solar power dynamics in India.

2014

Acumen launches its Lean Data work to understand customers' needs and impact of portfolio companies on their customers.

Acumen invests in **SolarNow**, its first solar power investment in Uganda, to support the launch of a new low-cost product.

2015

Acumen makes its first clean cooking investment (**BURN Manufacturing**), first solar mini-grid (**Devergy**), first off-grid solar company in Pakistan (**Nizam**), and first last-mile distribution company serving the rural poor in India (**Frontier Markets**).

Acumen exits its equity stake in **M-KOPA** through a secondary sale to a for-profit, impact investing firm.

2016

Acumen sponsors a new growth-stage fund in East Africa, which has to date raised over \$50 million.

2017

Acumen launches the Pioneer Energy Investment Initiative (PEII) – a \$20 million expansion of our pioneer energy investing, with a clear strategy built from our experience.

Acumen makes its first investments in off-grid solar power companies in West Africa in **PEG Africa** (Ghana) and **Easy Solar** (Sierra Leone).

2018

Acumen launches its first Energy Impact Report using Lean DataSM.

Acumen explores innovations in new clean cooking solutions.

Acumen continues to seek pipeline for our PEII investing.

APPENDIX

Capital Required to Reach SDG Seven by 2030 Compared to Capital Deployed 2012-2017

Required Annually to Achieve SDG Seven by 2030			
	Solar Home Systems	Mini-Grids	Clean Cookstoves
Grants	\$196M	\$1.91B	\$836M
Equity	\$809M	\$1.50B	\$2.02B
Debt	\$1.45B	\$1.14B	\$1.54B
Required: \$11.40B			
Capital Deployed (2012-2017) in Total			
	Solar Home Systems	Mini-Grids	Clean Cookstoves
Grants	\$46M	\$126M	\$63M
Equity	\$461M	\$55M	\$60M
Debt	\$415M	\$287M	\$66M
Deployed: \$1.58B			

1. International Energy Agency, World Energy Outlook 2017; 2018 Global Off-Grid Solar Market Trends Report, Dalberg and Lighting Global, 2012-2017.
2. Patient capital includes grants, patient equity, and patient debt. For the purposes of this report, patient capital refers to patient equity.
3. Aggregated research from Global Alliance for Clean Cookstoves, Energy4Impact, ClimateScope, International Finance Corporation, Off-Grid Catalyst Advisors, Dalberg, and Lighting Global.
4. Solar home system companies include companies selling pico-lantern and lanterns.
5. 2018 Global Off-Grid Solar Market Trends Report, Dalberg and Lighting Global, 2012-2017.
6. Sample data.
7. 2018 Global Off-Grid Solar Market Trends Report, Dalberg and Lighting Global; SEforAll Finance Committee Report, Sustainable Energy for All, 2014. Note: Including on-grid investments, which are also needed to achieve universal energy access, the total capital needed is \$45 billion per year, and currently, off-grid energy represents a quarter of the total projected need.
8. Annual average early-stage equity investments in seed and Series A equity rounds from 2012-2017 in the energy access sector across solar home system, mini-grid, and clean cooking sub-sectors.
9. This calculation is based on a top-down approach. By using a bottom-up approach, assuming one-fifth of the 200 companies operating in the Validate and Prepare phases are viable candidates for early-stage equity and each company requires approximately \$5 million in seed and Series A equity, the result is \$200 million needed for early-stage equity.
10. Optimal Mix: SEforAll research suggests that enterprises delivering energy access solutions, by sub-sector, would require future financing shares of specific debt:equity:grant ratios to scale operations and meet 2030 targets.
- Current Mix. Cookstoves: Global Alliance for Clean Cookstoves, Cookstove Investment, Capital by Year, 2007-2017; Mini-Grids (various sources): Energy4Impact, ClimateScope, International Finance Committee, Off-Grid Catalyst Advisors. Solar Home Systems: 2018 Global Off-Grid Solar Market Trends Report, Dalberg and Lighting Global, 2012-2017.
11. Husk Power Systems had a close relationship with the Shell Foundation, which provided grant capital and technical expertise to further refine the blueprint idea from 2008 onwards. Shell Foundation continues to have a close working relationship with the company.
12. Total in grants, equity, and debt.
13. 2018 Global Off-Grid Solar Market Trends Report, Dalberg and Lighting Global, 2012-2017.
14. Green Mini-Grids Market Development Program, GMG MDP Document Series: n°1. African Development Bank, Sustainable Energy for All, and Sustainable Energy Fund Africa. December 2016.
15. World Bank, ESMAP, Financial Viability of Electricity Sectors in Sub-Saharan Africa, 2017; International Institute for Sustainable Development, India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, 2017.
16. Global Alliance for Clean Cookstoves estimates three billion in the world use polluting, inefficient stoves to cook their food each day.
17. This analysis applies to Acumen's portfolio only. The more other investors and enterprises examine their double bottom lines with increasing rigor, the more we will be able to collectively understand about trade-offs over time.
18. Companies completely exited to date include Flowing Currents, M-KOPA, SHREY, and AKRSP. In addition, we have partially unwound our debt position with KMRI. This exit transaction is not included in the figures above.
19. Productive use is defined as an energy product or service used to generate income.

