Accelerating Access to Energy: Executive Summary

Lessons learned from efforts to build inclusive energy markets in developing countries

Shell Foundation

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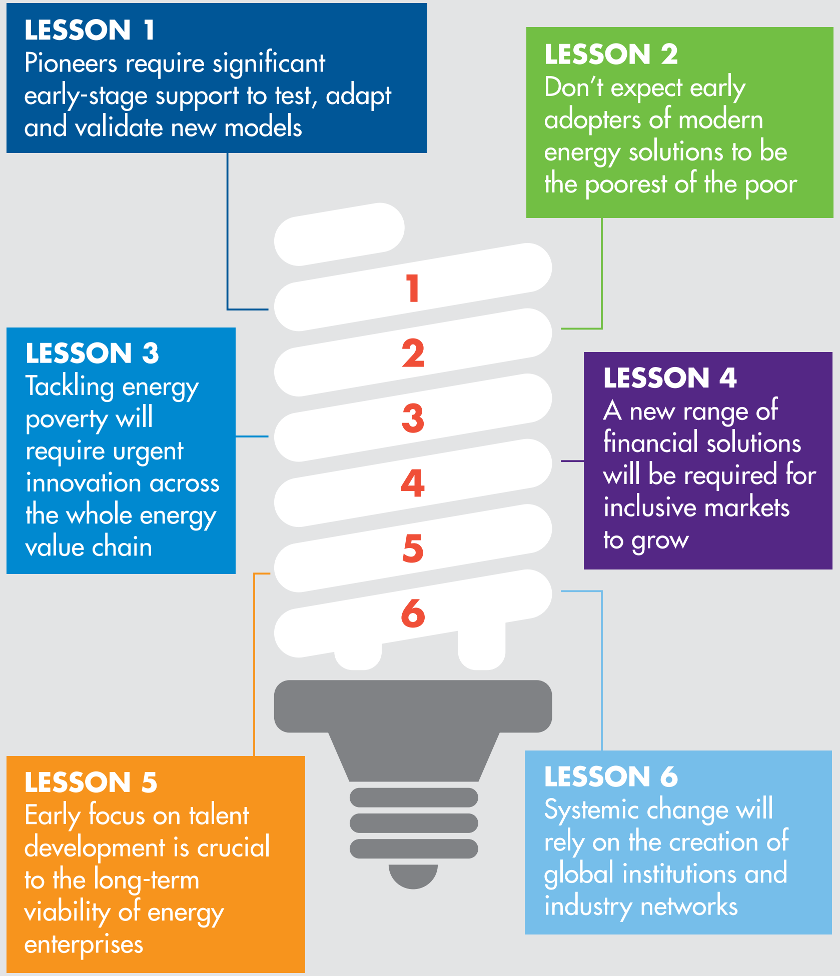
ACCELERATING ACCESS TO ENERGY: SIX LESSONS LEARNED



Executive Summary

Nearly two billion people[1] – that's three in every 10 people – lack access to reliable and affordable modern energy, constraining their health, education and earning potential. Of this group, 60% live entirely without electricity for cooking, lighting and heating at home, for community services such as schools or health centres, or for improving the productivity of small business and farms.

This **energy deficit** forms a formidable barrier to inclusive growth and poverty reduction that shows limited signs of abating. Already, researchers using World Bank data[2] have estimated that Africa misses out on 2–4% a year in GDP growth due to power shortages. Without major changes to the way people access and use energy, almost one billion people will still be without electricity in 2030.

WHY READ THIS REPORT?

This report outlines our 14-year journey to create and scale new **decentralised energy solutions** that provide safe, reliable and affordable power to low-income consumers in under-served areas. During this time, Shell Foundation (SF) has worked with over 100 entrepreneurs and organisations – deploying nearly $74 million – in an effort to develop new disruptive technologies and business solutions with the potential to deliver socio-economic, health and environmental benefits at scale.

In these pages, we analyse the common features of the most promising of these solutions, and the learning from failed efforts which informs our current strategy. We hope that these findings may be helpful to fellow donors, impact investors, development finance institutions, governments and corporates working hard to enhance energy access around the world today.

OUR JOURNEY

1. SF has always focused on catalysing new sustainable and scaleable solutions to deliver modern energy to low-income consumers, though our strategy to achieve this has varied greatly over the years. Our initial approach was characterised by small, short-term grant-giving to a multitude of NGOs; a conventional form of philanthropy that we found poorly suited to our objectives. Between 2000 and 2003, over 75% of funding deployed as part of our 'Access to Energy' programme failed to help grantees demonstrate the potential for large-scale impact.

2. This experience forced us to adopt a new 'enterprise-based' theory of change that involved identifying the market failures that prevent modern energy solutions reaching the Base of the Pyramid[3] and co-creating pioneer social enterprises to solve them. This helped us improve our efficiency and impact, though we discovered that pioneers require patient, flexible grant funding and extensive business skills support to refine new models and build the capacity for global expansion.

3. We found ourselves working proactively to analyse markets, build networks, test a few high-risk yet potentially transformative ideas and form long-term partnerships with aligned entrepreneurs.

   The market knowledge and learning gained from failed pilots, often over several years, was critical to the evolution of promising technologies and business models. While we continually try to improve this process by mitigating common risks (shared in Chapter 2), we believe that failure is a necessary step towards disruptive innovation, and that finding the right team is ultimately more critical to success than selecting based on the proposed business model.

4. By 2009, several of these pioneers had demonstrated demand for a range of affordable energy products (e.g. solar lights and cleaner cookstoves) and services (e.g. electricity from agricultural waste). Yet each business remained fragile, with slow growth across Asia and Africa. We discovered that significant 'barriers to purchase' and gaps in enabling infrastructure, explored further in this report, are constraining the adoption and replication of these models.

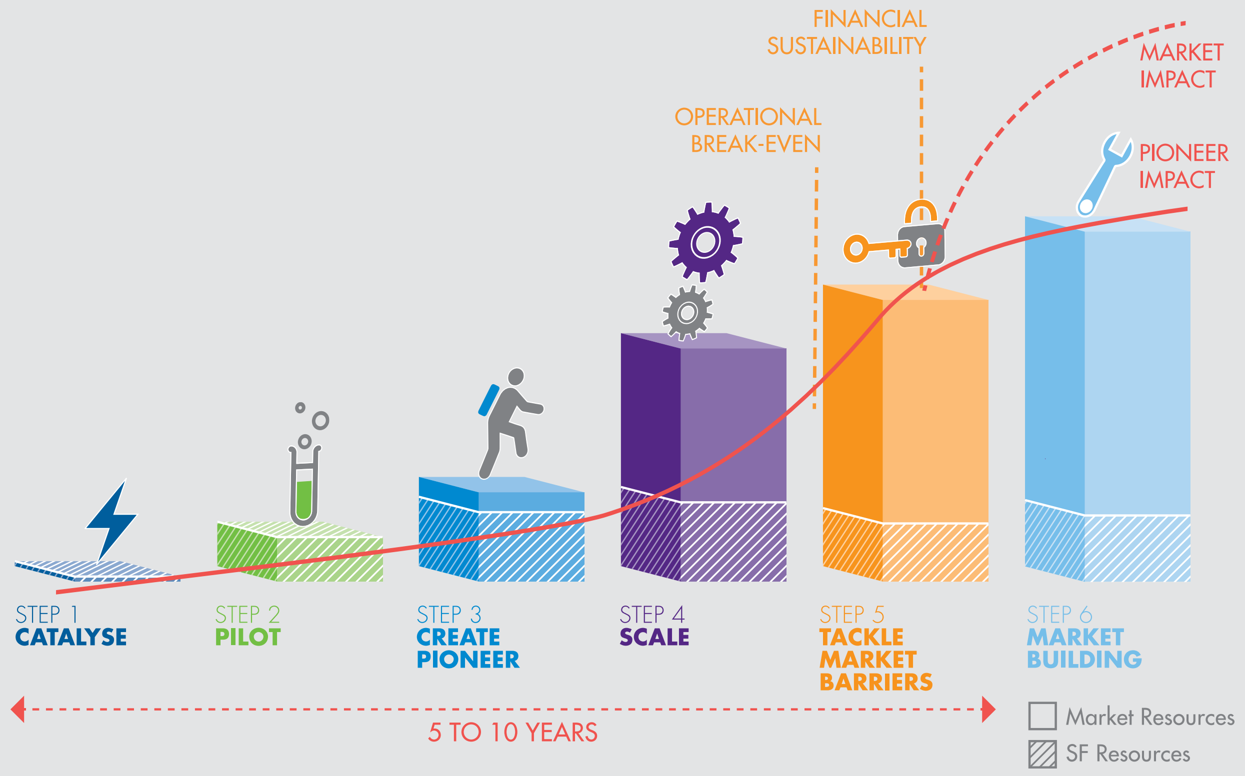
5. Reflecting on this experience, we now realise that our approach was insufficient to catalyse the systemic change required for inclusive businesses to achieve sustainable growth. Over time our thinking has evolved into a new 'Six Step Model' that includes the creation of dedicated market-enablers (supply chain service providers, financial intermediaries and catalytic institutions) to remove barriers to scale and provide capacity-building support to early-stage energy enterprises serving BOP markets.

6. In recent years, promising new 'inclusive' markets have begun to emerge in Africa, Asia and Latin America, generating power from renewable sources, improving the efficiency of energy appliances, and transforming the way the poor access and pay for energy. However, the growth of these markets has invariably been slow and there remain very few viable 'social enterprises' operating at an international level. Learning from the struggles of our early-stage partners as they seek to grow, we have come to believe that the fragmented nature of the social investment sector has led to critical gaps that prevent the emergence, validation and growth of inclusive energy markets.

7. This poses a challenge to donors, social investors, governments and corporates alike. In this report, we examine six market barriers that we believe prevent the innovation and scale-up of energy enterprises that can meet the needs of low-income consumers around the world, and emerging opportunities for collaboration across the public and private sector to solve them. We share these lessons as they apply specifically to the energy sector – although we believe they have generic relevance for effective social investment across a range of development challenges.

[1] "SE4All Global Tracking Framework", World Bank, and "Universal Access to Modern Energy for the Poor", UNDP.
[2] Power outages and economic growth in Africa (2013), Thomas Barnebeck Andersen & Carl-Johan Dalgaard.
[3] 'Base of the Pyramid', or BOP, was defined by CK Prahalad in 2002 as the four billion people earning less than $4 a day.

SIX STEPS TO SCALE



SIX CHALLENGES TO THE GROWTH OF INCLUSIVE MARKETS

Lesson 1:

Pioneers require significant early-stage support to test, adapt and validate new models

Pioneers providing new products or services to BOP markets face disproportionate costs to serve a risk-averse consumer base, especially when they lack prior market data to draw on. These businesses are inherently fragile and considered too high-risk for investors until they can:

- understand the true needs, wants and decision-making processes of their target customer;
- prototype (and iteratively improve) their technology to produce a range of high-quality, durable and affordable products and services that appeal to customers;
- adapt their business models to overcome gaps in the value chain, such as the lack of existing routes-to-market in low-income areas;
- build the systems, talent and assets to demonstrate viability and attract growth capital.

Our experience working with a range of partners has shown it can take **6 to 10 years** and anywhere between **$5 million** and **$20 million** for a breakthrough innovator to build a sufficiently strong customer base to achieve a net positive cashflow. This explains the often-cited 'absence of viable pipeline' for impact investors and illustrates the need for more organisations, especially foundations, to deploy **unrestricted, risk-tolerant grant capital** to help early-stage social enterprises adapt to market needs.

In practice, this type of catalytic grant is rarely available. While our partners have been able to leverage $92.5 million from a variety of social and commercial investors to date, on average it takes **3 to 4 years** before a pioneer can attract sufficient co-investment to cover their core costs.

Lesson 2:

Don't expect early adopters of modern energy solutions to be the poorest of the poor

Consumers are particularly sensitive to risk, cost and value – and this means initial demand for new products in these markets is almost always low. Simply put, if a product is unknown, offered by a company they haven't heard of, rarely stocked in local shops and comes without a warranty, don't expect BOP consumers to buy it.

Existing retail channels are typically unviable due to dispersed demand, low margins and high marketing costs required to 'push' products to reluctant consumers. Between 2007 and 2010, with our partners struggling to grow, we invested heavily in new ways to increase the uptake of their energy products and services through a variety of new retail, microfinance and NGO channels without significant success. We discovered four principle 'barriers to purchase' for BOP consumers: **Awareness, Accessibility, Affordability and Availability (the Four As)**.

Developing new supply chain solutions to these challenges can often take several years, requiring considerable investment, and only then will an energy enterprise gain significant traction in BOP markets. For example, it took **Envirofit**, a clean cookstove manufacturer, three years to transition from a B2C to a predominantly B2B business in order to achieve economies of scale and build the brand credibility needed to create, market and sell 'aspirational' products.

For this reason, early adopters of energy products and services tend to be from slightly higher income brackets and exposed to less risk. These first customers are needed to demonstrate aspirational value to lower-income consumers, especially for solutions where value is not easy to demonstrate. For instance, products that can be used to generate income immediately (such as solar lights) are extremely desirable, whereas financial savings from cookstoves are accrued only after many months of use.

Lesson 3:

Tackling energy poverty will require urgent innovation across the whole energy value chain

No matter how great their products or services, early-stage energy enterprises will struggle to serve low-income markets unless they can successfully tackle a wide range of demand- and supply-side constraints that prevent the creation of sustainable value chains. Chief among these are **three interrelated challenges:** demand activation, consumer finance and last mile distribution.

The resources required to tackle these barriers typically render these low-margin early-stage businesses unviable. In 2010, we began investigating a range of **integrated business solutions** to these market barriers. Three in particular show particular promise for scale and sustainability:

- **Integrated Business Models** relying on new technology and joint venture partnerships. **M-KOPA Solar**, for example, is a Kenyan social enterprise that combines embedded-mobile payment technology with solar power. The business forms joint ventures with national telecoms companies with well known and trusted brands, such as Safaricom, to provide consumer credit for solar home systems. Customers then pay this loan back over time via mobile money platforms such as M-PESA.
- **Integrated B2B partnerships with national corporates and distributors**, allowing social enterprises to benefit from the brand recognition, marketing power and sales channels of credible partners, or even join forces to develop new co-branded products to drive demand.
- **New Supply Chain Intermediaries** that create demand, financing options and routes-to-market for multiple manufacturers in a more cost-effective manner. These include Dharma Life, a social enterprise building a network of rural entrepreneurs, retailers and distributors to bring a range of social-impact products (such as cookstoves, solar lights, water purifiers and sewing machines) to market in rural India.

Lesson 4:

A new range of financial solutions will be required for inclusive markets to grow

Looking back across our portfolio and range of work, we realise that each and every one of our partners has been constrained by a lack of appropriate finance at every stage of their validation and scale-up. We see **three prime opportunities for financial innovation** to unlock appropriate capital from public and private sources to drive far greater collective impact:

- **New 'Incubation' Vehicles to Accelerate Transformative Innovation**. A range of new intermediaries are needed to provide appropriate capital (equity, patient grant, or convertible grant) plus technical expertise and business skills support to early-stage energy enterprises with different risk profiles. One example is **Factor(E)**, a venture development firm that offsets 'technology risk' by supporting early-stage energy innovators with a blend of risk capital and world-class engineering support from the Colorado State University.
- **Flexible Debt Finance for High Potential Energy Enterprises.** For enterprises that are already selling thousands of products every month, the single largest barrier to scale is the lack of affordable debt available to them. To address this challenge we have helped create three new models to provide working capital for distribution, capacity-building and the purchase of new productive assets.
- **New Models to Unlock Private and Public Capital.** These include: new tiered capital structures and grant-based instruments that allow investors with aligned social interests (but different expectations for risk and return) to participate in the same funding vehicle; the evolution of different types of partnerships between development agencies and foundations that better leverage private sector ability to innovate and the public sector's ability to validate new markets (a shift to private-public partnerships), and several emerging models to track, value and monetise social and environmental impact.

Lesson 5:

Early focus on talent development is crucial to the long-term viability of energy enterprises

The idea of a social enterprise investing heavily in human capital as a prerequisite for growth is not controversial or even new. Despite this, we still encounter examples of grant-makers that neither provide unrestricted funds of the level to enable the enterprises they support to attract and retain top talent at market-related rates, and impact investors that are reluctant to meet such costs as they believe it will delay financial returns.

Our experience emphasises time and time again that helping social enterprises with grant support allows them recruit top talent on market-related terms, which is critical not only to navigate the early phases of operation, but also as the basis for their scale-up and viable growth.

Without exception, the social enterprises that lead their respective markets treat finding, selecting and managing their human capital as their top priority. d.light, for instance, decided to recruit an independent CEO in 2011 alongside a raft of talent from the private sector. This investment paid off handsomely, with the business able to treble growth figures within the next three years.

Lesson 6:

Systemic change will rely on the creation of global institutions and industry networks

When SF was established back in 2000, we believed that a combination of private sector actors (philanthropists, social investors, big business and commercial funders) would be able to catalyse and scale market-based solutions to global challenges such as energy access. The intervening years have shown that while social enterprises are needed to tackle these problems at scale, they alone will be insufficient to solve entrenched problems of this size.

As pioneers in the inclusive energy sector have started to grow, we now see a need for neutral industry institutions and networks to work across public and private sectors to build the necessary market infrastructure for them to be effective. Public-private partnerships such as **Sustainable Energy For All** (SE4ALL), the **Global Alliance for Clean Cookstoves** and the **Global Off-Grid Lighting Association** will be critical to set international standards, codify best practice, publish market data and leverage investment into growing markets.

Central to their ability to bring credibility to these nascent markets will be a disciplined focus on adapting to the challenges faced by pioneers on the ground to enable one or more of these first-movers to achieve scale and viability. This lowers the risk for new investors and entrepreneurs to enter the market. Only then will dialogue with policy-makers, and efforts to share learning, foster a more conducive enabling environment to accelerate the growth of the wider market.

WHAT NEXT?

Lack of access to energy is a major obstacle to inclusive economic development and a challenge that SF will continue to focus on for the foreseeable future. While this has long been a subject for international attention (as currently witnessed by SE4ALL), our view is that there still remain few examples of financially-viable energy solutions that focus explicitly on generating large-scale benefit to BOP consumers.

The learning outlined in this report has helped shape our current 'Access to Energy' strategy and our understanding of the role that we, as a private foundation, can play in catalysing an effective response to the energy challenge. In particular, we see three areas for increased focus over the next five years.

1. **Work to accelerate the growth of the early-stage manufacturer, service provider and market-enabling pioneers in our portfolio of long-term partners.**

   Many of our social enterprise partners are now delivering promising results but they are all in early phases of growth and have a long way to go to fulfil their market potential. Until they can prove financial viability they will struggle to attract growth finance, yet organic growth limits their ability to enter new markets or diversify products/services attractive to BOP consumers.

   We believe the success of such pioneers is essential to lower the risks for further entrepreneurs and investors to join these markets. We therefore see the need for continued support (including grant, social investment, business skills and market linkages) to our existing partners, in conjunction with leveraged private and public investment, to support their scale-up, deepen their impact on BOP markets and to avoid mission drift during their journey towards sustainability.

2. **Work to improve the efficiency and effectiveness of our efforts to enhance energy access through more strategic collaboration with other actors in the social investment ecosystem.**

   We see several opportunities to partner with thought-leaders (across private and public sectors) to substantially improve our own performance. These include:

   i) **Greater 'syndication' with impact** investors to help early-stage energy enterprises navigate the 'valley of death' by reducing the risk and transaction cost of securing growth capital through new instruments, pooled funds and tiered capital structures.

   ii) **Improving our ability to measure impact.** Writing this report has highlighted gaps in our understanding of the long-term development outcomes that our partners deliver, e.g. the gender implications of impact and the differential value gained by different consumers. Further research will improve our ability to assess the public benefit of alternative interventions and to explore new revenue streams for 'marginal return' enterprises by monetising social impact.

iii) **Developing robust performance evaluation methodologies to track the cost-efficiency of the impact we deliver over time.** We see value in working with independent market analysts to validate the impact we deliver, assess our operational efficiency over time, and to share this transparently with others in the sector. Our hope is that such action forces a greater accountability on our organisation to continually improve its performance each year and, we hope, contributes to a sector-wide drive for transparent reporting and benchmarking to improve effectiveness.

3. **Identify game-changing solutions to specific market failures with the potential to deliver outsized social and environmental impact, such as:**

- **Improving the enabling infrastructure for decentralised energy services companies,** for example through low-cost power meters that manage demand, reduce theft and integrate pay-as-you-go technology, or greater use of mobile phone technology to crowd-source data from local hauliers to create new distribution solutions.
- **Developing larger-scale energy solutions for SMEs,** such as new sources of off-grid electricity (e.g. biomass gasification, biogas, waste and solar) that could improve the viability of small businesses currently without significant choice, leading to improved productivity and employment in rural areas.
- **Improving the availability of affordable energy for the urban poor,** for instance through new hybrid systems to supplement grid electricity, improvements in battery storage and integrated energy and sanitation solutions for people living in urban slums (e.g. by creating a market for municipal waste that can be converted into power or fertiliser).

ABOUT SHELL FOUNDATION

Shell Foundation is an independent charity, established in 2000 by the Shell Group. We work to create and scale new solutions to global development challenges by applying business thinking to major social and environmental issues linked to energy and mobility.

Learning from both success and failure we have gradually developed a new 'enterprise-based' model to catalyse lasting social and environmental impact on a global scale. This sees us deploy a blend of financial and non-financial resources to accelerate transformative innovation and harness private markets to deliver public benefit at scale.

Our Approach

Shell Foundation works with a small number of entrepreneurial partners to identify the underlying market failures behind intractable problems and co-create new social enterprises to solve them. We provide patient grant funding, extensive business support and access to networks to help pioneers to validate new models, achieve financial independence and expand across geographies.

We then create specialist intermediaries to facilitate growth and replication at an industry level. By working in this way we now have several strategic partners – addressing issues as diverse as energy access, sustainable mobility and job creation through the SME sector – that are now delivering large-scale impact in multiple countries across Africa, Asia and Latin America.

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