POWER FOR ALL

The Energy Access Imperative

June 2014

d.light SOLAR™

Contents

About this Report

Power for All is a call to a different action for the policymakers, stakeholders, entrepreneurs and customers engaged in driving universal energy access for the billions of people without reliable power. Power for All is an initiative of d.light, a for-profit social enterprise that manufactures and distributes solar lighting and power products to the developing world. Originally founded in 2006 to combat kerosene, d.light has sold over 6 million solar products in 62 countries, improving the lives of more than 33 million people. Over the course of eight years in market, d.light has experienced the ability of small-scale, distributed renewable energy solutions to transform the way people all over the world can access and pay for power. This report, authored by Donn Tice, Chairman and CEO of d.light, and Kristina Skierka, Strategic Advisor to d.light, is a reflection of the company's insights and experience in creating new freedoms for customers without access to reliable power, so they can enjoy a brighter future. To share your feedback, please contact info@powerforall.com.

I. Executive Summary

There is a better path to universal energy access: market-based distributed solutions that directly engage the energy impoverished in creating their own (renewable) energy and controlling their own destinies.

To achieve universal energy access for the 1.2 billion living in energy poverty by 2030, the International Energy Agency (IEA) estimates it will cost $33 billion a year, or a total of $700 billion between 2010 and 2030.[1] While the United Nations and a number of governments have identified universal energy access as an imperative, the current prospects seem dim: IEA estimates put the burden of energy delivery investments on governments and institutional investors, and anticipate it will take a quarter century to achieve. The financial costs are daunting and the opportunity costs are unacceptable.

There is a better path to universal energy access: market-based distributed solutions that directly engage the energy impoverished in creating their own (renewable) energy and controlling their own destinies.

The world is facing a unique moment in history to deliver universal energy access. At the same time the proliferation of affordable renewable technologies has created a viable marketplace for energy access products, base-of-the-pyramid (BoP) consumers have proven in large numbers that they can—and will—pay market prices for modern power solutions they control. As Power for All demonstrates, this burgeoning market for renewable, distributed, and democratized energy products—estimated by some to be worth $500 billion—can leapfrog electrical grids and rapidly accelerate the access timeline.[2] By leveraging consumer choice and private enterprise, Power for All envisions a vibrant market that can deliver universal energy access in half the time and a fraction of the cost than traditional institutions predict.

Renewable, distributed, and democratized energy is a critical part of providing universal energy access to billions of people—and it doesn't have to wait.

In contrast to the theoretical models from well-meaning research institutions, Power for All is based on the real-world experience of d.light, a for-profit social enterprise that manufactures and distributes solar light and power products for the developing world. However, market-building—and market transformation—requires more than one company; it takes an entire ecosystem of support. For this reason, Power For All identifies essential accelerators for the solar light and power industry, government, nonprofits, investors and lenders, and energy consumers. At the same time this paper challenges the conventional (and disheartening) wisdom that surrounds the time and money experts say it will take to deliver energy access, Power for All seeks to focus resources on delivering universal energy *before* 2030.

Renewable, distributed, and democratized energy is a critical part of providing universal energy access—and it doesn't have to wait.

II. The Power of Energy

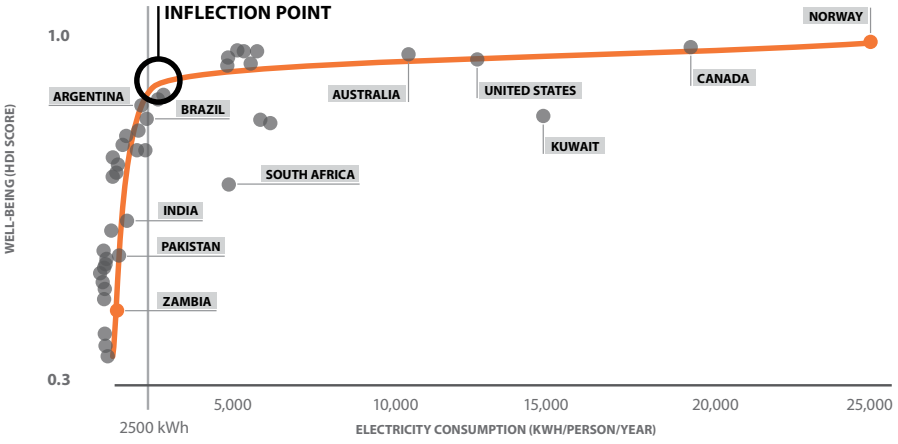
Power is fundamental to human and economic development: the greater a country's electricity consumption, the greater the well-being of its people. When correlating per capita electricity consumption with the human development index (HDI)—a measure of well-being that includes life expectancy, literacy, education, and standard of living—even a small amount of energy can transform lives, and nations.[3] A little electricity goes a long way; when annual energy consumption rises from zero to just a few thousand kilowatt-hours (kWh) per capita (a fraction of the average use in the United States), countries see a jump in correlated HDI scores (see Figure 1). Just as individual lives and whole villages have changed with access to energy, the impacts are very real in driving economic growth for entire countries. Increases in energy consumption are strongly correlated with dramatic increases in economic output and productivity.[4]

Access to energy is one of the most important factors in raising people in developing nations out of poverty. Electricity doesn't cause well-being, but it enables people to create opportunity for themselves. Energy empowers people to join in the kind of activities that drive development and create new freedoms by facilitating the ability to study and work before sunrise or after sunset, use cell phones, and access the Internet. In fact, electrification has been shown to increase incomes by 38 percent per year.[5] Current data available suggest that delivering energy access to the energy impoverished could create 1.5 trillion additional productive hours, save $38 billion in energy expenditures, and enable nearly 300 million school-age children to study longer under better conditions.[6] For these reasons, it is not surprising that the United Nations, under Secretary-General Ban Ki-moon, has launched the "Decade of Sustainable Energy for All," making universal energy access by 2030 a priority. With all of the benefits that energy can bring—more productivity, better health, and greater opportunity—universal access is one of the most important goals of the 21st century.

Access to energy is strongly correlated with raising people in developing nations out of poverty.

How then, to best deliver power for all? Current estimates are that approximately 2 billion people in the world do not have access to reliable electricity; 1.2 billion people have no electricity,[7] and another 1 billion have unreliable access.[8] To deliver basic energy access (defined as 250 kWh/year for electricity, enough to power a few lights, fans, and cell phones in rural areas) for the 1.2 billion people living in energy poverty by 2030, experts estimate it will cost $33 billion a year, or a total of $700 billion between 2010 and 2030.[9] These estimates put the burden of investments on governments and institutional investors, include a significant amount of traditional "steel in the ground" grid-based energy, and would take at least a quarter century to achieve. Is it necessary to shoulder not just the cost, but the opportunity cost? There is another option that is less expensive, faster, and creates other powerful societal benefits: market-based solutions that directly engage the energy impoverished in creating their own power and controlling their own destiny. This option is small-scale, distributed renewable power.

FIGURE 1: HOW ELECTRICITY POWERS WELL-BEING



III. Demand: The Human Face of Energy Access

Base-of-the-pyramid consumers have proven in large numbers that they can and will pay market prices for modern power solutions if the market can deliver reliable solutions that meet expectations.

Energy can transform the trajectory of individuals, families, and entire nations. It is with good reason that finding ways to deliver universal energy access as quickly as possible is an important part of the global agenda. However, aggregate demand numbers can mask critical factors that should define the most appropriate supply solutions. It is essential to examine the true nature of the demand for energy access; supply must be aligned with how energy is actually used by the people currently living and working in energy poverty, along with their needs and aspirations, in order to accurately portray the supply we need to create to achieve power for all.

Energy Demand of the Under-Electrified

The economics of supply and demand are fundamental to designing realistic approaches to delivering universal energy access. Equally important is an understanding of how energy is actually used in currently under-electrified areas. For most of those without energy access, life is lived day-to-day; people are often paid daily, and purchase food, transportation, cell phone minutes, and fuel on a day-to-day basis. Grid-based power usually requires people to pay for lump sums of use. However, a day's worth of power is more relevant to those in need of energy access—and more valuable because it is affordable and flexible.

The Profile of the Universal Energy Access Customer

Founded in 2006 as a for-profit social enterprise, d.light manufactures and distributes solar lighting and power products designed to serve the more than 2 billion people globally without access to reliable electricity. After nearly a decade and hundreds of hours in the field with our customers, we've learned that our customers (often referred to as the base-of the-pyramid or BoP consumers) want more than business as usual when it comes to energy access.

The universal energy access customer wants quality, flexibility, affordability; they appreciate small-scale, reliable solutions that they can control. Critical to the supply-demand equation, those in need of energy access are willing to invest in an upgrade from the expensive, dim, noxious light powered by fossil fuels (kerosene) to the bright, safe light delivered from distributed solar light and power products. As customers who already pay a substantial premium and a larger-than-average share of their total incomes for poor-quality solutions, BoP consumers have proven in large numbers that they can and will pay market prices for modern power solutions *if the market can deliver reliable solutions that meet expectations*. Across the diversity of nationalities, regions, cultures, and languages, customers have demonstrated

TABLE 1: BOP CONSUMER PREFERENCES (D.LIGHT)

Rank	Priority	Product Attributes	Customer Quotes
1	Save Money	Affordability, return on investment	"Stop burning what is earned."
2	Quality	Reliable, trustworthy, safe and clean	"I bought…because they [solar lights] fit into my personal goal of giving my customers a good experience."
3	Control	Flexible; delivers power as needed	"Energy on [my] terms…. Electricity would allow me to do so much more."

III. Demand: The Human Face of Energy Access

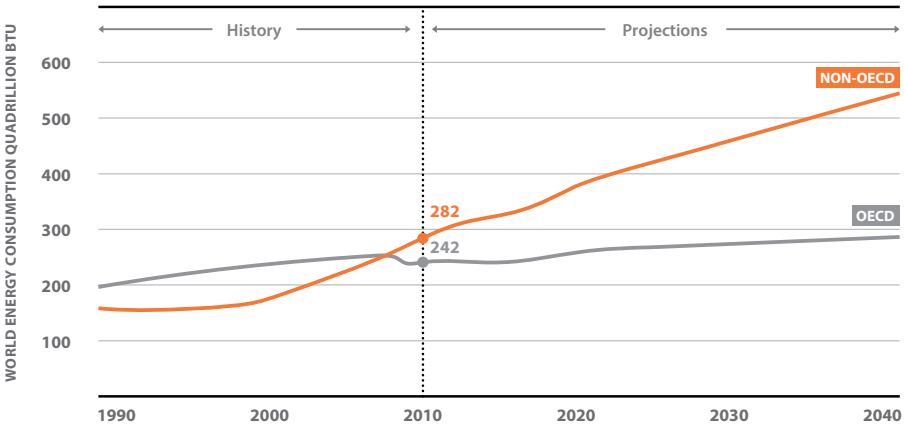
The planet will be home to more than 8 billion people in 2030. Over the course of the next 15 years, non-OECD countries will account for 70 percent of population growth and 90 percent of growth in energy demand, while energy demand will remain flat in OECD countries.

in inarguable numbers that they do not want to be passive recipients of energy access programs or giveaway products. Instead, the under-electrified want to be active participants in creating energy access for themselves, their families, and their communities.

Energy Demand Tomorrow

Knowing a bit more about the needs and desires of the energy impoverished today, what can the future of energy demand hold? Experts suggest that 952 more terawatt hours (TWh) than the world currently is prepared to produce is needed to provide power for all.[10] To consider this number in its full context, the planet will be home to more than 8 billion people in 2030. Over the course of the next 15 years, non-OECD countries will account for 70 percent of population growth and 90 percent of growth in energy demand, while energy demand will remain flat in OECD countries (see Figure 2).[11] As non-OECD countries are largely considered part of the developing world, it is countries like India and continents like Africa that will be driving demand for future energy. While the migration to urban centers in the developing world will affect the overall energy demand heat map, the vast majority of those without any energy access will continue to be in rural and peri-urban areas—some of the most challenging regions to supply electricity.

FIGURE 2: NON-OECD NATIONS DRIVE THE INCREASE IN ENERGY DEMAND



IV. Supply: Delivering Energy Access

More than 2 billion people do not have reliable access to energy. This means that nearly one-third of the people on earth are prevented from accessing the productivity, health, and opportunity that come from reliable energy access. With 85 percent of the energy impoverished living in rural areas,[12] lack of supply forces people in remote locations to self-destructive extremes to get power. These extremes include walking hours to "centralized" battery charging centers, exposing children to fire hazards with candles in order to study at night, and putting entire families at risk with toxic kerosene fumes. The default approaches to satisfy energy demand in rural areas of the developing world are a failure. Billions remain without a supply of reliable energy, with expensive, dangerous, and unsustainable consequences.

The default approaches to satisfy energy demand in rural areas of the developing world are a failure. Billions remain without a supply of reliable energy.

Universal energy access is not just a good intention, but a global imperative. No one would argue against the right to energy access and the benefits it produces. At the same time, meeting the demand for universal access to energy could create a climate catastrophe if we simply extend current approaches. The conversation must focus on not *if* but *how* the nearly 1,000 TWh of additional capacity needed to achieve universal energy access will be created and delivered. To combat energy poverty, a range of approaches—including traditional solutions like centralized power—should be considered. Renewables, especially solar, can and should play a larger role in delivering energy to developing regions than typically assumed.

TABLE 2: CONSEQUENCES OF INADEQUATE SUPPLY

Financial Loss	10 percent of income wasted on fossil fuel based energy[13] $40 billion per year spent on poor-quality lighting[14]
Productivity Loss	250 million sick days due to lighting and cooking fuels[15] Up to 10 percent of lost economic output per month[16]
Health/Environment Damage	800,000 deaths due to indoor air pollution per year[17] 190 million tons of greenhouse gas emissions per year[18]

Business as Usual Supply: Fossil Fuels, Central Power Generation, and Grid Transmission

FOSSIL FUELS

Fossil fuels, the default resource for the developing and developed world, have a lot to offer. As the incumbent resource, fossil fuels like kerosene, diesel, and coal have an established distribution system and a broad consumer base. Unfortunately, fossil fuels are responsible for a host of ills in the developing world, including tuberculosis, burns, asthma, lung cancer, and premature death. When considering fossil fuels as a resource for energy access, it is also important to keep in mind that 952 TWh is equivalent to building 170 new typically sized coal-fired power plants.[19]

IV. Supply: Delivering Energy Access

More, coal- fired power plants carry environmental costs of substantial greenhouse gas (GHG) emissions and solid waste (such as ash), which have been strongly linked to climate change. China has used fossil fuels to deliver energy access; the consequences are significant (as visible in the Beijing skyline, pictured at the top of this page).

With decades of proof that these approaches aren't meeting current demand, scaling fossil fuels for the developing world would be an environmental disaster. If clean, renewable energy can deliver access in a similar time frame and cost as fossil fuels, it should be prioritized as a key part of the solution to deliver energy access.

CENTRAL POWER PLANTS & GRIDS

While both the environmental and economic costs are concerning, central power plants and grids are also time-intensive and expensive. A single coal-fired power plant (650 megawatts) costs $550 million[20] and takes five years to build, not including planning and permitting time and costs. Centralized power also requires transmission grids and distribution systems. Setting aside the fuel used for power generation, centralized power with transmission grids can be a cost-effective solution for high-population-density, short-transmission-distance markets. In fact, with 60 percent of people expected to live in a city by 2030, grids are an essential part of the future of energy for high-density areas.[21] Unfortunately, the economics don't work in low-density, long-distance situations. Rural grid extension alone ranges from $8,000–$10,000 per kilometer,[22] and in some cases costs up to $22,000.[23] Once built, utilities in developing nations can experience transmission losses in the double-digit percentage range, often 15–25 percent.[24]

Centralized power production, grid distribution, and long-distance transmission are simply not cost-effective solutions for rural areas. Any practical solution to deliver energy access to lower-density, rural populations cost-effectively must include smaller-scale generation and limited—if any—transmission.

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V. Opportunity: Energy to Leapfrog the Grid

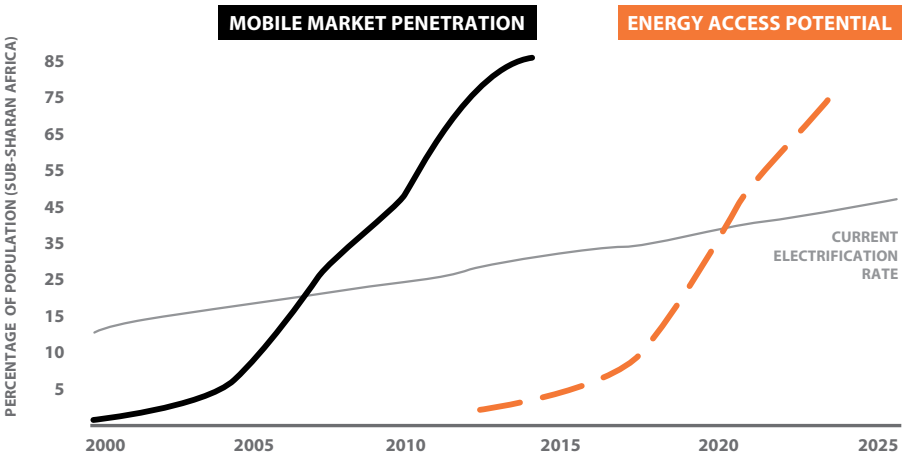
Energy delivery can now leapfrog slow, inefficient, and expensive centralized systems.

At the same time that the dearth of energy access presents a massive problem today and in the future, it also presents an incredible opportunity. Without an established method of energy delivery for the majority of the energy impoverished, rural areas of the developing world are a blank slate to reinvent how energy is generated, delivered, and paid for by more than 2 billion people in the world. The business-as-usual approach—tied to non-renewable resources and ingrained inefficiencies—does not have to be accepted. The performance and cost of the fundamental technologies underlying solar power, energy storage, and lighting are changing very rapidly. This has created the potential for new energy products that can transform the world energy outlook.

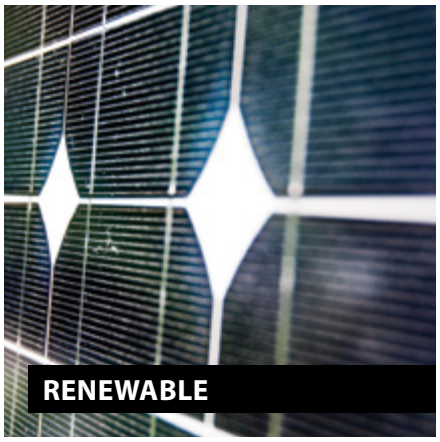
Energy generation is experiencing a revolution; technology is making universal energy access in our lifetimes possible. Cost and capital requirements to reach off-grid populations with renewable energy are changing rapidly: component prices for photovoltaics (PV) have dropped 80 percent in the last 5 years;[25] energy storage costs are falling while density is rising;[26] and prices for light-emitting diodes (LEDs) have fallen 90 percent in the last decade, while they have dramatically increased in efficiency and lifetime.[27] Even manufacturing costs are falling. These economies of scale have enabled the creation of a host of energy products that for as little as $10 can provide hours of additional light per day for years, leading to a doubling of study time or productive work hours.

Moreover, without the same legacy infrastructure to protect and maintain—and with cleaner, cheaper technologies available—energy delivery can now leapfrog slow, inefficient, and expensive centralized systems, much as mobile phones leapfrogged landlines in the developing world. As we've seen, the solutions to address the massively under-electrified population must be different from what they were (and are) for the developed world. In fact, the portable solar lighting industry today—one of the leading solutions to the energy access problem—while worth less than $1 billion now, is approximately the same size (based on penetration rates) as the African mobile phone industry in the 1990s.[28] In 1998, mobile phone penetration in developing countries was just 1 percent. Today, roughly 85 percent of the population in Sub-Saharan Africa uses mobile phones[29] (see Figure 3). In fact, there are over 650 million mobile phone subscriptions in Africa today, making it the fastest growing mobile region in the world.[30] This could be the adoption curve of energy access.

FIGURE 3: SUB-SAHARAN AFRICA MOBILE MARKET PENETRATION



VI. A Better Path to Energy Access



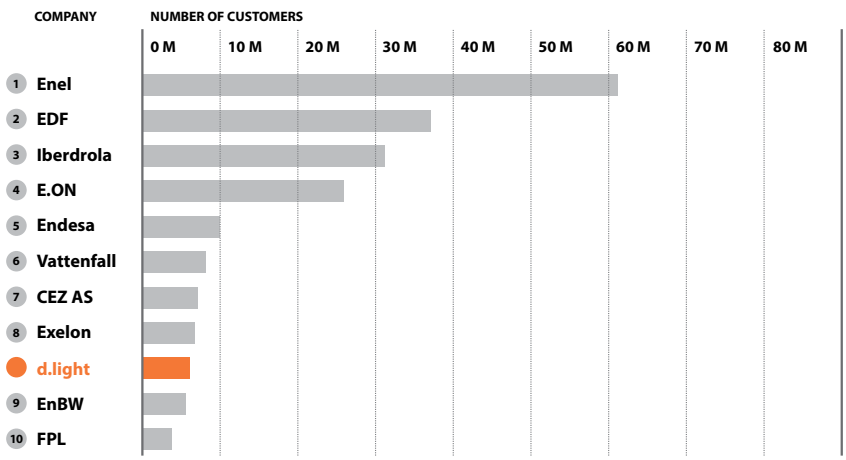
If clean, renewable energy can deliver supply in a similar time frame and cost as fossil fuels, it should be prioritized as a key part of the solution to deliver energy access. An often-cited challenge to scaling renewables is their site-specific nature. Hydropower is only practical where large-scale reliable water flow exists or can be created through dam projects. Wind power is only practical in areas of moderately strong and reasonably sustainable and predictable surface wind. Renewable power production is not reliably consistent with time of demand, so cost-effective energy storage is required. However, in the non-OECD countries where the vast majority of demand for energy access is located, the sun is abundant and reliable. As such, solar can play a vital role in meeting market demand for universal energy access.

While the societal impacts of renewable, distributed energy are reason enough to advocate for decentralized light and power products, the basic economics will dictate the best path to delivering universal energy access. In reviewing the nature of the demand, the quality of the supply, and the breadth of opportunities for this market, the ideal energy access products would be small-scale, designed for the household or small business level. Moreover, these solutions would also be high-quality, low-cost, customizable, and adaptable, enabling individuals to control their own power supply and cost. Essentially, democratized energy.

The good news: these products exist today as part of a growing and thriving marketplace. Sales of solar lanterns have increased by nearly 100 percent every year since 2009, growing 300 percent in 3 years (in Africa).[31] In fact, the World Bank estimates that the African market for off-grid renewable lighting alone will quadruple by 2015.[32] Proof of this business model abounds; in fact, in under a decade, d.light has provided energy access to more customers than many large electrical utility companies in the world (based on the number of unique connection points)[33] (see Figure 4). d.light's growth has been enabled by virtue of a market-based approach, focused on providing consumer energy products that respond to the specific needs and desires of the BoP consumer. With sales of over 6 million products—improving the lives of over 30 million people—d.light has proven that the market for energy access is viable and thriving.

Can universal energy access be achieved if rural areas in the developing world are supplied with renewable, distributed and

FIGURE 4: LARGEST GLOBAL ELECTRICAL UTILITIES

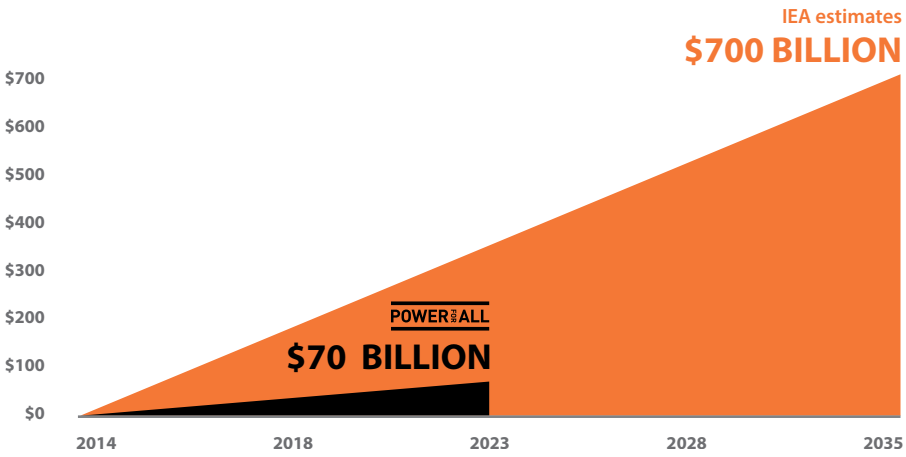


VI. A Better Path to Energy Access

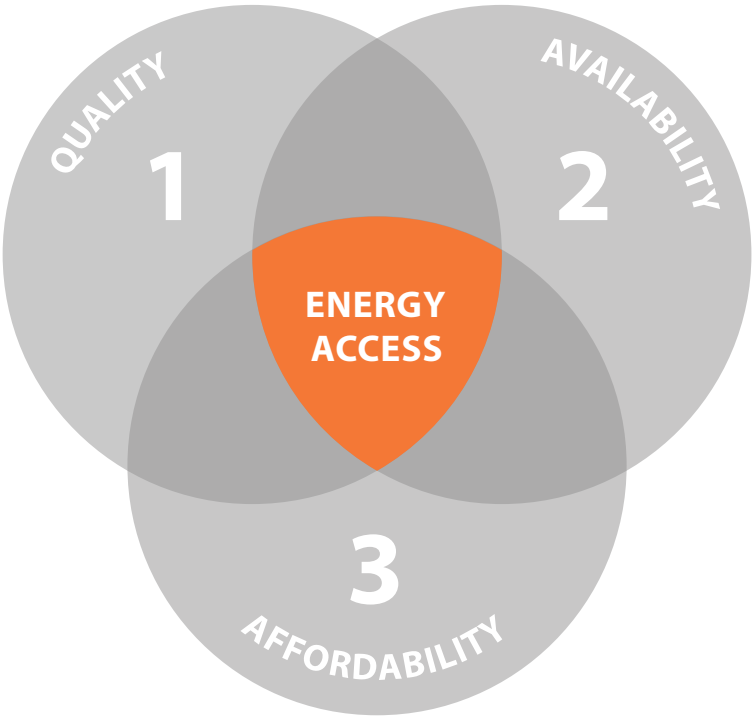
Renewable, distributed, democratized energy is far more economical and effective than traditional, "steel-in-the-ground" approaches in the markets most affected by energy poverty.

democratized power? As it turns out, this is not just the right thing to do, but it is a better solution; renewable, distributed, democratized energy is far more economical and effective than traditional, "steel-in-the-ground" approaches in the markets most affected by energy poverty. First, unlike the 5-year to 10-year process for siting and building power plants, distributed energy solutions can be delivered in weeks or months, not years. Second, by focusing on market-based approaches that involve energy consumers as active participants in choosing their own energy, costs will be shared by the market, not just large governmental bodies or institutional investors. By activating this market, solar power (sufficient to meet working definitions of energy access) could be delivered to 1.2 billion people starting today at a total cost of $70 billion.[34] The Power for All model, which drives distributed renewable energy solutions at the scale and price that the energy impoverished actually want and can afford, can solve the energy access problem in half the time at a fraction (10 percent) of the current estimated costs (even without adjusting for gradual price reductions and economies of scale)[35] (see Figure 5).

FIGURE 5: UNIVERSAL ENERGY ACCESS COMPARATIVE COSTS



VII. Scaling Distributed Renewables for the BoP



How far can small-scale, renewable energy systems take us? With all of the key success factors in place—low-cost manufacturing, efficient clean technologies, and a growing range of affordable products—this market has been expanding rapidly. However, overall market penetration is still less than 10 percent.[36] A few essential accelerators can help advance the path to energy access. These include high product quality, availability, and affordability.

Quality: Reliable Products for the Full Range of Customer Needs and Preferences

The Power for All model is based on BoP consumers being active participants in their energy supply, relying on market-based approaches, voluntary exchange, and competitive forces. Like any other consumer good or service, energy products for the developing world must meet high quality standards as the BoP market defines those standards. The market has indicated a strong preference for durable products that continue to perform as promised in the extremely challenging living and working environment that represents daily life for these customers.

The market for energy access stretches across geographies and cultures; energy consumption needs and means vary even within market segments, as does the percentage of income spent on energy. As we try to accelerate power for all to a greater diversity of regions, quality consumer energy products must include a broadening array of solutions so customers can match their investment to what they need and can afford at the time. Flexibility, customization, and upgradability are valuable features and must become part of the definition of a quality product. This is not just to address the vast diversity of nations requiring energy access products, but because as entry-level consumers reap the benefits of reliable, affordable, clean power, a substantial percentage will want to upgrade to higher power solutions. Production of quality energy products that can meet the full range of customer needs and preferences is a critical component to deliver power for all.

VII. Scaling Distributed Renewables for the BoP

Availability: Distributing Decentralized Energy

If developing countries are going to leap-frog the traditional power infrastructure and turn directly to distributed solar for power generation, it is critical to ensure availability of energy generation products. While free market competitive forces are solving the technology and product barriers to adoption, the "last mile" of distribution is still challenging access to energy. Entrepreneurs must deliver products and services to (and from) remote locations cost-effectively. The cost of transportation and middlemen often make it cost-prohibitive to deliver essential products and services to underserved communities. Poor infrastructure and widely dispersed consumers pose challenges to product availability. Product availability can be improved by leveraging the existing channel infrastructure, organized groups, and other established informal systems on a local and regional level. An even more critical—and often overlooked—factor in the success of distributed renewable solutions in rural areas is building sustainable last mile distribution. Especially in remote areas, channels can lose momentum (e.g., fail to keep stocks "fresh," introduce new generations of product or simply end sales) and disappoint customers, poisoning the market. As one might expect, retention and performance improves with careful selection of distributors and sales agents, strong compensation (including in-kind and "psychic income," such as improved status) and local support. Prioritizing strong relationships, including on-the-ground, in-country support for distribution channels is essential to drive universal energy access.

Energy is not a one-size-fits-all product or service.

Affordability: Energy in Small Doses and Financial Accessibility

Despite conventional wisdom, affordability is relative, not absolute, and energy is not a one-size-fits-all product or service. There is a valuable lesson to be learned from mobile phones in the mid-1990s: When African nations began to privatize telephone monopolies, providers developed inexpensive handsets and fiercely competitive operators began to sell air time in smaller, cheaper units. As a result, cell phone use exploded. As one journalist wrote a decade ago, "It turned out that Africans had never been big phone users because nobody had given them the chance."[37] If upfront costs limit adoption, energy providers must offer flexible financing and delivery. Enabling customers to pay for their energy in small installments holds promise; by leveraging mobile payment technology, customers can pay for their energy systems in small installments in amounts they choose. Introducing an ever-widening range of payment options will help bring an even larger customer base into the market. Based on BoP customer preferences, when consumers control how much—and what type—of energy they use, they are willing participants in the drive for universal energy access.

VIII. Power for All: The Call to Action

Global fossil-fuel consumption subsidies for 2012 were estimated at $544 billion. This means that one year of fossil fuel subsidies could provide over one billion people with the basic energy access needs estimated in this paper *seven times over*.

Renewable, distributed, and democratized energy is a critical part of providing universal energy access to billions of people—and it doesn't have to wait. This market is clamoring for clean, affordable, and reliable energy. As proof, in just two years, the number of just off-grid lighting providers in Africa alone has grown 400 percent, from 20 in 2010 to nearly 80 in 2012.[38] This BoP energy market, estimated at $500 billion, provides an incredible opportunity.[39] These solutions are not only less expensive and faster (especially with advancements in quality, affordability, and availability), but create a sustainable solution to the energy needs of the developing world. While the energy access industry is growing, there are essential accelerators for the solar light and power industry, government, nonprofits, investors and lenders, and energy consumers that will help focus resources on delivering universal energy *before* 2030.

The Solar Light and Power Industry: Quality is Job One

ENSURE QUALITY

While meeting quality standards such as those supported by Lighting Africa are voluntary, active pursuit of improved standards for products as a whole is essential. In addition, individual manufacturers and the industry alike must challenge copycat products and poor-quality "knock-offs" that poison the market. Anti-counterfeit policies and initiatives that protect private investment and prevent market spoilage are essential.

BUILD CUSTOMER TRUST

Closely related to quality, consumer trust is a prerequisite to facilitating wider adoption of solar goods and long-term, permanent displacement of fossil fuels. For first-time customers moving from kerosene to renewables, a positive initial experience is critical to drive future decisions to purchase solar light and power products. Manufacturers and distributors must take advantage of trust-building opportunities along the entire lifecycle of products, including strong warranties, performance as promised, and end-of-life plans.

MAKE ENERGY ACCESS MORE AFFORDABLE

Beyond the obvious of lowering costs and expanding the range of product choices, the solar light and power industry can do a great deal to increase affordability through innovative payment solutions, which will reduce up-front costs. In particular, micro-loans, micro-payments, mobile money, and "scratch" or "top-up" cards can enable people to access a basic energy system that is often described as a critical "first rung on the energy ladder."

COLLABORATE IN MARKET-BUILDING

It is essential that the industry works together, through trade groups such as the Global Off-Grid Lighting Association (GOGLA), to share insights, best practices, lessons learned, and other areas of mutual interest. In particular, the dearth of clear, consistent, and trusted market intelligence to support the growth of the industry can be addressed through trade groups and partners dedicated to building the off-grid sector for the developing world.[40]

Public Sector and Government Agencies: Include Distributed Renewables in Energy Policy

INCLUDE DISTRIBUTED RENEWABLES IN ENERGY POLICY

Off-grid energy can serve as an innovative, advanced component of national energy policy. The latest generation of distributed solutions—including self-contained, durable, upgradeable home systems—delivers premium power. By leveraging advanced technology in renewables, storage and lighting, modern off-grid solutions provide

VIII. Power for All: The Call to Action

Transforming the world energy outlook requires a shift in the way we think about energy.

All of society—including the public and private sectors—has a role to play in delivering Power for All.

clean, safe, affordable and immediate access (no grid build-out required) that millions of consumers have found superior to business as usual. When assessing policy solutions, governments can treat distributed renewables as part of a progressive energy portfolio that will deliver high-quality energy to constituents in need.

LEVEL THE PLAYING FIELD

Instituting policies to facilitate the market for renewable, distributed energy solutions for the BoP—including reducing tariff barriers on renewables (such as duties and value-added taxes)—is a critical role for governments to play in bringing power to all. Fossil fuel subsidies are particularly damaging; global fossil-fuel consumption subsidies for 2012 were estimated at $544 billion.[41] This means that one year of fossil fuel subsidies could provide over one billion people with the basic energy access needs estimated in this paper *seven times over*. If governments reallocated even a fraction of current subsidy budgets to market-building activities, power for all could be accelerated.

COLLABORATE WITH THE PRIVATE SECTOR

In early stages, market transformation requires coordination between market actors and policy makers. While off-grid is a thriving market, market-based approaches and policy decisions working together will accelerate efforts to electrify the energy impoverished. Establishing relationships and collaboration groups with entrepreneurs working to bring solar light and power products the developing world will help identify barriers that stand in the way of delivering energy access products to regions that need them most.

Nonprofit and Nongovernmental Organizations: Focus on Market-Building

FUND MARKET-BUILDING

The nonprofit sector can best accelerate energy access by directing grants and foundation support toward market-building initiatives (including support for consumer education and marketing)—not giveaways that can distort or destroy the market. Simply giving away light and power products does not build a self-sustaining market that will naturally align price and quality, nor does it encourage market transformation.

GROW CONSUMER AWARENESS

Funding campaigns for the product category that drives demand generally for solar light and power—similar to the ENERGY STAR campaign in the United States—will support the entirety of the market. Education that expands awareness and understanding of the value of distributed, renewable energy—ranging from expanding curricula to improving research on best practices—is essential to create new opportunities and enable informed energy decisions for customers, businesses, and donors.

SUSTAIN COMMITMENT

Industry growth takes time. Private sector firms focused on bringing solar light and power to the developing world have a number of challenges—the least of which is not dethroning established default fuels like kerosene and diesel. While the

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opportunity is great, the barriers are significant. Long-term support for chosen initiatives—perhaps 5–10 years—is critical, as is building adaptability into funding for this quickly evolving marketplace.

Investors and Lenders: Mobilize Capital

FINANCING FOR MANUFACTURING

Capitalization challenges in the solar light and power manufacturing and distribution chain create a limit to scale and an opportunity for the financial sector. Manufacturers of solar energy products for the developing world are limited by their ability to finance the supply chain, including manufacturing and shipping (8 to 12 weeks or more by sea freight). The result? A 3-month to 6-month financing cycle, just to deliver product to distributors. Providing capital to finance this critical component of delivery can help support a healthy distribution and sales channel.

FINANCING FOR DISTRIBUTION

Small distributors are often unable to pay cash on delivery for orders large enough to keep the distribution channel continuously stocked. Credit and debt facilities designed specifically to support distributors and downstream financing organizations will help drive accessibility and affordability for energy in the developing world.

FINANCING FOR CONSUMER PAYMENTS

Financeable solar light and power products generate reliably predictable consumer payment streams while enabling access through small, affordable purchases of energy. When companies have enough resources to finance consumer purchase of baseline solar energy systems (paid for over time, leading to system ownership) or provide energy as a service (e.g., pay-as-you-go), consumers can pay for their power as they use it and secure immediate access to energy on their own terms. To support growth of these activities, the sector needs specific facilities to advance financing for consumer payments.

INNOVATIVE INSTRUMENTS FOR DISTRIBUTED ENERGY ACCESS

New financial instruments that focus return-seeking funds on the particular challenges facing the delivery of small-scale, distributed energy can accelerate the scale of access-enabling services and products. Specific funds set up and targeted to universal energy access solutions would help prevent "steel in the ground" or other centralized approaches from poaching funds better used for distributed generation. More, specific tools to help young companies succeed in this market—such as managing currency volatility risk—will help the broadest range of market actors. In all cases, mobilizing capital for the particular needs of the energy access industry "speeds the plow" for the entire value chain, from manufacturers to customers.

EVALUATE RETURN ON INVESTMENT WITH SOCIAL IMPACT METRICS

The success of impact investing—a major accelerator for the energy access industry—hinges on the ability to meaningfully and credibly capture, track, report, and measure social and environmental impact. Given that social enterprise has driven most of the industry to date, companies

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and funds need meaningful management tools to authentically evaluate the performance of companies and markets alike. Looking at impact alongside financial return on investment is critical to build legitimacy for business models and continue to draw investment dollars to the category.

Energy Consumers: Choose Renewable, Distributed, Democratized Power

TEACH RENEWABLES

Globally, future generations must be prevented from simply defaulting to fossil fuels for energy. If kerosene, diesel, and coal continue to be prioritized energy sources, climate change impacts will be exacerbated, and universal energy access will not be achieved. The transition from fossil fuels can also be furthered by adopting renewable, energy-efficient technology in homes and businesses wherever possible. In building capacity for core technologies critical to delivering universal energy access, costs will further be lowered for components and manufacturing, benefiting energy access applications.

CHOOSE DISTRIBUTED

As demonstrated in Power for All, distributed generation is available—to varying degrees—around the world. From the United States to Liberia, distributed generation allows collection of energy from many sources with lower environmental impacts and improved security of supply. While grid parity has been achieved in a number of locations, consumers in all markets should "vote with their pocketbooks" by investing in appropriate local applications of decentralized power.

DEMOCRATIZE POWER

Modern technology offers possibility of a dramatically different electricity future: a democratic and participatory system, with homes and businesses around the world becoming energy producers (well as consumers) and architects of a new electricity system. All actions and investments that expand the global application of renewable, distributed, and democratized energy sources—ranging from zero-net energy buildings to affordable solar lanterns—grow legitimacy for the kinds of solutions that will deliver universal energy access to the energy impoverished, and a more democratic future of energy.

Power for All: The Future of Energy Requires Us All

To deliver power for all in the shortest time frame possible, there must be a shift in acceptance of renewable, distributed power as a legitimate part of the world's global energy supply. Transforming the world energy outlook requires a shift in the way we think about energy; all sectors of society have a role to play. Distributed solar light and power is both vastly less expensive and significantly faster, with a sustainable business model that directly engages the energy impoverished in creating their own energy and directing their own futures. Universal energy access can be achieved when we enable Power for All.

Notes

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