POWER FOR ALL

# Decentralized Renewables: The Fast Track to Universal Energy Access

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## About this Paper

Multilateral Development Banks (MDBs) are uniquely positioned—and publicly committed—to ending energy poverty. However, MDBs' common approach to energy access often overlooks the particular ability that decentralized renewable energy (DR energy or DRE) enterprises have to radically alter the access timeline.

Seeking the fastest path to universal energy access, Power for All has identified three specific courses of action that MDBs can pursue in support of decentralized renewables in order to accelerate clean energy access. If global banks (1) utilize energy access opportunity cost assessments in funding decisions, (2) catalyze energy access "super funds," and, (3) mobilize fast-track intermediaries to quickly and nimbly deliver funds in support of DR energy, MDBs can lead the way to achieving power for all.

Power for All is a global campaign to accelerate the deployment of market-based, decentralized renewable energy as the key to achieving universal energy access. The campaign serves as a collective voice for businesses and civil society focused on distributed renewable solutions, including decentralized solar, hydro, biomass, and wind designed for households and businesses. Learn more at powerforall.org.

# I. Executive Summary

**The international community is united by a global mandate and moral imperative to deliver, in just over a decade, affordable, reliable, sustainable, and modern energy access to the billions of people who live in energy poverty.** Ranging from the African Development Bank's commitment to end energy poverty by 2025 to the United Nations' Sustainable Development Goal 7 (SDG7) targeting 2030, energy is universally recognized as central to nearly every major challenge and opportunity the world faces today. The UNFCCC Paris Agreement, with an initial 177 signatories, acknowledges that renewable energy should be deployed to achieve universal energy access and climate mitigation.

Despite energy access commitments from governments and the world's most influential institutions, business-as-usual energy delivery will not achieve global goals to end energy poverty by (or before) 2030. In fact, based on current trajectories and conventional approaches—which include an abundance of 20th century technologies, like centralized energy—predictions are that there will be more energy poor in 2030 than there are today.[1] Hindered by legacy frameworks that slow the pace of change, many of the same institutions that have heralded SDG7 are actually limiting the ability of the global efforts to quickly address the costs of energy inequality.

**Many projects invested in by MDBs actually hinder efforts to meet global goals for electrification.**

While a number of players—civil society, governments, entrepreneurs—are critical to re-balancing this equation, multilateral development banks (MDBs) are uniquely positioned to accelerate energy access. The MDBs—including WBG,[2] AfDB, ADB, IADB[3]—are expressly designed to catalyze poverty alleviation. However, MDBs' common approach to energy access often overlooks the unique ability that decentralized renewable energy (DR energy or DRE) enterprises have to radically alter the access timeline. Decentralized energy like mini-grids and solar home systems are viable options[4] to economically deliver fast, efficient energy access[5] in areas where centralized grids are slow and prohibitively expensive to deploy.

Studies have identified the inadequate levels of MDB support for quickly deployable, decentralized renewable energy access (see Table 1), especially when compared to MDB support for traditional "steel in the ground" power, as a cause of slow electrification progress.[6] While these studies evidence under-investment by MDBs, there is another critical factor: the **energy access opportunity cost**. This missing link between pace of funding and speed of access means many projects invested in by MDBs actually hinder efforts to meet global goals for electrification. Current approaches that prioritize slow-to-build, unreliable grids over quickly deployed DRE mean countless children lose educational opportunities, hundreds of thousands of businesses are less productive, and health clinics serve millions inadequately.

The opportunity costs of delaying energy access can be remedied if MDBs and infrastructure development agencies incorporate into their plans the full spectrum of energy options available today, including DRE systems. To this end, Power for All calls on MDBs to (1) place value on the lost opportunity of delayed energy access, (2) speed the pace of sector investment through "super funds" of aggregated capital dedicated to DRE, and, (3) catalyze dedicated national energy access vehicles to address the deployment gap between MDBs' "wholesale capital" (large transactions) and the "retail capital" (smaller, diverse transactions) that will support the DRE sector, and radically accelerate the access timeline.

**TABLE 1: MDB FUNDING, ENERGY ACCESS, AND DECENTRALIZED RENEWABLES (2011–2014)[7]**

| Multilateral Development Bank (MDB) | Total Energy Access Funds | Energy Access Funding for Decentralized Renewables | Total Funding to Decentralized Renewables |
|---|---|---|---|
| World Bank Group (WBG) | $1,504,020,000 | 11% | $169,280,000 |
| Inter-American Development Bank (IADB) | $85,030,000 | 20% | $16,730,000 |
| African Development Bank (AfDB) | $229,370,000 | 1% | $1,570,800 |
| Asian Development Bank (ADB) | $243,700,000 | 2% | $5,250,000 |

*Note: Table 1 energy access funding percentages have been rounded.*

# II. Decentralized Energy: The Faster Path to Access

**Traditional centralized power plants and transmission grids, largely representative of the kind of projects funded by MDBs, are part of a suite of solutions that should be considered for energy access—but they are not the only solution.** Traditional power plants are not designed to create quick access for the unelectrified by 2030. Instead, incumbent approaches most often serve the needs of the already connected: urban and peri-urban populations, and factories. They rarely serve meaningful numbers of rural communities, as power plants and electrical grids consistently fail to reach billions who still live far from existing infrastructure.

The global community, with MDBs in important leadership positions, has agreed to 2030 as the deadline for universalizing access—but the median duration of MDB electricity investment projects is nine years, based on World Bank results. More, these typical MDB projects rarely adequately target rural areas, where, for example, over 80 percent of Africa's energy poor reside.[8] Hence, without radical increases in MDB energy portfolios and numbers of staff working on access, estimates are that low energy access countries are only likely to benefit from a wholly inadequate two to four World Bank electricity projects each between now and 2030.[9]

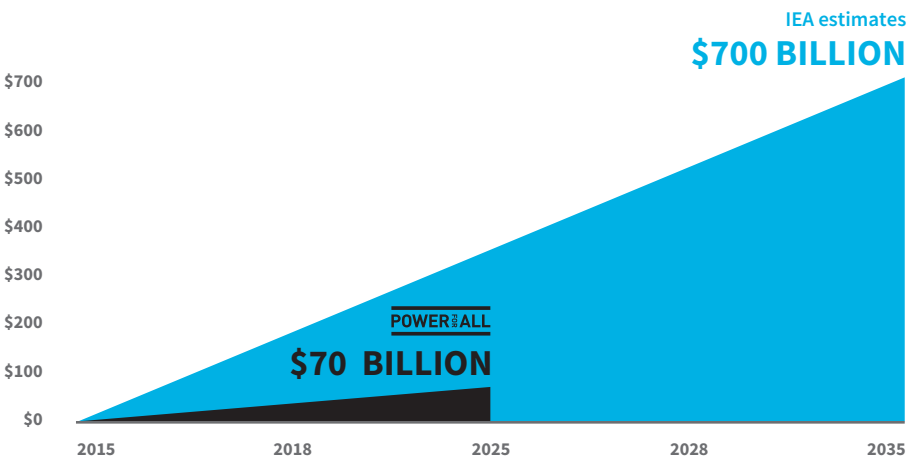
The good news: there is a faster path to universal energy access. A wide range of distributed generation and decentralized renewable energy solutions—including pico solar, pay-as-you-go solar home systems, multi-technology (wind, hydro, solar, biomass) mini-grids, and mobile solar farms—are designed specifically for places the grid will not easily or cost-effectively reach, where majorities of those without energy access now reside. These energy products and services are part of a growing industry which is providing services that align with the Sustainable Energy for All Tier 1 to Tier 4 levels.[10] For example, Tier 1 and Tier 2 solutions—part of a market projected to be worth at least $3 billion by 2020—offer options from basic lighting and phone charging up to systems that power televisions.[11] A testament to the success of DRE with energy impoverished customers, the sector has reached a legitimate scale: today, DRE technologies—ranging from lanterns up to mini-grids—provide energy to more customers than many of the largest global electrical utilities in the world.[12]

**Traditional power plants are not designed to create quick access for the unelectrified by 2030.**

What's more, evidence suggests that DRE, based on an achievable growth rate, can deliver a basic level of universal energy access in half the time of business as usual for 10 percent of the cost (see Figure 1).[13] While some detractors claim that DRE technologies only "shine a light on poverty," this argument falsely conflates the means with the ends. Tier 1 and Tier 2 systems (e.g., lanterns and some rooftop systems) create both an immediate access solution *and* serve as a bridge to the end goal of high quality power on a longer timeline. In fact, integrating DRE into planning can help traditional utilities by fostering a community that is accustomed to generating and paying for modern electricity services.

On this latter point, decentralized renewable energy solutions are not only immediately deployable, they are also widely affordable. In fact, when consumers in rural and peri-urban areas—who are already paying outrageous sums for poor solutions—are given a clean, safe, superior, and affordable alternative, one that provides a long-term return on investment, they have proven they can and will pay market prices for modern power solutions when given the choice. By creating consumer choice, the burgeoning market for DR energy can leapfrog the slow-moving process of centralized power and rapidly accelerate the access timeline.

**FIGURE 1: POWER FOR ALL: THE ENERGY ACCESS IMPERATIVE[14]**



# III. MDBs: The Cost of Business as Usual




**MDBs provide financial assistance to emerging markets, typically in the form of loans and grants, for investment projects (infrastructure, including power plants, as well as health and education) and policy-based activities (focused on policy enablers, such as reforms in electricity regulation).** There is well-known pressure for banks to get money "out the door" to developing countries, leading to incentives to pursue large transactions—especially when it comes to energy.[15] Given the massive disbursements of funds, large transactions simply make sense for banks. (The World Bank Group alone distributed $63.5 billion to the electricity sector during FY 2000–2014.)

## The Banks & Energy Access SMEs

Like all banks, MDBs need to sustain credit ratings (e.g., AAA), usually assessed by rating agencies like Moody's and Standard and Poor's, which evaluate banks on various criteria, including membership support. Credit ratings are often driven by volume of funding committed and disbursed on an annual basis. In terms of energy, this means funding often flows to well-understood and long-established patterns of large-scale infrastructure projects, such as grid extension, system upgrades, gas-fired power plants, and large hydropower projects. This orientation towards massive, slow-to-build generation is reflected in priorities for bank staff, staff portfolios, and cultivated expertise. By way of example, investment officers at the International Finance Corporation or IFC (part of the World Bank Group) are evaluated on four main factors, two of which are hitting investment dollar volume targets and financial return on investments.[16]

Moreover, many staff at MDBs are classically trained development economists with PhDs, or engineers who have been schooled in traditional, centralized, large scale energy generation and delivery as an infrastructure investment. Traditional training is not as easily applicable to the new world of decentralized renewable energy, with disruptive technologies, innovative business models, and smaller investment sizes that have only emerged as options in the last decade. Taken together, DRE translates into high transaction costs within current MDB operating frameworks.[17]

Given the institutional context of development banks, the orientation of MDBs towards large, long lead-time deals is not surprising. Although a handful of DRE companies have very recently reached a scale and capacity for $40 million to $50 million in capital (such as M-Kopa, Off-Grid Electric, and d.light), the vast majority of the sector's enterprises are internationally classified small businesses (or SMEs) with 250 employees or less, and capital needs often in the range of $3 million to $5 million or $10 million to $20 million.[18] Moreover, DRE transactions driving energy access are often led by young companies (less than five years old) that target consumers with little or no credit histories, and work with unstable local currencies in dispersed locations throughout the developing world. These "smaller" loans and disbursements that can launch the next generation of DRE access engines often fail to meet the current investment criteria for MDBs. Worse, as reported both by companies seeking funds and by MDB representatives, it can often take one to three years from DRE project conception to fund deployment.

Put simply, there is a mismatch between the traditional expertise and incentives within development banks (a small number of large projects with extensive due diligence) and the new opportunities that will quickly reach the poor with decentralized renewable energy access solutions (via

# III. MDBs: The Cost of Business as Usual

**Driven by urgency and unencumbered by long development pipelines, most DRE companies are leapfrogging the traditional, centralized process of planning and delivering basic energy access several times faster than business-as-usual infrastructure projects.**

numerous small transactions with limited information and high perceptions of risk).[19] These traditional banking practices are at the heart of the reasons why supporting accelerated energy access through decentralized renewable energy has been challenging for MDBs. These challenges are evidence of the clear and urgent need to develop new approaches to supporting the modern energy sector.

## The Radical Accelerators: Decentralized Renewable Energy Companies

Because the DR energy sector doesn't map directly to the way MDBs do business, the result is a significant missed opportunity when evaluating the best energy investments to accelerate universal energy access. As demonstrated in Table 2 (using real-world examples of successful DRE companies), decentralized energy's impacts on the speed and cost per connection challenge the business-as-usual assumption for projects delivering energy access.

In spite of the challenges of building new markets, most decentralized renewable energy companies raise the access rate and radically alter the access timeline, especially when compared to traditional investments in infrastructure projects made by development banks. Many household and small business solar providers—as well as a number of mini-grid developers—are nimble, data-driven enterprises with readily available technologies that can deliver Tier 1 to Tier 3 access within days to weeks after a customer's decision to purchase.[20] Driven by urgency and unencumbered by long development pipelines, most DRE companies are leapfrogging the traditional, centralized process of planning and delivering basic energy access several times faster than business-as-usual infrastructure projects. On average, pico solar companies are delivering energy access to nearly two million households per month.[21]

**TABLE 2: MAKING A CASE FOR THE ENERGY ACCESS OPPORTUNITY COST**

| Connection in Rural Area T1 Basic service or Greater Access[22] | Time per Connection | Cost per Connection[23] | One-Year Projected Reach | 10-year Potential Reach[24] |
|---|---|---|---|---|
| Case 1: DRE SHS/Pico Company | < 1 month[25] | $30 | 3,000,000 | 15,600,000 |
| Case 2: DRE Mini-Grid Company | 4 months[26] | $500 | 3200 | 576,000[27] |
| Case 3: Typical MDB power plant project | 9 years | $2,494 | 0 | 57,716[28] |

*This analysis attempts to demonstrate the period of time during which energy access benefits are lost while investing in the MDB business-as-usual projects.* ***These illustrative case studies are not a full cost benefit analysis of the three alternatives.*** *Cases 1 and 2 are based on real-world data from DR energy companies operating today. While representative, these cases will vary based on market and other conditions. Case 3 includes Power for All PEAK lab[29] analysis with data sourced from the IEG's World Bank Group Support to Electricity Access, FY2000–2014. For a detailed accounting of data and caveats, see notes on pages 13–14.*

# IV. Changing the Equation: A Call to Action

**Through their stated missions, MDBs are committed to reducing global poverty and achieving universal energy access.** When the MDBs talk, global financial markets listen: studies show that for every $1 a development bank invests in a sector, at least $2 of additional investment is secured.[30] Given this leveraging effect on sector growth, the mission alignment between the banks and DRE companies provides a powerful opportunity to collaborate and accelerate access, but requires changing the way that MDBs approach their work in this space.

In concert with its partners, Power for All has identified three specific courses of action that MDBs can pursue in order to become leaders in accelerating energy access. Specifically, MDBs can (1) utilize energy access opportunity cost assessments in funding decisions, (2) catalyze dedicated energy access super funds, and, (3) in the spirit of Bangladesh's Infrastructure Development Company Ltd., GAVI,[31] and other creative public private partnerships, capacitate and mobilize a new chain of intermediaries designed to quickly and nimbly deliver funds to decentralized renewable energy markets. Together, these ideas can accelerate the speed of delivering energy access in the regions and countries suffering most from energy poverty.

### 1. Energy Access Opportunity Cost

MDBs can rapidly accelerate universal energy access by developing performance assessment vehicles that reward the pace of tiers of energy access services delivered, not just dollars out the door. Presented here as a conceptual framework, the Energy Access Opportunity Cost approach proposes including the costs of connections and wait times for energy access service delivery, to provide a more appropriate assessment of options for delivering energy access services (see Figure 2).

Given the strong connections between energy, well-being, and economics, the Energy Access Opportunity Cost must account for the missed opportunities of individuals (Human Development Index, or HDI, scores) and nations (gross domestic product, or GDP, including both micro and macro economic indicators) of not having energy access. More specifically, decisions on which pathways to choose for energy access must include potential gains in health, education, income, and productivity that are not realized when energy access is delayed. The time element and cost differences become multipliers on the underlying "opportunity cost" of large scale projects, as decentralized renewable energy delivers HDI and GDP impacts faster and at lower cost to more people in more places.[32] While not yet captured here, fundamentally important ancillary issues such as rural economic stagnation and lack of opportunity's impact on migration and susceptibility to extremists have profound economic and security impacts as well.

**FIGURE 2: CONCEPTUAL FRAMEWORK OF ENERGY ACCESS OPPORTUNITY COST[33]**

# IV. Changing the Equation: A Call to Action

### 2. Energy Access "Super Funds"

Because the utilization of the Energy Access Opportunity Cost assessment will add new dimensions and values to investment decisions, Power for All recommends that MDBs catalyze energy access super funds[34] to expedite dedicated funding streams. Leveraging lessons taken from the Climate Investment Funds and its Scaling Renewable Energy Program (SREP), energy access super funds are envisioned as a combined initiative of major MDBs that aggregates capital and services into defined financial products in order to accelerate finance for DRE access. By bringing together grant and concessional streams, these super funds could deliver funding to energy access markets in a holistic manner, tackling the full continuum from market development to growth capital—as well as expertise—specifically to deliver access before 2030.

Support for dedicated energy access funding windows is found in sector discussions[35] and the SE4All Finance Committee's 2015 recommendations[36] to (1) create energy access finance and aggregation structures fit to the specific opportunities at the base of the pyramid and (2) facilitate aggregation via layered and blended funds.[37] The energy access super funds would address these recommendations by creating standardized documents, financial models, and established processes to increase efficiencies and reduce the expense of due diligence, structuring, closing, and monitoring of investments. In addition, the super funds could also provide clear opportunities for SMEs to spend more time serving their customers rather than their lenders, and deliver clear signals to commercial financiers that DRE is a compelling avenue for investment and profit. Finally, the super funds would directly impact the pace of access and tackle another roadblock frequently cited across the sector: the time-intensive funding cycles and the transaction costs of DRE investments.

**Super funds could directly impact the pace of access and tackle another road block: time-intensive funding cycles.**

The recently launched Climate Investor One is an example of a fund that combines three financing windows to achieve efficiency and expedite private investment in renewable energy generation projects.[38] While the market roadblocks may vary, the super funds could mirror Climate Investor One's approach of combining resources into one facility to efficiently break down roadblocks via strategically aligned, but separate, services and finance products that will develop a portfolio aimed at accelerating the scale of access. A DRE dedicated fund would have specific windows

**TABLE 3: THE OPPORTUNITY COSTS OF DELAYING ENERGY ACCESS**

| | |
|---|---|
| **Education** | Children who will lose out on education that would prepare them for work in the modern world |
| **Productivity** | Workers and businesses that will fail to reach their productive economic potential |
| **Health** | Health clinics and workers who will be forced to inadequately serve hundreds of millions of people |

# IV. Changing the Equation: A Call to Action

of funding and services to address three roadblock groups defined by Power for All and its partners, detailed in Appendix A, including market development, early stage development, and growth.

### 3. DRE Fast-Track Intermediaries: An IDCOL in Every Low Energy Access Country[39]

Even with energy access opportunity costing and dedicated DRE funds to aggregate and expedite capital flows, a bridging mechanism or intermediary is needed to address the deployment gap between MDBs' "wholesale capital" approach (large, standard transactions, fewer clients) and the "retail capital" approach (smaller, heterogeneous, hundreds of clients) needed at the national level to support DRE businesses and their customers and to radically accelerate the access timeline.

Intermediaries and the MDBs have a track record of success in this arena. One example is Bangladesh's Infrastructure Development Company Ltd. (IDCOL), a wholly government-owned organization that is funded by 11 MDBs and donors. Designed to optimize private sector engagement in promotion, development, and financing, the concentrated focus of IDCOL has supported both the establishment of the systemic framework for developing and financing energy access delivery channels and the creation of the ramp up leading to more than 60,000 solar connections per month since IDCOL's inception in 2003. While the 12-year time frame to this level of service delivery must be dramatically reduced to meet global goals, the IDCOL model offers elements that are core to country intermediaries tasked with accelerating energy access.

**An intermediary is needed to address the deployment gap between MDBs' "wholesale capital" and the "retail capital" approach needed at the national level to support DRE businesses.**

A $20 million loan facility in Ethiopia has been informed by IDCOL's experience, and is coordinated through the Development Bank of Ethiopia. In its first 18 months of operation, it has helped over one million people secure clean, safe, and affordable Tier 1 to Tier 2 energy access.[40] As testament to this model, even in the unlikely scenario that market growth rates stay flat in this energy poor country of 94 million people, six million people will gain access to basic energy services in nine years—exponentially more than typical World Bank power plant projects, as cited on page 4.

Public authorities and state-owned development corporations for housing, infrastructure, agriculture, and geothermal sectors are well known (e.g., Kenya Geothermal Development Company, Nigeria Tourism Development Corporation, Empire State Development Corporation). The decision to establish these fast-track intermediaries rests on the prioritization of public and private partnerships to achieve defined public goals. The global community has agreed that energy access is such a goal. Mobilizing program support to enable and empower national intermediaries, such as IDCOL and/or commercial lenders, will maximize MDB and donor resources, delivering on multiple human health, education, economic growth, climate, and other bottom lines to the benefit of all.

# V. Answering the Call to Action

**Traditional approaches to energy delivery are not sufficient to end energy poverty in our lifetimes.** To deliver power for all in the shortest time frame possible, there must be a paradigm shift in how the world addresses universal energy access. Transforming the world energy outlook begins with properly weighting the pace of funding and speed of energy access. While all sectors of society have a role to play, MDB client governments, the DRE sector and MDB donors can be powerful agents of change in the acceleration of the universal energy access timeline.

## MDB Government Clients: Ask for Decentralized Renewable Energy Funds

Low-access countries can support the growth and diversification of decentralized energy solutions—and therefore, the speed of access—by directly requesting funds for decentralized renewable energy programs and projects. The Energy Africa compacts to advance decentralized renewables agreed between some African Countries and the UK government[41] are one example of how an MDB donor and constituent nations are building the case for the technical and financial support to accelerate energy access. Similarly, countries like Rwanda and Kenya are working to achieve universal access objectives with integrative planning that combines grid and off-grid solutions. As more energy and finance ministries pursue access solutions based on affordability, levels of service, and short deployment periods, MDBs will respond to client demands and expand funding of decentralized renewables. Tools such as the Global Tracking Framework Access Investment Model,[42] combined with the Energy Access Opportunity Cost, will support low-access countries in making funding requests that reflect the full developmental, environmental, and economic values of delivering energy access in the shortest time frame possible.

## CSOs & the Private Sector: Collaborate on Category Creation

The decentralized renewable energy market itself—including civil society and the private sector—has a critical role to play in creating a faster path to universal energy access for poor communities around the world. Still a nascent industry, DRE companies and market-building organizations must collaborate on category creation, including proactive education of key audiences, from decision-making elites to rural end users. Millions—if not billions—of people are still in the dark about the exponentially better benefits, experience, and economics of decentralized energy in low-access countries. Market-building civil society organizations (CSOs) like Practical Action, GVEP, ASI, and SNV can work with enterprises to educate both global organizations (e.g., MDBs) and national governments about the sector's unique ability to deliver reliable, affordable, clean—and fast—energy access, along with powerful HDI and GDP impacts. Collaborative action between CSOs and the private sector (including via Power for All coalitions, such as those in Zimbabwe, Sierra Leone, and Nigeria), can shorten steep learning curves and create efficiencies through sharing insights, best practices, and lessons learned. By working together to drive awareness and behavior change and truly address the issues of the energy poor, CSOs and companies alike can enjoy faster growth, greater impact and, ultimately, contribute to the acceleration of energy access.

## MDB Donors & Members: Align Funds and Programs to Accelerate Access

To deliver power for all in the shortest time frame possible, there must be a shift in how MDBs and donors plan, implement,

# V. Answering the Call to Action

measure, and reward energy investments. Multilateral development banks are responsive not only to the demands of client countries, but also to bank donors. Donors to the MDBs (including the U.S. government and other wealthy nations) have unique power and authority to guide priorities and investments in low-access countries. At the global level, donors can urge the development banks to reassess projects and encourage the prioritization of a new kind of virtual infrastructure that accelerates universal energy access, based on opportunity costing. At the national level, donors active in low-access countries—including the European Union, the Belgian government, and the U.K. government—can help galvanize the broader ecosystem (including the organizations working on poverty alleviation, climate change, water, food, education, and health) to focus on-the-ground efforts towards accelerating the pace of energy access. Ensuring alignment across the multibillion dollars of donor-funded development programs is one of the most critical components of accelerating the access timeline.

### Power for All: The Future of Energy Requires Us All

With a reprioritization of funding, shifting of internal incentives, and adaptation of successful, fast-track funding schemes for decentralized renewables, MDBs can become the great accelerators of energy access and leaders in achieving power for all. However, the banks alone cannot create universal energy access. The international community is united by a global mandate to deliver affordable, reliable, sustainable, and modern energy access to the billions in energy poverty. We must work together to transform the way the world generates, uses, and pays for energy.

**The international community is united by a global mandate to deliver affordable, reliable, modern energy access.**

**MDBs can become the great accelerators of energy access and leaders in achieving power for all.**

With a shift in acceptance of renewable, distributed power as a legitimate part of the world's global energy supply, we can achieve power for all.

**Photos generously provided by:**
UK Department for International Development (p. 8, top right), Foundation Rural Energy Services (p. 9, top left), and Practical Action (p. 10).

# Appendix

| DR SECTOR GROWTH NEEDS | ROADBLOCKS | ACCELERATORS |
|---|---|---|
| **Market Development** | • Lack of consumer awareness, market data, technical and business development skills, product quality, supportive policy frameworks | • Provide national quality standards and testing models<br>• Consumer education materials and approaches delivered in collaboration with local stakeholders (CSOs)<br>• Technical and business training adapted to local markets |
| **Early Stage Innovation Risk Capital** | • Grantmaking practices require time-consuming application, approval, and reporting processes<br>• Lack of capital with appropriate risk appetite<br>• Limited investor awareness and lack of expertise (and trusted financial models) prolong and increase costs of investment process<br>• Market leaders attracting majority of new capital injections with little capital going to startup companies | • Business model and technology specific Challenge Funds with streamlined processes and reporting (e.g., Global Alliance for Clean Cookstoves)<br>• Technical assistance to equity and debt funds to reduce transaction costs of early stage investments (e.g., Seed Capital Access Facility)<br>• Technical assistance to companies on business management and community training on productive uses of energy for load growth<br>• Patient capital combined with multi-year results-based financing |
| **Mid-stage/Growth Equity Capital** | • Lack of capital with appropriate risk appetite<br>• Limited investor pool to expand beyond market leaders | • Loan guarantees (e.g., first loss; USAID Development Credit Authority guarantee)<br>• Results based financing (e.g., SNV in Tanzania) |
| **Supply Chain Debt/Working Capital** | • Banks (e.g. Citi) require 2–3 years of positive cash flow (only likely for companies 5–7 years old) | • Lend based on revenue growth data<br>• Loan guarantees/first loss pools |
| **Consumer Finance Debt** | • Debt prohibitively expensive from banks, foundations (10–15%)<br>• Local finance/micro finance institutions don't lend for DRE products | • Lend at 3–6% preferred rate for SMEs working in support of access goals<br>• Syndicated loan structures that provide better pricing<br>• Support SPV models and underwrite securitization vehicles for growth (e.g., BBoxx) |
| **Currency/Foreign Exchange** | • Hedging is expensive and difficult to get | • Loan guarantees/lines of credit to national financial institutions to de-risk local currency loans (e.g., IDCOL)<br>• Insurance products (e.g., HUGinsure[43]) |
| **Sovereign Risk** | • Expensive political risk insurance | • Sector specific insurance, underwritten through donor funds to reduce cost (e.g., HUGinsure) |
| **Standards for Credit Scoring/Portfolio Evaluation** | • Lack of a standardized credit risk data management process adds to market uncertainty and lack of investor confidence | • Standards for customer/portfolio risk assessment and reporting that will provide transparency and market insight (e.g, Lendable; GOGLA/Lighting Global Standard KPI guidelines) |
| **Advances on MDB Funding** | • Long lead times from approval to disbursement (e.g., Scaling Up Renewable Energy Program) | • Targeted support facilitate governments meeting investment requirements<br>• Bridge loan facility to allow early drawdown |
| **Technology R&D** | • Need to accelerate efficient appliances to enable DRE to increase service levels and efficiency levels of energy service | • Advanced Market Commitment (AMC) approach to stimulate manufacturers of efficient appliances, such as refrigerators, motors (e.g. GAVI )<br>• Energy Access and Efficiency Bonds (e.g., Social Impact Bonds) |

# Notes

## I. Executive Summary

1. *Sustainable Energy for All 2015—Progress Toward Sustainable Energy.* (International Energy Agency and the World Bank, 2015): xi. Also, *Africa Energy Outlook.* (International Energy Agency, 2014).
2. The World Bank Group includes the World Bank, the International Finance Corporation, the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID).
3. The Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (the "BRICS Bank") are not included, due to recent operationalization and lack of access to information.
4. Various analyses show that off-grid energy achieves universal energy access faster and more cheaply than estimated by conventional sources like the IEA. See *Clean Energy Services for All: Financing Rural Electrification.* (Sierra Club, 2014).
5. *Energy Poverty: How to Make Modern Energy Access Universal?* (IEA, UNDP, UNIDO, 2010).
6. *Still Failing to Solve Energy Poverty: International Public Finance for Distributed Clean Energy Access Gets another "F".* (Sierra Club and Oil Change International, 2016). www.sierraclub.org/sites/www.sierraclub.org/files/uploads-wysiwig/1281%20Energy%20Scorecard_06_web.pdf (accessed May 15, 2016).
7. Ibid. at xvi.

## II. Decentralized Energy: The Faster Path to Access

8. *World Bank Group Support to Electricity Access, FY 2000–2014: An Independent Evaluation.* (World Bank, 2015): 35.
9. Ibid.
10. *Sustainable Energy for All 2015—Progress Toward Sustainable Energy.* (International Energy Agency and the World Bank, 2015): 33.
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12. Analysis based on customer numbers provided in "The Top 10 Global Electric Utilities." (D. Hunkar, November 2009). seekingalpha.com/article/174823-the-top-10-global-electric-utilities (accessed May 5, 2016).
13. Internal analysis. Assumes a 250 kWh/year solar system costing $300 for a household of 5, delivering energy to 1.2 billion people (rounded to $70 billion).
14. Tice, D. and Skierka, K. *Power for All: The Energy Access Imperative.* (June, 2014). www.powerforall.org/resources (accessed May 15, 2016).

## III. MDBs: The Cost of Business as Usual

15. *Multilateral Development Banks: Overview and Issues for Congress.* (Congressional Research Service, 2015): 15.
16. "World Bank staff incentives" (Bretton Woods Project, April 2013). www.brettonwoodsproject.org/2013/04/art-572265/ (accessed May 5, 2016).
17. *Investing for social and environmental impact: A guide to the world of impact investment funds in the agricultural sector in developing countries.* (GIZ and Royal Tropical Institute, March 2013): 42. Transaction costs differ little between small and large investments, but management fees, based on a percentage of total deal size, vary dramatically. A 2% management fee over $5 million is much higher than over $200,000.
18. Power for All select partner survey. (Power for All, March 2016) (internal document).
19. Kearney, A.T. *Investment and Finance Study for Off-Grid Lighting.* (GOGLA, June 2014): 29.
20. GOGLA working meeting on sector capital needs, NYC. (May 2015) (unpublished); Power for All partner survey. (April 2016) (unpublished).
21. *Off-Grid Solar Market Trends Report 2016.* (Bloomberg New Energy Finance and Lighting Global, 2016): 78.
22. As Power for All is focused on radically altering the timeline for universal energy access, the focus is on the fastest path to Tier 1 or Tier 2 energy access, as defined by the Global Tracking Framework. Note that in many cases first-time access customers may be supplied up to Tier 4 or Tier 5 access, but only use Tier 1 to Tier 3 (as in Rwanda).
23. Illustration of purchase, installation, and related connection fees; assumes 5 people served per connection.

# Notes

24. Assumes industry-proven CGAR for SHS/Pico as 35 percent; as there are no established standards for mini-grids, assumptions are based on company growth predictions.
25. Includes purchase, delivery, and installation.
26. Based on four-week install; prep may take six to eight weeks, and sourcing of panels, systems, and inverters four to six weeks.
27. Predictions from Case 2 company, based on established levels of growth and efficiency of scale.
28. Given that WBG spending on off-grid was a small part of its portfolio for 2000-2014 (47 projects totaling about $1 billion in investment), these averages can be assumed to be across grid projects. Note that projects reported in WBG implementation completion reports sometimes include connections numbers only partly attributed to direct support by the Bank. *World Bank Group Support to Electricity Access, FY 2000–2014: An Independent Evaluation.* (World Bank, 2015): 111, 117.
29. The Platform for Energy Access Knowledge (PEAK) is an interactive information database designed to help aggregate and repackage the best research on energy access, and is a collaboration of University of California, Berkeley's Renewable and Appropriate Energy Laboratory (RAEL) and the Power for All campaign. More information is available at: rael.berkeley.edu/2016/03/first-of-kind-energy-access-research-and-outreach-project-launched/ (accessed May 15, 2016).

## IV. Changing the Equation: A Call to Action

30. Gohou, G. and Soumare, I. *The Impact of Project Cost on the Disbursement Delay.* (March 2010): 4.
31. GAVI, the Vaccine Alliance, is an international organization bringing together public and private sectors with the shared goal of creating equal access to new and underused vaccines for children living in the world's poorest countries. www.gavi.org
32. Full opportunity costing should also consider the costs of over-electrifying populations (e.g. Rwanda).
33. This analysis attempts to demonstrate some of the energy access benefits forgone by investing in MDB business-as-usual projects.
34. The streamlining effects of a super fund could be achieved through the creation of a new funding vehicle, or through the establishment of dedicated DRE funding windows in existing vehicles or MDBs that mirror the benefits of having a "one stop shop," such as standardization of application procedures, etc.
35. GOGLA working meeting on investment, NYC (May 2015) (unpublished); Power for All partner survey. (April 2016) (unpublished).
36. The SE4All Finance Committee was chaired by the World Bank, the Brazilian Development Bank, and Bank of America.
37. *Scaling Up Finance for Sustainable Energy Investments: SE4All Advisory Board's Finance Committee Report.* (World Bank, July 2015): 95.
38. "Climate Investor One." (Global Innovation Lab for Climate Finance, undated). climatefinancelab.org/idea/fmo-climate-development-finance-facility/ (accessed May 5, 2016).
39. A low-access country is defined as having under 50 percent electricity coverage; the Access Investment Model of the 2015 Global Tracking Framework report has identified 18 countries that account for 79% of the world's unelectrified population. *Sustainable Energy for All 2015—Progress Toward Sustainable Energy.* (International Energy Agency and the World Bank, June 2015): annex 2.
40. *Developing Effective Off-Grid Lighting Policy.* (UNEP, 2015): 12. www.enlighten-initiative.org/portals/0/documents/Resources/publications/OFG-publication-may-BDef.pdf (accessed May 5, 2016).

## V. Answering the Call to Action

41. Energy Africa compacts are being signed at the ministerial or head of state level and are designed to create and endorse political will to remove policy and regulatory barriers to DRE in African countries. Signatory countries are eligible for a technical assistance package offered by DFID and USAID. www.gov.uk/government/news/energy-africa-campaign (accessed May 15, 2016).
42. *Sustainable Energy for All 2015—Progress Toward Sustainable Energy.* (IEA and the World Bank, June 2015): annex 2.

## Appendix

43. HUGinsure is a specialist insurance underwriter utilizing risk management strategies for social impact investments. More information available at: www.huginsure.com (accessed May 15, 2016).