



2017
ENERGY ACCESS
PRACTITIONER NETWORK
SURVEY RESULTS

DISTRIBUTED ENERGY MARKET TRENDS AND ANALYSIS



FOREWORD



The distributed energy access sector continues to surge forward every year, much to the credit of a diverse, determined and innovative ecosystem of businesses, social enterprises, investors, policymakers and other enablers. Inevitably, with progress comes new challenges and opportunities and emerging trends.

This brochure – which was commissioned by the UN Foundation with support from Sustainable Energy for All – takes the pulse of the energy access ecosystem to shed light on the sector’s collective views and development. The brochure is based on the results of the 2017 Energy Access Practitioner Network survey, which builds on extensive data collection and analysis.

The survey takes stock of the sector through the lens of the world’s leading energy practitioners. This past survey covered 165 organizations, spanning the spectrum of the energy access value chain – from research and development (R&D), product design, consumer finance, marketing, distribution, and after-sales service. The 2017 survey also included, for the first time, a special feature on gender, providing an in-depth look at a wide range of gender and energy access issues. The good news? Forty percent of solution providers surveyed are either owned or led by a woman. This goes on to show how more must be done to accelerate and advance women into leadership – because progress for women is progress for everyone. Another of this 2017 survey’s biggest takeaway is the massive gap that remains between available capital and the amount of financing required to scale up enterprises and support consumers. Raising capital along with reducing the time taken to mobilize and disburse funds remains one of the top priorities for the sector.

As we all well know, access to reliable energy supply is not just about delivering electrons; it’s about enabling education, health services, and boosting social and economic activity which further creates opportunities for jobs and incomes. As the distributed energy access sector strives to provide modern energy services to the billions of people who lack access, we hope this work continues to contribute to a greater understanding of global access efforts.

A handwritten signature in black ink, appearing to read 'Jem Porcaro', written in a cursive style.

Jem Porcaro

Senior Director, Energy Access, UN Foundation

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SUMMARY

This brochure features findings from a survey conducted by the United Nations Foundation-led Energy Access Practitioner Network in the summer of 2017. The survey is the latest in a series of surveys the Practitioner Network has conducted since 2012 to increase our understanding of the current state of the energy access sector and to explore key market trends and areas of future opportunity. This latest survey most recently follows a 2016 survey.

The 168 respondents of the 2017 survey represent a wide variety of organizations (ranging from service providers to investors), and geographic areas. Over 35% of the survey's respondents come from small or medium enterprises, 25% from non-governmental organizations (including both local and international), 18% from social enterprises, and the remaining 22% either from larger enterprises, development organizations, governments, or academic and research institutions. Moreover, respondents cover all aspects of the energy access value chain from consumer finance, to product design and marketing, distribution, after-sales service, and research and development (R&D).

KEY INSIGHTS AND FINDINGS

- **The overarching theme that emerges from the 2017 Practitioner Network survey is that improving access to finance remains of critical importance.** The availability of finance (including finance both for solution providers as well as for consumers) is essential to helping the energy access market grow and thrive. Indeed, recent analysis indicates that the **markets where distributed energy access solutions are thriving best tend to be markets where access to finance is easiest and most widespread.**¹ This underscores the importance of partnerships between local banks, international funders, foundations, and other stakeholders to expand the volume and type of finance flowing through the sector, particularly consumer finance. Without ready access to small energy access loans, most households (particularly in lower income and rural regions) remain reluctant or simply unable to cover the full upfront cost of clean energy access products. The net effect of this absence of targeted consumer loans is to prolong users' dependence on products and services that may have a smaller upfront cost, but carry much larger long-term costs, both in terms of finances and in terms of human health impacts.
- **In addition to critical issues in accessing finance are the significant delays in mobilizing it.** A total of 16 respondents to the 2017 survey reported waiting longer than one year between the initial discussion with investors to the actual signing of a financing agreement. Meanwhile, a further seven respondents reported waiting over one year from the time of signing to the actual disbursement of the funds. These findings echo the 2016 survey findings, which suggests that little has changed in terms of disbursement lag times. These delays in the mobilization and disbursement of funds, including the considerable amounts of time energy access enterprises spend in trying to secure funding or external investment, contribute significantly to slowing down the pace of progress in the sector. Moreover, these delays tend to disproportionately impact smaller actors, particularly local solution providers, making it difficult for them to compete and scale.

¹ Sustainable Energy for All (2017) "Taking the Pulse: Understanding Energy Access Market Needs in Five High-Impact Countries", http://seforall.org/sites/default/files/2017_SEforALL_FR3-F.pdf

- **Respondents remain intent on raising large amounts of new finance over the next year in spite of the obstacles.** A total of 59 respondents reported their intentions to collectively raise over \$500 million of new finance over the next 12 months to continue scaling-up their activities, with the median respondent targeting between \$500,000 and \$1 million. This level of ambition points to a significant unmet need in the energy access sector, spanning all market segments.
- When evaluating a potential company or social enterprise for an investment, **financiers pointed to the underlying business model as the most important factor, followed by the social impact.** This underscores the fact that for many funders and investors in the energy access sector, the positive social, human, and economic benefits remain a critical part of investors' decision-making. This points to a need for better and more effective ways for energy access enterprises to tell their stories, and to highlight to investors as well as to other stakeholders the multi-dimensional nature of the benefits that come from having access to cleaner, more reliable, and more affordable energy.
- The **need for greater access to local currency financing endures.** Many enterprises operating in the energy access sector continue to incur high transaction costs in converting customer receivables (the payments made by customers) into the currencies commonly used to purchase energy access products (typically US dollars or euros). These roll-over costs, combined with the significant currency exposure they generate, remain a significant challenge across the sector and point to a need for greater local currency credit facilities targeted at the energy access sector.
- **Women are playing an increasingly important role in shaping and leading the sector.** Just over 40% of respondents reported working for organizations that are woman-owned or led, up from less than 30% reported in the 2016 survey. While women now fill a growing number of key management roles (44% of women vs. 56% for men in terms of leadership and senior management roles), company policies, hiring practices, and overall decision making still require progress. Significantly, over 58% of respondents indicated they felt having women in leadership roles had a positive measurable impact on the organization's performance. Although men continue to be dominate in a number of roles, particularly at the board level (63% of men vs. 37% of women), there is no doubt that women are playing an increasingly decisive and influential role in shaping the energy access sector.
- **The humanitarian sector, with its own unique needs, challenges, and priorities, is increasingly attracting more attention within the energy access community.** 65 respondents said they were involved in providing either products or services for humanitarian relief efforts in different parts of the world; this represents a significant leap from the 2016 survey results, where 23 respondents answered positively to this question.
- **In the stand-alone products segment of the electricity access sector, the top two barriers to the growth of the sector identified by all respondents are access to finance for customers followed by access to finance for enterprises.** Regarding the barriers to unlocking more equity investment, financiers ranked the insufficient knowledge of investors concerning how the sector operates, followed by concerns over the viability of the business model, as the greatest barriers overall. From the perspective of unlocking more debt finance, investors

ranked concern over company track record and foreign currency risk as the two main challenges. Debt providers are particularly concerned that a sudden devaluation in receivables will squeeze companies operating in the sector, which could hinder their ability to meet their debt service costs.

- **For solution providers operating within the sector, enterprises continue to face barriers to obtaining debt financing, whether from local or international sources.** Chief among these barriers are the high collateral requirements that banks impose. The high upfront cost of energy access products and services is also cited as a key barrier to growth. Bridging this cost gap is critical to the broader availability of consumer finance. However, consumer finance solutions such as rent-to-own or pay-as-you-go models are only available at scale in a select number of markets and often concentrated in urban and peri-urban regions.
- **For the mini-grid market, 2016 emerged as a breakthrough year: for the first time, the majority of mini-grid systems developed or commissioned by Practitioner Network survey respondents used solar PV.** This contrasts with previous years, where there was a more even breakdown between the different technologies (mainly diesel, hydro, biomass, and solar). In addition, over 75% of mini-grids built or commissioned in 2016 made use of storage technologies. Regarding barriers in the mini-grid sector, the most critical regulatory and policy barrier cited by respondents remains the inability to introduce cost-reflective tariffs. The presence of regulatory provisions hindering cost-reflective tariffs, combined with the absence of significant volumes of viability gap funding to cover the difference between national tariffs and mini-grid costs, continues to impose material constraints on the growth and scale-up of the sector. If growth remains piece-meal and funding remains capped to specific (and often inadequate) subsidy pools, the mini-grid sector will fail to achieve the economies of scale necessary and will continue to fall far short of its potential.
- **Respondents cite a lack of finance as the most critical barrier to the growth of the clean cookstoves sector, followed by consumer acceptance and behavioral change.** These findings mirror those from previous years. From the perspective of investors, the lack of industry track record (which in turn hinders the sector's ability to tap into external sources of finance) combined with investors' lack of understanding of the sector emerge as two of the most frequently cited barriers to scaling up. Similar to the Practitioner Network's 2016 survey, the top regulatory and policy barrier highlighted to scaling-up the clean cooking sector is the lack of clear national strategies to drive adoption and raise awareness. Respondents pointed to a lack of understanding of cookstove companies' business models as well as a lack of understanding of the overall sector's importance. Consumer awareness as well as funders' willingness to invest hinge critically on a deeper understanding of its many benefits, whether relating to gender, economic development, or human health.
- **Among the chief barriers to the growth of the appliances sector remains access to finance, in particular consumer finance, and product availability.** Finding better and more efficient ways of increasing the reach of products, particularly in rural and remote regions, will be critical to unlocking further growth in this sector.

ABOUT THE SURVEY

Established in 2011, the Energy Access Practitioner Network is an initiative of the UN Foundation that supports the development of a thriving global distributed energy sector as a way of expanding pathways to universal energy access. We do this by connecting our 2,500 members – who collectively represent more than 1,350 organizations – to industry insights and resources, and by helping create powerful partnerships. As the largest network of its kind, the Energy Access Practitioner Network provides an unparalleled platform for understanding and addressing the challenges and opportunities faced by the distributed energy access sector at large.

As a contribution to this goal, the UN Foundation conducts periodic surveys of its Practitioner Network members to generate market intelligence about the distributed energy sector and thereby assist all stakeholders – industry, investors, governments, and civil society – in making informed decisions. Considering the size of the Practitioner Network, these surveys serve as a way of “gauging the pulse” of the energy access sector. The purpose of the surveys is to draw on the collective experience of people working on the frontlines of delivering energy services around the world and to highlight broad trends related to a range of market, policy, gender, and finance topics.

In late 2017, the UN Foundation conducted its most recent survey of energy access professionals using the online platform called Qualtrics, an innovative data management

platform that enables a high level of sophistication in gathering and synthesizing data. The survey most recently follows a 2016 survey. As in 2016, the 2017 survey was open both to Practitioner Network members as well as non-members.

Since the UN Foundation first launched the Practitioner Network survey, the Practitioner Network has grown from 20 members in 2011 to over 2,500 members in late 2017. While the trend in members remains extremely positive and is a testament to a growing and diversifying energy access sector, the 2017 survey saw a drop in the number of respondents: from 270 in 2016 to 168 in 2017. While it is difficult to ascertain the reasons why the 2017 survey featured fewer respondents than in recent years, the emergence of other similar surveys from other industry stakeholders, combined with the growing length of the survey, have both likely played a role.

While the 2017 survey continues to include key market data on the energy access products, solar PV systems, mini-grids, as well as clean cooking market segments, its feature “Spotlight” focuses on the issue of gender and the increasingly important role that gender plays in the energy access agenda. Also, for the first time, the Practitioner Network survey includes a new sub-section on energy access appliances, highlighting the key contribution appliances specifically adapted to the energy access sector are making to improving energy access worldwide.

WHAT'S NEW IN THE 2017 SURVEY?

- Special Spotlight section on gender issues in the energy access sector
- A new approach to representing industry views, particularly data on the key barriers and challenges facing the sector
- Distinct sections covering each of the key market segments (stand-alone products, mini-grids, clean cookstoves, and appliances)
- An expanded section on finance trends
- A clearer breakdown between the barriers to accessing debt vs. equity for energy access enterprises
- A special section on the role of energy access in humanitarian and refugee settings
- A new sub-section on energy access appliances

As in previous years, the 2017 survey included both qualitative and quantitative questions, mainly consisting of multiple choice options to promote uniformity in answers. Most quantitative questions requested data/information pertaining to the calendar year 2016. Most qualitative questions allowed respondents to select multiple responses that applied to them. Other qualitative questions requested

respondents to rank their responses, which were weighted to produce an aggregate scoring for certain results. The survey was “branched” to optimize responses from different stakeholders, who only saw questions relevant to their organization and areas of work, to help avoid potential double counting. For many of the questions, particularly the ranking questions, respondents were divided into four main categories:

1. Financiers including impact investors, funders, foundations, and other providers of finance;
2. Solution Providers including companies, individuals, and organizations active in providing energy access solutions;
3. Policy Makers, including government representatives working on policy topics related to energy access;
4. Other Enablers, including consultants, aggregators, and other actors working within the sector.

The remainder of this brochure presents the survey's results – in the form of a collection of key findings and figures – with all summary statistics reflecting aggregated survey responses. Where feasible, there are comparisons made between the data from the survey and data from past surveys to show trends over time. Findings from the 2017 survey, as with previous years, are meant to inform the development of more appropriate policies, financing instruments, and other types of support for organizations involved in scaling-up distributed energy access solutions.

SPOTLIGHT: GENDER

This section is a special feature of the 2017 Practitioner Network survey and represents respondents' perspectives on a wide range of gender-related questions. The majority of these questions were specifically directed at solution providers, although a subset of questions were also aimed at financiers and all stakeholders that participated.

The topic of gender in the energy access sector continues to grow in importance, with an increasing recognition of the need to achieve gender equality to combat poverty. Continued reliance on traditional cooking fuels and technologies most negatively affects women (along with children). It is therefore

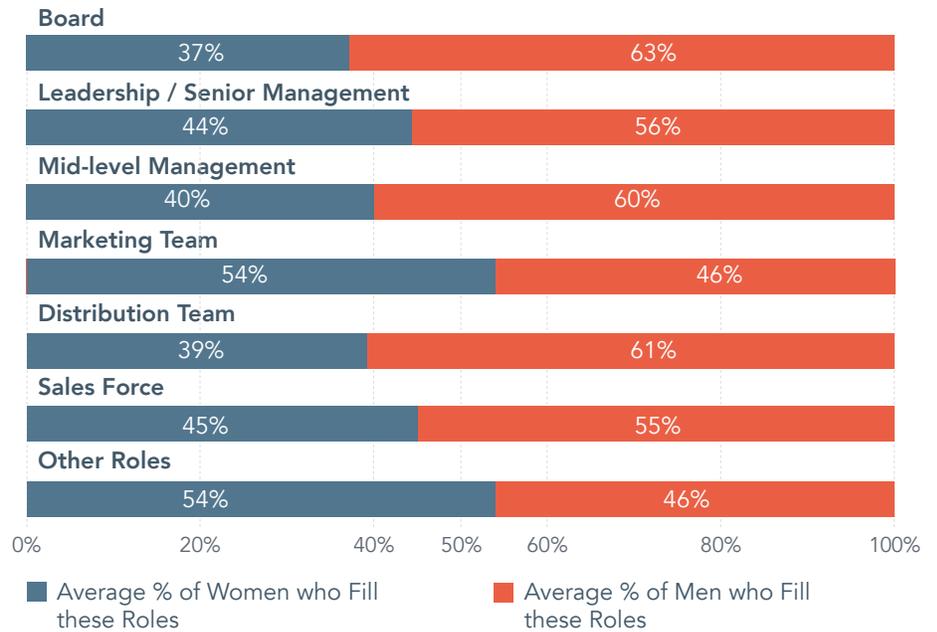
women that stand to benefit the most from improved energy access. Moreover, women are the primary users of many energy access products (particularly in the cooking sector). This underscores the importance of involving women at the product design stage, as it is women who often have to overcome any challenges (convenience, user-friendliness, etc.) that transitioning to cleaner technologies will entail. A further dimension of the gender challenge is that in many jurisdictions, women entrepreneurs continue to face higher barriers to obtaining finance than men. This makes it difficult for many women to start and grow their businesses.



PERCENTAGE OF SOLUTION PROVIDERS EITHER OWNED OR LED BY A WOMAN. THIS IS UP FROM LESS THAN 30% IN THE 2016 SURVEY.

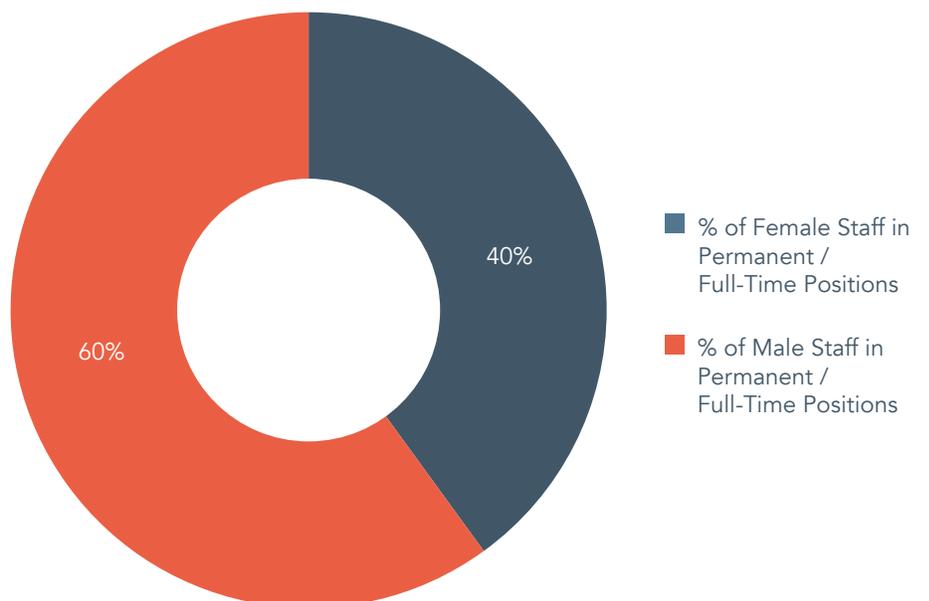
1 | ORGANIZATIONAL ROLES BY GENDER

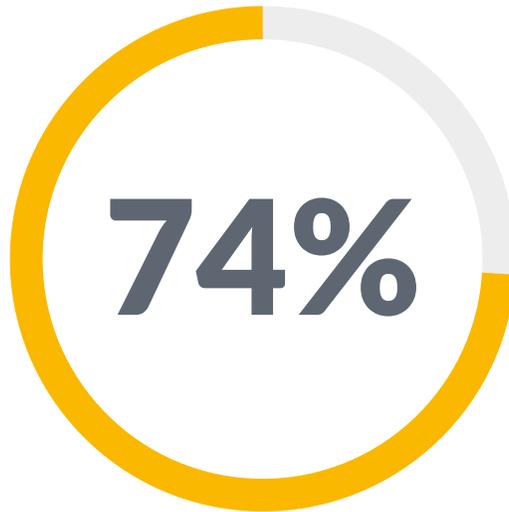
The energy access sector employs thousands of women across various components of the value chain worldwide. However, men continue to fill a disproportionate number of key management and leadership roles. Among solution providers, the survey found the lowest percentage of women at the board level, where women fill only 37% of roles. Other roles, such as marketing and sales, show a more even balance.



2 | SHARE OF PERMANENT/FULL-TIME EMPLOYMENT BY GENDER

Approximately 60% of male staff have full time positions, a contrast to 40% of female staff in full time positions across all solution providers.

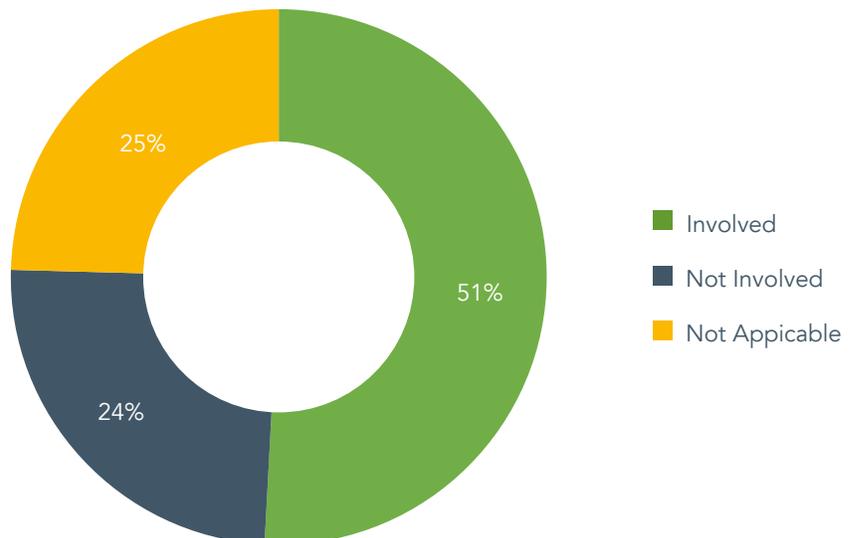




PERCENTAGE OF SOLUTION PROVIDERS WHO SEE SIGNIFICANT OR MODERATE POTENTIAL TO INCREASE THE SHARE OF THE ENTERPRISE'S SALES TO WOMEN.

3 | SHARE OF ORGANIZATIONS IN WHICH WOMEN ARE INVOLVED IN PRODUCT DESIGN

Out of the solution providers surveyed, just over half (51%) indicated that women were involved in the overall design of products and services provided by their company. Involving women at the design stage is critical to the successful adoption of particular energy access products and appliances. Since women are often the main users of certain energy access products, consulting with women at the design stage can help accelerate the diffusion of cleaner technologies.



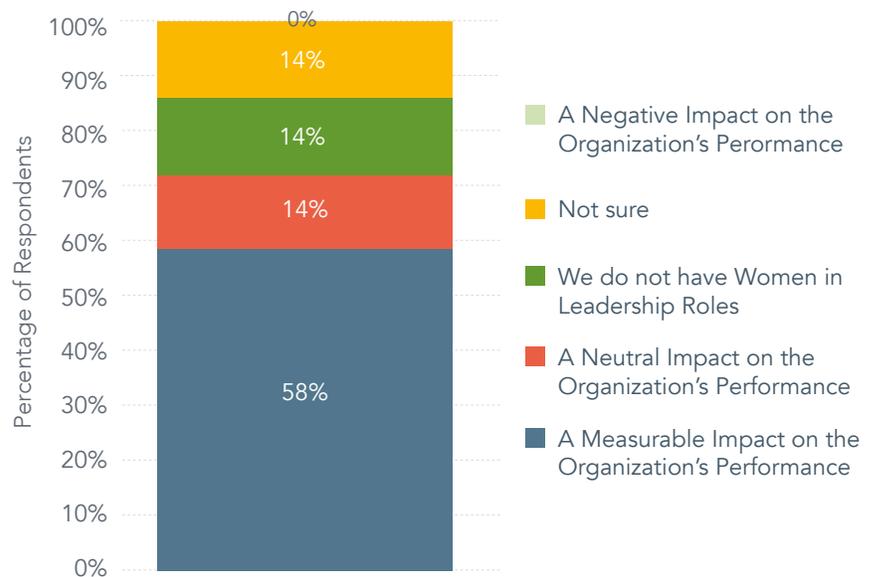
4 | BARRIERS FACED BY WOMEN ENTREPRENEURS IN ENERGY ACCESS SECTOR

According to solution providers, the main barriers women entrepreneurs face when starting a business in the energy access sector are cultural, societal, and sectoral in nature. Changing such social norms takes time, and despite improvements in lessening gender discrimination and promoting gender equality, there is still much work remaining.



5 | PERCEIVED IMPACT OF HAVING WOMEN IN LEADERSHIP ROLES

The majority of solution providers (58%) reported a favourable impact on their organization's performance from having women in senior leadership roles. A number of other recent reports and analyses confirm that having women in decision-making roles positively impacts outcomes, and improves the overall quality of decision-making.² This is particularly important for the energy access sector, where a significant share of the beneficiaries are comprised of women and children.



² Liswood, Laura, (2015) "Women Directors Change How Boards Work", Harvard Business Review, <https://hbr.org/2015/02/women-directors-change-how-boards-work>

6 | PRACTICES USED TO ENABLE WOMEN'S PARTICIPATION IN ENERGY ACCESS WORKFORCE

Over 50% of solution providers indicated that their organizations provided flexible hours to enable to both women and men to engage in child care. Other employee benefits such as child care support as well as specific policies such as hiring quotas were much less common, registering at 18% and 12% of respondents, respectively.



FINANCING ENERGY ACCESS

Understanding the financing of energy access enterprises is critical to understanding the sector. Enterprises that are heavily financed by grants, for instance, will typically have different priorities, management structures, and mission statements than enterprises funded primarily by private equity or venture capital funds. Similarly, to secure debt financing from a bank, enterprises must often meet several different requirements including a certain level of collateral, a proven track record of operations and sales, audited financial statements, etc. Lenders often also impose specific restrictions on how enterprises use funds made available through loans, such as covenants. The overall capital structure (share of debt, equity, and grants) that an enterprise uses illustrates these differences.

In addition, looking at the financing of enterprises and what barriers they face can help design specific policies

or interventions, including the development of innovative financial instruments or platforms to address specific sectoral needs. One clear example is the recent response of the government of Uganda to a significant challenge facing the industry: the urgent need for significant volumes of working capital. The need for more working capital is frequently cited by enterprises as one of the chief barriers to scaling-up.³ In response, the government of Uganda has launched a Solar Working Capital Facility to provide working capital specifically to the pay-as-you-go (PAYGO) solar sector.⁴ This demonstrates how a better understanding of the barriers to obtaining and mobilizing finance in the energy access sector can play a critical role in overcoming them.

The following section provides an overview of respondents' perspectives – primarily solution providers and financiers – on several important financing issues and challenges.

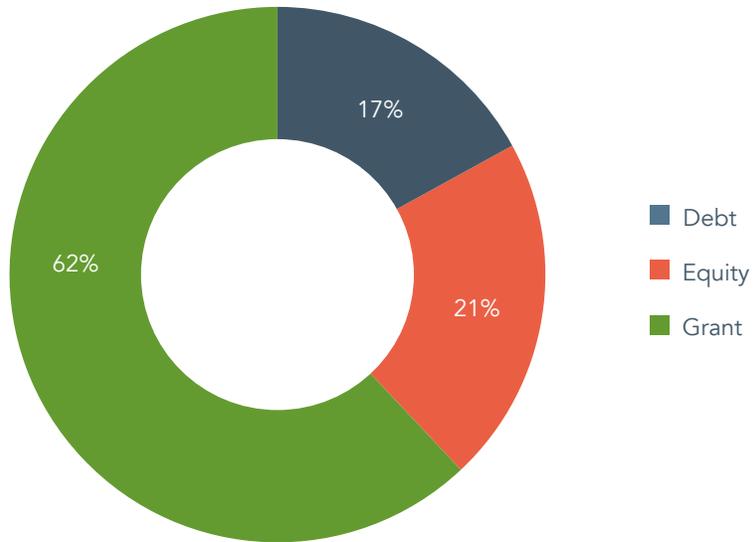


³ Sustainable Energy for All (2017) "Taking the Pulse: Understanding Energy Access Market Needs in Five High-Impact Countries", http://seforall.org/sites/default/files/2017_SEforall_FR3-F.pdf

⁴ Uganda Energy Credit Capitalisation Company, "The Solar Working Capital Facility", http://www.ueccc.or.ug/index.php/srv_working_capital

7 | RESPONDENTS' CAPITAL STRUCTURE IN 2016 (Weighted Average by Revenue)

The capital structure among solution providers that responded with both their gross annual revenues and an indicative break-down of their reliance on debt, equity, and grants shows a high reliance on grants. However, a closer look at the data reveals that many of the larger market actors (with revenues over \$10 million) did not disclose their share of debt, equity, and grant (D: E: G). Since the chart shown here is based on enterprises' gross revenues, this has a significant impact on the final D: E: G ratios and may not accurately reflect the financing of the overall sector.



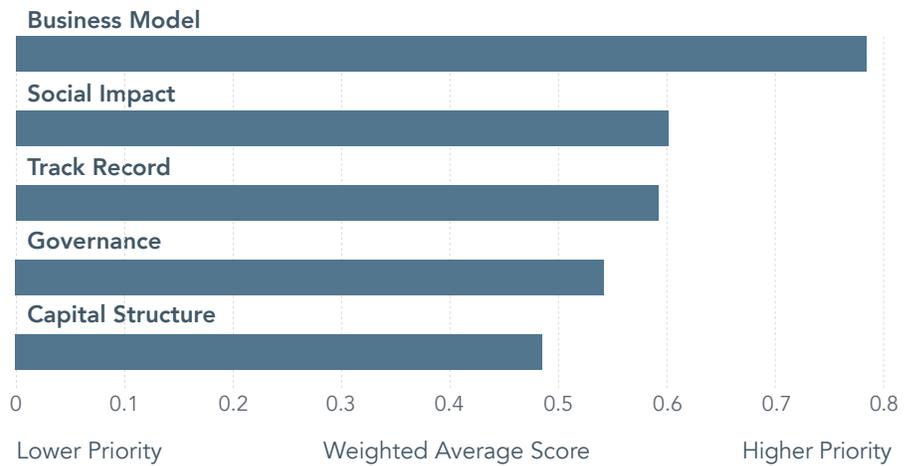
8 | TYPES OF INVESTORS IN THE ENERGY ACCESS SECTOR

Among the various financiers that responded to the 2017 survey, the two largest categories were specialist investors, such as impact funds, followed by philanthropic foundations. Both investor types are playing a growing role in driving energy access, particularly in sub-Saharan Africa and in parts of South Asia, providing much-needed capital to companies and social enterprises active in the sector. Other key actors surveyed include multilateral and bilateral aid agencies as well as development banks.



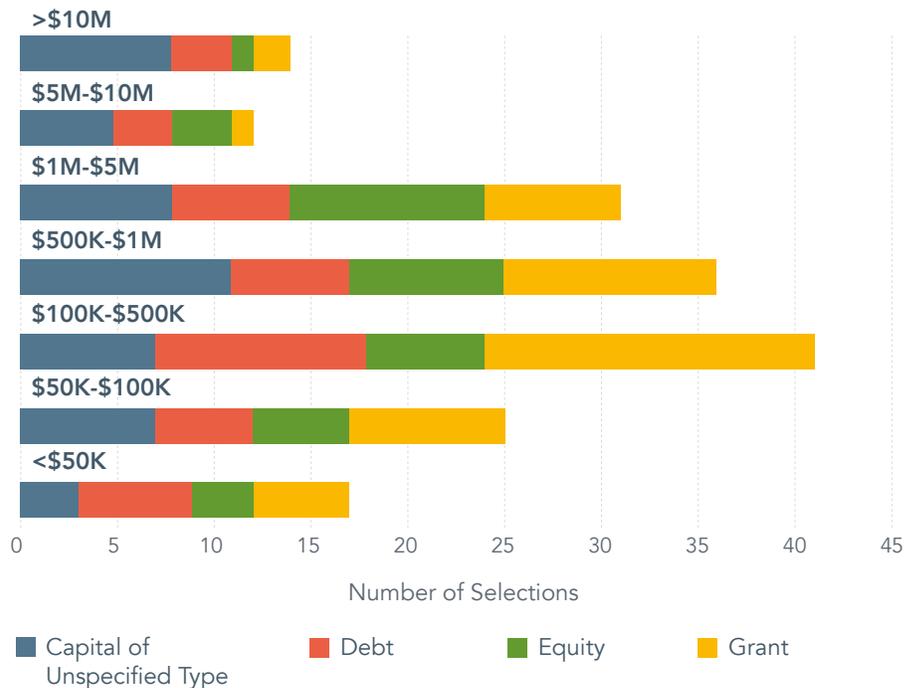
9 | INVESTOR'S CONSIDERATIONS FOR ENERGY ACCESS INVESTMENTS

Although many factors enter any given investment decision, financiers' top concern when evaluating energy access enterprises for future investment is the enterprise's business model.



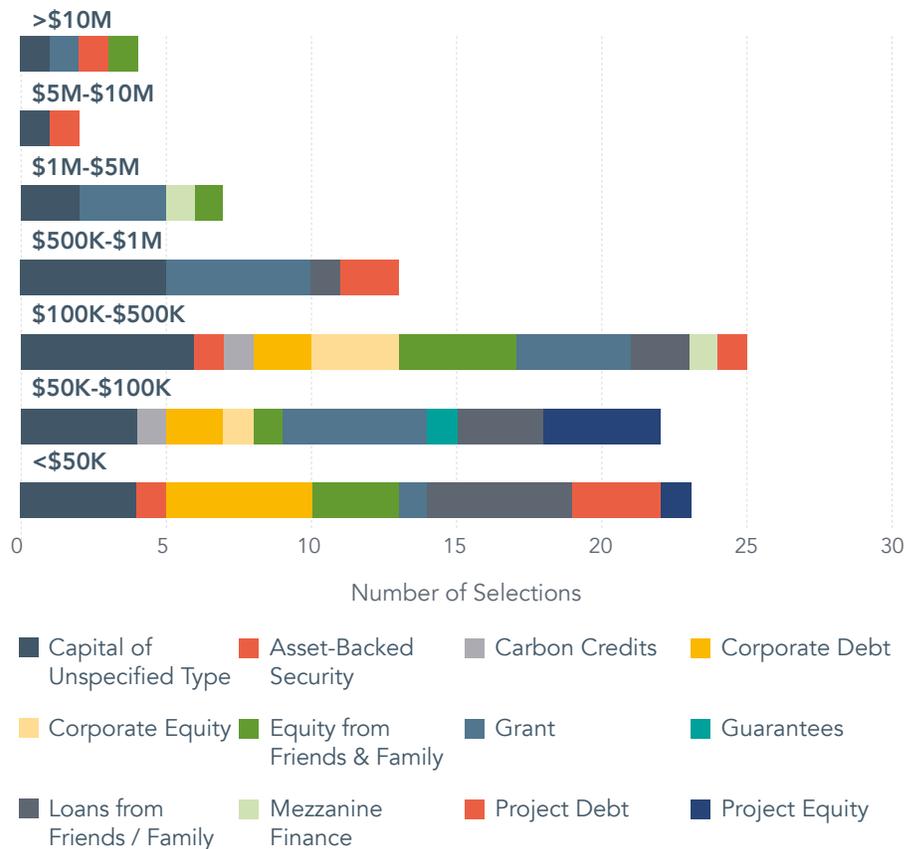
10 | SOLUTION PROVIDER'S FUNDING NEEDS FOR THE NEXT 12 MONTHS

When asked how much capital solution providers planned to mobilize over the next 12 months, they provided a wide range of answers. The median answer corresponds with a finance-raising target of \$500,000 to \$1 million. While respondents provided ranges, by taking the mid-point of each range to garner an approximate total, the cumulative answers represent a total expressed funding need of over \$500 million.



11 | TYPE AND AMOUNT OF CAPITAL RAISED IN 2016

Small ticket sizes are frequently identified as one of the challenges for mobilizing larger volumes of finance for the energy access sector. The smaller the transaction, the higher the share of transaction costs in the overall financing. Indeed, over 70% of the 59 solution providers who responded to this question in the 2017 survey reported raising amounts less than \$500,000, underscoring that the majority of transactions in the energy access sector remain small. Moreover, this share is up significantly from the 2016 survey, where the single largest category of funds raised was in volumes between \$500,000 and \$1 million and only 44% of respondents had raised volumes smaller than \$500,000. While the changing composition of survey respondents could explain the change, a clear trend toward larger ticket sizes is not apparent at present. When combined with costly delays, the small overall transaction size contributes to slowing down the pace of scaling energy access.

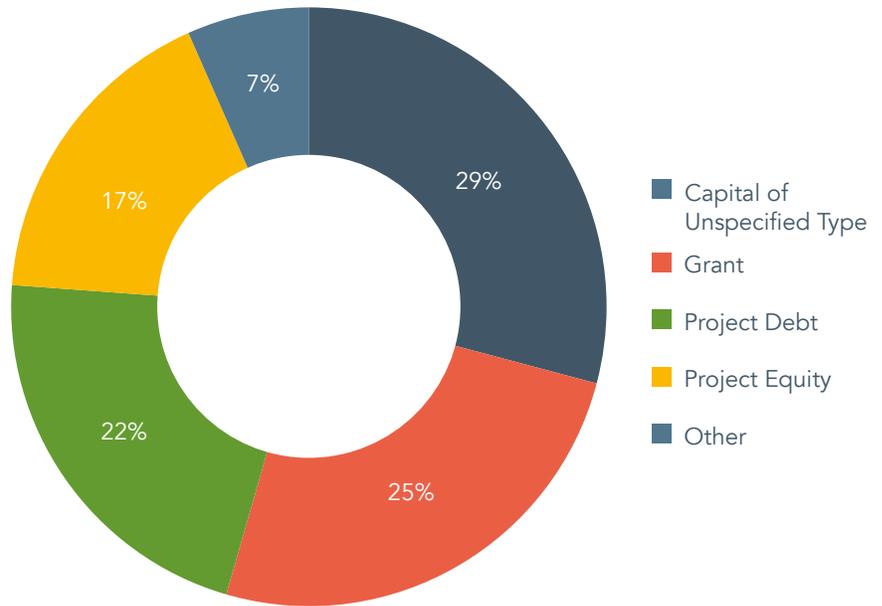


Over
\$95
 million

THE TOTAL AMOUNT OF CAPITAL RAISED BY SOLUTION PROVIDERS TO SCALE-UP ENERGY ACCESS IN 2016.

12 | TYPE OF CAPITAL RAISED IN 2016

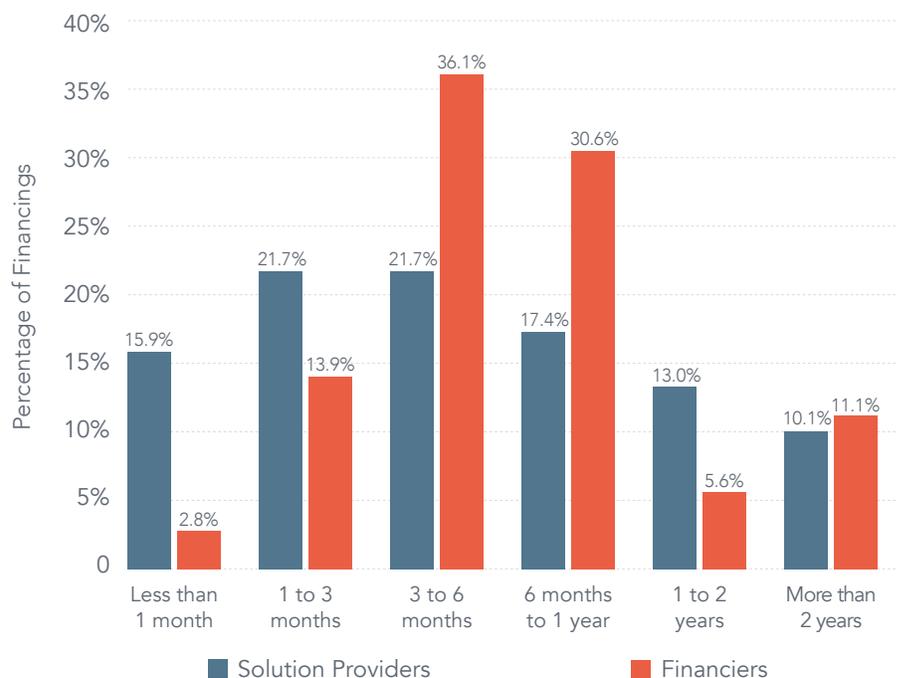
When broken down by the type of capital raised by solution providers, a more nuanced picture emerges: they raised 25% of capital in the form of grants, 22% in the form of project debt, and 17% in the form of project equity. Other types of finance such as corporate debt, corporate equity, and funds from friends and relatives played a much more limited role. (Note that a number of solution providers did not disclose the type of capital raised, only the volume.)



13 | TIME FROM INITIAL DISCUSSION TO SIGNATURE

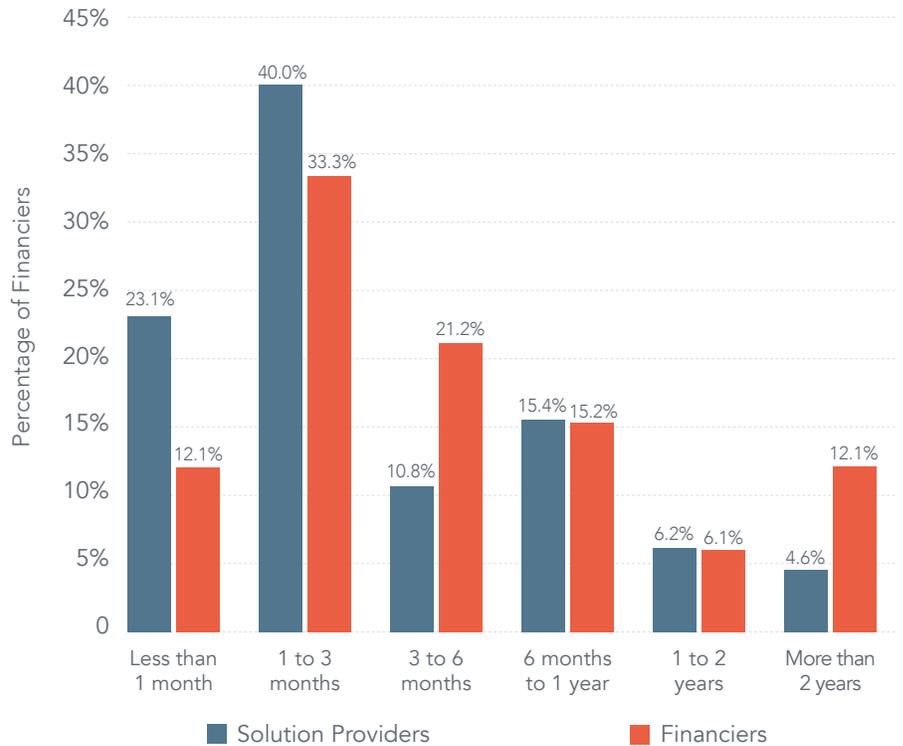
In 2016, roughly 60% of individual financings reported by solution providers required less than 6 months to move from initial discussion to signature of a financing agreement. Financiers reported signing deals on a slightly slower track.

These timings are broadly consistent with those identified in the 2016 survey, with notable exceptions at the tail ends of the time-scale. Compared with the 2016 survey results, there has been a relative increase in the number of deals taking less than one month and more than two years to move from discussion to signature.



14 | TIME FROM INITIAL DISCUSSION TO DISBURSEMENT

Regarding the time between actual signing and the disbursement of funds, solution providers have reported a significant improvement from prior years. Just under 74% of financings in 2016 closed in under six months of signing the funding agreement, up greatly from 49% in 2015. For investors, the share increased to 66% in 2016, up from 58% in 2015. This indicates that after the actual signing, projects are able to move forward more quickly, unlocking new regions and reaching new customers more efficiently. However, as seen below, reducing the average number of days between the initial discussion and the disbursement of funds still requires progress.



AVERAGE TIME REPORTED BY SOLUTION PROVIDERS FROM INITIAL DISCUSSION WITH FUNDERS OR FINANCIERS TO THE DISBURSEMENT OF FUNDS.

SOLAR HOME PRODUCTS AND SYSTEMS

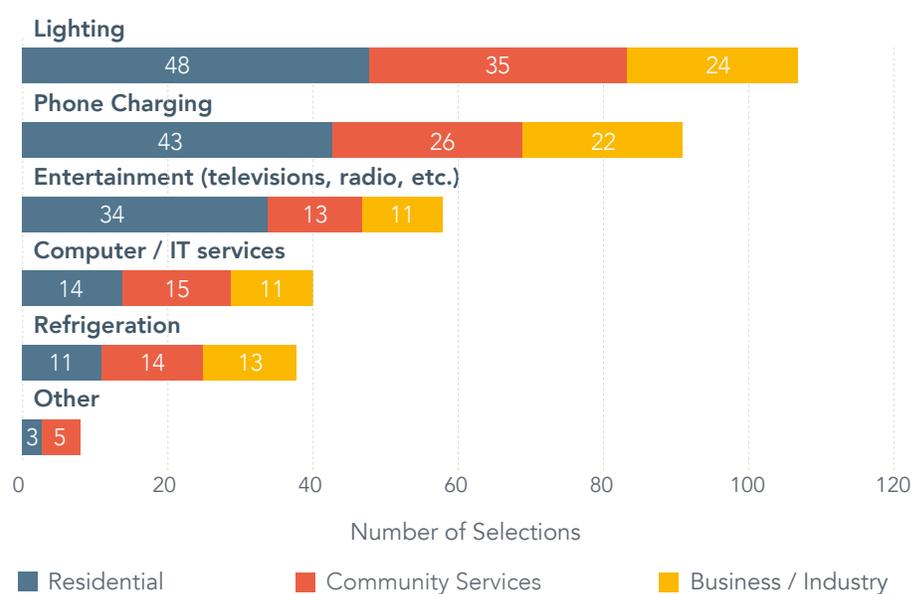
Stand-alone energy access products like solar lanterns and solar home systems (SHS) are a core part of the energy access ecosystem. For many households, such products represent their first step onto the clean energy ladder. Critically, such products and services also save households money. Stand-alone energy access products are already transforming people's lives in small but meaningful ways by reducing purchases of candles, kerosene, batteries, and other traditional lighting products; reducing reliance on costlier fee-for-service providers that require payment to charge a

mobile phone or battery-based product; and by reducing the distance that people need to travel to charge their mobile phones.

Drawing on the perspective of solar home products and system providers, and other market enablers (e.g. financiers, policy-makers, etc.), this section provides recent market trends and insights into the rapidly growing market for solar products.

15 | END-USES OF PORTABLE/STAND-ALONE SYSTEMS SOLD IN 2016

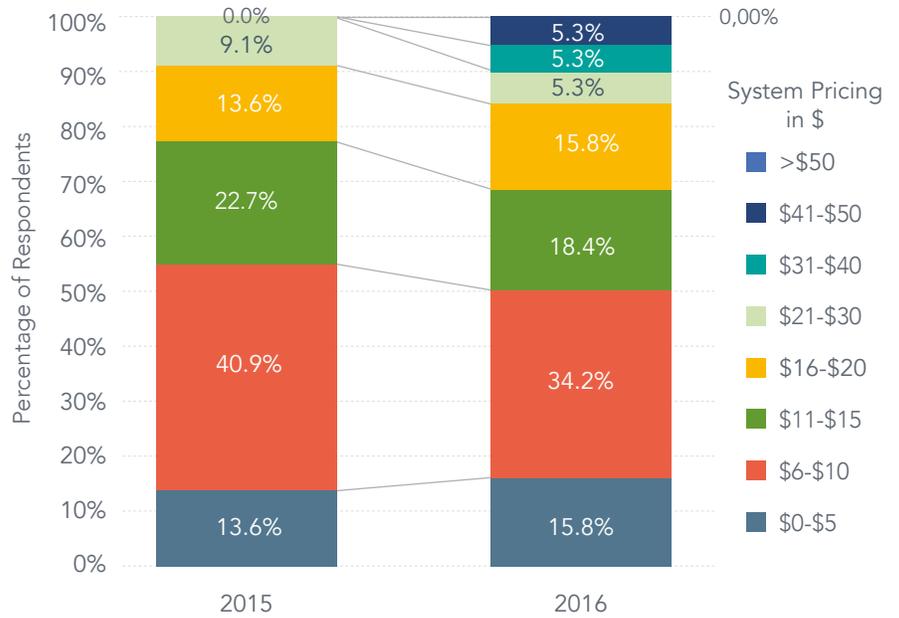
According to providers of portable and/or stand-alone products, the two primary uses of their products are lighting and phone charging. Other services, such as computer usage, televisions, and refrigeration, are common but less widespread. As income levels rise and households gain more disposable income, the purchase of higher capacity solar systems becomes more common, thereby enabling higher levels or tiers of energy access. According to the Multi-Tier Framework (MTF) developed by the World Bank and other partner organizations like SEforALL, most portable solar products and solar home systems deliver Tier 1 or Tier 2 service.⁵



⁵ ESMAP and Sustainable Energy for All (2015), "Beyond Connections: Energy Access Redefined", <https://openknowledge.worldbank.org/bitstream/handle/10986/24368/Beyond0connect0d000technical0report.pdf?sequence=1&isAllowed=y>

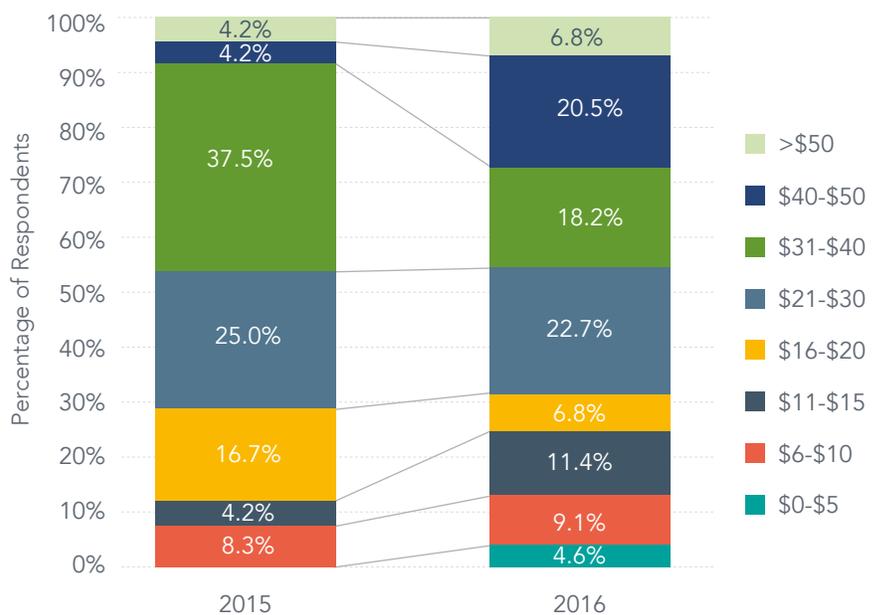
16 | SINGLE LIGHT SOLAR SYSTEM PRICING

Product pricing spans a wide range across all product categories. For single light systems, approximately 50% of products are currently priced under \$10. One notable difference from the 2016 survey is that in the 2017 survey, some solution providers indicated they were now selling single lighting products in the higher price categories (\$31 and up), suggesting the emergence of higher quality and longer lasting products in this market segment. For products featuring both a single light and charging functions, a similar pattern emerges, with a growing share of respondents now offering more products in the higher price range. Nevertheless, approximately a third of respondents were still selling products in this category in the sub-\$20 price range. This share is up slightly from the 2016 survey results.



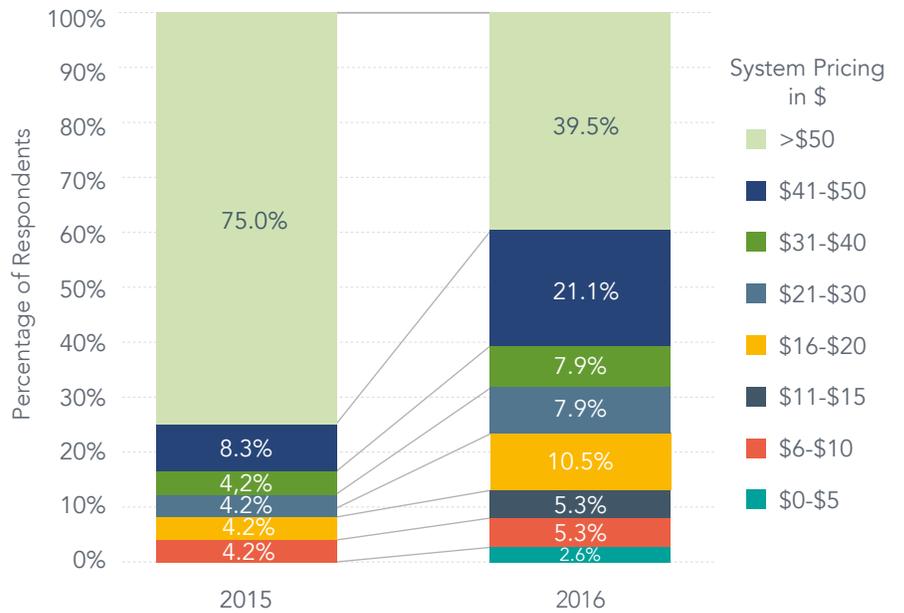
17 | SINGLE LIGHT AND PHONE CHARGING SYSTEM PRICING

There is an even more notable shift in products providing multiple light points and phone charging, with a greater share of respondents providing products in the more affordable price segments. In the 2016 survey, 75% of respondents reported retailing their products in this category at \$50 and above; in the 2017 survey, this share has declined to 39%. Fully 40% of respondents now indicate that they are selling products featuring multiple light sources and phone chargers for under \$40, suggesting a wider array of products are available to customers in this market segment. Taken as a whole, the pico solar lighting products market is in the process of widening its offerings, in particular by providing a greater range of both price and quality to better meet customers' needs and better respond to a rapidly changing products landscape.



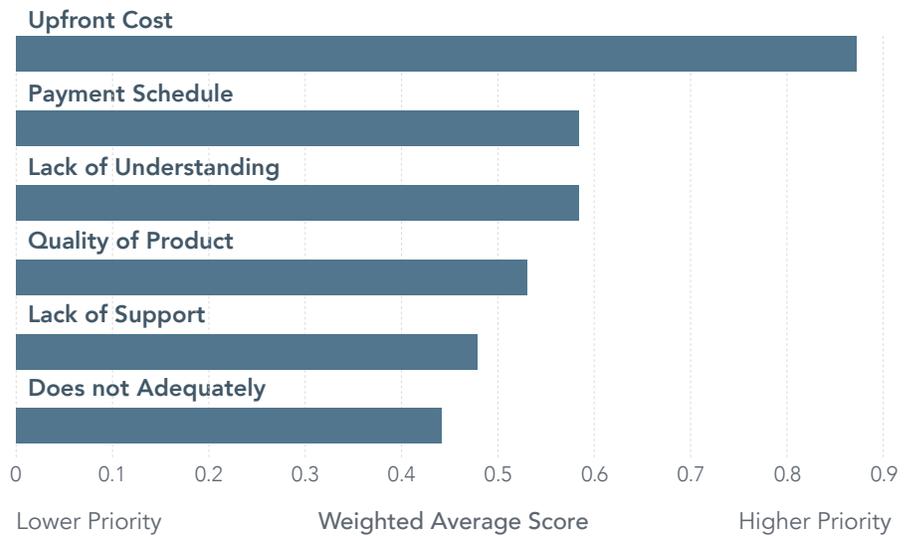
18 | MULTIPLE LIGHTS AND PHONE CHARGING SYSTEM PRICING

There is an even more notable shift in products providing multiple light points and phone charging, with a greater share of respondents providing products in the more affordable price segments. In the 2016 survey, 75% of respondents reported retailing their products in this category at \$50 and above; in the 2017 survey, this share has declined to 39%. Fully 40% of respondents now indicate that they are selling products featuring multiple light sources and phone chargers for under \$40, suggesting a wider array of products are available to customers in this market segment. Taken as a whole, the pico solar lighting products market is in the process of widening its offerings, in particular by providing a greater range of both price and quality to better meet customers' needs and better respond to a rapidly changing products landscape.



19 | INDUSTRY VIEW ON CUSTOMER'S CONCERNS ABOUT PURCHASING DECENTRALIZED ENERGY

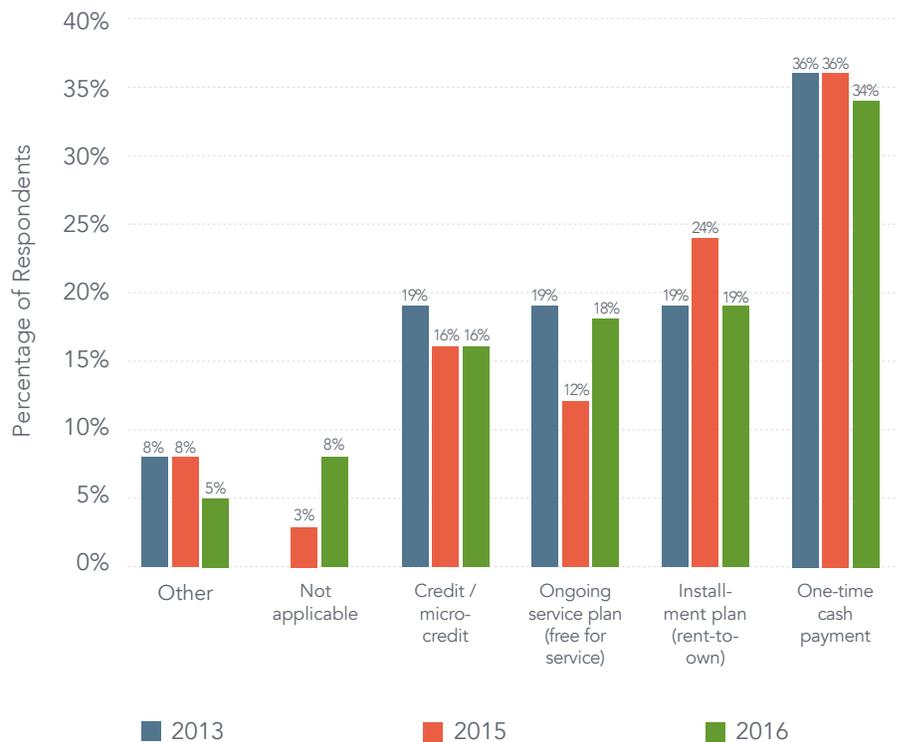
Consistent with previous Practitioner Network surveys, solution providers report the top concern of customers interested in purchasing energy access products remains their high upfront cost. This reflects a concern shared widely across the appliances, stand-alone products as well as the clean cookstoves market segments and remains one of the main barriers to scaling up the market.



20 | TYPES OF PAYMENT PLANS OFFERED TO CUSTOMERS (2013, 2015, 2016)

For the solar products and solar home systems market segments, solution providers selected all the payment plan options that they provide to their customers (i.e. one respondent could select more than one type of payment plan if they offer more than one).

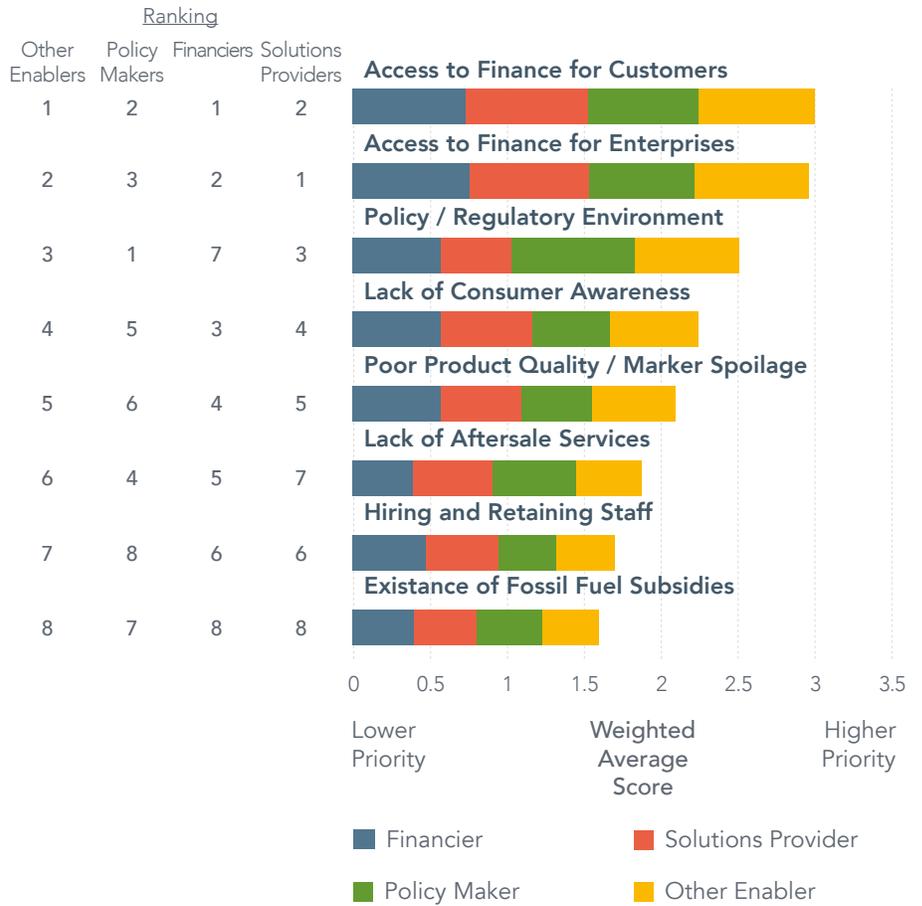
Out of a total of 76 respondents, the most common form of payment remains the upfront cash payment, followed by rent-to-own and the on-going service plan, or “fee for service” option. This points to a critical disconnect: although customers’ top concern remains high upfront cost of products, upfront cash payments remain the most common method used to sell energy access products. One clear conclusion is that expanding the use of consumer finance to bridge the upfront cost requires more effort on all sides (i.e. from local banks, international funders, governments, and energy access enterprises).



21 | BARRIERS TO GROWTH OF STAND-ALONE PRODUCTS MARKET

Across all stakeholders, access to finance for both enterprises and for consumers ranked among the top barrier to the growth of the portable solar products markets. This clearly indicates that the availability of finance, including widening the number of countries and regions where consumer finance options, such as rent-to-own plans (particularly those coupled with mobile money), needs to significantly increase.

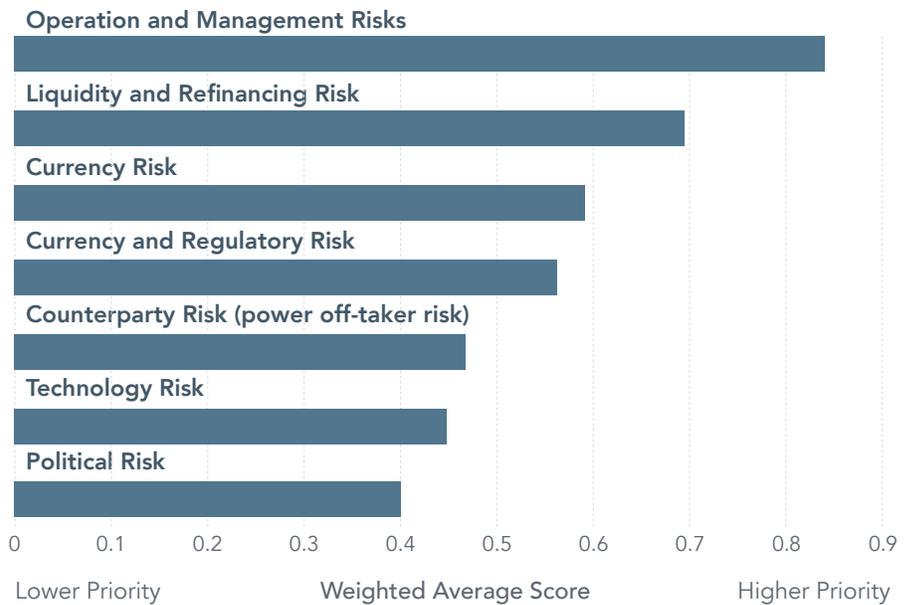
The third highest ranking barrier is the policy and regulatory environment, ranking highest among policymakers. Even though the solar products segment often operates outside of the regulatory frameworks in place for mini-grid or other larger operators (e.g. independent power producers), certain aspects of the regulatory environment, such as taxes, duties, import tariffs, and other aspects, continue to hinder the growth of the sector in many countries.



22 | INVESTOR'S VIEWS ON TOP RISKS WHEN INVESTING IN PORTABLE / STAND-ALONE PRODUCT MARKET

According to financiers, the largest investment risk that needs mitigating in this market segment is companies' operation and management risks, followed by liquidity and refinancing risks. The concern over operations and maintenance risks closely mirrors investors' concerns in the 2016 survey, underscoring the importance of business development services and training for early stage enterprises.

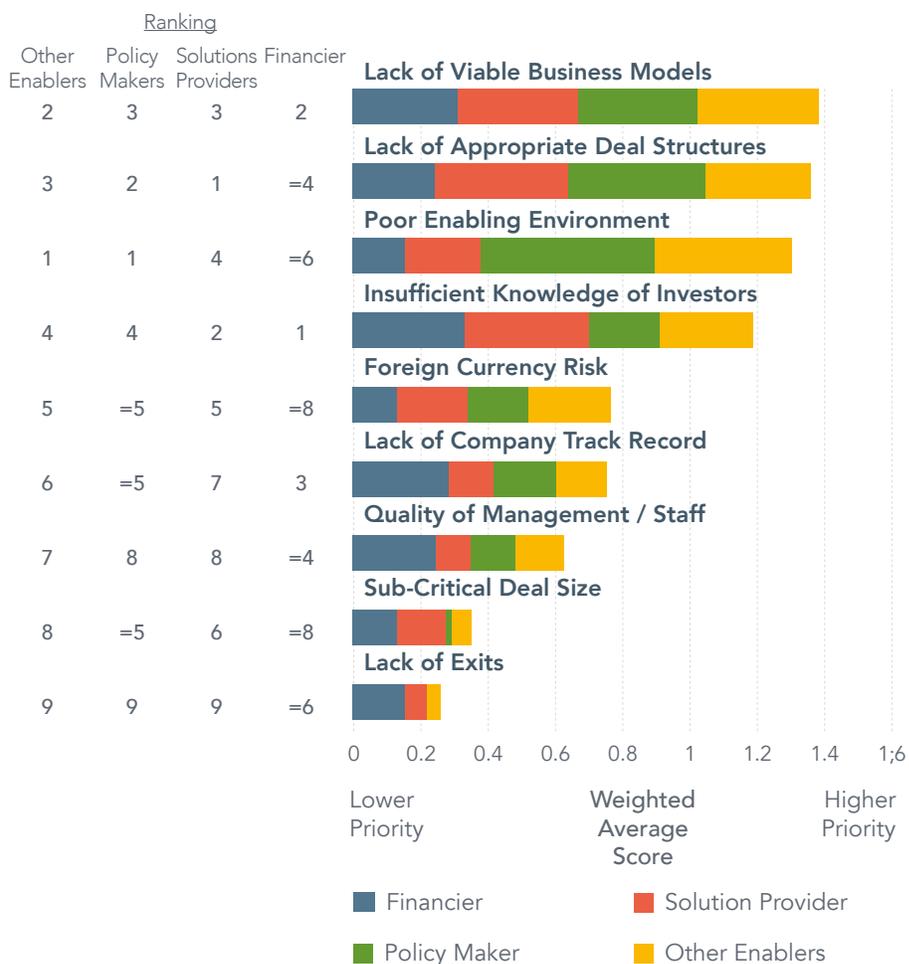
In contrast to the mini-grid market, few respondents consider policy and regulatory risks among their top barriers to investment in this market segment.



23 | BARRIERS TO FINANCING PORTABLE / STAND-ALONE ELECTRICITY PRODUCTS MARKET (for Equity Investments)

When it comes to financing the portable/stand-alone electricity product market, respondents generally agree that a lack of viable business models and poor enabling environments constitute the most significant barriers to raising equity and debt, respectively.

However, seen from the perspective of equity investors, the insufficient knowledge of investors about how the sector operates, followed by concerns over the business models and company track record, register as the greatest barriers overall to financing enterprises in the solar products market. Although a growing number of equity investors have entered the market in recent years - including venture, impact, and philanthropic capital providers - there is a growing recognition of the need for more debt providers, including “patient capital”, to support the longer-term growth of the sector.



MINI-GRIDS

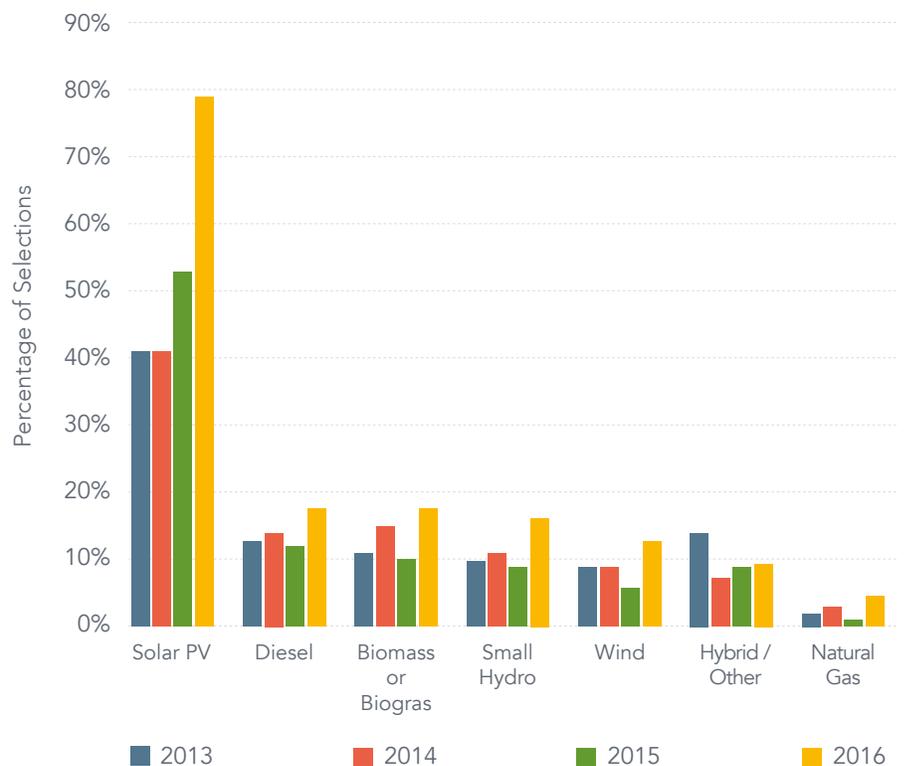
The mini-grid market is growing rapidly around the world and a growing number of governments are in the process of developing or implementing new rules for the up-and-coming sector. However, achieving sustained growth requires resolving several important challenges. Concerns over viable business models remain widespread, and the importance of bankable policy and regulatory frameworks remains

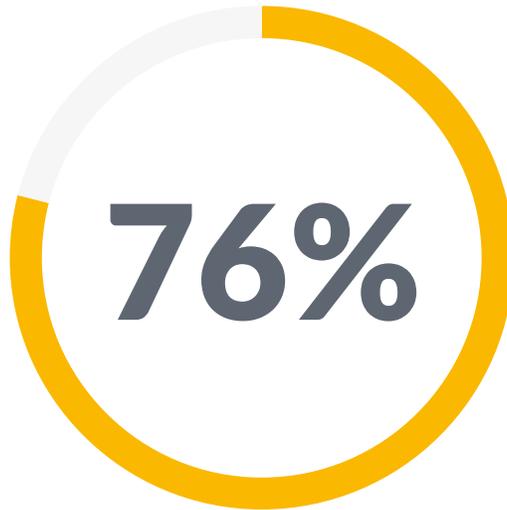
paramount across the various actors surveyed.

Drawing on the perspective of mini-grid developers and other market enablers (e.g. financiers, policymakers, etc.), this section provides recent market trends and insights into the mini-grid market.

25 | TYPES OF TECHNOLOGIES USED FOR MINI-GRID GENERATION (2013-2016)

Mini-grids can support a wide range of different electricity access needs, including commercial and productive uses. Across the many end-uses listed, the most common for solution providers included lighting, phone charging, entertainment (TV, radio), and refrigeration. These are broadly consistent with last year's findings.

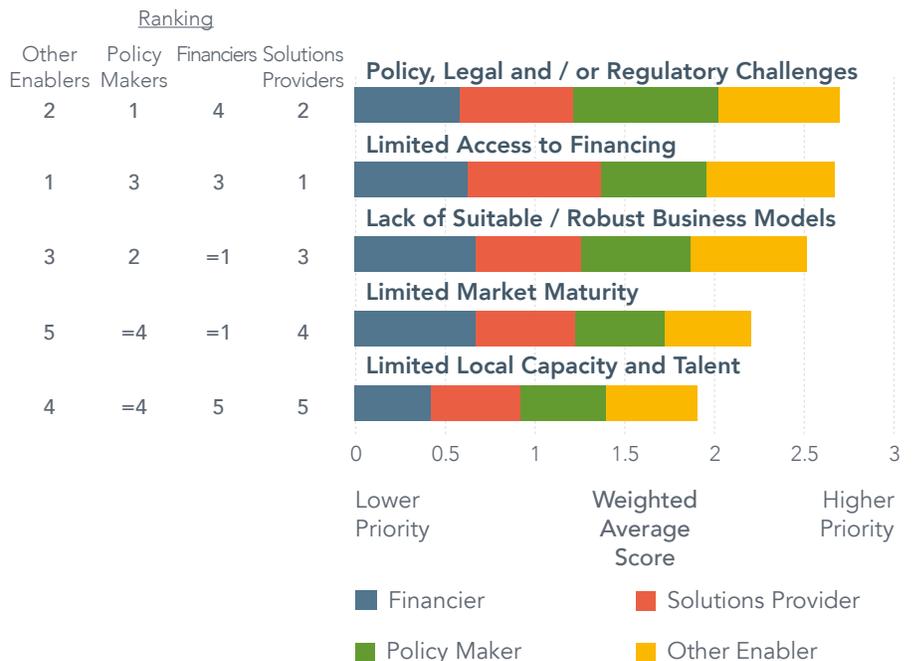




PERCENTAGE OF MINI-GRIDS COMMISSIONED OR BUILT IN 2016 THAT MADE USE OF BATTERY STORAGE, ACCORDING TO SOLUTION PROVIDERS WHO RESPONDED.

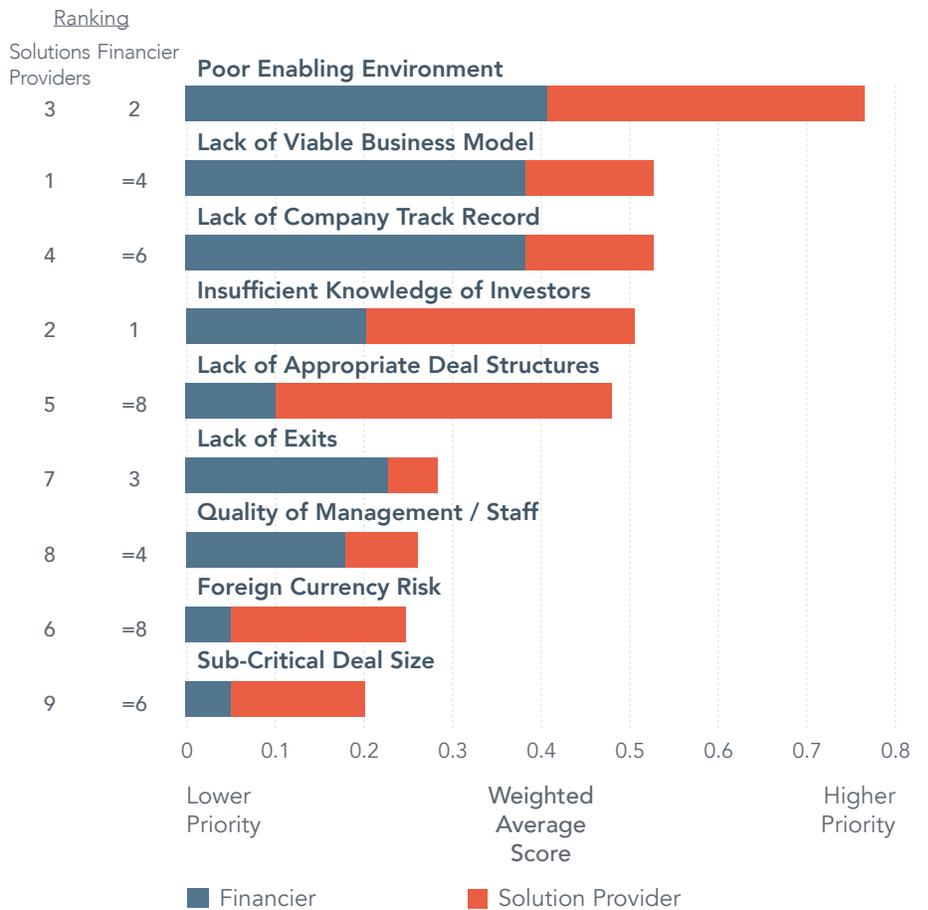
26 | BARRIERS TO GROWTH OF MINI-GRIDS MARKET

When considering responses from all respondents, the two top barriers to the growth of the mini-grid market are the policy and regulatory environment and the limited access to financing, echoing the main concerns cited in the 2016 survey. The investability of the mini-grid sector remains highly dependent on the overall policy and regulatory environment, particularly the tariff regime in place. In many countries, appropriate legal and regulatory regimes to govern the emergence of mini-grids do not exist. And even where they do exist, concerns over timely implementation and enforcement of the rules are widespread. Barriers to accessing finance feature particularly prominently in the answers provided by solution providers, as solution providers must undertake the difficult work of mobilizing the finance needed for mini-grid development. Although enthusiasm in the mini-grid sector is growing and business models are evolving rapidly, the 2017 survey indicates that significant barriers to achieving sustained growth remain.



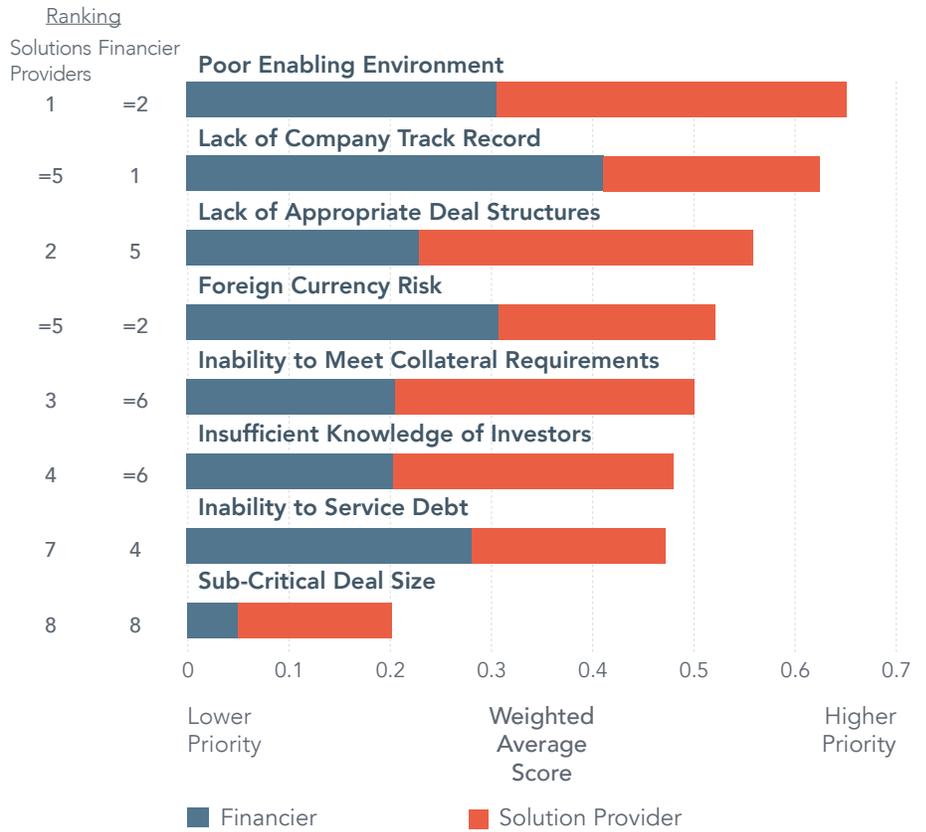
27 | BARRIERS TO FINANCING MINI-GRIDS MARKET (for Equity Investments)

According to the financiers surveyed, the poor enabling environment registers as the greatest barrier to providing equity to the mini-grid market, followed by the lack of viable business models. As pointed out earlier, the underlying legal and regulatory frameworks for mini-grids are lacking in many jurisdictions and even in those jurisdictions where they are present (or in the process of being implemented) both investors and solution providers frequently voice concerns about governance and the overall enforcement and implementation of the rules. When it comes to providing debt, financiers cite the lack of company track record as the biggest barrier.



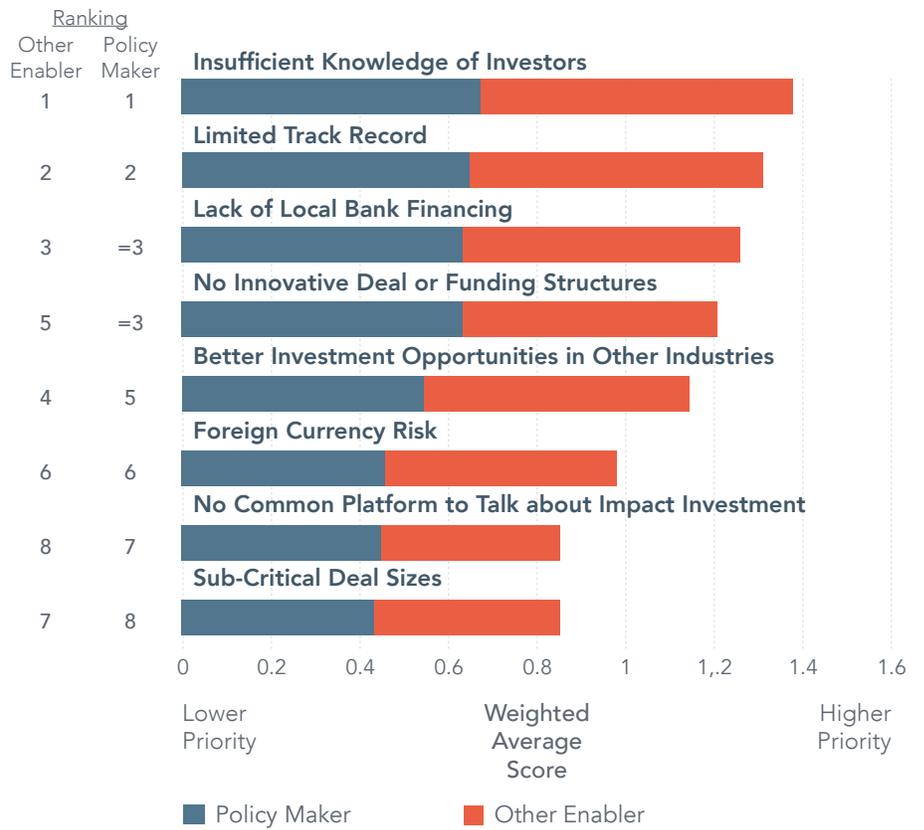
28 | BARRIERS TO FINANCING MINI-GRIDS MARKET (for Debt Investments)

For solution providers the inadequate enabling environment registers as the top concern for securing debt financing, underscoring the critical role that government policy plays in determining the investability of the sector. When it comes to equity, solution providers cite the lack of appropriate deal structures as the biggest hurdle.



29 | BARRIERS TO FINANCING MINI-GRIDS MARKET (for both Equity and Debt Investments)

Questions in the 2017 survey posed to policy makers and other enablers regarding barriers to financing focused on finance in general, rather than specifically for debt or equity finance. In response, both groups policy cited the insufficient knowledge of investors and the limited track record of companies operating in the sector as among the top barriers overall. However, the lack of local bank financing was also cited as one of the top barriers, underscoring the importance of increasing local bank participation and local currency lending for the mini-grid sector.

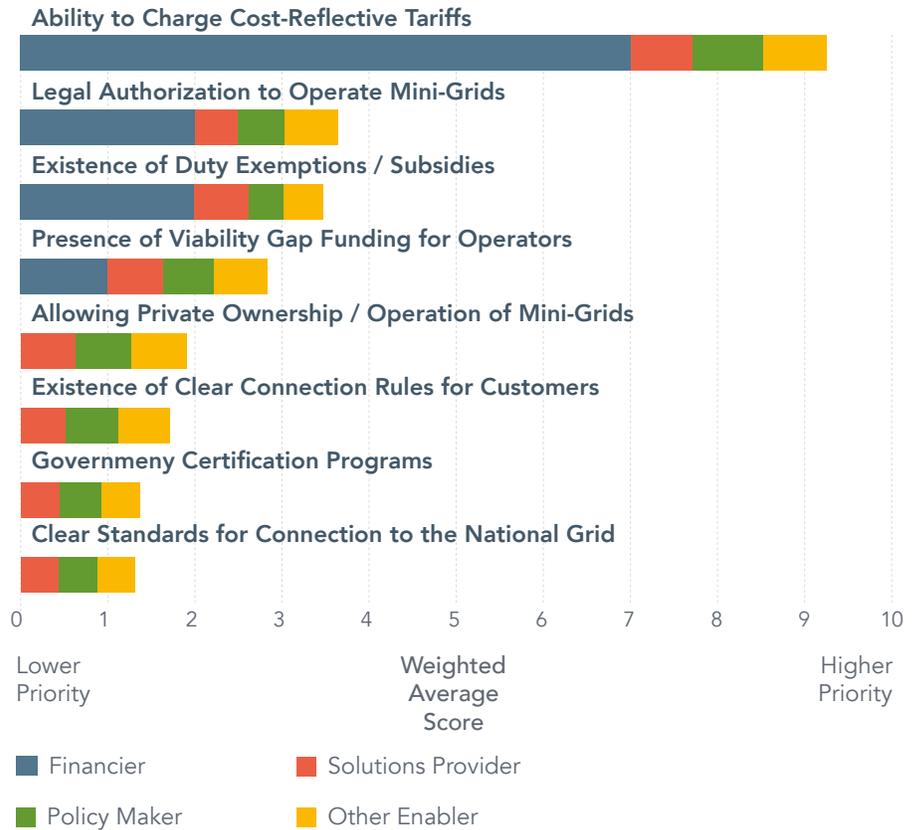


30 | REGULATORY AND POLICY CONSIDERATIONS FOR SCALING UP MINI-GRIDS MARKET

The top regulatory and policy considerations for the mini-grid sector exhibited unambiguous alignment across the four key actor types surveyed: the need for mini-grid operators to be able to charge cost-reflective tariffs.

This differs notably from the 2016 survey, where the main consideration cited concerned whether the business models in use were viable. However, many governments continue to maintain flat national tariffs, including in mini-grid rules currently under development in countries such as Togo and Benin, underscoring the difficulties in introducing cost-covering tariffs in the sector.

The presence of viability gap financing is one important means by which to solve this problem. Tellingly, respondents preferred the ability to charge cost-covering tariffs to the presence of subsidies, presumably due to the perceived risks associated with building a business model around the presence of temporary supports.



CLEAN COOKSTOVES

The clean cookstoves market is in many ways less developed than the market for solar products and solar home systems. Investors do not understand the market as well, and it continues to face greater difficulties in mobilizing finance. Regardless, a growing body of research, such as that of the Global Alliance for Clean Cookstoves, points to significant economic and human health benefits provided by cleaner cookstoves. This makes the clean cooking sector a critical

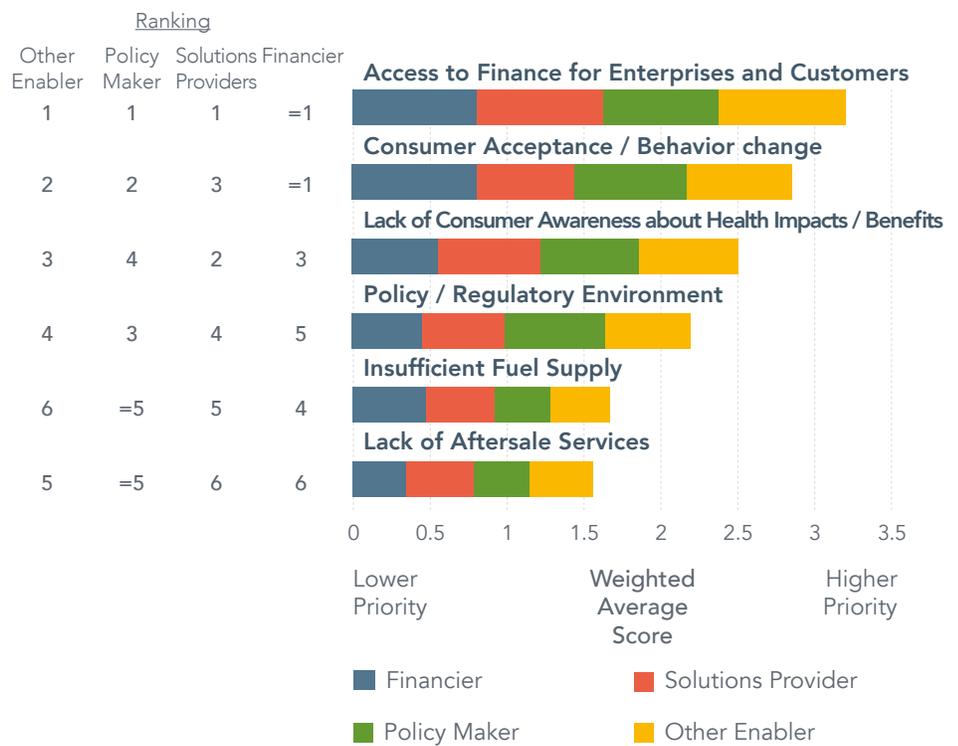
part of the energy access ecosystem and one of the areas of greatest need.

Drawing on the perspective of cookstove providers and other market enablers (e.g. financiers, policymakers, etc.), this section provides recent market trends and insights into the clean cookstoves sector.

31 | BARRIERS TO GROWTH OF CLEAN COOKSTOVES SECTOR

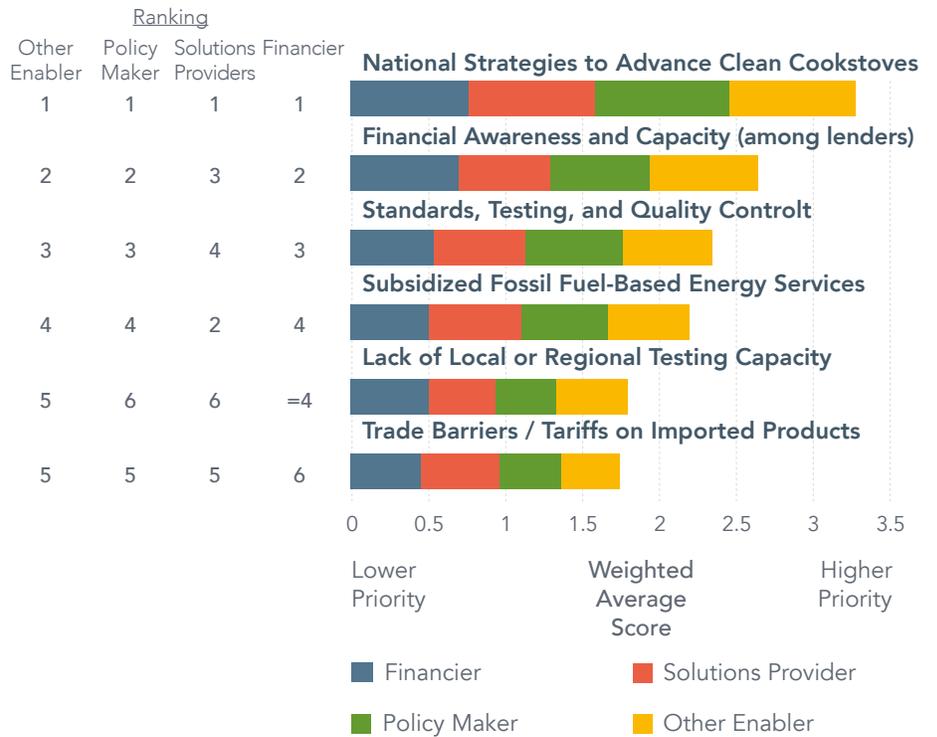
Among the four actor types surveyed in the 2017 survey, the top barrier identified to the growth of the clean cookstoves sector is access to finance. This differs markedly from the 2016 survey where the top barrier to growth was consumer acceptance. While consumer acceptance remains important in the 2017 survey, it now ranks second behind access to finance.

This is a sign that the cookstoves sector is maturing as customers begin to become more aware of the cost savings and health benefits of using cleaner cooking technologies. There is much work remaining, however, on raising awareness, both among consumers as well as among investors, to significantly scale-up the deployment of clean cookstoves worldwide.



32 | REGULATORY AND POLICY CONSIDERATIONS FOR SCALING UP CLEAN COOKSTOVES SECTOR

Most respondents cited national strategies to advance clean cookstoves as the most important action governments can take to scale-up the clean cookstoves sector. Although national clean cooking strategies are currently being developed in certain countries, such as Bangladesh and Kenya, there is still much to be done to make clean cooking mainstream in many parts of the world, most notably in sub-Saharan Africa.



33 | BARRIERS TO FINANCING CLEAN COOKSTOVES SECTOR

The top two barriers to financing the clean cookstoves sector are the limited knowledge of investors and the limited track record of industry players. This marks a significant change from the 2016 survey, where the top concern cited by investors was subcritical deal sizes.

Although an increasing number of companies in the clean cooking sector are growing, too few have achieved profitability and demonstrated a track record that will persuade more investors that the underlying business models are bankable. One key commonality, however, between the 2016 and 2017 surveys is the continued prominence of investors' lack of knowledge as a major barrier to mobilizing finance. This suggests that raising the profile of the clean cooking sector requires more effort, including advocating for its many opportunities and co-benefits, both for local residents and the surrounding environment.



APPLIANCES

The appliances market often receives less attention than both the solar home systems or mini-grid market segments, and yet it remains a critical and growing part of the overall energy access value chain. An increasing number of international companies are beginning to develop products specifically targeted at the energy access sector, and many start-ups are

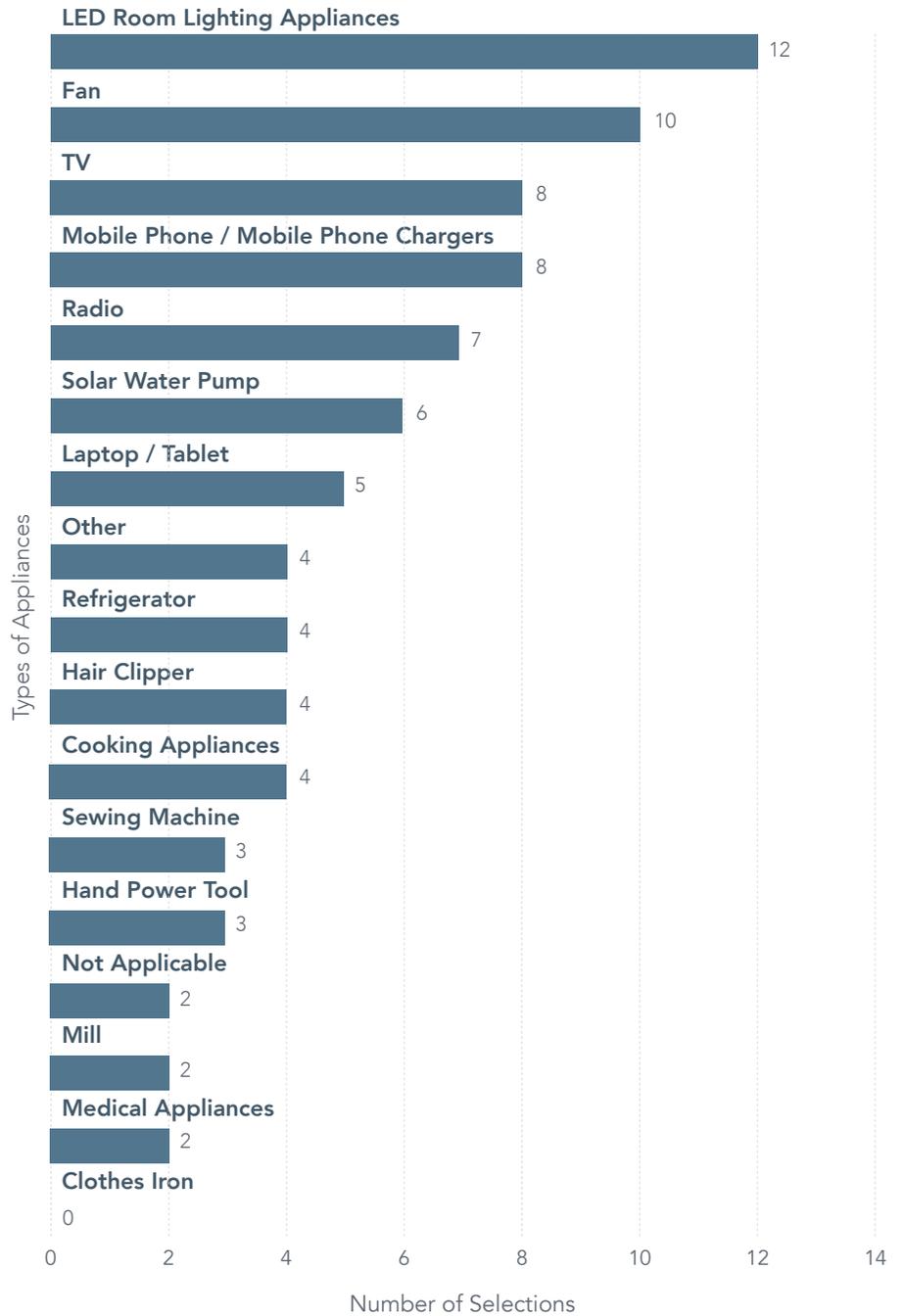
beginning to emerge, developing a wide range of products and appliances to service this growing need.

The following section provides recent market trends and insights into the market for appliances.



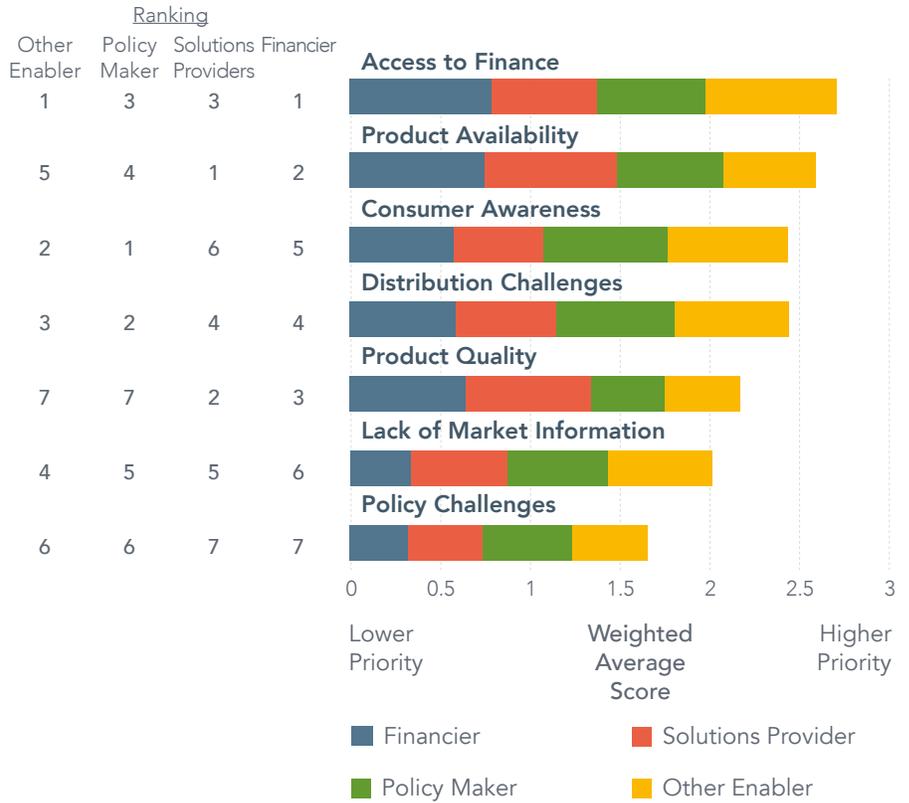
34 | TYPES OF APPLIANCES SOLD IN 2016

Among solution providers who responded to the 2017 survey, the most common appliances sold were lighting products, fans, TV sets, and mobile phones/chargers. The relative popularity of these appliances tracks closely with findings from the 2016 survey as well as from an appliance survey conducted by Global LEAP in 2016.



35 | BARRIERS TO GROWTH OF APPLIANCES MARKET

According to all actors surveyed, the largest barriers to the growth of the appliances market are access to finance and product availability. However, in several markets consumer awareness remains a major constraint on growth, underscoring the importance of bringing products out into the market and allowing customers to test and use them, including in rural regions. Investing more in better distribution channels is a critical part of building familiarity with the products and increasing awareness, particularly in regions where energy access products are not widely available and the market remains dominated by conventional alternatives.



36 | REGULATORY AND POLICY CONSIDERATIONS FOR SCALING UP APPLIANCES MARKET

Regarding policy and regulatory considerations that could help scale-up the appliances market, respondents reported that consumer awareness was the most critical component. While this remained the case in aggregate, both financiers and solution providers placed equal or greater importance on the role of import duties and tariffs on constraining the growth of the energy access appliances market. In many countries, the nomenclature for the categorization of energy access products and appliances remains outdated, lacking differentiation between LED and CFL lamps for instance, as well as between different types of storage devices (storage technologies often face particularly high import duties and taxes). In addition, better and more streamlined procedures at customs for importing clean and/or certified energy access products and appliances, including the designation of pre-approved importers who benefit from a simplified process (such as the current implementation in Togo), represent major steps forward that can significantly increase both the pace and scale of energy access.



37 | BARRIERS TO FINANCING APPLIANCES MARKET

The top barrier to financing the appliances market remains product affordability. This view prevailed by a significant margin across all four actor types surveyed. This suggests bringing down the upfront costs of products requires continued work, including reducing taxes and duties on select products, investing more in product design and innovation, as well as increasing the availability of financing for the appliances market segment. Research in markets like Tanzania suggests that the ability (as well as the willingness) to pay for products in one upfront cash payment declines significantly beyond a sales price of \$15. As such, developing financing solutions to allow customers to finance the remainder could significantly increase the rate of uptake of new energy access products and appliances.



ENERGY FOR HUMANITARIAN SETTINGS

Providing modern energy services in refugee or humanitarian settings is a growing priority within the energy access community. As political and economic instability disrupts a growing number of people's lives, providing quality and affordable energy services in humanitarian settings is increasingly critical.

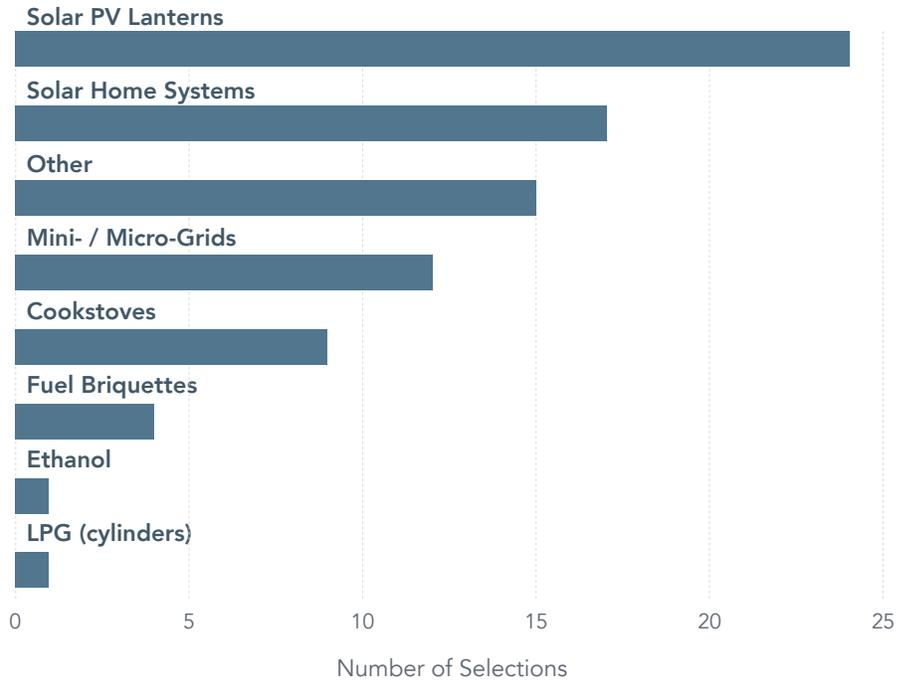
This short section provides an overview of respondents' perspectives on this rapidly growing part of the energy access market.



NUMBER OF RESPONDENTS OF THE 2017 SURVEY THAT ARE ACTIVE IN PROVIDING ENERGY ACCESS SOLUTIONS IN REFUGEE OR HUMANITARIAN SETTINGS. THIS IS UP FROM 23 RESPONDENTS IN THE 2016 SURVEY. THIS REPRESENTS A SIGNIFICANT LEAP, PARTICULARLY CONSIDERING THE LARGER RESPONDENT POOL IN 2016.

38 | TYPES OF ENERGY PRODUCTS DEPLOYED IN HUMANITARIAN RELIEF SETTINGS IN 2016

Similar to 2016's results, the most common products deployed by respondents in humanitarian settings remain solar lanterns (portable products) and solar home systems providing electricity to individual housing units, health clinics, and other buildings providing vital services in distressed regions.



39 | FACTORS CONSIDERED WHEN SELECTING PRODUCTS FOR HUMANITARIAN SETTINGS

Solution providers and other respondents ranked the quality as the most important factor in selecting products for use in humanitarian settings. Due to the challenging settings that many humanitarian organizations are working in, with precarious supply lines and long delays, having longer-lasting products confers numerous advantages. This contrasts with the top concern among retail customers of energy access products, who tend to place a higher importance on the upfront cost. Indeed, only two out of 44 respondents selected product price as the top priority.

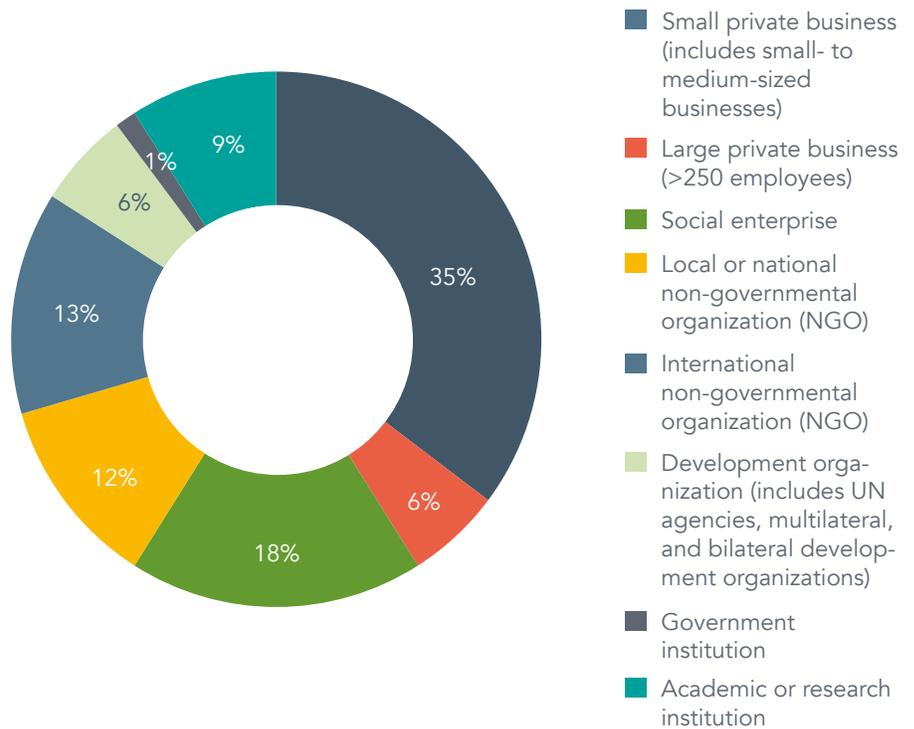


RESPONDENT PROFILES

This section provides a brief overview of the overall profile of the respondents for the 2017 Practitioner Network Survey.

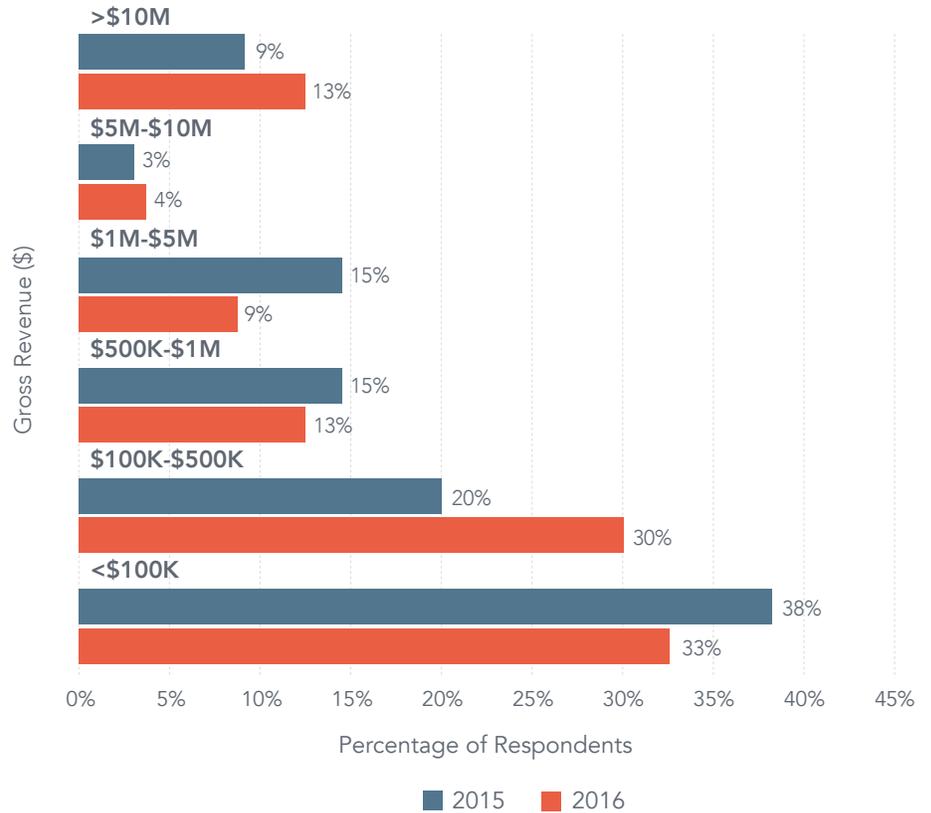
40 | DISTRIBUTION OF RESPONDENT'S AFFILIATIONS

Private and social enterprises represent almost 60% of total respondents. As with the 2016 survey, the single largest category of respondents is small privately-owned businesses.



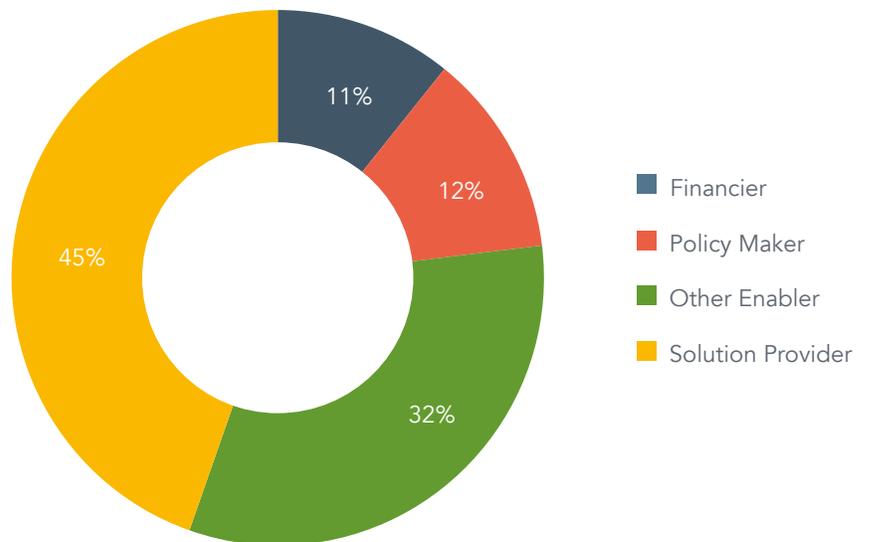
41 | DISTRIBUTION OF RESPONDENTS' GROSS REVENUE

Two-thirds of solution providers who responded to the 2017 survey have a gross revenue of less than \$500,000, suggesting that the distributed energy access sector remains dominated by small and medium-sized enterprises. This is broadly in line with findings from the 2016 survey, with the exception of an increase in the share of enterprises with gross revenues between \$100,000 and \$500,000 and over \$10 million.



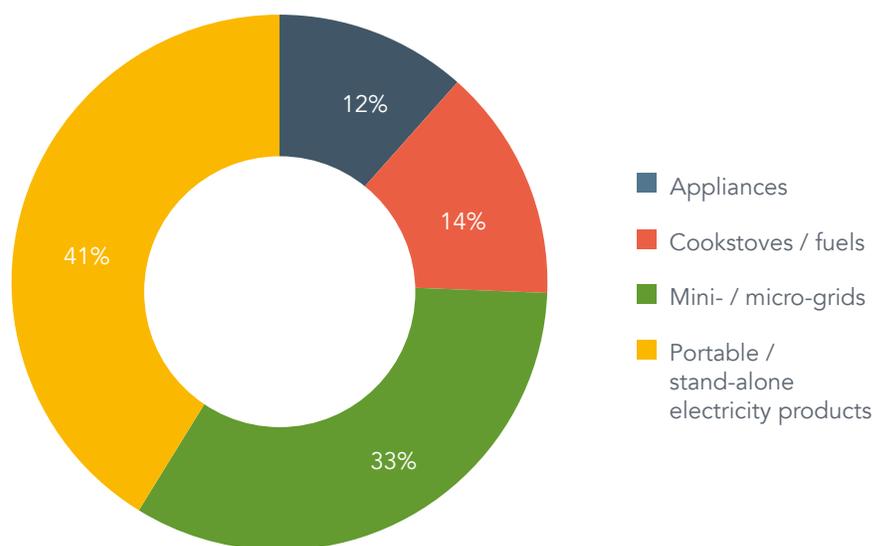
42 | DISTRIBUTION OF RESPONDENTS' INVOLVEMENT IN THE ENERGY ACCESS ECOSYSTEM

The majority of respondents to the 2017 survey identified themselves as a solution providers.



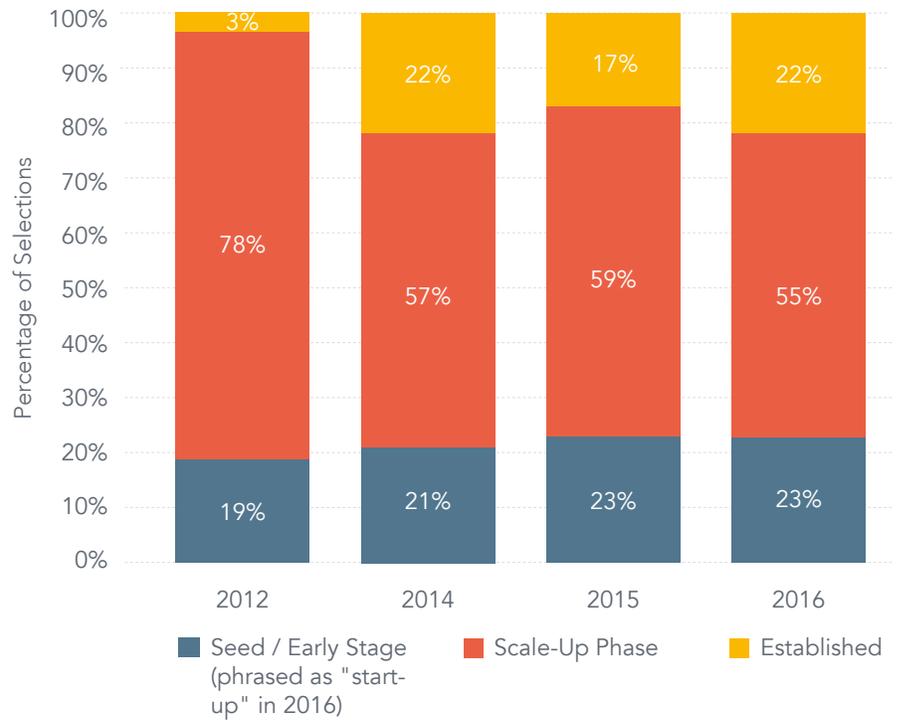
43 | DISTRIBUTION OF SOLUTION PROVIDERS INVOLVEMENT IN DISTRIBUTED ENERGY TECHNOLOGIES

Out of all solution providers that answered the survey, the majority were involved in portable solar products / solar home systems, or mini-grids.



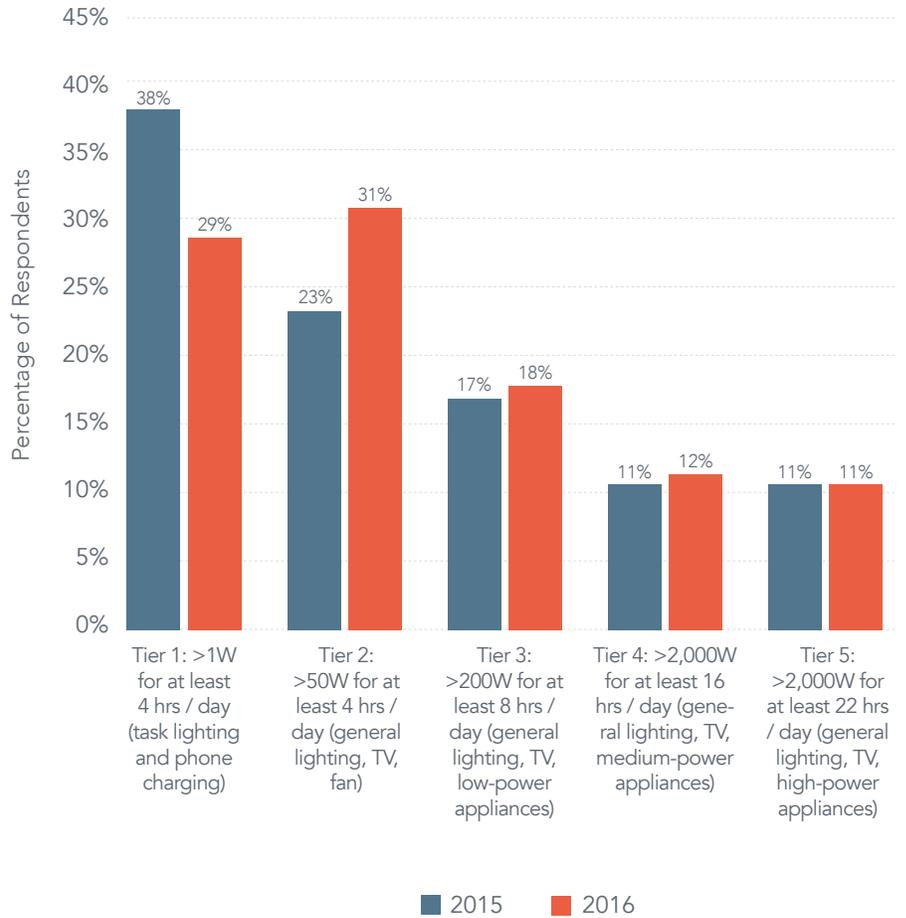
44 | RESPONDENTS' STAGES OF GROWTH

Similar to past years, almost a quarter of solution providers who responded to the 2017 survey identified themselves as established players in the energy access sector. Likewise, the shares of respondents who identified themselves as being in the early-stage and scale-up phases has remained almost the same.



45 | LEVELS OF ENERGY ACCESS SUPPORTED BY RESPONDENT’S PRODUCT SALES

The majority of solution providers (60%) reported that their energy access solutions provide Tier 1 and 2 levels of energy access, which is broadly in line with findings from the 2016 survey. Interestingly, the 2017 survey saw an increase in the share of solution providers providing Tier 2 access; this is an encouraging sign and reflects improvements in the product offerings available in the off-grid sector.



ABOUT THE PARTNERS

UNITED NATIONS FOUNDATION

The United Nations Foundation builds public-private partnerships to address the world's most pressing problems, and broadens support for the United Nations through advocacy and public outreach. Through innovative campaigns and initiatives, the Foundation connects people, ideas, and resources to help the UN solve global problems. The Foundation was created in 1998 as a U.S. public charity by entrepreneur and philanthropist Ted Turner and now is supported by global corporations, foundations, governments, and individuals. For more information, please visit www.unfoundation.org

ENERGY ACCESS PRACTITIONER NETWORK

Established in 2011, the Energy Access Practitioner Network is an initiative of the United Nations Foundation that supports the development of a thriving global distributed energy sector to catalyze the achievement of universal energy access. We do this by connecting our 2,500 members – who collectively represent more than 1,350 organizations – to industry insights and resources, and by helping create powerful partnerships. As the largest network of its kind, the Energy Access Practitioner Network provides an unparalleled platform for understanding and addressing the challenges and opportunities faced by the distributed energy access sector at large.

The Practitioner Network is open to all organizations and individuals actively involved in the implementation, development, financing, and management of delivering energy sustainably, affordably, and effectively. For more information and to join, please visit www.energyaccess.org

SUSTAINABLE ENERGY FOR ALL

Sustainable Energy for All (SEforALL) is a global platform that is working towards three ambitious objectives for 2030:

1. ensuring universal access to modern energy services
2. doubling the share of renewable energy in the global energy mix
3. doubling the global rate of improvement in energy efficiency

SEforALL supports these objectives by empowering leaders to broker partnerships and unlock finance to achieve universal access to sustainable energy as a contribution to a cleaner, just and prosperous world for all. SEforALL connects stakeholders, marshals evidence, benchmarks progress, amplifies the voices of its partners and tells stories of success. For more information, please visit www.seforall.org.

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