EFFICIENCY FOR ACCESS

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POLICY BRIEF

PROMOTING HIGH-PERFORMING OFF-GRID APPLIANCES

JUNE 2019

EFFICIENCY FOR ACCESS COALITION

EXECUTIVE SUMMARY

An exciting new generation of high-performing appliances is being developed for use in off- and weak-grid areas, many of which run on direct current (DC) rather than alternating current (AC) power.[i] The cooling, irrigation and communications benefits of off-grid refrigerators, fans, solar water pumps and televisions have the potential to improve the productivity, livelihoods, education and health of millions worldwide.

Appliance efficiency contributes to energy access by enabling people with limited electricity supply to power more appliances for longer.[ii] Efficiency also enables the use of smaller photovoltaic (PV) modules and batteries, allowing people to access a higher level of service at lower cost. For example, a solar home system (SHS) coupled with super-efficient appliances is up to 35% cheaper than one using conventional appliances to deliver the same level of service.[iii]

Ensuring the quality of efficient appliances is essential to consumer protection, and to the overall health of markets. High-quality, durable products have a larger positive impact on the lives of end-users than low-quality products, which often lack warranties or after-sales service, leaving people exposed to the risk of early product failure.

Standards and labelling initiatives are needed to promote quality and efficiency, as well as to protect consumers. Whilst progress has been made in developing test methods and standards for use in off-grid settings, additional steps are needed at both national and international levels.

As off-grid appliance markets mature, a broader range of test methods and standards will need to be developed and adopted by international standards organisations, such as the International Electrotechnical Commission (IEC). At the national level, governments and aid agencies can use the proven tools outlined below. These tools are especially effective when combined with other market development initiatives, such as consumer awareness campaigns or financing facilities.

- **Test methods** are the foundation of all standards-related policies and programmes. They enable measurement and comparison of the quality and performance of products across markets in a consistent way.

- **Voluntary standards** build on test methods by establishing minimum requirements in areas such as performance, durability, safety, truth-in-advertising or warranty. They can be used to ensure that only products and companies that meet requirements benefit from market development initiatives. When implemented by governments, voluntary standards can act as a stepping stone towards the introduction of mandatory standards or labelling programmes.

- **Mandatory standards** are used to ensure that all products manufactured or imported into a country legally meet minimum requirements, helping to keep poor-quality products out of the market and protect consumers. The benefits of mandatory standards can be significant, especially in countries where poor-quality products are prevalent. The cost of implementing and enforcing compliance with standards can be high. Markets must be mature enough, and sales volumes high enough, for benefits to outweigh costs. Similarly for the private sector, the benefits of getting products certified must outweigh the cost of doing so.

- **Labelling** programs make comparative information about products available to businesses or consumers. Governments considering labelling programmes for off-grid appliances need to carefully consider:
  - The availability of comparative information about products
  - The mechanism needed to police use of the label; and
  - The consumer education campaigns needed to ensure that off-grid consumers are aware of the label.

1. Undertake Market Research and Stakeholder Mapping

Measures to promote quality need to be introduced at the right stage in a market's development, so as to achieve the desired effect. If they are introduced prematurely, based on inadequate market knowledge or without stakeholder consultation, they can cause significant harm to fragile, nascent markets. Decision-makers are encouraged to undertake market research activities to build their understanding of products, companies and value chains, and how the market is likely to be affected by the measures being considered. Decision-makers should also undertake stakeholder mapping to fully understand the broader environment in which they are operating, and be confident that the institutional, financial and human resources needed to effectively implement measures are either in place, or can be built. Mapping can also identify key stakeholders to work with throughout the standard development and implementation process. Important stakeholders may include Customs Authorities, Bureaus of Standards, industry associations or consumer groups.

2. Build on Existing Tools and Consider a Regional Approach

Alignment of test methods or standards across programmes and countries helps to make products more affordable by enabling companies to design and manufacture products for multiple markets, reducing testing and certification fees, fostering competition and helping to unlock economies of scale. Decision-makers are encouraged to check whether there is an existing international, regional or national test method or standard that meets their needs before developing their own. At the international level, the International Electrotechnical Commission (IEC) has existing standards that cover electrical safety, ingress protection and other areas, as well as a network of accredited test laboratories. Global LEAP test methods, which are designed to test and evaluate the performance and quality of appliances suitable in off- and weak-grid settings, can be used to compare products and performance requirements if needed.[iv]

Governments and other stakeholders are strongly encouraged to take advantage of the Global LEAP test methods and align with them as much as possible.

A regional approach is an effective strategy for aligning test methods and standards. Many regional institutions have a mandate to champion standards development, adoption and implementation. For new measures to be developed and implemented, a critical mass of countries needs to be supportive of their introduction. Country representatives are encouraged to act as 'champions' for new regional measures, and to work closely with other Member States to drive through reform. However, given the rapid pace at which interest in off-grid appliances is developing, decision-makers may prefer to focus on national standards, which can be introduced more quickly. If such an approach is pursued, governments are encouraged to align their efforts as much as possible with international standards and tools from the IEC, Global LEAP Awards and others. National standards can be developed, adopted and implemented through a gradual, phased and collaborative 'roadmap' approach, as outlined below.

3. Develop a Roadmap and Engage Stakeholders

A roadmap can be used to outline a government's objectives, the tools they plan to use, the key stakeholders involved and their roles. It can also outline the process a government envisages for the development of policies and programmes, as well as a strategy for stakeholders consultation. Roadmaps help make the changing policy and regulatory environment as predictable as possible, enabling all stakeholders to understand the process and plan accordingly. Throughout the design and implementation of quality-related policies and programmes, strong stakeholder engagement and collaboration are key. Important stakeholders are likely to include manufacturers, distributors and mini-grid developers, a range of government ministries and departments, consumer groups and civil society organisations.

BOX

Understanding the Impact Potential of Appliances

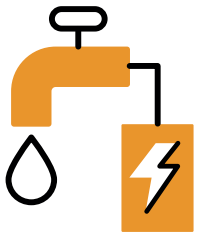
Solar Water Pumps[v]

A recent survey of 375 solar water pump customers in Kenya, Uganda, and Tanzania found 81% of respondents believe access to a solar water pump has had a positive impact on their quality of life.

30%
reported increased income, improved standard of living

22%
reported saving money, no longer spending on fuel, hired labor

16%
reported a better yield, ability to farm throughout the seasons, increased farming area



"I am now able to buy sugar because I can make some money from the people who I loan the pump to. Life has improved and I am also helping other people as well. I am able to get money both from my farm and from the pump."

– Wenslaus Barasa sweet potato farmer, Kenya

Source: Solar Water Pump Customer Research Report, Lean Data, Forthcoming

Televisions[vi]

Preliminary research finds that off-grid televisions may contribute to a more informed population. Efficiency for Access and 60 Decibels surveyed over 1,700 Global LEAP results-based financing participants and found customer motives to purchase an off-grid television extend beyond entertainment.

27%
of respondents indicated their decision to purchase a TV was driven by a desire to stay informed with current events

"Sometimes when I went to the market, I would find there was no safe route to use. But when you have a TV you know about that before leaving the house and you will know if it's safe."

– Dorine Adhiambo, Kisumu, Kenya

The Role of Efficiency in Energy Access

Appliance efficiency contributes to energy access by enabling people to power more appliances, for longer, when they only have a limited electricity supply.[vii] Whilst conventional appliances consume too much power for use in off- or weak-grid areas, a new generation of efficient appliances is being developed specifically for use in these settings, many of which run on direct current (DC) rather than alternating current (AC) power.[viii] Energy-efficient, off-grid appliances such as televisions, fans, refrigerators and solar water pumps have the potential to deliver the benefits of cooling, irrigation and communications to millions, leading to improved productivity, livelihoods, education and health (see box on page 4).

High demand for efficient appliances, and the benefits that they bring, is driving growth in the solar home system market. The 2018 Efficiency for Access Off-Grid Appliance Market Survey found light-emitting diode (LED) lighting, mobile phone charging, radios, televisions, fans and refrigerators are the highest ranking off-grid domestic appliances in terms of consumer demand. Solar water pumps and agricultural cold chain technologies were ranked the top two productive use appliances for both consumer demand and impact potential.[ix] According to the survey, a key driver of growth in the off-grid solar market is the increasing uptake of solar home systems (SHS) large enough to power household appliances, and an increasing awareness of the transformative potential for distributed renewable energy systems to power productive use appliances.[x]

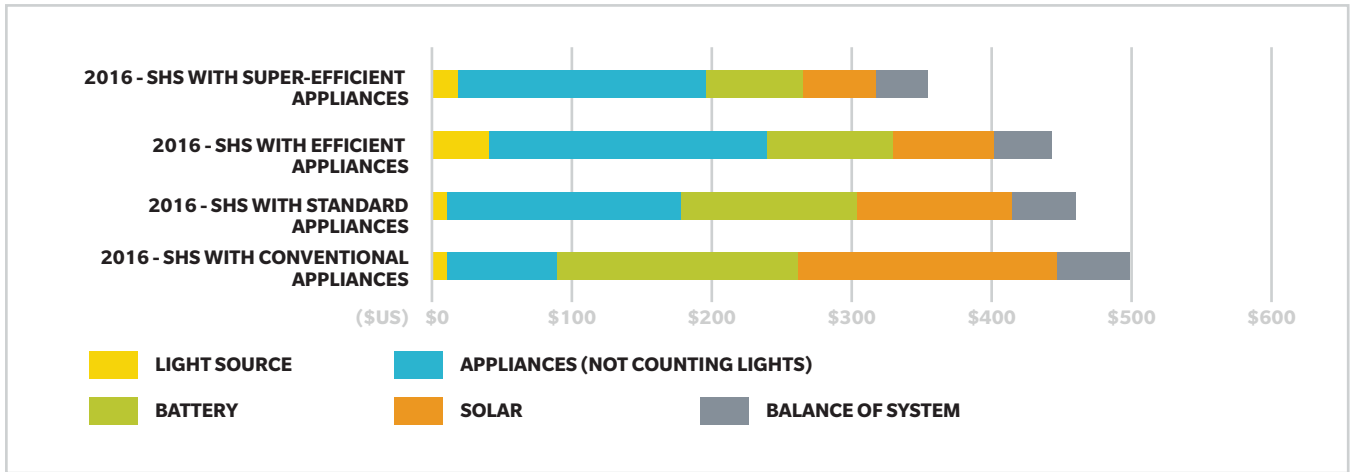
Appliance efficiency enables solar home systems to deliver a higher level of energy service, at a more affordable price. When conventional appliances are replaced with efficient appliances, smaller photovoltaic (PV) modules and batteries can be used to power them, reducing overall cost to the consumer by as much as 35%.[xi] Figure 1 shows the cost difference between solar home systems using conventional, standard, efficient and super-efficient versions of the same DC appliances.[xii] Each of the systems provides the same level and quality of service.

Appliance efficiency could also potentially enable mini-grid developers to encourage demand creation and offer a higher level of energy service at a more affordable price. Efficient appliances deliver high-quality energy services to customers, which could stimulate demand for more appliances and energy usage. Improved availability of affordable, efficient appliances could also allow developers to reduce the size of mini-grids, thereby achieving cost reductions which could be passed on to end-users.

The Importance of Quality for Consumer Protection

Ensuring the quality of efficient appliances is essential to consumer protection, and to the overall health of markets. High-quality, durable products have a far greater positive impact on the lives of end-users than low-quality products. Quality assurance protects an end-user's often significant, and considered risky, investment in acquiring an appliance. Promoting quality is particularly important when new products emerge onto a market. If customers have a good experience with a product, they will likely recommend it to others. If they have a negative experience, they will likely discourage others from making the same purchase.[xiii] Off-grid customers are often unaware of the benefits of high-quality products. They may also lack information on how to distinguish high-quality products from poor-quality products, which often lack warranties or after-sales service, leaving them dangerously exposed to the risk of early product failure.

Figure 1: Total Cost of Solar Home System with lights, mobile phone charging, radio, TV and fan of various efficiencies



Government standards and labelling initiatives are needed to promote quality and efficiency, as well as to protect consumers. Standards and labelling programmes are operational in more than 80 countries, covering more than 50 different types of appliances and equipment.[xiv] National or regional energy efficiency programmes have a proven track record in saving consumers money, generating revenue for industry, improving energy security and reducing greenhouse gas emissions. The impact of one of the world's leading efforts, the European Union (EU) Ecodesign programme, is outlined in Figure 2.[xv,xvi] These powerful policy instruments can be harnessed to deliver significant benefits for off-grid communities around the world.

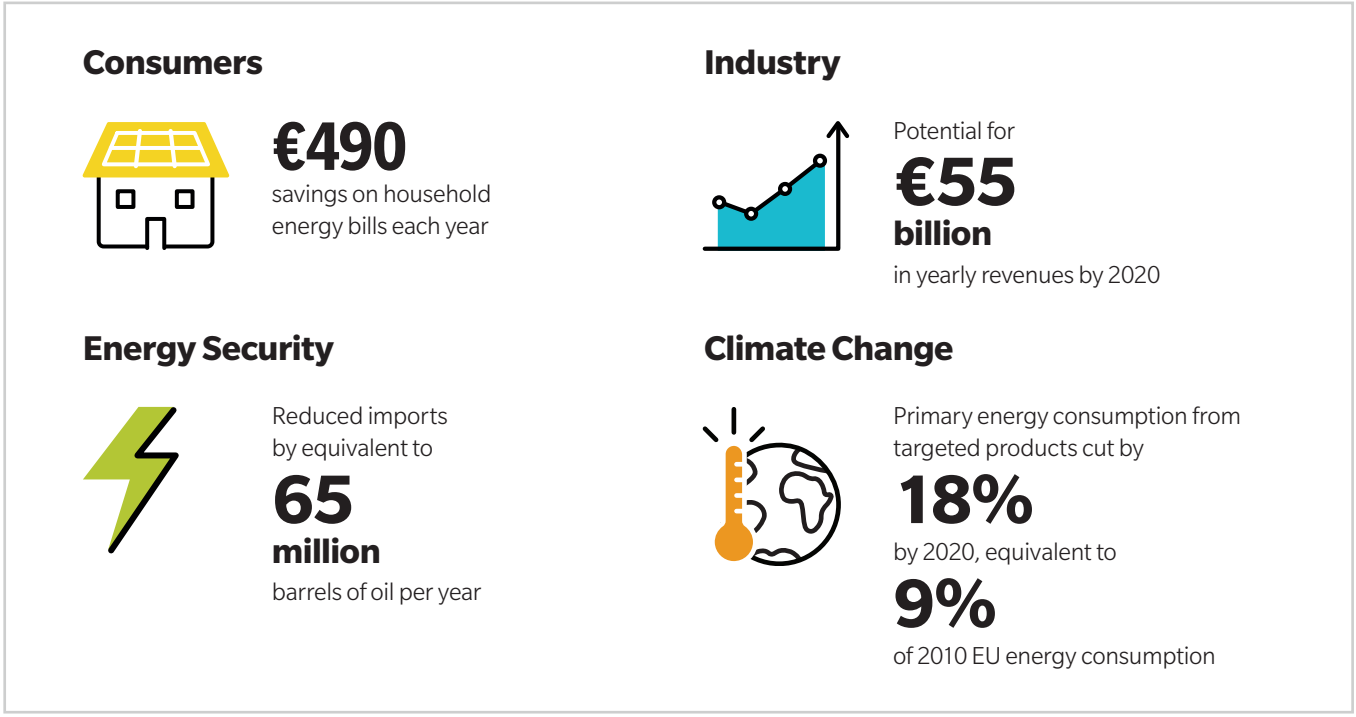
Whilst progress has been made in developing test methods and standards for use in off-grid settings, additional steps are needed at both national and international levels to promote high-performing, off-grid appliances. The World Bank / International Finance Corporation (IFC) Lighting Global programme has developed test methods and standards for off-grid solar lights and home systems up to 350Wp, with test methods formally adopted by the IEC.[xvii] Market development programmes using Lighting Global standards to ensure quality have been implemented in more than 20 countries around the world. Rwanda, Ethiopia, Kenya and Tanzania are introducing harmonised, mandatory national standards, with many countries following suit. The Global LEAP Awards has developed test methods covering fans, televisions, refrigerators and solar water pumps. Global LEAP Awards data will be available for public access through the Equip Data Tool in June 2019.[xviii] GOGLA has also started collecting data on appliances through its Sales and Impact reports.

As off-grid appliance markets mature, a broader range of test methods and standards will need to be developed at international level and adopted by the IEC. At the national level governments and aid agencies will need to use the tools outlined in the following section to promote high-performing products that protect consumers and achieve universal energy access.

"When you have a benchmark like Lighting Global, it's cheaper to develop national standards, but when you don't have a benchmark it's more expensive, and you need to evaluate the size of the market to justify the standard development efforts. IEC is recognised world over, so if standards are developed by the IEC it makes it even easier to start with a harmonised standard and then customise if you need to".

– Nickson Bukachi, Senior Renewable Energy Officer, Kenya Energy and Petroleum Regulatory Authority

Figure 2: EU Ecodesign and Energy Labelling Programme Impact



Tools to Promote High Performing Off-Grid Appliances

A range of tools are available to governments and aid agencies interested in promoting high-performing off-grid appliances. These tools are especially effective when combined with other market development initiatives such as consumer awareness campaigns or financing facilities. As outlined in Figure 3, each tool has a distinct function and can be used to pursue specific objectives.

Test Methods

Standardised test methods are the foundation of all standards-related policies and programmes. They enable measurement and comparison of the quality and performance of products across markets in a consistent way. Test methods establish definitions and key metrics to be analysed, and how these can be measured. For example, the IEC has adopted Lighting Global test methds for solar lights and home systems. Test results for those products should only be accepted from International Organisation for Standardisation-accredited laboratories.[xix]

The Global LEAP Awards has developed test methods covering safety, durability, and energy performance for fans, televisions, refrigerators and solar water pumps. The definitions, key metrics, test methods and test results to date will be available on in a forthcoming digital tool. Global LEAP is also in the process of developing field testing protocols for refrigerators and other productive use appliances, since more field monitoring is needed to better understand their durability and performance over time.

Voluntary Standards

Voluntary standards can be used to ensure that only companies and products that meet requirements gain access to the benefits of participating in market development initiatives. Such initiatives may include bulk procurement; consumer awareness campaigns; access to finance through grants, concessional loans or results-based financing; tax exemptions; capacity building or other forms of business development support.

When implemented by governments, voluntary standards can act as a stepping stone towards the introduction of mandatory standards or labelling programmes. Voluntary standards allow governments to build understanding of the market; develop a stakeholder database; establish dialogue with industry associations and consumer groups; and begin to put in place the institutional, financial and human resources needed to transition to mandatory standards.

Figure 3: Tools for Achieving Quality-Related Objectives for Energy-Efficient, Off-Grid Appliances

TOOL	FUNCTION	POSSIBLE OBJECTIVE
TEST METHODS	• Evaluate product quality and performance under specific conditions	• Provide impartial information on product performance and quality, for organisations setting standards. • Facilitate direct comparison of products.

VOLUNTARY STANDARDS	• Establish voluntary minimum requirements relating to performance, durability, safety, truth-in-advertising or warranties.	• Promote high quality products through
		  • Consumer awareness campaigns;
		  • Grants, concessional financing or results-based financing;
		  • Tax exemptions; and
		  • Other market support programmes.
		• Build stakeholder skills, experience and capacity prior to introducing mandatory standards.

MANDATORY STANDARDS	• Establish mandatory minimum requirements relating to minimum energy performance (MEP), durability, safety, truth-in-advertising or warranties.	• Ensure standards fully cover both conventional and efficient versions of products.
		• Reduce or eliminate lowest-performing products from the market.
		• Prevent poor quality products from entering a market, and protect consumers, through
		  • Conformity Assessment;
		  • Market Surveillance; and
		  • Enforcement.

LABELLING	• Make information regarding performance and/or adherence to standards available to businesses or consumers.	• Raise business or consumer awareness of product performance and adherence to standards, enabling more informed choices. • Make it easier to identify products that meet standards, as part of enforcement efforts.

Mechanisms for checking conformity can be piloted to ensure that, when they are rolled out, they do not lead to additional costs or disruption. A plan to ensure compliance, including market monitoring and enforcement, can be developed, costed and approved, to help minimise costs and disruption.

Voluntary standards build on test methods by establishing minimum requirements in areas such as performance, durability, safety, truth-in-advertising or warranties. Companies may be required to report performance to the end-user, to provide a user manual, to offer a warranty, or all of the above. Governments and aid agencies can provide end-users with grievance redress mechanisms, such as hotlines that they can call if products fail to meet expectations. In the off-grid pico-solar and solar home system market, the Lighting Global quality standards protect consumers by covering five key aspects (Figure 4).

Internationally-recognised standards covering the areas outlined above have not yet been developed for off-grid appliances. For these new technologies a correlation between price, performance and efficiency is beginning to emerge for the most advanced appliances, such as fans and televisions.[xx] What remains unclear is the appropriate time to begin regulating off-grid appropriate applainces, as the market for many of these products remains nascent. When standards are developed, they will need to be created for specific appliances and end-uses, and phased in over time as appliance markets reach the required level of maturity. Research and stakeholder engagement, with businesses and end-users, is needed over the next decade and beyond to develop, refine and enhance the quality assurance framework for efficient, off-grid appliances.

Mandatory Standards

Mandatory standards are used to ensure that all products manufactured or imported into a country legally meet minimum requirements, helping to keep poor-quality products out of the market and protect consumers. Governments may be concerned about the prevalence of poor-quality products commonplace in many countries. Lighting Global tested 17 top-selling, non-quality-verified pico-solar products, and found that 94% of the products failed to meet standards, primarily due to durability deficiencies that lead to a high risk of early product failure.[xxi]

If standards are too lax, they will not meaningfully promote quality or protect consumers. If they are too stringent, few companies will be able to meet them. Overly stringent standards can lead to expensive products that reduce imports and limit consumer choice. This occured in Kenya with room air conditioners in 2017, before the government took swift corrective action (see box on Kenya's cooling efficiency policy).[xxii] Testing costs can also be a barrier for companies with small sales volumes or limited access to finance. The market access benefits of meeting standards must be great enough to incentivise companies to participate. Decision-makers should carefully consider company size, their ability to pay for testing and conformity assessment, as well as the potential value of market access before implementing mandatory standards.

The benefits of appropriately-designed mandatory standards can be significant, especially in countries where there is a high prevalence of poor-quality products. As markets and technologies mature over time, standards can be periodically updated to drive further improvements in quality and performance. Governments can set higher standards when a significant proportion of products in a market are able to meet more stringent requirements without causing major negative effects, such as price rises that render products unaffordable.

Figure 4: Lighting Global Quality Standards for Off-Grid Solar Lights and Home Systems

TRUTH IN ADVERTISING
Advertising and marketing materials accurately reflect tested product performance.
LUMEN MAINTENANCE AND DURABILITY
Product maintains consistent light output after 2,000 hours of operation. Product is appropriately protected from water exposure and physical ingress, has durable switches and connectors and, if portable, survives being dropped.
SYSTEM QUALITY AND SAFETY
Product passes a visual wiring and assembly inspection, and is safe to use.
WARRANTY
A consumer-facing warranty is available; the required warranty duration varies by product type.

BOX

Kenya Cooling Efficiency Policy

When Kenya's standard for room air conditioners was first introduced in 2017, it required products to be tested at a high temperature that did not fully reflect the country's climate. Many products failed to meet standards. As a result, imports fell by 60% in 2018. The Government took action to revise the standards, and introduced a consumer facing efficiency labelling programme, in late 2018. Imports are now recovering and Kenya is one of the few countries in Africa that protects consumers from inefficient, environmentally harmful and poor-quality air conditioners.

The cost of developing, implementing and enforcing compliance with standards can be high. If mechanisms for ensuring compliance are weak, there is a risk of damaging fragile, nascent markets. Standards development requires building a strong understanding of market conditions to minimise the risk of potential unforeseen costs or disruption. Mechanisms need to be put in place to assess conformity with standards, and to monitor and enforce compliance with standards. Implementation of these systems and processes requires dedicated financial and human resources. Guidance is available regarding how—once mandatory standards are in place—governments can use conformity assessment processes to ensure compliance at market entry.[xxiii] However, ensuring compliance remains a challenge for many countries with porous borders, and limited human and financial resources.

Labelling

Import standardisation marks (ISM) or stickers are used to indicate that a product meets national standards. ISMs are used in Kenya, Uganda, Ethiopia, India and elsewhere. Importers obtain ISM stickers directly from the national Bureaus of Standards once conformity has been confirmed. ISMs enable governments and consumers to undertake real-time product quality checks in the market. The Kenya ISM shown in Figure 5 uses quick response codes (QR codes) and software for tracking all products bearing the ISM mark, and provides a free mobile phone app for consumers to check the validity of certification before purchase.

Labelling programs make comparative information about products available to businesses or consumers. In more mature markets, endorsement labels indicate that a product is amongst the most energy-efficient on the market, whilst comparative labels enable consumers to compare products. With support from Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), five countries in West Africa are enhancing or implementing standards and labelling programs for major appliances for the first time. The Southern African Development Community (SADC) and the East African Community (EAC) are developing quality standards and compliance control capabilities for energy-efficient lighting and appliances, with support from Swedish International Development Agency (Sida). The African Union Commission (AUC), along with the EU Technical Assistance Facility, are working on "Guidelines for Minimum Energy Performance Standards, Energy Labelling and Eco-Design at the Continental Level."[xxiv]

In the off-grid solar sector, businesses may use the Lighting Global website to see if a product meets Lighting Global standards before making a purchase decision. However, domestic consumer-facing labels for off-grid solar products have not yet been developed. In off-grid markets, the potential benefits of a consumer-facing labelling programme do not yet outweigh the costs and the sustained effort needed to prevent counterfeiting.

Governments considering labelling programmes for off-grid appliances need to carefully consider:

- The availability of comparative information about products;
- The mechanism needed to police use of the label;
- The consumer education campaigns needed to ensure that people are aware of the label.

For more information, please see the CLASP Standards & Labelling Guidebook.[xxv]

Figure 5: Kenya Bureau of Standards Import Standardization Mark

The following recommendations are based on decades of collective experience supporting measures that promote high-performing appliances in on- and off-grid settings, including the development of the first ever test methods for off-grid appliances.

1. Undertake Market Research and Stakeholder Mapping

Measures to promote quality need to be introduced at the right stage in a market's development, so as to achieve the desired effect. If they are introduced prematurely, based on inadequate market knowledge or without adequate stakeholder consultation, they can cause significant harm to fragile, nascent markets.

Decision-makers are encouraged to build their understanding of the market, including products, companies and value chains. They must be confident that the market is ready for the proposed measure. On the demand side, decision-makers can use market assessments and user dialogues to understand user preferences and ability, as well as willingness to pay. Questions to consider include whether the technology is widely available and affordable, whether there is demand for it, and the extent to which affordability is a barrier. On the supply side, research can give decision-makers a good sense of how many products will meet a given standard or in the case of procurement, what level of performance or efficiency to expect for a given price. It can also be used to understand the impact that standards will have on businesses and the market as a whole, and help to avoid unintended negative consequences. Governments can identify challenges companies are likely to face in adapting their business models to promote efficient appliances, and consider how these might be addressed. Databases, such as the forthcoming Efficiency for Access Equip Data Tool, can be useful secondary sources.[xxvi]

Decision-makers should also undertake stakeholder mapping to fully understand the broader environment in which they are operating, and be confident that the country or program is ready to move ahead. They should consider whether there is sufficient leadership support for the considered measures; whether institutional, financial and human resources are available; whether there is capacity to implement within key institutions such customs authorities or bureaus of standards, or whether capacity can be built; whether there is access to laboratories or other facilities; and whether there are stakeholder representatives such as industry associations and consumer groups that can help to guide the process. Decision-makers should identify existing tools or resources that they might use, either at international, regional or national levels. They should also seek to identify any regional activities or policymaking processes that might be relevant for their own efforts. Governments considering national standards should also consider whether legislative frameworks are needed and, if so, whether they can be put in place.[xxvii]

"Markets for off-grid solar home systems, radios and TVs are relatively mature, but markets for off-grid refrigerators and solar water pumps are still developing. Because of this, we are currently focused on off-grid lighting, radios and televisions, and will consider standards for other DC appliances in due course once markets mature, and once the benefits of regulation justify the costs. The first thing we do is benchmark against other countries. Then we base our standard on what works for the sector."

– Nickson Bukachi, Senior Renewable Energy Officer, Energy and Petroleum Regulatory Authority, Kenya

2. Build on Existing Tools and Consider a Regional Approach

Alignment of test methods or standards across programmes and countries helps to make products more affordable across the board. The more standards are aligned across programmes and countries, the easier it is for companies to design and manufacture products that meet them. Alignment lowers testing and certification costs, as well as overall time requirements. This helps companies achieve the high sales volumes needed to unlock economies of scale and drive down prices, making products more affordable. Consumers benefit from the ability to choose from a broader range of quality products. Increased competition also helps to drive down product prices. In contrast, where countries have developed their own non-aligned standards, local manufacturers that have designed products to meet national standards will be at a disadvantage when exporting their products to other markets with different requirements. Alignment across regions also makes it cheaper to enforce compliance and identify and share information regarding non-compliant products. More information on the benefits of an aligned approach is available from Lighting Global.[xxviii]

Decision-makers are encouraged to check whether there is an existing international, regional or national test method or standard that can meet their needs before developing their own. At the international level, the IEC has existing standards that cover electrical safety, ingress protection and other areas, as well as a network of accredited laboratories for testing. Global LEAP test methods can be used to compare products, as well as to set performance requirements, if these are needed. Governments and other stakeholders are strongly encouraged to take advantage of the Global LEAP test methods and to align with them as much as possible.

Country representatives are encouraged to act as 'champions' for new regional measures and work closely with other Member States to drive through reform. Regional institutions have a mandate to champion standards development, adoption and implementation. Such institutions include the African Electrotechnical Standardization Commission (AFSEC), and ECREEE and the South African Development Community Centre for Renewable Energy and Energy Efficiency (SACREEE) in West Africa and Southern Africa, respectively. East Africa has the Centre for Excellence for Renewable Energy and Energy Efficiency (EACREEE) and South-East Asia has the Association of Southeast Asian Nations Centre for Energy. For new measures to be developed and implemented at the regional level, a critical mass of countries needs to be supportive of their introduction.

Regional standard development can take many years. Given the rapid pace at which off-grid appliances are emerging, decision-makers may prefer to focus on national standards, which can be introduced more quickly. If such an approach is pursued, governments are encouraged to align as much as possible with international standards and tools from the IEC, Global LEAP and others. National standards can be developed, adopted and implemented through a gradual, phased and collaborative 'roadmap' approach, as outlined below in Recommendation 3.

"In West Africa, we are asking ECOWAS member states to check with us at regional level before developing their own standards. It does not make sense to invest time in developing national standards if these will be superseded by new regional standards after just one or two years. If member states do decide to go ahead with national standards, we want to work with them closely so that we can use their experience as an example for the region, and plan for regional harmonization from the outset."

– Charles Diarra, Energy Efficiency Expert, ECOWAS Centre for Renewable Energy and Energy Efficiency

3. Develop a Roadmap and Engage Stakeholders

A roadmap can be used to outline a government's objectives, the tools they plan to use, the key stakeholders involved and their roles. It can also outline the process a government envisages for the development of policies and programmes, as well as a strategy for stakeholders consultation. Governments can clearly state their intentions in the short- and long-term, for example, if they plan to adopt voluntary standards as a stepping stone towards mandatory standards. **A roadmap helps make the changing policy and regulatory environment as predictable as possible, enabling all stakeholders to understand the process and plan accordingly.**

India successfully used an energy efficiency roadmap approach to transform its room air conditioning market. Faced with growing air conditioner ownership and associated energy demand, India's Bureau of Energy Efficiency launched the first voluntary policy for fixed speed air conditioners in 2006, which became mandatory in 2009. The policy was incrementally revised and expanded in scope in 2015, and again in 2018 (Figure 6). **A gradual, phased and collaborative roadmap approach has enabled India to achieve tremendous improvements in efficiency in parallel with rapid market growth.** 30% of the market is now made up of more efficient inverter air conditioners, compared to 1% in 2015, and the market has grown from 0.3 million units sold in 2007-8 to 7.6 million in 2017-18.[xxix]

Throughout the design and implementation of quality-related policies and programmes, strong stakeholder engagement and collaboration is key. Important stakeholders are likely to include manufacturers, distributors and mini-grid developers, a range of government ministries and departments, consumer groups and civil society organisations. Dialogue with the private sector can help decision-makers understand the impact that a policy or programme is likely to have on businesses and the market as a whole. Dialogue with government ministries and departments is needed to fully understand the role, capacity and support needs of agencies involved in implementation. Dialogue with consumer groups and civil society organisations, which is often neglected, is essential to ensure that the perspective of end-users informs the design, implementation and monitoring of policies and programmes to promote quality.

Figure 6: India's Air Conditioner Efficiency Roadmap

Learn More

Contact us to learn more about the tools outlined above and how the Efficiency for Access Coalition can help you promote high-performing, off-grid appliances. Visit us on our website www.efficiencyforaccess.org, or get in touch at info@efficiencyforaccess.org.

Further Reading

- Global LEAP Off-Grid Refrigerator Test Method – www.efficiencyforaccess.org/publications/global-leap-off-refrigerator-test-method
- Global LEAP Off-Grid Fan Test Method – www.efficiencyforaccess.org/publications/global-leap-off-grid-fan-test-method
- Global LEAP Award Buyer's Guide: Fans and Televisions – www.efficiencyforaccess.org/publications/global-leap-buyers-guide-refrigerators
- Appliance Data Trends: Insights on Energy Efficiency, Quality and Pricing for Off-Grid Appropriate TVs, Fans and Refrigerators, Efficiency for Access Coalition, September 2018
- Equip Data Tool – www.equipdata.efficiencyforaccess.org/.
- Benefits of Harmonizing Test Methods and Quality Standards, Technical Note # 25, Lighting Global Quality Assurance - www.lightingglobal.org/resource/benefits-of-harmonizing-test-methods-and-quality-standards/
- Standards and Labelling Guidebook, CLASP – www.clasp.ngo/tools/s-l-guidebook. This is a manual for developing, implementing, and maintaining energy efficiency labeling and standards-setting programs.

ENDNOTES

[i] AC power is more suited to being transported over long distances through transmission lines, whereas DC power is more suited to appliances that only require a small amount of electricity. For more information please see: https://www.diffen.com/difference/Alternating_Current_vs_Direct_Current.

[ii] "Appliances" are defined as energy consuming products that can operate in an off-grid energy system, such as low-voltage DC solar home systems or AC/DC mini-grids. "Off-grid" refers to populations that live far from the traditional grid; "weak-grid" refers to populations that have unreliable grid connectivity and suffer frequent and sometimes lengthy outages.

[iii] Analysis conducted by the Schatz Energy Research Center and CLASP. Figures are based on the cash sales price of SHS and appliances, although a similar cost reduction trend, would apply to pay-as-you-go products as well. The four efficiency scenarios were defined as follows:

- Super-Efficient: Average of the top 25% most efficient products in the dataset
- Efficient: Average of the other 75% in the dataset
- Standard: Average of worst-performing products in the dataset (e.g. non-LED TVs, high power consuming fans, etc.)
- Conventional: Data used in 2014 version of the model (e.g. non-LED lamp, etc.).

[iv] See www.globalleapawards.org

[v] Use and Benefits of Solar Water Pumps, Efficiency for Access and 60 Decibels, 2019

[vi] Global LEAP Solar TV RBF: Baseline in Africa, CLASP and 60 Decibels, Forthcoming

[vii] "Appliances" are defined as energy consuming products that can operate in an off-grid energy system, such as low-voltage DC solar home systems or AC/DC mini-grids. "Off-grid" refers to populations that live far from the traditional grid; "weak-grid" refers to populations that have unreliable grid connectivity and suffer frequent and sometimes lengthy outages.

[viii] AC power is more suited to being transported over long distances through transmission lines, whereas DC power is more suited to appliances that only require a small amount of electricity. For more information please see: www.diffen.com/difference/Alternating_Current_vs_Direct_Current.

[ix] "Productive use of energy" is defined as involving the application of energy derived mainly from renewable resources to create goods and/or services either directly or indirectly for the production of income or value. See "Productive Uses of Energy for Rural Development", Cabraal, R.A. et al., 2005.

[x] Off-Grid Appliance Market Survey: Perceived Demand and Impact Potential of Household, Productive Use and Healthcare Technologies, Third Edition, Efficiency for Access Coalition, September 2018

[xi] www.efficiencyforaccess.org/why-efficiency-for-access

[xii] See endnote 4.
See also 'Powering a Home with Just 25 Watts of Solar PV: Super-Efficient Appliances Can Enable Expanded Off-Grid Energy Service Using Small Solar Power Systems', A. Jacobson et al, Lawrence Berkeley National Laboratory, 2015.

[xiii] Providing Energy Access through Off-Grid Solar: Guidance for Governments, 2nd Edition, Global Off-Grid Lighting Association, 2017

[xiv] Achievements of appliance energy efficiency standards and labelling programmes: A Global Assessment, International Energy Agency et al, 2016.

[xv] EcoDesign and Energy Labelling Factsheet, European Commission, 2019 (https://ec.europa.eu/energy/sites/ener/files/documents/ecodesign_factsheet.pdf)

[xvi] Achievements of appliance energy efficiency standards and labelling programmes: A Global Assessment, International Energy Agency et al, 2016.

[xvii] www.lightingglobal.org

[xviii] See Efficiency for Access Equip Data Tool (www.efficiencyforaccess.org/equip-data)

[xix] See the World Bank / IFC Lighting Global Quality Assurance Program (www.lightingglobal.org/quality-assurance-program/)

[xx] Appliance Data Trends: Insights on Energy Efficiency, Quality and Pricing for Off-Grid Appropriate TVs, Fans and Refrigerators, Efficiency for Access Coalition, September 2018

[xxi] 'Quality Matters', Lighting Global Technical Note #27, August 2018

[xxii] Cooling in a Warming World: Global Markets and Policy Trends, CLASP, 2019

[xxiii] www.clasp.ngo/impact/compliance

[xxiv] www.rcreee.org/content/rcreee-supports-1st-technical-meeting-%E2%80%9Cguidelines-minimum-energy-performance-standards-meps

[xxv] https://clasp.ngo/tools/s-l-guidebook

[xxvi] See Efficiency for Access Equip Data Tool (www.efficiencyforaccess.org/equip-data)

[xxvii] Steps to Adopting, Implementing and Revising National Standards, Lighting Global Quality Assurance, 2018

[xxviii] Benefits of Harmonizing Test Methods and Quality Standards, Lighting Global Technical Note Issue 25, December 2017

[xxix] Cooling in a Warming World: Global Markets and Policy Trends, CLASP, 2019

ABOUT THIS DOCUMENT

This policy brief has been produced by the Energy Saving Trust (EST) and CLASP, on behalf of the Efficiency for Access Coalition, a coalition to accelerate global energy access through energy-efficient appliances. Since its founding in 2015, Efficiency for Access has grown from a year-long call to action and collaborative effort by Global LEAP and Sustainable Energy for All (SEforALL) to a coalition of 13 donor organizations. Coalition programmes aim to scale up markets and reduce prices for super-efficient, off- and weak-grid appropriate products, support technological innovation and improve sector coordination. Current Efficiency for Access Coalition members lead 12 programmes and initiatives spanning three continents, 44 countries and 19 key technologies. CLASP and EST jointly serve as the Secretariat to the Efficiency for Access Coalition.

The purpose of this brief is to support governments and aid agencies in promoting high-performing appliances for use in off- and weak-grid areas. "Off-grid" refers to areas where populations live beyond the reach of the traditional grid; "weak-grid" refers to areas where populations have unreliable grid connectivity and suffer frequent and sometimes lengthy outages.

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This brief will be periodically updated to capture emerging best practices. Subsequent briefs will provide guidance around how to accelerate adoption of specific appliances, as well as guidance on key policy topics relevant to all appliances.

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