

TONY BLAIR INSTITUTE FOR GLOBAL CHANGE

# Six Steps to Universal Energy Access in Africa

DELPHINE HENNEGRAVE SERGIO PORTATADINO There can be no social or economic development without access to abundant and affordable electricity. While access to electricity is most often framed as a development priority, the way in which it is delivered is of paramount importance to addressing climate change globally. This is why the Tony Blair Institute is committed to supporting governments in sub-Saharan Africa to achieve universal access to energy in line with the United Nations' Sustainable Development Goal 7 (SDG7).

In this first paper of a new Power Africa series that draws on the Institute's experience of working shoulder to shoulder with governments, we outline a conceptual framework for a six-step approach to universal energy access. This proposes a holistic route to reversing the recent slowdown in the rollout of solar-home systems and mini-grids. The approach puts governments firmly back in the driving seat: the access challenge can only be met by **strengthening governments** in fragile countries to address policy, planning, financing and delivery issues, and by **leveraging technology to develop effective policy and to bridge information gaps.** 

#### Power at the Heart of Development

Approximately 600 million people in Africa do not have access to electricity, which has significant and negative social and economic consequences. Power underpins nearly all the UN's SDGs from access to education to increased agricultural productivity, the creation of formal and skilled jobs to economic development and industrialisation, as well as the fight to combat climate change.



Figure 1 – Level of access to electricity in Africa by percentage of the population

Source: IEA



Figure 2 - People without access to electricity in sub-Saharan Africa compared to the world

Source: The Rockefeller Foundation

To bridge this gap, countries rely on three main electrification strategies: the extension of the main power grid – usually by a national utility – or the development of decentralised systems; mini-grids; and solar home systems, often delivered by the private sector. Electrification in Africa requires deploying and mixing all three of these solutions optimally:

- Grid extension is the traditional way to deliver energy services. Managed by large-scale national utility companies, grids have the advantage of being able to deliver power loads for higher consumption needs.
- Mini-grids can be a more cost-effective solution for large villages located far from the main grid. They are best suited to serve between 200 and 800 customers, with installation periods of between three and eight months.
- Solar-home systems (SHS) hold huge potential for supplying smaller communities and low-power appliances such as lights, televisions, fridges and pumps. Installation usually costs between \$30 and \$1,000, with deployment in less than a day.

Mini-grids and SHS are the most relevant for areas that are located far from the main grid and which have lower levels of consumption and the ability to pay. As shown in Figure 3, SHS sales grew rapidly at the start of the last decade, with these systems now providing power to around 1 billion people worldwide. Homes powered using these clean emission-free devices also have the added advantage of helping countries reach electrification objectives in a sustainable way. The growth of SHS has been enabled by reductions in the cost of solar panels and batteries, innovations in mobile money, and support from finance institutions and development donors to provide low-cost working capital in order to help companies scale their operations rapidly.

![](_page_4_Figure_1.jpeg)

![](_page_4_Figure_2.jpeg)

Mini-grids have continued to grow over the past decade, with more than 7,000 renewable hybrid minigrids installed in this period across sub-Saharan Africa, Asia and small island nations.<sup>2</sup> The growth of this market has been slow compared to SHS, however. While SHS are a retail product costing as little as \$50-\$100, a mini-grid represents a significant infrastructure asset costing around \$1,500 per connection, with larger versions requiring an investment of hundreds of millions of dollars.

As the off-grid market has grown worldwide, the number of households without access to energy has dropped. But the picture is not uniform across the developing world. Outside Africa, the number of households without energy access (primary clients for SHS) has reduced from more than one billion in 2000 to less than 200 million today. Yet, in Africa the number of households without access has remained stubbornly around the 600-million mark. This means that energy-access gains are only keeping up with population growth and, as a result of Covid-19, the number of people in sub-Saharan Africa without access to electricity actually increased in 2020.<sup>3</sup>

Source: TBI/Gogla and Lighting Global data

Several factors can explain the off-grid market's plateauing: the low-hanging fruit, in other words relatively affluent consumers in commercially attractive countries, has been plucked; the remaining market consists of poorer consumers who live outside big towns and cities and are therefore more costly to serve; and countries that would still suit off-grid solutions often have challenging investment environments that hinder the development of sustainable business models.

Despite observing different trajectories in recent years, the Institute believes that the future growth of SHS and mini-grids are both dependent on effective government leadership, in particular in two areas:

- 1. **Strengthening government capacity** in fragile countries, which account for the bulk of the remaining unelectrified population, to address policy, planning, financing and delivery issues.
- 2. Utilising technology to develop effective policy and to bridge information gaps.

This approach is further broken down by our six-step approach, as shown in Figure 4, which builds on the experience gathered by the Institute in supporting leaders across ten sub-Saharan countries to meet the challenge of energy access.

![](_page_5_Figure_5.jpeg)

Figure 4 - Six steps to enabling effective government leadership in support of electrification

Source: TBI

#### Putting Governments in the Driving Seat

Governments must drive electrification initiatives to ensure alignment of policy, regulation, planning and politics. Access to affordable electricity improves living standards immediately but also absorbs resources from public finances, making it a politically charged issue. As a result, **high-level political engagement** is essential, not just to secure an understanding of the different connection options that are available but also the trade-offs between them – and the varied approaches that government must adopt in their deployment (planning, procurement and investment in grid extension, for example, differs from the market-enabling approach that must be adopted for SHS expansion). Fostering this understanding and appreciation is step 1, and without it there is a risk that other measures become piecemeal and inconsistent. The Institute has supported governments to develop this understanding, including in Rwanda where we facilitated the development and adoption by cabinet of the national "Rural Electrification Strategy".

On the **policy** side, it is crucial to put in place a regulatory framework (step 2) that can unlock private investment in the off-grid sector. For SHS, this should include consistent and market-enabling fiscal incentives with a quality framework. And for mini-grids, clear licensing processes, appropriate tariff methodologies, clarification around operations and connection in the instance of grid arrival, and a quality-assurance framework are all required. To date, the Institute has supported the development of regulatory frameworks in Burkina Faso, Liberia, Senegal and Sierra Leone. Such frameworks can be standardised at the regional level to significantly reduce barriers to entry and risks to investment, especially in smaller or more fragile countries. Standardisation both facilitates and incentivises projects to reach scale, which is essential for reducing the cost of services for both governments and final users. Scale can also be promoted through smart subsidisation, especially targeted to the most-remote and least-commercially viable markets.

**Planning** (step 3) is vital to coordinating efforts and ensuring efficient use of available resources, as well as to provide clarity to investors and donors about which technology is expected in which area. Electrification plans are often highly technical, however, and governments can be reluctant to take ownership of them. As a result, it is essential that plans are developed under the direct leadership of the appropriate government agency, with coordination and alignment between multilateral and bilateral institutions. Electrification plans should also be in step with broader socioeconomic development considerations, especially in rural areas. The sequencing, timing and scale of rural electrification projects should follow broader government plans for rural development; a failure to do so risks the creation of plans that do not align with policies and therefore are left to gather dust on a shelf. Integrated planning is a cornerstone of the support the Institute is currently providing in the Democratic Republic of the Congo (DRC) and Burkina Faso.

**Mobilising finance** (step 4) for off-grid solutions is particularly challenging both because of the amount of investment required and the need to provide affordable power for rural populations. Public resources are limited, even more so as a result of the pandemic, so it is critical to attract private investment. This requires that the previous steps – building a conducive policy and planning environment – are successfully completed. Derisking projects is the most effective way to reduce their cost while quality regulation and planning ensure fair competition with other means of access, for example by securing similar levels of subsidy to grid extension. Subsidies are always needed to ensure power is affordable for the poorest households, so it is essential that the most suitable approach is adopted for different applications. There are many subsidy options available: one example is supply-side, results-based finance (RBF) models exemplified by the ongoing programme to add 5 million SHS in Nigeria, or the RBF programme being designed in the DRC to accelerate electrification for 15 million people, both with the Institute's support. Cross-sector synergies – especially with health and industry – could also contribute to easing financial constraints and making projects more commercially attractive.

**Delivering** (step 5) on policies and plans can be complex in countries where institutional capacity to run competitive procurement processes and to coordinate a large number of stakeholders is weak. Based on our on-the-ground experience, the Institute has focused on clarifying institutional responsibilities for programme implementation while building government capacity to run competitive procurement processes – as in Mozambique with the introduction of its off-grid procurement unit or in Sierra Leone and Senegal with the establishment of off-grid multi-stakeholder groups.<sup>4</sup>

Working in partnership with the private sector is a key factor for success. As discussed previously, the financing gap for achieving universal energy access cannot be bridged without private investment. Many off-grid companies are currently struggling with profitability, resulting in frequent requests to increase subsidies. This shows the need for a) scale to reduce the cost per kWh (kilowatt hour) from mini-grids, distribute fixed costs across bigger markets, and optimise risk management in the SHS and mini-grid markets, and b) harmonisation of regulation between countries to reduce barriers to entry and facilitate larger-scale operations. Feedback and new information needs to be effectively incorporated into plans, policymaking and implementation strategies, with the ultimate objective of facilitating inflow of private capital. Tackling some of these challenges at the regional level can create economies of scale and maximise impact. The Institute has had significant engagement in the Mano River Union and G5 Sahel to facilitate regional harmonisation of regulation and develop large-scale regional energy programmes.

#### Leveraging Technology

Technological developments, including the internet, blockchain, big data and machine learning, offer tremendous opportunities to accelerate electrification in Africa (step 6). Technologies can allow energysector stakeholders to bridge information gaps, such as identifying the likely ability of consumers to pay in different regions, as well as to gather information crucial to the development of electrification plans and policies, such as smart subsidy programmes, which can ensure the best use of public resources. Technology can support governments to oversee the sector, for example, through real-time monitoring of sales-and-systems performance, important both politically (allowing senior politicians to see daily progress) and also financially (securing future investment). More broadly, new technologies can also boost economic development in rural areas because data collected through off-grid electrification programmes can be leveraged to facilitate access to credit or to target relief funds based on householdassessed credit scores and predicted vulnerabilities.

The Institute is strongly engaged in this transition and committed to working alongside governments to help them take full advantage of these technologies. Concrete discussions are under way with partner governments to enact this commitment, with more to be shared soon.

Universal energy access in sub-Saharan Africa can only be met by having governments drive policy, especially in the early phases of this challenge. Governments and the private sector must partner to take advantage of the technological revolution to underpin the process. The Institute and other development partners can facilitate this convergence by adopting an institutional-centred approach as we have presented here. Such an approach will also play an important role in the transition towards green-energy systems since off-grid solutions in the region are well-placed to use renewable technologies, such as solar. A successful off-grid policy will not only foster economic growth in rural areas but contribute to the planet's overall sustainable development agenda.

The six-step approach discussed here reflects the lessons learned by the Institute after more than a decade of work on the ground assisting sub-Saharan governments and their development partners to formulate and implement energy-access policies and projects.

Over the coming months, this series of short papers will explore in more detail how to facilitate government leadership to achieve universal energy access within the next ten years, how to build capacity at public institutions to formulate robust policy and integrated plans, how to maximise "the art of delivery" and how to tap into the digital revolution to accelerate electrification in developing countries.

Charts created with Highcharts unless otherwise credited.

### Footnotes

- ^ https://www.lightingglobal.org/wp-content/uploads/2020/03/ VIVID%20OCA\_2020\_Off\_Grid\_Solar\_Market\_Trends\_Report\_Full\_High.pdf
- 2. ^ https://minigrids.org/wp-content/uploads/2020/06/Mini-grids\_Market\_Report-20.pdf
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