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INSTITUTE
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How Digitalisation and Open Data Can Help Governments Reach Universal Energy Access

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TBI is partnering with Power Africa to help African-government leaders plan and deliver for increased access to electricity by using digital data platforms, as part of the Senior Advisors Group programme.

Introduction

Benefitting from the digital revolution should not be a privilege reserved only for high-income countries or limited to the private sector. As the Tony Blair Institute for Global Change (TBI) stated in the first paper in this series, governments will need to fully leverage a broad array of data and innovations in how it is used to de-risk investment and ensure delivery of universal access to electricity by the end of this decade, in line with the United Nations' Sustainable Development Goal 7 (SDG7). The International Energy Agency has calculated that between 2030 and 2040, sub-Saharan Africa will require more than \$100 billion per year to be able to deliver universal energy access. This is equal to the entire amount of climate finance promised – but not yet delivered – at COP26 for developing economies. A quarter of this amount would have to be invested in decentralised solutions – mini-grids and solar home systems (SHS) – representing a five-fold increase in the current level of investment.¹ This is a huge challenge and, to succeed, governments and their development partners must initiate large-scale programmes to reach millions of customers in a relatively short period of time. In this second paper, we want to continue the conversation by focusing on how technology can help governments and companies achieve this goal.

Planning, preparing, funding, executing and monitoring large electrification projects requires efficient mechanisms to analyse and communicate data and then leveraging the information collected. For example, precise geographical coordinates, as well as demographic data of customers, can help governments to plan a least-cost electrification solution for rural and remote areas, and help private companies to implement a successful strategy, such as boosting productive uses of electricity when there is economic potential. The use of this data, if presented in open sources where it can be freely used, reused and redistributed by anyone for any purpose, will maximise its impact, even beyond the energy sector.

Data Gaps Are at the Root of Many of the Sector's Challenges

We need robust data to understand demand, distribution and affordability as well as clear information on mobile-network coverage and access to mobile money services. Without it, we cannot effectively drive electrification policies and focus investment. Yet, in sub-Saharan Africa, this information is either unavailable, of poor quality, or spread across several actors and sources, and making the energy-access challenge particularly complex for every stakeholder.

- **Governments** are in the driving seat, defining the strategic objectives and the plans to achieve them. They need to collect accurate data, not only to identify the optimal electrification modality (such as grid extension, mini-grids or SHS) but also to better focus their limited subsidies and to exploit potential synergies with added-value sectors (agriculture, industries, mining and so on) to boost a wider economic development. The lack of real-time information about ongoing programmes also makes it very difficult for governments to assess successful strategies, track and communicate progress and address bottlenecks and their impact on policies. Better data mean better decisions.
- **Development partners** must optimise the use of limited financial resources, starting with effective planning of their programmes to minimise development costs and streamline delivery schedules. The implementation of innovative approaches, such as demand-side subsidy models, has been stalled by the limited adoption of digital technologies to collect and process real-time data on the consumer side. Programme assessment is also a significant challenge: without the correct data, tools and evidence-based reporting, it is almost impossible to identify successful models that can be scaled up and replicated.
- **Investors** struggle to identify bankable projects and make informed decisions without a complete dataset, and these uncertainties naturally translate into higher risks and capital costs. Having access to government data about population density, energy uses, geographical access rate and so on is essential for the analysis and development of innovative business models.

It is the people who ultimately pay the price of these data gaps: progress on electrification is slower, leading to fewer social and economic benefits and higher prices for energy-related services. Open-data digital platforms benefit all citizens by creating an environment of entrepreneurship for local talent seeking new or improved energy-access solutions.

Digital Solutions to Accelerate Off-Grid Market Development

While in more advanced markets, sophisticated technologies are being tested to improve distributed generation, in developing countries where the objective is to achieve universal access to electricity, several technological solutions have emerged. They can be divided into two main categories: geographic information systems (GISs) which underpin the planning phase and digital platforms to monitor the implementation of programmes.

GISs are highly effective at assessing the development potential of electricity access through geospatial analysis, allowing more accurate planning. They can leverage several data sources (for example, satellite imagery, renewable energy potential, population levels and densities, and user-generated data) by applying predictive algorithms to anticipate demand, testing electrification scenarios and eventually facilitating government planning. The ability to process huge amounts of data makes it possible to integrate non-energy data – for example, population density, mobile-network coverage, distance to high and medium voltage lines, distance to major ports, main roads, and so on – at the planning stage to maximise the economic and social impacts of electrification plans. Further, they facilitate the assessment of project feasibility of a wide range of sites and generate financial analyses that can be shared with the private sector to attract investment. Through the combination of visualisation tools and modelling, together with predictive analyses, risk-assessment models can be created to evaluate households' vulnerability, predict revenue flows and better target poverty-relief programmes.

Digital platforms with open data offer transparency and comfort to all stakeholders, showing how many people have access to electricity, monitoring the progress of electrification in different locations and understanding customers' consumption habits and their ability to pay. Government leaders can use these platforms to monitor the progress of all initiatives within the energy-access sector, whether publicly or privately funded. Private companies and donors can use these data to make investment decisions or budget allocations based on solid and trustworthy information. The data can then be analysed to de-risk a project when it develops from a pilot to a large-scale programme, making it easier to attract private capital. Digital platforms with open data are necessary to underpin results-based programmes, now widely used for financing the deployment of SHS because such programmes require periodic reporting and detailed verification processes. They also bring transparency and allow for client segmentation, again increasing their attraction to private investors.

Through GIS solutions and digital platforms, governments can enhance their capacity to use information strategically and improve policymaking, service delivery, performance management and transparency, and consequently create value through innovation and entrepreneurial solutions. Private investors can

collect and utilise precise data on consumption habits and demographics to get a better sense of the risk profile and therefore raise funds more efficiently. This would reduce the need for public subsidies.

There are some important issues to address when integrating data-driven approaches and digital technologies. For example, in terms of data collection, different actors (from SHS providers to electricity utilities) have their own databases with limited incentives to share them. It is, therefore, essential for governments to establish a regulatory framework that determines incentives and companies' obligations (for example, it could be decided that, to qualify for a subsidy, a company must make available high-level repayment data on consumers to give them credit histories and open up options for finance). It should be noted, that data-sharing has privacy implications and requiring private companies to share valuable data without recompense is not always straightforward. Such an approach is likely to be met with resistance by the companies which collect this data for whom it is extremely valuable, but given that sales are often made as a result of government subsidies, it could remain a point of negotiation.

To tackle these issues, TBI has developed the following steps:

1. Identify the needs of the government and propose a data-driven solution.
2. Research processes for data gathering and identify challenges.
3. Partner with relevant donor partners and development-funding institutions familiar with the approach, tech providers with a proven track record and TBI colleagues.
4. Agree with government counterparts on what data is required and key performance indicators.
5. Define processes and timeline for gathering, analysing and validating data. Select focal points responsible for data gathering. Identify a coordinator within the government to create a culture of ownership and build skills internally.
6. Run a pilot: start small to test and build capacity.

A Real-Life Example from the TBI Partnership with Power Africa

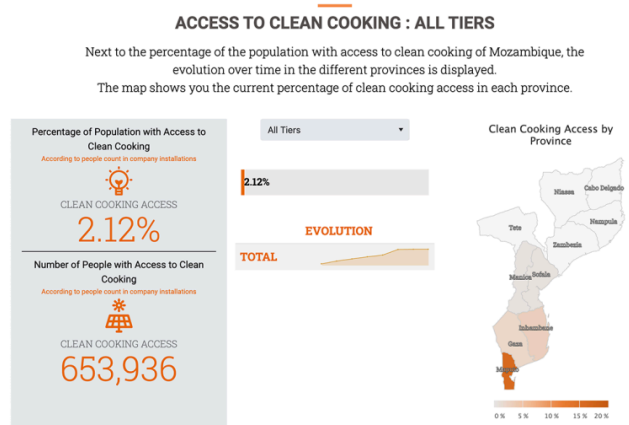
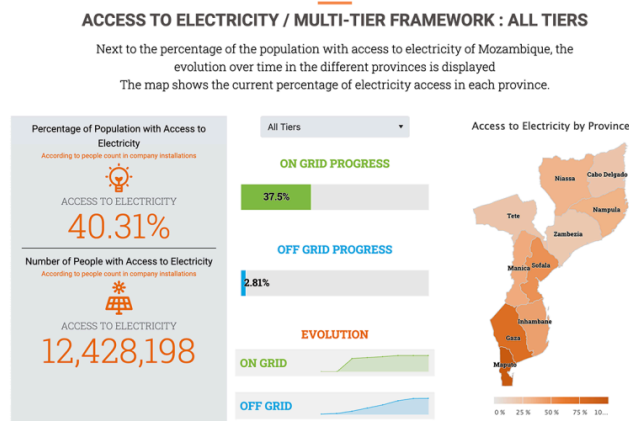
In Mozambique, around 40 per cent of the population has access to electricity, which is slightly below the average for sub-Saharan Africa at 47 per cent. There are also disparities in the provision of electricity services between urban and rural areas (72 per cent of the urban population has access, compared to five per cent in rural areas).

To address this, the Government of Mozambique (GoM) recently launched the “Programa Nacional de Energia Para Todos” (Electricity for All National Programme) as an integrated national plan to provide universal electricity access to all Mozambicans by 2030. TBI, in partnership with Power Africa, supported the GoM to adopt an online platform to track the evolution of the energy-access rate and the goal of achieving universal access to electricity by 2030. The platform was developed by Energising Development (EnDev) Mozambique, a programme implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and funded by the governments of Germany, the Netherlands, Norway, Switzerland and the European Union.

During the initial phase of research, TBI identified a platform developed by Endev as being the most suitable and helped Endev refine the platform to address the specific needs of the Minister of Energy (e.g. presenting monthly energy access rate figures were turned into a more visual and user-friendly format). During the process, TBI coordinated meetings and communications between the ministerial agencies, (e.g. the public utility EDM and the agency for rural access FUNAE) and private stakeholders, such as the SHS and cook stoves suppliers. Finally, TBI led the presentation of the platform to the public and the private sectors as well as the training for relevant ministerial officers.

The platform integrates on-grid and off-grid data reported by electricity stakeholders to the Ministry of Energy and Mineral Resources (MIREME) every month. The private sector has welcomed the initiative as tangible proof of the government’s commitment to improving transparency in the energy sector. This platform sits within the integrated electrification unit dedicated to coordinating and supervising the planning, development and implementation of the country’s electrification policy. It has introduced targets that MIREME, supported by TBI and Power Africa, is putting into action to reach the universal-access target and address the current lack of coordination among implementing agencies, serving as a trustworthy and transparent data source for energy access in Mozambique.

Figure 1 - Status of energy access in Mozambique



Source: [Status | PLATAFORMA DE ACCESO UNIVERSAL A ENERGÍA EM MOÇAMBIQUE \(sdg7mozambique.org\)](https://sdg7mozambique.org)

The [Platform of Universal Access to Energy](#) was presented on 14 June 2022 by Mozambique’s National Director of Energy, Pascoal Bacela. In his speech, he cited the challenges facing the electrification sector and the relevance for the “government, and particularly the MIREME, [to] have the relevant information and have sufficient knowledge through the monitoring of the activities carried out by all the actors”.

He further highlighted how the platform is proof of “the government’s commitment to improving the business environment, to attract private investment in the energy sector, whose role is essential for achieving universal success”.

This digital tool would not have been possible without the pertinent regulatory support. The government of Mozambique published the Regulation for Off-Grid Energy Access in September 2021. With this regulation, Mozambique joined its neighbours in putting in place a regulatory framework to attract private investors by providing greater clarity to all actors in the off-grid energy sector. Among the

principal aspects of the regulation, there is the provision to deliver relevant information to ensure effective monitoring of energy access in areas outside the grid.

Conclusion

Achieving universal access to electricity is a huge challenge for governments and their partners. Millions of people, some in very remote areas, need to be connected. It will be necessary to collect, analyse and share a huge amount of data in order to plan effectively, de-risk projects and raise enough capital.

Digital tools are essential for effective decision-making by governments. Public-sector platforms offer transparency, attract private investors and donors, and foster an entrepreneurial environment where citizens can co-create solutions or improve the existing framework. Development partners can play a role by helping governments understand these digital solutions, possibly by financing them and offering their expertise to the public sector. Private companies should also play their part in enhancing the quality of governance in the energy sector and reaching the goal of universal access to electricity. At the same time, working with the public sector with access to huge amounts of data is likely to help private companies develop their own business models particularly with regard to client segmentation and opportunities for targeted advertising.

Finally, it is important to note that a multi-disciplinary approach is necessary: to enable digital services for electrification, governments and their partners need to boost telephone and internet coverage and, at the same time, ensure that industrialisation and agribusiness programmes work alongside electrification initiatives.

Power Africa and TBI are committed to bringing the best available technological solutions to our partners, helping them to build internal capacity to effectively prepare for and deliver the electrification strategies to reach universal access by the end of this decade.

Lead Image: USAID

Footnotes

1. ^ World Energy Outlook, IEA, 2019.
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