



FEBRUARY 2024

State of the Market Report for Healthcare Facility Electrification



Executive Report

- Background and objectives
- Healthcare electrification trends
- Key challenges and lessons learnt
- Financing and investment needs
- Measuring impact
- Outlook
- Recommendations



Background and Objectives

This State of the Market report provides a comprehensive analysis of global healthcare electrification, grounded in the extensive Sustainable Energy for All (SEforALL) Powering Healthcare Intervention Database. It charts a strategic path forward, making it an essential guide for stakeholders aiming to align their activities with the UN Sustainable Development Goals and improve global health.

Healthcare electrification contributes to the improvement of health outcomes, promotes access to sustainable energy for all, fosters sustainable industrialization and innovation, and contributes to global efforts to combat climate change.

While substantial progress has been made, challenges persist, particularly in regions with weak infrastructure and limited financial resources. According to the World Health Organization (WHO), an estimated 1 billion individuals across the globe currently have local healthcare facilities with an unreliable power supply. Moreover, in Sub-Saharan Africa alone, a staggering 25,000 healthcare facilities lack access to electricity entirely, while around 70,000 health centres have an unreliable electrical supply. In South Asia, 12% of healthcare facilities lack any access to electricity.

This State of the Market report on healthcare electrification stands as a valuable contribution within the landscape of recent publications due to its unique bottom-up approach, which leverages the most

up-to-date data from 387 initiatives from 78 stakeholders in 89 countries. What sets this report apart is its foundation in SEforALL's Powering Healthcare Intervention Heatmap and Database, which is currently the most comprehensive and up-to-date source of information regarding health facility electrification initiatives. This ensures the accuracy and granularity of the analysis, offering a real-world perspective on the challenges, opportunities and best practices in healthcare electrification.

The report not only presents the current state of the healthcare electrification market, but also charts a strategic roadmap towards the market's sustainable growth. Drawing on insights gathered from in-depth interviews with approximately 20 key stakeholders and a thorough examination of over 100 reports and evaluations, the report offers a comprehensive and informed perspective on the healthcare electrification landscape, while also serving as a signpost for the strategic evolution and sustainable advancement of this critical sector.

Healthcare electrification trends

Since the onset of the COVID-19 pandemic, healthcare electrification initiatives have seen robust growth, with a notable focus on smaller and rural health centres and a shift towards larger, more comprehensive power solutions.

Healthcare electrification gained momentum during the COVID-19 pandemic and activity levels have remained high compared to pre-2020 levels. The annual growth rate in electrification initiatives between 2018 and 2021 averaged 47%, gaining unprecedented prominence on the international stage, as governments and development partners rallied to ensure adequate and reliable power supply to medical facilities grappling with the demands of treating COVID-19 patients. While the number of newly electrified healthcare facilities declined in 2022, it remained high when compared to pre-2020 levels.

The provision of power solutions has consistently been the most common type of initiative related to healthcare electrification, commanding an average share of 38% between 2018 and 2023. Needs assessments accounted for almost one fifth of all initiatives, followed by technical assistance and feasibility studies at 17% and 16%, respectively. Furthermore, 82% of electrification initiatives have opted for stand-alone solar technology, reflecting its popularity as a reliable and sustainable energy source. Among mini-grid options, hybrid mini-grids have emerged as a more frequent choice by implementers, compared to solar mini-grids. An increasing trend of making grid connections to power healthcare facilities has been observed over the years, with a notable acceleration observed from 2022 onwards.

More organizations are opting for restricted procurement. This approach involves relying on specialists while following a fair and open tender process. It allows for the acceleration of project progression, enabling faster execution of healthcare electrification initiatives while enhancing the understanding of costs for better budgeting.

The duration of healthcare electrification initiatives is decreasing. The healthcare electrification landscape has seen a decline in the average duration of initiatives across different facility types. This reduction can be attributed to streamlined processes and increased data availability, allowing for the deployment of more standardized solutions. However, the shorter duration of these initiatives indicates that provision for operations and maintenance (O&M) may lack a long-term perspective. Looking ahead, the emerging emphasis on the energy service company (ESCO) model suggests that we can anticipate a marked increase in the duration of health facility initiatives, reflecting the inherently long-term orientation of these projects.

Collaboration between energy and health stakeholders is improving, but further progress is required. Collaborative global efforts, such as the Health and Energy Platform of Action and the Multilateral Energy Compact for Health Facility Electrification, have been instrumental in bridging the health and energy sectors to advance healthcare electrification. While these global initiatives have made significant progress, there remains a pressing need for enhanced coordination at the country level to ensure optimal resource utilization.

Recognizing the diverse energy needs of healthcare facilities, 53% of electrification initiatives now prioritize conducting needs assessments before project implementation. Different healthcare tiers, from health posts to regional hospitals, have varied energy requirements influenced by factors like medical services provided, equipment, staffing, local health challenges and even seasonal climate conditions. Such assessments ensure that energy provisions align with the specific needs of each facility, considering services, staff and equipment.



Data-driven decision-making is becoming paramount in healthcare electrification. Historically, the absence of comprehensive geographic information system (GIS) health facility data has posed challenges. However, advancements in spatial tools and big data processing are transforming the landscape. Decision-makers are leveraging geospatial technology to bridge data gaps and prioritize electrification initiatives. Remote monitoring technologies are also being integrated into healthcare electrification initiatives, providing real-time data on service quality.

Stakeholders are beginning to realize the importance of capacity building. Effective healthcare electrification requires strong in-house capabilities within government departments. However, many governments lack the capacity for tasks such as site

evaluation and oversight of bidding processes. A notable challenge is the misconception that solar power is free, often due to the prevalence of donor-funded installations. This can lead to reluctance in allocating budgets for ongoing maintenance, jeopardizing project sustainability.

Climate finance emerges as a promising avenue for funding health facility electrification, aligning with broader sustainable development goals and climate change mitigation. As sectors increasingly tap into climate finance mechanisms, healthcare electrification can benefit from dedicated funds, renewable energy certificates (RECs), grants and concessional loans. This not only ensures sustainable electricity supply for healthcare, but also resilience and reduced greenhouse gas emissions.



Photo: PMI Impact Malaria



Technological advancements and strategic approaches are reshaping healthcare electrification, emphasizing efficiency, sustainability and adaptability.

Technological trends in solar photovoltaic (PV) systems, batteries and remote monitoring are making healthcare electrification more cost-effective and sustainable. The PV industry's growth has led to innovations in materials and manufacturing, with monocrystalline wafers and passivated emitter and rear cell (PERC) designs gaining traction. Battery technology, particularly lithium-ion, is rapidly evolving, offering longer lifespans and declining costs, although challenges with sourcing rare metals persist. Modular PV system designs are emerging, allowing for scalable solutions tailored

to healthcare facilities' needs. Remote monitoring tools are becoming central, providing real-time insights, optimizing system performance and aiding demand estimation. Quality standards are being established for healthcare facilities, focusing on equipment efficiency and resilience. E-waste management is also gaining attention, with development partners developing toolkits to address the challenges of off-grid solar projects. On the demand side, however, there has been little advancement, particularly in the adoption of energy-efficient medical appliances.

There is a growing trend for exploring innovative business model approaches to ensure sustainability, in particular moving from engineering, procurement and construction (EPC) to ESCO or service-based models.

Efforts to electrify healthcare facilities have largely depended on grants and donor support, focusing on EPC models. While they offer quick implementation, they often overlook long-term O&M, leading to sustainability concerns. Tight donor deadlines and limited budgeting for long-term maintenance exacerbate these challenges. A shift towards service-based models, such as the ESCO model, is emerging where private sector providers offer electricity services over extended periods, ensuring consistent power quality. However, these models come with their own challenges, including non-payment risks and the potential for service disruption if providers face financial difficulties. While private sector involvement is crucial, it is essential to balance their expertise with the continuity of vital

services. No single model addresses all healthcare electrification challenges, so a combination of approaches, tailored to specific contexts, is necessary.

An increasing number of governments are also including health facility electrification in their national electrification strategies or developing healthcare-specific policies that prioritize the electrification of healthcare institutions. For instance, tariff regulation has been playing a critical role in scaling up mini-grid implementation for healthcare electrification. Also, streamlining procedures and reducing bureaucracy for obtaining the necessary permits and approvals can significantly accelerate the implementation of healthcare electrification projects.





Key challenges and lessons learnt

Financial, technical and institutional challenges need to be taken into account when designing future interventions in order to ensure their long-term sustainability.

Developing sustainable and scalable health facility electrification projects continues to have its challenges, including:

- A lack of sustainable O&M frameworks
- Inappropriate health facility electrification design and needs assessments
- Limited capacity at government level
- A lack of institutional coordination
- A lack of understanding of the health sector's energy-related needs, often stemming from limited data availability
- A lack of flexible financing options tailored to healthcare electrification

Financing and investment needs

Approximately 64% of global health facilities lack adequate power supply, requiring an estimated total investment of USD 4.9 billion¹, with current financing falling significantly short. This underscores the urgent need for innovative funding solutions and partnerships to ensure reliable healthcare delivery.

The largest investment gap is in Sub-Saharan Africa at USD 2.5 billion, followed by South Asia at USD 2 billion. Current capital flows into health facility electrification programmes are significantly below the

required amounts, indicating a substantial investment gap. The financing models need to be enhanced, with a focus on innovative structures and partnerships.

Measuring impact

In the realm of healthcare electrification, measuring impact is pivotal to evaluate the success of initiatives that provide consistent electricity to health facilities.

Healthcare electrification's success hinges on accurately measuring impact. Assessing the effects of healthcare electrification initiatives, by observing factors such as patient care, equipment functionality and overall healthcare quality, enables a comprehensive examination of the cost-effectiveness of electrification projects and the social and health outcomes for vulnerable communities. Through this process, stakeholders can identify areas for improvement and make informed choices for future projects. This process ultimately contributes to the enhancement of healthcare services and an improved quality of life in their surrounding communities.

Current methodologies focus on quantifiable metrics in energy, health, and broader social and environmental aspects. While data collection on energy

metrics, such as system uptime, is straightforward, tracking progress in health-related metrics requires consistent collection of health outcomes over the years, which can be challenging, especially in remote and resource-constrained areas. A broader category of indicators encompasses economic benefits for the facility and the wider community, spillover effects on education and overall quality of life, and reduced gender inequality, as well as environmental benefits related to the reduction in the use of fossil fuels. However, the lack of a standardized list of key indicators that should be followed for impact assessments remains a challenge. Short-term initiatives yield immediate benefits like extended operating hours. Long-term initiatives enable a holistic view, showcasing improved patient outcomes and service efficiency. A consistent evaluation framework is crucial for these efforts.

—

¹ USD 4.9 billion is needed across 63 low- and middle-income countries combined.



Outlook

Current and planned initiatives for which funds have been secured account for roughly 4% of hospitals and 7% of non-hospitals that require a new connection. Despite the significant progress made over recent years, the electrification access gap among health facilities remains significant. Recent commitments highlight that the pace of health facility electrification may be substantially higher. Collectively the World Bank, USAID/Power Africa and the IKEA Foundation aim to electrify over 50,000 health facilities by 2026. This ongoing momentum is likely to increase the funding for such initiatives in the coming years, reducing the connections gap.

However, there are several potential risk factors that may affect the trajectory of the health facility electrification sector. Political and site selection issues, lengthy

implementation timelines, logistical hurdles and the lack of a holistic framework are significant risks that could impede progress. Additionally, broader challenges such as population growth and the increased likelihood of more pandemics due to climate change further complicate these scenarios. Also, neglecting the maintenance and replacement needs of recently solarized systems can widen the energy access gap over time, undermining the long-term sustainability of solar initiatives. Financial challenges and the need for effective public-private collaboration also present hurdles that must be overcome.

The private sector plays a vital role in bridging the health facility electrification gap, with emerging market players leveraging innovative technologies, business models and partnerships to drive



change. These include energy storage providers, local installers, GIS/geospatial companies, technology giants, monitoring solution providers, local entrepreneurs, telecommunications companies, system integrators, financial institutions, de-risking facilities, and academic and research institutions. The engagement of these diverse players is crucial for a comprehensive and accelerated advancement towards equitable and sustainable electrification of healthcare facilities.

The health facility electrification (HFE) sector stands at the brink of significant transformative developments. In the next five years the integration of energy-efficient appliances, including advanced diagnostic tools, efficient lighting and reliable refrigeration systems, is expected to surge. Concurrently,

the “energy-as-a-service” model is gaining traction, allowing healthcare facilities, particularly those with limited budgets, to pay for their energy use without having to cover large initial investment, while encouraging long-term sustainability. Data analytics, remote monitoring and artificial intelligence (AI) are set to enhance the efficiency and sustainability of health facility electrification initiatives by improving system management, automating data collection and proactively addressing system inefficiencies. Furthermore, the role of distributed renewable energy certificates (D-RECs) and broader climate finance in funding health facility electrification initiatives is becoming increasingly crucial. As traditional funding proves insufficient, especially in remote areas, D-RECs enable healthcare facilities to monetize the environmental benefits of their renewable installations.

Recommendations

For sustainable healthcare electrification, a collaborative approach involving policymakers, the private sector and donors/investors is crucial, emphasizing the importance of long-term O&M strategies, tailored country taxonomies, enhanced inter-sectoral coordination, capacity building, champion engagement and consistent impact measurement.

→ Policy and regulatory change is essential for sustainable health facility electrification.

Governments in low-income countries often underestimate the maintenance needs, and associated costs, of solar energy systems, posing challenges to sustainable electrification, especially in healthcare facilities. A shift in perspective through capacity building is needed to recognize the importance of long-term O&M strategies.

→ In the pursuit of effective healthcare electrification, it is crucial to develop a tailored method of categorizing countries, considering their unique electrification landscapes and capacity.

Recognizing the diverse starting points and varying private sector and government capacity across

nations, a bespoke approach is essential. This categorization should guide custom-designed strategies, ensuring that electrification initiatives are context-specific and address both immediate needs and long-term growth in the healthcare sector.

→ Enhanced coordination between health, energy and climate stakeholders is vital for advancing healthcare electrification.

Moving beyond traditional silos, there is a pressing need for integrated approaches and dynamic partnerships that pool expertise from both the health and the energy sectors. Establishing enduring institutional frameworks, such as multisectoral coordination committees, can streamline planning and investment. This would ensure that supply-side interventions are matched



with demand-side investments, with both contributing to a stronger and more climate-resilient health sector. By prioritizing synchronized efforts at the country level, stakeholders can optimize resources and accelerate progress in healthcare electrification.

→ For long-term sustainability in healthcare electrification, it is crucial to build capacity across the policy, institutional and technical levels.

Clear, adaptable policies drive investment and foster innovation, while institutional strengthening ensures effective on-the-ground implementation and promotes community ownership. Technical advancements and capacity building are essential for modernizing healthcare delivery. Donor-funded initiatives should emphasize national capacity development through O&M training and capacity building, fostering collaboration that enhances local expertise and ensures project longevity. Embedding local knowledge in electrification efforts not only amplifies immediate benefits, but also promotes community ownership and care for the systems.

→ Engaging with champions, including government officials and healthcare workers, is vital for driving healthcare electrification initiatives.

Achieving sustainable healthcare electrification requires strong government buy-in, with government actively participating in all aspects of the electrification process, from site selection to capacity building.

→ Project design needs to be more structured and streamlined.

Every healthcare electrification initiative should commence with a detailed country roadmap, like those recently developed by SEforALL and IRENA, to understand the current energy landscape and devise tailored strategies. Electrification efforts should adopt a holistic approach, ensuring entire health facilities are powered, while also recognizing the value of specific solutions, such as vaccine storage during emergencies. A comprehensive needs assessment is essential to determine precise energy demands, ensuring a balance between functionality

and affordability. Reducing administrative burdens on grantees allows them to focus on project execution, while leveraging economies of scale can optimize costs and attract funding. Starting with a pilot project helps identify challenges and refine strategies before broader implementation. Lastly, consistent measurement and monitoring of impact, possibly through remote technologies, are crucial to ensure long-term functionality and understand the health benefits of electrification.

→ There is a pressing need to substantially increase financial flows towards healthcare electrification initiatives, elevating them to a top development priority.

The current health facility electrification financing model based on grants is unlikely to cover the projected USD 2.5 billion investment gap. Enhancing financing models is essential so that they include provision for O&M costs and component replacement right from the outset, as well as to allow any new activity to continue where a previous one left off, effectively extending the overall programme duration.

→ To effectively bridge the healthcare facility electrification gap, a multi-pronged strategy involving policymakers, the private sector and donors/investors is essential.

Policymakers must shift their perspective on solar energy, promote energy-efficient designs and ensure government buy-in. The private sector should enhance coordination, especially in underserved regions, and adopt long-term funding mechanisms. Donors/investors need to adjust funding cycles to the long-term nature of electrification projects and ensure robust financial support. Shared responsibilities include developing a healthcare electrification taxonomy, fostering inter-sectoral coordination, building capacity, engaging champions and consistently measuring impact. This collaborative approach promises transformative change in healthcare electrification, enhancing healthcare access and community well-being.





ABOUT SEFORALL

Sustainable Energy for All (SEforALL) is an independent international organization that works in partnership with the United Nations and leaders in government, the private sector, financial institutions, civil society and philanthropies to drive faster action on Sustainable Development Goal 7 (SDG7) – access to affordable, reliable, sustainable and modern energy for all by 2030 – in line with the Paris Agreement on climate change.

SEforALL works to ensure a clean energy transition that leaves no one behind and brings new opportunities for everyone to fulfil their potential. Learn more about our work at www.SEforALL.org.

