



EnerSHelf
Policy Brief
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Exploring the Determinants of Demand for Solar Systems in Ghanaian Healthcare Facilities

An essential requirement for improving health and caring for our environment is to ensure that health facilities have sufficient and reliable access to the supply of clean and sustainable energy. The EnerSHelf project aims to enhance the reliability and sustainability of energy supply through photovoltaic-solar hybrid systems while applying an interdisciplinary research approach. This brief provides insights into demand for and its determinants of solar systems in Ghanaian Healthcare Facilities.

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Research Setting

Ghana is experiencing an important increase in the demand for electricity as a result of its economic growth, and the composition of the energy mix shows great potential for expanding on renewable sources, specifically solar systems¹. Nonetheless, despite reports showing that the installed solar Photovoltaic (PV) power capacity in Africa has grown almost 40 times in comparison to 2011², the quality and reliability of the electricity supply to health facilities remains a challenge. PV-based energy solutions have the potential to improve the current situation. Yet, little is known on user's perceptions, access, and utilization of electricity. To fill this knowledge gap, data on electricity use, knowledge and preferences for renewable energy systems were collected using structured questionnaires applied to decision-makers and their representatives of 200 health facilities from June 2021 to October 2021³. The objective was to explore the demand for PV solar systems in Ghanaian healthcare centres and analyse different factors influencing the demand of these. The results are described in the following sections.

The Electricity Demand Structure of Health Facilities in Ghana

- 98% of the facilities interviewed relied on the governmental grid connection as the main source of electricity.
- 76% of the respondents reported the ownership of fuel generators in the health facilities.
- 57% of the respondents were dissatisfied with the reliability of electricity supply and reported disruptions across the year of up to 5 hours daily.
- The disruptions and electricity fluctuations translate into financial losses of up to 6,705 GHS (\$708) in 2020-2021, resulting from damages to equipment.
- 5% of the facilities had either "pico" (very small) solar cells for lightning and battery charging or have installed small-scale PV-solar systems as a supplementary electricity source.

Attitudes and Perceptions Towards the Reliability of Electricity Supply and PV Systems Among Decision-makers

- 93% of the respondents had a generalized perception that increased reliability can improve service provision and operations of facilities.
- 83% of the respondents perceived that improved reliability could allow for offering healthcare to more people.
- 85% of the respondents had a positive attitude toward the potential for PV solar systems to improve the reliability of the electricity supply.
- 72% of the respondents reported that their facilities would be suited to install a PV based system.
- Yet, about 50 % of the respondents expressed concern about the challenges of obtaining financial support for the installation of a PV-solar system.

¹ According to the Energy Outlook for Ghana 2021 published by the Energy Commission, in 2020, the source of 47.3 per cent of the electricity generated in Ghana came from gas, 35.8 per cent from hydropower, 16.3 per cent from oil, 0.3 per cent from solar systems, and 0.1 per cent from other renewable sources.

² <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

³ For the selection of the health facilities, the registries of the Ghana Health Service were used. These registries were filtering for ownership, only including private facilities, facilities attached to the Christian Health Association of Ghana, and other faith-based facilities. Public health facilities were excluded as the decision-making process for investments in infrastructure depends to a bigger extent on the public development plans and public financing.



Factors Influencing the Preferences for PVs in Health Facilities

Configuration

While exploring how the different configurations for the electricity sources can influence demand⁴, health facilities showed a general proclivity for the grid electricity supply, with a clear preference for hybrid systems that combine the national grid electricity with PV solar systems over the ones that include fuel generators. Moreover, the larger the facility was, the more likely to prefer the PV solar systems over the current grid supply. Also, increased disruption experience incentivised the likelihood of choosing PV solar system.

Costs matter

For analysing the potentials for uptake of PV solar systems we looked closer at two reference attributes, namely the initial investment cost, and the maintenance and operation costs per month. A predisposition for lower initial investment cost was observed, however, this factor did not appear to be as much a deterrent to the adoption of PV system as the running cost of the PV system. Instead, it was observed that the average cost of monthly electricity cost was more important in affecting the choices for electricity system across our sample.

Expected improvements in reliability are key

The reliability of the energy supply system has a central role in the choice among electricity systems in the health care space. Relative to the current situation with the grid connections of the facilities, there was a significant positive inclination for highly reliable electricity supply while small improvements in reliability did not provide sufficient incentives for a positive bias towards PV systems.



⁴ Combination of electricity sources as the national grid, fuel generators, and PV solar systems

Key messages for policy and stakeholders

- Despite almost all health facilities being connected to the national grid, issues with the reliability of the electricity supply remain a challenge for the supply of health services.
- The disruptions and fluctuation of the electricity supply represent important financial burdens, especially when equipment gets damaged.
- PV solar systems are regarded as an option to use in combination with the grid supply to assure reliability of electricity.
- Financial constraints were important factors to consider for the adoption of PV solar systems, but the central factor regarded by the managers of health facilities for adoption was improvements in the reliability of electricity supply.

EnerSHelf Quick Facts

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Energy Supply for Healthcare Facilities in Ghana

EnerSHelf is an interdisciplinary German-Ghanaian project of political economists, engineers and partners from the private renewable energies sector. The project deals with the sustainable and reliable energy supply for healthcare facilities in Ghana.

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