

# EnerSHelf – Energy supply for healthcare facilities in Ghana

## Client II – International partnerships for sustainable innovations

As in many developing and emerging countries, power outages are a frequent occurrence in Ghana and the power grid is extremely unstable. Both of these factors have a particularly negative impact on the healthcare sector, as the lights might go out in the operating room or life-saving medical equipment may fail. Although photovoltaic (PV) power could help, the PV market in Ghana is still relatively underdeveloped. In the German-Ghanaian joint project “EnerSHelf”, experts from science and industry of the various disciplines work together to find both technical and political-economic solutions to improve and disseminate marketable PV-based energy solutions for healthcare facilities in Ghana.

### Lack of access to energy and healthcare

The young democracy of Ghana is one of a group of countries with a (lower) medium income and has achieved significant developmental successes in the last two decades. However, this success is threatened by the country’s limited access to energy. Since 2011, there have been frequent blackouts (“dumsor”) and the public power grid is unstable. The energy crisis negatively impacts the performance of the Ghanaian health sector significantly, thereby reinforcing existing problems regarding access to health services. The current Ghanaian government has pledged to ensure universal access to energy by the end of the current legislature period in 2021. Renewable sources of energy, especially photovoltaics (PV), are regarded as important solutions to this problem.

Despite good solar radiation conditions, the solar market in Ghana remains relatively undeveloped. Although PV technologies were introduced in Ghana back in the 1990s, they were not taken up on a large scale. From a commercial perspective, the Ghanaian healthcare sector is a particularly attractive target market. PV systems are typically financially viable due to the high cost of electricity, unstable networks and the use of diesel generators for back-up power. The healthcare sector could also serve as a point of entry for further establishing PV in the Ghanaian market. However, the viability of possible solutions depends on ensuring that country and sector-specific factors are included in system planning and operational management optimization. It also requires a better understanding of demand structures and the local variability of existing solar resources as well as a good understanding of the relevant institutional conditions.

### Interdisciplinary search for solutions

The project brings together a wide range of disciplines; Options for strengthening governance structures in the Ghanaian energy and health sector are to be developed from an economic development perspective. This is based on empirical analyses of the barriers and drivers of institutional change towards a sustainable energy revolution and of the decision-making behaviour of decision-makers in healthcare facilities and companies regarding the adoption of PV solutions. From a technical point of view, priority will initially be given to field testing PV-based solutions and improving the data basis (energy meteorological data and load data). This data serves as the input for newly developed tools and algorithms. The aim is to achieve greater reliability in the planning, design and control of hybrid PV-diesel systems as well as a context-specific electrification strategy.



Installed PV modules, St. Dominic’s Hospital Akwatia, Ghana.

Thanks to the collaboration between technical disciplines (engineering and natural sciences) and social sciences (development economics) within the project, it will be possible to gain an integrative understanding of the interplay between the institutional and technological changes in the health-energy nexus. The primary issue here is understanding the interaction between the development and dissemination of technological solutions and the specific institutional and political-economic country context.

### Contribution to sustainable development

The project can indirectly contribute to sustainable economic, environmental and social development. An accelerated diffusion of integrative and reliable PV solutions will support an increase in the market share of renewable energies, thus strengthening the sustainability of the national energy system. The latter has a positive effect on the environment thanks to a reduction of emissions and diesel consumption. Furthermore, improved energy access and reduced energy costs will allow for improved healthcare. This, in turn, will lead to long-term improvements in the health of the population – which will also be supported by a reduction in the negative health effects caused by diesel emissions.

The close cooperation between Ghanaian and German stakeholders during the project lifetime is key to ensuring that results are exploited. This will increase visibility and trust in the project results, thus making it more likely that they will be reused. The project partners also act as multipliers themselves. In order to ensure that the findings of the project have an impact outside the project team, an evidence-based learning process will be initiated with relevant national and international stakeholders to support the spread of PV-based energy solutions in the health sector and to review the intersectoral and international transferability of the obtained results.



Participants in the stakeholder workshop in Accra.

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