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Editorial

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The 100-4-100 programme: Secure, clean energy for 100 district hospitals in the Global South

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Hospitals and healthcare facilities worldwide have a continuous demand for electricity to power basic services such as lighting, ventilation and clean water provision, but also to be able to support key healthcare activities. Reliable energy is essential for safe maternity services, to provide vaccinations, and to deliver surgery.1 Healthcare facilities in the Global South mainly rely on electricity from the main grid and at the time of long outages, on diesel generators. Unreliable grid supply and the high cost of diesel contributes to power cuts, further reducing clinical activities. A global survey recently run by our research network in 1,583 hospitals and healthcare facilities showed that hospitals globally are affected by power cuts. In low- and middle-income countries, 88% of hospitals experience power cuts, occurring for up to 9 out of 30 days. Of these, the majority (70%) reported the whole hospital being affected, leading to delays in surgery. Harm to the patients as a result of power cuts was reported in 40% of the centres.

Emissions due to energy supply have been found to represent as much as 84% of the total carbon footprint of operating theatres.2 Reliance of fossil fuels leads to greenhouse gases emissions and poor air quality for local populations, with 30% of surveyed hospitals found to be reliant on highly polluting diesel generators. Introduction of on-site solar energy to healthcare facilities in areas of ample sunlight would reduce their carbon footprint, while also representing a reliable source of energy for the hospitals and their surrounding communities.3,4 It would represent both a mitigation and adaptation measure, leading to the reduction in the production of greenhouse gases and representing a reliable source of energy in the presence of natural disasters.5 Solar energy leads to considerable savings which can be reallocated into other areas and critical care equipment, thus directly improving patient care while at the same time powering critical equipment.

The 100-4-100 programme aims to implement, innovate, and evaluate secure and clean energy strategies for 100 major hospitals in seven low and middle-income countries. Our large global team seeks to raise £100M to install innovative energy hubs, including solar panels and batteries, which could power a significant area of the hospital, or the whole site.

The first phase of the programme consists of a small, two-country pilot, to install energy hubs to power two operating theatres in two hospitals (India and Nigeria). Chinchpada Christian Hospital is a 50-bed hospital providing care for one of the poorest districts of Maharashtra, India. The hospital is affected by major power cuts daily, which last up to 9 hours: prior to the recent introduction of diesel generators, surgical procedures had to be conducted with the use of flashlights if affected by a power cut. The diesel generators present challenges, including elevated cost of diesel and the requirement for manual activation, which causes delays in the power being restored.

Obafemi Awolowo University Teaching Hospitals Complex in Ile Ife (Figure 1), Nigeria is an 850-bed first-generation tertiary hospital providing a wide range of surgical subspecialties. Surgical services in this hospital are often interrupted due to the inadequate power supply and the elevated costs for diesel to supply the backup generators is unaffordable (Figure 2). It has been estimated that the cost of diesel to power the generators for a two-hour long strangulated hernia repair could equal up to six times the cost of the patient's entire hospitalisation period.

The second phase will consist in the roll-out of the programme to other 100 hospitals in the Global South. The 100-4-100 programme will benefit surgery and other healthcare services across the hospital. Reliable energy provision will support the delivery of safer maternal health, increase the cold chain capacity for

vaccines administration, and improve basic care across all other hospital areas. The benefits can also extend outside healthcare, as hospitals are central to the wider community; local schools and telecommunication services can be involved in the programme, providing a template for the future.

This is an ambitious, forward- looking programme, which would make a strong contribution to achieving the United Nations' Sustainable Development Goals 3, 5, 7 and 13 (Good health and well-being, Gender Equality, Affordable and clean energy, Climate action), and that aligns with the objectives of the World Health Organisation (WHO).1,6 As Dr Tedros Ghebreyesus, Director-General of WHO, stated 'All healthcare facilities in poorer countries could be electrified using solar energy within five years for less than $5bn, putting an end to the risk of life from power outages'. This programme represents a significant first step to reaching this goal, promoting good quality healthcare while fostering a greener, more sustainable community in the Global South.

Figure 1. Solar panels installed in the Dental Centre of Obafemi Awolowo University Teaching Hospital complex, Ile-Ife, Nigeria

Figure 2. Surgical procedure under phone flashlight due to power cut

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