SELCO Foundation

2025

# Fundamentals of Operations and Maintenance for Solar Equipment in Healthcare Facilities

## Affordable and accessible healthcare lies at the centre of universal health coverage. However, 4.5 billion people across the globe cannot access reliable health services.[1]

With growing climate change concerns that have direct and indirect health impacts, the disease burden across the globe is set to rise, thus increasing the need for reliable healthcare access.

To be able to achieve universal health coverage for all, we need to re-design health service delivery in a way that is optimized for people and planet. Access to energy enables the provision of a wide range of services and enhances the quality of care that health facilities provide.

Access to quality energy supports the usage of life-saving medical equipment such as fetal heart monitors and ultrasounds during pregnancy and childbirth. Reliable energy helps in the efficient functioning of refrigerators and vaccine cold storage, which helps maintain the shelf life of the vaccine and limits wastage of vaccines and other medicines. Energy access also enables telemedicine, administrative services and allows the staff to receive and provide timely communication and tend to emergencies by aiding in charging mobile devices. It also helps in reducing staff attrition as staff feel motivated to come to work regularly in a comfortable setting. By improving healthcare delivery services, there is a direct improvement in the health outcomes of the region and the healthcare system.

**A vital component for ensuring effective service delivery keeping global and local climate goals in mind is having decentralised renewable energy (DRE) as a catalyst. However, to maximise the gains from decentralised solar energy, it is essential to focus on operations and maintenance (O&M) as it influences the performance of the system and thus impacts the services and well-being of staff and patients at the health facility.**

1 World Health Organization. (2025). Universal health coverage (UHC). Retrieaved from https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)

# What is O&M?

Operations and Maintenance (O&M) includes a set of activities carried out to enhance the energy system's performance and functionality by examining all the components and connections, rectifying issues that may emerge, and effectively coordinating and allocating resources for the same.

Often, O&M is equated with the annual maintenance contract (AMC) signed with a vendor for a specific period of time, such as two years or five years. Each component has a warranty period, which means they can be replaced during that period without any hassle. While the AMC and warranty are important components of O&M, the definition of O&M has a much broader scope.

This definition is important to understand in order to cater to the many needs of O&M – both in terms of human and financial capacity.

When planning O&M for public assets, particularly in under-resourced regions and among marginalized populations, it is critical to ground the approach in clear and intentional ownership structures. In the context of public health infrastructure, O&M cannot be treated as a separate or downstream activity - it must be embedded into the design and budgeting of the overall program from the outset. This includes defining roles and responsibilities across stakeholders, planning for the full cost of ownership (not just installation), and formalizing processes like asset handover.

Early O&M planning directly influences procurement choices and technical specifications - ensuring that systems are not just functional at installation but remain sustainable over time. It also enables the building of institutional and community capacity for ongoing maintenance, supports robust monitoring systems, and facilitates more responsive decision-making and funding adjustments. Without these foundational elements, the longevity and impact of clean energy systems and other public assets in these contexts are severely compromised.

## O&M consists of preventive maintenance, scheduled maintenance and corrective maintenance. These can be defined as follows:

### Preventive maintenance

focuses on activities that enhance the performance of the system. This is carried out by staff at the health facility on a weekly/monthly basis to ensure there is no dust or check the integrity of components.

### Scheduled maintenance

includes activities carried out by trained personnel who validate the functionality of all components of the system

### Corrective maintenance

includes repairs and replacement of components that have failed or resulted in frequent issues.

## Ownership is key to holistic O&M for public assets such as solar energy systems at health facilities. Defining the ownership of the equipment at the facility level, district level and the state level. Ownership at each of these levels contributes to effective implementation of different components of O&M.

Well-defined ownership at the facility level prevents thefts, encourages staff to take care of the system and utilise it to provide better services.

At the district level, well-defined ownership will allow for appropriate coordination with vendors, allocation of funds from the district level as well as raising issues to the state. The coordination for training and inclusion of refresher trainings in the training calendar of the district.

At the state level, clear ownership allows for overall planning of O&M, including asset management, laying out the escalation matrix for issue resolution and ensuring that issues out of warranty are address through the delineated mechanisms.

Defining ownership at each level ensures implementation of O&M through specified processes by stakeholders who have been identified and assigned responsibilities.

# Keep in mind

O&M is a continuous process to keep the system in robust conditions and meet the energy needs of the facilities.

It requires collaboration among various entities such as government departments which allocate financial resources and may also assign dedicated human resources to carry out the activities, enterprises that may be contracted by the government, health facility staff who operate the system on a day-to-day basis and community members or groups that ensure accountability for working condition of systems at the facilities.

Expanding the scope of O&M beyond contracts with vendors and scheduled maintenance is key to the overall program sustainability plan. O&M must include preventive, scheduled and corrective maintenance, carried out at different frequencies by different stakeholders. Delineating activities, processes and roles and responsibilities of stakeholders for carrying out comprehensive O&M ensures there are mechanisms in place to be able to cater to the expanded scope of O&M.

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**For more information, get in touch!**
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