



**ENERGY
FOR
HEALTH**



HT Parekh
FOUNDATION



IKEA Foundation



ENERGY FOR HEALTH **OPERATIONS & MAINTENANCE**



Background and Context on Operations & Maintenance of Solar Health Systems

WHAT is O&M of Solar Health Systems

Ongoing tasks, activities, and procedures involved in running and managing DRE systems to ensure their optimal functionality, efficiency, and longevity.

O&M requires people, technology and tools which includes coming together on technical and financial aspects in order to serve a DRE system overtime.

Problem Statements in the O&M of Solar Health Systems

01. Lack of timely maintenance of public owned DRE assets

- due to **lack of ownership** at the end-user level
- due to **lack of skills, supply chain and incentives** for stakeholders

02. High transaction cost for DRE services based enterprises

- **Remoteness and limited incentive**

03. Budget issues for O&M

- Lack of **separate budgetary provisions** to conduct O&M
- Delay in **payments and approval processes**

Need for Operations & Maintenance of Solar Health Systems

A.

Immediate identification and rectification of the solar system, having a significant impact on the availability of health services (especially in the remote areas)

B.

Timely communication & interaction between different stakeholders to avoid misunderstandings, delays and increased costs.

C.

Ensuring adequate and timely training to various operators, technicians and maintenance personnel

D.

Enable a local servicing-maintenance network for solar energy health systems

E.

Boost ownership among enterprises and end-users

F.

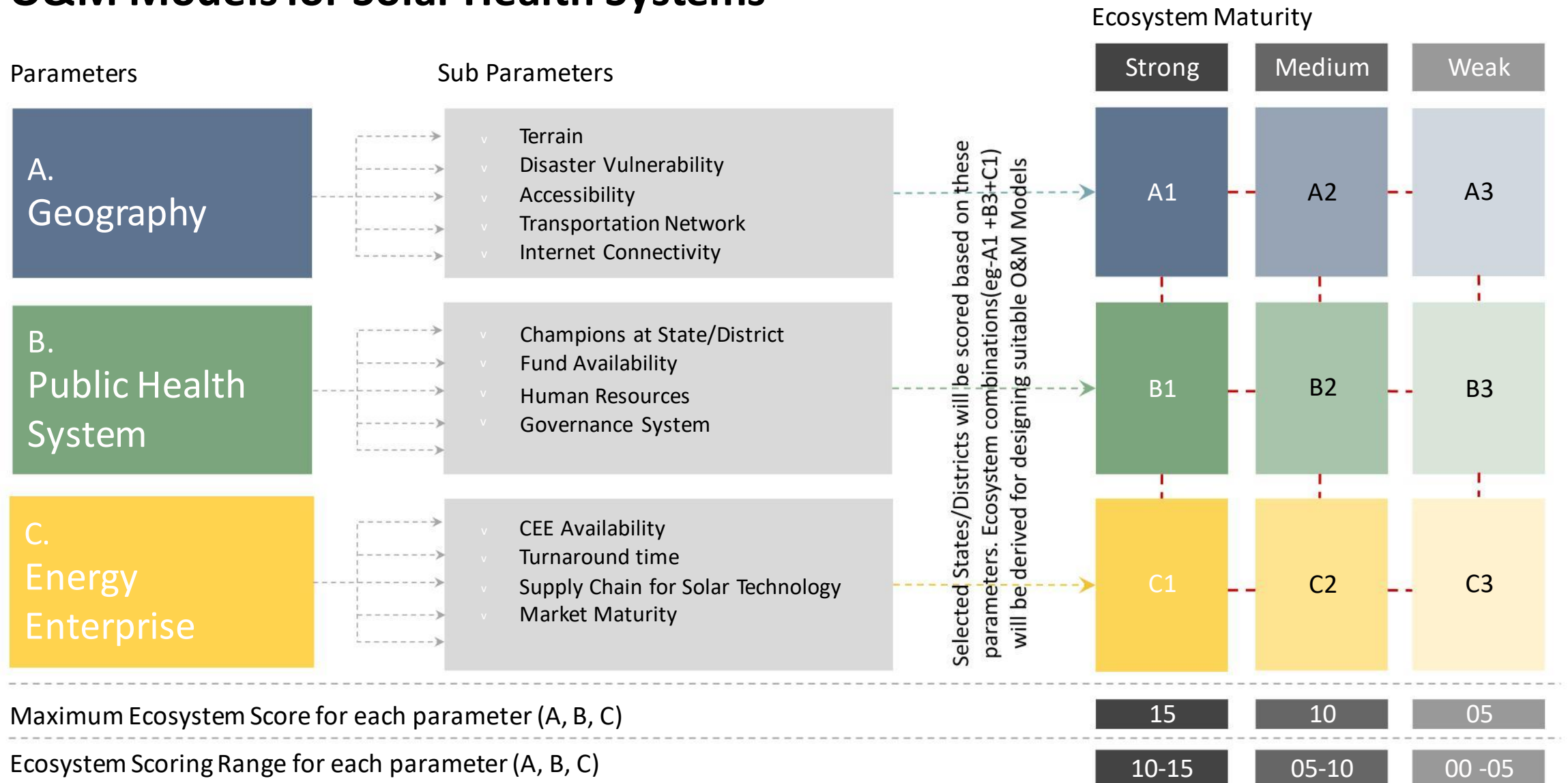
Create process and costing benchmarks through documentation of issues and data collection



Key Components and Tools of the E4H Operations & Maintenance System

Component	Priority	Primary Stakeholders	Tools to Identify, Raise, Track Issues	Tools to Resolve Issues
01. Technical Component	Who does the O&M – Issue Raising and Resolving	Government/ Local NGO's/ Local DRE Service Enterprises	<p>Remote Monitoring System (RMS)</p> <p>Customer Relationship Management System (CRMS)</p>	<p>Remote issue resolution via calls or videos by CRM/ Technical staff</p>
02. Financial Component	Who pays for the O&M – HR Skilling, Trainings and Issue Resolution	Government/ Philanthropy	<p>Physical Monitoring System (PMoS)</p>	<p>Physical Maintenance System (PMaS)</p>

Ecosystem Matrix for developing O&M Models for Solar Health Systems



Ecosystem Matrix for NE States

Parameters	Ecosystem	Questions?
Geography	<ul style="list-style-type: none">• Hilly Terrains• Disaster Vulnerability – Landslides/Lightning Strikes/Heavy Rains• Local Transport – Not adequately accessible• Travel Transactions - High in terms of time and cost• Network Connectivity – may not be available in the remotest and far flunged areas	What could be the ideal O&M Model for the NE states?
Public Health System	<ul style="list-style-type: none">• Availability of adequate funds budgeted for system maintenance• Availability of skilled manpower for O&M of clean energy systems	How to build up a strong ecosystem for the CEEs?
Energy Enterprise	<ul style="list-style-type: none">• Supply chain for Solar technology – Not strong enough• Lack of existence of CEEs locally• Enhanced turnaround time for system maintenance	

Key Issues Addressed through the E4H Operations & Maintenance System

Category of the issues	MINOR ISSUES		MAJOR ISSUES		
	Repair/Service/Replacements Related		Disaster / Man Made Related	Repair/Replacement of Essential Components	Infrastructure Related
Description of the issues	Maintenance, Replacing battery water, cables, inverter fuse, AJB, battery and panel lugs, tightening of the screws etc.	Replacing inverter motherboard, IGBT card, grid protection, MCB, Inverter display (spare parts available)	Floods, Lightening's or manmade occurrences like thefts and breakage etc	Panel, Battery & Inverter replacement as per warranty. Replacement of key components beyond warranty	Infrastructure Changes/ Renovations
Turnaround period	Within 24 hrs OR as per issue priority	< 48 hrs OR as per issue priority	> 48 hrs OR as per issue priority		
Availability of spares	Immediately available with the enterprise	Available / Arranged via government or local enterprise	Not dependant on availability of spares. Needs further approvals based on financial implications		

Addressing Key Inverter Issues

Description of Issue	Cause of Issue	Action	Ideal Turnaround Period
Shutdown Issues	Overload current from heavy loads, Surge voltage from lightning, High Voltage spikes, IGBT Damage, Motherboard Card burnt, SMPS Failure, Cooling Fan Fault, Tripping of MCB (Grid, Solar, Load, Battery)	Needs repair/replacement	<24 Hrs.
Short Circuit Issues	Insulation damage/Burning of cables, Water clogging (flooding from top/bottom of PCU)	Needs repair/replacement	<24 Hrs.
Cable Issues	Loose contact at terminals, Improper crimping and insulation, cables disconnection from inverter	Needs repair/service	<24 Hrs.
Electric Shocks	Leakage current, Earthing Issues	Needs repair/service	<24 Hrs.
Display Issue	Display Damage	Needs repair/service	> 48 Hrs.
Theft Issues	Manmade	Needs Replacement	Within 48 Hrs.



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