Lasting Impact: Sustainable Off-Grid Solar Delivery Models to Power Health and Education

30 July 2019

Commissioned by:

UNITED NATIONS FOUNDATION

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Prepared by:

CATALYST OFF GRID ADVISORS

With support from:

UKaid from the British people

Lasting Impact: Sustainable Off-Grid Solar Delivery Models to Power Health and Education

Welcome and Introductions

Panelists:

- Jem Porcaro, Lead Energy Access Specialist, SEforALL
- Christine Eibs Singer, Senior Associate, Catalyst Off-Grid Advisors
- Raihan Elahi, Lead Energy Specialist, World Bank

Q&A Session

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Powering Health Care

CURRENT CONDITIONS

- 1 in 4 health facilities in SSA lack access to electricity; 3 in 4 lack reliable power
- Business-as-usual (grid extension) leaves large access gap by 2030
- Infrastructure is main cost driver for achieving UHC
- DRE provides a fast and cost-effective way to power health facilities

STRATEGY

Build an investment case

Address structural barriers *(lack of capacity, business models, appropriate technologies)*

Put in place system to monitor progress

ACTIONS

Evidence/data

Thought leadership

Convening

Communications

IMPACT

Short-term

Policies ***Capacities***

Delivery models ***Coalitions***

Long-term

Finance

Sustainability

VISION

UNIVERSAL HEALTH FACILITY ELECTRIFICATION BY 2030

- Health worker and patient safety and hygiene improves
- Electricity-driven equipment is available, functional and used more for medical services
- Energy-efficient devices/appliances are available
- Health worker retention improves

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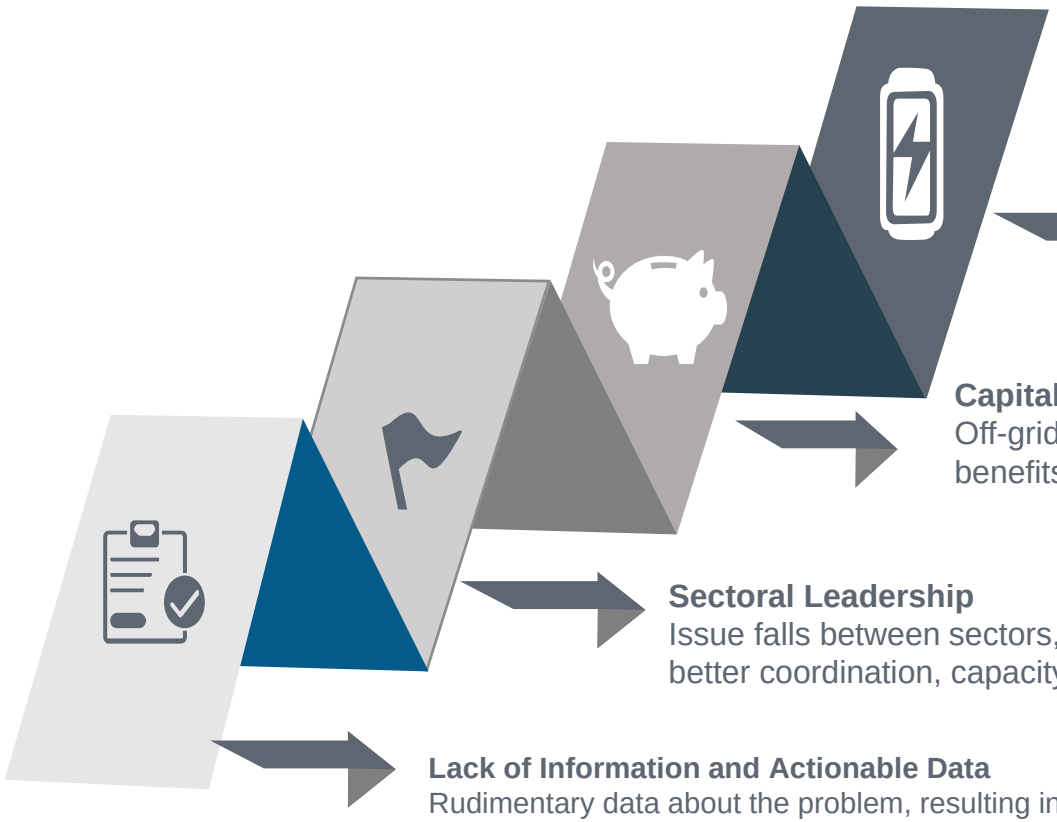
Key challenges to powering public institutions with off-grid solar



Sustainability
Sustaining the operation of off-grid solutions (e.g. PV systems) at community facilities in resource-constrained environments can be difficult

Capital Expenditure
Off-grid solutions can be prohibitively expensive, but have multiple benefits over incumbent solutions

Sectoral Leadership
Issue falls between sectors, leaving unclear leadership and a need for better coordination, capacity and policies

Lack of Information and Actionable Data
Rudimentary data about the problem, resulting in low levels of awareness of and priority given to the topic

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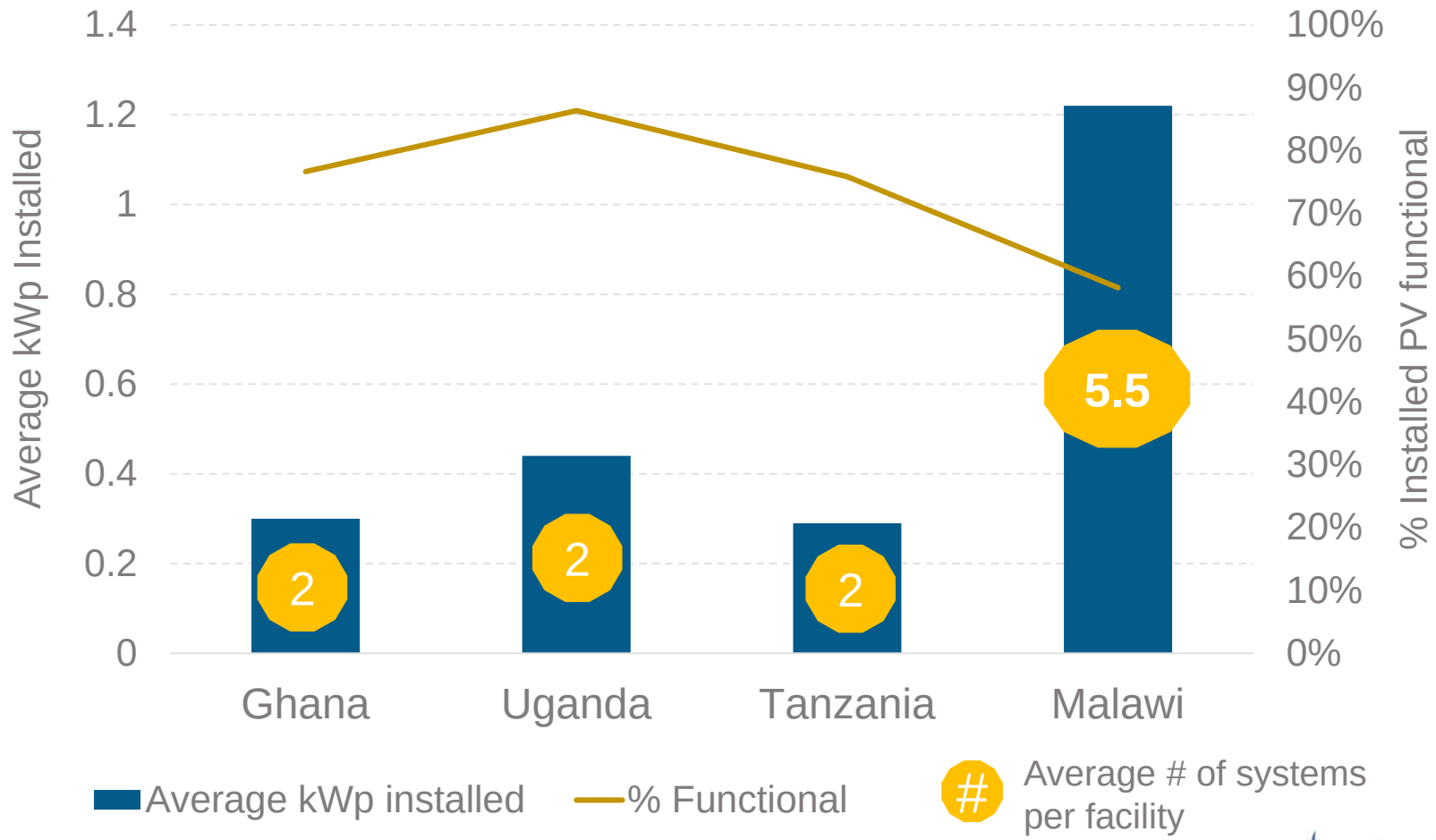
Key challenges to powering public institutions with off-grid solar

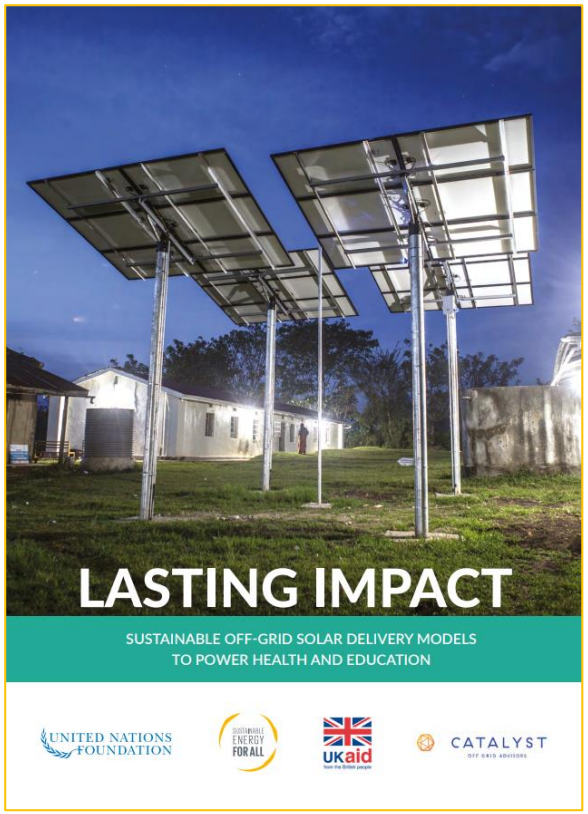


Source: UNF

Lasting Impact…

Commissioned to:

- Help public, private and philanthropic stakeholders design and sustainably implement robust off-grid public-facility electrification projects.
- Encourage innovation in the way off-grid PV solutions are designed for and delivered to public facilities.
- Recommend areas for further research



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Sustainability vs Scale

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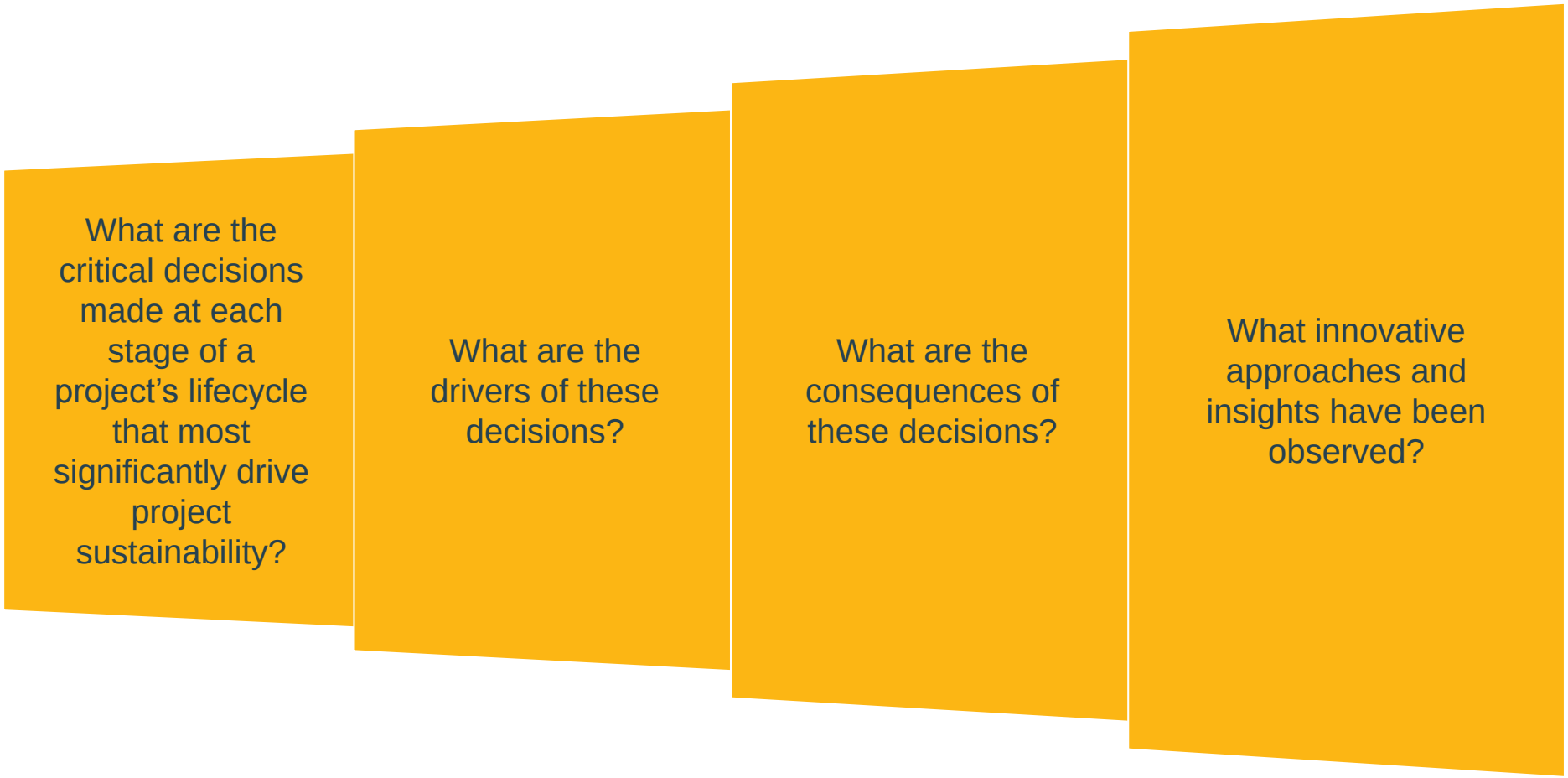
Questions



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Report methodology

Sustainability Framework

Organizational, Technical and Economical Pillars

Delivery Models

Public, private, philanthropic

Case Studies (7)

Interviews with stakeholders from implemented and ongoing projects

Key Insights

Lessons learned

Emerging Cases (2) & Hypotheticals (2)

Highlight key design features & challenges of new cases

Conclusions

Sustainability and Scale

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Sustainability framework

Sustainability Framework Pillars	Organizational	Technical	Economic
Three "pillars" of sustainability—Organizational, Technical, and Economic	Arrange project stakeholders to preserve systems' long-term functionality	Make certain installed systems are robust and fit for purpose	Ensure financing and incentives are structured for the long haul

MODEL SUSTAINABILITY FRAMEWORK

Project Lifecycle Phases	I. Inception	II. Design	III. Build	IV. O&M
Each pillar contains four project lifecycle phases—Inception, Design, Build, and Operation and Maintenance (O&M)	Define core goals and approach	Finalize facility siting, expected needs, and system sizing	Undertake procurement and execute installation contracts	Ensure system performance for its expected life

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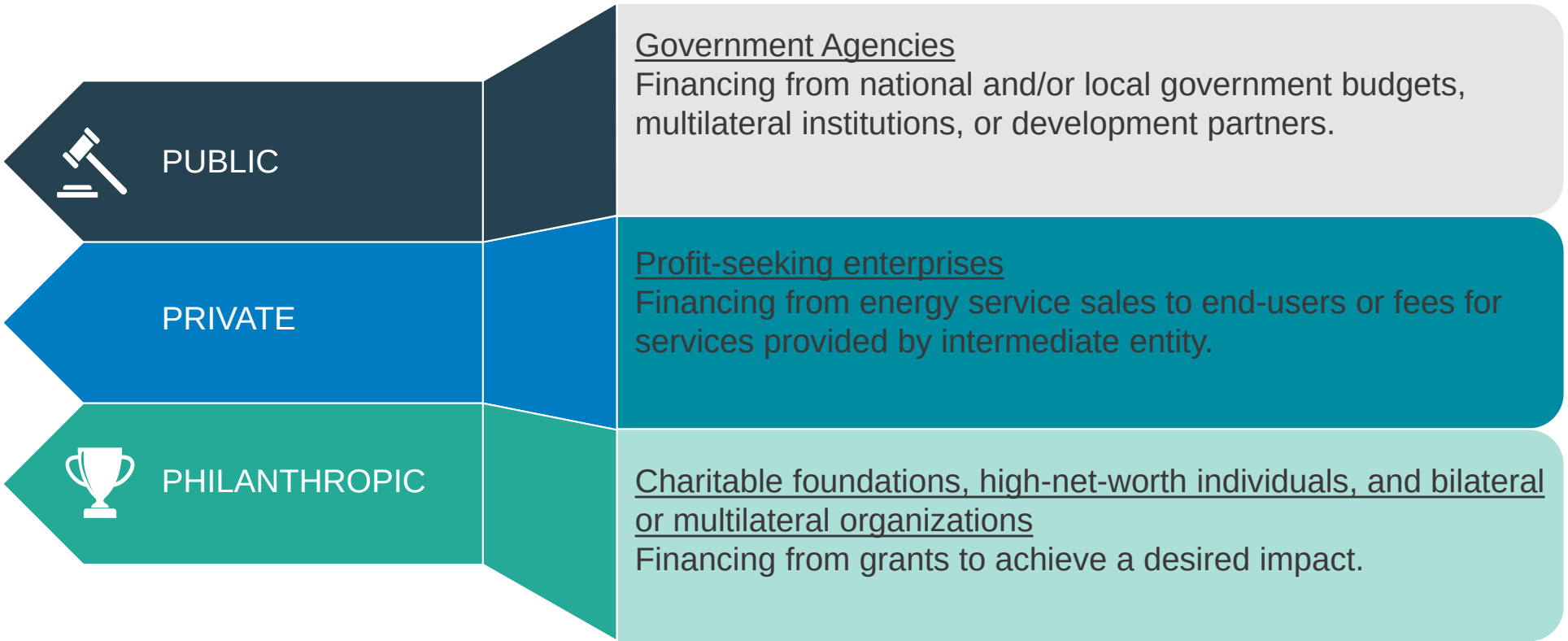
Delivery models



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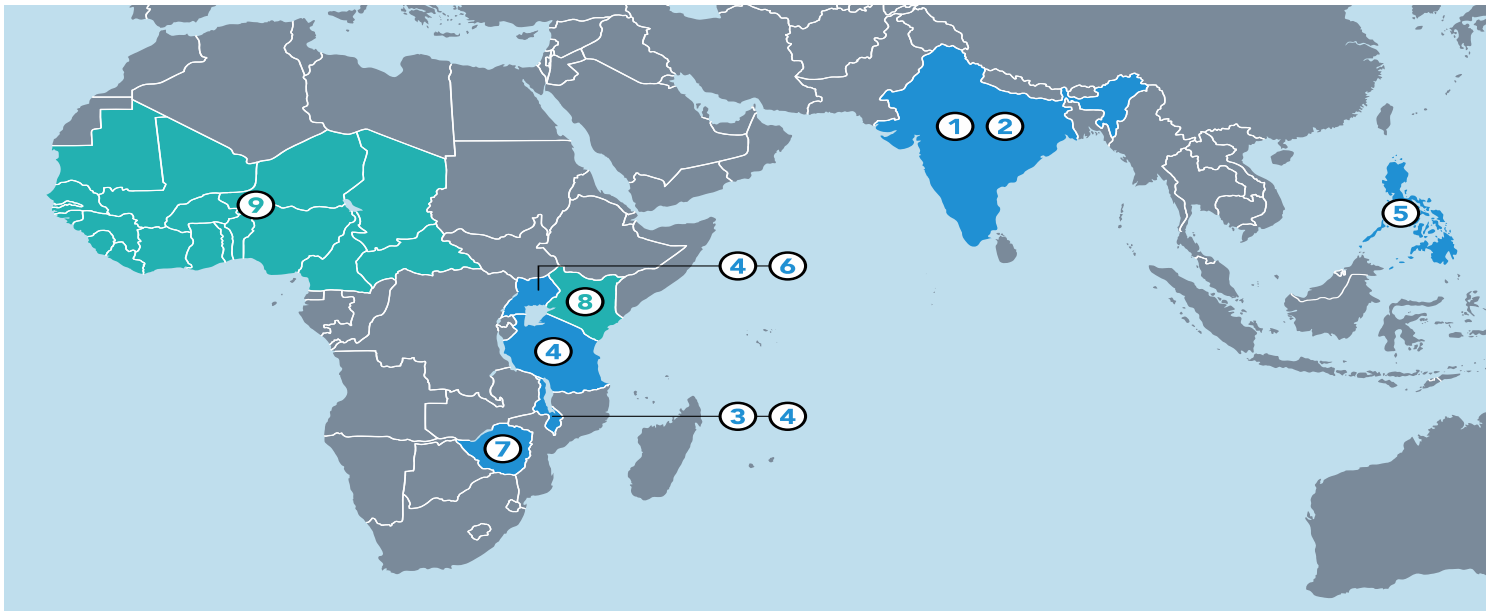
7 case studies



Retrospective cases

India
1. CREDA
2. SELCO

Malawi
3. CEDP

Malawi, Tanzania, Uganda
4. IA

Philippines
5. SSMP

Uganda
6. ERT-II

Zimbabwe
7. S4H

Emerging cases

Kenya
8. KOSAP

West Africa
9. ROGEP

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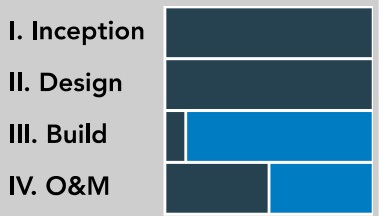
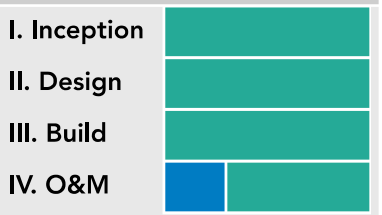
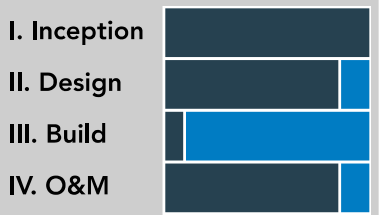
Selected case studies

Project Name	Country(ies)	Dates	Target(s)	Project Scale	Models
Chhattisgarh State Renewable Energy Development Agency (CREDA)	India	2011 - Ongoing	Health	984 facilities electrified to date	
Innovation Africa (IA)	Malawi, Tanzania, Uganda	2008 – Ongoing	Health and Education	110 facilities electrified to date	
Energy for Rural Transformation – II (ERT-II)	Uganda	2008-2016	Health and Education	1082 facilities (560 education and 522 health)	

Key insights

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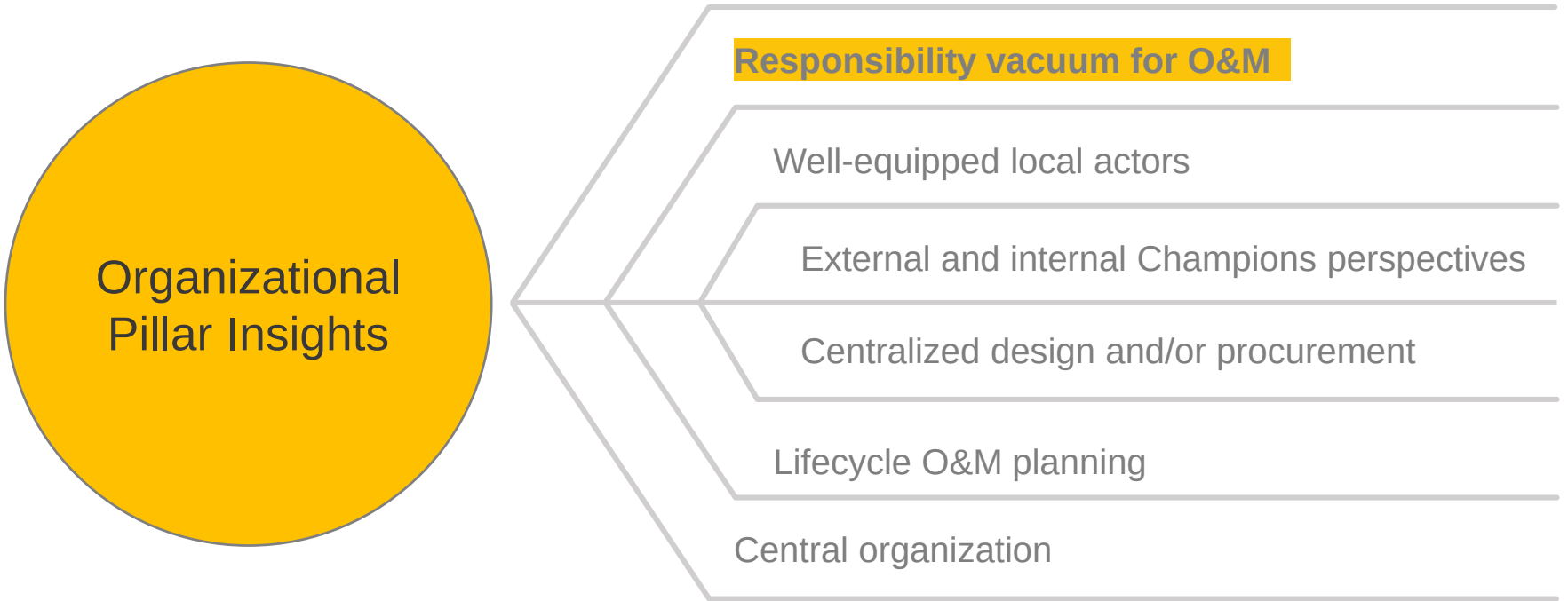
Sustainability Framework Pillars | Organizational | Technical | Economic



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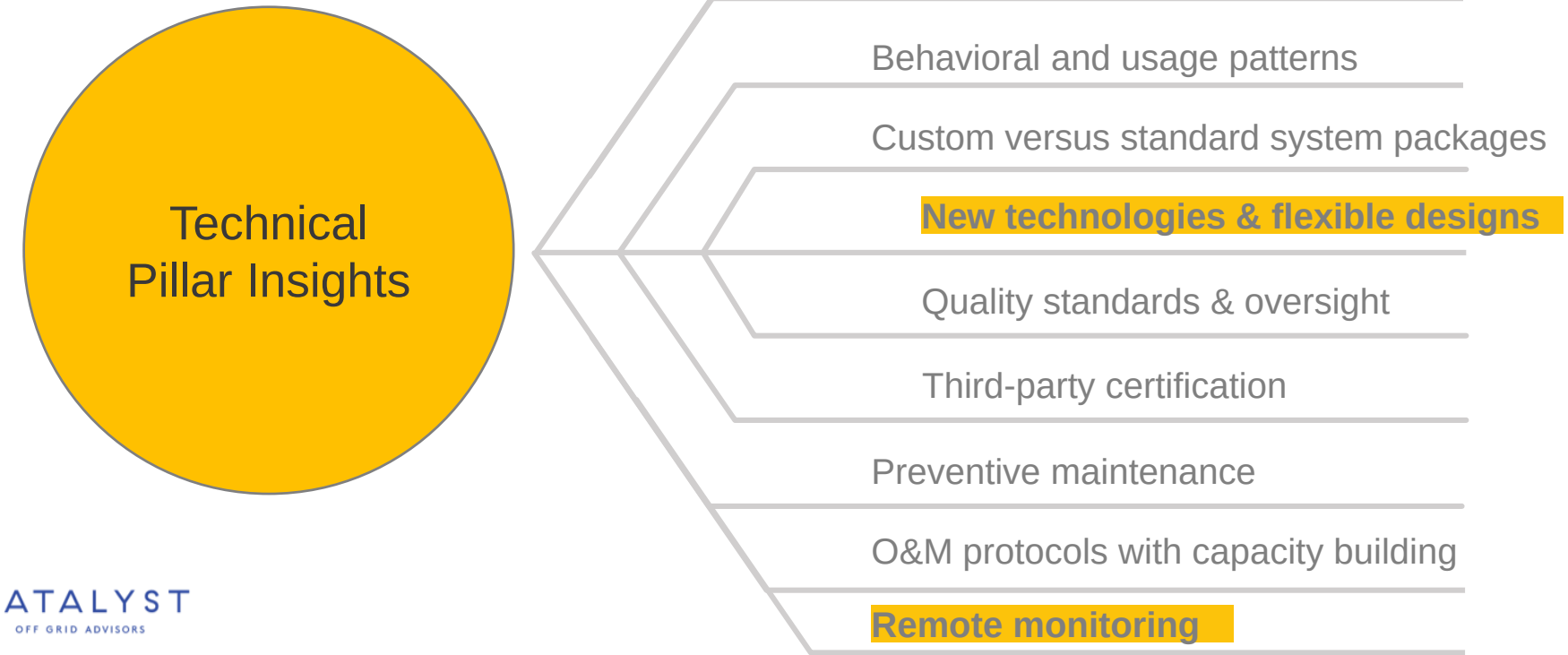

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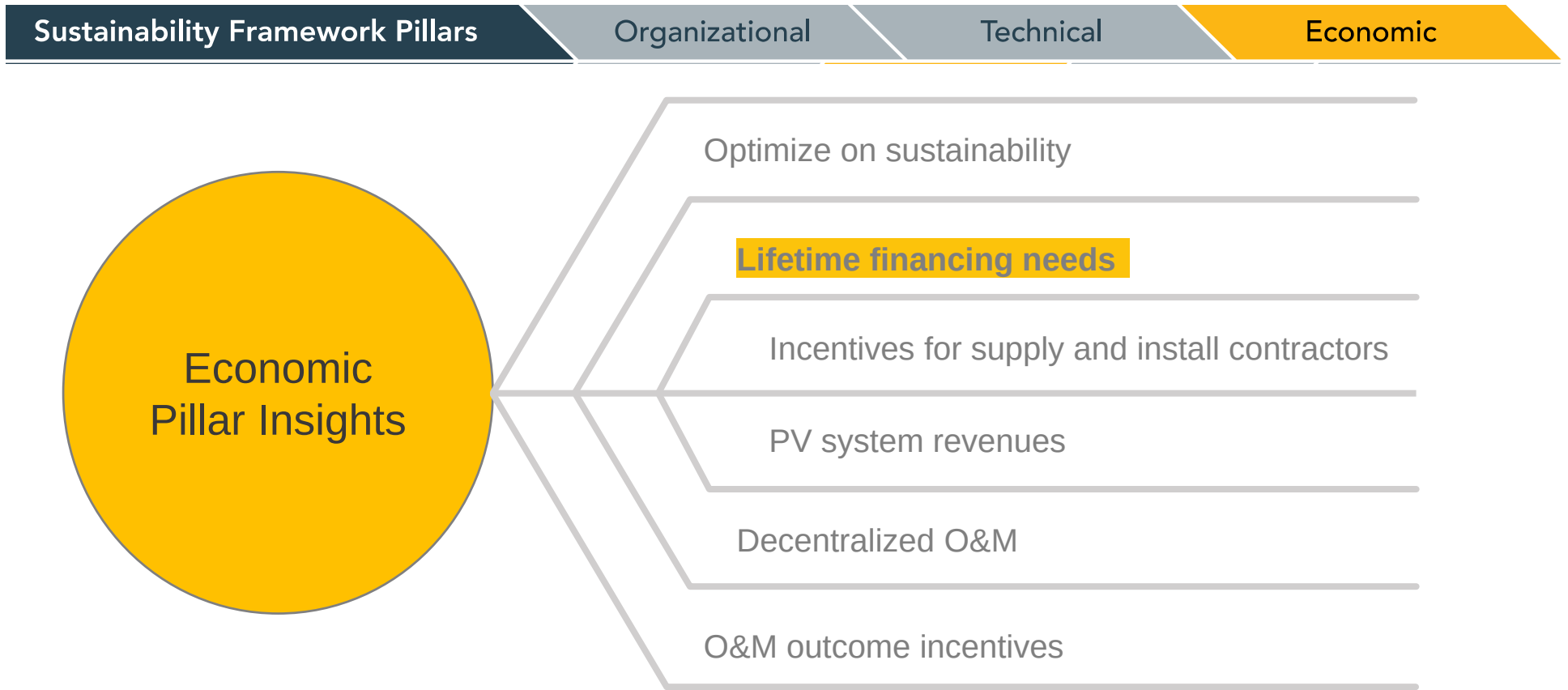

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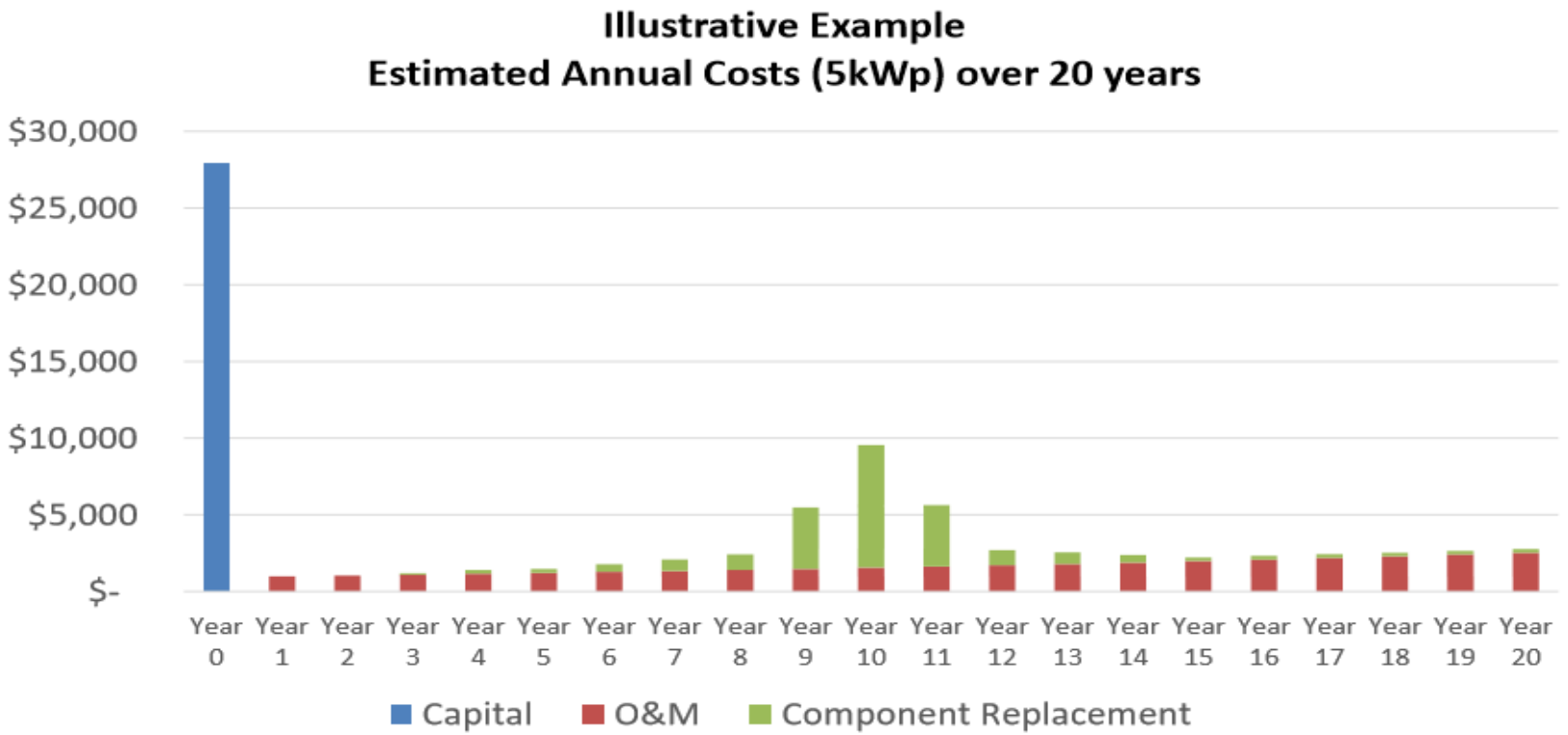

Assumptions:

- CapEx excludes soft costs (design, logistics, installation, training, community mobilization)
- O&M estimated based on economies of scale across multiple installations; assumes inflation
- Component replacement costs are conservative as they don't factor in declining battery costs

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Emerging cases: KOSAP

Key Design Features:

- ✓ World Bank funds cover supply & installation
- ✓ Private Sector Providers (PSPs) selected on lowest NPV supply, installation, maintenance
- ✓ 10-15 year O&M contracts with PSPs; performance based
- ✓ Kenya Power owns retail relationship; collecting tariffs from facilities/local governments, paying PSPs

Possible Sustainability Challenges:

? Local governments/tariffs enough to cover O&M

? Kenya Power carries off-taker risk

? Capacity of Kenya Power to monitor PSP performance

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Emerging cases: ROGEP

Key Design Features:

✓ Government inception (design); ESCOs (design), build and maintain

✓ Timely Government payment based on key performance indicators

✓ Remote monitoring

✓ MIGA guarantee

Possible Sustainability Challenges:

? ESCO's ability to raise CAPEX

? Remote monitoring across West Africa untested

? O&M post year 7 contract period unknown

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Ingredients for Sustainability

1. Sustainability requires an all-encompassing definition of success
2. Sustainability demands integrated knowledge and sector-specific expertise
3. Sustainability requires alignment of public and private sector incentives
4. Leveraging of philanthropic models and actors
5. Sustainability is enhanced when energy is a core element in facility planning
6. Sustainability requires both the ability and willingness to pay for electricity

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Opportunities for further investigation

1. **Central inventory of data** on current state of energy access in health facilities
2. **Improved site auditing tools and integration of survey techniques** highlighting best practices, focus on understanding facilities' future energy needs and scaling systems
3. **Holistic policy and regulatory planning** for public-facility electrification including financing and technical standards
4. **System design toolkit** including cost-benefit analysis between technologies and scale, and calculators for long-term revenues and operating costs
5. **Key Performance Indicators** specific to off-grid public electrification programs
6. **Environmental sustainability toolkit** covering system disposal and recycling
7. **Sustainability framework** built for achieving organizational, technical, and economic sustainability in health facilities

For more information

Link to full report: poweringhc.org/resources/

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