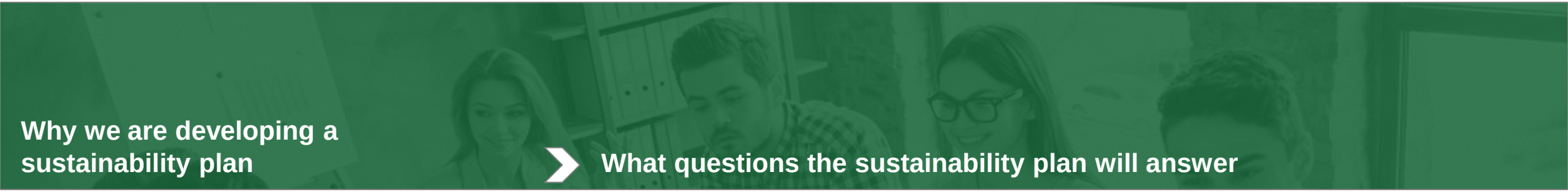
Energizing Education Program (EEP) Phase II Sustainability Planning – Presentation to the Stakeholder Meeting

Rural Electrification Agency (REA) / World Bank Group (WBG)

March 2nd, 2020

We are developing a sustainability plan for the Phase II institutions



Why we are developing a sustainability plan

- The Federal Government has borrowed funds to finance the initial construction of small-scale energy systems to power Energizing Educations Program Phase II institutions (7 universities & 2 teaching hospitals)
- The system will need to be self-sufficient for at least 15 years post commissioning, such that no additional outside capital will be needed
- The REA has engaged McKinsey to develop sustainability plans for Phase II institutions

What questions the sustainability plan will answer

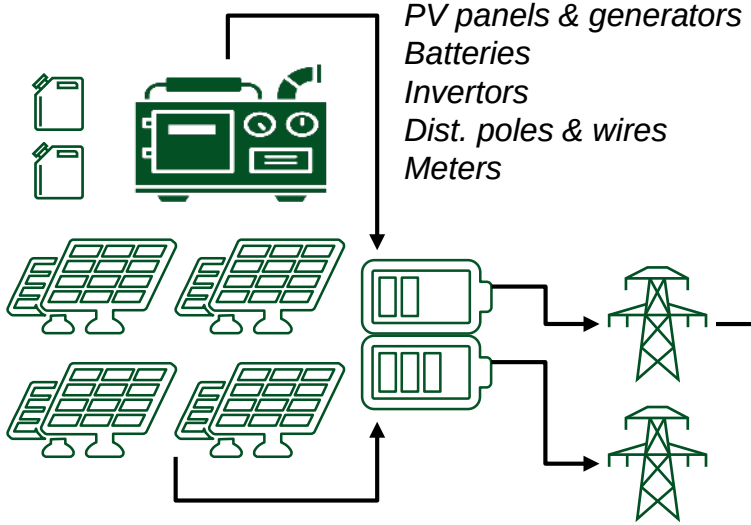
- What commercial model will allow the projects to finance themselves for the next 15+ years?
- What should the governance structure be? What should roles / responsibilities of the various stakeholders be?
- What set of controls are needed to manage key risks? What set of agreements will codify the relationships between key stakeholders?
- What are the regulatory implications?
- How best can we embed energy efficiency principles within the beneficiary institutions?
- How do we ensure that the system brings benefits to students, faculty, and staff (particularly women)?

Q **How can Energizing Education Program beneficiary institutions sustainably finance, operate, and maintain their small scale energy systems for 15 years without any additional external financial or operational support?**

Understanding the ecosystem of a small scale energy system

PRELIMINARY

Generation and distribution infrastructure



PV panels & generators
Batteries
Invertors
Dist. poles & wires
Meters

- Capital expenditure
- Operational expenditure
- Replacement costs
- Maintenance

- Overall cost of energy

Beneficiary institution

Students / patients
Faculty
Medical professions
Institution staff
On-site businesses

- Service charge level and structure
- Collections methods and strategy
- Energy efficiency strategy
- Behavioural change initiatives
- Capacity building
- Gender mainstreaming
- Training centre activities

Contractual counterparties

EPC contractor
O&M contractor
Service providers

- Contracting strategy
- Contract scope, pricing & conditions (templates)
- Risk allocation and management

Government and regulators

Ministry of Power
NERC, NEMSA

Local / State Government

- Government engagement
- Regulatory posture
- Service charge and contract approvals

Ownership, governance, and oversight

Management and staff

- Ownership / mgmt. structure
- Decision processes
- Organizational structure

Community relations

- Beneficiary input / oversight
- Community engagement
- Sustainability unit

Customer & Financial management

- Financial / cash management
- Compliance and controls
- Working capital strategy

The sustainability plan will encompass five major components

Sustainability component	What sustainability would mean	We will measure success by:
1 Financial	▪ A commercial model able to cover all costs ▪ No additional financial support after development	▪ A cost reflective service charge able to meet all needs for next 15 years ▪ Implementation of a cash management system
2 Governance and Operations	▪ Clearly defined roles and responsibilities ▪ Strong controls in place to safeguard the funds ▪ O&M[1] approach that will ensure the system lasts	▪ 100% uptime of system for 15 years ▪ Governance structure mutually accepted by all stakeholders
3 Legal and Regulatory	▪ Compliance with all relevant NERC and NEMSA regulations ▪ Contracting structure that properly allocates risks	▪ Binding agreements between key stakeholders ▪ Obtaining all required regulatory approvals
4 Energy efficiency	▪ Ability to provide more power using the same capacity ▪ Decrease in the energy intensity of universities	▪ Adoption of energy efficiency guidelines ▪ Creation of conservation & sustainability culture
5 Engagement and inclusion	▪ Clear path to participation for the university community, including students and women	▪ Development of training centre that provides training, workshops, and research opportunities ▪ 20 female STEM students to receive hands on training during the construction of the system

1 Operations and Maintenance

We will be developing the sustainability plan in four stages

Deep dive to follow

	Step 1: Diagnostic	Step 2: Financial & Commercial Evaluation	Step 3: Operating and Governance model	Step 4: Final sustainability report
Key Activities	▪ Understand small scale energy system approaches to sustainability ▪ Structured interviews with developers ▪ Defining industry best practice ▪ Conducting site visits to understanding nuances of the individual universities	▪ Develop a detailed financial / commercial model ▪ Determine service charge structure ▪ Explore incremental revenue options ▪ Design cash management system	▪ Define an appropriate operating model, including: – Org. structure – O&M approaches – Energy efficiency policy ▪ Determine key roles and responsibilities ▪ Design governance model ▪ Develop contracting strategy	▪ Compile all learnings around sustainability planning for Phase II institutions ▪ Share insights with Phase II Universities, the REA, the World Bank, and others
Deliver-ables	▪ Diagnostic report covering: – Approach to sustainability – Best practices – Site visit learnings	▪ Excel cash flow model for Phase II institutions ▪ Evaluation report covering: – Payment structuring – Cash management	▪ Evaluation report covering: – Organizational structure – Key roles and responsibilities – Contracting for O&M	▪ Report encompassing design principles across all elements of sustainability of the EEP program

Learnings on best practices for sustainability have emerged from case studies and expert engagements

Africa-focused mini grid developers and operators

Organization	Countries present
MAYO TROPICAL TECHNOLOGY LTD.	
arnergy	
HAVENHILL Synergy	
PowerGen RENEWABLE ENERGY	
rensource	

Topics discussed

- Key cost drivers
- O&M models
- Service charge design
- Revenue collection models
- Grid load management
- Energy efficiency policies
- Metering strategies

Global case studies

West Bengal Renewable Energy Development Agency (WBREDA) Sunderban island mini-grids

Community-managed hydro grids in Meemure, Sri Lanka

The Bulongwa Lutheran Hospital owned mini-grid in Tanzania

The Urja Upatyaka hydro mini-grid project in Baglung, Nepal

We are conducting site visits to EEP Phase II institutions to design sustainability plans suitable to the contexts of each university

Key Activities for Site Visits

A
Interviews with key University stakeholders

- Vice-Chancellor
- Deputy Vice-Chancellor, Development
- Head of Works and Services
- Dean of Engineering
- Bursar
- Chief Security Officer
- Head of Physical Planning

B
Sustainability Forums

Stakeholders present:

- University leadership
- University staff
- Faculty and students
- On-campus business owners

Sessions:

- Project overview session
- Visioning sessions
- Focus groups

C
Tour of campuses and current electrical infrastructure

- University power house
- Student centers / libraries
- Energy intensive academic buildings
- Student hostels and faculty housing
- On campus businesses

Site visits have produced several insights that may inform sustainability plan design choices (1/2)

	Insights	Implications
Financial & commercial model	▪ Current cost of electricity is high (some universities paying ~20mn monthly for grid and diesel generation) ▪ Electricity payments are non-uniform across users – students pay flat utility fee, on-campus faculty pay via post-paid meters, and on-campus businesses often do not pay specifically for electricity ▪ Electricity payments (DisCo and diesel) are made into a sub account of the Treasury Single Account (TSA) ▪ Payments are often sourced from internally generated revenues, which consist of student fees and charges ▪ Often the total national allocation for universities is not even sufficient to cover electricity, let alone overhead costs ▪ Diesel allocation mechanisms for distributed generators not well tracked, discouraging efficient use	▪ Different segments of users may require a different billing model (multi-tiered service charge structure) ▪ Electricity payments may be ring-fenced within a sub-account separate from all other uni. Funds
Operating & governance model	▪ University leadership and financial executives generally open to a range of governance options for the system (for example, special purpose vehicle) ▪ Different stakeholder groups have expressed differing opinions on who should “own” the system ▪ Some existing energy infrastructure are in disrepair (non-functional generators) or are not maintained (dusty panels)	▪ Governance design choice will need to find a balance between promoting university ownership of the individual systems, with the ability to control for key project risks centrally (i.e. REA) ▪ Universities may need to adopt more standardized approaches to maintenance

Site visits have produced several insights that may inform sustainability plan design choices (2/2)

	Insights	Implications
Energy efficiency	▪ Not all universities have energy efficiency policies in place ▪ Current electricity use is significantly energy inefficient - campus tour revealed air conditioners switched on in empty classrooms, as well as much energy inefficient equipment ▪ Current billing structure disincentivizes energy conservation (central billing) ▪ There is consensus that usage-based service charge can create accountability & drive efficient behavior	▪ Some universities will required energy efficiency guidelines for their sustainability plans ▪ Instituting usage based service charge will encourage energy efficiency aims ▪ Opportunities exist to replace current university appliances ▪ Educational programs can be developed to address energy use culture
Engagement and inclusion	▪ Renewable Energy capabilities exist currently, though limited ▪ There are renewable energy groups dedicated to research on renewables topics at some campuses ▪ Group however lacks specialized capacity and research/training equipment ▪ Women are vastly underrepresented in energy and engineering fields and there are currently few programs aimed at increasing representation	▪ Existing university activities may be used in developing and running the training center ▪ Policies that ensure gender inclusiveness for the project have the potential to increase female representation in energy and engineering

Stakeholders across the board have engaged the team with excitement and underscored the importance of a reliable energy solution to universities

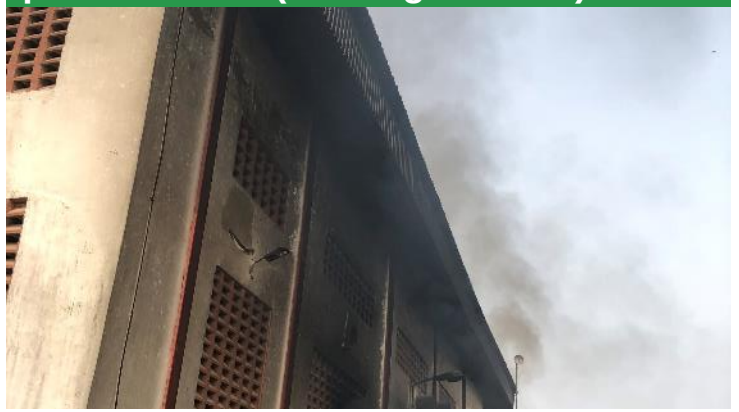
A Vice Chancellor welcoming the team

Stakeholders taking notes at the launch forum event

> ***I understand the criticality of clean, reliable energy not just for the university, but for the nation***
>
> **Vice Chancellor**

> ***For this project to succeed and be sustainable, all of us must play our part. We must use energy wisely and carefully so that the system can last longer without failure***
>
> **On-campus business owner**

Thick black soot from the central power station (diesel generator)



Head of Works leading a tour of the proposed solar farm site

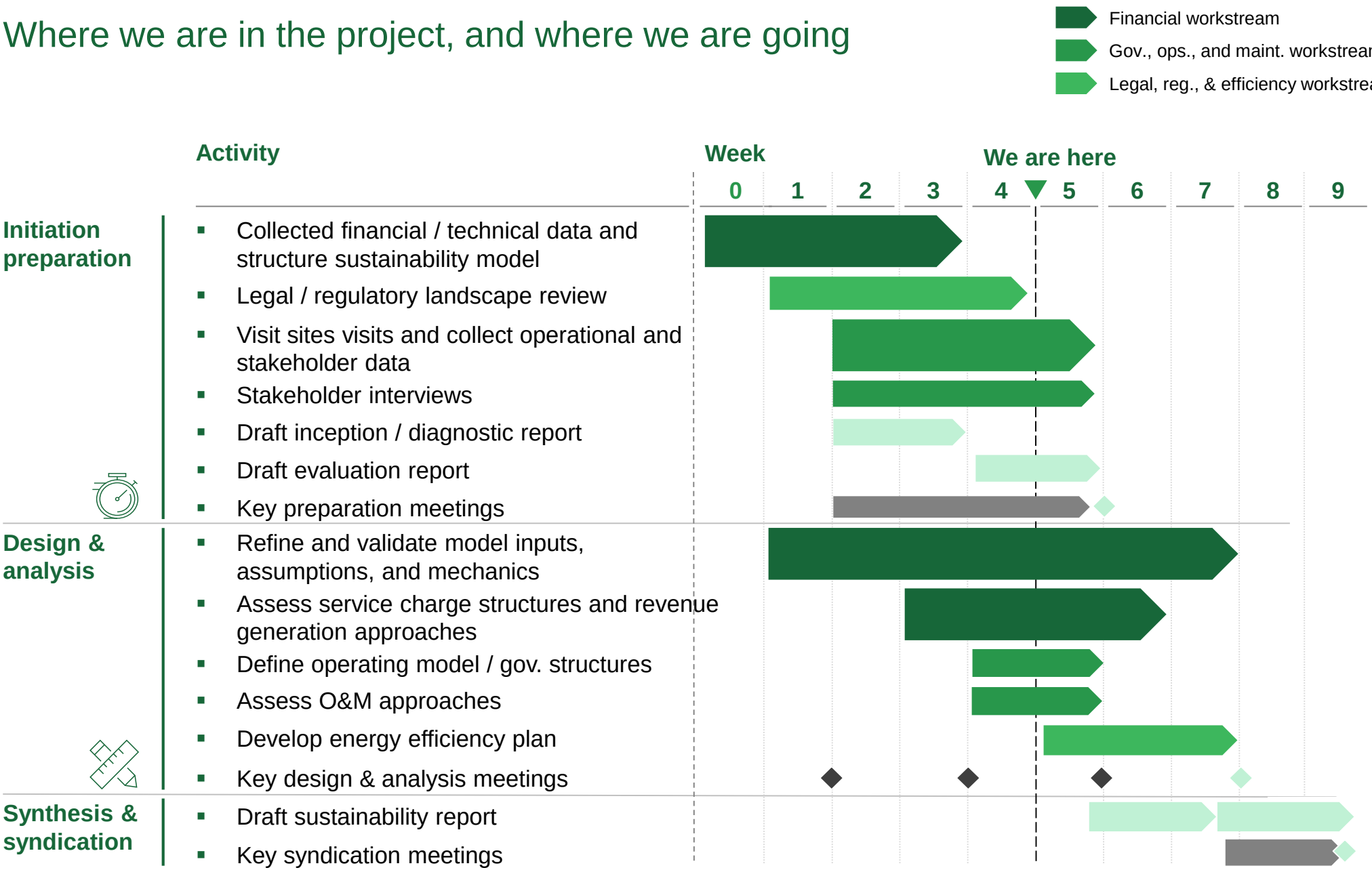
Proposed site for a new energy system

We will be producing sustainability plans for EEP Phase II institutions

Element of sustainability plan	Key design choice(s)
A Financial & commercial model	▪ Service charge levels and structure ▪ Payment flow design ▪ Cash management system
B Operating & governance approach	▪ Organization structure and governance representation ▪ Roles and responsibilities of the organization and third parties ▪ Relationship with the beneficiary institution
C Legal & regulatory posture	▪ Development of regulatory approach ▪ Development of contracting approach to allocate risk ▪ Draft versions of required contracts and license applications
D Energy efficiency policy	▪ Development of University energy efficiency principles ▪ Design of energy system elements to promote sustainability ▪ Design of behavioral change initiatives to promote sustainability
E Engagement & inclusion plan	▪ Design of training centre & initiative design for capacity building ▪ Integration plan for universities' faculty, research activities, and current initiatives ▪ Drafting of principles for gender inclusion

Appendix

Where we are in the project, and where we are going



Key Activities Coming Up:

- *Site visit to NDA*: March 9 – 10
- *Evaluation Report*: March 17
- *Financial Model*: March 17
- *Operating Model*: March 17
- *Final Sustainability Plan*: March 31
- *Syndication of Sustainability Plan*: March 30 – April 3