GLOBAL PROGRAM FOR ENERGY STORAGE

January 2020





ENERGY STORAGE IS KEY TO ACCOMPLISHING 1.5°C AND SDG7 GOALS

- Wind and solar are constrained by variability.
- Energy storage increases system flexibility helping to:
 - 1. improve energy access through minigrids;
 - 2. reduce **GHG emissions** displacing fossil-fuels with renewables.
- Battery storage is modular and universally deployable.
- However, market still nascent: 19GWh stationary vs. 400GWh for EVs.



CONCESSIONAL FINANCE CAN SPEED UP THE TRANSITION



- Concessional finance can bridge financial viability gap.
- \$1 billion Energy Storage Program will mobilize:
 - initial \$500 million through the CIFs, including DFIs;
 - o other sources of concessional climate finance;
 - additional \$3 billion from DFIs and private financing.
- Program will catalyze a market of 200-400 GWh.
- Expected outcomes: increased access, reduced cost and emissions.

INITIAL \$250 MM CONTRIBUTION TO THE CIFS FOR STORAGE PROJECTS FROM THE UK

Support structured as a CIF **Dedicated Private** Sector Program (DPSP).

- DPSP program requires projects to meet the following criteria:
 - a. potential for GHG emissions savings;
 - b. cost effectiveness;
 - c. demontration potential at scale;
 - d. development impact;
 - e. implementation **potential**;
 - additional cost and risk premium.
- Also required to include detailed analyses on:
 - how projects facilitate private sector investment
 - how projects meet minimum concessionality \checkmark and **blended finance** principles

THE CLIMATE INVESTMENT FUNDS GLOBAL ENERGY STORAGE PROGRAM

RENEWABLES ARE ON THE RISE. Amid falling clean

than in 2009, and renewable energy accounts for a

is being made, but barriers to a climate-smarter future

persist. In particular, renewables such as wind or solar

power are prone to intermittency, providing electricity

only when the wind is blowing or the sun is shining.

In order to generate round-the-clock clean power

countries-especially emerging economies-need

an efficient, reliable, scaled, and affordable means of

and narrow the global energy access gap, many

integrating energy into the electrical grid.

conditions, more communities are powered by

output of 11 gigawatt hours (GWh), today's market for stationary batteries is still in its infancy, especially technology costs and increasingly favorable regulatory when compared to the more mature electric vehicle (EV) battery industry. Greater investment is needed to renewable energy than ever before. Wind turbines and mitigate risk and clear a path for scaling up these and solar panels are respectively 40% and 80% cheaper other critically important storage technologies. record 26% of global electricity generation. Progress

INTRODUCING THE GLOBAL PROGRAM FOR ENERGY

STORAGE. The Climate Investment Funds' Global Energy Storage Program (GESP) will help deliver breakthrough energy storage solutions at scale in developing countries. The program makes CIF the world's largest multilateral fund supporting energy storage, building on over \$400 million in existing storage support. Every dollar invested through GESP is expected to generate up to \$8 in partner financing.

ENERGY STORAGE BUILDS LOW-CARBON ECONOMIES. Energy storage technologies, such as batteries

AVAILABILITY EXPECTED IN FEB-MAR 2020 TO ALL CIF COUNTRIES



PROGRAM WILL INVEST IN 17.5 GWH OF BATTERY STORAGE BY 2025

- 1. Support adoption of **policies and regulations**
- 2. Diversifying to more **environmentally sustainable** technologies
- 3. Support to firm power auctions (PV/wind + storage)
- 4. Finance large-scale demonstration projects
- 5. Support mini-grids and distributed applications
- 6. Finance **standalone batteries** as grid asset

(over 4GWh in WB's current pipeline)



PROGRAM WILL INCREASE STORAGE KNOWLEDGE THROUGH COOPERATION



THIS PARTNERSHIP WILL PROVIDE...

Global public goods approach to energy storage:

- Building capacity in developing countries.
- Understanding of emerging markets.
- Opportunities to inform investments and policy dialogue.
- Access to country and project-specific information.
- Opportunities for new technologies to gain visibility.
- Opportunities for multilateral cooperation and responsible innovation.



STRONG COMPLEMENTARITY BETWEEN INVESTMENTS AND KNOWLEDGE



ESP WORKING GROUPS



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V-AV-S-V





ENERGY MANAGEMENT ASSISTANCE PROGRAM (ESMAP)



✓ Partnership between World Bank and 18 partners
✓ to help reduce poverty through sustainable energy solutions.

PROVIDING TECHNICAL ASSISTANCE AND CUTTING-EDGE KNOWLEDGE



800 million people still lacking access to electricity 6x renewable energy capacity increase by 2030



Targets by 2030

7.1 Ensure <u>universal access</u> to affordable, reliable and modern energy services

7.2 Increase substantially the <u>share of renewable</u><u>energy</u> in the global energy mix

7.A <u>Enhance international cooperation</u> to facilitate access to clean energy research and technology.

ADDITIONAL CHALLENGES FACED BY SIDS COUNTRIES

- 1. Strong reliance on **imported fuel supply**
- 2. Lack of regional connectivity
- Limited RE deployment potential due to lack of flexibility
- 4. Price premium associated with projects due to remoteness of locations
- 5. High exposure to adverse weather events
- 6. Importance of planning for resilience
- 7. Limited options for supplying firm power



OPTIONS IN DEVELOPING COUNTRIES FOR SUPPLYING FIRM POWER ARE VERY LIMITED









WBG PROGRAM WILL INVEST IN 17.5 GWH OF BATTERY STORAGE BY 2025

Renewable energy

+ Add to myFT

World Bank plans battery revolution in developing nations

Institution looks to mobilise \$5bn to generate increase in battery storage capacity



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GROWING PORTFOLIO OF ACTIVE BATTERY PROJECTS



ESP WORKING GROUPS



- Produce a common guide for safe operation of energy storage systems
- Develop cost-benefit valuation methods and a catalogue of applications
- Identify warranties that are suited for applications in developing countries

Progress:

- Drafting the outline for a best practice document on safe operation of BESS in developing countries based on literature review, reports from CIGRE and World Bank's presentations
- Collecting key documents/guidelines on cost benefit valuation
- Produced a draft presentation with key aspects of energy storage warranties for developing countries





Conseil national de recherches Canada





- Host an energy storage testbed in challenging climatic conditions
- Contribute to research, monitoring and building capacity in developing countries

- Continue exchanges between the Partners around viable testbed models for the conditions / locations of each Partner
- Continue engagement with donors and prospective partners to raise resources for advancing testbed concept development



 Investigate discrepancies between specifications of energy storage systems and actual performance in developing countries

- Assessing 5-6 pilot PV + BESS mini-grids sites in Nigeria (NREL and Faraday Institution)
- Collecting key documents such as reports from BERA and NREL



Expand Annex 35 on flexible sector coupling to developing countries

Progress

• Defining a deliverable based on internal discussions with the group



Task

- Develop new models for the role of storage in mini-grids that will be available in open course
- Study on what type of battery is needed for different types of mini-grids depending on the number of people

- Drafting outline of the study
- Secured funds and preparing desk review for mini-grids study









- Produce a paper identifying policies and regulations to enable energy storage
- Produce a paper on best practices on service purchase agreements (PSPAs) for energy storage

- Drafting paper on energy storage policies and regulations: engage whole team, circulate outline for feedback, invite suggestions for case studies and inputs, and develop draft report with inputs
- Drafting a literature review paper about existing solar plus storage PPA's (IFC)



- Identify most relevant technology attributes for environmental sustainability
- Take stock of current recycling practices
- Identify successful models for recycling systems

- Preparing structure of the future report, methodology, and distribution of work
- Collecting data and conduct literature review, including reports form WG members
- Gathering insights through dialogue with different stakeholders, including the private sector

