

# THE WORLD BANK's ENERGY STORAGE PROGRAM

CIF: Keeping the Power On: Sparking Energy Storage Solutions in Developing Countries  
May 12-13, 2021

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# STRONG COMPLEMENTARITY BETWEEN INVESTMENTS AND KNOWLEDGE

## BATTERY STORAGE INVESTMENT PLAN (BSIP)

Focused on batteries



Different battery technologies

Provide **lessons learned** from WBG projects

Inform on **best practices** (policy, procurement, enabling infra.)

Develop **sustainable battery solutions** for **developing countries**

## ENERGY STORAGE PARTNERSHIP (ESP)

Technology neutral



Mechanical



Electrical



Chemical



Thermal



Electro-chemical

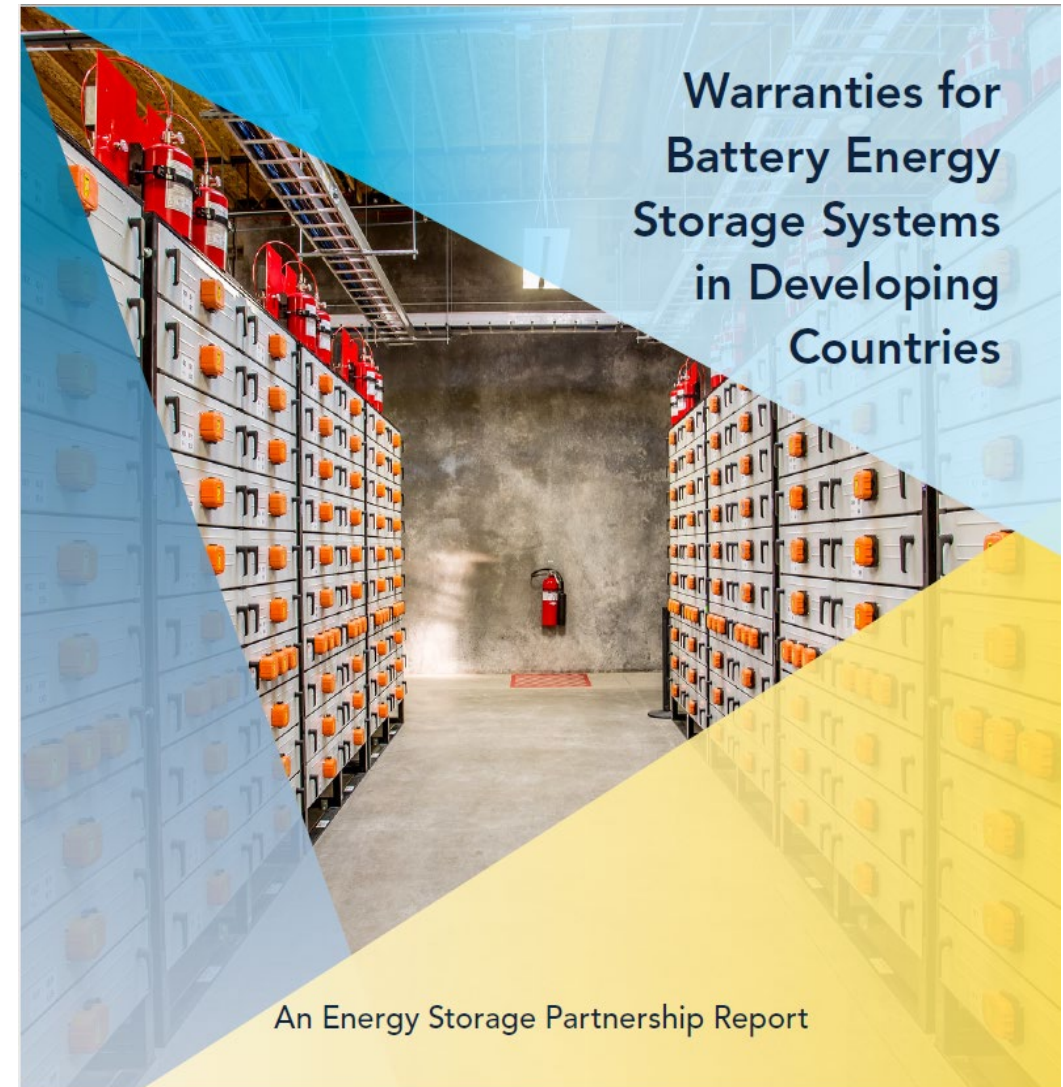
# ESP WORKING GROUPS





# WARRANTIES FOR BESS IN DEVELOPING COUNTRIES

- **Warranties** provide mechanisms for buyers and investors to **mitigate the technical and operational risks** of battery projects.
- **Warranties** can play a key role leveling the playing field for **emerging energy storage technologies** and increasing their **bankability**.
- This brochure describes best practices in designing **BESS warranties for typical applications in developing countries**, considering the local **environmental conditions** and **low O&M capacity**.



# POLICY AND REGULATORY CONSIDERATIONS

## Deploying Storage for Power Systems in Developing Countries Policy and Regulatory Considerations



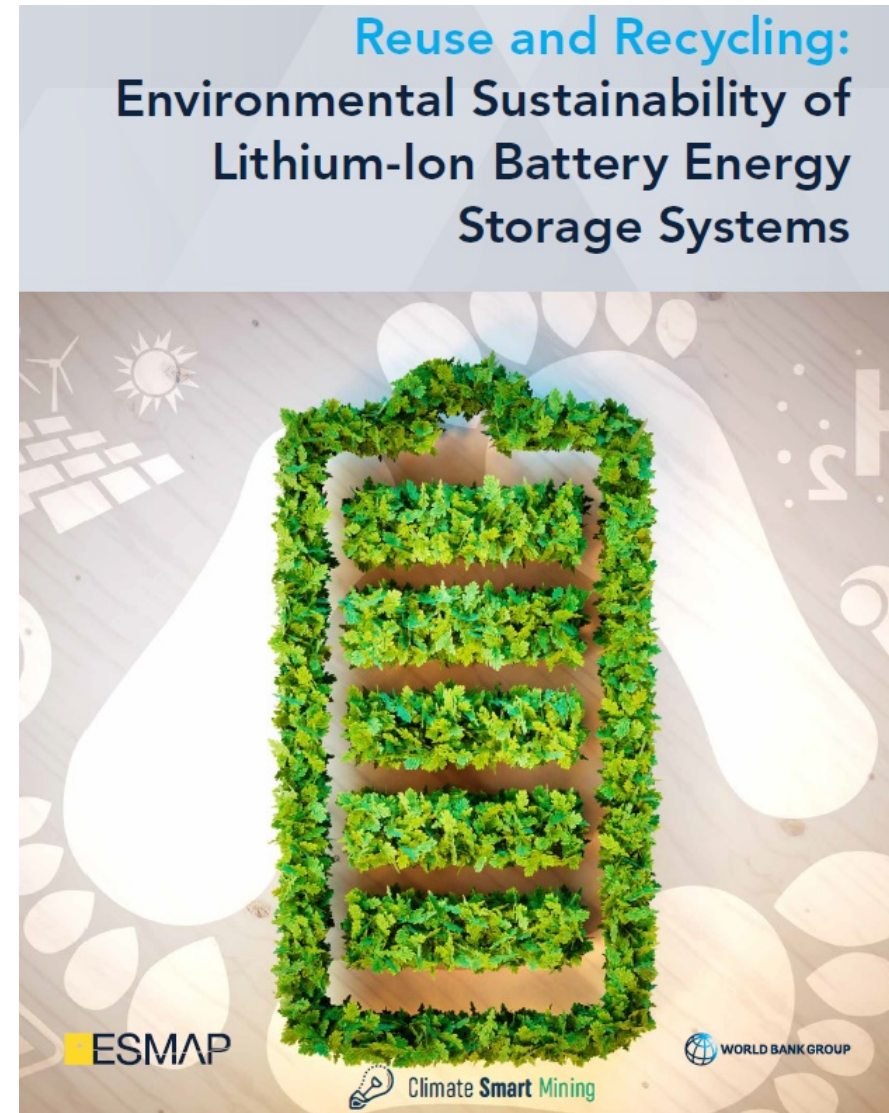
An Energy Storage Partnership Report

- Energy storage can be a **flexible** tool for the grid by acting as a **generator**, a **provider of flexible load**, and as a **substitute of additional grid infrastructure**.
- Energy storage is **new in many systems** and therefore **policy, market and regulatory frameworks often lack storage-specific provisions**.
- The report describes how storage can make a substantial contribution towards cleaner and more resilient power systems, **providing guidance on how to determine the value of storage from a system perspective and to align policy and regulation to attract investments**.



# REUSE AND RECYCLING: ENVIRONMENTAL SUSTAINABILITY OF LI-ION BESS

- **Some of the materials** contained in **lithium-ion batteries** are potentially **hazardous to the environment**.
- It is vital to **establish a reuse and recycling system for the effective management of all materials included in batteries** throughout their **lifecycle**, with **disposal** eventually reaching a net zero target.
- This report provides guidance on how to **integrate reuse and recycling considerations** in future battery design.



# YEAR 2: FOCUS ON TESTING, TRAINING & CAPACITY BUILDING

## 1) Energy Storage Testbeds

- The ESP is exploring with Partners the concepts of testbeds in Morocco, South Africa and India to serve wider regional needs.



## 3) Energy Storage Academy

- Organized around a series of 11 thematic sessions
- To connect ESP partners with WB operations

## 2) Women in Energy Storage Mentoring Program

- Global mentoring program in partnership with GWNET.
- First cohort includes 25 mid-career women from developing countries working in energy storage.



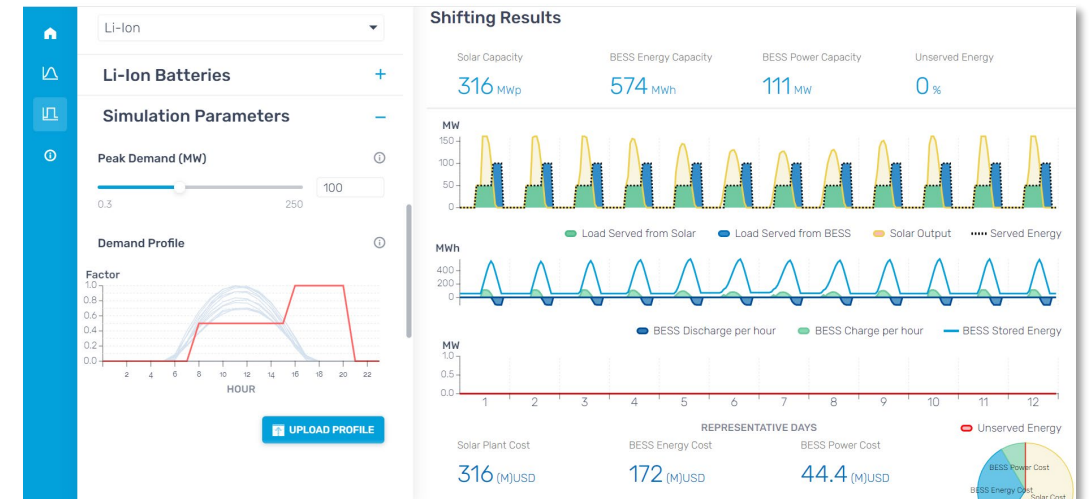
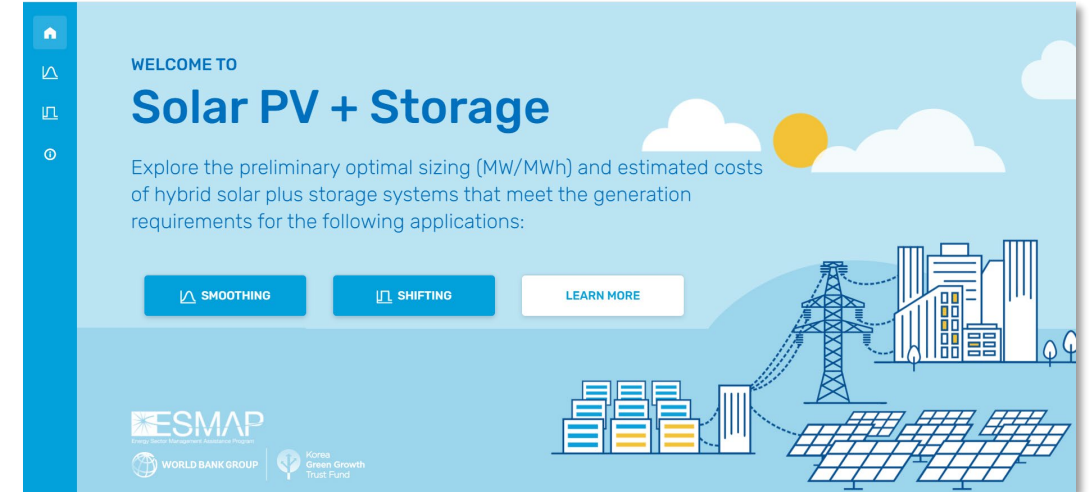
## 4) Other activities:

- Distributed battery storage
- Business models for battery storage applications
- Sector coupling
- Recycling and reuse of batteries



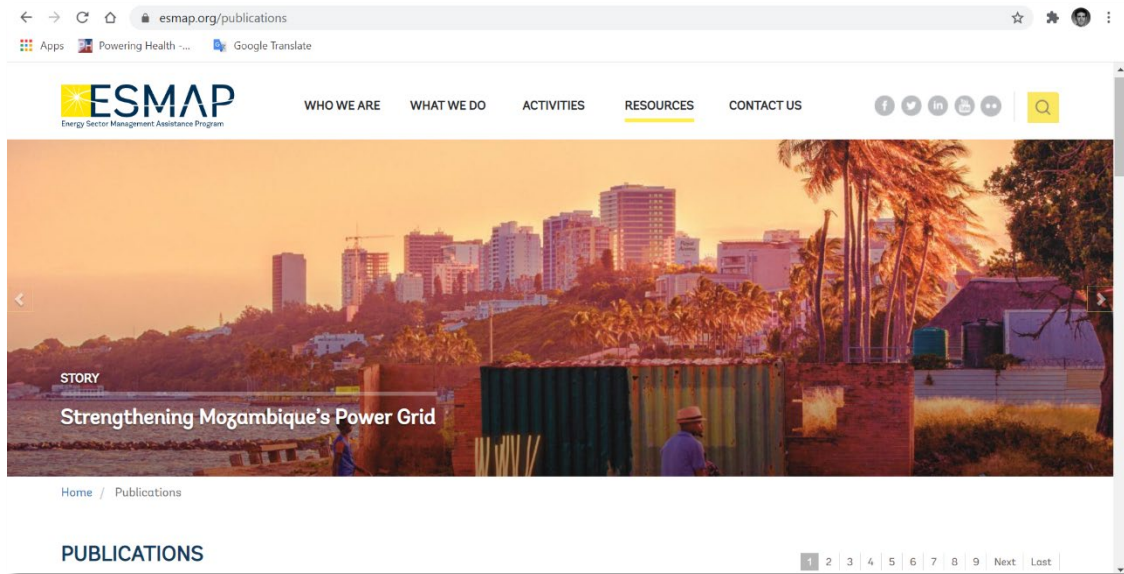
# ENERGY STORAGE SIZING APP

- **Optimally sizing** the energy and power components of battery energy storage systems (BESS) is crucial to maximize the benefits of hybrid solar plus storage plants.
- Battery sizing is a **complex multi-dimensional problem** that requires key performance factors such as the energy and power requirements
- This tool is to provide a **preliminary assessment of the energy storage sizing requirements** (both in terms of energy and power), and the project cost of hybrid solar PV and energy storage systems,
- Available at <https://storagesizing.energydata.info/>



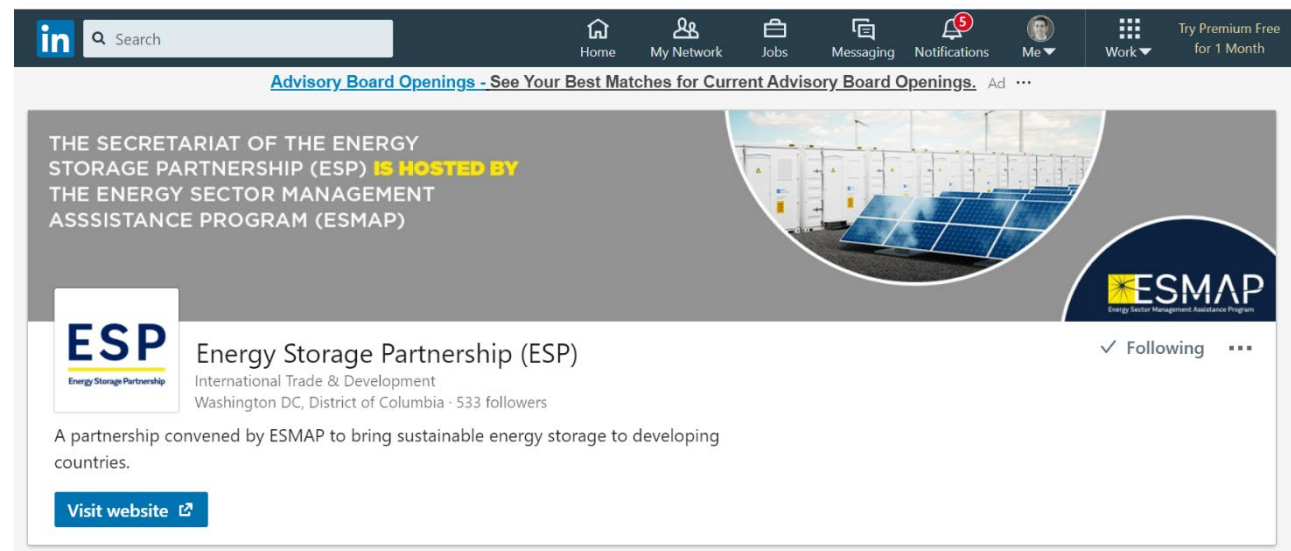


# STAYING CONNECTED WITH THE ESP



<https://www.linkedin.com/company/energy-storage-partnership>

<https://www.esmap.org/publications>





# THANK YOU