

Grids of the Future



Global Energy Alliance
for people and planet

Cutting edge technologies to deliver abundant, reliable, clean electricity across the Global South

The challenge

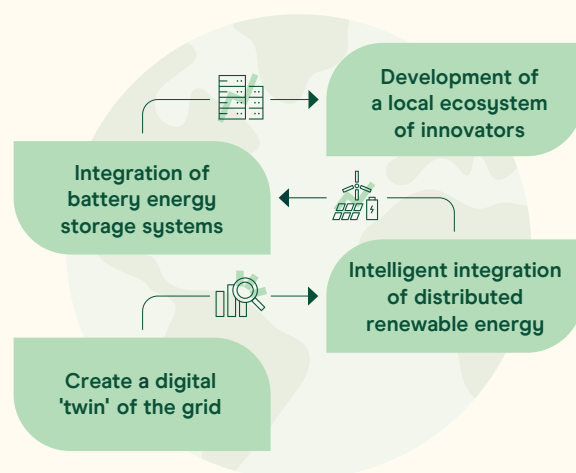
Across the world nearly 700 million people lack access to electricity, and more than a billion lack access that is affordable, reliable or clean. Modern electricity grids are critical to closing this gap. Yet in many emerging and developing economies, utilities – which supply the bulk of electricity – struggle to keep up with demand, held back by aging infrastructure, underinvestment and inadequate staffing, training and actionable data. Efforts to overcome these challenges are often confined to isolated pilots, limiting their ability to address grid-wide, systemic vulnerabilities.

The opportunity

The world stands at a technological and geopolitical inflection point. As emerging economies chart pathways toward energy security and climate resilience, governments are reimagining their countries' energy systems to move beyond fossil fuels. Rapidly falling costs of renewable energy and battery storage, combined with breakthroughs in computing and large AI models, are fundamentally reshaping how energy is produced, moved and managed. As demand for electricity grows, a new generation of modern grids is emerging – smarter, more flexible, and renewables-ready – cutting emissions and unlocking inclusive, sustainable economic growth.

Our approach

Grids of the Future works in deep partnership with utilities, local governments, regulators and innovators to realize this opportunity. By supporting utilities to adopt grid digitalization – the mapping of the physical grid to create a digital 'twin' – and embedding advanced analytics and AI tools, we enable real-time insights into grid health, asset optimization and more accurate demand forecasts. Most importantly, the digital twin allows for the intelligent integration of utility managed battery storage (BESS) and distributed energy resources at points where they deliver the greatest efficiency and climate impact. Complementing this approach, we develop a local ecosystem of innovators and entrepreneurs who help design, deploy and scale solutions.



This approach enables emerging economies to leapfrog from aging, fossil fuel-dependent grids into an abundant, reliable, clean energy future.



The Zawaciki mini grid in Kano, Nigeria, is one of a series of interconnected mini grid projects that are helping Nigeria transform its energy system.



A powerful foundation

Grids of the Future is a replicable approach which builds on Global Energy Alliance projects already delivering impact across the world.

In **Nigeria**, home to the world's largest unelectrified population, **mini grids** interconnected with the local utility serve more than 4,000 homes. The model sparked a pipeline of projects that will **serve hundreds of thousands** more.



Vietnam's groundbreaking **national BESS roadmap**, aiming for 10,000 MW to 16,300 MW of BESS capacity by 2030, is supporting the country's ambitious, just energy transition.



The first competitive BESS tender in **Latin America and the Caribbean** is helping **Barbados** achieve 100% clean energy by 2030. An aggregated procurement initiative supports efforts to fortify energy systems and enhance climate resilience across the region.



Sub-Saharan Africa's first BESS project in Malawi, will help protect the country's hydroelectric grid from the impacts of droughts and extreme weather events.

India

In **Rajasthan**, new digital and financial tools helped scale the government's **distributed renewable energy** program to reach **600,000 rural farmers**, creating a replicable model of public-private collaboration.

India's first commercial, standalone **utility-scale BESS** in New Delhi is improving grid reliability for **100,000 homes and businesses**. Expansion will support the country's ambitious climate and clean energy agenda.

The ENTICE initiative empowers hundreds of entrepreneurs to deploy **cutting edge digital solutions** for grid modernization and decarbonization efforts in India and beyond.

In the Indian state of **Rajasthan**, a digital **'twin'** of Jaipur's electric grid is unlocking reliable power for **18 million mostly rural people**, serving as a blueprint for expansion in India, Brazil, Kenya, Nigeria and beyond (see image below).

Our impact so far

Together these projects are on track to:



Reach **12 million** people with reliable electricity



Avoid **26 million** metric tons of carbon emissions



Enable **1,700MW** of renewable energy capacity

● Digital twins
● Grid-integrated distributed renewables

● Battery storage
● Driving innovation

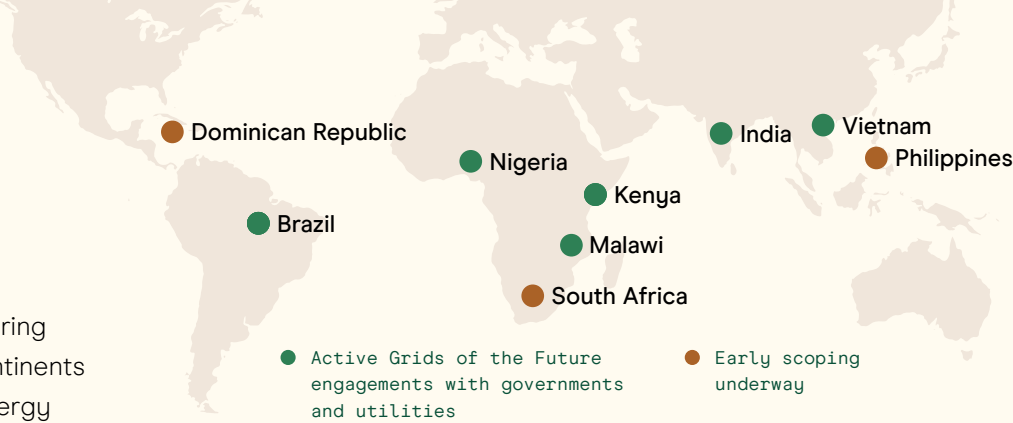


The pathway to scale

Grids of the Future is actively partnering with energy utilities across three continents to replicate our model, improving energy reliability for more than 460 million people.

Our '**champion utilities**' represent a diverse range of geographies and challenges. From small island states to large economies, the challenges their grids face range from low to near universal energy access and from fossil fuel-dependency to rapidly scaling programs of renewables. Seven out of ten customers are from low-income, rural communities.

Our support de-risks technologies, creates markets and unlocks co-investments across four strategic investment tracks:



Our ambition

By 2030 we expect to*:

- Avoid **1.5 gigatons** of carbon emissions
- Reach **462 million** people with reliable electricity
- Unlock **\$65 billion** in financing representing 150X leverage
- Create or improve **64 million** jobs and livelihoods

*Projections based on current program assumptions, methodologies and available data. Numbers may evolve as projects advance and more information becomes available.

Investment track	Initial capital requirement	Uses of funds	Impact & leverage
Digitization	\$5–10M per utility	Technical assistance, grants and concessional debt for utility digitization and capacity building.	Creates next-generation utilities. Lower losses. Unlocks multi-billion dollar infrastructure procurement pipelines.
Hardware and services	\$15–30M per utility	Grants, returnable grants and equipment financing for smart equipment and services (smart meters, transformers, management software) enabled by digitalization.	Improves utility bankability and operational efficiency. Green jobs. Co-investment opportunities with development banks and private sector.
BESS and on-grid distributed renewable energy	\$10–30M per utility	Catalytic capital, regulatory and technical support, pilot funding.	Enables renewables as primary electricity source. Builds grid resilience. Co-investment opportunities with development banks and private sector.
Grid-tech Innovation	\$5–10M per utility	Early-stage capital for grid tech startups. Utility pilots and regulatory facilitation.	Creates innovation ecosystem. Fosters technology adoption by utilities. Attracts venture capital co-investment.

With these investments we will transform our champion utilities by 2030, and create a set of high-impact blueprints for the transformation of energy infrastructure across the Global South.

We are seeking co-funders and strategic partners to join us in executing this vision. Together we can build the Grids of the Future.

 partnerships@energyalliance.org