



Global Energy Alliance
for people and planet

Reliable power for a modern economy

India's first ever, commercial standalone,
utility-scale battery system paves the way for
modern electricity grids across the world



100,000
people receiving
reliable electricity



50+ fact-finding
visits from
global utilities



1.8 million
tonnes of carbon
dioxide avoided



At a glance

- **Project name:** Kilokari Battery Energy Storage System
- **Location:** Kilokri, New Delhi, India
- **Duration:** April 2023-ongoing

Objective

To prove that battery energy storage systems (BESS) are commercially viable and a critical tool for tackling climate change, unlocking renewable energy and stabilizing power grids across the Global South.

Outcome and pathway to scale

The BESS project is now delivering clean, reliable electricity to more than 100,000 people and is projected to avoid 1.8 million tonnes of carbon dioxide emissions — the equivalent of taking 20,000 cars off the roads in India each year. Moreover, it proved that large, utility-scale battery energy storage systems are technically and commercially viable and can deliver stronger electricity grids, both in India and beyond.

By aligning policy, delivering a new regulatory framework and providing catalytic financing and technical assistance, Global Energy Alliance turned what was once considered a high-risk endeavor into an investable product. Today, India's standalone BESS pipeline has more than 55GWh of potential capacity, representing an estimated \$5-6 billion in anticipated investment. Kilokari provides a replicable playbook for modernizing energy systems across emerging economies.



In the south side of New Delhi, India, in the busy neighborhood of Kilokri, where apartment buildings and businesses jostle for space with a school, a health center and a police station, an unassuming new installation turns few heads.

In appearance, it's nothing more than a series of pale grey boxes, about the size of shipping containers, and surrounded by the apparatus of electrical infrastructure. But the prosaic appearance belies a striking story.

This is the groundbreaking Kilokari battery energy storage system (BESS). It guarantees the flow of reliable electricity to more than 100,000 people, though its impact reaches far beyond.

The lessons from the Kilokari project turn one breakthrough into a pathway for many more.

Since its commissioning in April 2025, the site has played host to delegations from across the world. They are keen to understand how a system that did not exist a year ago manages soaring energy demand in one of the world's greatest cities.

This is the story of how the Kilokari BESS came to be and what it means for our clean energy future. It is a story of alliances forged, hurdles overcome, records broken — and of the creation of a BESS playbook that is poised to supercharge a large-scale roll out of BESS projects across the world.

A delegation from Malawi on a site visit to Delhi's battery energy storage system, July 2025. Photo: Global Energy Alliance

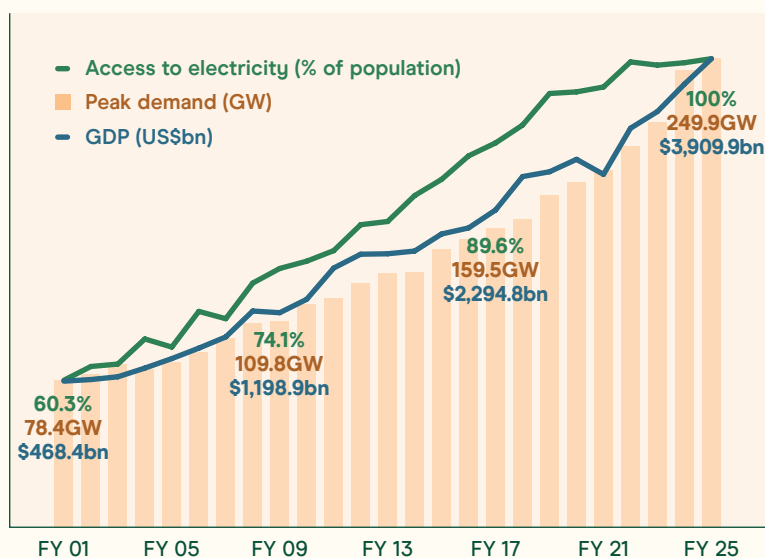


A powerful challenge

The story begins with the homes and businesses of New Delhi. As the city's population and economy grow, the burden on its aging electricity grid is intense. Outages, once infrequent, are becoming more common. More extreme heat, driven by climate change, and growing industrial and domestic demands, all add to the strain.

The city's power demand soared to an all-time high of more than **8440 MW in 2025**, a near tripling of demand since 2002. Current trends suggest that Delhi's peak power demand is likely to exceed 10,000MW by 2029.

India: 25 years of growth



India has made immense strides to meet this demand. The country reports near universal electrification — up from just over 60 percent in 2000. And today, India is considered a world leader in renewable energy. In 2025, the country announced it had achieved its goal of having 50 percent of its installed electricity capacity from non-fossil fuel sources, five years ahead of target.

But that success comes with a challenge: The rapid economic growth and expansion of renewable energy capacity are straining an aging electricity grid not built to manage high demand and the variability in supply that wind and solar bring. Without action, outages are predicted to grow.



Kilokari battery system helps provide reliable electricity to 100,000 residents in New Delhi.
Photo: Global Energy Alliance



The promise of battery storage

BESS is an elegantly simple solution. Utility-scale batteries, strategically connected to the grid, can store electricity when supply is high — for example during the midday sun — and release it during periods of peak demand. By supporting the integration of wind and solar, BESS also reduces reliance on fossil fuels, cutting carbon emissions and helping India, and the world, meet ambitious climate goals.

Global Energy Alliance's key interventions

- New cost analyses deliver new tariff benchmarks
- Concessional capital reduces costs, increases project viability
- Support on RFP development
- Ongoing support for on-the-ground operations and safety measures
- Training curriculum and global knowledge-sharing

As climate change advances, batteries can also supply back-up power during outages caused by extreme weather or planned grid maintenance.

“BESS is more than simply a technology advancement,” said Nirmal Shaju, a manager on the Grids of the Future team at Global Energy Alliance. “It’s a cutting-edge solution that makes electricity cleaner and more reliable, affordable and available when people actually need it, especially in fast-growing, resource constrained markets.”

Across the world, nearly 700 million people lack access to electricity and more than a billion live with access that is unaffordable or unreliable. Even where energy is available, price and supply chain volatility, coupled with unreliable grids, hold back economic planning and growth.

The International Energy Agency estimates that global energy storage capacity must increase sixfold by 2030 to facilitate the planned deployment of renewable energy sources.

As developing and emerging economies seek to expand clean energy — both as a route to greater prosperity, carbon emission reductions and energy sovereignty — BESS is a critical piece of the puzzle. The International Energy Agency estimates that global energy storage capacity must increase sixfold by 2030 to facilitate the planned deployment of renewable energy.

But, despite falling prices and growing use in some markets, the path to large-scale BESS adoption in some emerging and developing economies has not been smooth.



Global Energy Alliance's Nirmal Shaju (right) shows visitors around the Kilokari battery site.
Photo: Global Energy Alliance



Breaking down barriers, breaking new ground

Across economies, limited regulatory frameworks, a lack of technical experience, constrained financing and long lead times have often slowed deployment. While globally, [battery deployment in the power sector tripled in 2023](#), low-and-middle-income countries, excluding China, accounted for only around one percent of new capacity.

In India, regulators, energy companies, utilities and lenders were often skeptical of the technology's viability and cost. Many saw BESS as a solution for the developed economies, too costly for a place like India.

One of the primary challenges has been the complexity of evaluating BESS costs and benefits across diverse use cases. Unlike solar and wind — which often benefit from well-established, long-term purchase agreements that clearly define pricing — the value of energy storage varies by application and market design.

“Previous efforts to determine the financial benefits of BESS didn't adequately weigh the cost of the initial investment against savings that come over time,” said Shaju. “So the benefits were being consistently undervalued.”

India also lacked essential regulations and policies to approve or structure grid-scale BESS projects. In the absence of a policy framework or a precedent, regulators were hesitant to be the first to approve a potentially costly new technology.

Breaking down these barriers would require a multi-stakeholder alliance comprising government, utilities, communities, finance partners and other stakeholders. Policies would need updating, new regulations establishing, along with innovative financing and strong engagement from the grid operators, developers and regulatory authorities.

“

Previous efforts didn't adequately weigh the cost of initial BESS investment against savings over time. So the benefits were being undervalued,”

– Nirmal Shaju, Global Energy Alliance

The neighborhood of Kilokari, New Delhi now has reliable power thanks to the new battery system.

Photo: Global Energy Alliance





A partnership made for power

BSES Rajdhani Power Limited (BRPL) supplies electricity to about 12 million people in New Delhi and has operated a power substation in the bustling neighborhood of Kilokri for roughly two decades. The substation serves a large and growing low-income population. By 2021, it was becoming hard to meet growing demand. Finding real estate to build another substation in a dense urban area seemed impossible.

BESS had been floated as a solution before, but a 2019 project never made it past the drawing board. Regulators, concerned that consumers would bear the cost, hadn't officially authorized battery storage as a viable technology. And state distribution companies, already financially stretched due to soaring power demand, were cautious about committing to new technologies.

In May 2023, working with BRPL and Deloitte, Global Energy Alliance began a study to determine the feasibility of re-igniting the 2019 project by examining how the industry and technology had evolved over the past few years. Instead of relying solely on forward-looking estimates, the team used BRPL's actual data to determine how the utility would have benefited from the storage facility if it had been up and running at an earlier point in time. This approach helped to demonstrate to the regulator that the value of BESS was grounded in today's reality.

The analysis found that, compared to 2019, BESS now offered greater benefits while costs had marginally reduced. This meant that if structured intelligently, concessional capital could make the project viable and help establish a scalable business model.

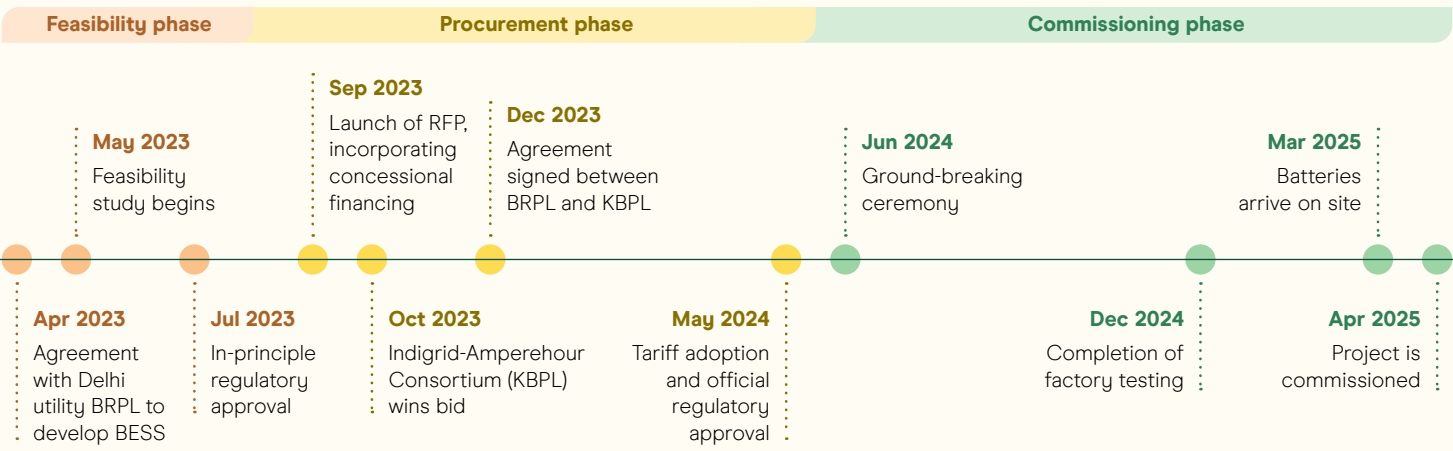
In July, the project received in-principle regulatory approval to proceed. And then, in August, news arrived that brought even greater hope. The national [Ministry of Power published a 14-page framework](#) that officially championed battery storage technology for the first time.

"For energy transition, shifting from fossil fuel-based capacity to renewable energy capacity, it is necessary that the renewable energy becomes ... available 24x7. This is possible only with energy storage," the paper said.

For members of Global Energy Alliance who had long advocated for battery storage, it was a breakthrough moment. "The Indian government had taken a significant step," said Shaju. "It boosted confidence for everyone involved."

In September 2023, Global Energy Alliance appointed [The Energy and Resources Institute](#) (TERI) to invite bids for the planning, design and installation of a 20 MW/40 MWh energy storage system, calling it "a timely and much needed step."

From conception to delivery in less than two years





1.8 million tonnes of CO₂



The amount of climate pollution Kilokari BESS is projected to avoid — equivalent to taking 20,000 cars off India's roads each year.



The Kilokari substation has been a crucial step towards the development of integrated BESS in India. Photo: Global Energy Alliance

“The main purpose of this particular plant is to help increase resilience within the distribution network to provide grid balancing services,” said Abhishek Ranjan, chief executive officer of BRPL, “as well as helping to bring down the overall cost of power purchase for the distribution company and thereby to the residents of Delhi.”

The RFP explicitly included a concessional loan from Global Energy Alliance, which would cover up to 70 percent of the project debt. The loan helped bring down the project's price tag — and therefore the likely cost to consumers — a key element in the effort to secure regulatory approval. It also gave the private sector the confidence that this project would move forward and encouraged bidders to step up.

Through a competitive bidding process, IndiGrid, working with AmpereHour Energy, was selected to develop the Kilokari BESS system. And In May 2024, the project won approval from the [Delhi Electricity Regulatory Commission](#).

“This approval was a key unlock for us and the entire sector,” said Shaju. “As the first regulatory approval for a standalone BESS project in India, it set a clear precedent for other state regulators to evaluate and approve similar projects.”

As work got underway, Global Energy Alliance provided further support to develop AI-enabled systems to detect

early signs of battery overheating and potential fire risks, as well as safety measures like firewalls around the site.

In parallel, a training curriculum was developed for BRPL and other utilities to build institutional capacity around BESS operations and safety. Together, these efforts helped reassure regulators that technical support would be in place all the way from the planning stage to ongoing support after the facility was operational.

The Kilokari storage system began commercial operations in April 2025 and was formally inaugurated in a late-May ceremony attended by Delhi's power minister, local leaders and utility officials.



A labor of love: The AmpereHour team celebrates the commissioning of Kilokari BESS, April 2025 Photo: AmpereHour





“The project went from the drawing board to commissioning in under two years,” said Shaju. “That’s a record in India and a testament to how bringing together the right partners, in the spirit of a true alliance, can turn ambition into reality.”

A few months after the official launch, the site hosted the International Solar Alliance Assembly. More than 60 delegates from 40 countries toured the facility learning about the technical, financial and regulatory hurdles the project had overcome.

Today, Kilokari has become an attraction for BESS observers around the world. Since launch, officials representing more than 50 utilities have visited the site, to share knowledge and lessons that they can apply to projects elsewhere.

Building off the learnings and relationships developed through the BESS work, in March 2026, Global Energy Alliance officially launched the [Grids of the Future](#) India Accelerator. This crosscutting initiative will harness battery storage, artificial intelligence and grid digitalization to support utilities across India and beyond in their journey toward reliable, resilient, future-proof grids.

“

[The Kilokari] project is a strong signal to policymakers and investors alike that battery storage is not just a future solution, it is an urgent priority and compelling opportunity today.”

– Francesco La Camera,
Director-General of the
International Renewable
Energy Agency (IRENA)

Worlds apart, united by BESS

At first glance, Malawi and Barbados don’t have much in common. More than 6,000 miles apart, Malawi is a land-locked, developing nation in southeastern Africa. Barbados is a tropical Caribbean island with an economy deeply dependent on tourism.

But they share common challenges: growing energy demand, spiraling prices for import fuels — and the escalating impacts of climate change that frequently knocks out power. Both countries urgently need more resilient electricity grids to fortify them for the future to come.

Unlocking Malawi’s clean energy potential

Renewable energy comprises at least 90 percent of Malawi’s installed electricity capacity, making the country’s grid cleaner than many. Over 70 percent of that capacity comes from hydropower. A robust clean energy agenda, championed by Malawi’s president, Prof. Arthur Peter Mutharika, sees more solar added to the grid every year. The country has decommissioned 78MW of diesel-fired generators since 2022.

To help modernize Malawi’s grid to manage solar expansion, Global Energy Alliance is working in partnership with the Government of Malawi and Electricity Supply Corporation of Malawi (ESCOM) to roll out BESS. The country’s first grid-connected 20MW / 40MWh BESS will go online in the capital city of Lilongwe in May 2026, unlocking new solar capacity, reducing the country’s reliance on diesel generators and transforming energy access for as many as 2.5 million people.

Global Energy Alliance also supported the training of more than 40 power sector specialists and academics in BESS technology and project development and provided on-the-job training for local contractors and consultants.





Workers in Malawi prepare the Lilongwe site for the new batteries. The grey building on the left houses soon-to-be-decommissioned diesel generators.

Photo: Global Energy Alliance



A new learning center at Lilongwe — similar to the one that a delegation of Malawi dignitaries saw when they visited the Delhi BESS site in 2025 — will serve as a hub for collecting, analyzing and sharing project development and performance data from the BESS project in Malawi and other projects across Southern Africa.

Through workshops, site visits and other knowledge sharing platforms, the Southern Africa BESS Centre of Excellence at Mzuzu University will support the expansion of BESS projects across Africa and around the world.

A first in the Caribbean

Caribbean islands have experienced a tripling of Category 4 and 5 hurricanes over the past 30 years, each causing catastrophic damage and power outages that can last for months. When Hurricane Elsa struck Barbados in 2021, nearly all the island lost power. At the same time, 80 percent of the region's power demand is met by imported oil and diesel, placing it at the mercy of volatile global energy markets. In Barbados alone, fossil fuel imports account for roughly six percent of the island's annual GDP.

Under the leadership of Prime Minister Mia Mottley, Barbados is pursuing an ambitious plan to achieve 100% renewable energy and carbon neutrality by 2030. But the plan faces a challenge: a glut of solar power and a grid not yet equipped to handle the extra capacity. Projects are stalled, solar panels ordered but not installed.

To ease the problem, Barbados is turning to BESS. Since the technology was completely new to the region, the first step was to establish the policies, laws and regulations that would govern and enable it to go ahead.

With the help of Global Energy Alliance and partners, the country designed a new regulatory framework and launched a procurement process for 60MW (240MWh) of BESS. The work included a competitive bidding process, new long-term energy storage agreements with the national utility, and a revolving credit facility that provides flexible capital to support project development and reduce financing barriers for new businesses.

This is more than a technical project,” said Destine Gay, a senior technical officer with the government of Barbados. “It is Barbados taking full ownership of its energy future.”

In partnership with RELP, an independent nonprofit that advises governments on competitive renewable energy and storage procurements, and the Government of Barbados, we are spreading the word with potential bidders. A conference designed to outline key components of the BESS bidding process was attended by more than 200 participants from more than 40 companies. Bidding closes on April 30, 2026. It is anticipated that Barbados will have its first utility-scale BESS before the end of 2027, unlocking the country's full renewable energy potential for the first time.

With the learnings from the Barbados project, Global Energy Alliance, RELP and partners have launched the Caribbean Aggregated Procurement Program, to help countries across the Caribbean harness their collective purchasing power to bring down the cost of clean energy and BESS, and advance the region toward greater energy security and climate resilience.



From New Delhi to the world

Today, Kilokari's battery system helps provide reliable electricity to 100,000 people. Located across from a hospital and next to a police station, it is also strategically placed to ensure the flow of back-up power to these essential services during power cuts and emergencies. Over the system's lifetime, it is projected to avoid 1.8 million tonnes of carbon emissions from fossil fuel generation, the equivalent of taking 20,000 cars off the road in India each year.

With a discovered cost 55 percent lower than India's previous benchmark, the project has set a new standard for BESS affordability in India.

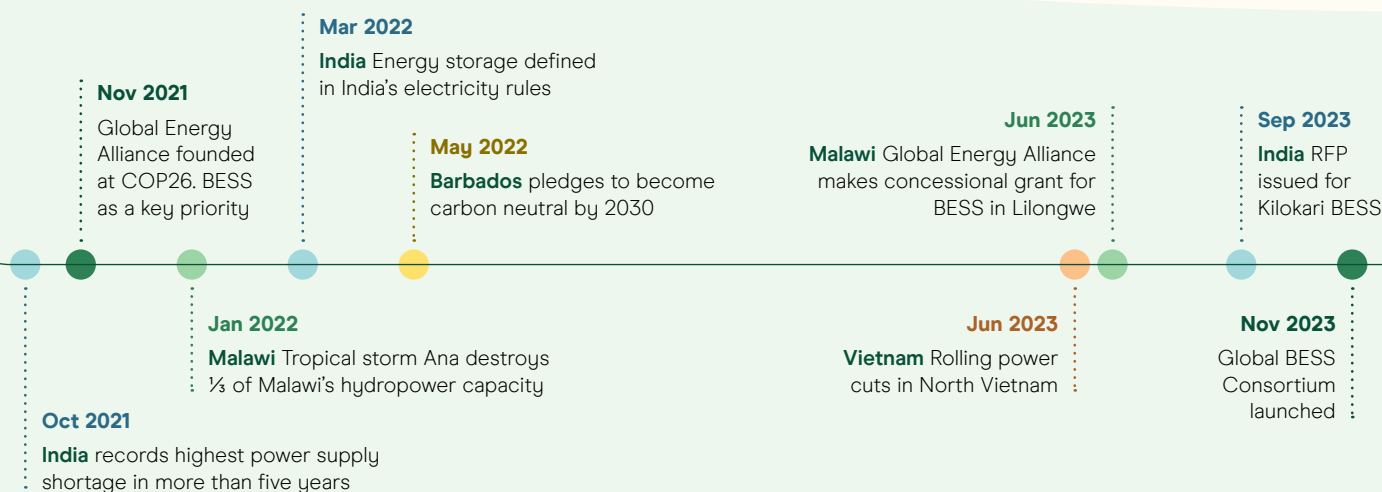
Progress also continues in India. Kilokari demonstrated that standalone BESS was commercially viable at a time when the market barely existed. Since then, aided by the rapidly falling costs of battery storage worldwide, India's standalone BESS pipeline has grown from 40MWh in 2023, to a pipeline of more than 55GWh today, representing an estimated \$5-6 billion in anticipated investment from public and private sources. The government's Viability Gap Funding initiative alone — which now covers 30 GWh of new BESS capacity — is projected to mobilize about \$4 billion.

Initiatives, including in Rajasthan and Maharashtra, have drawn investment from Norway's largest pension fund and British International Investment, the U.K.'s development finance institution.

In March 2025, with technical support from the Global Energy Alliance, Tata Power Mumbai launched an RFP for BESS totalling 100MW. The country's largest battery storage project yet — five times the size of the Kilokari project — is expected to go live in the western state of Gujarat in April 2026.

A global movement for BESS

The Kilokari project is a key part of the Global Energy Alliance-convened BESS Consortium — a group of high-impact global partners working together to unlock 5GW of battery storage capacity in emerging and developing economies. Today the BESS Consortium is supporting projects in more than 20 countries including Malawi, Barbados and Vietnam.





The project uses the same developer as the Kilokari project, and will support a grid that supplies power to over 70 million people.

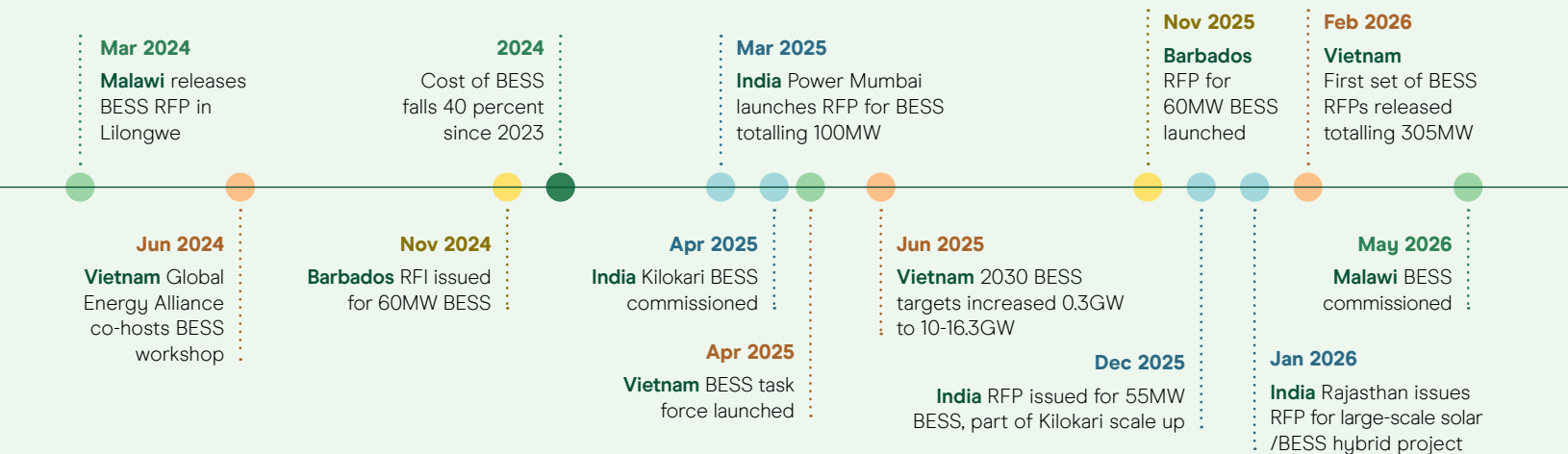
Since Kilokari, India's standalone BESS pipeline has grown to more than 55GWh of capacity, representing an estimated \$5-6 billion in investment.

As Francesco La Camera, Director-General of the International Renewable Energy Agency, said: "Battery storage is not just a future solution, it is an urgent priority and compelling opportunity today."

The Kilokari BESS was commissioned in April 2025, marking a major milestone in a worldwide movement for BESS.
Photo: Global Energy Alliance

Global Energy Alliance and partners continue to share insights with local distributors, state regulators and other stakeholders to support knowledge-sharing, capacity-building and wider adoption. Training sessions at Kilokari and elsewhere focus on BESS maintenance, including a workshop for Delhi's fire services teams in April 2026. An open-source data-sharing tool that can be used at other BESS sites and adapted to optimize individual systems is also under development.

The future for BESS in India and beyond is bright.



Project partners

India

Co-funding partner:

The Rockefeller Foundation

Technical partner: Deloitte

Advocacy partner: RMI

Bid manager: TERI

Implementing partners:

Indigrid, AmpereHour

Utility partner: BRPL

Malawi

Co-funding partner:

Electricity Supply Corporation of Malawi (ESCOM)

Government partners:

Government of Malawi, Ministry of Energy and Mining, Malawi Energy Regulatory Authority

Technical partners:

USAID Power Africa, National Laboratory of the Rockies (formerly NREL), Mzuzu University, Malawi University of Business and Applied Sciences

Implementing partner:

ESCOM

Private sector: National

Bank of Malawi Plc

Barbados

Government partners:

Ministry of Energy and Business Barbados, Fair Trading Commission Barbados

Co-funding partner and transactional advisor: RELP

Private sector: Barbados Light & Power Company

Technical partners:

National Laboratory of the Rockies (formerly NREL), Regulatory Assistance Project

Other partners:

InterAmerican Development Bank

About Global Energy Alliance for People and Planet

Global Energy Alliance for People and Planet builds transformative public, private, philanthropic partnerships to end energy poverty and accelerate green economic opportunity. Founded in 2021 by The Rockefeller Foundation, IKEA Foundation and Bezos Earth Fund, we work in more than 30 countries to unlock finance, strengthen institutions and transform markets, delivering progress that goes beyond individual projects to drive lasting systems change.

Through our two interconnected global pillars, **Grids of the Future** — focused on innovation and infrastructure — and **Powering Opportunity** — with a focus on jobs and livelihoods — we work toward our vision: a world where everyone has access to affordable, reliable, clean electricity and the means to use it to improve their lives.

