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for people and planet



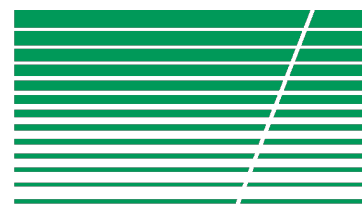
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TA-10479 REG: Accelerating Battery Energy Storage System Development in the Asia and Pacific Region

Newsletter Series

Newsletter No. 1



1. BESS Scale-Up Starts Here: Launching the TA-10479 Knowledge Series

Battery energy storage systems (BESS) are moving quickly from technical option to strategic necessity. As Cambodia, Mongolia, Viet Nam, and other countries across Asia and the Pacific accelerate renewable energy deployment, storage is becoming central to keeping power systems reliable, flexible, and ready for a cleaner energy future.

Welcome to the first issue of the newsletter series under TA-10479 REG: Accelerating Battery Energy Storage System Development in the Asia and Pacific Region. This regional technical assistance supports Cambodia, Mongolia, and Viet Nam in identifying and addressing the barriers that still limit wider BESS deployment: from policy and regulatory gaps to market design, technical standards, safety, recycling, digitalization, and gender inclusion.

The TA's knowledge-sharing stream provides a practical space for regional exchange, peer learning, and dialogue among government institutions, utilities, regulators, development partners, technical experts, and other stakeholders working to scale up BESS. Through knowledge-sharing, analytical work is connected with real-world discussion, helping countries move from storage ambition to practical deployment pathways.

Over the course of the TA, the knowledge-sharing program will deliver **six newsletters** and **six webinars**, complemented by **three regional workshops** and online outreach. Together, these activities will share practical insights, international experience, country updates, and emerging lessons on how BESS can support renewable energy integration, grid flexibility, system reliability, and the broader clean energy transition.

In this issue

This first newsletter brings together the key building blocks of the TA's knowledge-sharing agenda:

- Why energy storage matters now for modern power systems and renewable energy integration;
- Country snapshots from Cambodia, Viet Nam, and Mongolia, highlighting recent BESS-related developments and opportunities;
- Why gender matters in energy storage and renewable energy deployment;

- Highlights from the first workshop and webinar under the knowledge-sharing series; and
- Upcoming knowledge-sharing activities, including the next webinar and the Interim Workshop in Mongolia.

The aim of this newsletter series is not only to report on TA activities, but also to share useful, accessible, and timely knowledge for stakeholders working on BESS deployment in Asia and the Pacific. As the TA progresses, future issues will continue to spotlight country experiences, practical lessons, technical insights, and opportunities for collaboration.

2. From Backup to Backbone: Why Energy Storage Matters Now

Power systems are changing fast. As countries add more solar and wind power, they are also facing a new challenge: clean electricity is not always produced when it is needed. This is where energy storage becomes essential.

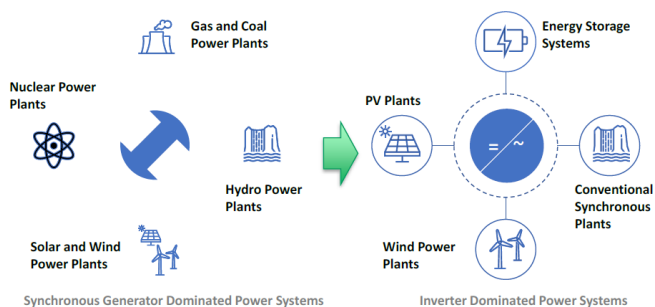
BESS are no longer just a backup option. They are becoming a core part of modern power systems, helping countries integrate more renewable energy, manage demand peaks, strengthen grid stability, and reduce reliance on fossil-fuel-based flexibility. For Cambodia, Mongolia, and Viet Nam, this shift is especially important as each country explores practical pathways to scale up renewable energy and modernize its electricity system.

The grid is changing

Traditional power systems were built around large, dispatchable power plants such as coal, gas, hydropower, and nuclear units. These plants use synchronous generators, which naturally provide inertia and help keep the grid stable. In this model, electricity supply could be adjusted relatively predictably to follow demand.

Today, that model is evolving. Solar PV, wind power, and battery storage are connected to the grid through power electronics and inverters. As shown in Figure 1, power systems are transitioning from synchronous-generator-dominated to inverter-dominated systems. This transition supports decarbonization, but it also changes how power systems are planned and operated.

Figure 1: The transition from conventional synchronous-generator-based power systems to modern inverter-based power systems



Source: IES, 2026

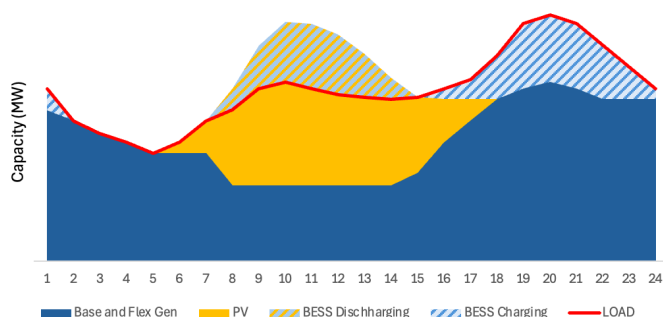
With higher shares of variable renewable energy (VRE), system operators must manage faster generation changes, lower system inertia, new congestion patterns, and greater uncertainty in daily operations. Flexibility is therefore becoming one of the most valuable resources in modern grids.

Storage solves the timing problem

Solar and wind power are inherently variable. Solar output rises during the day and falls in the evening. Wind output can change quickly depending on weather conditions. Demand, however, follows its own pattern and often peaks when renewable output is low.

Energy storage helps solve this timing problem. It can store electricity when renewable generation is high, or demand is low, and discharge it when electricity is needed most. This allows more clean electricity to be used instead of curtailed and helps reduce pressure on conventional generators during peak periods.

Figure 2: Peak shaving and load shifting: using storage to manage demand and improve system flexibility



Source: IES, 2026

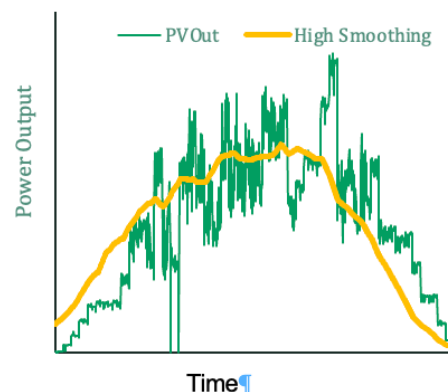
In practical terms, storage can support:

- shifting solar generation from midday to evening peak demand;
- reducing renewable energy curtailment;
- smoothing sudden changes in solar and wind output;

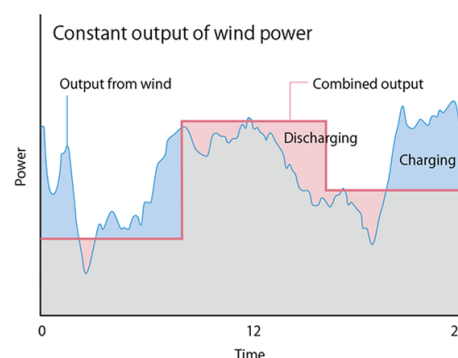
- improving the use of existing grid infrastructure; and
- supporting more reliable power supply in weak or congested networks.

Figure 3: Smoothing variable renewable energy output: examples from solar PV and wind power

A – PV ramp Smoothing



B Wind Capacity Smoothing



Sources IES, 2026

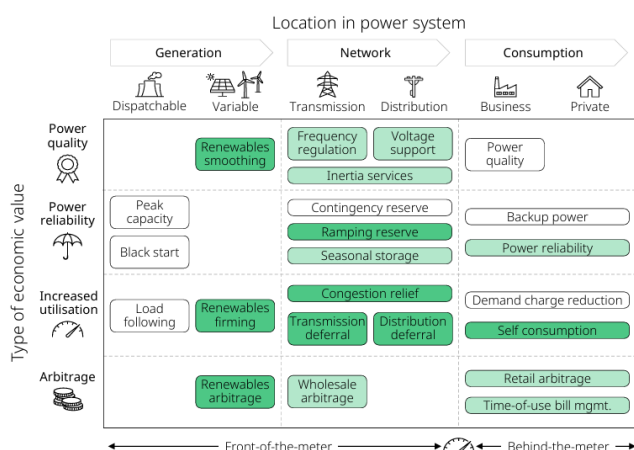
This is why BESS is increasingly viewed not only as an energy asset, but also as a flexibility asset.

BESS does more than store electricity

The value of BESS goes beyond charging and discharging. Modern battery systems can respond within milliseconds, making them highly suitable for grid support services.

BESS can help stabilize frequency, support voltage, provide operating reserves, smooth renewable energy ramps, and assist with black-start capability. Advanced systems equipped with grid-forming inverter functions can also provide virtual inertia and fast frequency response, helping maintain system stability as conventional synchronous generation declines.

Figure 4: How storage systems support renewable energy integration and grid reliability



Source: Dr. Iain Staffell, 2025

These services are especially important in power systems with growing shares of inverter-based resources. As more solar and wind plants are connected, BESS can help bridge the operational gap between traditional grid stability mechanisms and the needs of modern, low-carbon power systems.

Why it matters

Energy storage can help power systems:

- integrate more renewable energy;
- reduce curtailment of solar and wind generation;
- manage evening peaks and rapid demand changes;
- improve frequency and voltage stability;
- defer or reduce the need for some grid investments;
- support reliability in weak or isolated grids; and
- create new opportunities for private investment and market participation.

Flexibility has economic value

Storage also creates economic value. Depending on the market and regulatory framework, BESS can earn or justify revenue through multiple services. This may include energy arbitrage, capacity provision, ancillary services, congestion management, and peak shaving.

This combination is often called revenue stacking. Instead of relying on a single source of value, a storage project may combine multiple services to strengthen its business case. For example, a BESS can shift energy across time, provide fast frequency response, support voltage regulation, and reduce congestion in the same system, if market rules and dispatch arrangements allow these services to be recognized and compensated.

Storage can also act as a Non-Wires Alternative. In some cases, strategically located BESS can help defer or avoid costly transmission and distribution upgrades by reducing congestion, supporting local demand, or managing peak loads. This does not replace all network investments, but it can give planners another tool to improve system efficiency.

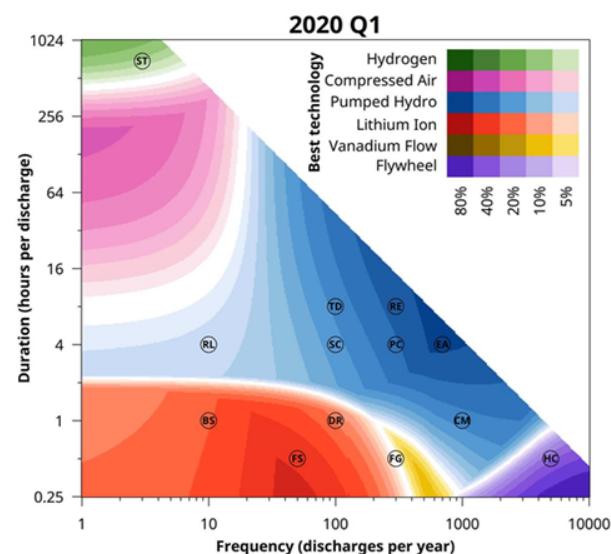
Different technologies, different roles

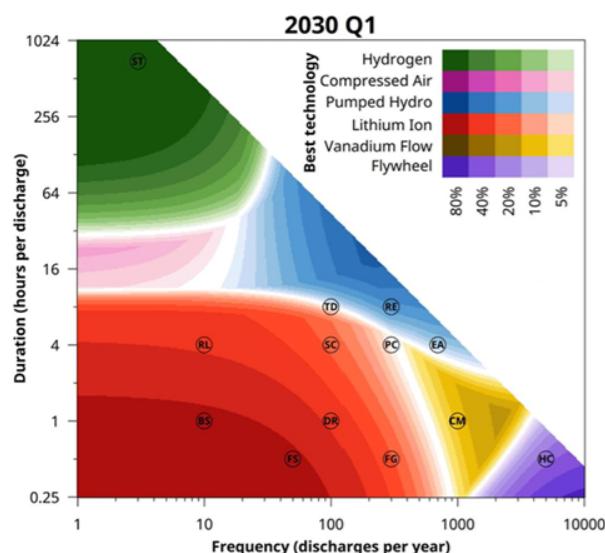
No single storage technology is suitable for every application. Different technologies serve different time scales, response needs, and system functions.

Flywheels are well suited for very fast, short-duration services such as frequency regulation. Lithium-ion batteries are widely used for short- to medium-duration applications because they are modular, fast-responding, and scalable. Vanadium redox flow batteries can be useful for medium-duration applications and renewable energy firming. Pumped storage hydropower remains a mature option for large-scale and long-duration storage where geography allows. Other options, such as compressed air energy storage, thermal storage, and green hydrogen, may become increasingly relevant for long-duration or seasonal balancing.

The key message is simple: power systems may need a portfolio of storage technologies. The right choice depends on the service required, the duration needed, the grid location, cost, safety, environmental considerations, and the maturity of the regulatory framework.

Figure 5: Different storage technologies for different grid services and durations





Source: <http://www.energystorage.ninja> (June 2025)

What still needs to change

Despite strong momentum, wider deployment of energy storage still faces important barriers.

Many countries do not yet have clear rules defining how storage should be classified: is it generation, load, network infrastructure, or a separate asset class? This matters because classification affects licensing, tariffs, grid connection, dispatch, and cost recovery.

Market frameworks are also often incomplete. Without clear mechanisms for remunerating flexibility, ancillary services, capacity value, or congestion relief, BESS projects may struggle to become financially viable. In some systems, storage can provide valuable services, but there is no formal market or tariff structure to pay for them.

Technical and safety standards are another priority. As BESS deployment grows, countries need clear requirements for system design, fire safety, commissioning, operation, emergency response, and grid integration. These standards are important for investor confidence, public acceptance, and reliable long-term operation.

Lifecycle management is equally important. Batteries must be collected, handled, repurposed, recycled, or disposed of safely at the end of their life. Circular economy approaches, second-life applications, recycling infrastructure, and Extended Producer Responsibility schemes can help reduce environmental risks and recover valuable materials.

From technology option to system necessity

Energy storage has moved from the margins of the power sector to the center of energy transition planning. It enables greater integration of renewable

energy, strengthens grid flexibility, enhances reliability, and creates new pathways to cleaner, more resilient power systems.

For Cambodia, Mongolia, and Viet Nam, the question is no longer whether BESS can play a role. The question is how to create the right policy, regulatory, technical, financial, and institutional conditions for BESS to deliver its full value. This is the focus of TA-10479 REG and knowledge-sharing activities: turning global experience into practical deployment pathways for Asia and the Pacific.

3. Country Focus: BESS Momentum in Cambodia, Viet Nam, and Mongolia

3.1. Cambodia: Solar Growth Creates New Momentum for Storage

Cambodia's power system is expanding quickly, and storage is moving up the agenda. With renewables already accounting for a major share of installed capacity and solar PV growing fast, BESS are becoming an increasingly important tool for managing variability, supporting grid reliability, and turning renewable energy growth into dependable power supply.

Cambodia is not starting from zero. The country has already commissioned a sizeable BESS portfolio, including large standalone systems and batteries co-located with solar PV projects. This means storage is no longer only a future option; it is already part of Cambodia's evolving power system.

Cambodia at a glance

Figure 6: Solar PV and battery storage at the National Solar Park in Kampong Chhnang, Cambodia



Source: ADB, 2026

- 5,932 MW total installed generation capacity in 2025, including 672 MW imported from neighbouring countries
- 22,361 GWh electricity delivered in 2025
- 3,325 MW renewable energy capacity, equal to 63.23% of installed capacity
- 10,317.52 GWh supplied by renewables, equal to 50.09% of delivered electricity
- 1,476 MW solar PV capacity, including 1,307 MW utility-scale solar and 169 MW rooftop solar
- 563 MW of commissioned BESS capacity by 2025
- 1,000 MW BESS included in the 2025–2029 priority investment package

Renewables are already reshaping the power mix

Cambodia's power sector has expanded rapidly over the past decade. In 2025, total installed generation capacity reached 5,932 MW, while electricity delivered totalled 22,361 GWh. Renewables now represent 3,325 MW, or 63.23% of installed capacity. In terms of electricity delivered, renewables supplied 10,317.52 GWh, or 50.09% of total delivered electricity.

Hydropower remains the backbone of Cambodia's renewable energy supply. It accounts for 1,801 MW of capacity and delivered 8,167.52 GWh in 2025. Solar PV has also scaled up quickly, reaching 1,476 MW and delivering 2,097.41 GWh. Most of this solar capacity is utility-scale, while rooftop solar contributes 169 MW and 265.69 GWh.

This mix shows both progress and the next challenge. Renewables already dominate installed capacity, but their contribution to delivered electricity is lower because generation depends on resource availability, seasonal patterns, and system operation. As solar and wind expand, Cambodia will need greater flexibility to manage when renewable electricity is produced and when it is needed.

Solar growth brings flexibility needs

Solar PV is becoming a major part of Cambodia's clean energy transition. However, higher solar penetration also brings operational challenges. Solar generation is concentrated during daylight hours, while demand often peaks later in the day. Without adequate flexibility, systems can face ramping needs, congestion, curtailment, and increased pressure on conventional balancing resources.

Cambodia has begun addressing these issues by introducing clearer rules for rooftop solar. In 2023, the country introduced a formal permitting framework for rooftop PV to improve safety oversight and manage potential impacts on the distribution network. A central feature is an annual quota-based permitting

system for grid-connected rooftop solar, set at 30 MW for 2025 and a further 30 MW for 2026.

Stakeholders widely believe that several hundred megawatts of rooftop solar were installed before the 2023 framework. This means the current policy agenda has a dual role: enabling new rooftop solar growth while gradually bringing existing installations into a more transparent and managed system.

BESS is moving from concept to deployment

Cambodia has already commissioned 563 MW of BESS capacity by 2025, covering both standalone systems and batteries co-located with utility-scale solar plants. Two flagship projects anchor this commissioned portfolio: 300 MW / 600 MWh in Kampong Chhnang and 200 MW / 400 MWh in Pursat. Both are approximately two-hour duration systems, indicating a focus on peak support, ramp management, and short-duration energy shifting.

Several smaller batteries, including systems of 12 MW, 6 MW, 30 MW, 3 MW, and 4 MW, are deployed alongside specific solar projects. This reflects a growing trend toward PV-plus-storage configurations, where batteries help improve the operational value of solar generation.

What the 2025–2029 investment package signals

Cambodia's updated Power Development Plan points toward a more flexible and diversified power system. The medium-term strategy emphasizes the rapid deployment of variable renewable energy, especially solar and wind, supported by flexibility investments such as BESS and pumped-storage hydropower.

In November 2024, the Government approved a priority investment package for commissioning during 2025–2029. The package includes 2,710 MW of utility-scale solar PV and a staged rollout of 900 MW of wind projects in Monduliri. These renewable additions are complemented by major investments in flexibility and firm capacity, including 1,000 MW of standalone BESS, 1,000 MW of pumped-storage hydropower, and a 900 MW LNG-fired plant to strengthen system adequacy and balancing.

This package signals that Cambodia's next power-sector challenge is not only to add more renewable capacity, but also to ensure that the system has enough flexibility to integrate it reliably.

Why it matters for BESS

BESS can help Cambodia:

- integrate higher shares of solar and wind power;
- manage evening peaks and short-duration balancing needs;
- reduce curtailment and improve the use of renewable generation;
- support grid reliability near load centers and renewable generation zones;
- improve ramp management as solar output changes during the day; and
- create a foundation for future market, tariff, and regulatory development.

Cambodia is moving from early-stage discussion toward practical BESS deployment. The next step is to strengthen the enabling environment so that storage can deliver its full value. This includes clear technical standards, safety requirements, cost-recovery mechanisms, grid connection rules, and business models that recognize the multiple services BESS can provide.

Through TA-10479 REG, Cambodia's experience will contribute to regional learning on how battery storage can support renewable energy integration, grid flexibility, and the development of reliable clean power.

3.2. Viet Nam: PDP8 Puts BESS on the National Power Roadmap

Viet Nam's power system has grown at remarkable speed. Over the past decade, electricity demand has risen strongly, installed capacity has nearly doubled, and solar and wind have become central to the country's power-sector transformation. This growth has helped green the grid, but it has also created a new challenge: integrating large volumes of variable renewable energy while keeping the system reliable, flexible, and investment-ready.

This is where BESS are moving into focus. Under the revised National Power Development Plan VIII (PDP8), storage is no longer only a pilot or a technical option. It is becoming part of Viet Nam's long-term power system planning, with a major role expected for both pumped storage hydropower (PHS) and BESS.

Viet Nam at a glance

Table 1: Selected PDP8 revised targets relevant to renewable energy and storage

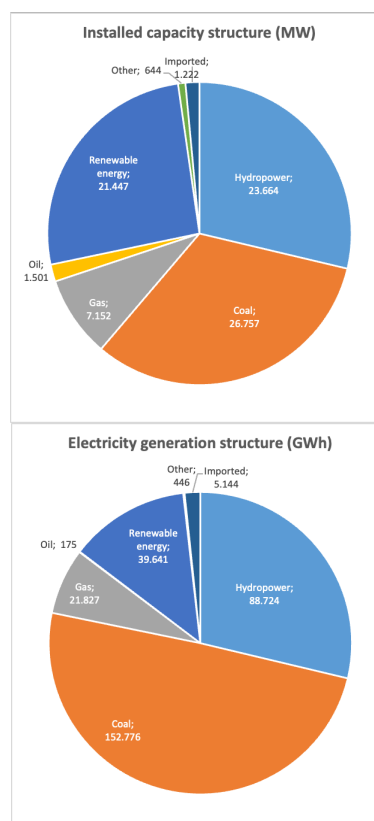
Selected PDP8 revised indicators	2026–2030	2031–2050
Pumped storage hydropower and BESS capacity	12,400 MW	116,674 MW
Investment needs for PHS and BESS	USD 6.1 billion	USD 21.9 billion
Solar capacity	46,459 MW	293,088 MW
Onshore wind capacity	26,066 MW	84,696 MW
Offshore wind capacity	6,000 MW	113,503 MW
Total generation and transmission investment needs	USD 136.3 billion	USD 699.2 billion

Source: Electricity Authority of Vietnam, 2025.

A fast-growing power system

Viet Nam's power sector has made strong progress in scale and diversification. From 2015 to 2024, national electricity load increased at an average annual rate of about 9–10%, reflecting rapid economic growth, industrialization, and rising electricity demand. Over the same period, total installed generation capacity nearly doubled, reaching almost 82,400 MW by the end of 2024.

Figure 7: Viet Nam's power mix in 2024



Source: Electricity of Vietnam, Annual Report 2024–2025.

This rapid expansion has helped Viet Nam meet growing demand and support socio-economic development. It has also made system planning more complex. As the grid becomes larger, more diversified, and more renewable-heavy, flexibility becomes increasingly important for balancing supply and demand, managing congestion, and ensuring reliable operation.

Renewable growth changed the grid

Viet Nam experienced a major renewable energy boom during 2019–2021, especially in solar and wind power. Feed-in tariff schemes helped unlock large-scale investment and rapidly increase renewable capacity. This was a major achievement for the country's energy transition.

However, the next phase is more challenging. Renewable energy investment has slowed in recent years due to grid congestion and the lack of new incentive mechanisms. High renewable penetration also creates operational pressures, including curtailment, local network constraints, variability in generation, and growing demand for balancing and ancillary services.

In this context, storage can help unlock more value from both existing and future renewable energy assets. BESS can absorb electricity when solar or wind output is high, discharge when the system needs power, and provide fast-response services that support grid stability.

PDP8 revised gives storage a bigger role

The revised National Power Development Plan VIII, covering 2021–2030 with a vision to 2050, sets ambitious renewable energy targets. Renewables excluding hydropower are expected to account for about 28–36% of total generation capacity by 2030 and 74–75% by 2050.

With this level of renewable energy integration, storage becomes a strategic system requirement. PDP8 revised identifies BESS as a potential solution to enhance grid stability, optimize the use of variable renewable energy, and reduce curtailment. Expected BESS capacity is about 10,000–16,300 MW by 2030 and 95,983–96,120 MW by 2050.

The investment scale is also significant. The PDP8 revised investment table groups PHS and BESS together, showing 12,400 MW of combined PHS and BESS capacity for 2026–2030 and an estimated investment need of USD 6.1 billion. For 2031–2050, the plan indicates a combined PHS and BESS capacity of 116,674 MW, with estimated investment needs of USD 21.9 billion.

These figures signal a major planning shift. Storage is increasingly considered not a marginal technology but part of the infrastructure needed to support a high-renewable power system.

Why BESS matters for Viet Nam

For Viet Nam, BESS can support several practical power-system needs:

- reducing curtailment of solar and wind generation;
- improving grid stability in areas with high renewable penetration;
- shifting electricity from periods of high renewable output to periods of high demand;
- supporting peak demand management and short-duration balancing;
- providing fast-response ancillary services;
- helping manage congestion in renewable-rich regions; and
- supporting hybrid solar-plus-storage and utility-scale storage applications.

BESS can also support the next stage of power market development. As Viet Nam continues to modernize its power sector, storage could play a role in future mechanisms for ancillary services, flexibility procurement, and private-sector participation, provided that clear regulations and revenue models are established.

Why it matters for BESS

Viet Nam's storage opportunity is significant because BESS can help:

- unlock more value from existing and future solar and wind capacity;
- provide flexibility in congested or high-renewable regions;
- support grid stability and ancillary service needs;
- reduce curtailment and improve renewable energy utilization;
- create opportunities for pilot projects, market design, and private investment; and
- translate PDP8 revised storage targets into practical implementation pathways.

Viet Nam's BESS scale-up will depend on more than technology alone. Clear regulations, revenue models, technical standards, licensing procedures, dispatch rules, and bankable business models will be essential to move from planning targets to implementable projects.

Through TA-10479 REG, Viet Nam's experience can contribute valuable lessons for the region on how fast-growing power systems can integrate renewables, manage flexibility needs, and prepare practical pathways for large-scale BESS deployment.

3.3. Mongolia: From First BESS Projects to a Growing Storage Pipeline

Mongolia is already moving beyond early discussion on battery storage. In a power system shaped by coal-fired combined heat and power plants, import dependence, harsh winters, and growing renewable energy ambitions are making BESS a practical tool for grid support, energy security, and renewable energy integration.

The country has already commissioned several BESS projects, including an ADB-supported flagship system in Ulaanbaatar. At the same time, a larger pipeline of standalone and hybrid solar-plus-storage projects suggests that Mongolia's storage market could expand significantly if the enabling environment continues to improve.

Mongolia at a glance

- About 81% of installed generation capacity comes from coal-fired combined heat and power plants
- Wind and solar each contribute just under 9% of installed generation capacity
- Electricity imports reached around 2.86 billion kWh in 2024, roughly one-quarter of national consumption
- Mongolia targets 30% renewable energy in installed capacity by 2030
- Around 160.6 MW / 525.2 MWh of operational BESS capacity had been deployed by early 2026
- The 80 MW / 200 MWh Songino BESS in Ulaanbaatar was commissioned in 2023 with ADB support
- A near-term standalone BESS pipeline of 106 MW / 274.8 MWh is planned for 2027–2028
- A longer-term hybrid solar-plus-storage pipeline includes 870 MW / 3,462 MWh of BESS co-located with 1,175 MW of solar PV

A coal-heavy system with growing flexibility needs

Mongolia's power sector is at a critical transition point. The system remains heavily dependent on coal-fired combined heat and power plants, which account for about 81% of installed generation capacity. Wind and solar each contribute just under 9%, reflecting the country's strong renewable resource potential but also the early stage of large-scale integration.

The power system is also fragmented into five regional grids. The Central Energy System dominates national supply and serves most electricity consumers, while other regional systems face their own reliability and flexibility challenges. Mongolia also remains

structurally dependent on electricity imports from the Russian Federation and the People's Republic of China. In 2024, imports reached around 2.86 billion kWh, equivalent to roughly one-quarter of the country's total consumption.

This combination of coal dependence, rising demand, import exposure, and limited flexibility makes storage highly relevant. BESS can help shift electricity across time, support peak demand, provide fast grid response, and improve the integration of Mongolia's solar and wind resources.

Policy signals are pointing toward cleaner and smarter grids

Mongolia's policy direction is clear. Vision-2050, the State Policy on Energy 2015–2030, and Mongolia's NDC 3.0 all point toward a cleaner, smarter, and more flexible energy system. The government targets a renewable energy share of 30% of installed capacity by 2030 and has introduced tariff reforms to improve cost recovery in the power sector.

Importantly, BESS is already recognized as a licensed energy asset under the regulatory framework. This provides a foundation for further development. However, the market framework remains incomplete. Mongolia still lacks a formal ancillary services market through which BESS could be remunerated for services such as frequency regulation, reserves, and other grid-support functions.

BESS is already supporting the grid

By early 2026, Mongolia had deployed around 160.6 MW / 525.2 MWh of operational BESS capacity, equivalent to roughly 9% of installed generation capacity. This makes Mongolia one of the more advanced early BESS markets among developing economies in East Asia.

The flagship project is the 80 MW / 200 MWh Songino BESS in Ulaanbaatar, commissioned in 2023 with ADB support. The system provides fast-response frequency regulation and peak shaving by charging during off-peak periods and discharging during the evening peak. In doing so, it can help reduce the need for expensive peak-period electricity imports.

Other notable projects include the 50 MW / 200 MWh Baganuur BESS, two smaller ADB-supported systems in remote grids, and private-sector projects such as Erdene Nar, 20 MW / 80 MWh, and Tom Nar, 10 MW / 42 MWh. Together, these projects show that BESS in Mongolia is no longer experimental. It is already being deployed for practical grid support and renewable energy integration.

Why BESS is valuable in Mongolia

The value of BESS in Mongolia is particularly strong because it addresses several structural weaknesses in the power system simultaneously.

First, BESS can help reduce peak imports by charging during periods of low demand and discharging during evening peaks. Second, it can provide fast frequency response in a system with limited flexibility and low inertia. Third, it can help absorb otherwise curtailed wind and solar generation, especially where inflexible coal-fired combined heat and power plants limit the grid's ability to accommodate variable renewable energy. Fourth, in weaker regional grids, BESS can support voltage control and enable higher solar PV penetration.

In practical terms, storage is becoming a key enabler of Mongolia's renewable energy ambitions, not only a standalone technology option.

Why it matters for BESS

BESS can help Mongolia:

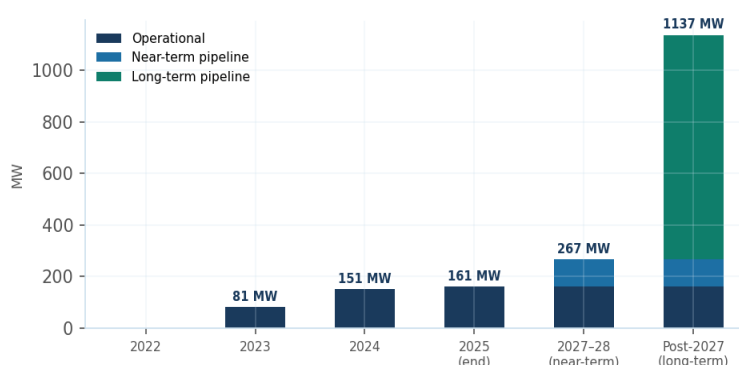
- strengthen energy security by reducing peak import needs;
- support renewable energy integration in a coal-heavy power system;
- provide fast-response grid services such as frequency regulation;
- manage evening peaks and weak-grid conditions;
- reduce curtailment of wind and solar generation;
- support private-sector interest in solar-plus-storage projects; and
- create a foundation for future ancillary services and tariff frameworks.

A pipeline that could change the scale of the market

Mongolia's BESS pipeline suggests that the market could expand rapidly if planned projects move forward and enabling reforms are strengthened. In the near term, three standalone projects totaling 106 MW / 274.8 MWh are planned for commissioning in 2027–2028.

Figure 8: Mongolia's operational and pipeline BESS capacity trajectory

Source: Ministry of Energy; compiled by consultant, 2026.



Beyond this, a much larger pipeline of hybrid solar-plus-storage projects has emerged. Nine known projects include 870 MW / 3,462 MWh of BESS capacity co-located with 1,175 MW of solar PV. If realized, this would represent a major step change in scale and move Mongolia from early adoption toward a larger storage market linked directly to renewable energy buildout.

The pipeline also suggests a possible shift from government-led demonstration projects toward larger private-sector-led hybrid investments. This makes project preparation, bankable contracts, and clear market rules increasingly important.

What still needs to change

Despite strong momentum, several barriers continue to constrain scale-up. The financial position of the power sector remains fragile despite recent tariff reform, limiting the bankability of private off-take arrangements. The absence of an ancillary services market means that BESS developers cannot yet monetize the full value of grid services.

Mongolia's extreme winter conditions also create technical and financial challenges. Low temperatures require thermal management systems, which can reduce efficiency and increase costs. In addition, grid studies, dispatch-optimization capabilities, and institutional experience with multi-service BESS operation remain limited.

These constraints do not weaken the case for storage. Rather, they confirm that regulatory reform, project preparation, and capacity building will be essential to unlock the pipeline.

Mongolia is already demonstrating the practical value of BESS. The next step is to strengthen the enabling environment through clearer ancillary services and tariff frameworks, technical standards, cost-recovery mechanisms, bankable project structures, and targeted preparation for larger solar-plus-storage projects. Through TA-10479 REG, Mongolia's experience can provide important regional lessons on how

BESS can support energy security, renewable energy integration, and power system flexibility in coal-heavy grids.

4. BESS Is Not Gender-Neutral: Why Inclusion Matters

BESS are often discussed in technical terms: megawatts, megawatt-hours, grid flexibility, system integration, safety standards, and market rules. But storage deployment is not only a technical issue. It also affects people, households, communities, and workforces in different ways.

Energy systems are social systems. Gender roles influence how people access energy, use electricity, participate in decision-making, and benefit from new technologies. This means BESS deployment is not gender-neutral. If gender dimensions are overlooked, storage projects may unintentionally reinforce existing inequalities. If they are considered from the start, BESS can support more inclusive, safer, and more sustainable energy transitions.

Energy reliability affects women differently

Reliable electricity matters for everyone, but unreliable supply can affect women and girls in specific ways because of their roles in household energy management, caregiving, cooking, food preservation, and home-based income activities.

In Cambodia, nearly 80% of rural households still rely on solid fuels for cooking, exposing women to health risks and time-intensive fuel collection. Limited or unreliable electricity can also constrain women's work, particularly in home-based enterprises and food preservation.

In Mongolia, studies in Ulaanbaatar's ger districts show that women often manage electricity payments and household energy consumption. Outages can disrupt cooking schedules, household routines, and family-run businesses, creating both time and income losses.

In these contexts, improved energy reliability is not only a technical outcome. It can reduce unpaid labor, support household resilience, and improve opportunities for income-generating activities.

Storage can reduce burdens, if projects are designed inclusively

BESS can help improve electricity reliability in weak-grid areas, mini-grids, renewable energy systems, and locations where supply is variable or constrained.

By storing electricity and making it available when needed, BESS can support cleaner energy use, reduce outages, and help households and small businesses manage daily routines more effectively.

However, these benefits are not automatic. To ensure that BESS projects respond to real community needs, women and men should both be included in consultations and decision-making. Project design should consider how electricity is used in households, small businesses, schools, health facilities, and community spaces and who is most affected when supply is unreliable.

When gender perspectives are included early, storage projects can better reflect local priorities and improve the distribution of benefits.

Safety and community acceptance need women's voices

Utility-scale BESS projects raise important questions about land use, safety, fire risk, environmental management, emergency response, and public communication. These issues are technical, but they also influence community trust and acceptance.

Women are often key community-level stakeholders, yet they are frequently underrepresented in consultations and decision-making processes. This can lead to gaps in project design. For example, site selection may not fully consider community resources used by women, safety information may not reach all groups, or emergency communication may not reflect how households and communities actually receive and act on information.

Including women in consultation processes can improve project design, strengthen safety communication, and reduce the risk of misunderstanding or resistance. It can also help ensure that community concerns are identified early and addressed transparently.

Electrification combined with storage can also have safety benefits. In rural or weak-grid areas, more reliable lighting can improve nighttime safety for women and girls and support safer access to public and community spaces.

BESS is creating jobs, but will women benefit?

The expansion of BESS is creating new value chains in manufacturing, installation, operation, maintenance, digital monitoring, recycling, and lifecycle management. These areas can create new technical

and professional opportunities in the clean energy economy.

Figure 9: Women's participation in clean energy skills and technical roles is essential for an inclusive energy transition



Source: UNDP, 2025

Yet women remain underrepresented in the energy sector. In ASEAN, women account for only around 8% of the energy workforce. Globally, women represent about 20% of the energy workforce and less than one-fifth of leadership roles. Even in renewable energy, where participation is higher than in fossil fuels, women hold around 32% of jobs.

Without targeted measures, BESS deployment could reproduce existing male-dominated labor patterns, especially in technical and field-based roles such as electrical installation, battery maintenance, system operation, safety management, and digital monitoring.

This is why skills development matters. Training programs, technical workshops, internships, mentoring, and inclusive recruitment can help women participate not only as beneficiaries of energy projects, but also as technicians, engineers, entrepreneurs, regulators, planners, and decision-makers.

Why it matters for BESS projects

Gender inclusion can strengthen BESS projects by supporting:

- better understanding of household and community energy needs;
- stronger safety communication and emergency preparedness;
- higher community acceptance of BESS projects;
- more inclusive workforce development;
- better design of training and capacity-building activities;
- stronger monitoring of project benefits and risks; and
- broader participation in the clean energy transition.

Gender entry points for BESS deployment

Practical entry points include:

- gender-inclusive stakeholder consultations;
- women's participation in technical workshops and training programs;
- gender-disaggregated data collection for participants and beneficiaries;
- safety communication tailored to different community groups;
- skills development for women in BESS operation, maintenance, digital tools, and recycling;
- engagement with women's organizations, universities, and training institutions; and
- inclusion of gender indicators in project monitoring frameworks.

From technical solution to inclusive transition

BESS can play an important role in renewable energy integration, grid flexibility, and energy security. But to deliver its full development value, storage deployment should also consider who benefits, who participates, who is consulted, and who gains access to new skills and opportunities.

For Cambodia, Mongolia, and Viet Nam, integrating gender considerations from the start can help ensure that BESS deployment supports both clean energy objectives and inclusive development outcomes. Under TA-10479 REG, gender inclusion is therefore not an add-on. It is part of building stronger, safer, and more sustainable energy storage pathways.

Coming in the next issue: Part 2 of this article series will examine how gender inclusion can improve BESS project outcomes, from improved consultation and skills development to stronger monitoring and social acceptance.

5. Knowledge Sharing Activities

From Phnom Penh to the Region: BESS Dialogue Gains Momentum

The knowledge-sharing series under TA-10479 REG: Accelerating Battery Energy Storage System Development in the Asia and Pacific Region is now underway. The first activities have already brought together policymakers, utilities, regulators, technical experts, development partners, and project stakeholders from Cambodia, Mongolia, Viet Nam, and the wider Asia-Pacific region.

Through workshops, webinars, newsletters, and online outreach, the TA is creating a practical regional space to exchange experience, discuss barriers, and

identify solutions for BESS. The focus is clear: helping countries move from interest in storage to practical deployment pathways that support renewable energy integration, grid flexibility, and the clean energy transition.

Knowledge-Sharing Highlights

- 48 participants joined the Inception Workshop in Phnom Penh, Cambodia
- 123 participants from 21 countries joined Webinar No. 1
- 41.5% female participation was recorded in Webinar No. 1
- Workshop and webinar materials were shared online for wider dissemination
- Webinar No. 2 is planned for 19 August 2026
- The Interim Workshop in Mongolia is planned for the week of 7 September 2026
- Further webinars and newsletters will continue throughout 2026

Cambodia Workshop Opens Regional Dialogue on BESS

The Inception Workshop of Component 1 was held on 6 May 2026 at Baitong Hotel & Resort in Phnom Penh, Cambodia, in a hybrid format. The workshop brought together representatives from Cambodia, Mongolia, Viet Nam, ADB, the consultant team, and project stakeholders to discuss the TA scope, methodology, work plan, and country-specific priorities for BESS development.

The workshop served as the formal launch of Component 1 knowledge-sharing activities and introduced the role of the TA as a regional channel for technical exchange. It also helped align expectations among the three participating countries and created an early opportunity to discuss the practical barriers and opportunities facing BESS deployment in each national context.

Discussions covered the current status and key issues for BESS development in Cambodia, Mongolia, and Viet Nam, followed by international experience from ADB-financed BESS projects, the Australia and Asia-Pacific context, battery lifecycle and recycling, and lessons from the German BESS market. The workshop also included an important session on why gender matters in renewable energy and energy storage.

Participants particularly valued the opportunity to exchange experiences across the three countries and discuss practical solutions for accelerating BESS deployment.

A short overview video from the workshop was also shared via Development Asia and LinkedIn to increase the TA's visibility and communicate key messages from the event to a wider professional audience.

Figure 10: Participants from Cambodia, Mongolia, Viet Nam, ADB, and the consultant team joined the Inception Workshop



Webinar No. 1 Draws 123 Participants from 21 Countries

The momentum continued with Webinar No. 1, held on 13 May 2026, titled “Accelerating BESS Deployment: Technology, Markets, Safety, and Regional Pathways.” The webinar expanded the TA's knowledge-sharing series to a wider regional and international audience.

Figure 11: Webinar No. 1 brought together participants from 21 countries to discuss technology, markets, safety, and regional pathways for accelerating BESS deployment.



Source: Consultant, 2026

The session attracted 123 participants from 21 countries, with 41.5% female participation. Engagement was particularly strong from Cambodia, the Philippines, and Viet Nam, alongside participants from across Asia-Pacific and beyond. This strong turnout confirmed the growing regional interest in BESS as a key technology for renewable energy integration, grid flexibility, and power system modernization.

The webinar explored the strategic role of BESS in modern power systems. Discussions covered grid-

forming inverters, private-sector participation, battery recycling and circular economy, and health and safety standards for BESS deployment. The session also provided an opportunity for participants to raise questions and exchange views on how BESS can support national power system priorities and regional energy transition pathways.

Presentation materials and the webinar recording are available on Development Asia:

<https://lnkd.in/dauPHUgk>

What Comes Next: Safety, Standards, Mongolia Workshop, and More

The knowledge-sharing series will continue in 2026 with a strong pipeline of upcoming activities.

The next online event will be Webinar No. 2: “Battery Energy Storage Systems: Safety, Technical Standards, and System Integration,” planned for 19 August 2026. The webinar will focus on practical technical and regulatory issues critical to safe and reliable BESS deployment, including safety requirements, technical standards, and system integration considerations.

The next regional in-person event will be the Interim Workshop in Mongolia, planned for the week of 7

September 2026. The workshop is expected to include a field visit to an ADB-financed BESS facility near Ulaanbaatar and two days of technical sessions. The workshop will focus on the results of the Component 1 Interim Report, including the analytical review of barriers, diagnostic assessment, proposed countermeasures, and other priority topics relevant to BESS scale-up in Cambodia, Mongolia, and Viet Nam.

Further knowledge-sharing activities planned under Component 1 in 2026 include:

- **Webinar No. 3:** “BESS Procurement and Business Models in Emerging Markets”, planned for 21 October 2026
- **Final Workshop** in Viet Nam, planned for the last week of November 2026
- **Webinar No. 4:** “Battery Energy Storage Systems: Sizing, Siting, and Deployment Strategies”, planned for 9 December 2026
- **Newsletters No. 2, 3, and 4**, to be prepared and posted on Development Asia after each webinar

The upcoming newsletters will continue to share BESS updates, technical insights, gender-related perspectives in renewable energy and energy storage, and information on upcoming activities under the TA.

Stay Connected

Thank you for reading the first issue of the TA-10479 REG newsletter series.

The knowledge-sharing activities will continue throughout 2026 with upcoming webinars, regional workshops, country updates, and practical insights on BESS, renewable energy integration, grid flexibility, safety, market development, and inclusive energy transition pathways.

Stay tuned for the next issues, where we will continue sharing updates from Cambodia, Mongolia, Viet Nam, and the wider Asia-Pacific region.

For questions, suggestions, or ideas for future newsletter topics, please feel free to contact us:

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