AH-Stack
by amperehour

Plug-and-play energy storage
systems for applications across
the power value chain

amperehour

Why Energy Storage?

Energy storage is at the center of the global clean energy transition and is becoming critical as more renewables are added to the grid and the transportation sector moves towards electrification. It is a key solution to the challenges facing electricity markets and transmission grids, growing consumer and industrial demand for smart grid services and localized capacity constraints on electrical networks.

INCREASING RENEWABLES

The intermittent nature of renewable energy requires energy storage as a buffer to maintain grid stability by matching demand and supply in real time.

FOCUS ON DECARBONIZATION

The global focus on decarbonization is leading to several regulations disincentivizing the use of polluting energy sources such as backup diesel generators - which are being replaced by energy storage systems.
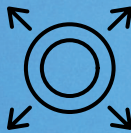
DECENTRALIZED GENERATION

The growing penetration of distributed energy resources and the advent of "prosumers" increases the complexity of the grid and creates the need for energy storage to act as a buffer to build resilience.

ENERGY ACCESS

Over a billion people globally still lack access to reliable electricity. The remote nature of these settlements creates the need for decentralized mini-grids closer to the load centre. Energy storage is a key component of creating these primarily renewable remote mini-grids.
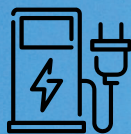
ELECTRIC VEHICLES

As traditional ICE vehicles make way for EVs, the charging infrastructure required to power them needs to be built. Energy storage is proving to be a key component of this charging infrastructure to reduce the strain on an aging grid.

REDUCING BATTERY PRICES

Over the last decade, battery prices have reduced drastically by almost 80%. This has enabled battery based energy storage to be commercially viable in an increasing number of applications. As prices continue to fall, the number of use cases will keep growing.

How can it help you?

Battery energy storage systems (BESS) offer a great deal of flexibility, cost saving and resilience to the user across different parts of the power value chain. Applications of BESS are:

ACTIVE POWER

ENERGY SHIFT/ENERGY ARBITRAGE
Reduce overall cost of energy or increase share of renewable energy by charging with lower cost energy / renewable energy and discharging during times of high energy prices or when renewable energy is not available.

PEAK SHAVING/DEMAND REDUCTION
Mitigate capacity bottlenecks in your network or save on demand charges behind the meter by charging the BESS during periods of low demand and discharging during high demand periods to reduce peak loads.

BACKUP POWER
Utilize BESS to provide power during grid outages instead of polluting and expensive sources such as diesel generators.

FREQUENCY REGULATION
Generate revenue by providing grid ancillary services to reduce or increase fluctuating grid frequency by charging or discharging the BESS respectively.

RENEWABLE FIRMING
Provide firm, dispatchable power from intermittent and fluctuating renewable sources.

RENEWABLE RAMP RATE CONTROL
Control renewable power ramping using BESS to stay within defined grid codes or for ramp sensitive loads such as electrolysers.

RENEWABLE CLIPPING AVOIDANCE
Avoid clipping losses by charging during peak renewable generation beyond plant permitted connection capacity.

REACTIVE POWER

VOLTAGE REGULATION
Regulate voltages using reactive power from the BESS

POWER FACTOR IMPROVEMENT
Improve load power factor to reduce electricity bills by using reactive power from the BESS

PHASE BALANCING
Balance phase unbalanced loads using reactive power from the BESS

	Generation	Transmission	Distribution	Industrial/ Commercial	Off-Grid
Energy Shift	🟢	🟢	🟢	🟢	🟢
Peak Shaving		🟢	🟢	🟢	
Frequency regulation	🟢	🟢	🟡	🟡	
Renewable firming	🟢			🟢	🟢
Renewable ramp rate control	🟢				
Renewable clipping avoidance	🟢			🟡	
Backup power			🟢	🟢	🟢
Voltage regulation	🟢	🟢	🟢	🟢	🟢
Power factor improvement			🟢	🟢	
Phase balancing		🟢	🟢		

# AH-Stack: A plug-and-play energy storage solution

AH-Stack is a flexible, modular, plug-and-play battery energy storage solution for a wide variety of applications ranging from 25kW - 2 hour systems to 25 MW – 4 hours systems.

It consists of an application customized stack of batteries, power electronics, software and balance of system. AHE utilizes the best batteries and electronics from its wide range of partners to create the best AH-Stack configuration that minimizes the levelized cost of storage for your application. Additionally, AH-Stack comes pre-loaded with AHE's ELINA-Edge Energy management software that allows you to monitor, control and optimize your asset in the most flexible way possible.

BATTERY
AH-Stack utilizes the best Li-ion (LFP / NMC) batteries from Tier 1 battery suppliers. All batteries are thoroughly tested in our RnD facility to ensure quality and safety before they are used in the field. AH-Stack can also be configured with battery chemistries other than Li-ion for specific applications with high C-rates or multiple daily cycles.
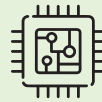
ELECTRONICS
AHE works closely with multiple global electronics suppliers to provide customized power conditioning systems ideally suited for your size and application. All electronics used in AH-Stack are thoroughly tested in our lab and conform to the most stringent global standards.

AH-Stack

BALANCE OF SYSTEM
The balance of system for AH-Stack includes container or cabinet-based housing, built-in thermal management, fire protection and other electrical protection, making it a completely plug-and-play system. Components of the BoS are designed and optimized in-house to minimize cost while providing maximum safety and asset life.

SOFTWARE
AH-Stack comes built in with ELINA-Edge, AHE's state of the art energy storage management software that integrates with not only the BESS, but also all other critical components at site. ELINA-Edge allows you to monitor, control, optimize and utilize your asset flexibly and reliably for any application.

Features

1. Modular and scalable from a few kW to a few MW

2. Plug-and-play installation

3. Application suited batteries and electronics for optimal cost

4. Engineered for long life and minimal maintenance

5. In-built thermal management to maximize battery life

6. Multiple levels of fire protection

7. Detailed tracking of all operational parameters

8. Fully automated, remote monitoring and control

9. Remote diagnostics with centralized service team
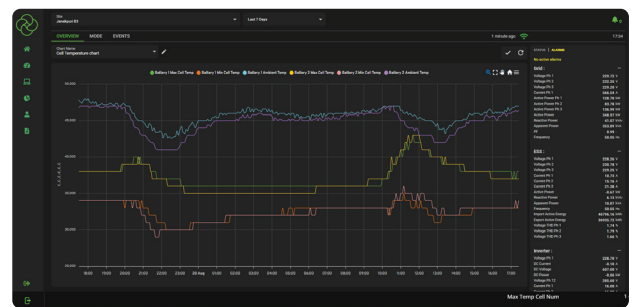
The AmpereHour Approach to Energy Storage

At AmpereHour, we believe that a one-size-fits-all approach is not suitable when creating optimal energy storage solutions. We utilize sophisticated tools to appropriately size and design your AH-Stack solution to best cater to your use case.

Sizing & Design

- Analyze customer use case and needs

- Model technical and financial parameters

- Determine right size, technology and configuration for the customer

- Design the BESS with lowest LCOS for the customer's application.

Turnkey Project Execution

- Fully integrated BESS manufacturing and testing at AHE facility

- Shipping and installation post acceptance testing

- Standardized site acceptance testing and commissioning

Operations & Maintenance

- Dispatch strategy to maximize value from the ESS

- Real time remote monitoring and data driven preventive maintenance

- Warranties and long term capacity contracts.

- Centralized operations centre and service team for OnM support
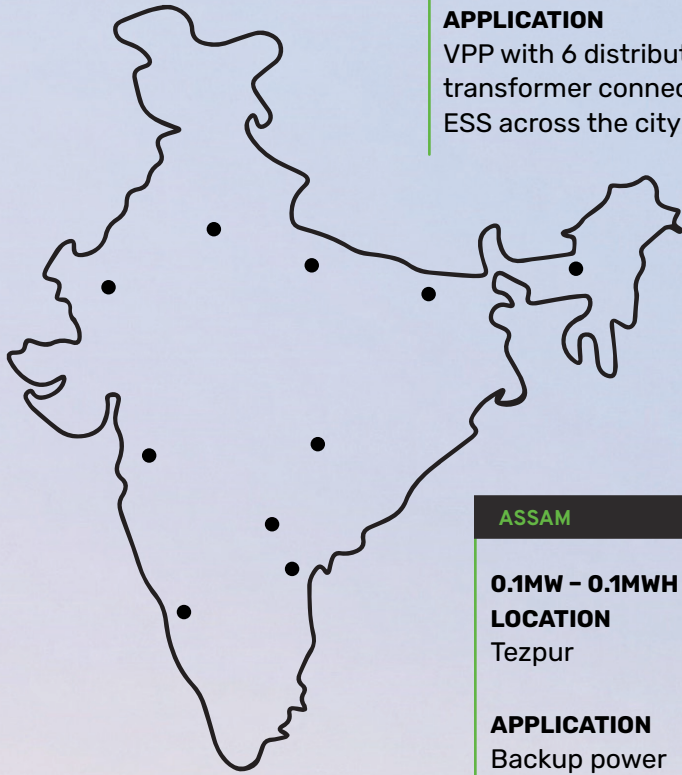
Project References

DELHI

0.7MW – 1.4MWH
LOCATION
Delhi

APPLICATION
VPP with 6 distribution
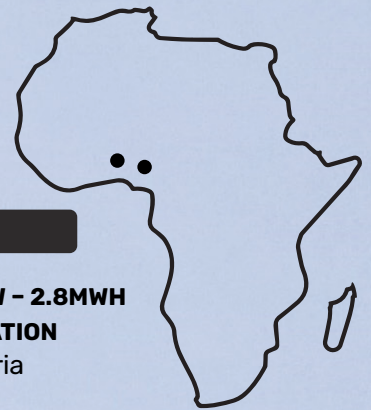transformer connected
ESS across the city

NIGERIA

1.1MW – 2.8MWH
LOCATION
Nigeria

APPLICATION
Rural electrification
with renewable
mini-grids

ASSAM

0.1MW – 0.1MWH
LOCATION
Tezpur

APPLICATION
Backup power
and DG usage
minimization for a
university building

MAHARASHTRA

0.2MW – 0.5MWH
LOCATION
Maharashtra, India

APPLICATION
Rural electrification
with renewable
mini-grids

1MW – 3.5MWH
LOCATION
Navi Mumbai, India

APPLICATION
PV Energy shift to
evening peak load
hours

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