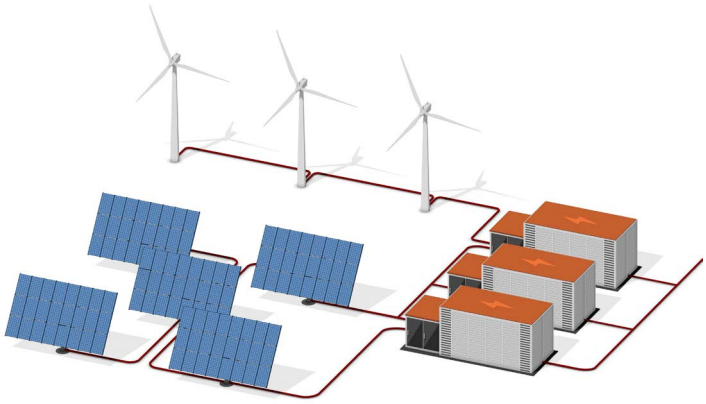
Case Study

DuPont Solutions for Stationary Battery Energy Storage Systems



Power transmission and distribution needs are changing rapidly as power grids age, assets are retired and demand grows for robust solutions to utilize and integrate renewable energy sources into power infrastructure. Energy storage systems will be essential to support the adoption of renewable energy sources like wind and solar and translate those resources into:

- supplemental support to the existing grid for rapid response capabilities to help ensure consistent power supply during heavy load or emergency periods
- the ability to eliminate higher priced per kilowatt hour peaker plants that run only when the grid is under severe/high demand
- backup power supply for community or industrial facilities where the power must stay on at all times
- power generation on demand for residential needs

Challenge

Renewable energy is plentiful in certain geographies, but very intermittent in others. Capturing and storing energy from renewable energy sources is a challenge when the water isn't flowing, the wind isn't blowing, and the sun isn't shining. Progress has been made in the development of energy collection and storage solutions from simple flywheels to complex hydrogen fuel cells. However, these all represent varying degrees of power output, efficiency and expected lifetime.

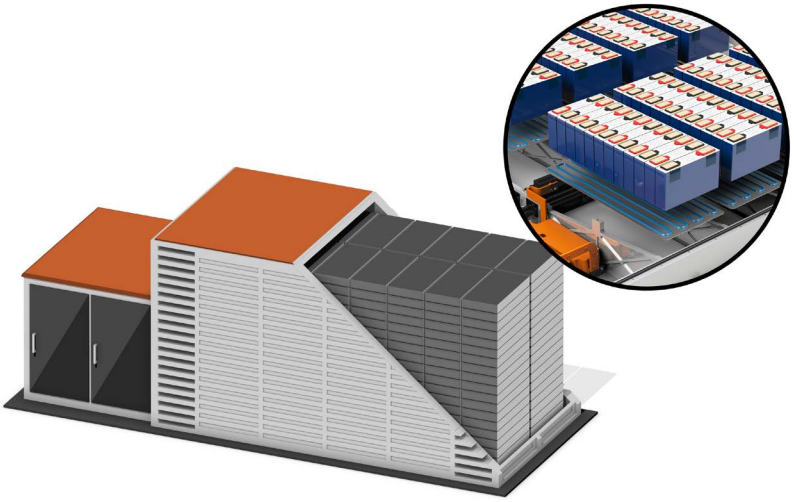
Stationary battery energy storage systems (BESS) are showing a lot of promise, and as technology grows within the electric vehicle market, application development specialists are rapidly adapting that technology as a storage solution. Stacked battery packs of various sizes and configurations are connected to form large assemblies. These assemblies are housed in a structure comprised of a roof, floor and sidewalls that are designed to resist extreme environmental conditions while allowing access for service and maintenance.

Solution

DuPont has been a market-leading supplier of adhesive technologies to the transportation market for decades. That expertise easily transfers to energy storage systems and early successes have been achieved with major energy storage unit builders and component suppliers.

Adhesive technologies can be used in many applications for these energy storage systems. For example, BETAMATE™ has been commercialized and is in use for roof and floor bonding with a major manufacturer of energy storage systems. Primary benefits are:

- Weld replacement or reduction – the continuous adhesive bond creates a watertight seal that can withstand extreme conditions to prevent water incursion and subsequent potential for corrosion.
- Strength and flexibility – bond must be strong enough to last for anticipated 20+ year service life. Adhesive also provides structural strength with the right amount of flexibility that can bend and flex during storage unit transportation and setup.
- Resistance to extreme conditions – in addition to moisture and water-incursion resistance, adhesives must also stand up to extreme temperature and humidity fluctuations.
- BETAMATE™ is powder coat compatible with a class-A, clean finish/appearance.



The common thread that supports battery packs for either vehicle or storage solutions – adhesives.

Result

DuPont has the in-house application development, advanced engineering, and testing capabilities to rigorously validate every solution. Major manufacturers in North America, Europe and Asia are currently adopting DuPont adhesive technologies for stationary BESS cabinet assembly and sealing, thermal management for residential battery power packs, and multi-material bonding validation for battery pack components.

Collaboration creates the strongest bonds and we welcome participation in your next project. We invite you to dEVelop with DuPont.

For more information, call your DuPont representative or visit dupont.com/mobility.

Trust a Proven Leader

Adhesive technology benefits for stationary BESS are not limited to cabinet construction and sealing. DuPont has a wide portfolio of battery pack assembly and thermal management solutions that have been validated and specified with EV and lithium-ion battery manufacturers around the world.

These solutions easily translate to stacked battery packs for energy storage systems of all sizes, configurations, and end uses. In addition to BETAMATE™, DuPont supplies:

- BETATECH™ thermal interface materials that improve safety by maintaining optimal temperatures
- BETAMATE™ and BETAFORCE™ thermally conductive adhesives that provide durable structural bonding, effective thermal management, improved safety, and parts consolidation for cell-to-cell, cell-to-plate and cell-to-cooling ribbon bonding
- BETAMATE™ and BETAFORCE™ structural adhesives to enhance structural strength and longevity, optimize cost by reducing fasteners and welds, and support multi-material bonding
- BETASEAL™ sealers for ease of servicing and repair/replacement of battery cells/modules

Most DuPont adhesive solutions are non-abrasive in formulation and are easily dispensed using industry standard equipment.

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Form No. 001-20106-HMC0824