

ENERGY STORAGE on the GRID in the FUTURE

Energy storage isn't just for AA batteries anymore. Thanks to investments from industry and government initiatives, energy storage will soon play a bigger part in the electrical grid and help enable the increased generation of renewable electricity.

Producing renewable electricity is most commonly associated with wind and solar power. Although these power sources are clean and renewable sources of electricity, they are also intermittent; they don't produce any power when it gets dark or the wind stops blowing. As these power sources become more important to the energy economy, so does investment in technologies that allow energy producers, such as utilities, to store energy that is generated when the sun shines and the wind blows, so it can be released as needed.

▶ Today's electricity grid has very limited storage. New technologies could enable the storage of vast amounts of electricity anywhere on the grid across North America. Improved methods for storing and dispatching electricity would enable the increased use of renewable electricity generation while maintaining high reliability in electric supply.

▶ Beyond enabling the increased use of renewable electricity generation, improved energy storage technologies have several benefits.

- Security: A more efficient grid that is more resistant to disruptions.
- Environment: Decreased carbon dioxide emissions from a greater use of clean electricity.
- Economy: Increase in the economic value of wind and solar power and strengthened North American competitiveness in the clean energy race.
- Jobs: New income sources for rural landowners and tax revenues for wind and solar development areas. More jobs in supporting sectors such as manufacturing, engineering, construction, transportation, and finance.

▶ According to a new report from Pike Research, part of Navigant's Energy Practice, the market for energy storage on the grid (starting from a very low base in 2012) will surpass \$30 billion in annual value by 2022.

▶ New technologies, including capacitor battery technology, lithium titanate oxide, nickel-iron, and solar thermal, are swelling the pipeline of advanced energy storage projects. At the same time, new variants on older technologies, such as power-to-gas, are also coming online. These developments define an industry that is dynamic, if still not mature.

▶ According to a new tracker report from Navigant Research, 38 new advanced energy storage projects were announced, deployed, or begun in the first six months of 2013.

▶ In total, there are now 633 energy storage projects operating or under development worldwide, says Navigant Research.

▶ The market for energy storage, including traditional pumped storage, is extremely fragmented, with at least 136 vendors offering various solutions. The leader, in terms of deployed capacity market share, is Alstom, with 22 percent of the market, followed by Voith (19 percent) and Allis Chalmers (8 percent). When traditional pumped storage is excluded, however, the market looks quite different: the top three vendors are NGK Insulators, Energy Storage and Power LLC, and Solar Millennium.

▶ Advances in next-generation pumped storage, compressed air energy storage, and advanced batteries have multiplied the technology options available for energy storage on the grid, while at the same time, the applications for energy storage on the grid are increasing. Rapidly changing energy mixes and increasingly volatile load profiles will challenge grid operators to deliver reliable and secure electricity, encouraging demand for energy storage on the grid over the next decade.

Some of the above information is sourced from the Energy Storage on the Grid Report and an Energy Storage Tracker Report from Pike Research/ Navigant Research. www.pikeresearch.com

