Energy Storage and Power LLC



Home

About Us
> Company Overview
> Executive Profiles

Technology Overview
> Compressed Air Energy Storage
> Power Augmentation

Publications

In the News

Careers

Contact Us

Technology Overview - CAES

Ever since Thomas Edison first invented the light bulb in West Orange, New Jersey, the search has been on for an effective method to store energy. This search has intensified as more renewable energy sources − mainly wind and solar − have been added to the grid. Both of these sources are intermittent. In addition, wind is adding electricity at night, when the wind is strong but electric use is low. Energy storage is the missing piece of the puzzle for a green, affordable and reliable electric grid for the 21st century.

That search is over with Energy Storage and Power's (ES&P's) next generation of CAES built on the success and lessons learned from Dr. Nakhamkin designing and supervising delivering and monitoring early operations of the first generation CAES plant in Alabama. This patented improved second generation CAES technology is ideally suited to take advantage of the economics of today's energy market. CAES technology stores off-peak energy, in the form of compressed air in an underground reservoir, and releases this energy during peak hours. CAES can be used for load management of intermittent renewable energy resources or as a stand-alone intermediate generation source for capturing energy arbitrage, capacity payments and ancillary services. CAES technology can be used by electric utility companies, independent power producers, renewable energy developers and transmission owners.

Dr. Nakhamkin's original patented first generation CAES technology is a proven design. The 110 MW compressed air power plant in McIntosh, Alabama has completed over 16 years of successful operations. From lessons learned and technology advancements over these many years from the first generation CAES development, the patented second generation CAES is here with compelling advantages over the earlier CAES design.

- **Lowest capital cost** per kilowatt-hour of output of all power storage technologies (including first generation CAES).
- **Lower maintenance cost** by using standard equipment (combustion turbines and independent motor driven compressors) with established operating and maintenance procedures.
- **Exceptional operation flexibility** from the combination of incorporating a combustion turbine with compressed air expansion provides fast start times and wide range of spinning reserves which are important ancillary services for grid stability that will become ever increasingly important as renewables (the output of which is inherently unpredictable and intermittent) become a bigger part of the US energy power supply.
- **Scalability** of second generation from 15 MW to 430 MW to meet the specific requirements of the application. 15 MW coupled with above ground air storage can be an alternative to batteries to 430 MW for the large-scale needs of the wholesale power industry.
- **Low emissions** by incorporating the dry low NOx burners of combustion turbine instead of a using custom designed high and low pressure burners. Permitting of a standard combustion turbine as the air emission source should reduce the uncertainty in permitting process.
- **Exceptional equipment sourcing flexibility** as the plant can be designed around basically any combustion turbine which is available including under utilized existing peaking units. In addition, the motor driven air compressors can be grouped into trains so there is flexibility of suppliers.

Second generation CAES time has now come.

Alabama Electric Cooperative 110 MW McIntosh compressed air storage power plant

For more detailed information regarding different CAES technologies please review the links below:

- First Generation CAES
- Second Generation CAES with Air Injection
- Second Generation CAES with Inlet Chilling