

Companies Leading Energy Storage

Special Report

Who's Leading the Charge?

There's really only one reason why you don't have solar on your roof or why your house isn't powered by wind... *Batteries*. Or, more precisely, the lack of advanced batteries.

I've been screaming about batteries for quite some time now.

And those who listened early have banked gains upwards of 675%.

That's not hyperbole. That's reality.

Here's why battery stocks are surging that high and why there's still plenty of time to make easy gains.

It's the Capacity, Stupid

Frankly, I'm surprised the solar and wind industries haven't died already. The economics of energy are brutal. And a technology needs to have the most uptime possible to be able to compete.

This is why coal, natural gas, and nuclear are so attractive...

You can run them nearly all the time.

This is not the case with wind and solar. You can't make electricity when the wind doesn't blow; same when the sun doesn't shine.

New energy storage solutions are going to change that. And the [energy storage companies](#) making them are going to make billions.

But hardly anyone realizes it...

Twice the Power, Twice the Profits

Sources of power can only make money while they're generating.

As such, the economics favor coal, gas, and nuclear plants, which have the most uptime.

But what if you make solar and wind plants churn out electricity nearly 24 hours per day?

Having solar power at night and wind power when it's not blowing would drastically change the economics. Solar and wind farms would have twice the generation capacity — and generate twice the revenue.

And utilities would be much more apt to adopt these sources, since energy storage puts them on par with fossil-fired plants.

What's more, utilities would then even start to favor solar and wind, since they don't have any fuel imports or costs after initial construction.

The profit opportunity here should slap you in the face.

Wind and solar stocks have already delivered thousands of percentage points to early investors. Energy storage stocks will do even better.

And that's why we're on the storage industry like white on rice!

Here are some common, and some unusual energy storage technologies being used today. . .

The World's Biggest Battery

Fairbanks, Alaska, has taken battery storage to a whole new level...

An array of 13,760 NiCad batteries — "the world's biggest battery" — was deployed in 2003 to provide emergency power in a place so frigid that water pipes can freeze in a few hours.

If the data I found is correct, the 1500 ton, 3680 amp-hour, 5000 volt system can provide roughly 18,400 kilowatt-hours (kWh) of power. The array could discharge the power over a range from 27 megawatts of power for 24 minutes, to 46 megawatts for 5 minutes.

That's just enough to keep the grid in Fairbanks humming when there are problems wheeling power over from the generators in Anchorage.

At a cost of \$30 million (in 2003), that works out to \$1,630 per kWh. That seems pricey indeed when compared to the 15 cents/kWh regular grid power price in Alaska, but cost per kWh is the wrong metric to use.

The real measure of its worth is in preventing damage to the health of customers, infrastructure, and economic activity. By that measure, the \$30 million seems like a bargain. The system provided 529 minutes of backup during outages for more than a quarter of a million customers in the first year of operation alone.

Pumped Heat Storage

A newer and far cheaper solution is pumped heat storage. A startup company in the UK called Isentropic Energy has developed a modular system to store energy as heat, and claims it can do it for only \$55/kWh.

The system uses two large containers of gravel, seven meters high and eight meters wide, with a reversible heat pump between them. One container is cold (-160°C) and the other is hot (500°C). Air pumped from one vessel to another lets it operate reversibly, to generate or store power. The claimed efficiency of the system is good, at 72%-80%.

Designed for small utility scale applications, the first Isentropic systems will deliver 16 MWh of power, making them slightly smaller, but vastly cheaper, than the battery array in Fairbanks.

Ice Storage

A new heat pump solution announced this year uses ice as a storage medium.

Colorado-based startup Ice Energy is offering a system that freezes 450 gallons of water in large boxes placed next to air conditioners in commercial buildings. Freezing the water at night when grid power prices are low, then circulating air over the ice in the middle of the day, will let customers in warm climates shut down their air conditioners when grid power prices are highest.

The company claims its technology can slash fuel consumption by 30% by reducing the need for utilities to run expensive natural gas-fired plants to meet peak loads. Air conditioning accounts for as much as half the peak power demand in California.

Distribution Instead of Storage

A different approach I've mentioned in the past is the HVDC "supergrid" that nine European countries plan to build around the North Sea. When completed, the connections would enable renewable power to be shipped around Europe at will, whether it's being generated by offshore wind in Denmark, wave power in Scotland, solar power in North Africa, or hydropower in Norway.

Additionally, Norway's hydropower facilities — equivalent to about 30 large coal-fired power plants — could effectively function as power storage for the European supergrid. Excess production from any of the connected generators could be used to pump water up to Norway's reservoirs, then generate power at a later time by running the hydropower plants.

Compressed Air Storage

Compressed air storage is another older technology that is being applied in some new ways.

For example, startup SolarCAT, Inc. is working on its first application in Arizona, which will use off-peak grid power to compress air in large underground salt caverns and other geological formations. The compressed air alone functions as a storage medium, but SolarCAT intends to take the idea to the next level.

The compressed air can be heated to high temperatures with a concentrated solar power (CSP) plant or another type of heater (such as a natural gas furnace), then used to power small, efficient turbines.

Compressed air has also been under consideration in various parts of the world as a storage medium for wind-generated electricity.

Ammonia Storage

A handful of companies are working on another new application of an older storage medium: ammonia. Ammonia has been synthesized from natural gas and electrolysis for nearly a century, but it is mostly used to make fertilizer.

The new idea is to use it as a storage medium for energy generated by sources like offshore wind turbines that are too far away from the grid for transmission lines to be economical.

Other options include:

- Flywheels
- Pumped Hydropower
- Superconductors
- Fuel Cells
- Batteries (Lead Acid, Lithium-ion, Lithium polymer, Nickel metal hydride, and Sodium sulfur)

More about energy storage - and the companies offering the biggest gains in energy storage - can be found at [Green Chip Stocks](#).

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