

Watt's Happening? #113

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Energy Storage Revolution



Electric cars will never work up here, because batteries will never be able to take the cold," said an acquaintance of mine the other day. I just smiled and said, "Give it five years."

I didn't have time to explain to him that the only battery he is familiar with, the lead-acid battery, is one hundred year old technology. And hey, even they do pretty well at 30 below, as we all realize every time we successfully start our internal combustion engine with one in the winter.

But the real news is in the explosive growth of "new energy storage technologies". Energy storage tech will soon catch up with solar and wind as the fastest growing energy source on the Planet.

THE GRID IS CHANGING

You see, we've never been able to store energy on a massive scale before, except perhaps as water behind

hydroelectric dams. Large, centralized utilities create power in real time and distribute it through the grid just as it is needed. This is how we've been doing it for about one hundred years now, but that is changing, big time.

Wind and solar on a massive scale are here to stay and on the rise. Fact. But they are intermittent sources of electricity. Fact. So to make renewables truly viable, we need to figure out how to store energy on a massive scale. Fact.

And that's exactly what's happening.

The good news is that advanced storage will make the grid more reliable, "smarter" and much more efficient. Energy production is becoming distributed rather than centralized, and incorporates two-way energy flows. Often power is now produced right where it is

Wind and solar are the fastest growing energy sources in the world, but they are intermittent. Sometimes the wind blows, sometimes it doesn't. By adding energy storage technology, this problem is rapidly disappearing.

needed rather than transmitted long distances. The whole idea of “the grid” is changing.

Think of a “grid-tied” solar array on your roof feeding excess power into the grid and withdrawing it later when you need it. I have one. It works flawlessly and eliminates my electrical bills, but it’s just the beginning.

JUST ADD BATTERIES AND STIR

Now add a battery bank. Now you can store your excess energy in your batteries, and release it to the grid when it is worth more, during peak grid demand. Or just use it when you need it, later that night or if the grid fails.

This gives you personal energy security like you’ve never had before, but also helps level out peak demand for the utility, while making you more money by selling your power into the grid when it is worth more. Your electric car, plugged in to charge, will be doing the same thing for you and for the grid.

This is no pipe dream. Most advanced electric cars and home energy storage systems (now coming onto the market) have this ability already built in.

Now scale this up to utility size. Suddenly wind and solar are not only clean energy but also a lot less intermittent. The grid is more resilient, more flexible and much more reliable. You might say, “better.”

STORAGE GROWTH

At the heart of all this is the energy storage transformation that is just now getting into full swing. How fast is storage growing? In 2016, the US market grew by an astounding 284%. By the end of that year, the US had some 2,300 megawatts (MW) of storage installed. This year installed storage is expected to grow by another 50%.

Globally, utilities are expected to add another 30 gigawatts (one GW = one thousand megawatts), a growth rate of 60% per year.

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High-speed automated manufacturing continues to drive the cost of battery technology down, led mostly by advanced lithium-ion batteries for electric and hybrid cars.

Lithium batteries are leading because they are light-weight and maintenance-free for mobile devices and cars. They also scale up and down very well: a tiny one can power your smart phone, and a massive one can regulate the power from a wind farm.

Utility scale lithium batteries can be cycled (drained and then recharged) every day for up to 20 years with no maintenance. And these are still the Model T days of battery technology.

So will electric cars work in the north? Of course they will. Just give it five years.

