How can energy be stored

How can energy be stored

The outage started in Ohio, messed up traffic in Michigan, cut the lights in Canada, then brought darkness to New York City, the city that never sleeps. By the end of the Northeast Blackout of 2003, the region lost approximately $6 billion.

What do you think caused such a huge blackout -- something extraordinary? Did someone sabotage the grid? Was there an earthquake? Nope -- there was no sinister plan or natural disaster -- just a few standard hiccups. The U.S. electricity grid was operating as usual, but then its glitches added up, helped along by computer failures and some pesky trees and voil? -- about 50 million people were sans power.

According to Imre Gyuk, who manages the Energy Storage Research Program at the U.S. Department of Energy, we can avoid massive blackouts like the big one in 2003 by storing energy on the electric grid. Energy could be stored in units at power stations, along transmission lines, at substations, and in locations near customers. That way, when little disasters happen, the stored energy could supply electricity anywhere along the line.

It sounds like a big project, and it is. But pretty much every system that successfully manages to serve many customers keeps a reserve. Think about it. Banks keep a reserve. Supersized shops like Target and Wal-Mart keep a reserve. Could McDonald''s have served billions without having perpetually stocked pantries and freezers? Because the U.S. electric grid operates on scrambling, not reserves, it is set up for trouble. See what we mean on the next page.

On any ordinary day, electric power companies plan how much electricity to generate on the next day. They try to predict what customers will do, mainly by reading historical records of usage on the same day of the previous year. Then they adjust those figures to the current weather forecast for the following day.

Maybe it''s not an ordinary day. Maybe a tree falls on a power line or lightning strikes it. These disruptions will knock the line''s voltage off of the intended amount. Voltage variations reset computers. Now your alarm clock is blinking 12:00. Or worse: "For all automated manufacturing processes, if the computer resets, it shuts down the process. If you''re a plastics manufacturer, and your machines cool down, plastic solidifies in your machines," says Boyes.

With the grid already scrambling, it''s hard to imagine adding more renewables, like wind and solar power, because they are intermittent sources of power. We know customers are unpredictable, but now, so is the electricity. When the wind dies unexpectedly, a wind farm can lose 1,000 megawatts in minutes and must then quickly buy and import electricity for its customers.

The alternative then is to use a peaker-style fossil-fuel plant, but that adds air pollution to clean electricity. Or nature can reign. On wind farms in Texas, the wind blows almost exclusively at night while demand is low, and the price of electricity becomes negative. "That means you have to pay the grid to put electricity on it," says Gyuk. "I talked to someone who runs his air conditioning all night to chill the house because he gets it for free. Then he shuts the windows."

Before we dive into the topic, it''s important to understand what it means to store energy. The job of the grid is to deliver electricity to every customer at 120 volts and 60 hertz. This is accomplished by adding or removing current from the grid. A storage device helps by adding or removing current exactly when needed.

Pumped hydroelectric stations use falling water to make electricity. An example of this can be seen at Raccoon Mountain in Tennessee. At the foot of the mountain, the Tennessee Valley Authority (TVA) made a lake by siphoning some of the Tennessee River.

Pumped hydroelectric stations are operating worldwide, outputting between 200 megawatts and 2,000 megawatts of power on peak demand days [source: Cole]. They emit no air pollution, and once charged, are online in 15 minutes, faster and greener than a peaker plant. The only problem is "we''re running out of good sites for it," says Gyuk.

Now it''s time to look at storage that supplies a big burst of big electricity or less for longer. These systems can''t send big electricity to customers all day, like pumped hydroelectric and CAES can.

Contact us for free full report

Web: https://www.sumthingtasty.co.za/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346