

Clean tech means data-crunching algorithms

By Bryan Walsh, *Time*

As environmental policy, improving energy efficiency isn't just a no-brainer; it's a no-loser. By limiting wasted energy, we reduce the number of power plants we need—along with their resulting pollution—and we save money.

Cutting energy waste is first and foremost a data challenge. You can't cut waste until you know what you're wasting, and most of us have only the slightest idea. Standard electricity meters take one reading for an entire month. Imagine trying to diet if all you knew was the total amount of food you ate every four weeks. Says Bennett Fisher, CEO of the building-efficiency start-up Retroficiency: "You need data to make energy saving work."

We've got the data, thanks to the growth of smart, Internet-enabled sensors that can read and relay energy use almost in real time. A host of new big-data companies are figuring out how to crunch that information so energy users from huge factories to individual households can track and reduce waste. This combination of energy technology with the Internet—the industry calls it the Enernet—is the hottest sector in clean tech, in part because it relies on relatively cheap, easily scalable software rather than on the expensive factories needed for, say, making solar panels. "It's much more capital-efficient," says Roy Johnson, CEO of EcoFactor, an energy-management start-up.

And efficiency is what the Enernet is all about. Take Virginia-based Opower, one of the oldest and most successful Enernet companies. Opower began by offering homeowners the chance to compare their power use with their neighbors'. Just

knowing whether they were energy hogs or energy saints—along with following Opower’s energy-efficiency tips—was enough to reduce waste among homeowners. But as smarter meters taking dozens of readings per day have begun to gather more-granular data, Opower has been able to offer much more. The company sorts through the data collected by smart meters to help customers identify exactly where the waste is occurring and how it can be reduced. “These are things we could never do without big-data analytics,” says Dan Yates, CEO of Opower.

For utilities, big data can be even more powerful and valuable for the bottom line. Smarter energy management can keep overloaded grids running and prevent the need for new, expensive plants. Energy use isn’t constant throughout the day or the year, but because utilities keep power running 24/7, they need to have spare capacity to accommodate spikes. Even if it isn’t needed all the time, that extra power has to be generated, usually by polluting and costly coal or gas plants. Companies like AutoGrid help utilities spread out the demand for energy, smoothing the spikes and reducing the need for unused excess power. AutoGrid’s algorithms sort through the petabytes of data from smart meters—adjusting for variables like weather—and spit out solutions that let utilities and their customers automatically shift nonessential electricity use to nonpeak times. The Enernet can also help utilities make better use of wind and solar power, compensating when the wind isn’t blowing or the sun isn’t shining. Amit Narayan, AutoGrid’s CEO, estimates that his company’s algorithms can help utilities get about 30% more power out of existing resources.

If we’re ever going to truly clean up our electrical grid, we’ll need to replace coal and natural gas with zero-carbon sources like solar or nuclear while improving efficiency. It won’t be easy or cheap. But a smarter, more efficient grid—enabled by the same intelligence that brought us the Internet—can help smooth that transition.