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Light rail on green track

Energy system up for test could save money and cut pollution.

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Ask any superhero: It's not easy to stop a speeding train.

But when it does grind to a halt, energy resulting from normal braking is lost as heat, dispersed into the air around the city.

Regional Transit and the Sacramento Municipal Utility District plan to put this energy to use. They are planning to test soon a regenerative braking system for light rail's Folsom line.

Similar to the system in popular gas-electric hybrid vehicles, braking energy from the electric-powered trains will be captured and sent back into power lines to boost the acceleration of trains as they leave the station. The technology was developed by Sacramento-based Siemens Transportation Systems.

While modest savings of \$25,000 a year are expected, this move toward green technology is in line with a vision for the region held by some politicians and businesses.

That vision was highlighted at a clean-energy forum in Sacramento last week.

"Our region can use clean energy technology to become what Silicon Valley became during the dot-com explosion but with a more sustainable outcome," said Matthew Mahood, president and CEO of the Sacramento Metropolitan Chamber of Commerce.

At the forum, Mahood announced the goal of creating 20,000 jobs directly or indirectly associated with clean-energy technologies by 2015. With more than 60 such companies in the region, the chamber of commerce has set its sights on turning the state capital into the world capital for clean energy technology.

Efforts to date have been noticed. The current issue of Fast Company magazine highlighted Sacramento as a "city on the verge" of becoming a green leader.

With clean energy gaining momentum, Bill Boyce, supervisor of the electric transportation group at SMUD foresees a big increase in the number of vehicles on U.S. roads running on biofuels or powered by a combination of gasoline, ethanol and electricity.

Hybrid cars like Toyota's Prius use regenerative braking technology. But where the Prius channels energy to batteries, the system to be tested at RT uses special capacitors.

Banks of these devices, each about the size of three "D" batteries stacked on top of each other, store energy. However, they release energy much more quickly than batteries. This surge of energy can be tapped in the 30 seconds it takes a train to get up to its cruising speed of 55 mph. Forty percent of the energy from braking can be recovered and sent back to accelerating trains.

Oliver Hauck, CEO of Siemens Transportation Systems, said the energy storage system allows trains to share power, let current infrastructure support more trains with fewer substations and shave expensive peak

power demands. RT expects a 7 percent reduction in energy use and an 8 percent drop in peak demand. This translates into 175 tons of prevented carbon dioxide emissions, Hauck said.

Reliable service, however, is the most important benefit of the technology, according to Mike Wiley, deputy general manager at Regional Transit.

Last summer, long stretches of days with temperatures above 100 degrees led to soaring electricity demands. Huge spikes in power caused RT substations to go off-line, stranding trains without power about a half-dozen times.

Regional Transit hopes this system will help prevent such service disruptions.

Other than increased reliability, riders probably won't notice much after the energy system is installed. The energy storage device will be housed in an inconspicuous 10-foot cubicle close to existing stations.

Besides hooking the system up to overhead wires, no further retrofitting of trains, tracks or stations is expected. Maintenance costs should be low since there are no moving parts.

Similar systems running in Cologne, Germany and Madrid, Spain, gave the California Energy Commission and SMUD confidence to move forward with a \$400,000 grant that should make Sacramento the nation's first mass transit system to implement the Siemens' energy storage technology.

"Sacramento, for us, is a perfect test site," said Hauck. "We found a good set of partners, in SMUD, Regional Transit and local political support. Everything came together just perfectly."

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