

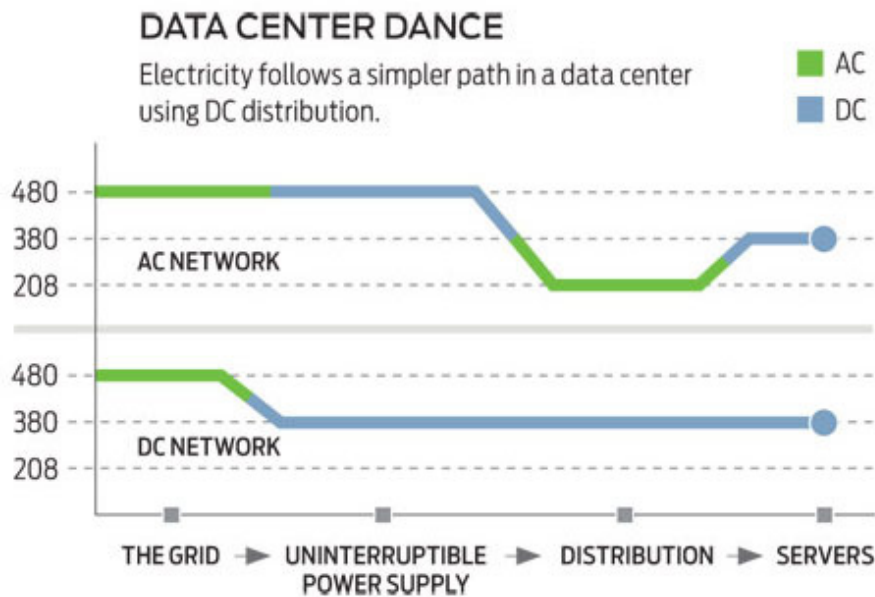
## ENERGY / THE SMARTER GRID

## NEWS

## Direct-Current Networks Gain Ground

Efficiency tempts computer centers to go DC

By PETER FAIRLEY / FEBRUARY 2011



DC distribution offers a comparatively simple scheme, whereby a single rectifier turns 480-V AC into 380-V DC that can both charge the UPS and supply the servers. The University of California, San Diego, began testing a 380-V DC data center last year, and in November, the Electric Power Research Institute (EPRI) and Duke Energy Corp. measured a 15 percent reduction in power consumption in a test of 380-V DC distribution at the utility's Charlotte, N.C., data center. Net energy savings could be twice that, they claim, once the cooler-running equipment's reduced air-conditioning burden

is factored in.

The U.S. Environmental Protection Agency's [Energy Star](#) program and similar initiatives to drive up the efficiency of AC power supplies should narrow DC's advantage. However, a 2008 analysis by Intel predicts that, even compared with premium high-efficiency AC systems, DC distribution will use 7 percent less power.

Though right now up-front costs are about equal, DC systems' simpler components should also provide a cheaper, more reliable power supply. "The price isn't lower right now, simply because of volume," says Dennis Symanski, EPRI's senior project manager and chairman of EMerge's 380-V DC standards committee.

That volume might come from a combination of [solar panel installations](#) and [battery-powered vehicles](#). DC distribution is an efficient means of combining these inherently DC devices, according to Dragan Maksimovic, a power electronics expert at the University of Colorado at Boulder. "PV/DC chargers have a target efficiency of 98 percent. Compared to 90 percent for the round-trip efficiency of inverters, that's a 5-to-1 difference in losses," says Maksimovic. Intel Labs is incorporating a 10-kilowatt solar array and electric vehicle charging stations into a microgrid at its New Mexico Energy Systems Research Center, in Rio Rancho, and the enterprise software firm SAP is doing much the same in Palo Alto, Calif.

Symanski predicts that EMerge and ETSI could harmonize their respective drafts to forge a worldwide 380-V DC standard before the end of the year. If that happens, equipment for 380-V DC power could be available within months.

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