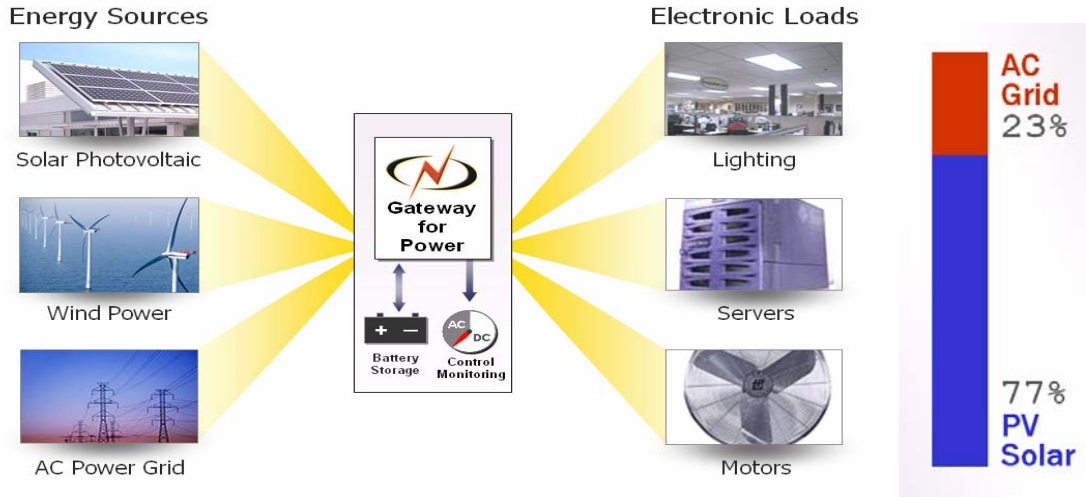


NEXTEK POWER SYSTEMS

Power Gateway

THE PLATFORM FOR SMART POWER USE IN BUILDINGS

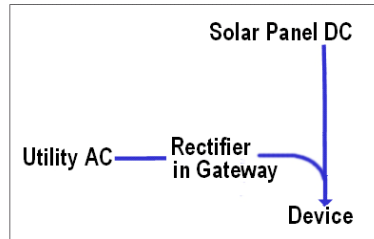
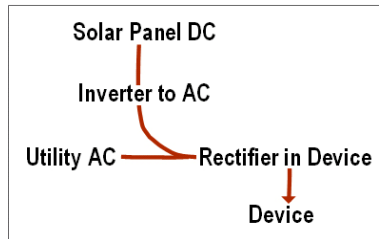


Nextek Pioneers An Advanced Grid-Connected Renewable Energy Strategy

The Nextek Power Gateway guides multiple sources of electricity, both from the grid and from any renewable source (like solar or wind) to building loads, only using the grid when necessary. This innovative routing device draws power first from any available renewable sources, then fills in as needed with power from the main utility grid. Unlike typical inverter-based systems which shut down automatically during power outages (called Anti-Islanding), the Nextek system continues to supply power from the renewable sources or, if none are available, from batteries. Nextek's intelligent integration and distribution of power creates highly efficient uninterruptible hybrid electrical systems for buildings.

The technology behind Nextek's Power Gateway is called Direct Coupling®. It is based on two crucial trends in the power industry; the mainstream use of renewable energy, like solar and wind, and the increasing number of electronic devices used in buildings. Recognizing that renewable sources of energy produce DC (Direct Current) and that most electronic devices consume DC, a scientist at Brookhaven National Labs endeavored to directly connect those DC sources to DC loads, *bypassing the need for inverters and rectifiers*.

Typical Solar Power System
~89%
efficiency, solar panel to device.



Direct Coupling® System
~99%
efficiency, solar panel to device.

Before Direct Coupling®, clean DC energy needed to pass through an inverter to change it to grid compatible AC, then through a rectifier inside the device, changing it back to DC. Now, with Nextek's Gateway, power generated as DC remains as DC and is used without conversion, bypassing both the inverter and the rectifier inside the device. This not only increases efficiency, but also dramatically reduces the heat generated by fluorescent lighting ballasts, computer power supplies, and more. Nextek's smart power distribution platform is at work in dozens of commercial installations across the U.S.

Direct Coupling® provides a more efficient, cooler electrical system by using clean renewable energy *where, when and how* it is generated.

For more information, see www.NextekPower.com or email mailto:info@nextekpower.com

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Applications

Direct Coupling® is designed for buildings where there are DC compatible loads that operate throughout the workday. These include:

- Fluorescent Lighting Ballasts
- DC outfitted Computer Servers
- Variable Frequency Motor Drives
- DC Motors
- Battery Charging/Battery Backup
- Plug-In Hybrid Vehicles (pending)

Operating Installations

Lighting Application: Grocery Store, Berkeley, CA

This supermarket has a 30kW solar PV system Direct Coupled® to high efficiency DC Ballasts in the T8 fluorescent lighting fixtures. 90% of the power required for the lights comes directly from the solar panels at 99% efficiency. 10% (or more when it's cloudy) comes from the grid, is rectified to DC, then added to the power from the solar panels. This acts as an emergency lighting system as well, even though they do not have batteries. During a power failure, only 10% of the lights go out and customers don't even notice.



Air Handling Application: Hempstead, NY



A Variable Frequency Drive is a device that allows an AC motor to slow down and speed up as needed, saving energy and maintenance costs. This controller works more efficiently on DC. The 40kW system installed in a Town Hall improves the efficiency and reliability of the system. If there were an extended power outage, the Air Handling System would run whenever the solar panels were producing power.

Datacenter Demonstration, Sun Microsystems, Newark, CA

EPRI, working with Lawrence Berkeley National Laboratory and Ecos Consulting, engineered a DC-powered datacenter demonstration at Sun Microsystems' Newark data center in California. The project demonstrates how DC-powered servers or server racks can be operated with existing components, providing the same functionality. Increased efficiency and reduced heat generation from elimination of multiple AC-DC conversion steps are expected to save the industry over a billion dollars annually.



Mixed Application with Direct Coupled Lighting & Net Metering: Rochester, NY



This 40,000 sq ft office/warehouse is equipped with a 20kW solar PV system. Part of the system is dedicated to the lighting and is integrated with occupancy and daylight sensors. Additional solar power is inverted and sent back to the grid. The low-cost DC ballasts, equipped with an internal occupancy sensor connection circuit, allow easy integration of the high efficiency controls.

Online graphical demonstrations at <http://www.NextekPower.com> illustrate the operation of the system.



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