

Energy Storage (eStorage) Grid Stabilization through Storage

What is eStorage? NEC eStorage leverages NEC's experience and know-how in lithium-ion battery technologies to provide Energy Storage Systems at multi-tiers, from home level to substation level. NEC eStorage fuses power electronics with IT network technologies, which are necessary for power control and energy management. The result is a high capacity, long-life energy storage device accompanied by a robust Energy Management System.

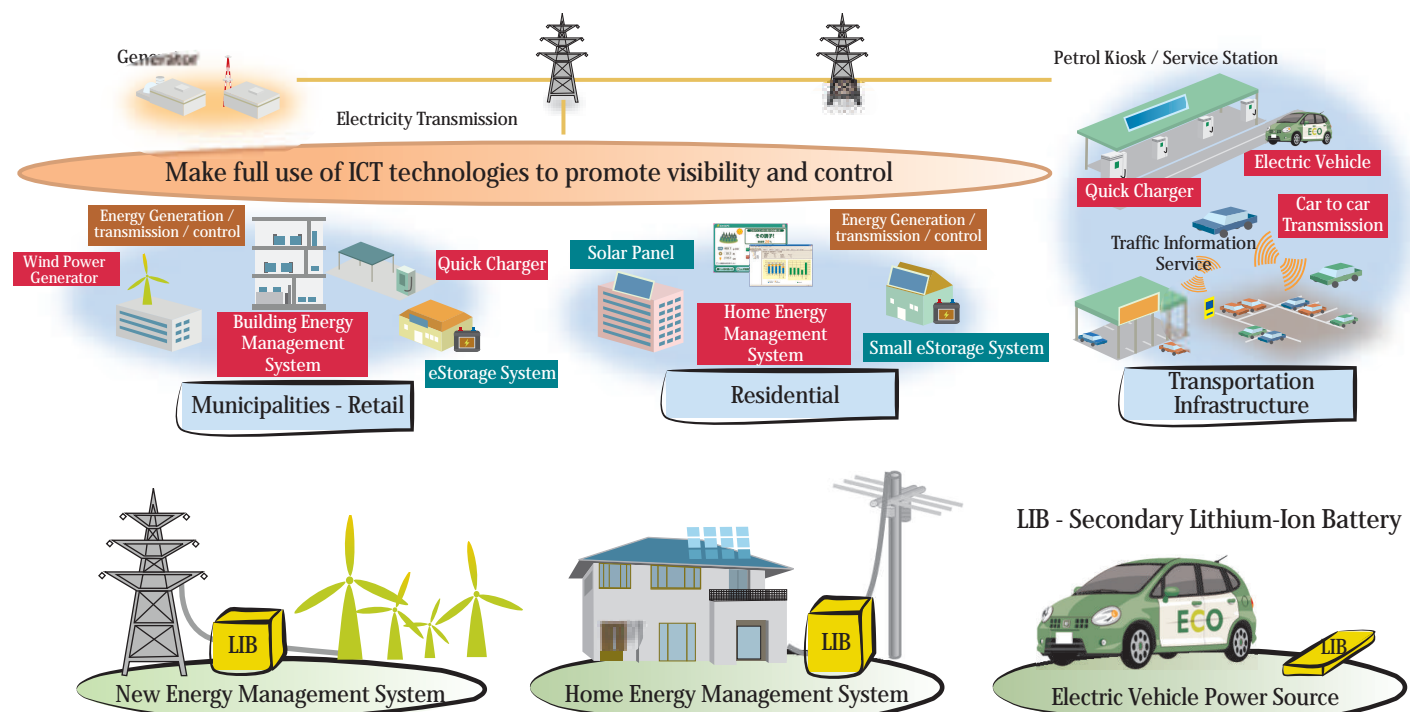
The utility energy storage market is in an exciting phase. Energy storage technologies have a large role to play in the electricity grid of the future. The demand is driven by several key trends such as the proliferation of intermittent renewable energy sources such as wind and solar, the onset of Smart Grid concepts, and the shift to plug-in hybrid and electric vehicles. The introduction of demand response (DR) mechanisms will encourage the use of energy storage systems to arbitrage between periods of peak hour and off-peak hour energy pricings.



25kW/50kWh Battery Storage System

What will NEC eStorage mean to you? With the capability to harness and integrate renewable energies, off-peak generated electricity, and vehicle-to-grid (V2G) technologies to stabilize the grid, NEC eStorage will help contribute to a **Smarter City**, and a **Greener Earth**.

eStorage Overview



NEC eStorage Solution

NEC Energy Devices, Ltd., a wholly owned NEC subsidiary, develops and mass-produces rechargeable high-capacity laminated lithium-ion batteries. The electrode production capacity is planned to reach more than 2 million kilowatt-hours (kWh) per year within the fiscal year ending March 31, 2011.

Electrodes are central components of lithium-ion batteries and the highest level of quality management is required for their use with automotive applications. NEC Energy Devices' production lines have achieved large scale mass production of superior quality by employing advanced clean air

semiconductor business, automatic inline monitors and quality stabilization technologies.

The production of electrodes for automotive lithium-ion batteries, and the manufacturing of lithium-ion batteries for energy storage systems, are each supported by "Invest Kanagawa" (Kanagawa Prefecture), the "STEP50 Industry Promotions Regulation" (Sagamihara City) and the "Regional Development Subsidy for Enterprises Creating Employment and adding to a Low-Carbon Society" (Japan's Ministry of Economy, Trade and Industry).

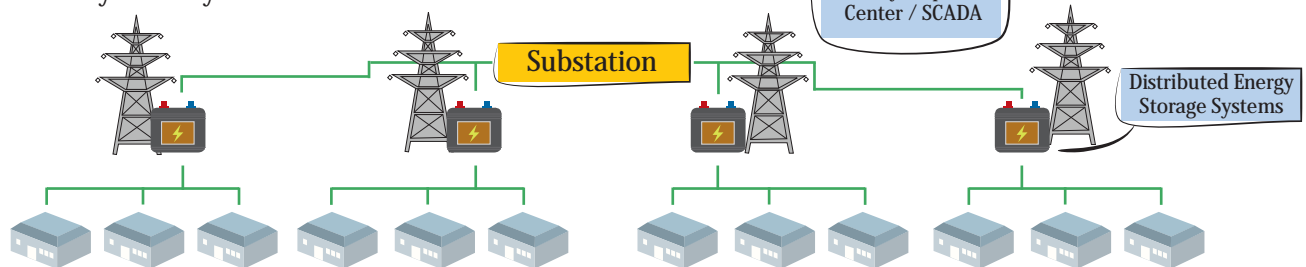
eStorage Case Studies

Energy Storage System with EPRI, Tennessee, United States of America (U.S.A.)

NEC is working with Electric Power Research Institute, Inc. (EPRI) to conduct joint field trials of an electricity storage system using NEC's lithium-ion batteries.

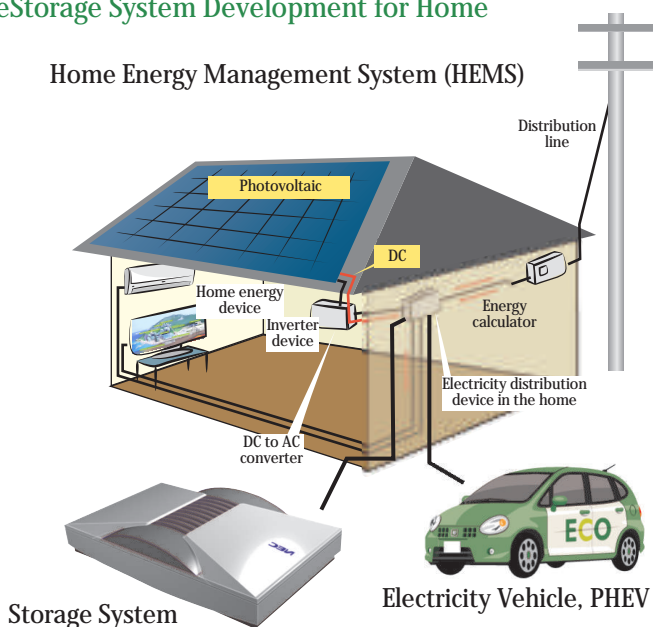
In the first phase of the testing, a 25kW system provided to EPRI by NEC is an initial step towards future smart grid applications. Follow-up electric utility demonstrations of larger 1 MW systems could be possible as part of an EPRI - U.S. electric utility industry research collaborative.

This is part of NEC's strategy to make important advances in the cost reduction and optimization of energy management through NEC's highly reliable, high capacity and long operation life technologies for large-scale energy storage systems. The same technologies are used for NEC's automobile battery business.



eStorage System Development for Home

Home Energy Management System (HEMS)



NEC eStorage on the home front has developed a Energy Storage System to facilitate energy self-sufficiency through a combination of new sources of energy as well as storage batteries. The Energy Storage System will interact with NEC's eMS (Energy Management Systems) to provide electricity storage for additional sources of energy generation (wind or solar). The Energy Storage System will also be able to help store electricity during lower pricing periods (eg. night time), and then release the electricity during peak periods.

Load-leveling by making full use of late-night electricity can achieve reduced peak demand and improved load factor. This brings about benefits such as stable power demand and supply, energy savings, reduced CO2 emissions, and lower power supply costs through less investment in power supply equipment.