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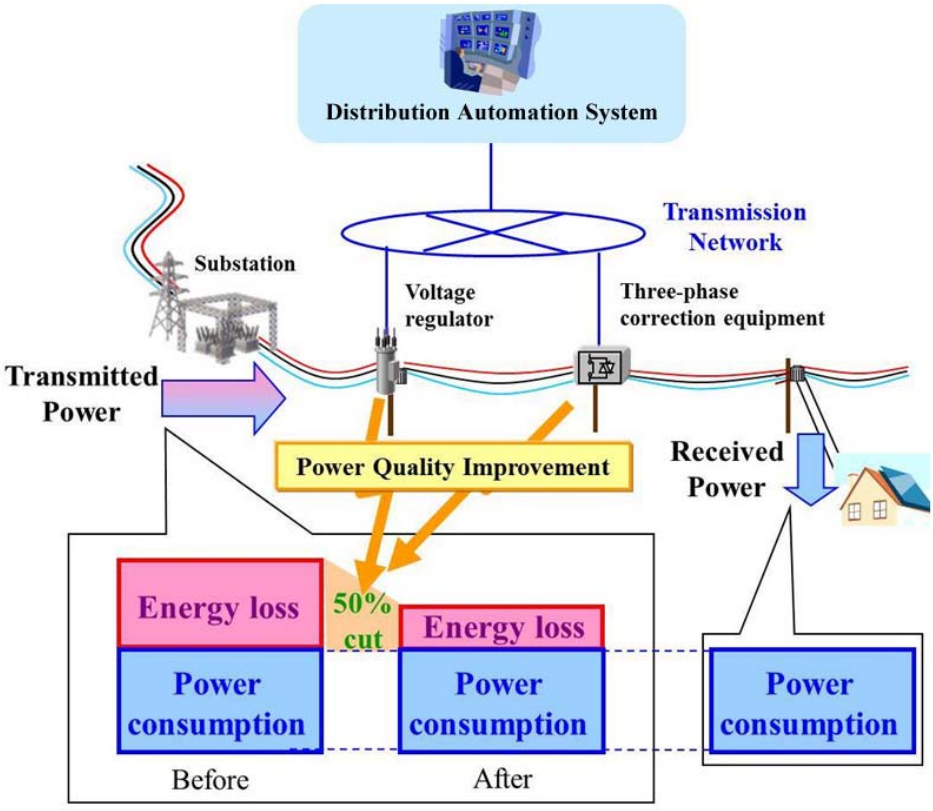
Mitsubishi Electric Develops Energy Loss-reduction Technology for Power Distribution Grids

Achieves 50% less energy loss and reduces power-generation costs

TOKYO, February 13, 2014 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it has developed energy loss-reduction technology that uses fast analysis of three-phase electricity to establish optimal coordination of power-distribution grids for reductions in energy loss and power-generation costs. The technology was achieved under Mitsubishi Electric's Smart Grid Demonstration Project.



Overview of Energy Loss-reduction Technology

While the use of photovoltaic power in Japanese power-distribution grids is increasing because of the positive environmental effects, photovoltaic-power generation is easily affected by weather and its single-phase output must be randomly connected to two of the three distribution lines in three-phase systems, which leads to an unbalance. As a result, changes occur in three-phase voltage and current, making it very difficult to maintain three-phase voltage within the range of 101±6V as required in Japan. Mitsubishi Electric has solved these problems with technologies for fast phase-by-phase analysis of three-phase electricity and reduction of electricity loss, thereby helping to decrease wasted current.

Accurate phase-by-phase analysis of three-phase power flow, voltage fluctuation and power loss is possible, but the computational complexity is about three times larger than conventional analytical capacity. Mitsubishi Electric's new three-phase analytical method is about 100 times faster, and the distribution system data can be measured online, making the technology suitable for real-time supervision and control of distribution equipment.

The supply of photovoltaic power from residences and the resulting extensive use of compensation capacitors cause three-phase voltage and current to become unbalanced. The new system controls three-phase correction equipment to decrease wasted current and the three-phase unbalance, thereby helping to reduce a significant energy loss because it is proportional to the square of the current.

Mitsubishi Electric's new system achieves optimal control of distribution equipment to maintain the voltages of all three phases within the required range of 101±6V. Optimized three-phase power-flow analysis enables both conventional voltage regulators to stabilize voltage fluctuations and correction equipment to balance three-phase power flow and voltage.

Distribution Voltage Control Systems

	Function	Performance
Mitsubishi Electric (new)	Real-time centralized control based on three-phase analysis	・Stabilized voltage of all three phases and reduced power loss ・Fast analysis for real-time control ・Coordinated control of all distribution equipment
Conventional	Local control based on three-phase-averaged analysis	・Stabilized average for three-phase or single-phase voltage ・Local control of distribution equipment

Patents

Pending patents for the technology announced in this news release number two in Japan.

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About Mitsubishi Electric Corporation

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 3,567.1 billion yen (US$ 37.9 billion*) in the fiscal year ended March 31, 2013. For more information visit http://www.MitsubishiElectric.com

*At an exchange rate of 94 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2013