July 1, 2008

Launching a New Joint R&D Project for EV Charging Infrastructure System Using Renewable Energy

Mitsubishi Corporation (MC) has started a whole new R&D project to develop an infrastructure system for charging electric vehicles (EVs) using renewable energy. The project is in collaboration with Tokyo Institute of Technology and other private companies.

EVs have a number of benefits. For a start, they are environmentally-friendly. By emitting no harmful emissions (like CO2), they can help prevent global warming and climate change. Their use is also influenced little by the rising price of oil, which could have a considerable impact on the logistics industry if they become a more widespread means of transportation.

Mitsubishi Motors Corporation (MMC) has announced that they will start selling their "i-MiEV" (Mitsubishi Innovative Electric Vehicle) from 2009. The car is expected to sell briskly, due to its potential as a solution to both environmental and social problems. In order to popularize EVs, however, infrastructure needs to be in place for charging their lithium-ion batteries.

Through this collaborative effort, MC and its partners will work to develop an infrastructure system to charge EVs, using electricity generated by renewable energies, such as solar photovoltaic (PV), solar thermal energy, and wind power. PV panels and "Dish Type" concentrated solar power (CSP) generators will be installed at the Ookayama Campus of the Tokyo Institute of Technology (T.Tech.). Test runs of the i-MiEV will then be carried out between the Ookayama Campus and T.Tech's Suzukakedai Campus or Tamachi Campus. Meanwhile, Eyeful Home Company (Tostem Housing Institute Co., Ltd.) plans to build a concept house in Tokyo with solar PV panels installed on its roof. Once the house is complete, the i-MiEV will commence test runs there as well.

These runs are part to the AEM (Advanced Energy Management) project, conducted by T.Tech's Integrated Research Institute. The AEM project is lead by Professor Takao Kashiwagi, and will be carried out from July 1, 2008 to March 31, 2010. Cooperation is also expected from several other companies, including GS Yuasa Power Supply Ltd..

End

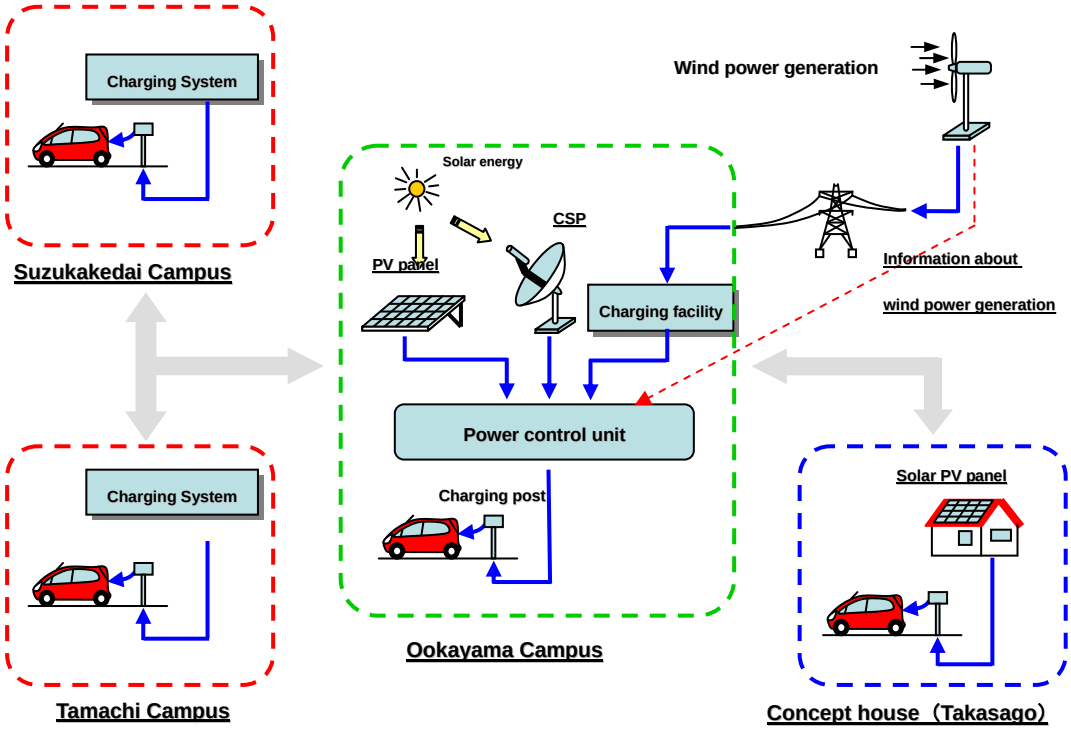
1． Overview of EV Charging Infrastructure System

This project aims to minimize environmental impact by reducing the consumption of electricity generated by oil, LNG, coal, and nuclear power, and maximizing the use of renewable energies like solar PV, solar thermal (Concentrated Solar Power: CSP), and wind power.

Because solar power generation is not possible at night, power storage systems are needed to utilize night-time-surplus electricity from power companies, which will also help to minimize energy costs. Through this R&D, MC and its partners will develop a power control system that is both environmentally friendly, and capable of maximizing the use of low cost energies.

In parallel to these efforts, the project will devise a high-speed charging system that can be installed wherever EVs are likely to be used, such as parking facilities at convenience stores, supermarkets, and highway service areas. Ideally, customers will be able to charge their vehicles quickly and safely as they shop or rest.

【EV Charging Infrastructure System】



2. Solar PV Panel Generation and Solar Thermal Generation

(1) Solar PV Panel Generation

Using solar battery panels, that are constructed mainly with silicon semiconductors, is a means of directly converting solar energy into electricity. The use of such panels is becoming more and more widespread, from large-scale power plants to individual households.

(2) Solar Thermal Generation (Concentrated Solar Power: CSP)

This system generates electricity by harnessing the thermal energy of sunlight. Various mirrors called "collectors" reflect and concentrate the sunlight on "Receivers". The concentrated thermal energy is exchanged from the receivers to oil or molten salt, which work as heat exchange mediums. These in turn produce steam, which can power turbines to generate electricity.

There are three types of concentrated solar power plants: the parabolic trough type, the solar tower type, and the parabolic dish type. For this project the last type has been chosen,, which is relatively compact and suitable for a geographically small nation like Japan. The "Dish," which is essentially a concave mirror, reflects and concentrates the sunlight towards the receiver at the mirror's center. Electrical power is generated by a Starling engine, which is very famous for its high generating efficiency.

【Dish type solar thermal generator】

Photo courtesy of Infinia Corporation

www.infiniacorp.com

（3）Normalization of Wind Turbine Generation

Wind is the cheapest method of generating electricity; however, as it depends on wind intensity, it is impossible to regulate power generation in line with the demand for electricity. Although power consumption is lower at night, for example, wind turbines continue to supply electricity needlessly to power grids. This can have a negative impact on the stability of power supplies..

T.Tech is now working on a system to convey wind power generation data from remote locales to charging systems for EVs. Through this system, the vehicles are only charged when the wind power is actually generating electricity. This will have several benefits. While helping to increase EV proliferation, excess nighttime power generation can be used efficiently to charge the vehicles, and the burden on power grids can be lessened, enabling a stable supply of electricity.

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3. About Tokyo Institute of Technology

- President: Kenichi Iga
- Place: Ookayama 2-12-1, Meguro-ku, Tokyo, Japan
- Number of Faculty: 1, 759 (As of May 1, 2007)
- Academics:

■ Undergraduate Education

School of Science

School of Engineering,

School of Bioscience and Biotechnology

■ Graduate Education

Graduate School of Science and Engineering

Graduate School of Bioscience and Biotechnology

Interdisciplinary Graduate School of Science and Engineering

Graduate School of Information Science and Engineering

Graduate School of Decision Science and Technology

Graduate School of Innovation Management

■ Institute Library

■ Research

■ Research Laboratories

Chemical Resources Laboratory

Precision and Intelligence Laboratory

Materials and Structures Laboratory

Research Laboratory for Nuclear Reactors

■ 21st Century Center of Excellence Program