Construction Completion of Miyako Island Mega Solar Demonstration Research Facility for The Okinawa Electric Power Company, Inc.

Miyako Island Mega Solar Demonstration Research Facility of The Okinawa Electric Power Company, Inc.

The Miyako Island Mega Solar Demonstration Research Facility has two objectives. The first is to examine the impact on an actual power system due to the installation of a large-scale renewable energy system such as a photovoltaic (PV) power generation plant. The second is to study measures for power system stabilization by analyzing data from the PV power generation facilities and rechargeable batteries. Toshiba, as the engineering, procurement, and construction (EPC) contractor, completed this project in October 2010. This pilot project will be conducted for three years (until March 2014) by The Okinawa Electric Power Company, Inc.

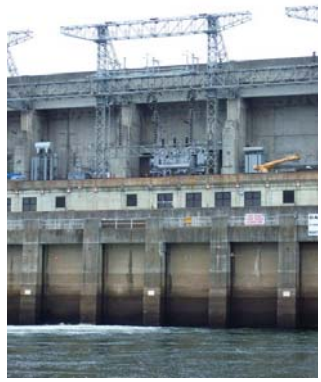
Toshiba was responsible for construction of the major equipment, as follows:

- PV power generation plants
  A 3 000 kW mega solar plant and consumer side PV power generation facilities supplying 1 000 kW in total to simulated consumers, providing an overall power supply of 4 000 kW.
- Storage battery systems
  A lithium-ion battery system, consisting of twenty-five 8 kWh SCiB™ rechargeable batteries developed by Toshiba, with power-conditioner systems (PCS) and one 4 000 kW NaS battery with a PCS are installed. The lithium-ion battery is an advanced SCiB™ rechargeable battery produced by Toshiba.
- Three-tiered control system composed of central, distribution, and consumer control systems
  The entire facility is supervised by communication with each system or item of equipment and managed through the use of monitoring devices.
- Communication network
  Dedicated fiber-optic lines are installed between related plants for high-speed communication between the control system and other devices.

Energization of First 80 MVA-144.5 kV Gas-Insulated Transformer in U.S.A.

80 MVA-144.5 kV GIT on site after installation

Overview of Osage Power Plant



Overview of GIT base

The first gas-insulated transformer (GIT)(*) in the United States was commissioned by Ameren Missouri at the Osage Power Plant, a hydroelectric power station located on the Lake of the Ozarks in the state of Missouri. The design review of this three-phase GIT (high-pressure, one-tank type) commenced in September 2009, and it was successfully energized on December 17, 2010. Replacement of the oil-immersed transformer (OIT) was required at the Osage Power Plant because the OIT had been in operation for more than 70 years.

Toshiba proposed to Ameren Missouri that the application of a GIT offered advantages over an OIT such as nonflammability and explosion-proof characteristics. The installation of the GIT at the plant avoids risks such as oil leakage to the lake, fire, and explosion, which could have catastrophic effects on the dam as well as on the roadway situated above it. In addition, the GIT's compact structure allowed the existing basement to be reused without any major civil works modifications.

Based on our successful experience with Ameren Missouri and our record of sales in Japan, Europe, and Australia, we are planning to further expand our GIT sales in overseas markets.

(*) The ratings are as follows:
Gas directed/air forced cooling (GDAF),
60 Hz three-phase one tank,
80 MVA-13.8 kV(△)/144.5 kV±2×2.5% (丫),
High-pressure gas type (gas pressure: 0.43 MPa G (20°C)),
Total mass: 75 tons.

Lineup of High-Efficiency Photovoltaic Inverters to Meet All Market Needs

100 kW, 250 kW, and 500 kW PV inverters

Photovoltaic (PV) inverters are not longer only a means of transforming the DC power generated by PV modules into AC power and then delivering it to the grid, but have also become a fundamental device supporting and stabilizing the grid.

With this as a background, Toshiba has developed a series of PV inverters that provide not only high efficiency, compact design, large capacity, and multifunctionality, but also enhanced grid support and reliability.

A lineup of models covering the 100 kW to 500 kW range with IEC-compliant third-party certification has been completed. Of special note within this lineup is the fact that the 100 kW model is the first(*) fanless PV inverter in the market. Additionally, the 500 kW model achieves the world's top-class efficiency of 98.5% due to the adoption of the latest conversion technology.

IEC: International Electrotechnical Commission

(*) As of May 2011 (as researched by Toshiba)

Operation and Construction of Mega-Scale Photovoltaic Power Generating Systems for Japanese Electric Power Companies

Overview of Shiga PV system of Hokuriku Electric Power Co., Inc.

Toshiba has concluded contracts for seven mega-scale photovoltaic (PV) power generating systems (hereafter referred to as "PV systems") with Japanese electric power companies. Two systems—the Miyako Island PV system of The Okinawa Electric Power Co., Inc. (4 MW) and the Shiga PV system of Hokuriku Electric Power Co., Inc. (1 MW)—have commenced operation, and construction of the other five systems is proceeding on schedule.

The Shiga PV system commenced operation on March 12, 2011. We applied highly efficient poly-silicon solar modules and our 250 kW power-conditioning system (97.5%) to maximize the annual electric power output.

Since Shiga is located in an area close to the Sea of Japan, some snow is expected in winter. We optimized the solar module supporting system in view of not only the angle and height of the solar modules but also the effect of accumulated snow subsidence.