

Amazing Atacama Lecture Materials

Smart Grid for Solar Tao Project

MITSUBISHI RESEARCH INSTITUTE, INC.

AUG 1 2012

**Research Fellow
Akira Koza**

■ Special Features of Japan 's Smart Grid Technology(1)

① Operation tests of PV-based systems

- In contrast to U.S. and European wind-based systems, Japan's attention from early on has been focused on PV

② Much research on grids for remote areas such as isolated islands, etc.

- Demonstration experiments on Miyakojima
- Contributions to elevating electrification rates and solving environmental problems

③ Technology for power distribution including electric vehicles (rechargeable batteries)

- Use of EVs for electric power storage
- Optimized use of weak power sources via advanced supply-and-demand control systems

④ Use of energy-saving technologies at every turn

- Applications of energy-saving technology in commercial buildings, homes, etc

Special Features of Japan's Smart Grid Technology (2)



Demonstration experiments on Miyakojima



Source : Toshiba Web Site

■ Japanese Smart Grid Technology Useful for the Solar Tao Project

- ① **Large-scale Electricity Storage Technology**
 - **1 MW-range high-performance large-sized Lithium-ion battery**

- ② **High Performance Power Conditioner**
 - **Highly efficient power conditioner technology to accompany the diffusion of PVs**

- ③ **Electric Vehicles (EVs)**
 - **Long record of performance in connecting to the grid, from small cars to large buses**

- ④ **Distribution Control System**
 - **Advanced supply/demand system to control unstable networks**

- ⑤ **Energy Conservation Technology**
 - **Many technologies to support energy conservation in factories, buildings, homes**

■ Solar Tao Project Issues and their Solutions via the Smart Grid

- ① **Weak electric power system**
 - **Advanced supply/demand control system,**
Stabilization of electricity supply through storage cells

- ② **Environmental considerations (Reduction of CO₂ emissions from electricity generation and automobile exhaust gas)**
 - **Mega Solar, Electric Vehicles**

- ③ **Efficient use of a high ratio of sunlight hours**
 - **Minimization of natural gas- and diesel-fired generation through the introduction of MegaSolar**

- ④ **Contributions to the local community**
 - **Stable supply of electricity**
 - **Contribution to the tourism industry through the use of electric buses, etc.**

■ Possibility of Applying the Smart Grid to the Solar TAO Project

