

## <Appendix>

### 1. An overview of the 1,000 kW-class NAS battery system

#### 1) Facility overview

Application: NAS battery system (peak control function program)

Ability: Rated output 1,000 kW (maximum 1,200 kW)

Maximum capacity 7,200 kWh (equivalent of six to seven hours of daytime power use in 500-600 average American homes)



#### 2) AEP company overview

Chairman: Michael Morris

Headquarters: Columbus, Ohio

Capital: US \$36.2 billion

Annual sales: US \$12.1 billion (2005)

Number of employees: 19,630

AEP is a major U.S. power company that serves about 5 million households in 11 states.

Total generation facility output: approx. 36 million kW

Power cable span: approx. 63,000 km

## **2. Advantages of NAS battery system**

### **[In the case of customer installation]**

#### **1) Electric-load leveling**

- \* By charging and storing power during nighttime and supply it during peak hour in daytime, the NAS battery system will level customer power consumption.

#### **2) Higher power reliability**

- \* Prevents momentary voltage drop.
- \* Functions as an emergency power source.

#### **3) Long-term durability and maintenance-free**

- \* Designed to last even with high-cycle use for a long time  
(assumed specification: over 2,500 cycles, expected duration: over 15 years)
- \* Requires low maintenance (regular inspection and change of consumable parts need to be implemented when necessary)

#### **4) Compact body**

- \* The installation area is only about one-third of lead acid battery, about the same size as an emergency diesel power generation room.
- \* Air supply/exhaust pipes, necessary for emergency and regular power generators, are no longer needed; construction and installation become easier, and floor-to-space ratio can be effectively improved.

#### **5) Environmentally friendly**

- \* Absolutely no air pollutants (NO<sub>x</sub>, SO<sub>x</sub>, ash dust, particulates, among others) are emitted from the equipment because no combustion is involved.

### **[In the case of power company installation]**

The NAS battery has three times more energy density when compared to lead acid battery. It charges and stores power during nighttime and supply it during peak hour in daytime, and therefore, the function is the same as a pumped-storage hydro power station. The NAS battery can be installed in urban and other demand areas, and a vicinity of such locations – a major advantage. It is useful for leveling of electric load, which tends to have wide daytime/nighttime fluctuation, as well as efficient operation of power facilities. This in turn would enable the restraint of capital investment. By combining NAS battery with renewable energy sources, such as wind and solar power, unstable power supply can be stabilized, and could also be used as an emergency power source.

### 3. Deployment and installation of NAS battery system in Japan

1) Number of deployment: about 90 locations, a total output : about 130,000kW (as of June 30, 2006)

#### 2) Major sites of customer installation

Customer name	Facility output (kW)	Installation date	Features
1) Fujitsu Akiruno Technology Center [Semiconductor factory in Akiruno, Tokyo]	1,000	July 2002	Momentary voltage drop prevention function for load leveling added
2) Tokyo Dome City LaQua [Spa and entertainment facility, Bunkyo Ward, Tokyo]	1,000	March 2003	Emergency power generation function added; underground installation
3) Tokai University Isehara Hospital [Hospital, Isehara, Kanagawa]	2,000	November 2004	Emergency power generation function added

#### 3) NAS battery facility installed at TEPCO substations (for load leveling)

Installation location	Facility output (kW)	Starting operation date
1) Chichibu Substation [Chichibu, Saitama]	1,000	June 2002
2) Matsuo Substation [Sammu, Chiba]	2,000	February 2004
3) Kamiyama Substation [Namegata, Ibaraki]	2,000	March 2004