### Basic Research Equipment of Gas-insulated Bus Model using High Pressure SF$_6$ Substitute

**Purpose:** To elucidate discharge phenomena and practical insulation performance of environmentally friendly gases (compressed N$_2$ or CO$_2$), and estimate the possibility of using environmentally friendly gases as an alternative insulation gas for practical gas-insulated apparatuses. Moreover, we will investigate the possibility of a next generation gas-insulated apparatus (gas-insulated bus or gas-insulated transmission line) using a hybrid gas insulation system that has the combined features of a solid insulator and a dielectric gas by discussing the basic insulation characteristics of hybrid gas insulation system.

**Main Specifications:**
1. Voltage rating: 300kV
2. Lightning impulse withstand voltage (LIWV): 1300kV
3. Normal frequency withstand voltage: 460kV (at 1 minute)
4. Rated frequency: 50Hz
5. Maximum testing tank gas pressure: 1.0MPaG (with observation window)
6. With signal terminal for partial discharge measurement

**Location and Date of Installation**
Electric Power Engineering Research Laboratory, March 2004

### Coal Gasification Facility for Advanced Basic Research (FRONTIA)
(FRONTIA : Forefront Research Gasifier for Development of Novel Technology and Innovative Application)

**Purpose:** Using this facility, the research gasifier that has a lot of functions and special measuring equipments, we aim to develop the technologies required to commercialize IGCC. These are: ensuring stable plant operation, evaluation and diversification of usable coal, and cost reduction.

**Main Specifications:**
This facility is a dry feed pressurized entrained flow type coal gasifier. The following are basic specifications of this facility.

1. Capacity: 3ton/day
2. Pressure: 2MPa
3. Gasifying agent: air/oxygen/steam
4. Special measuring equipments:
   a) Thermometer
   b) Heat flux probe
   c) Probe and test panel to evaluate ash adhesion characteristic
   d) Sampling probe of gas and particle in gasifier
   e) Online gas chromatography
   f) Dust sampling unit
   g) Monitor of slag flow condition

**Location and Date of Installation**
Energy Engineering Research Laboratory, February 2004

### Nondestructive Inspection System for Detecting Internal Flaws

**Purpose:** To develop a technology based on phased array and TOFD technologies to detect defects in thick-walled structures

**Main Specifications:**
1. Ultrasonic instrument applicable to phased array & TOFD
   a) The number of channels: 32/64CH (60CH for phased array, 4CH for TOFD & Pulse echo)
   b) Variable refraction angle: 30°~70° / 0.1° Pitch
   c) TOFD: 4CH
   d) Pulse echo: 8CH
   e) Frequency band: 0.7~20Mhz
2. Driving unit
3. Signal processing unit

**Location and Date of Installation:**
Materials Science Research Laboratory, September 2003