

## NEW “GREEN” HOUSE

When Carnegie Mellon University (CMU) decided to build the first “Green” Residence Hall in the country, they contacted Pittsburgh Auto-Matrix to provide the control system. The “New House” is a 72,000 square foot building that will house 256 students.

The U.S. Green Building Council (USGBC), a nonprofit organization of building industry leaders, developed Green Design. Green Design is a commitment from institutions to construct and remodel buildings that are environmentally safe and healthy for occupants. Certification is rated by a system of credits known as the Leadership in Energy and Environmental Design (LEED™) Green Building Rating System. Points are awarded for such things as water efficiency and water use reduction, minimum energy performance and renewable energy, construction waste management, Carbon Dioxide (CO<sub>2</sub>) monitoring, and usage of local/regional materials (American Auto-Matrix [AAM] is located approximately 25 miles from CMU).

The AAM control system, provided and installed by Pittsburgh Auto-Matrix (PAM), contributed to the green initiative and will be used to measure and trend the performance for years to come. PAM played a significant role in controlling the indoor air quality and temperature. Extensive monitoring points were added for all electrical panels, steam usage, chilled water usage, and domestic water usage.

To control indoor air quality, CO<sub>2</sub> sensors were placed in all common spaces. A CO<sub>2</sub> sensor was also added to the common outdoor air duct. Indoor air quality is continuously maintained and controlled at no more than 400 PPM over the outdoor air CO<sub>2</sub> measurement. This is done by increasing the amount of outdoor air brought into the building via the air-handling unit serving that particular space. Outdoor air replaces the CO<sub>2</sub> laden air created when many people gather in one area. When the area is unoccupied, the outdoor air and return air dampers are positioned to maintain the most economical temperature control, yet always maintaining a 15% minimum position for outdoor air ventilation requirements.

A unit located in the penthouse ventilates each dormitory room continuously. This unit is 100% outdoor air. Typically with this type of unit, a great deal of money is spent conditioning the air for comfort. In this case, the exhausted air passes through a heat recovery wheel that transfers heat from either the exhausted air or outdoor air. In other words, during the summer, heat from incoming outdoor air is transferred to the exhausted air whereby cooling the outdoor air. During the winter, heat is transferred from the exhausted air to the outdoor air. Once the outdoor air passes through the heat recovery wheel, it is further conditioned via a heating or cooling coil so that 55-degree air is maintained year round. The heat recovery wheel transfers up to 25 degrees of heat to precondition the outside air. This means that on a 30-degree day with 68-degree exhaust air temperature, the heat recovery wheel preconditions the outside air to 55 degrees. All building resources, such as electrical panels, incoming steam for heating, chilled water usage, and domestic water usage, are monitored by the AAM system. The electrical metering system includes kilowatt meters on 3 separate panels on each floor of the facility. Each floor has an electrical distribution panel for the room fan coil units, lighting, and outlets. The system is so accurate that it can measure the increase in energy created when a student turns on a hair dryer.

