

Sustainability for an Emerging Green World

Any building impacts the environment by using energy, water and other raw materials and generating waste during construction, occupancy and eventually demolition. To minimize this impact at the Dennis Campus, the project team developed a plan for sustainability initiatives that will minimize operational costs and environmental impact throughout the life of school. It serves as a “demonstration project” to show how a sustainable building can be optimally designed, built and operated by blending high technology with green thinking. DPS will use this project to demonstrate how educational and technical specifications can come together in building a better school.

Sustainability at the Dennis Campus begins with site orientation. Buildings are positioned to be responsive to the environment. An east-west orientation maximizes the heating and lighting effects of the sun and winds. Additional sustainability goals include: optimal energy usage; protection and conservation of water; use of environmentally friendly construction materials; enhanced indoor air quality; daylighting strategies; optimization of operational and maintenance practices; building adaptability and flexibility to accommodate change. Following are examples of how these goals are being met.

Geothermal Heating & Cooling

Heating and cooling in all campus buildings is generated by an innovative geothermal heat pump system. Miles and miles of sealed coiled piping—referred to as a “slinky coil” loop—is buried 12 feet deep under a 6.5-acre portion of the athletic fields. A glycol solution is circulated through the pipes and maintains a constant temperature year around. In cold weather, the solution absorbs heat from the earth and is circulated to create warm, comfortable, filtered air throughout the campus buildings via a series of heat pumps. In warm weather, the heat pumps absorb warm air from the buildings and transfer it to the water circulating in the pipes where it eventually is transferred into the ground. This cools and dehumidifies air throughout the school. In addition, acoustically lined heat pump cabinets, lack of vibration and elimination of outdoor fans results in noise-free operation. The system also includes Integrated Energy Recovery Ventilators (IERV) to assist in controlling humidity in the four campus buildings.

Up to 80% of the energy supplied by the geothermal system comes directly from the earth—clean, free and renewable. According to the U.S. Environmental Protection Agency (EPA), geothermal systems are “the most energy-efficient, environmentally clean and cost-effective space conditioning systems available today.”

As part of the goal of making the new school a learning tool in itself, energy kiosks with large interactive touch screens inform students about energy consumption and other information for their particular building and compares the data to the other academies. In addition, plexiglass-covered wall cutaways let students get an inside look at how the piping, heat pumps, ducts, electrical lines, framing, insulation and other construction components are installed and coordinated. This helps them learn up close and personal about energy consumption, building operation, construction complexity and environmental care.

Bright Idea: Use the Sun

A major element of a sustainable building is “daylighting,” which is the use of windows, skylights, glass walls and reflective surfaces to provide or enhance the internal, controlled lighting system. This helps to maximize visual capabilities and reduce energy use. Classrooms in

the campus academies all feature large expanses of glass to bring in outside lighting. Ceilings are also slanted downward to reflect light and get the most benefit out of every incoming ray. Automatic dimming switches in the programmable control system coordinate light fixtures and natural light to reduce energy consumption.

Gathering areas in each of the academy buildings feature floor-to-ceiling expanses of glass which allow inflow of light and heat while offering inspirational views of Colorado mountains and plains—not a bad place to discuss the lessons of the day.

The gymnasium in the Student Union features a unique lighting installation known as a Solatube® Daylighting System. Approximately 40 tubes penetrate the roof of the gym. A dome on top of each tube captures sunlight and channels it down through a patented internal reflective system. Diffusers on the ceiling inside disperse the light, simulating the effect of powerful light bulbs while also creating a unique architectural effect—all at zero energy cost. Solatubes are virtually maintenance-free and are far more efficient than traditional skylights which can lose up to 50 percent of potential light transmission.

On the roof of the Student Union is a solar panel array totaling approximately 30,000 square feet and generating 300 kilowatts of energy for the campus buildings—all from the power of the sun. This will result in net zero energy consumption for two of the campus buildings. The ultimate goal is an entire campus that is net zero in terms of energy consumption.

This sustainability effort was intentionally designed to minimize energy use, reduce the carbon footprint, create high quality indoor air and lower operating and maintenance costs. Wherever feasible, ENERGY STAR®-rated products, materials and systems were used to contribute to these objectives.

It's LEED Gold and Truly Green

Leadership in Energy And Environmental Design (LEED) is a third-party certification program and nationally accepted benchmark for the design, construction and operation of high-performance green buildings. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. The entire project team and community of Green Valley Ranch are proud that the Dennis Campus is on track to achieve LEED Gold certification for sustainability.