Walmart Opens Next Generation Western Climate Specific High Efficiency Pilot Store

HE.6 in Sacramento, California, designed to be up to 30 percent more energy efficient than 2005 baseline supercenter

At Wal-Mart, we believe being a profitable and efficient business goes hand-in-hand with being a good steward of the environment. In an effort to help Wal-Mart move closer to its environmental goals of using less energy and producing less waste, we developed the high efficiency (HE) store series to integrate even more environmentally-friendly technologies into our stores.

The HE.6 store in Sacramento, California

On June 17, 2009, Walmart opened the latest in its high efficiency series, the HE.6 pilot in Sacramento, California. The HE.6 is designed to be up to 30 percent more energy efficient than the baseline Walmart supercenter. This store builds on learnings from the HE.5 in Las Vegas and is built specifically for select Western climates, meaning the efficiency gains are made possible by innovations designed for the unique conditions of the region

- Leveraging advancements in design from previous pilots in the HE series, the HE.6 pilot incorporates many years of research, experiments and partnerships, and could serve as a model for Walmart's store of the future.
  - The HE.6 offers next generation technologies previously deployed in Walmart's HE.5 store.
  - The HE.6 includes a next generation refrigeration system that is expected to improve overall system efficiency and reduce total charge by more than 90 percent.
  - The HE.6 also builds on recently established innovations like evaporative cooling and radiant flooring technologies that together, we expect will provide a cool, comfortable shopping environment while using less energy.
  - Additionally, the HE.6 includes all of the industry-leading technologies currently being installed in new Walmart supercenters, such as white roofs, daylight harvesting systems, light-emitting diodes in grocery cases and highly efficient bathroom fixtures.

- Walmart is working to stay on the leading edge of sustainable building practices and is committed to openly sharing its learnings with the world.
  - California's latest building codes strengthen efficiency standards and complement Walmart's efforts to develop clean technologies and reduce energy consumption.
  - Walmart has also partnered with the Western Cooling Efficiency Center at the University of California-Davis to test and develop many of the innovations being deployed in the HE.6 including indirect evaporative cooling and rapid rollout radiant floor cooling. This partnership has been critical to the recent progress of our HE stores in western climates.

HE.6 Store Features

INDIRECT EVAPORATIVE COOLING WITH RADIANT FLOORING

The HE.6 store features advancements in heating, cooling, refrigeration and lighting that is expected to conserve 30 percent more energy than the baseline Walmart supercenter and reduce refrigerant use by 90 percent. The HE.6 store utilizes an integrated water-source format system piloted in the HE.1 and HE.2 pilots and adapted to a western climate by adding indirect evaporative cooling and radiant flooring technologies. The new system cools water thru natural evaporation via roof-mounted towers and then pumps the cold water underneath the retail floor to cool the shopping area.

INDIRECT EVAPORATIVE PROCESS

Cooling towers

Walmart's HE.6 store combines indirect evaporative cooling with a radiant floor. In the evaporative process, water travels through cooling towers on the roof of the building, which lowers the temperature of the liquid as some of the water evaporates. The resulting water is projected to reduce the building's cooling needs by approximately 60 percent and is more efficient than using electricity to cool the water. Once cooled, the water is circulated to the water-source format refrigeration system to chill grocery and freezer cases, and to the radiant floor to cool the store. Even in extremely hot temperatures, the store is designed to stay cool and comfortable for customers and associates while saving energy.

Because water has approximately four times the heat-carrying capacity of air, all of Walmart's high efficiency prototypes were designed to use water for transference between systems. The HE.6 store's indirect evaporative process is an even more efficient use of water that also optimizes electricity use.

INTEGRATED WATER-SOURCE FORMAT REFRIGERATION SYSTEM

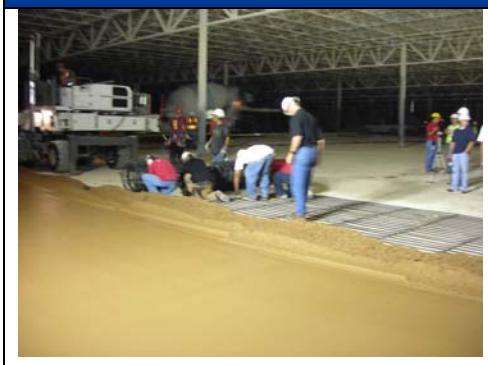
Integrated water-source refrigeration system

All of Walmart's high-efficiency stores contain 100 percent integrated, water-source format heating, cooling and refrigeration systems that reclaim waste energy from the refrigeration units. This store utilizes a glycol based, medium temperature secondary loop system, driven by a modular chiller concept that reduces installed copper piping and dramatically lowers the refrigerant charge.

This store also incorporates a carbon dioxide (CO2) based, low temperature secondary system which is the first full supercenter installation of its kind in the U.S. and only the third CO2 system installed for Wal-Mart (the first two are in Sam's Club). This system also reduces installed copper and reduces total charge. Both the medium and low temp systems incorporate state-of-the-art technology with electronic valves and variable speed drives on pumps & compressors. The two systems, medium temp and low temp collectively, reduce the total initial refrigerant charge by 90 percent.

Like most Walmart stores, waste heat from the refrigeration system is used to heat domestic hot water for restrooms and kitchen areas. Additionally, refrigeration waste heat is also used to heat the space for comfort. Nationwide, approximately 70 percent of the hot water needs for Walmart supercenters, Sam's Clubs and Neighborhood Markets are generated this way, saving enough energy to provide hot water for more than 30,000 U.S. homes per year.

RADIANT FLOORING



Walmart first tested radiant floor cooling in its Aurora, Colorado experimental store in 2005. Most retail buildings use heating, ventilating and air conditioning (HVAC) units located throughout the store to cool the ambient air. With Walmart's radiant floor system, cold water is circulated underneath the sales floor, cooling the air closest to customers as it floats upwards. The radiant floor is much more efficient than a conventional air-cooled system and is expected to significantly reduce maintenance costs.

Unlike a typical retail store that needs up to 40 Roof Top Units to heat and cool the building, the HE.6 uses only 10 Air Handling Units that bring in fresh outdoor air to maintain indoor air quality. The reduction in rooftop units considerably reduces noise, raw materials and maintenance costs.

DAYLIGHT HARVESTING SYSTEM

Skylights provide natural daylight

Store lights dim based on available daylight

More than 95 percent of newly constructed Walmart supercenters and Sam's Clubs include a daylight harvesting system, which incorporates skylights throughout the store and light sensors that monitor the amount of natural light available. During periods of higher natural daylight, the system dims or turns off the store lights if they aren't needed, thereby reducing energy usage. While barely noticeable to customers and associates, this program saves a substantial amount of energy. As an added bonus, dimming and turning off building lights eliminates unnecessary heat in the building.

Daylight Harvesting can reduce up to 75 percent of the electric lighting energy used in a supercenter during daylight hours. Each daylight harvesting system saves an average of 800,000 kWh per year, enough energy to provide electric power for 73 single family homes (11,020 kWh average annual usage) for an entire year.

Compared to American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) standards, Walmart's lighting system is 38 percent more efficient than the 2005 baseline minimum.

WATER CONSERVATION IN RESTROOMS

Highly efficient faucets save water and energy

Walmart uses advanced water- and energy-saving technologies in its restrooms. The restroom sinks in newly constructed Walmart stores contain sensor-activated 1/2 gallon per minute high efficiency faucets. These faucets regulate water flow and reduce water usage by 78 percent (over currently mandated 1992 EPA standards). In addition to electronic sensors, there are water turbines built into each faucet. During use, water flowing through the turbines generates the electricity needed to operate the sensors.

In newly constructed stores and Sam's Clubs, Wal-Mart also installs high efficiency urinals that yield an 87 percent reduction in water usage and low-flow toilets that yield a 20 percent reduction in water usage (over EPA standards). Automatic flush valves on the toilets have water turbines similar to the low-flow faucets, which generate the power required to activate the flush mechanism. These turbines save energy and raw materials by eliminating the need for electrical conduits and wiring otherwise required to power automatic flush valve sensors.

Walmart estimates that its water conservation measures will reduce the overall water consumption in each newly constructed store by 17 percent.

LED CASE LIGHTING

LEDs illuminate products in freezer and grocery cases

Walmart has been using LED lighting for all exterior signage since 2005 and began incorporating LEDs into freezer and grocery cases in new Walmart supercenters beginning in January 2007.

LEDs last three to four times longer than fluorescent bulbs; stay cooler, which reduces the cooling load on the cases; perform better in cold environments; and contain no mercury. The life span of LED lights is projected to be at least 10 years beyond conventional fluorescent lighting, which allows for a significant reduction in re-lamping and maintenance costs. In refrigerated cases, this may result in the case lighting lasting as long as the cases themselves.

The total energy savings for LED refrigerated case lighting is estimated to be more than 90,000 kWh per year for an average supercenter.

OTHER ENVIRONMENTALLY FRIENDLY ASPECTS OF THE HIGH-EFFICIENCY STORE


Recycled plastic baseboards

All Walmart stores in the U.S. run on a centralized Energy Management System (EMS), which monitors all heating, air conditioning, refrigeration and lighting units from the Home Office in Bentonville, Ark.; 24 hours per day, seven days per week. It allows the company to monitor energy usage, analyze refrigeration temperatures, observe HVAC and lighting performance, and adjust system levels accordingly at all times.

Many Walmart stores have “white” membrane roofs, including the HE.6 pilot . The high solar reflectivity of the white membrane roof can lower the cooling load of the store by roughly 8 percent.

The environmentally preferable features of a Walmart store include recycled construction materials in its buildings. All newly constructed Walmart stores and Clubs require up to 20 percent fly ash or 25 percent slag in concrete mixes. Walmart uses 90 percent recycled content steel for interior and exterior metal studs, structural framing systems, and wall and foundation reinforcements. By integrating these recycled components into its stores, Walmart is using by-products instead of raw materials and protecting the environment.

Base cabinets, wall cabinets and counters in newly constructed Walmart stores and Sam’s Clubs are manufactured from particle board and medium-density fiberboard, a waste product from sawmills. Additionally, Walmart baseboards are manufactured from 100 percent recycled plastic.

Floors in the HE.6 store are made of integrally colored concrete instead of carpet or tile. Eliminating carpet and tile reduces the amount of surface-applied flooring materials and removes the need for many harsh chemical cleansers, wax and wax strippers, which can be harmful to the environment.