



## PINK Green Gold

# Owens Corning World Headquarters Certified for Sustainability

Talk about foresight; how many buildings can qualify for environmental standards that didn't exist when they were built?

That's exactly what happened when the Owens Corning World Headquarters building was certified in the Gold category of LEED® Existing Buildings v2009. The building had been commissioned 14 years earlier when LEED (Leadership in Energy and Environmental Design) was only a great idea in the process of being developed by the U.S. Green Building Council (USGBC). LEED for new construction was launched in 2000, and LEED for Existing Buildings (EB) began its pilot phase in 2002. LEED-EB was officially introduced in the fall of 2004.

So how did the building qualify for requirements established years later? The answer is a combination of foresight and follow-through. The project team had sustainability in mind from the beginning and operation of the building keeps improving today.

### Three Drivers

Looking back on the design and construction phase, Owens Corning project manager Jim Eckert – now Director of Corporate Real Estate – says there were three drivers that shaped the building's performance.

"There was an organizational driver; our facilities experience in the previous building and the things we learned from industry experts," says Eckert.

"Our CEO at the time, Glen Hiner, was working to bring the organization together and break down the 'silos' he perceived in the company. We had 10 business units and they tended to work as autonomous units. He wanted to flatten the organizational structure and bring people together for more cross talk and sharing of best practices."



"From our facilities experience we know Owens Corning is a very dynamic organization with lots of growth and change. We expected that to continue and wanted an interior that would be flexible and allow us to move people around without generating a lot of waste in used building materials."

"We benchmarked a lot of recommended buildings but they all looked the same to us – boxes with furniture in them," continues Eckert. "We finally found ABSIC (Advanced Building Systems Integration Consortium), a coalition at Carnegie-Mellon, and the people there were very helpful. We picked their brains for a full day and some of our best features came from that discussion."

Asked to name a couple, Eckert cites the building's under-floor ventilation system and narrow footprint.

Considered progressive even today, under-floor ventilation provides many advantages that are consistent with LEED goals. For example, air can be delivered at much lower velocities than traditional HVAC systems, resulting in the use of small efficient fans. Controllable vents can be added anywhere in the workspace for occupant comfort.

A relatively narrow footprint combined with walls of glass provides access to daylight. Offices and work areas are near but not next to windows so interior walls don't block incoming light. All of this results in a pleasant environment for employees.

### Hines

Supporting the company during the design and construction phases was Hines, the Houston-based developer.

Jerry Lea, Senior Vice President, Conceptual Construction Group, consulted early in the project and helped with team selection and coordination during the design phase. Michael Harrison, Senior Vice President and Development Officer, led a seven-person Hines team

during design and construction that was located on-site during that time. Day-to-day management of the building and facilities is now out-sourced to Hines.

“Without question,” says Lea, “the Owens Corning World Headquarters building is one of the projects I am most proud to have been involved in simply because it was a landmark project.

“Hines is very forward-thinking but Owens Corning pushed us beyond where we would have gone in tapping new technology,” he continues. “We looked at new ideas from around the world. Some things were discarded for not delivering real value but many things were adopted, including the under-floor air system.

“The under-floor air system came from Europe and Owens Corning World Headquarters was the first non-governmental building of any real size to use the technology in the United States. We have applied that system to many other projects since that time.”

Harrison cites the modular nature of the under-floor air, power and data distribution systems, which simplified the reconfiguration of work space, as another contributor to the building’s sustainability profile.

“In its previous building, Owens Corning paid more than \$1,000 per person when individuals and teams were moved. That cost included carpenters, electricians, painters and other trades people whose work had to be carefully scheduled and coordinated. Today that cost is more like \$300 or less.”

“For the new building, Jim Eckert wanted reconfigurations and employee moves to be done in-house with partition walls, work stations and power/data and voice systems assembled from a modular ‘kit of parts,’” continues Harrison. “I remember Jim telling me he wanted the workspace to be reconfigured with no more than a hammer, wrench and screwdriver. And that’s what we ended up with.”

Sustainability benefits of the new moving process include the fact that almost all parts and pieces are moved and used again; there is no waste from old walls or partitions going to a landfill.

Another significant contributor to LEED certification is efficient operation of the building’s HVAC system. When the company moved into the building, annual electrical costs were more than \$1 million. Despite rising energy prices and expanding the computing capacity of the Data Center during the years since the building was commissioned, annual electrical costs are now only slightly more at about \$1.1 million.

### Mission Possible

Eckert says much of the credit for efficient operation of the facility today goes to Hines’ Engineering Manager Dave Crow and an on-site engineering team. One of the challenges Crow faces is operating a building that includes the servers for the company’s computer network.

“The data center uses 20 to 25 percent of the total energy while occupying less than 1 percent of the space,” says Crow. “When our energy costs are compared to buildings that don’t have onsite servers, they seem high. The ENERGY STAR® Program gives



applicants the ability to exclude both the energy consumption of a Data Center and its square footage to qualify for ENERGY STAR. That places our building in the top 25 percent of buildings its size.”

In 2011, Energy Star unveiled a model for tracking and comparing buildings with data centers. The program was developed to accurately depict an individual building’s data center power use and provide a level comparison with similar building sizes and designs. The program requires meters on the output of the UPS system to be compliant with future Energy Star submittals. Hines had installed the meters several years prior to this requirement and continues to use this information in tracking data center power use trends.

To drive down overall power use, Crow says the facilities team has done everything from using more daylight – there are motion detectors and photo cells to monitor and to turn off lights when they are not needed – to engaging an automated step-by-step process for warming the building before occupants arrive in the morning.

“From our facilities experience we know Owens Corning is a very dynamic organization with lots of growth and change.”

Jim Eckert, Director of Corporate Real Estate



The company also launched an “Energy Mission: Possible” program to solicit ideas from employees. A team was assembled to evaluate and prioritize suggestions. Crow says they received so many ideas they spent nearly two years implementing them.

“Some had big savings, were easy to implement and required no investment,” Crow explains. “We implemented those ideas right away. Then we worked on ideas that took time or investment.”

### LEED Certification

When Owens Corning first decided to apply for LEED-EB certification, version 2.0 was in effect and the company sought help from Johnson Controls, Inc. Paul von Paumgartten, Johnson Controls’ Director of Energy and Environmental Affairs, developed a Return on Investment planner for the facility using his company’s Green Compass™ building assessment and management tool.

“Our initial look at the building found 23 LEED credits that were either already earned or achievable with documentation,” says Paumgartten. “We also found the means to harvest 21 more credits for total savings of more than \$100,000 per year.”

Owens Corning then implemented and documented the additional energy saving measures, and the company also engaged Johnson Controls to compile the 560 page LEED-EB submittal. The result was

LEED certification in the Silver category, awarded in 2006 – 10 years after the building was commissioned.

“We learned a lot while preparing the paperwork for LEED certification,” says Crow. “It was humbling to realize how far-sighted the people were who built the building,” he explains, “but we also picked up a lot of ideas for new control strategies going forward.”

### Moving Up to Gold

As Hines and Owens Corning continued to make the World Headquarters building more efficient and sustainable year after year, they decided to apply for Gold certification. This time, the Hines staff on site did all of the paperwork – a two-year process that was again both tedious and educational.

“The LEED application is a great checklist for efficient and responsible operation,” says Gale Tedhams, Sustainability Director for Owens Corning. “Going through the application process enables us to look at our operation from an external perspective. It helps us continue to be a leading-edge enterprise in energy efficiency and sustainability.”

Lighting was an opportunity for additional improvement that helped the facility qualify for Gold. Since qualifying for Silver, the facility has:

- Changed elevator lighting from 60 watt incandescent bulbs to 9 watt compact fluorescent bulbs
- Changed an outside gazebo with 20 fixtures from 75 watt incandescent bulbs to 13 watt compact fluorescent bulbs
- Changed the 42 fixtures in the Café from 175 watt metal halide lamps to 68 watt compact fluorescent bulbs
- Changed Fitness Center lighting from 40 watt to 25 watt compact fluorescent bulbs
- Changed two major hallways from 26 watt to 21 watt compact fluorescent bulbs
- Changed overhead fluorescent lighting in the offices to a Philips bulb that reduced mercury content from 4.5 milligrams to 1.7 milligrams per unit and extended operating hours 25 percent

In addition, the four lighting fixtures in each of three Atrium stairwells were changed from two-bulb compact fluorescent units to single-bulb LED units that also enabled fixture wattage to be reduced from 52 to 22 watts each. This change also eliminated the need to erect four-tier scaffolding when changing burned out bulbs; the work can now be done with an extension pole for improved safety and cost.

The LEED process also generated a tight focus on water management at the facility. The building engineering staff analyzed daily, weekly and monthly water use for the irrigation system and discovered a deficiency with the volume of water used compared what the system was designed to use. This evaluation, in conjunction with local evapotranspiration (ETP) rates – an estimate of the predictable soil conditions relative to local climate conditions and subsequent watering needs – allowed adjustments that provided water use reduction. In 2012, a new irrigation control system was installed to perform these adjustments automatically.



A change to sustainable cleaning also spruced up the building and the LEED Gold application.

Hines worked with the building's cleaning service to change supplies to all Green Seal certified products. Training is provided to ensure cleaning chemicals are mixed properly and not over-used. The cleaning service also uses new dry fiber cleaning tools instead of the traditional cotton rag and bottle of cleaning solution.

Dave Crow continues to tweak the HVAC system to optimize performance. For example, he studied the habits of the building's occupants so he could know precisely when to warm up the facility ahead of their arrival. He adjusted the operation of the system's air box during the lunch hour when fewer people are at their desks. From 2008 to 2009, the hours of run time for the building's six units were reduced from 34,000 hours to 31,000 hours.

Crow also upgraded the filtration system to achieve higher-quality air for occupants. While the industry standard is MERV 11 (minimum efficiency reporting value), the system at Owens Corning World Headquarters is now operating at MERV 13. Higher MERV ratings mean a higher percentage of smaller particles are captured on each pass.

### Dot Cool

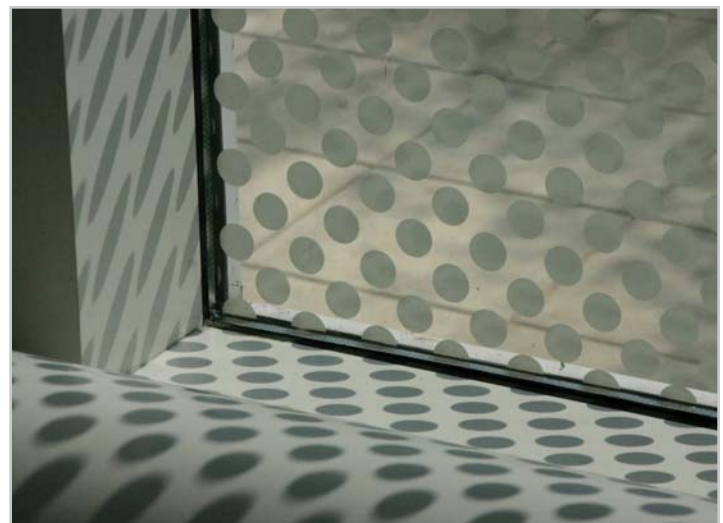
When looking at the building carefully, it seems no detail is too small to escape attention. Examples include the frit pattern that covers portions of the glass in exterior stairwells and the atrium. At first glance the small white circles seem to be decorative elements. The real reason they are there is to reduce heat gain in greenhouse-like areas that receive direct sunlight. So while daylight penetration is enhanced by the clear glass, the fritting minimizes the heat gain and impact on air conditioning requirements.

Tedhams sees the building as an example of the good that can result when a project is approached holistically and with sustainability in mind. "Good design adds value faster than low cost," she says. "If you make it comfortable, flexible and energy efficient, you can save money forever."

She says the building is also a symbol of the company's continuing commitment to energy efficiency. "Owens Corning has a legacy around energy efficiency and we want to lead by example."

Eckert says the company didn't invent anything for the building. "What we did was bring together an unusual combination of things that work very well for us."

The building does work well, and that's not just Eckert's opinion. He has ENERGY STAR and LEED-EB certifications to endorse that claim.



## Sustainability Features

Following are a few elements that helped Owens Corning World Headquarters qualify for LEED certification:

### Site Selection

Owens Corning World Headquarters is located on urban land that was once described as a derelict industrial site. More than 55 percent of this land was converted to a natural environment with plantings of native vegetation that support wildlife and are low maintenance. During a period of three to five years, hardy prairies were developed that support peregrine falcons, tree swallows, screech owls and grassland nesting birds. The facility has been a cornerstone of urban renewal in downtown Toledo, Ohio.

### Daylight and Views

Almost 90 percent of the occupants reside in the east perimeter of the building with an incredible view of the Maumee River. This wall of glass provides optimal access to daylight. In addition, most corridors and the Café face an interior courtyard that provides tranquil beauty for occupants. These elements combine to create an atmosphere that is pleasing and productive.

### Under-Floor Ventilation

Considered progressive even today, under-floor ventilation offers several advantages that are consistent with LEED goals for sustainable built environments. For example, controllable vents can be added anywhere in the workspace for occupant comfort. Air can be delivered at much lower velocities than traditional HVAC systems, resulting in the use of small efficient fans. These elements combine to deliver just the right amount of thermal comfort with almost no noise in the most energy efficient manner possible.



### Efficient Movement

Owens Corning is a dynamic corporation that consistently achieves a move rate at its headquarters near 100 percent. That means the facilities team will relocate about 1,100 people annually. Once upon a time that would have meant tearing down and building walls with conventional materials, resulting in tons of waste going to a landfill. Today the company has a flexible environment that allows fast and low-cost movement with zero waste. Walls and partitions are minimized, and what there are can be disassembled, moved and re-installed.

### Optimized Operating Systems

The facility is maintained and operated by Hines Management Services. The company has reduced energy consumption for the building from 11.7 million kwh during the first full year of commissioning in 1997 down to a current average of 9.5 million annually. As energy costs have continued to escalate, operating practices have expanded to now take into account such factors as when to operate and not operate the HVAC system, how to warm or cool the building after weekends, what temperature to maintain during business hours and what set-backs to use during nonbusiness hours.

### Quality of Life

The building also includes a variety of features and services intended to support healthy living and help occupants balance their work and life needs. These amenities include:

- Courtyard Café with healthy menu options and high glass wall to let in sunlight and allow unobstructed views of the gardens
- Convenience market that includes laundry, dry cleaning and tailoring services
- Medical center and indoor fitness facility for wellness and physical conditioning
- Outdoor fitness facilities and walking trails
- Credit union and ATM
- TechnologyOne center showcasing emerging information technology for employee learning and growth
- Landscaping to soften the environment and, in conjunction with the glass curtain wall, bring a sense of outdoors to the interior
- Embedded cast and fused glass panels by leading artist Tom Patti

### Quality of Work

The building also incorporates many features that make it easy to work at the facility and enhance productivity. These features include:

- Flexible cabling and telecommunications systems with WiFi access throughout the facility
- Use of generous stairwells, central Atrium and Café to invite casual communication "collisions"
- Positioning executive offices in the middle of the building for easy access and visibility
- Positioning of Board Room for visibility and so that it could be broadly used
- Ability to broadcast and connect multiple facilities and network meetings
- Open environments to encourage collaboration
- Avoiding physical barriers in the interior plan so organizations could freely expand as necessary
- Use of sound masking ("white noise") to reduce distraction from other noise in the environment
- Matching ceiling panels to sound transmission or absorption requirements depending on space use



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