

Vanderweil GreenNotes is a quarterly update that profiles our everyday efforts towards sustainable design and practices.

## Vanderweil LEED®

*Vanderweil demonstrates a strong track record with the LEED Rating System*

Since 2004, eighteen Vanderweil buildings have earned LEED certification, and over fifty are registered with the USGBC to submit documentation in the next two years alone.

This spring, four more projects joined our growing list:

**The Palazzo in Las Vegas, NV** earned a LEED-NC v2.2 Silver Rating. This project is the largest LEED building on record at over 7.5 million SF, and over four times larger than the second largest project. The Palazzo design process was detailed in our Summer 2007 GreenNotes, but the following sustainable strategies are worth noting again: 100 kW photovoltaic array, 65% reduction in interior lighting power density, 35% reduction in domestic water use, 50% reduction in cooling tower water use, solar thermal panels reducing 60% of annual pool heating energy, increased outdoor air delivery, CO2 monitoring, and enhanced refrigerant management. Here are some excerpts from the Palazzo's own literature:

- Over 41.6 million gallons of water is conserved annually; enough to fill 63 Olympic-sized swimming pools.
- Over 10.6 million kWh of energy is conserved annually; enough to power more than 700 homes per year, and enough to prevent over 16.4 million pounds of carbon emissions from entering our atmosphere.
- Over 42,000 tons of construction waste was diverted from landfill to recycling; the equivalent to a stack of cars approximately 23 miles high.

The Palazzo team celebrated this accomplishment at a April 9th award ceremony attended by NV Governor Jim Gibbons, Rick Fedrizzi – Founding Chairman of the USGBC, and David Rodgers – Deputy Assistant Secretary of the US Department of Energy.

*continued on page 2*

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## Solar Thermal at the Palazzo

*Vanderweil designs one of the largest solar thermal systems in the world - Contributors: Mark Clement and Gary Vanderweil*

Our Palazzo project for the Las Vegas Sands Corporation is a giant project in many respects. It contains: a giant hotel tower – 3,030 rooms, a giant underground garage – 4,400 cars, a giant casino/retail/entertainment podium – 2,000,000 sq. ft., and a giant waterworks system – 60 pools, canals, fountains, and other water features. It is a giant LEED® project, the world's largest, and it contains a giant solar thermal system – the largest we are aware of in the world – designed by RGV. The system has 364-4 ft. x 12 ft. collectors and is designed to provide 60% of the annual pool and spa heating energy.

We designed 26 rows of collectors, each row containing 14 collectors in series to achieve a fairly high supply temperature. The 26 rows were piped in parallel, using a reverse return piping system. The solar collectors are flat plate type, each rated for 51,000 Btu per day by SRCC (Solar Rating & Certification Corp.). The system is designed for up to 130°F water leaving the solar arrays, with a 20+°F drop through the heat exchangers.

*continued on page 4*



## Vanderweil LEED®

(continued from page 1)

**Iowa State University Morrill Hall in Ames, Iowa** earned a LEED-NC v2.2 Silver Rating. Morrill Hall is an adaptive reuse of a landmark historic building with a 25,000 SF museum, textile conservation facility, and teaching spaces. The most notable LEED credits pursued by the project include, a 15% energy performance improvement beyond ASHRAE 90.1-2004 baseline, a comprehensive measurement and verification program to monitor building lighting systems, mechanical systems, air pressure and volumes, and process energy, and a “Green TouchScreen” serving as an information kiosk online and in the building.

**Boston Scientific** earned a LEED-NC Rating for the renovation of its Endosurgery Headquarters in Marlborough, MA. The 500,000 SF campus houses research and development laboratories and office space, and features the following sustainable strategies: high SRI roofing, highly efficient lighting and HVAC systems, low-flow plumbing fixtures, low VOC finishes and furniture systems, and over 95% of the project’s construction waste was recycled, a exemplary achievement in a suburban area. Boston Scientific also received a Central Massachusetts Green Award from the Worcester Business Journal to recognize the environmental efforts behind the Marlborough renovation project.

**Cooper Carry’s office in Alexandria, VA** earned a LEED-CI Gold rating and received a special merit award for Sustainable Design from the Mid-Atlantic’s Chapter of the International Interior Design Association. The 13,000 SF space is located

in the same building as our NCR office, and features highly efficient lighting and HVAC, day-lighting controls, 100% Energy Star equipment, 43% post-consumer or post-industrial recycled content in new materials, and low VOC finishes and furniture throughout. During construction, the contractor recycled over 80% of construction waste.

**Congratulations to Dale Cibene, Brandy Chambers, Michael Kelly, Roselin Osser, Alex Vanderweil, and Shelley Vanderweil**

for passing the LEED Accredited Professional Exam in the past several months. We have also added to our growing list of LEED Accredited Professionals with three recent hires: **Michael Peugh, Joe McCabe, and Aaron Fernandes.**

Company-wide, we have over forty-eight LEED APs with a new 2008 goal of sixty. Studying the LEED Rating System in preparation for the accreditation exam is an excellent way to learn green design and environmental fundamentals; beginning preparation materials may be found on the Vanderweil intranet under “Engineering: Green Design Resources.”



## Greening 274

Today, companies have great opportunities to improve environmental performance through proactive green policies and in-house greening activities. Vanderweil has approached this by “greening 274” with many building upgrades and improvements. From solar-powered, hands-free sinks to occupancy lighting sensors on all floors, Vanderweil is saving money and energy.

Over the past two years, low-flow kitchen faucets, motion-sensor lavatory faucets, a combination of waterless and low-flow urinals, and dual-flush water closet valves have been installed to conserve water. All light fixtures on the floors have been re-lamped to use one halogen bulb as opposed to three, and motion-sensors are used to turn off the lights when the floors are empty. To maximize use of natural day-lighting, we’ve installed individually-controlled motorized shades and photocell controls on perimeter lights.

In addition, condensate is collected from the seven to eight heat pumps that operate on each floor to heat and cool the building.

Condensate drains to the basement and is pumped directly to the cooling tower to serve as make-up water.

We have many other plans in place, including replacing water coolers on each floor with filtered water chillers that are supplied by municipal water and a single-stream recycling program which allows all recycled materials to be mixed within the building and separated appropriately off-site. We believe that single-stream will save time and encourage much higher levels of recycling. We are further investigating recycling programs for batteries and light bulbs.

We encourage everyone at Vanderweil to participate and provide input to this ongoing effort!



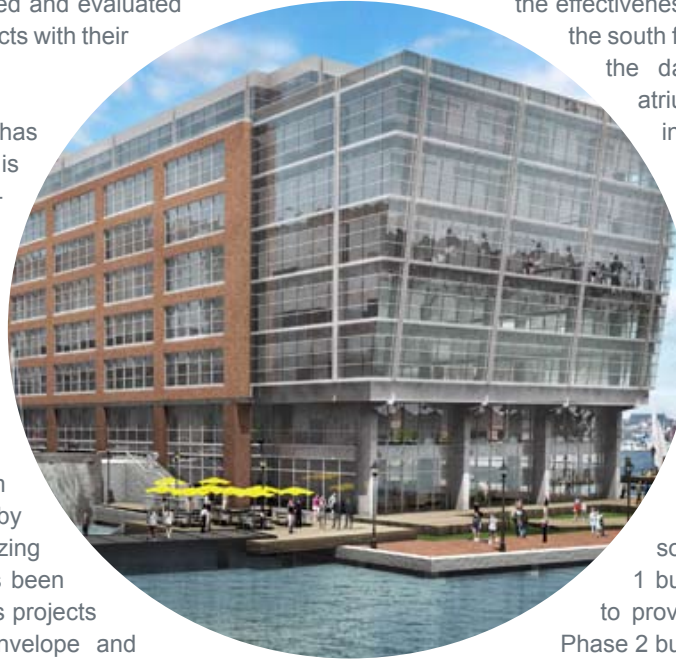
## IES Virtual Environment

*Integrated analysis tools are being used on several Vanderweil projects - Contributors: Gary Vanderweil and Don Posson*

The integrated design approach so useful in developing sustainable building solutions is moving towards earlier and earlier use of integrated analysis tools. Also, many of these analysis tools have been evolving over the past year to become more integrated with 3D graphical design and production tools such as Revit, the Autodesk BIM software being utilized at Vanderweil. Although these software analysis tools are still limited in what they can realistically bring to the design process, the capabilities of each are being tested and evaluated by us to help our clients and architects with their sustainable designs.

The main program that Vanderweil has been utilizing over the past year is the IES Virtual Environment (IES-VE) software, an integrated data modeling and analysis program that allows for daylighting analysis, solar studies, lighting design, CFD modeling, and heat transfer and thermal analysis including energy analysis. The latest version of IES-VE has been integrated with the Revit program to allow the models developed by the architect to be studied utilizing IES-VE. The IES-VE software has been utilized at Vanderweil on numerous projects to help optimize the building envelope and understand the performance of various sustainable design strategies. These projects include the following by our Alexandria office:

**Parks & People Foundation Headquarters, Baltimore, MD.** This project is being designed for LEED® “Platinum” certification. We are using IES VE to study the solar chimney natural ventilation system design proposed by the architect and to evaluate the daylighting performance of the building.



**Thames Street Wharf, Baltimore, MD.** For the Thames Street Wharf office building project, aiming for LEED® “Silver” certification, the design team utilized IES Virtual Environment to study a large sloped south facing glass façade to understand the glazing performance and shading system options.

**NOAA Center for Weather and Climate Prediction, College Park, MD.** We created an IES model to study and understand the effectiveness of the solar shading devices along the south façade of the building and understand the daylighting achieved in the central atrium space. The south façade curves in two directions with shading devices curving and following the curve of the glazing. Because of the curved perimeter the shading system could not be modeled with a standard energy analysis program, IES-VE was utilized to understand their performance.

**NIH Porter Neuroscience Laboratory, Bethesda, MD.** IES-VE was utilized to evaluate an existing problem with glare and solar heat gain with the existing Phase 1 building in order to allow the architect to provide a better shading design for the Phase 2 building.

**National Marine Corp Museum Chapel, Triangle, VA.** An all glass chapel building at the National Marine Corp Museum complex in Triangle, Virginia is being modeled in IES-VE to better understand the daylighting and thermal performance of the various glazing systems being proposed for the project. This project is the first at Vanderweil to utilize an existing Revit model from the architect as the basis for the IES-VE analysis. Various fritting systems and etchings are being proposed by the architect to create themes for the chapel glazed walls and visual affects within the chapel space. The IES-VE software will allow the architect to better understand the performance of each of these glazing options.

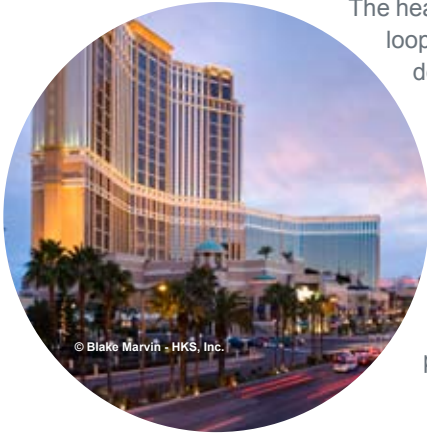


## Solar Thermal at the Palazzo

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We designed a variable speed circulating pump which allows us to balance supply temperature against total available heating. The peak solar production is 3.8 million Btuh. In the event all the heat is not needed for the pools and spas, the piping is connected to the domestic hot water system which absorbs the excess. This feature is valuable as the greatest collector output will occur when the pools and spas require the least heating. The pools are maintained at 82°F, spas at 104°F, and domestic hot water is supplied at 120°F.

The heat transfer from the collector loop into the pools/spas and domestic hot water heaters occurs via plate and frame heat exchangers. In the event of low solar insolation (e.g. at night), the circulating pump is de-activated to prevent back-radiation of heat from the pools to the panels to the sky. Because



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of the surrounding high rise buildings, we conducted shading studies in order to locate the panel arrays for maximum solar exposure.

Our collector selection is very cost effective: black colored HDPE tubing – each collector costs approximately \$200 to purchase. While this exposed tubing collector is not as efficient as the more sophisticated “glazed black box” with tubing under a vacuum in the collector to minimize losses for colder climates, simple exposed black tubing construction is practical in the Southwest.

Las Vegas is one of the sunniest places in the country. If solar thermal can't be successful there, it can't be anywhere. The solar insolation in the Las Vegas-Phoenix corridor averages about 1,700 Btu per sq. ft. per day (on a horizontal surface). In the Northeast, it is only about 1,100 – 1,200 Btu per sq. ft. It is important to note that with Las Vegas summer roof temperatures as high as 115°F, the collectors will receive conductive and convective heating as well. The system is still under construction but should be up and operating this summer. Stay tuned.

## New in the Q

The Green Design Resources folder on the Q-Drive has moved to the intranet. Check it out!

### Quantifying Sustainability

A Study of Three Sustainable Building Rating Systems: AIA compares LEED-NC v2.2, Green Globes, and the SBTool against 16 criteria for performance-based green building rating systems. Published in May 2008 in concert with the AIA convention, the study draws only general conclusions, but provides a useful overview of each system.

### Adobe Systems, Inc.

Three Platinum Certified Green Buildings: Written by Adobe's facility director, this study reviews the specific measures that have been taken to reduce electricity, gas, and water usage at three platinum buildings. “To date, Adobe has spent approximately \$1.4 million on energy conservation and related projects, received \$389,000 in rebates from local and state agencies, and reduced annual operating costs by \$1.2 million. This is a 9-month payback with a return on investment of 121%.”

### LEED 2009

New Construction Redlined Rating System: The USGBC recently released LEED 2009 for public comment. In summary, the rating system incorporates the most commonly referenced CIRs, reweights credits that are perceived to have the most environmental impact, adds regional bonus credits, and changes baseline performance standards to IPC 2006 and ASHRAE 2007. Public comment period is open until June 22, 2008.