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SAVINGS BY DESIGN PROGRAM

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"The new facility can hold four times more product than the old facility, yet it will take half as much energy to operate."

- PHOEBE HAMANN, LEED AP, HAMANN CONSTRUCTION



Cold storage, cold cash: ICE II designed to rack up energy savings

The new ICE II cold-storage facility is designed to run on **60% less electricity** than standard facilities. **See Page 2** to learn how this design/build project by Hamann Construction earned **almost \$230,000 in SDG&E® incentives**. Inside the ICE II freezer warehouse are, from left, Gregg and Phoebe Hamann of Hamann Construction, SDG&E's Peggy Crossman, and refrigeration consultant Doug Scott of VaCom Technologies. Behind them is one of six electric, high-lift Condor™ cranes that recharge with energy generated by the weight of products being lowered from 50-ft.-high racks.

Cold storage, cold cash: ICE II designed to rack up energy savings

Picture about 436,000 home freezers, each with a capacity of 15 cubic feet, stacked six stories high, and you've got a rough idea of how much pre-packaged frozen food could fill a new facility being opened in March 2009 by Innovative Cold Storage Enterprises Inc. (ICE). Dubbed "ICE II" because it is the company's second refrigerated warehouse in Otay Mesa, the new mega-freezer is designed for mega-savings: more than \$408,000 annually at current electricity prices for savings topping 3.4 million kilowatt-hours, which is 60% better performance than standard cold-storage facilities.

As a result, SDG&E® awarded a \$150,000 Savings By Design incentive to ICE for the design/build project by Hamann Construction of El Cajon. Given the ongoing electricity savings and the one-time incentive, the simple payback is merely 1.2 years for the extra investment ICE made to upgrade energy performance for the life of the building.

A new use for LED technology

SDG&E also awarded an Emerging Technologies incentive of \$79,773 to offset the cost of light-emitting diode (LED) light fixtures that are instantly activated by motion sensors in the ICE II freezer warehouse and dock areas. Typical lights in commercial freezers go on and off more slowly, don't work with motion sensors and emit heat, so they draw more electricity.

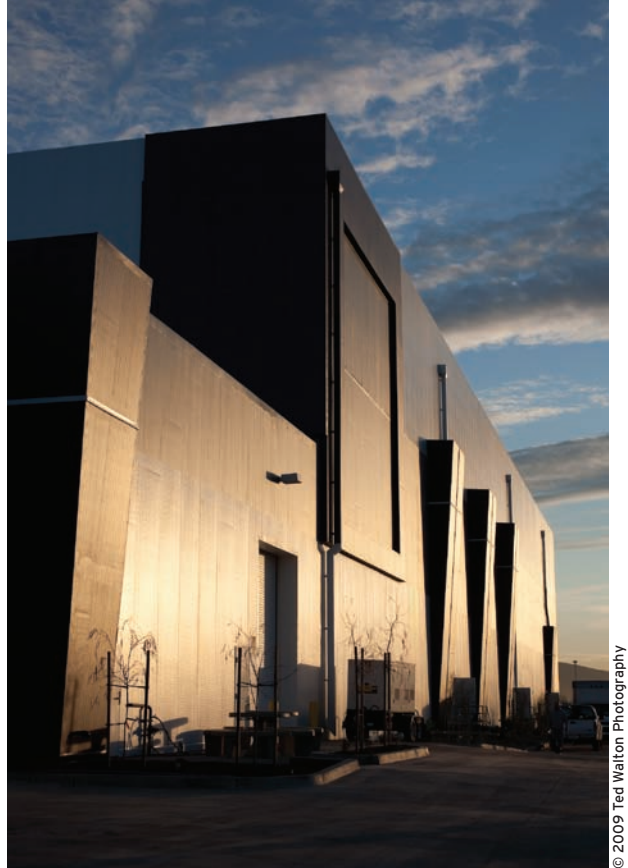
"The new facility can hold four times more product than the old facility, yet it will take half as much energy to operate," says Phoebe Hamann, LEED Accredited Professional, Hamann Construction, who is pursuing LEED Gold certifica-

tion for the project. The Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ of the U.S. Green Building Council gauges building performance in terms of energy efficiency, sustainable site development, water savings, materials selection and indoor environmental quality.

The exceptional energy performance of ICE II can be traced to several factors, including early consideration of energy-efficiency measures, an integrated, whole-building design approach, and teamwork.

As Hamann recalls, "We gave all of our plans to SDG&E for review. Doug Scott analyzed them and gave us a report on the energy-efficiency measures we originally included and additional ones that SDG&E recommended. We worked closely with Peggy Crossman (of SDG&E), Doug Scott, our refrigeration subcontractor (C&L Refrigeration Corp.) and other subcontractors to incorporate the energy-saving measures we chose to pursue."

"Every potential energy-saving measure was evaluated in terms of what's the cost, what's the savings, what's the incentive and what's the payback – item by item – as investment decisions," notes Doug Scott, president of VaCom Technologies, whose analysis compared the ICE II design in relation to Title 24 and



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Rising to a clear height of 60 ft., the steel-framed ICE II facility integrates a variety of energy-saving features, including an R-42 cool roof, R-39 freezer walls with 9 inches of polystyrene foam sandwiched in steel, high-speed freezer doors that reduce infiltration, and refrigeration components with variable-speed drives and computerized controls.

industry standard practice, the base case for SDG&E's incentive calculations. "The Hamanns wanted to figure out the best way to build the building and to get the best life-cycle cost out of the building. They understand integrated design, and how there are tradeoffs for different measures. It was a very informed, hard-nosed, financial decision-making process."

Scott's description of the decision-making process elicited a chuckle and agreement from Hamann: "We run a business. When you run a business, you have to run on economics. We are green builders who work off of economic payback, and what's best for everyone – best for the environment and best for the company."

With a footprint of almost 132,000 sq. ft. and a clear height of 60 ft., the ICE II building accommodates a 114,300-sq.-ft. freezer, 13,200-sq.-ft. dock, 5,000-sq.-ft. office area,

TWO LOCAL PROJECTS WIN TOP STATEWIDE AWARDS

Two of San Diego's newest architectural gems recently garnered top statewide honors for seamlessly blending architectural elegance with energy efficiency and other sustainable features. **The New Children's Museum** earned the 2008 Savings By Design Energy Efficiency Integration Award of Honor, the highest recognition, and the **Francis Parker School** earned an Award of Merit, one of two given during the Savings By Design Energy Efficiency Integration Awards presentation at the California Practices Conference of the American Institute of Architects, California Council (AIACC) in November. Five utilities, including SDG&E, sponsor the awards program in cooperation with AIACC.

Design teams for the two winning projects worked with SDG&E to maximize energy efficiency and earn Savings By Design incentives. Following are brief project profiles. For photos and detailed project information, visit <http://aia-awards.com/AIACC/> and click on "2008 Design Awards Entries," then "Savings By Design."

The New Children's Museum gives full play to energy performance

The New Children's Museum offers downtown San Diego a breath of fresh air architecturally – and literally. Natural ventilation is just one of the many green aspects of this urban oasis, where budding young artists can explore and express their creativity.

Spanning three levels and 50,000 square feet, The New Children's

Museum relies on natural heating, cooling and ventilation for about half of the building. Cool bay breezes enter through roll-up doors and windows. As the air inside the building warms up, it enters louvers at the base of a central glass chimney that serves as both a cooling tower and an elevator shaft. The warm air rises up inside the 92-foot-high tower to louvers at the peak, where it is vented outdoors.

Clerestory windows also allow warm air out (and sunlight in). As warm air is vented outdoors, the convection process pulls cooler air in, repeating the cycle.

To keep the indoor temperature comfortable, a computerized climate system responds to changing weather conditions by making adjustments, such as opening or closing louvers. In addition, the building's exposed concrete construction



An abundance of natural light fills The New Children's Museum, even in the late afternoon.

provides thermal mass for retaining heat in winter and staying cool longer in summer.

Natural daylighting illuminates most of the gallery and staff spaces. The building houses 15,500 square feet of galleries, a public lobby, retail store, a café with exterior decks and activity areas, a 6,000-square-foot arts education center, and administration space for museum staff.

Though the museum opened in May 2008, design work began in 2001. In addition to incorporating green strategies for energy savings through nonmechanical means, the museum has 19,673 square feet of mechanically conditioned floor area designed to perform 19.9% better than required under California's 2001 Title 24 energy-efficiency standards. None of the mechanical equipment is visible from the surrounding high-rise buildings, but the roof is put to good use as a base for photovoltaic panels that generate almost half of the building's electricity.

Rob Wellington Quigley, FAIA, of the San Diego architectural firm by



Photovoltaic panels on slanted roof segments are barely visible on The New Children's Museum. The central glass chimney seen on top serves as a cooling tower, exhausting hot air from gallery spaces.

Photo by Brighton Noying, courtesy of Rob Wellington Quigley, FAIA

Children's Museum

CONTINUED FROM PAGE 3

the same name led the winning design team, which included architects Katy Hamilton and Bob Dickens. Consultants for The New Children's Museum focused on realizing the project's energy-saving potential included: LSW Engineers California Inc., San Diego, for mechanical and electrical systems; Paul Linden, Ph.D., of the University of California, San Diego, Department of Mechanical and Aerospace Engineering, who analyzed fluid dynamics and the natural ventilation control strategy; Patrick B. Quigley & Associates, Torrance, for lighting design; and SDG&E Savings By Design program representatives Marianne Sy, senior account executive, and Bob Nacke, PE, new construction supervisor.

Francis Parker School excels at multiplying energy savings

Most new construction projects present multiple potential opportunities for saving energy. Francis Parker School offers an excellent example of how to multiply that potential with seven, going on 12, new buildings designed to perform better than required under California's Title 24 energy-efficiency standards (see accompanying table).

Greg Papay, FAIA, of Lake|Flato Architects in San Antonio, Texas, led the award-winning design team, which included project managers Brandi Rickels and Joe Farren. San Diego-based consultants included mechanical engineer Jeremy Clifton, PE, principal, SC Engineers Inc., electrical engineer Dale Franchak, PE, principal, ILA | Zammit Engineering, and for SDG&E's Savings By Design program, Bob Nacke, PE, new construction supervisor.

Lake|Flato Architects won a 2002 design competition to create a new master plan for Francis Parker's Middle/Upper School campus and expand the circa-1960s facilities of San Diego's oldest and largest nondenominational, co-educational day school.

CONTINUED ON PAGE 5



Photography by Hester + Hardaway

TOP: The new library is one example of the use of daylighting and the connection of interior spaces with gardens and other outdoor views at Francis Parker School. BOTTOM: At Francis Parker School, a narrow footprint, deep overhangs, sunshades, light shelves, and louvers with projection factors between 0.7 and 1.0 redirect light deep into the classrooms through spectrally selective glazing with high visible light transmittance.

SDG&E Savings By Design projects for Francis Parker School

(New buildings on Upper/Middle School campus)

Building	Square footage	Improvement upon performance required by Title 24	Annual electricity savings (kWh)	Annual natural gas savings (therms)	Owner incentive	Design team incentive	Total Savings By Design incentives
#100-Classrooms	5,287	36.1%	35,160	0	\$6,329	\$2,110	\$8,439
#101-Classrooms	8,090	37.6%	66,042	0	\$11,887	\$3,962	\$15,849
#102-Classrooms	5,170	41.6%	43,159	0	\$7,769	\$2,590	\$10,359
#103-Classrooms	5,170	41.6%	43,217	0	\$7,779	\$2,593	\$10,372
#104-Classrooms	1,332	12.8%	791	294	\$180	\$0	\$180
#105-Science Labs	13,341	21.9%	52,476	1,383	\$7,723	\$2,593	\$10,316
Library and Math/Science Bldg.	6,386	14.3%	16,525	0	\$2,322	\$0	\$2,322
COMPLETED 2006-2007	44,776 sq. ft.	29.4% (average)	257,370 kWh	1,677 therms	\$43,989	\$13,848	\$57,837
UNDER CONSTRUCTION*							
Admin./Stu. Svcs.	21,726	29.7%	102,341	351	\$25,896	\$8,597	\$34,493
Arts Bldg. 1	10,984	17.0%	31,918	203	\$5,558	\$1,863	\$7,421
Arts Bldg. 2	2,808	31.5%	15,430	28	\$3,958	\$1,314	\$5,272
Lecture Bldg.	4,933	33.4%	33,935	280	\$8,763	\$2,910	\$11,673
Music Bldg.	7,036	34.5%	52,504	146	\$13,272	\$4,407	\$17,679
COMPLETION FALL 2009	47,487 sq. ft.	29.2% (average)	236,128 kWh	1,088 therms	\$57,447	\$19,091	\$76,538

*Figures for buildings under construction are estimated and subject to change, based upon final inspection.

It pays to get an early start

It's easier to maximize energy efficiency - and cash incentives of up to \$200,000 per building - when you consider energy performance options right from the start.



Go Green.
Save Green.

SDG&E's Savings By Design program offers design team incentives of up to \$50,000 per qualifying building and owner incentives of up to \$150,000 for commercial new construction projects that perform better than required by California's Title 24 energy-efficiency standards.

To learn about Savings By Design incentives, technical assistance and training opportunities, visit www.sdge.com/savingsbydesign or contact your SDG&E representative early in the design phase of your next project:



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Photography by Hester + Hardaway

Use of the new library at Francis Parker School tripled in the first year of operation, a testament to its appeal as a learning center for students.

Francis Parker School excels CONTINUED FROM PAGE 4

Approximately 60,000 square feet of new academic spaces, including 32 classrooms, 11 science laboratories, and a new library, are designed to accommodate 800 students at the Middle/Upper School campus. The new facilities promote a healthy learning environment through balanced daylight, natural ventilation, engineered acoustics, efficient building systems and sustainable materials. Two-story structures helped reduce footprints on the irregularly shaped 21-acre site and provide views to the Pacific Ocean. Glazed, operable wall systems encourage indoor activities to extend outdoors, where students and faculty enjoy three new courtyards on the garden campus.

"Exemplary, innovative design"

Jurors admired the connection forged between indoor and outdoor spaces, which contributed to their selection of Francis Parker School as a 2008 Savings By Design Energy Efficiency Integration Award of Merit at the American Institute of Architects, California Council (AIACC), conference. Locally, AIA San Diego acclaimed Francis Parker School with two awards in 2008: a Committee on the Environment

(COTE) Award for beautiful, sustainable architecture, and a Merit Award for "exemplary, innovative and well-resolved design."

The various new construction projects at Francis Parker have been earning incentives through SDG&E's Savings By Design program for being designed to perform better than required under California's Title 24 energy-efficiency standards. The first five phases of construction were completed from 2004 through 2007.

Post-awards phase being built

The sixth and final phase of the two-campus expansion and renovation plan is under construction now and scheduled for completion in fall 2009. Joining LakeFlato Architects in maximizing the high-performance designs of five buildings are mechanical engineer Aaron Parkington, PE, senior electrical/lighting designer Fred Bowman, and electrical engineer Gary Eastley, PE, principal, Randall Lamb, San Diego; and SDG&E Savings By Design representatives Chuck Berry, account executive, and Roger Yamasaki, PE, senior engineer. Representing Francis Parker School is Grant Lichtman, chief operating officer.

and rooftop mechanical “penthouses” rising just past the 72-ft. mark. The many energy-efficiency enhancements contributing to its performance include:

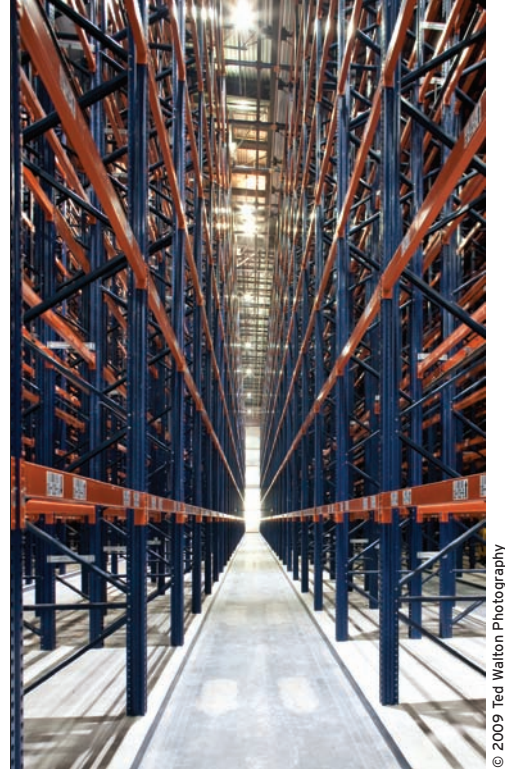
- A 60-ft. “high-rise” freezer configuration that incurs less heat gain and requires less lighting power and less floor space than a conventional freezer design by minimizing the exterior surface area of the building.
- Placement of racks along very narrow aisles – 6 ft. wide instead of the typical 12 ft. needed for standard forklifts to turn around. The narrow aisles and 50-ft.-high racks maximize product storage space and minimize distances traveled to store and retrieve pallets, though this configuration also required an extra investment in special high-lift Condor™ cranes to maneuver in such tall, tight quarters.
- Three high-efficiency, ammonia screw compressors, each providing 88.4 tons of refrigeration. The original refrigerant considered was a synthetic compound that contains chlorine and is being phased out because of damage to the ozone layer. “Ammonia is toxic, but it’s much better for the environment,

a safe refrigerant, properly done, and it saves money,” Scott notes.

- Variable-speed drives on all components of the refrigeration system with computerized controls to optimize efficiency every hour of the year.
- Daylighting in all offices.
- High levels of insulation, including an R-42 cool roof and R-39 freezer walls with 9 inches of polystyrene foam sandwiched between pre-finished 26-gauge steel skin.
- Tight-fitting dock doors and high-speed freezer doors that reduce infiltration.

In addition, the project includes two solar photovoltaic systems jointly developed by SDG&E and an affiliate of ICE. The combined peak power output of SDG&E’s system and ICE’s system is enough to meet just over 1 megawatt of demand. Together, the two solar energy systems are expected to produce a total of approximately 1.7 million kilowatt-hours per year for ICE II and the community.

When designing your next commercial new construction project, contact your SDG&E account executive or visit www.sdge.com/savingsbydesign.



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The ICE II freezer warehouse is designed to store pre-packaged frozen food items at -10°F, stacked in 28,630 pallet positions on racks up to 50 ft. high. Its 23 aisles are only 6 ft. wide – about half the industry standard – to maximize storage space and minimize distances traveled by forklifts. Motion sensors instantly activate LED light fixtures in all aisle ways.

DESIGN TEAM

Those who helped shape the exceptionally energy-efficient design of the ICE II facility included:

Gregg Hamann, president, finance, **Phoebe Hamann**, LEED AP, LEED consultant, and **Paul Giese**, RA, architect and project manager, Hamann Construction, El Cajon; **Tom Dosch**, PE, refrigeration designer/contractor, C&L Refrigeration Corp., Brea; **Bob Sweigart**, mechanical designer for office HVAC, Slayton Mechanical Contractors Inc., Lakeside; **Doug Scott**, president, VaCom Technologies, La Verne, refrigeration consultant and analyst for SDG&E; and SDG&E Savings By Design program representatives **Peggy Crossman**, senior account executive, and **Bob Nacke**, PE, new construction supervisor.



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The Savings By Design program is funded by California utility customers and administered by SDG&E under the auspices of the California Public Utilities Commission.

Progress Through Design is published by SDG&E for the architectural and engineering communities. For address changes, contact Ernie Rincon at 858-503-5101 or ERincon@semprautilities.com.

Editor: Lynn Scott

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