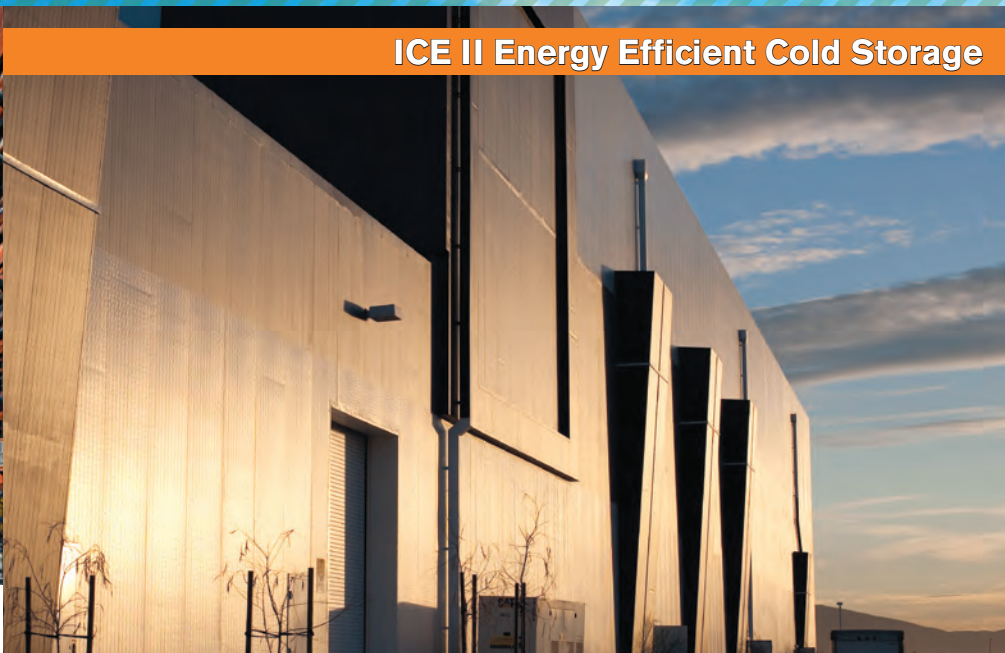
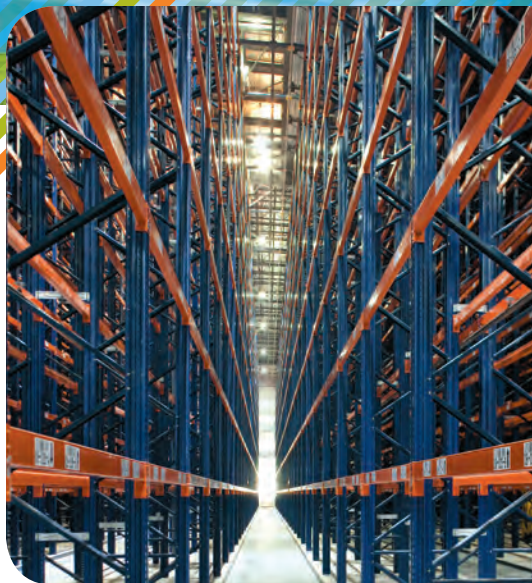


## ICE II Energy Efficient Cold Storage



## C&L Refrigeration Designs Breakthrough Systems for Cold Storage

### Brea Company Part of Team for LEED-Compliant Facility

Brea, Calif. | When a new cold storage facility opened in March in San Diego County, it wasn't just another energy-draining industrial building. This one is groundbreaking in design, solar-powered and expected to cut energy costs by 75%. It even is on track to attain the highly coveted gold certification from the U.S. Green Building Council's Leadership in Energy and Environment Design (LEED) program. It never could have happened without teamwork. C&L Refrigeration was an integral part of that team.

The 134,511-square-foot cold storage building for Innovative Cold Storage Enterprises Inc. (ICE) of San Diego was a collaborative effort spearheaded by El Cajon, Calif.-based Hamman Companies, SunPower Corp. of San Jose, ICE, and San Diego Gas & Electric (SDG&E). It took a 10-person design team and more than 40 subcontractors to address and resolve the challenges present in creating a LEED-compliant, solar-powered, energy-efficient cold storage facility.

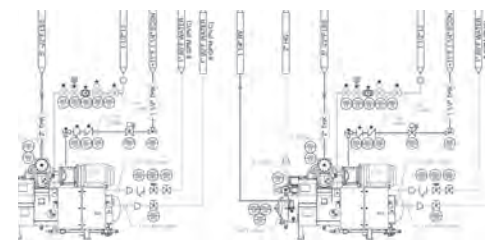
C&L Refrigeration was called in to resolve refrigeration challenges involving the building design, integration of the refrigeration system with the solar panels, and handling wastewater generated from the refrigeration system. C&L stepped up to the plate.

#### Challenges and Solutions

**Challenge:** The solar panels on the roof needed to provide the power for the refrigeration system during the hottest part of the day.

**Solution:** The C&L Refrigeration control system is integrated with the solar panel control system. During the hottest part of the day when energy is most expensive, the refrigeration output is lowered to meet the available power from the solar panels. This is accomplished by adjusting the frequency on variable speed drives of each compressor.

*continued on next page*



#### QUICK FACTS

- Reduces energy costs by 75%
- CO2 emissions reduced
- Stores up to four times more at about half the cost
- Refrigeration control system integrated with the solar panel control system
- High-efficiency ammonia screw compressors vs. halocarbon refrigerants

*Challenge:* Reducing heat load to attain a 75% more efficient building.

*Solution:* “Going vertical was very important, because there’s the same square footage on the roof but more storage space inside,” said C&L project engineer Tom Dosch, PE. Because the roof is the biggest source of heat and 90% of a cold storage facility’s energy bill comes from refrigeration, having more storage space without increasing the size of the roof reduces the overall power needs.

*Challenge:* Minimize water usage and recycle waste water.

*Solution:* C&L designed a way to minimize the amount of water used from the cooling tower and devised a plan to store and use wastewater for irrigation, saving about 42,000 gallons of water each month. Then they designed a way to store the defrost water from the evaporators and use it to operate the building’s low-volume toilets. “That may have never been done before,” said Ron Cassell, President of C&L.

*Challenge:* A 60-foot ceiling height was 25 feet taller than is typical for cold storage facilities. That meant the evaporators—usually suspended from the ceiling—would have to be moved in order to be more accessible for maintenance.

*Solution:* C&L designed ‘penthouses’ on the roof for the evaporators. Having the evaporators on the roof allowed for easy access for maintenance. It also allowed for having just a few large evaporators rather than many small evaporators.

*Challenge:* Leave a smaller carbon footprint.

*Solution:* C&L chose high-efficiency ammonia screw compressors instead of the more common halocarbon refrigerants, which is ozone-depleting. Ammonia, a naturally occurring compound, has zero ozone depletion potential, Dosch said.

**The result of these and other efforts by the team will be to:**

- Reduce energy costs by about 75% by producing the majority of the energy with solar panels. This also reduces CO2 emissions.
- Provide more storage capacity (6.5 million cubic feet) using less power. Because ICE has another, older cold storage building, it will be possible to compare energy usage. The new building is expected to store four times as much product at half the cost of ICE’s first building.
- The ICE II building received \$225,000 of incentive funding from SDG&E for the energy-efficient features through that company’s Sustainable Communities Program. Now it will be a model for future buildings.
- C&L plans to leverage its experience with this cold storage facility to other applications for clients. The company will seek ways to apply LEED standards to existing buildings and maintenance efficiencies as well as to new construction. “There’s a good future in green technology for industrial applications and we’re committed to being a leader in that,” Cassell said. “Customers always have wanted us to innovate and be more efficient.”



### About C&L Refrigeration

C&L Refrigeration has provided high-quality maintenance, engineering and construction service in the commercial and industrial air conditioning and refrigeration industry since 1978. In addition, C&L assists clients with air conditioning needs and in meeting EPA, AQMD and OSHA compliance standards. A family-owned business, C&L strives to encourage its 175 employees to take pride in their performance, understand each customer’s needs and customize projects to meet those needs. The Brea, Calif.-based company counts companies like Farmer John, Dreyer’s Grand Ice Cream, Golden State Foods, Miller Brewing Co. and Helen Grace Chocolates among its clients. Reach C&L at [www.clrefrigeration.com/ICEIIPRESS](http://www.clrefrigeration.com/ICEIIPRESS).



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