

CASE STUDY

BEST PRACTICES IN INDUSTRIAL REFRIGERATION

Henningsen Cold Storage

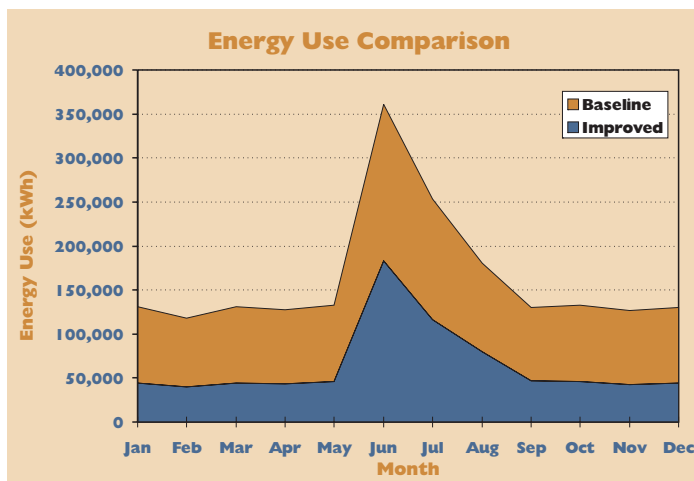


The Project

The Henningsen family has been in the cold-storage business since 1923. When you have been in the business for more than eighty years, you take the long view, and one way to do that it is to look at life-cycle costs.

Headquartered in Hillsboro, Oregon, Henningsen Cold Storage Co. is a full-service, public, refrigerated warehousing company that offers over 36 million cubic feet of frozen and refrigerated warehousing space and has locations in Idaho, North Dakota, Oklahoma, Oregon, Pennsylvania, and Washington.

In 1996, Henningsen built a state-of-the-art cold-storage warehouse in Gresham Oregon. After nearly a decade of operation, it is still an outstanding example of Best Practices in energy-efficient industrial refrigeration.



PROJECT SUMMARY

Benefits

- Reduced energy cost
- Less wear of equipment
- Improved temperature control

Financial Overview

Incremental Installation Cost

\$410,000

Oregon Business Energy Tax Credit

\$143,500

Portland General Electric Incentive

~\$70,000

Energy Savings

58% of base energy use

1,140,000 kWh/year

Energy Cost Savings

\$51,000/year (1996 rates)

Resources

Project Owner

Henningsen Cold Storage

(503) 531-5400

www.henningsen.com

Energy Consultant

Cascade Energy Engineering, Inc.

(509) 529-8040

Marcus Wilcox, P.E.

marcus.wilcox@cascadeenergy.com

Business Energy Tax Credit

Oregon Department of Energy

1-800-221-8035 (inside Oregon)

(503) 378-4040

www.energy.state.or.us

Electric Utility

Portland General Electric

(Incentives are now available through the

Energy Trust of Oregon)

1 (866) 368-7878 (inside Oregon)

(503) 493-8888

www.energytrust.org

The Gresham Warehouse Story

During the summer of 1995, planning was nearing completion on the new Henningsen Cold Storage facility in Gresham, Oregon. The 50,000-square-foot facility would provide food-storage and blast-freezing services to their customers. According to Paul Henningsen, great-grandson of the company's founder and director of corporate development, the goal for the facility was to provide high-quality services at a fraction of typical operating cost. Cascade Energy Engineering, Inc. was brought in to recommend cost-effective energy-efficiency measures.

Because this was a new construction project, a "baseline" design was developed that included standard facility design, equipment, and controls. This was compared to a system design that included state-of-the-art equipment and controls, along with extra insulation and efficient lighting. The new facility opened in June of 1996 and was built with all recommended efficiency improvements.



After a rigorous commissioning and verification process, annual energy savings of 1,140,000 kWh, worth \$51,000, were documented—a 42% reduction compared to the baseline design.

The incremental cost of the upgrades in design, equipment, and controls was \$410,000. These additional costs were partially offset by efficiency incentives from the serving utility, Portland General Electric and by state tax credits offered by the Oregon Department of Energy. These incentives brought the effective payback down to about four years (at 1996 energy rates).

At the time, Paul Henningsen said "This project reduces our power bill and improves our bottom line, and since we know more about what's going on in our facility, we make better decisions. My advice is that since power rates never seem to get cheaper, installing efficient equipment will help you offset likely increases."

These words proved to be prophetic. The four-year payback may have been a bit of a stretch at the time, but the Henningsen team's foresight was rewarded when energy rates surged upward in 2000.



Energy Efficiency

Energy-efficiency improvements include:

- 6 inches extruded polystyrene wall insulation
- 6 inches extruded polystyrene floor insulation
- 15 inches extruded polystyrene ceiling insulation
- Three fast-acting warehouse doors serving dock
- 400W Bi-level HPS lighting fixtures
- Oversized condenser at 85°F design
- Axial condenser fans
- VFD condenser and evaporator fan control
- Evaporators sized for 10°F temperature difference
- Three diversely sized screw compressors
- Thermosiphon compressor cooling
- Premium-efficiency motors
- Computer control system
- Automatic non-condensable gas purger
- Coordinated VFD and slide-valve control on trim compressor

Continued Success

The energy-efficient system design proved its worth to the company's bottom line, so when Henningsen more than doubled the size of the facility in 1998, efficient design, equipment, and controls were again specified. This brought an additional 660,000 kWh per year in energy savings and reduced operating costs by \$30,000 annually.

