Engine Drives Are Fueling the Future of Food Processing

Engine Refrigeration Compressor Drives Demonstrate Energy Saving Benefits

Demonstration Provides Substantial Operating Savings Using Natural Gas Engines in California

Gills Onion is the Nation's largest producer of fresh whole peeled, diced and pureed onions. The Gill Family started the produce processing operation in 1979, but the family's farming roots in Ventura county date back to the late 1800's. In 1999, Gills Onions expanded its operations in the 84,000- square foot former U.S. Department of Energy forge. The company also purchased 14 acres for anticipated future growth. "Oxnard, just north of Los Angeles, is a key location for Gills Onion, being centrally located between two major agricultural communities, Salinas and Yuma, "according to Steve Gill.

The facility has a substantial amount of refrigeration for onion storage and processing. An ammonia liquid over-feed refrigeration system serves the various food processing and storage areas. The refrigeration system includes two 250 HP FES electric screw compressors as well as three 150 HP TECOFROST engine-driven screw compressors. The system can be operated with either the electric or engine-driven units. The engine-driven compressors will operate primarily during the day when electric demand costs are high. The electric compressors will primarily operate at night and during off-peak periods when electric costs are more modest.

"Three engine-driven compressor sets have produced far more in energy savings this year than I ever expected. Who could have predicted what has happened here in California. Natural gas-driven refrigeration and air compressors are currently saving me tens of thousands of dollars every year. Steven Gill, President Gills Onion.

Economics

Three operating schedules were considered for energy and cost savings over the base case. The operating schedules include 24-hour/day gas engine; 6-hour/day gas engine operation during the on-peak period and continuing through the winter; and 16-hour/day gas engine operation during both the mid-peak and on-peak periods.

The energy situation in California is well known. June 3, 2001 industrial customers of Southern California Edison found out the financial impact electric prices would have on their business. Comparing the actual gas cost (July 2000 through June 2001), which were the highest recorded, with the new electric rates, yields annual energy savings from $30,000 (six hours per day engine-driven compressor operation) to $76,000 (24 hours per day engine-driven compressor operation). Allowing 1.2 cents per HP/hr for the maintenance contract, results in $25,000 to almost $56,000 annual operating savings per year depending on operating sequence. Adding heat recovery (see page three) further boosts the potential annual savings to $100,000.

The estimated installed premium for the three engine-driven compressor sets was just a little over $100,000.

Gills Onion

TECOFROST engine-driven screw compressors. The system can be operated with either the electric or engine-driven units. The engine-driven compressors will operate primarily during the day when electric demand costs are high. The electric compressors will primarily operate at night and during off-peak periods when electric costs are more modest. The plant's "low side" operation is based on a ammonia liquid overfeed system.

Each of the engine-driven chillers were installed with catalytic converters and mufflers. This auxiliary equipment assured that ambient noise and emissions were in compliance with stringent Oxnard, California requirements.

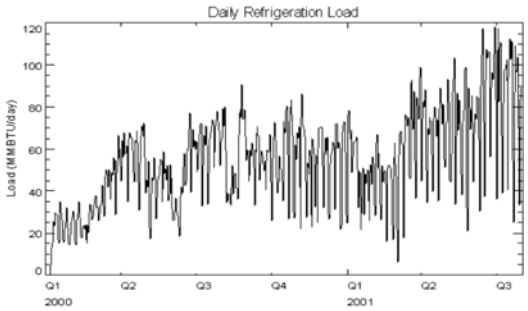
The engine-driven compressors have operated as expected and maintenance has been within budgeted expectations.

The Bottom Line is Clear

"Natural gas is essential to my business as it allows me to produce a quality product at the lowest possible energy cost. In California, it also assures that my plant is consistently up and running. In fact, I am in the process of procuring a cogeneration system for the plant to eliminate future cost and power interruption problems."

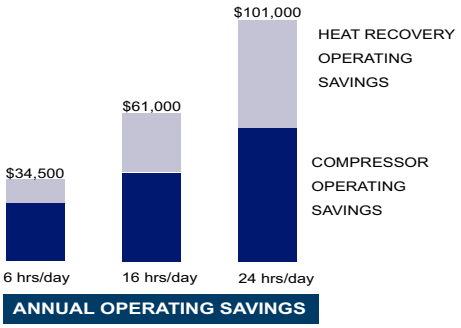
Steve Gill

Heat Recovery Technology



Gills Onion production at this new facility has steadily increased as evidenced by its daily refrigeration load growth over the course of the past 24 months (see graph left). This load growth, combined with the recent increases in energy costs led to investigating the potential energy savings available in recoverable energy from the refrigeration system's engines.

Assuming that about 50% of the available heat is recovered and 50% percent utilization (referring to the amount of heat usable in the process) considerable economic gain can be realized, particularly at the higher operating times. The financial benefit from heat recovery, in this case, increases from almost $10,000 per year operating six hours per day to $45,000 annually operating 24/7.



Gas Technology Fueling the Food Industry

150 HP standard engine-driven screw compressor product line

Standard brine chillers from 50 to 1,000 HP

Industrial custom engine driven compressor sets up to 5,000 HP

Dehumidifiers ranging from 1,000 scfm to 50,000 scfm

Industrial air compressors up to 750 cfm

Engine-driven onsite electric power generation in sizes up to 5 MW

Turbine-driven onsite electric power generation in sizes up to 30 kW to 15 MW

Combined heat and power systems providing electric or shaft power and thermal heat recovery

Fueling the Future of Industry

Energy Efficiency, Emissions and the Future of Energy Decisions

The electric power industry is in transition with the intended outcome leading to competition in a formerly restricted and regulated environment. In time, numerous benefits can be expected from a competitive electricity market; however, the transition will require rethinking electric delivery system design to accommodate the nation's future economic, environmental and reliability needs.

Combined heat and power "CHP" systems (either direct drive systems like Gills Onion or onsite electric generation systems with heat recovery) have the potential to eliminate costly transmission and distribution bottlenecks, reduce electric peak demand, improve power reliability and power quality. Technology exists today that can be integrated into successful CHP systems. Smaller sized and advanced CHP systems are on the horizon.

Be sure to consult your local gas utility for economics of refrigeration systems, CHP systems and other natural gas based industrial products in your area as rates vary widely across the nation.

In the future, when peak demand is expected to rise, when improved integrated devices are made and when CO_2 emission reductions are valued, then even with low electric rates gas engine driven compressors with heat recovery systems will have vastly improved pay backs.

For further information contact

Industrial Center Inc..

The Industrial Center supports the commercial introduction of new technologies to help build value-added markets for natural gas in North America. The Industrial Center and its members identify, evaluate and prioritize industrial markets and products for the opportunities they offer.

The Industrial Center then coordinates market development programs to move specific products from R&D success to market acceptance and ultimate commercial success. The goal of each program is to achieve stand-alone sales for each supported technology within 5 years of its first market demonstration.

400 North Capitol Street
Washington, DC 20001
Phone: 202.824.7150
Fax: 202.824.7096
e-mail:
information@industrialcenter.org
Web site:
industrialcenter.org