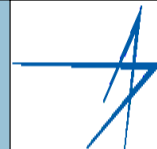


LOCKHEED MARTIN HEAVY INDUSTRY PROGRAM



WE NEVER FORGET WHO WE'RE WORKING FOR

Goals: To reduce the energy consumption of this company's refrigeration process

Strategies: Install a variable speed drive on each cooling tower fans' motor

Benefits:

- **Total Energy Savings:**
477,486 kWh annually
- **Peak Energy Savings:**
63.37 kW

Equipment Installed:

- **(11) variable speed drives**

Financial Analysis:

- **Total Project Cost:**
\$224,012
- **LM Paid Incentive:**
\$49,310
- **Energy Cost Savings:**
\$57,298 annually
- **Simple Payback In:**
3.0 years

Cooling Tower Fan Retrofit



A certain company facility, covered by this case study, contains over sixty (60) buildings located on their campus, each having its own purpose and staff. For this project, Energy Engineers audited three (3) cooling towers. Cooling tower 62 (CT62) serves the large ammonia refrigeration compressors which serves the process systems and space conditioning for one of their buildings. Cooling tower 62A (CT62A) serves a chilled water system for a second building and cooling tower 82 (CT82) serves a chilled water system for a third building.

CT62 is a six cell tower rated at a capacity of 2000 tons and each cell has a fan that is powered with a two-speed motor. The high speed motor horsepower (HP) is rated at 30 hp and the low speed motor is rated at 7.5 HP. CT62A is a two cell tower with the same capacity as CT62, however its fan's high speed motor HP is rated at 75 HP and its low speed is rated at 18.8 HP. CT82 is a three cell tower with a capacity of 2880 tons with fan motors that have a same high and low speed HP rating as CT62A.

Continue on reverse....

Energy Engineers audited the three different cooling towers that serve their respective buildings. Individual Variable Speed Drives (VSDs) were installed on each fan's motor. VSDs control the speed of the motor to meet the demand of the cooling tower cell, typically a cooling tower is sized to meet the peak demand which represents approximately 3% of the total hours. During all other times, the air flow is reduced while still meeting the load requirements. Additionally, the outdoor air temperature fluctuates throughout the year which changes the operating requirements of the cooling towers. Energy savings is achieved by installing VSDs to reduce the speed of the fan beyond the high and low speed settings of the motor.

The total project cost was \$224,012, however Lockheed Martin paid an incentive of \$49,310. Implementation of these upgrades saved the facility 477,486 kWh annually, corresponding to a energy cost savings of \$57,298 per year. During peak hours, the facility also had a reduction in energy consumption of 63.37 kW. These savings make the simple payback period only 3 years!

Project Team:

- **Pacific Gas and Electric Company**
- **Lockheed Martin Energy Services Inc, Heavy Industry Program**



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Www.lmsi-pge.com

It is our objective to assist PG&E heavy industry customers in:

- Improving their competitive position
- Identifying process-focused energy improvements and other opportunities (e.g. demand response)
- Facilitating electricity and natural-gas energy efficiency equipment and demand reduction upgrades
- Reducing Operating costs per unit of product
- Improving product quality and production rate
- Reducing waste, pollutants, and Green House Gas emissions

**Remember that increased production efficiency = lower production costs
= increased profits**

The Heavy Industry Efficiency Program is managed and facilitated by Lockheed Martin Services Inc.(LMSI), and is funded by California utility ratepayers, under the auspices of the California Public Utilities Commission. The program objective is to identify and facilitate the implementation of major process-orientated and other energy-efficiency upgrades for PG&E's heavy industry customers. Customers that install energy efficiency systems receive incentives based on the annual kWh or therm saving achieved.