LOCKHEED MARTIN
HEAVY INDUSTRY PROGRAM

WE NEVER FORGET WHO WE'RE WORKING FOR

Goals: Reduce the energy consumption this Corporation's facility

Strategies: Install timers on heaters, variable speed drives on cooling tower pump/fans, eliminate line 133 blower and maximize glass melting

Benefits:

- **Electrical Savings: 2,047,211 kWh annually**
- **Natural Gas Savings: 13,015 therms annually**
- **Peak Energy Savings: 252.43 kW**

Equipment Installed:

- **Twist timers on heaters**
- **Bypass Pump to towers**
- **VSDs on fans/pump**
- **Foreign glass melting upgrades**

Financial Analysis:

- **Total Project Cost: $452,333**
- **LM Paid Incentive: $217,797**
- **Energy Cost Savings: $198,105 per year**
- **Simple Payback Period: 1.2 years**

Cooling Towers and Heater Upgrade

The Corporation in this study manufacturers insulation for residential and commercial building construction. The facility had the following conditions which could be improved in order to reduce the amount of energy consumption, yet still maintain sufficient production.

The plant has forty-three (43) 9,000 BTUH gas-fired heaters. Twenty-five (25) are currently equipped with start/stop buttons and tend to run all the time, regardless if the station is occupied or not. The North and South Cooling Towers have "hot wells", basically sumps that the spent cooling water from the factory returns to. Each tower is equipped with a twenty (20) horsepower pump to lift the water out of the hot well and send it up and over the ballast. The South Cooling Tower is a two cell, 600 ton capacity unit with two 15 hp fans. Both fans are run in manual at high speed all the time and the HVAC condensers receive water from the South Tower at 85°F and expel it at 100°F. The HVAC-South Tower cooling system runs year round, twenty four hours a day. Regardless of cool weather, the condensing demand is quite low but the 100 hp condenser pump is still circulating water in the loop. The North Tower is identical to the south tower, only It serves process cooling loads. The plant also has a 150 Hp high pressure blower serving Line 133, which is also cooled by the North tower. Additionally, the plant receives a certain amount of foreign recyclable glass that it

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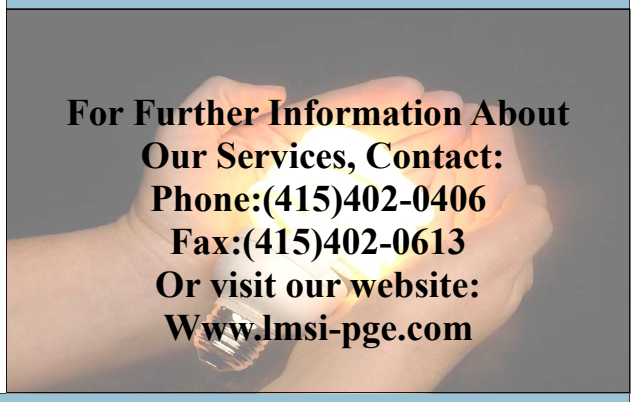
must melt, as required by the government, however maintaining quality control and air emissions can be difficult with more foreign waste.

Energy Engineers audited the facility and replaced the start/stop buttons on the gas-fired heaters with a one hour twist timer control. This will require someone to physically restart the heater every hour so they can shut off and save energy when not being used. Bypass pipes around the hot wells were also installed to the north and south cooling towers, this will eliminate the two (2) 20 HP pumps from the circuit. Variable Seed Drives (VSDs) were installed on the South Tower Fans and Condenser Pump, and the North Cooling Tower Fans, allowing them to run on a supply/demand setting rather than one high speed. Serving Line 133's blower fan was eliminated, instead the line will receive low pressure air from a different 150 Hp blower. New Conveying, batching, emission controls, and purchase emissions offsets in order to increase the percent of foreign cullet in the batch feed.

For the financial analysis and energy savings please refer to the bullet points on the first page.

Project Team:

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



For Further Information About Our Services, Contact:
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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.

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