



PG&E's Energy Management Solutions for

GREENHOUSES

Pacific Gas and Electric Company offers growers design assistance and financial incentives as well as education and training to support energy efficient, high performance greenhouse operations. Whether you are planning a new facility, retrofitting old inefficient equipment, or implementing demand response capabilities, PG&E's energy management solutions can be customized to meet the unique needs of your project.

"By participating in Pacific Gas and Electric Company's Energy Efficiency Incentive Programs I have been able to retrofit my greenhouses with efficient technologies. I have reduced my natural gas and electric use by 30%. The retrofits also improved the quality and yield of my roses, gerberas, and lilies. The financial incentives motivated and enabled me to proceed with these installations: heat curtains, double polycarbonate roof, ventilation systems, condensing boilers, under-table heating systems. In this competitive cut flower business, I need to manage a very efficient greenhouse operation."

Curtis Louie
Manager, Green Valley Floral

DESIGN ASSISTANCE, REBATES AND INCENTIVES ARE AVAILABLE FOR THE FOLLOWING MEASURES:

HEAT CURTAINS – Install heat curtains with an energy savings rating greater than 40% to reduce nighttime heat loss. Heat curtains can also provide shading to control light levels and reduce daytime temperatures.

INFRARED FILM – Install double polycarbonate, double acrylic or double-inflated polyethylene with infrared film to reduce heating costs.

EFFICIENT BOILERS – Condensing boilers with efficiencies of 90 – 95% reduce heating costs and are particularly well suited to low temperature under-bench and root-zone heating systems.

UNDER-BENCH OR ROOT-ZONE HEATING – Under-bench heating reduces energy costs by allowing growers to lower the air setpoint temperature in their greenhouses. Plants benefit from even root temperatures.

HORIZONTAL AIR FLOW (HAF) FANS – With furnace or unit heaters, HAF fans improve temperature, humidity, and CO₂ distribution. Install HAF fans with a ventilation efficiency rating greater than 15 cfm/Watt to reduce fan energy.

VENTILATION FANS – Large diameter propeller fans efficiently move large volumes of air against low static pressures. Select fans with a ventilation efficiency rating (VER) of at least 15-20 cfm/Watt.

PREMIUM EFFICIENCY MOTORS (PEMS) – PEMS should be specified on all fans and pumps with long operating hours. In addition to saving energy, PEMS are more reliable than less efficient motors.

NATURAL VENTILATION – In mild climates it may be possible to provide cooling using natural ventilation and eliminate evaporative cooling. In greenhouses with roof vents, the vent area should be at least 20% of floor area.

MOVABLE BENCHES – Movable benches contribute to energy efficiency by increasing the usable production area of a greenhouse by 15-20%. Added benefits include better ergonomics for the greenhouse workers.

LIGHTING – Specify high efficiency lighting such as high pressure sodium or metal halide lamps instead of incandescent lamps; use of lighting controls will substantially reduce energy use.



For more information on PG&E's ENERGY MANAGEMENT SOLUTIONS, call the Business Customer Center (800) 468-4743 or visit www.pge.com/business



Pacific Gas and Electric Company®

PG&E'S ENERGY MANAGEMENT SOLUTIONS can help you control your operating expenses through building energy efficiency and demand response capabilities into your new and existing facilities, and your long-range planning. Services include energy analysis of existing facilities, design assistance for planned projects, equipment rebates, project incentives, and education and training.

PG&E'S Energy Management Solutions



PG&E OFFERS
A WIDE RANGE
OF SOLUTIONS
TO HELP YOU
MANAGE THE
ENERGY AT
YOUR FACILITY.
CONTACT
PG&E TO FIND
OUT HOW
YOU CAN TAKE
ADVANTAGE
OF THESE
SERVICES.

Energy Analyses

An energy analysis - also referred to as an "energy audit" - is the first step toward a comprehensive energy management plan and can help you identify no cost, low cost and investment grade opportunities. In addition to on-site, phone-based, or on-line audits, PG&E also offers larger dairies the on-site Integrated Energy Audit, which identifies opportunities in demand response and self-generation as well as energy efficiency.

Energy Efficiency Rebates for Your Business

Rebates are the quickest and simplest way for you to get cash back for your eligible energy efficient purchases. Install qualifying greenhouse heat curtains and apply for rebates of \$0.20 per square foot. Install qualifying infrared film and apply for a rebate of \$0.03 per square foot. To find out if a product qualifies under the rebate program, go to www.pge.com/biz/rebates or contact the Business Customer Center at (800) 468-4743 to request an application and one or more technology catalogs.

Customized Energy Efficiency/Demand Response Incentive Application

For more customized energy efficiency projects or projects with a demand response component, PG&E offers design assistance, calculation support and standardized incentive rates through Customized Energy Efficiency/Demand Response Incentives.

Lighting05 per kWh saved
Process08 per kWh saved
HVAC and Refrigeration*.....	.14 per kWh saved
Natural Gas80 per therm saved

**Please note that some refrigeration-related equipment is considered Process.*

Total incentive payments are based on actual reductions in energy usage. Customers and/or their consultants may sponsor projects under this approach. Be sure to contact PG&E early in the design process, before you start your project so that you can schedule optional technical support and the required pre-inspection of your existing equipment.

New Construction Design Assistance and Cash Incentives

PG&E's new construction program - also referred to as Savings By Design - provides owner and design team cash incentives, technical design assistance, and education to support the design and construction of energy efficient new facilities and process systems. Incentives are based on exceeding 2005 Title 24 requirements by at least 10% for standard building systems, and on exceeding industry standard practice baselines for process systems. Through both the simple Systems Approach and the more integrated Whole Building Approach, customers can now receive up to \$150,000 in cash incentives per project.

Energy Management Education and Training

You can learn about the latest and best energy-efficiency practices, technologies, tools and more through the hundreds of free classes offered by PG&E every year. To search by market sector, technology, class location (including Web-based classes) or target audience, use the Pacific Energy Center's class search tool at www.pge.com/education_training/classes/energy_efficiency/index.jsp



Additional Resources on Energy Efficiency and Self-Generation for Greenhouses

- PG&E's Self Generation Incentive Program - www.pge.com/suppliers_purchasing/new_generator/incentive
- California Energy Commission Energy in Agriculture - www.energy.ca.gov/process/agriculture/index.html
- National Sustainable Agriculture Information Service - attra.ncat.org/energy.html