



DURING A MEETING TO DISCUSS POWER NEEDS FOR THE NEW PLANT, THE LOCAL ELECTRIC UTILITY OFFERED MISSION FOODS THE OPPORTUNITY TO PARTICIPATE IN ITS NEW CONSTRUCTION DESIGN ASSISTANCE PROGRAM. RECOGNIZING THAT THEY COULD REDUCE THEIR OPERATING COSTS BY DESIGNING THEIR NEW PLANT TO BE ENERGY EFFICIENT, THE MANAGERS WERE VERY INTERESTED IN PARTICIPATING, BUT CONCERNED ABOUT NEGATIVE IMPACTS ON THEIR FAST-TRACK CONSTRUCTION SCHEDULE. AS THEY ARE NOW SAVING OVER THREE HUNDRED THOUSAND DOLLARS EVERY YEAR ON ENERGY COSTS, MISSION FOODS MANAGERS ARE CONFIDENT THAT THEIR DECISION TO FOCUS ON ENERGY EFFICIENCY WAS THE RIGHT ONE.



## Tortilla Manufacturing Produces Energy-Saving Opportunities

In recent years, sales of Mission Foods' Mexican food products have been increasing so rapidly the company has been building an average of one to two new production facilities a year. As demand for their product had grown in the Inland Empire, it was decided the time had come to build a new facility in that region. The new Mission Foods Production Facility in Rancho Cucamonga is basically a one-story concrete tilt-up building containing approximately 50,000 square feet for administrative and support areas in a two-story office section, 125,000 square feet for manufacturing, and 134,000 square feet for warehousing. The production and packaging areas are divided into three product-oriented sections: flour tortillas, corn tortillas, and fried products. The warehouse area also houses large coolers for storing products and ingredients.

Plans for the new facility indicated that the largest energy-consuming systems in the factory would include process equipment for manufacturing tortillas and chips and refrigeration equipment for storing product. Because food processing equipment transfers large amounts of heat to a manufacturing area, space cooling would also be a major load. Since alterations to the process systems were not feasible, the design team, working with energy consultants from the electric utility, focused on developing strategies that would reduce energy requirements for space conditioning. Additional energy efficiency measures included lighting and glazing efficiency improvements.

One of the primary energy-saving measures of the facility is the use of evaporative precoolers on the air handlers that serve the manufacturing areas. These precoolers reduce the temperature of outside air entering the building and are particularly effective due to the dry climate conditions in the region. Since the outside air requirement in manufacturing areas is a minimum of 50 percent, the resulting energy savings are substantial. Additionally, indirect evap-



orative cooling equipment, rather than mechanical cooling, serves the manufacturing support areas. This measure reduces the load on the chilled water plant without raising the humidity of the space, and subsequently reduces the amount of energy needed for pumping chilled water.

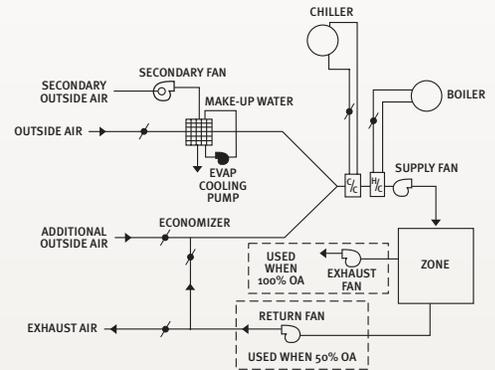
In the refrigeration plant, a high-efficiency screw compressor chiller is used to generate chilled water for all space conditioning in place of a conventional centrifugal chiller. In addition, an evaporative condenser with a two-speed fan takes the place of a conventional open cooling tower, as it takes up less space and reduces the water pumping and chemical treatment requirements associated with a cooling tower.

Further space-conditioning enhancements include a combination of premium efficiency motors and variable speed drives (VSD). The motors were upgraded in all air handlers and for all pumps. VSDs were installed in place of inlet vanes in the administrative and support area air handlers to modulate the equipment according to the space cooling and heating requirements. VSDs were also used in place of cycling equipment in the air handlers serving the packaging areas. Additionally, a VSD modulates the chilled water pump serving the air handlers.

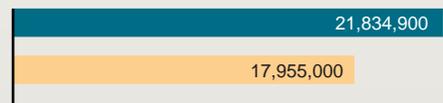
One energy efficiency measure that was studied and recommended, but not originally implemented due to first-cost restrictions, was the addition of a VSD to the screw compressor serving the central plant chiller. This feature is now being added to allow for more effective modulation of the chiller capacity based on actual cooling requirements, to further increase the operational efficiency of the plant.

Lighting system improvements in the facility include the use of T-8 lamps and electronic ballasts in the office area and metal halide fixtures in the open manufacturing areas. Occupancy sensors in all enclosed office and support areas are used to turn off lights when these spaces are not being used.

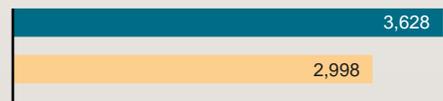
Windows in the office areas, which are primarily on the north and east sides of the building, use glazing with a low-emissivity coating. Skylights which provide abundant natural light to the production and packaging areas also include a low-emissivity glazing. The mostly invisible, metallic low-emissivity coating helps reduce heat gain to these spaces without reducing the amount of visible light illuminating the interior.



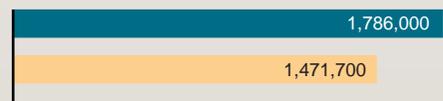
**MISSION FOODS FACILITY MANAGERS THINK THEIR PLANT IS SO SUCCESSFUL THAT THEY HAVE ENTERED A CORPORATE-WIDE COMPETITION FOCUSING ON OVERALL FACILITY QUALITY. TO DEMONSTRATE THE WAYS IN WHICH THEIR FACILITY OUTPERFORMS OTHER PRODUCTION FACILITIES, THEY INCLUDED A DISCUSSION OF THE ENERGY EFFICIENCY MEASURES AND THE RESULTING BENEFITS. THEY BELIEVE THEIR CHANCES OF WINNING ARE PRACTICALLY ASSURED.**



Annual Energy (kWh)



Electric Demand (kW)



Annual Electric Cost (\$)

■ Base Case  
■ As-Built