

## F-D-S Manufacturing Company

For F-D-S Manufacturing Company in Pomona, California, trigeneration is more than generating onsite electrical, thermal, and cooling power from a single fuel – it's the company's clean-and-green way to battle California brownouts and produce packaging material with a competitive edge.

Already an environmentally thoughtful industry leader, ambitious F-D-S Manufacturing owners were determined to make their recyclable, Earth-friendly paper and plastic packaging products for industrial and agriculture customers even greener.

In 2009, the company planned to install a new plastics extruder line that required large amounts of electricity, hot air, and cold water. After a widespread search, executives selected six Capstone C65 MicroTurbines® to meet the facility's forecasted combined cooling, heating, and power (CCHP) needs, and significantly shrink its carbon footprint and energy bill – a cleaner way to do business.

Today, members of the family-owned business say they made the right choice with the low-emission Capstone microturbines. The microturbines have safeguarded the company's power supply, cut costs, and reinforced its reputation as a leader in the green packaging market since installed in December 2009.

### Brownout barricade

According to Kevin Stevenson, F-D-S Manufacturing Vice President of Engineering, the need for a reliable, Earth-friendly power source that could operate even during brownouts launched the clean-energy project.



## At a glance

### Location

Pomona, California, USA

### Commissioned

December 2009

### Fuel

Natural gas

### Technologies

- 6 C65 Capstone microturbines in a CCHP application.
- 2 Sigma Energy heat exchangers.
- Thermax LT10C absorption chiller.

### Results

- Grid-connected CCHP system generates 320kW of electricity and supports 20% of the site's total power usage.
- Microturbines operate at near 80% efficiency.
- CCHP system saves F-D-S Manufacturing an estimated US\$35,000 per month – a 1/6 reduction of the facility's entire energy bill.
- Microturbine exhaust heat is used in the plastic extrusion process in which recyclable plastic is dried using 280–320°F [138–160°C] heat byproduct from 2 microturbines connected to Sigma Energy heat exchangers.
- Heat from 4 microturbines produces 198°F (92°C) water, which is pumped to an absorption chiller to produce chilled water that cools plastic during the extrusion process.
- The CCHP system replaced old piston-type chilling equipment and natural dryers – a drastic improvement to the company's carbon footprint and image.

*“Ultimately, our microturbines make us more competitive and conscious of the environment. They’ve been a great sales tool and resource that supports our intent to be a green manufacturer.”*

— *Kevin Stevenson, Manufacturing VP, Engineering  
F-D-S Manufacturing*

“We were evaluating ways to increase our power supply and realized microturbines would allow us to fend for ourselves when California brownouts strike,” he said.

Today, F-D-S Manufacturing uses 100 percent of electricity generated by the microturbines for manufacturing processes at the 240,000-square-foot (22,300-square-meter) manufacturing and warehousing facility.

The company averages a mighty 2MW power load for a 24/7/365 production schedule to produce recyclable strawberry baskets, fruit clam shells, tray liners, and other high-demand plastic agriculture products.

The grid-connected CCHP system generates 320kW of electricity and supports 20 percent of the site’s total power usage. The natural gas-fueled microturbines operate at near 80 percent efficiency, saving F-D-S Manufacturing an estimated US\$35,000 per month – a 1/6 reduction of the facility’s entire energy bill.

#### **First-of-kind microturbine plastics drying system**

F-D-S Manufacturing’s microturbines are the foundation for the company’s unprecedented plastics drying system.

“From drying to cooling, we use our microturbines continuously for manufacturing processes, which is a huge advantage over solar power that’s only available during the day,” Stevenson said.

While six C65 microturbines generate clean onsite electricity for manufacturing equipment, microturbine exhaust heat is used in the plastic extrusion process. Prior to the plastic extrusion process, recyclable plastic is dried using 280–320°F (138–160°C) heat byproduct from two microturbines connected to Sigma Energy heat exchangers. The four remaining microturbines are plumbed in parallel to produce 198°F (92°C) water. The hot water is then pumped to a 100 refrigeration tons Thermax LT10C absorption chiller to produce chilled water that cools plastic during the extrusion process.

The CCHP system is low-maintenance, but because of its sophistication, Capstone distributor Regatta Solutions retains a Capstone maintenance plan with F-D-S Manufacturing that includes quarterly check-ups to ensure equipment runs at an optimal level.

#### **All in-favor of green manufacturing**

Stationed in a region of fertile California soil, flourishing vineyards and a rooted citrus community, F-D-S Manufacturing is a crucial player in the West Coast agriculture industry. For more than six decades, the company has made packaging material for major California growers, distributors, grocers, and universities.

Since F-D-S Manufacturing replaced its old piston-type chilling equipment and two natural dryers with the low-emission CCHP system, the company has notably improved its carbon footprint and marketability.

“Our customers are very conscious of our carbon footprint,” Stevenson said. “Our image was competing with other companies that have solar power. Although it’s hard to quantify the value of marketing our greener image, we have a solid reputation as a green manufacturer and are taken more seriously.”

Customers aren’t the only fans of F-D-S Manufacturing’s microturbine CCHP system. The company received a Self-Generation Incentive Program grant from California to fund the Capstone microturbine installation.

F-D-S Manufacturing’s enhanced public perception and power surety, and reduced environmental impact and costs has the Stevenson family excited about installing additional microturbines in the future. “We have capacity for six more C65 microturbines,” Stevenson said. “We believe we’ll install more when additional waste heat is needed because we’ve had such success generating inexpensive electricity using low-cost natural gas. Ultimately, our microturbines make us more competitive and conscious of the environment. They’ve been a great sales tool and resource that supports our intent to be a green manufacturer.” ■