

case study Powder Coating Paint Manufacturer Caledonia, Michigan

An investment-grade audit conducted by Delta P2E2 engineers at a Michigan-based powder coating paint manufacturer found that one relatively simple process change could save the company more than \$180,000 a year and also produce significant environmental benefits.

At the factory, powder coat pigments are mixed, processed via mechanical heating and extrusion, and packaged. Facility operations include mechanical mixing of dry and wet raw materials, heated extrusion, packaging, and quality control activities. The company wants to expand capacity by 300,000 pounds of product per year.

The facility currently uses approximately 123,100 CCF of natural gas per year at a total cost of \$95,400. Electricity costs come to \$225,600 per year for approximately 3.4 million kWh.

Delta's analysis of plant operations identified a total of 11 opportunities to conserve energy and reduce pollution. Further technical underwriting determined which opportunities were most feasible and eliminated four. The Delta P2E2 Center is putting together a financing package to help the company move forward on the remaining seven projects.

| Project | Cost | Annual Savings | Payback (Years) |
|--|------------------|------------------|-----------------|
| Install sample prep line | \$386,000 | \$181,800 | 2.1 |
| Upgrade lighting | \$ 4,400 | \$ 950 | 4.6 |
| Reuse totes for quality assurance testing | \$ 695 | \$ 4,950 | 0.1 |
| Recycle raw material packaging wastes | \$ 1,000 | \$ 675 | 1.5 |
| Eliminate leaks from air compressor | \$ 1,800 | \$ 2,400 | 0.8 |
| Increase number of iterations for distilling solvents. | — | \$ 1,138 | — |
| Eliminate power factor penalty on utility bill by installing a capacitor | \$ 1,700 | \$ 1,200 | 1.4 |
| Total | \$395,595 | \$193,113 | — |

Currently, the company uses its entire production line to test for quality assurance. When technicians identify product that is not up to standards, time and effort are required to rework the nonconforming product back into the system.

Delta P2E2 engineers collaborated with the company’s maintenance and technical staff to conceptualize and refine a different approach: installing a small-scale (bench-size) powder-coat line to test batch samples for quality. The sample prep line will free up the full-scale line to manufacture product rather than test it. Doing so will boost plant capacity and improve efficiency while reducing the company’s environmental footprint. Installing a sample prep line will reduce the amount of nonconforming product and also reduce solid waste—including waste PVC, resins, fine dust, and off-specification product—which the company currently pays to send to an off-site landfill. There’s an upstream benefit, as well—fewer raw materials will produce the same amount of product. Simply by installing the prep line and upgrading the facility’s lighting, the company can realize significant environmental and economic benefits.

| Project | Economic Benefits | Environmental Benefits |
|--|---|---|
| Install Sample Prep Line Use a bench-scale powder coat line to test batch samples for quality instead of using the full production line. | A new sample prep line will increase plant capacity and sales by 300,000 pounds of product per year. Net cost savings of approximately \$181,800 per year if increases in capacity are realized. | Electricity savings of 50,280 kWhr/yr, even with the increase in plant capacity = annual air pollution savings of: CO2- 39 tons NOx- 169 lbs. SO2- 355 lbs. If the plant expanded capacity without a sample prep line, the company would send an additional 37,560 lbs/yr of solid waste to a landfill. If the plant expanded capacity without a sample prep line, raw material usage would increase by: Resins: 1,600 lbs/yr Non-conforming product (reworked into product): 68,250 lbs/yr. |
| Upgrade Lighting Replace 20 metal halide fixtures with 20 T-8 fluorescent fixtures. | Net cost savings of approximately \$1,000 per year. | Electricity savings of 13,573 kWhr/yr. = air pollution savings of: CO2- 11 tons NOX- 46 lbs. SO2- 96 lbs. |