

WHYCO TECHNOLOGIES

Over a Barrel, Plating Firm Innovates and Cuts CO₂ in the Bargain

PROJECT SNAPSHOT

PROJECTS

Development of a more efficient plating barrel, and sale of technology to other companies

TECHNOLOGY

Metal finishing and electroplating

CO₂ EMISSION REDUCTIONS

About 22,800 tons a year from use of Whyco's barrels nationwide

INVESTMENT

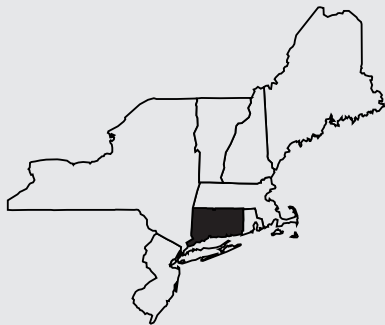
Roughly \$1.4 million

LESSONS LEARNED

Innovative problem solving can generate unanticipated efficiencies and benefits.

FUNDING SOURCES

Whyco's investment to develop the barrels has been nearly \$1 million; U.S. DOE provided a \$390,000 grant to manufacture and market them.



INTRODUCTION

Spurred by a desire to build a better barrel, a New England metal plating company has come up with an idea that is catching on across the country – and reducing greenhouse emissions by thousands of tons a year. The story illustrates the connection between seemingly unrelated things: a desire to increase production, a need to minimize toxic waste, and a plan to address climate change.

Metal plating and finishing is an energy-intensive industry. It requires use of heavy metals like nickel, as well as other substances like chemical solvents and cleansers, all of which can harm the environment and compromise public health. When plated, small objects are placed in a perforated “plating barrel” that is submerged in a solution of metal salts and catalysts. By passing an electric current through the solution, metal is removed from the dissolved salt and deposited on the objects in the barrel. Because the barrels are made of a non-metallic material, they are not plated.

Staff at Whyco Technologies, a Connecticut-based electroplating firm, became increasingly dissatisfied during the 1990's with the performance of the company's plating barrels. After a comprehensive search for alternatives from other manufacturers failed to turn up a better barrel, engineers at Whyco set out to design one themselves.

THE PROJECT

Whyco's dissatisfaction with the performance of its barrels initially arose from the difficulty it had achieving consistent metal ratios when plating with alloys. So Whyco engineers set out to design barrels that would make these ratios easier to maintain. They not only succeeded at that task, but they also found they could make barrels that plated their contents in a far more efficient manner, reducing both energy use and waste.

Whyco accomplished this by reducing the thickness of the barrel wall, while maintaining its strength. Historically, the

walls of metal plating barrels have been one-half to one inch thick. They are perforated by thousands of holes, which allow the solution to pass from the bath to the objects inside. But the new barrel, with thinner walls and shallower holes, allows more solution to make more rapid contact with the objects to be plated. It also facilitates removal of the solution after plating. This helps reduce chemical retention in the bath, known as “drag out.” Less drag out means that the barrel and its contents require less rinsing. With less rinsing, there is less contaminated wastewater.

Whyco engineers found that they could maintain the strength of a slimmed-down barrel using a wall covered with a honeycomb-like lattice. As the barrel was rotated in the plating solution, the honeycombs trapped the liquid. This dramatically increased the amount of solution that passed through the holes – reducing the plating time and improving results.

Because Whyco's new barrel plates its contents faster and more evenly, the process consumes less electricity and generates less wastewater. “Suddenly, what was intended to help maintain the alloy ratio in one process seemed to have sweeping implications,” notes Mark LaVine, an Environmental Manager at Whyco. The company's success with its new design prompted the U.S. Department of Energy's Office of Industrial Technologies to award a grant allowing it to manufacture more barrels and market them to other plating companies. In late 1998, the company opened a 5,000-square-foot manufacturing facility in Thomaston, Connecticut. To date, it has sold hundreds of barrels to other companies across the country.

THE RESULTS

Without doubt the new barrels offer significant energy and cost savings. Precise quantification has proven to be difficult, however. That is because Whyco's new invention allowed it to increase its output. In fact, the company has moved from a seven-days-a-week production cycle to one that is six days, while upping output

by 20 percent. Currently, there are about 750 of Whyco's new barrels in use at plating facilities across the U.S. DOE estimates that their use cuts annual carbon dioxide emissions by 22,800 tons a year.¹ This is equivalent to reducing oil consumption by almost 42,000 barrels per year, or taking more than 3,200 typical passenger cars off the road.

Whyco's investment in the development of the barrels is nearing \$1 million. On top of that is the \$390,000 grant from DOE. The company has not released revenue projections from the sale of its barrels, or an estimated payback period for its investment.

LESSONS LEARNED

The challenges Whyco faced in developing the new barrels were primarily ones of engineering and design. Because of the problems the company was having with existing technology, the idea for developing a new barrel met with little resistance. From the company's perspective, the key lesson learned is that effective problem solving can reap benefits and efficiencies not originally envisioned – and point the way to new business opportunities.

FUTURE COMMITMENTS

Although Whyco intends to continue to market and sell its new barrels, it plans to remain primarily a plating and finishing company. But its successful experience with this new product has contributed to a positive internal atmosphere supportive of further innovation. Whyco believes that this will help increase the effectiveness of its continuing efforts to reduce waste and energy use.

THE COMPANY

Whyco Technologies is a metal finishing and electroplating company based in Thomaston, Connecticut. It employs about 250 people. In November 1999, Whyco was purchased by Lombard Technologies, a holding company that owns five other manufacturing firms in various industries. As a metal plating company that relies upon heavy metals and other hazardous substances, Whyco has focused on environmental issues for many years. The company takes an aggressive approach to reducing its waste stream, and it has gone beyond regulatory requirements in many areas to ensure that the waste it does generate is properly treated and disposed of.

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¹ See the U.S. DOE's write-up of Whyco's story at www.oit.doe.gov/nice3/projects/successes/wast2.shtml. All emission reductions cited here are calculated based on New England regional marginal emission rates, provided by ISO New England. See Appendix A for a discussion of these calculations.

CLEAN AIR-COOL PLANET CASE STUDY RATING

This case study reduces CO₂ emissions equivalent to the following:

Avoiding the consumption of 61 barrels of oil per day. (1 barrel = 10 barrels of oil)



OR Taking 1,698 vehicles off the road per year. (1 car = 100 vehicles)



Assumptions: 1,093 lbs of CO₂ per barrel of oil. Vehicles are average passenger cars (approximately 20 lbs CO₂ per gallon of gasoline - 22.5 miles per gallon, averaging 16,000 miles per year)