

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

This section presents case studies in the order that they appear in the workshop.

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CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

A. Finkl & Sons

A. FINKL & SONS Co.

INNOVATION IN THE DIE STEEL FORGING INDUSTRY

Introduction

In 1879, German immigrant Anton Finkl started his own blacksmithing firm, the Finkl Forge Co., at Clinton and Monroe Streets in Chicago that would evolve into A. Finkl & Sons and pass down through three generations of his descendants. From a “smithy” that specialized in making high-grade tools for tradesmen, A. Finkl & Sons Co. has evolved into one of the largest and most innovative custom forgers in the U.S. The privately held firm, which employs more than 400 people, is anticipating 1995 revenues of \$80 million. Its products — die blocks for the closed die forging industry, plastic mold and die casting die steels, custom open die forgings, and forge shop and steel mill repair parts — are turned out from a fully integrated steel production facility in the heart of Chicago’s near north side.

The innovative touch that Anton Finkl exhibited more than a century ago has been carried through by subsequent generations and is a major reason why A. Finkl & Sons is widely regarded as an industry leader.

Anton’s grandson William Finkl, who led the company from 1933 until his death in 1984, invented his first patentable product while still a teenager before the first World War — a combustion bulb that determined the amount of carbon in steel faster than any previous technique. Throughout the 1920s, he developed a variety of new processes and steels, ranging from molybdenum-bearing steel (a breakthrough for its strength characteristics) to what would be patented as “FX,” the first successfully water-quenched die block of nickel-chrome-moly steel and the introduction into the 4300 series of steel. Today, FX is still the most successful die block in the business.

William’s son, Charles (Chuck), current chairman and chief executive officer, continued the company’s innovative tradition by developing the vacuum arc degassing (VAD) system. This is a patented process for vacuuming deleterious gasses from molten metal that, if left unattended, would result in cracks and impurities in the finished product. The VAD system today is licensed by Finkl to steelmakers across the world and provides the cleanest air-melted steel.

Today, the Finkl company holds more than 100 worldwide patents on a variety of steels, steelmaking processes, techniques, and equipment.

Energy Efficiency and Productivity

At its plant, Finkl's recycling effort currently reuses or recycles 99.7% of the solid waste generated by the company. It also has won its reputation for leadership by virtue of its ability to respond rapidly to changing market conditions — particularly when those conditions could have negative implications for the industries it serves. For example, in the late 1970s and early 1980s, A. Finkl & Sons was setting new records for production, shipment, and sales volume. But by spring of 1982, the bottom had fallen out of the market and the industry was rocked by the worst recession since the 1930s.

With many customers down to three-day work weeks, the company knew it had to change and reduce its costs in order to help its accounts — and its own operation — survive. Flying in the face of the industry trends of spending and production cutbacks, Finkl launched a continuing long-term capital improvements program to reduce its costs and improve productivity — and thus prove more cost-effective to the industries it serves.

With the addition of new larger machinery, upgrading with computerization of other equipment and building of new and more efficient heat treat and heating furnaces, including the addition of a Vacuum Arc Remelt furnace, the results have been impressive.

Today, A. Finkl & Sons is one of the most efficient and productive forge shops in the business. Among the specific results:

- Total energy consumed has declined 36.4% from 165 therms to 105 therms per ton shipped.
- Production efficiency, in terms of man-hours worked, has doubled.

Pollution Prevention

A. Finkl & Sons is committed to improving its community by reducing its solid waste output. In fact, more than 99.7% of the solid waste it produces is reused in the plant or recycled.

Here are just a few examples of its waste-reduction efforts:

- First and foremost, 100% of the steel the company makes is produced from premium scrap metal.
- In the melt shop, Finkl has extended the life of a furnace and ladle brick by 400%. And when it's time to reline, the company does not throw the brick away; it returns it for recycling.
- In the smooth forge area, the shot used by the shot blaster is delivered in drums. Rather than discarding those drums, the company reuses them as everything from garbage cans to storage containers around the plant.
- Finkl no longer discards the used shot and dust from this operation — instead, it is now charged into the melt furnaces and ultimately leaves the plant as part of Finkl steel.
- The company used to spend a small fortune on wooden pallets for use in the plant and for shipping — today, it reuses pallets throughout the plant and, when they finally fall apart, it sends them to a pallet-rebuilding company.

Does reduce and reuse work? Consider this, the company's waste hauler used to pick up 18 containers of refuse from Finkl three times per week or 54 containers a week. Today, it sends out less than two containers a week — a near total elimination of its solid waste output.

Results of Efficiency and Waste Reduction: Steelmaking in an Upscale Neighborhood

Partly because of its success in the areas of pollution prevention and energy efficiency, the City of Chicago and A. Finkl & Sons Co. have created a new urban manufacturing campus in the heart of Chicago's exclusive Lincoln Park-Clybourn Corridor community.

The dedication of Finkl's new manufacturing campus culminates almost a decade of effort to preserve the nearly 10,000 manufacturing jobs provided by Finkl and its industrial neighbors. The specialty steelmaker is located only steps away from single-family homes that are valued at more than \$500,000.

The manufacturing campus falls within the City's recently dedicated Northbranch Industrial Corridor, a designated manufacturing area roughly bounded by the Kennedy Expressway, Clybourn Avenue, Diversey Street, and Chicago Avenue. The Industrial Corridor is believed to be the first in the Nation to blend heavy manufacturing and affluent residential interests. According to the City, 164 industrial firms are located within the Corridor.

Bruce C. Liimatainen, Finkl president, notes that the Northbranch Industrial Corridor represents the accomplishment of a goal that began with the creation of several planned manufacturing districts (PMDs) in the area. "Thanks to the innovative leadership of Mayor Daley and city departments, this designated area for manufacturing will encourage industrial companies to stay in the City," he explains. "With the meteoric growth of the surrounding community, it was clear that Chicago needed to take proactive steps to retain high-paying manufacturing jobs."

The PMDs' tiered zoning maps reserve the core of the area for manufacturing and create a buffer layer for commercial use, separating residential properties from the heavy manufacturing area.

According to Scott Sonoc, principal of Sonoc, Hutter, Lee Ltd., the architectural firm that created the master plan for Finkl's campus, the designation of the area as an "Industrial Corridor" assures its future prosperity. "It became apparent early on in the planning process that meshing the interests of the manufacturers and the adjoining neighborhoods would be required to assure the area's long-term survival," he said.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

AAP St. Mary's

AAP SAINT MARY'S

THE SAVINGS ARE IN THE CHIPS

Introduction

AAP Saint Mary's is a producer of original and after-market aluminum wheels for the automotive industry. As an integrated casting and machine shop, AAP takes raw aluminum ingots and melts, casts, machines, and polishes finished aluminum wheels. While they were able to perform the whole process within one firm, AAP, like many other aluminum machining firms, still relied on an outside contractor to retrieve, clean, and re-form the chips from the machining process back into aluminum ingot.

The Problem

While many firms would look at the metal chips falling off rough castings in the machining process as a necessary waste product of fabrication, AAP identified a potential resource. Given that a typical wheel at the plant loses up to 40% of its weight in the machining process, the resulting waste chips add up to around one million pounds of aluminum *per month*. With 6,000 tons of aluminum shavings spinning off of AAP's milling machines per year, the opportunities for cost savings were immense

Previously, these chips, which are covered with cutting oil and other waste products, were transported by truck from the plant to a third-party recycling center. There, the chips were cleaned of the oil and other waste, re-melted, and reformed into aluminum ingots. The ingots were then transported back to AAP Saint Mary's, where they were melted once again and poured back into molds.

A Team Emerges With a Solution

AAP received an unsolicited information package from the Ohio Department of Development (ODOD) detailing the State's participation in the NICE³ program sponsored by the US Department of Energy. Realizing that they had a potential point of improvement in the efficiency of their production process, and that they could find a partner in ODOD, AAP Saint Mary's developed a plan to move the chip reclamation process in-house, eliminating the need to transport and re-melt their waste aluminum chips.

AAP submitted an abstract to NICE³ detailing their proposal for the trial of a new in-house centrifuge-based cleaning process that would allow them to integrate recycling into the plant's wheel production process. The new chip recycling process transports aluminum chips directly from the machine shop to the cleaning and re-melting operation for immediate recycling. The chips are separated from the cutting oils in a centrifuge, and then fed into an advanced furnace which improves the recovery of aluminum and produces fewer pollutants than the equivalent off-site melting process.

Energy and Environmental Savings

By reducing chip transportation and melting the aluminum once instead of twice, the new system reduces the energy consumption of the whole process by 15.6 billion BTUs. Additionally, aluminum waste has been reduced to 1.5% from the 8% waste rate found in the old process, and cuttings oils are now recycled as well.

Economic Impact

By reducing transportation and handling costs, cutting out the unnecessary independent recycling step, and maximizing the efficiency of its internal recycling system AAP Saint Mary's has realized significant economic savings. The cost savings amount to \$1.60 per wheel, and with a 100,000 wheel per month production rate, saves AAP Saint Mary's over \$1.9 million per year. The cost savings paid for the implementation costs of the project in a little over 18 months.

Project Financing

AAP Saint Mary's, with the help of the Ohio Department of Development, was able to secure \$300,000 in Federal financing to defray the cost and offset the risks involved in this \$1.3 million project. This grant was made available through the National Industrial Competitiveness through Energy, Environment and Economics (NICE³) program sponsored by the Department of Energy. The program attempts to reward projects that promote innovative solutions to problems of energy and waste conservation. The remainder of the costs associated with the project were financed internally, and recovered from savings in a little over 18 months.

Dan Hosek of AAP St. Mary's and Sue Covey and John Greenway of the Ohio Department of Development were especially helpful in aiding in the preparation of this article

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

Decatur Foundry

DECATUR FOUNDRY, INC.

SMALL FOUNDRY MAKES BIG EFFICIENCY GAINS WITH PROCESS IMPROVEMENTS

Introduction

Decatur Foundry's 1993 sales of \$5.9 million may be small relative to the \$4.5 billion dollar National market for gray and ductile iron castings, but the innovative management of this small manufacturing firm in Southern Illinois has made Decatur a leader in high-quality, high-efficiency manufacturing. While a small facility, with a 1993 employment of 75 workers and output of 1,000 tons per month, Decatur's agility and regard for customer satisfaction, quality products, and efficient manufacturing make it an example for what can be accomplished.

As a small-run jobbing foundry, Decatur's production process places a high premium on a nimble production process. At the same time, the castings industry has been moving away from quickly drying solvent-based coatings to environmentally safer but slower drying water-based coatings. For many firms, this transition has created a bottleneck in the production process, as such coatings require extensive drying times.

The Problem

As this shift in drying procedures constrained Decatur's ability to establish quick turn-around time on production runs, market conditions demanded the opposite. The plants' customers, such as utilities and manufacturers of products containing Decatur's castings, were moving to just-in-time inventory systems, and were placing a premium on the ability of their suppliers to provide short-cycle responses to orders.

Decatur's unique need for a flexible, fast production cycle was further mandated by its small production runs. With an average run of only 10-25 parts on any particular mold, and with some orders for individual items, it was necessary that molds be formed and made ready for casting as quickly as possible.

The production of gray and higher strength ductile castings is a time-consuming process that requires precision and a tightly controlled environment if the end product is to be satisfactory. Initially, a mold is constructed using sand and a two-part epoxy binder. Once solidified, the mold is then coated to provide a smooth surface for the casting, and to prevent the molten iron from attaching to the porous sand.

While organic solvents have long been used for such coatings because of their high evaporation rate, environmental concerns now require Decatur to use drying water-based coatings. Even with electric ovens, it may take 20 minutes or more to dry the coatings. Worse, the tendency of the water to soak into the porous molds makes them prone to catastrophic failure. As the molten iron hits the sand, any remaining water will vaporize with sufficiently explosive force to shatter the mold.

Before approaching Illinois Power, and eventually working with the Electric Power Research Institute's (EPRI) Center for Materials Production, Decatur Foundry used two conventional electric-resistance ovens to dry molds. The slow drying time involved in the process was made worse by the ovens' inability to thoroughly dry the 20 mil coatings used, and to penetrate molds that often had deep crevices and pockets.

A Team Emerges With a Solution

Working with Illinois Power (now Illinova) and EPRI, Decatur identified a technology that solved their production problems. BGK Finishing Systems of Minneapolis, MN, which manufactures short-wavelength infrared drying systems used in the application of automotive paints, suggested the replacement of the ovens with an infra-red/forced air unit.

While the old electric-resistance ovens warmed the coatings indirectly by warming the air in contact with the mold's surface, the new short-wavelength infrared systems radiate heat directly to the surface of the mold. Instead of reflecting off of the coating, the infrared light directly heats the mold's surface, quickly driving moisture out of the sand. Further, the new system requires no warm-up time, so it need only be powered up when in use. It was outfitted with precision instrumentation, allowing a greater degree of control through the drying process. The net effect has been an increase in product quality with a decrease in drying time of 85%.

Energy and Environmental Savings

Decatur Foundry's approach to efficient mold drying has reduced the energy consumption of the first production line to be upgraded by 120,000 kwh annually, shaving \$9,000 dollars from Decatur's electric bill. The system has worked so well that the foundry replaced the dryer on the other original line soon after the prototype was installed, and has placed the infrared system on two subsequent lines as original equipment. In addition to the environmental benefits of water-based coatings, Decatur, through reduced electrical consumption, has also reduced CO₂ emissions associated with electrical production by 27 tons of carbon-equivalent per year.

Economic Impact

As often happens with energy-efficiency improvements, the benefits of the new system extend well beyond the reduced electrical bill. While the drying-bottle neck at one time forced extensive idle time for shifts of workers waiting for dry molds and created the need to pay inordinate amounts of overtime wages, the product flow from forming the mold to being able to pour and produce a finished product has been shortened. This reduced wage costs, and enabled Decatur Foundry to offer an extremely competitive turnaround time from the initial bid to the delivery of the finished product.

Improvements in the control of the drying time, coupled with advanced water-based coatings have provided mold surfaces that are sufficiently smooth to produce end products that require little or no additional polishing. The new units have freed up floor space, and provide enough flexibility to finish molds for castings weighing as little as a pound, or as heavy as almost 3 tons. Mold failure rates have fallen, and end-product quality is up.

Project Financing

A true success story, Decatur has added two new lines, increased employment to 85 workers, and has \$10 million in annual sales, an increase of over 40% from 1993. The cost of the initial system was \$12,000, which was paid back in electrical savings alone in less than 16 months. Financed internally through normal cash flow, the payback on this investment has been sufficient to make it a “no-brainer” according to factory management. Decatur’s experience demonstrates the payback that small initial investments in energy efficient technology can have in a short time frame. It is also proof of the advantages such low-cost investments can have on an entire plant.

Special thanks are due to the assistance of Mr. Terry Young of Decatur Foundry, Inc. for his extensive help in the preparation of this case study.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

Quad/Graphics

QUAD/GRAPHICS, INC.

INNOVATION IN THE PRINTING INDUSTRY

Introduction

In 1971, President and Founder of Quad/Graphics, Inc., Harry Quadracci, bought an abandoned factory in Pewaukee, Wisconsin, using a \$35,000 second mortgage on his home and capital raised from a handful of associates. The beginnings were humble: 11 employees, a single press, and a 20,000- square-foot building. Today, Quad/Graphics ranks as the largest privately held printing company in North America. It has been growing more than 20% annually since it opened its doors.

As one of the country's top five printers, with 10 manufacturing sites, over 8,000 employees, and annual revenues of \$1 billion, Quad/Graphics specializes in high quality, four-color printing, and prints more than 1,000 titles, including *Time*, *Newsweek*, *Playboy*, *JAMA*, *Architectural Digest*, *Black Box Catalog*, as well as a variety of niche publications and catalogs. Quad/Graphics also has a division — Quad/ Tech — that designs, builds, markets, and services press and finishing controllers to the printing industry.

Quad/Graphics serves the catalog, magazine, free-standing insert, direct-mail and commercial products markets, and will soon serve the book industry. Quad/Graphics provides full production services, from design and photography through finishing, mailing, and distribution. The company offers full graphic design and typesetting; studio photography; professional desktop production; full photomechanical and digital image retouching, stripping, and final film preparation; archiving of digitized information; platemaking; gravure cylinder preparation; direct digital cylinder engraving; direct-to-plate imaging; mailing list management; and direct-mail manufacturing services.

Quad/Tech is the research and development division of Quad/Graphics. It provides engineering solutions to improve product quality, reduce waste, and add control and logic to press and finishing operations. Quad/Tech's High Tech Center, a facility specially built to house its design and manufacturing efforts, represents an investment in the development of

technology to improve signature and web handling, control color registration, provide management information and improve ink-jet addressing and demographic mailings. Quad/Tech's resources range from software programming and computer-aided design to manufacturing heavy machinery.

Energy Conservation

Energy may be the ultimate resource, and Quad/Graphics has worked aggressively over the long term to conserve it. The company used 13% less energy per unit of production in 1994 than in 1985, despite offering increasingly complex services.

In 1995, Quad/Graphics was awarded a \$400,000 grant from the Department of Energy's National Industrial Competitiveness through Energy, Environment, and Economics program (NICE³), whose goal is to improve industrial energy efficiency, reduce industry's production costs, and lower emissions to the environment. The Wisconsin Energy Bureau handled the application process and worked with Federal agencies to meet all application requirements. The grant was used by Quad/Tech to design, test, demonstrate, and commercialize a closed-loop ink-jet supply and printer solvent recovery system. This new technology has significant environmental, economic, and energy benefits for Quad/Graphics and other businesses in the publication, product labeling, direct mailing, and packaging industries. The ink-jet supply and printer solvent recovery system will reduce the amount of ink and solvent used in the ink-jet printing process by at least 50%, will reduce materials costs by \$552,000 annually, and will reduce energy costs by \$72,900 annually.

Quad/Tech has devised a closed-loop ink-jet system that captures 80 to 90% of methyl ethyl ketone (MEK) vapor and condenses it for reuse instead of letting it escape into the air. Once the closed-loop system is installed on all the ink jet lines at Quad/Graphics, use will be reduced by nearly 7,000 gallons annually, resulting in savings of \$420,000. The company also expects to save a minimum of 2.31 trillion BTUs by the year 2010 by eliminating ventilation systems and the production and transportation of MEK. The closed-loop system will soon be commercially available. Because the system is very economical and has its emission-reducing apparatus built into the unit, small print shops (which typically receive less regulatory scrutiny) will have both the incentive and the means to reduce emissions.

Conserving Energy in Other Ways:

- In 1994 Quad/Graphics signed on as one of the initial participants in the Federal Climate-Wise initiative, a program jointly sponsored by the Environmental Protection Agency and the Department of Energy. The company pledged to work toward continuing a 3% annual rate of reduction in energy usage. Maintaining that rate will require increasing innovation as we approach the limits of current technology. On December 12, 1994, the company was honored for its leadership in the Climate-Wise initiative at the first White House Conference on Environmental Technology in Washington, D.C.
- With many other energy conservation projects coming into fruition in 1994, Quad/Graphics earned more than \$472,000 in utility company energy rebates from process improvements.
- The company uses the latest, most energy-efficient technology in equipment expansions and in retrofits.
- It also designs energy-efficiency into new building construction — in insulation, lighting, and mechanical systems.
- Quad/Graphics recovers waste heat by making use of the hot water created in water-cooled mechanical systems.
- The company continually evaluates new technologies and techniques for opportunities to make manufacturing processes and infrastructure more efficient. Currently under scrutiny are ways to reduce temperatures in our ink-drying ovens, converting part or all of their fleets of vehicles to alternative fuels, and using more energy-efficient computer terminals.
- As a participant in the Federal Green Lights program, Quad/Graphics followed an accelerated schedule for retrofitting lighting fixtures with more efficient technology. The company's initial round of Green Lights improvements annually conserves 1.5 million kilowatt-hours, preventing emission of 2.25 million pounds of carbon dioxide 8.7 million grams of sulfur dioxide, and 3.75 million grams of nitrogen oxides.

Reduce, Reuse, Recycle — Using Resources as Wisely as Possible

Quad/Graphics' environmental stewardship centers around making the best possible use of all resources. The company's first step is to use resources as conservatively as possible. Then the company reuses or recycles all that it can. Finally, it evaluates materials that leave the plants for disposal, looking for ways to prevent waste in the future.

A key factor that makes this strategy viable for the long term is that it makes perfect business sense. When business and environmental interests coincide, efforts are doubly productive.

Paper

Conserve: The company's consistent waste percentage reduction — from 10.11% in 1988 to just 7.58% in 1994 — results in millions of pounds of paper saved each year.

Recycle: Production, office paper and cardboard recovered for recycling in 1994: 133,000 tons.

Dollars and sense: Recycling paper waste makes perfect sense. The costs of collecting, shredding, and baling wastepaper are offset by the money it brings in as a raw material, and by the \$6.7 million in landfill fees avoided.

Ink

Conserve: In the late 1980s, Quad/Graphics began providing employees with information about ink waste. The company asked for their ideas on reducing it, and implemented the best plans. Decline in ink waste from 1989 to 1994 reached 40%, to 460 drums from 762. (Note that these figures are absolute, not relative to production, which increased 111% during the same period.)

Dollars and sense: Approximate cost of offset printing ink: \$1,000 per drum. Disposal cost of offset printing ink: \$150 per drum.

Plastic

Recycle: Quad/Graphics works aggressively with vendors and others to find willing recipients of, or better yet, markets for used plastic. Much of its plastic is sent back to the vendors for reuse. The careful sorting of colored plastic creates a closed-loop system. For instance, the green strap is recycled back into green strap. Much of the stretch wrap that the company recycles is made into garbage bags. Plastic recycled in 1994: 287 tons. Plastic end cores from polywrap rolls, sent back to the manufacturer for reuse in 1994: 35,000.

Dollars and sense: Plastic recycling revenue: \$33,114. Landfilling fees avoided: \$14,350.

Wood

Master Carpenter Ben Erdman established a highly efficient Pallet Repair Department to fix broken pallets. The company also chips and shreds waste wood for mulch. In 1994, it developed a new facility and made upgrades to equipment to increase capacity for chipping and shredding.

Conserve: Number of pallets repaired for reuse in 1994: 96,000.

Recycle: Wood plugs from paper-roll stocks: 224 tons.

Metals

Recycle: Quad/Graphics recycles strapping, aluminum and miscellaneous metals from all facilities. Metals recycled in 1994: 370 tons.

Dollars and sense: Hauling, tipping and landfill fees avoided: \$18,500.

Quad/Graphics was honored in 1994 with the Wisconsin Business Friend of the Environment Award for Environmental Stewardship. In 1993, The State of Wisconsin recognized Quad/Graphics' environmental commitment by bestowing the company with its second Governor's Waste Reduction & Recycling Award.

Pollution Prevention

Quad/Graphics invests in the best practical pollution control technology to minimize emissions from drying ink, and maintains its equipment to ensure maximum performance. The catalytic converters on offset presses are more than 99% efficient, and the solvent recovery system in the gravure pressroom is more than 97% efficient.

The company literally keeps a lid on press cleaning solvents and other evaporative chemicals by closely monitoring how employees use, reuse, handle, and store them.

For instance, the Hartford plant has started wringing blanket wash from press-cleaning rags and reusing it. Other plants use a centrifuge to be sure that solvent is separated from cloths before sending them out to the cleaners. In 1994, waste figures were less than half the amount from four years earlier, despite the company's increasingly complex services and steady production increases.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

Ponderay Newsprint Co.

PONDERAY NEWSPRINT COMPANY

BYPASS SULPHONATED LONG FIBER DIGESTER PROJECT

Introduction

Ponderay Newsprint Company located in Usk, Washington, manufactures the paper required for the newspaper industry. Ponderay employs 200 individuals. The newspaper manufacturer is an excellent example of a company that uses energy efficiency to increase profitability and productivity. Ponderay Newsprint continues to achieve energy savings and increase productivity in their High Yield Pulp Mill, using energy efficiency techniques.

Project Description

The underlying concept behind Ponderay's project is to simplify the existing paper refining process and to make it more efficient. Operational experience has shown Ponderay that they have the ability to produce an acceptable strength material without using the standard pressurized chemical treatment process. The standard process required equipment that used a large amount of energy in an inefficient system. The standard equipment used energy continuously, irrespective of the treatment process. In addition, the existing system in the High Yield Pulp Mill was a single line system that caused total line curtailment when out of service. Ponderay's process energy efficient improvements relieved operational difficulties, reduced maintenance requirements, and improved system capacity. Ponderay replaced the chemical treatment equipment with a much simpler system for fiber refining.

The company installed a Bypass Sulphonated Long Fiber Digester.¹ The new system consists of an atmospheric variable speed metering conveyor, a vertical drop chute, and a fixed speed, low compression, plug screw feeder for each refiner. Ponderay Newsprint created two independent lines to increase operational flexibility and reliability. The total cost of the project was \$389,265.

Project Economics

Ponderay's energy efficiency project results in savings in several operational areas and results in an increase in productivity. The savings from the Bypass Sulphonated Long Fiber Digester

¹The Bypass Sulphonated Long Fiber Digester involves the technology used to collect long fibers and bundles created as waste in the former process. The new system reprocesses these fibers into acceptable pulp. The long fibers are collected in storage tanks, dewatered to a consistency of about 27%, possibly chemically treated, heated under pressure, and refined.

project result in a 4.61 year payback period. The company has a debt to equity ratio criteria of approximately 40% nominal, and an internal rate of return hurdle rate of 20%-30%. The estimated rate of return for this project is 18.72%. Though this would appear to be slightly lower than Ponderay's hurdle rate, for special projects, with clear corporate advantages, the company pursues projects accordingly.

Energy and Environmental Savings

Ponderay's annual measured energy savings from the energy efficient digester in their High Yield Pulp Mill is 182.26 kW or 1,596,614 kWh.

Project Financing

Ponderay Newsprint financed the majority of their energy efficiency project internally. They received additional financing assistance from Pend Oreille County's conservation program. The program pays \$.15 per kWh/year which translates to \$239,492 per year in savings. These savings improve the payback period from 8.03 years to 4.61 years. Ponderay's financing program is effectively a capital lease, but Ponderay's energy manager readily suggests that in the future they will consider doing projects of this type, using energy savings performance contracts.

The Team That Was Required To Succeed

The team that worked together to see this project to completion consisted of utility partners, county government, and technical consultants, as well as Ponderay's in-house expertise, including Ponderay's energy manager, Don Guenther and the company's financial operations.

Special Considerations

Don Guenther explains that although Ponderay chose to finance the digester project internally, next time he would consider financing a similar project with performance contracting.

Ponderay clearly benefits from its energy manager's close working relationship with the company's production processes. Don Guenther's network with the Industrial Customers of Northwest Utilities helps energy managers share ideas on energy efficiency and pollution prevention, and other cost effective projects that make sense for manufacturers.

Ponderay's energy manager explains that for profitable energy efficiency and pollution prevention projects, the company "just finds a way to get it done." The company doesn't base everything on hurdle rate and IRR. They also want to do the right thing, "knowing that energy efficiency and pollution prevention moves often lead to increased profitability and productivity of manufacturing operations."

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

NISSHINBO, CALIFORNIA, INC. - ENERGY CAPITAL PARTNERS

VARIABLE SPEED DRIVES INSTALLATION

Nisshinbo, California, Inc.
& Energy Capital Partners

Introduction

Nisshinbo, California, Inc. is a textile manufacturer located in Fresno, California. The manufacturer is a U.S. Department of Energy Motor Challenge Partner that produces yarns and threads, from the initial spinning process to finishing. Nisshinbo has been in business since 1989. The company joined forces with Energy Capital Partners of Boston, Massachusetts, to finance their energy efficient motor replacement project. Energy Capital Partners, a project financier, provides financing that enables companies like Nisshinbo, CA, Inc. to implement energy efficiency and pollution prevention projects. Nisshinbo is an innovative young company that incorporates energy efficiency techniques into their business approach, maximizing profits and creating positive environmental results.

Project Description

Nisshinbo installed variable speed drives throughout their manufacturing facility. The new drives are a part of the textile spinning and weaving processes. Nisshinbo realized that energy efficient motors would out-perform their former system, saving the company in operating costs. The total cost of the variable speed drive project at the Nisshinbo facility was \$178,000.

Project Economics

Nisshinbo's new drives reduce energy expenses and create profits through increased productivity. The savings from the variable speed drives create a 1.3 year payback period. The rate of return for this project is approximately 70%.

Energy and Environmental Savings

Nisshinbo's variable speed drives conserve energy in the textile manufacturing process, creating improved efficiency and allowing for energy consumption that more adequately tracks energy requirements. The standard drives required a constant supply of electricity irrespective of system requirements. The new system adjusts for load requirements, using less energy, more efficiently. The new system also increases production at the facility. The variable

speed drives improve the performance of the spinning and weaving processes and result in higher product quality. Nisshinbo's annual measured energy savings is 1,314,342 kWh. This translates to approximately \$140,000 in savings for the company each year.

Project Financing

Nisshinbo collaborated with Energy Capital Partners to develop a financing program that works. Energy Capital Partners financed the manufacturer's project savings "off balance sheet," reflecting the upgrades as a cost of doing business rather than an asset. They created a 9 year loan. Energy Capital Partners' financing program is called Project Finance, offering the energy service company a financial annuity and Nisshinbo a performance-based solution. Nisshinbo received additional funds from the Pacific Gas and Electric Power Saving Partners Program. Their energy service provider recognized the efficiency project's eligibility for this program and initiated the process. Nisshinbo explains that innovative financing was essential in implementing their project.

The Team That Was Required to Succeed

The variable speed drive project is an excellent example of how a manufacturer and a financier of energy projects can join forces to generate profits through E2 and P2. Nisshinbo worked with Energy Capital Partners to finance their innovative project. An energy service company, ADI Control Technologies, installed the variable speed drives in the facility and is responsible for the performance and maintenance of the equipment.

Special Considerations

Drives are a fundamental part of many manufacturing operations and buildings in general. Competitive companies recognize that minimizing unnecessary use of energy has a positive impact on profitability and productivity. Innovative financing helps companies take advantage of energy efficiency and pollution prevention technology opportunities with little or no out-of-pocket expenses. Nisshinbo is very aware of the competitive nature of the markets the company supplies. Whenever possible such companies are going to capitalize on the competitive advantages available to them with E2 and P2 projects or any other profitable projects.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

Wacker Siltronic

WACKER SILTRONIC

MULTI-WIRE SAW FOR SILICON SLICING

Introduction

Wacker Siltronic Corporation located in Portland, Oregon manufactures silicon wafers used in the semiconductor industry. The company employs 1700 individuals and involves each employee in the achievement of environmental performance and pollution prevention goals. Wacker Siltronic is an excellent example of a corporation that utilizes energy efficiency and pollution prevention technologies to increase their profitability and productivity.

Project Description

Wacker Siltronic's process improvements decrease waste production and reduce the large amount of consumables required by wire saw operations. In an effort to minimize waste, and improve efficiency, profitability, and productivity, Wacker Siltronic identified the following tasks:

- Develop alternative cutting fluids, which reduces consumables, and is recyclable.
- Develop a reclaiming technology to recover silicon carbide abrasive.

To meet these goals Wacker Siltronic installed a new multi-wire saw silicon slicing technology, and reclaimed the cutting slurry from the company's wire saw operations. The estimated cost of the entire project is \$2 million. Wacker Siltronic's energy efficiency project increases productivity and reduces costs as a result of water savings and reduced sewer charges.

Project Economics

Wacker Siltronic's slicing and reclaiming technology increases productivity and creates savings in several operational areas of the company. The installation of the new multi-wire saw increases silicon wafer production by 20%. They continue to save \$400,000 per year in water expenses and sewer charges. Alternative cutting fluids and recycling technology result in a 75% savings in disposal costs. This translates into a savings of \$640,000 each year for the company. Wacker Siltronic's reduction of consumables generates \$1.5 million in savings per year. The savings from the new system result in a 1.4 year payback period. Wacker Siltronic has an internal rate of return hurdle rate of 10% for new projects. The rate of return for this project is 26.3%.

Energy And Environmental Savings

Wacker Siltronic's project decreases the use of alternative cutting fluid, the use of water, and the production of air emissions. Wacker Siltronic developed an alternative cutting fluid that is recyclable, thus decreasing waste production and reducing the need for the fluid itself. The project reduces the volume of hazardous air emissions, created when changing cutting fluids, by 36 tons per year. The improvements create a savings of 37 million gallons of water each year.

Project Financing

Wacker Siltronic is a privately held company. The company provides for all of its financing internally from shareholders and operating budgets. Wacker Siltronic considers energy savings and pollution prevention projects under the same terms as other capital projects. All capital projects must have a payback period of five years, and the company prioritizes projects and expenditures with a payback period of three years or less.

The Team That Was Required To Succeed

The team that worked to see this project to completion consisted of process technology engineers, environmental engineers, equipment suppliers, waste treatment providers, and Wacker Siltronic's internal corporate and financial decision-makers.

Special Considerations

Wacker Siltronic Corporation is an ISO 9001 certified supplier of hyper pure silicon wafers. The Corporation operates under a Quality Management System and strives to be the vendor of choice to their customers by exceeding expectations in terms of quality and total value, and achieving six sigma quality products and services. Wacker Siltronic strives toward continuous improvements of their products and services, and energy efficiency and pollution prevention projects offer opportunities for improvements in all areas of the manufacturer's operations.

Corporate quality goals serve equally as well for environmental performance and pollution prevention. Continuous improvement in all environmental areas has resulted in numerous awards for Wacker Siltronic including: the first Oregon Governor's Award for Toxic Use Reduction, Excellence Award for Waste Water Treatment Performance, the first EPA Evergreen Award for Environmental Leadership and the Best Success Award for Energy Savings, Waste Reduction, Water Conservation, and Transportation Alternatives.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

TOP VENEER & TRADING CO., LTD. - HELLER FIRST CAPITAL

SHADE AND MIST SPRAY SYSTEM

Top Veneer & Trading Co.
& Heller First Capital

Introduction

Top Veneer & Trading Company, Ltd. is a new veneer manufacturing plant, located in Merlin, Oregon. They will employ 50 individuals and specialize in the production of sliced and dried hardwood face veneers. Top Veneer will produce their “fancy face” veneers from a sustainable Western United States hardwood species. They are an excellent example of how a manufacturer can work with a financial provider to generate profits by incorporating energy efficiency and pollution prevention techniques into their manufacturing process, even during business start-up.

Project Description

In its new facility, Top Veneer will be installing a new Shade and Mist Spray System. The new system will utilize water containment and recirculation, combined with steam condensate collection from flitch heating chambers. Top Veneer will install the new energy and water efficient steam chambers in place of standard hot water vats. The efficiency project also addresses accident potential and disposal requirements. The total cost of the project is \$35,000.

Project Economics

Top Veneer’s energy efficiency project will result in savings in several operational areas and will result in an increase in productivity. The savings from the Shade and Mist Spray System will result in a 7 year payback period. The Shade and Mist Spray System will decrease water usage, resulting in reduced water costs. Smaller volumes of water produced at the end of each flitch cooking schedule will save Top Veneer sizable water disposal costs. Productivity for flitch cooking will increase because there is no need to heat large volumes of water for each cycle. The implementation of steam chambers will eliminate the time and energy consuming process of continually heating and maintaining the temperature of 500-600 gallons of water required to fill the vats.

Energy and Environmental Savings

Top Veneer's Shade and Mist Spray System will reduce water usage, and recycle (re-use) evaporated non-contaminated water rather than releasing the water into the sewer system. Veneer manufacturers have historically used hot water vats to process materials. The hot water vats create large quantities of water for disposal at the end of each flitch cooking schedule. The new process will reduce disposal requirements. Eliminating the presence of large, open hot water vats on the premises, will reduce the potential for occupational accidents, improving conditions and reducing liabilities.

Project Financing

Top Veneer and Trading Co. financed the project with the help of Heller First Capital. Heller First Capital's financing package involves a conventional loan, with a 75% SBA loan guarantee. The loan has a 7 year term. The financing is part of an SBA guaranteed loan package that Heller First Capital offers to finance business improvements. The loan financing package provides for inventory, working capital, equipment, and tenant improvements.

The Team That Was Required to Succeed

The team leader, working to see this project to completion, is Dave Fairbairn, from Top Veneer & Trading Co., Ltd. Dave Fairbairn is Top Veneer's general manager, and is responsible for the conception and outline of the project. Rance Plumb, of Plumb industries, is the project supervisor, and is responsible for the installation of the Shade and Mist Spray System. Tom Gillman, of Pacific Northwest Steel Construction, is the engineer/fabricator, and is responsible for the design of the project. Robin Hudson, of Rendatta Industrial Parks, is the park's business manager, and is responsible for the waste disposal in the park. Heller First Capital joined forces with the team to make the project financing work.

Special Considerations

Top Veneer and Trading Co., Ltd. will be producing thin sliced (1/100" thick) fancy face veneers from a sustainable, Western United States hardwood species. The veneers will be marketed primarily in Asian markets. The company knows they can make profitable improvements using energy efficiency and pollution prevention technologies. The Top Veneer project illustrates that E2 and P2 approaches are projects that the financial community has faith in, because they know their customers will be improving profitability and productivity and reducing liabilities.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

TRAILBLAZER FOODS, INC. - THE MONEY STORE & KEY BANK

WATER RECYCLING AND TREATMENT SYSTEM

Trailblazer Foods, Inc.,
The Money Store & Key Bank

Introduction

Trailblazer Foods, Inc. is a food manufacturing company, located in Portland, Oregon. They specialize in the production of fruits, jams, and syrups, and currently employ 45 individuals. Trailblazer Foods exemplifies how a manufacturer can work with a team of financial providers to generate profits by incorporating energy efficiency, pollution prevention, and recycling into their manufacturing techniques.

Project Description

As a result of expanding business Trailblazer Foods needed a new building to meet demand. The company realized that the new building represented a terrific opportunity to take advantage of profitable energy efficiency and pollution prevention projects. Working as a team, Trailblazer designed and installed one of the most innovative water recycling systems for heating and cooling in the food processing industry. The system cuts the company's water use and electricity use in half. The system also reduces gas use by 10%. The water recycling and treatment system also helps Trailblazer comply with State environmental requirements for process effluents. The project is truly unique because the company's employees proposed, designed, and implemented the innovative recycling and energy saving system. Employees at Trailblazer Foods saw the benefits of E2 and P2 and made the innovative project work. The water treatment system uses recirculated water for pasteurizing and cooling food products. The system recycles water continually for the consistent processing of syrups, fruits, and jams. The system increases and decreases temperatures reliably, using the heat capacity and thermal integrity of water to control the process. The Trailblazer system accomplishes the cooling efficiently, reducing the unnecessary electricity and gas costs required by fans for cooling and by boilers for pasteurization. After using the water multiple times for pasteurization and the cooling process, Trailblazer treats system water and discharges effluent that meets environmental standards. Trailblazer's separator eliminates sludge prior to discharge, preventing the release of hazardous sludge material. The cost of the Water Treatment project was \$40,000.

Project Economics

Trailblazer's energy efficiency project results in savings in several areas. The new system reduces water and electricity use by half, cutting associated operating expenses by 50%. The reduction in gas use is 10%. The savings from the water treatment project result in a 2 year payback period. The company has a debt to equity ratio criteria of 2 to 1 nominal, and an internal rate of return hurdle rate of 20%. The rate of return for this project is 30% . While economic payback is a crucial factor in considering new projects, Trailblazer Foods also considered this project in terms of its environmental, and energy efficiency advantages.

Energy and Environmental Savings

Trailblazer Foods, Inc. is required by the state of Oregon to meet State environmental regulations and specifications. They know they can create profits by doing the right thing environmentally. Trailblazer Foods takes advantage of this challenge, creating profits, increasing energy savings, and decreasing pollution. From an energy standpoint for pasteurization, recirculating water cuts boiler energy use in half, reducing gas requirements and the associated costs. This translates to 10% gas savings. This system also cuts electricity required by fans for the cooling process in half. The system cuts water use by 50%, saving 1,500,000 gallons of water per year. In addition to the resource savings, the water system eliminates the release of hazardous sludge into the water system. Trailblazer accomplished this by installing a separator to filter sludge out of the water sent into the water system.

Project Financing

Key Bank's Paul Warr-King and Northwest Small Business Finance Corporation's (NSBFC) Teresa Cowles, now of The Money Store, joined forces to finance Trailblazer Foods' new building and their innovative water and energy saving project. The companies worked together to finance the project with competitive rates, using a conventional loan with an SBA guaranteed loan under the SBA's 504 loan program. Trailblazer's president Gary Walls, explains that "a half percentage point one way or the other didn't make as much of a difference as our financial partners' understanding of the needs and goals of Trailblazer Foods." Trailblazer Foods chose financial partners that are sensitive to the specialized needs of the company and willing to work with Trailblazer to create an appropriate financing package. Key Bank and NSBFC helped see the project through to completion. Key Bank and NSBFC created a 10 year loan with an 8.6% interest rate in the amount of \$750,000. NSBFC provided a 20 year loan in the amount of \$750,000, subordinated to Key Bank using an SBA 504 loan guarantee. NSBFC's 504 loan program provides financing for owner occupied commercial real estate and equipment.

The Team That Was Required to Succeed

Trailblazer Foods hired a contractor for the overall design and construction of the new building. Trailblazer designed the new water recycling and treatment facility in the building, and the design and construction contractor helped ensure that the building design properly incorporated the requirements for the innovative new water and energy savings system. Teresa Cowles and Paul Warr-King, and their respective financial institutions, worked with Trailblazer Foods to ensure financing was in place for the project.

Special Considerations

Trailblazer illustrates that good companies listen to their employees, because good ideas often surface from within. They demonstrate that energy efficiency and pollution prevention investments are compatible with new building design and often result in increased profitability and productivity.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

NAUMES, INC. - PACIFICORP

AMMONIA REFRIGERATION UPGRADE

Naumes, Inc. & PacificCorp

Introduction

Naumes, Inc. is the largest family-owned pear grower in the United States, with facilities in Medford, Oregon; Wapato, Washington; and Marysville, California. They specialize in fruit growing, storage, processing, and juice production. The company joined forces with PacificCorp of Portland, Oregon for up front auditing and analysis of their energy efficiency and pollution prevention project at their Medford facilities. Naumes, Inc. exemplifies how a manufacturer can generate profits through the implementation of energy efficiency technologies.

Project Description

Naumes, Inc. implemented new and retrofit projects for ammonia refrigeration upgrades. The company upgraded two ammonia refrigeration systems to increase energy efficiency. The first project was a retrofit of an ammonia refrigeration system serving three buildings. The new system uses computer controls and variable speed drives. The second project involves new construction with an additional three buildings. The new construction employs computer controls, variable speed drives, and optimized equipment selection. The project cost for the retrofit was \$125,000. The project cost for the new construction was \$185,903.

Project Economics

Savage Engineering performed the verification of the results for Naumes' new and retrofit projects. The actual operation savings from the new construction refrigeration, controls, and variable speed drives installation result in a 4.4 year payback period. The retrofit project's payback period is 2.1 years. The manager explains that on average the company typically likes to see projects with 7 year (or less) payback periods.

Energy and Environmental Savings

Naumes, Inc.'s energy efficiency project results in energy savings and even higher product quality, though product quality may be hard to quantify. The energy efficiency project also improves monitoring and awareness with regard to energy and environmental management. Originally the new construction project was expected to save 475,386 kWh per year;

however, in the first three years the project has outperformed estimates, saving an estimated 550,000 kWh/year. The retrofit project creates a savings of approximately 741,000 kWh/year. Naumes' cost savings amount to \$28,000/year for the new construction, and \$37,000/year for the retrofit project with an electricity rate of \$0.05/kWh for both projects. The new project creates a 46% refrigeration savings, and the retrofit project saves 53% on refrigeration costs.

Project Financing

Pacificorp's FinAnswer program provided Naumes, Inc. with free, up-front auditing and analysis for their upgrades. The company evaluated economic and environmental implications of the new and retrofit projects and then financed the improvements internally, counting on additional financial return from the State of Oregon's performance based tax credits. The tax credits amount to a total of 35% of the implementation costs of the E2 and P2 project accrued from the project over its first five years. Naumes was awarded \$65,000 in tax credits for the new construction project, and \$42,000 for the retrofit.

The Team That Was Required to Succeed

The participants in this project were:

- Cascade Energy Engineering for analysis
- PacifiCorp for the project direction and information
- State of Oregon for tax credits
- Techni-Systems for controls contracting
- Valley Electric for electrical contracting
- Savage Engineering for verification
- Allen Bradley for the variable speed drives

Special Considerations

Naumes, Inc., understands the competitive nature of its business better than anyone. They understand that any competitive advantage represents potential market share and profitability. energy efficiency and pollution prevention projects are helping Naumes remain competitive in a price and quality conscious market place. The company understands that quality and commitment are synonymous with the profitability and productivity results of E2 and P2 projects.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

U.S. BANCORP LEASING AND FINANCIAL

RECYCLING PROCESS ENHANCEMENTS

U.S. Bancorp
Leasing and Financial

Introduction

U.S. Bancorp Leasing and Financial located in Beaverton, Oregon provides equipment leasing and financing services for businesses of all types. The corporate examples below are examples of the kind of projects in which U.S. Bancorp serves its customers. Each refuse collection and recycling company is one of the largest in the industry in the Portland area. Each company generates revenues in the range of \$15,000,000 - \$30,000,000. Both companies prefer to remain anonymous. Each company is an excellent example of a company that uses energy efficiency to increase profitability. Both recycling and refuse collection companies have achieved energy savings through enhancements to their recycling process.

Project Description

Each recycling company has increased productivity through the use of measures that improve the energy efficiency of the recycling process. Both companies developed projects that involve energy efficient conveyor systems, balers, transportation equipment, and loading equipment to increase efficiency throughout their operations.

Project Economics

The energy efficiency projects result in savings in several operational areas of each company. The savings from recycling enhancements result in a 3.5 year payback period for the first company, and a 3 year payback period for the second company.

The Oregon Office of Energy (OOE) offers a program that allows a company to claim tax credits on qualifying energy efficiency projects. The program is called the Business Energy Tax Credit program (BETC). The program allows the User or the Lessor to claim a 35% tax credit on the total energy project implementation cost, claiming 10% in the first two years, and 5% for each of the 3 years thereafter. The process begins when the company files an application with OOE for consideration under the BETC program. OOE evaluates the project

and determines the project's eligibility. If eligible, OOE issues a Preliminary Certificate of Qualification. The applicant pursues the project and OOE awards a Final Certification. In the recycling industry examples, the companies applied for and received the OOE tax credit after demonstrating the savings each would create with its energy efficiency improvements.

Energy and Environmental Savings

Each company determined the total cost for the implementation of their energy efficiency and pollution prevention project, and included this information in the application for the BETC program. The first company now handles 95,800,000 lbs. of material annually. The recycling company's E2 and P2 project enables the company to recycle 43,110,000 lbs. of this material each year. They included both of these figures in their BETC application. Each company's project reduces their electricity use, gasoline use and labor costs. As a Lender or Lessor, U.S. Bancorp Leasing and Financial considered all of this information in their credit decision and in terms of the agreements that would link to the BETC program.

Project Financing

Project planners frequently approach U.S. Bancorp with proposed projects involving a variety of tax and financing assumptions. In the two current examples U.S. Bancorp created an equipment lease totaling \$750,000 for the first company, and an equipment lease totaling \$185,000 for the second. The first recycler uses the depreciation to reduce their tax liability. The approximate terms of the transaction are 60 months with monthly payments of \$11,704. There will be a 20% residual at the end of the lease. The cost to finance, on a yield to maturity basis, is approximately 4.3%. The second company's equipment lease also has a 60 month term with 60 monthly payments of \$2,567 to a Fair Market Value Residual. Based on U.S. Bancorp's experience with the equipment, they estimate that their cost to finance, on a yield to maturity basis, is about 3.0%.

The Team That Was Required To Succeed

A U.S. Bancorp team for an equipment lease typically consists of the lessor's CFO, the project planner (frequently an engineer), the lessor's CPA or tax advisor, the technical contractors, and the state partners participating in the energy efficiency and pollution prevention project.

Special Considerations

Leases work best for some companies, while loans work best for others. In each of the two U.S. Bancorp examples, the financial partners worked with the company to provide an E2 and P2 financial package that is most responsive to the client's business needs.

CASE STUDIES IN ENERGY EFFICIENCY AND POLLUTION PREVENTION EXCELLENCE

B & G MACHINE, INC. - CASCADIA REVOLVING FUND

JET WASHER/EVAPORATOR SYSTEM

*B & G Machine, Inc.
& Cascadia Revolving Fund*

Introduction

B&G Machine, Inc. is a machine tool fabricator located in Seattle, Washington. The company “re-machines” large trucks, and employs 31 individuals. The manufacturer recycles automotive parts, machining and refining them for use in new and used heavy duty vehicles. B&G’s customers are those who seek a cost-effective alternative to parts replacement. B&G joined forces with Cascadia Revolving Fund to finance their innovative cleaning and evaporating system, involving energy efficiency and pollution prevention. Cascadia Revolving Fund provides financing, enabling companies like B&G to carry out similar projects. B&G exemplifies how a manufacturer can work with a financial provider to generate profits and increase efficiency through pollution prevention technologies.

Project Description

B&G’s project eliminates most of the company’s caustic automotive parts cleaning. They accomplish this by using a jet washer/evaporator system. The new system creates benefits for the environment and improves B&G’s occupational environment. The B&G system works on the principal of total pollutant segregation. It reduces water requirements in the automotive parts cleaning process.

Toxic Use Reduction (TUR) is a major result of the new jet washer/evaporator system. TUR is a cost-effective pollution prevention strategy. A small amount of caustic is still used to clean oversized parts. The reduction of caustic use, combined with the tandem use of the jet washer, caustic tank, and evaporator improves the energy efficiency of B&G’s operations. The total cost of B&G’s jet washing and evaporator system was \$31,000.

Project Economics

B&G’s pollution prevention project results in savings in several operational areas of B&G’s production process and results in increased productivity. The jet washer/evaporator system generates \$36,000 in savings each year.

The new technology increases throughput which in turn increases profitability. The new process reduces cleaning time from several hours to less than half an hour. Reductions in water usage and the elimination of expenses for sewer discharge permits significantly reduce costs. Hazardous discharge permit fees, based on volume, are eliminated entirely.

Energy and Environmental Savings

The jet washer/evaporator system reduces water consumption in the cleaning process from 180-220 gallons per day to 73-101 gallons per day. This represents a 27% decrease in annual water consumption. The new system allows for the separation of hazardous effluents and eliminates the disposal of hazardous waste into the sewer system. The significant reduction in cleaning time also reduces energy use.

Project Financing

B&G financed their jet washing and evaporator system using Cascadia Revolving Fund's financing program. Cascadia's program is called the Pollution Prevention Lending Program, providing financing to small businesses to reduce their output of pollution. B&G evaluated economic and environmental implications of the jet washer/evaporator system within their company first, and then provided Cascadia Revolving Fund with the specifics on the project. Cascadia created an 8 year loan for B&G at the rate of 11.5%. B&G's loan principal with Cascadia is \$37,000 with a \$600/month payment.

The Team That Was Required To Succeed

The team that worked together to see this project to completion consisted of B&G (the manufacturer), Cascadia Revolving Fund (the financier), and the contractors required to install the new system.

Special Considerations

B&G's environmental management project generates positive results in numerous areas of the company. These results include financial, environmental, and energy benefits. The new system reduces employee exposure to caustics, increasing employee comfort and productivity. The design and installation of the technology has facilitated a "learning process" that has encouraged B&G to make other environmental changes. Improved labeling and a stricter segregation of chemicals are a few of the positive ramifications of B&G's energy efficiency and pollution prevention endeavor.