

Mercury Marine saves energy by improving compressed-air performance

CASE STUDY

Mercury Marine, the world's leading manufacturer of marine-propulsion systems, broke new ground with the installation of its innovative central compressed-air system. Mercury Marine assessed and evaluated its current decentralized system and then carefully planned, installed, and commissioned its new centralized system—cost-effectively achieving significant energy and dollar savings.

The new system includes five 300-horsepower (hp) IR two-stage rotary compressors for base load, two 200-hp IR Nirvana variable-frequency drive (VFD) compressors for trim load, and a 30,000 gallon storage tank.

The system eliminates 1,057 cubic feet per minute (CFM) in non-use air loss (leaks). Compressed-air system performance rose from 3.5 CFM per kilowatt (kW) to its current average of 5.5 CFM per kW, a substantial gain in efficiency. The system saves 1,079 kW of demand and 9.2 million kilowatt-hours (kWh) of electricity annually. As a bonus, heat recovery from the new system lets Mercury Marine avoid using 135,000 therms of natural gas for space heating each year.

The controlled pressure adequately and reliably meets work-floor demand, permits hp supply to follow actual demand and no longer wastes energy for unused compressed air.

Mercury Marine, located in Wisconsin, is a division of Brunswick Corporation of Lake Forest, Ill., leads the world in the manufacture of marine-propulsion systems. Mercury Marine's operation includes energy intensive manufacturing and aluminum casting processes. Since 2000, Focus on Energy, in partnership with Alliant Energy, has worked with Mercury Marine on many projects, lowering annual energy usage by almost 17 million kWh and 135,000 therms. This has amounted to \$925,000 in annual energy savings. Mercury Marine can save an additional 2.3 million kWh per year through an aggressive plan to fix the remaining leaks, saving an estimated \$115,000.



Left to right: Marc Dufour, president of Ingersoll-Rand Solutions (IR); LaMonte Wilder, plant engineering manager of Mercury Marine; Robert Dorill, IR; Jerry Eaton, plant engineering-facilities of Mercury Marine; Joe Fumo, IR; Brent Becker, IR; and Bill Gerlach, IR.

THE OPPORTUNITY

Mercury Marine's system was similar to many other large industrial systems comprised of remote compressors serving various points in a fragmented distribution system. There was little or no control between compressors, insufficient system response, and significant leakage. The leaks caused pressure fluctuations and inadequate capacity during peak demand. A routine audit identified numerous problems, including pressure fluctuations, slow system response, distribution leaks, and inadequate storage. Mercury Marine had no systematic way to identify and correct leaks and inappropriate uses.

THE SOLUTION

The new system serves Mercury Marine's needs and saves over \$540,000 in annual energy costs. Plant-wide, compressed-air pressure is now controlled at +/-0.2 pounds per square inch (psi) of demand pressure.

PROJECT SUMMARY	
Project Cost	\$1,850,000
Energy Savings	\$541,000
Focus Incentive	\$60,000
Energy Payback	3.3 years
Total Payback	2.6 years

For more information, call **800.762.7077** or visit focusonenergy.com.

PROJECT BENEFITS

"We now have a central compressed-air system that is less costly and that is truly reliable. Maintaining a set pressure of +/-0.2 pounds per square inch throughout is important to us," said Jerry Eaton, Mercury Marine's project manager.

The new compressed-air central plant reduces Mercury Marine's annual electricity usage by approximately 9.2 million kWh and cuts power demand by 1,079 kW. The graph to the right shows the load-following characteristic of the new system. As demand for CFM changes, so does the power requirement.

Mercury Marine also installed heat-recovery units on all seven new compressors. The recovered heat displaces 135,000 therms of natural gas that the company would otherwise have to purchase for space heating—enough gas to heat almost 150 Wisconsin homes.

The total expected annual savings for the new system are:

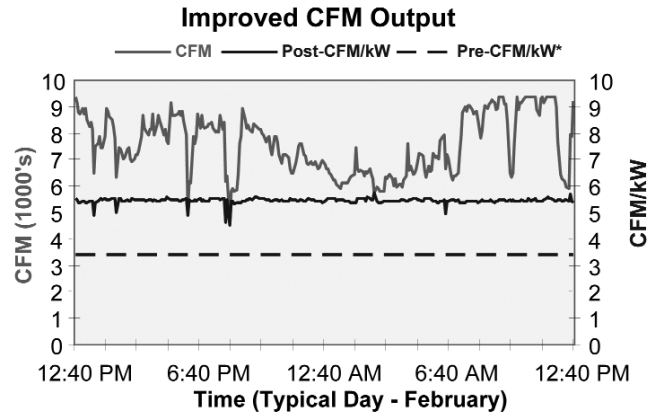
- Electricity—\$460,000
- Heat Recovery—\$81,000
- Water Savings—\$60,000
- Parts/Inventory—\$100,000

The total cost for the system was \$1.85 million. With an estimated savings of \$700,000 per year, the total system payback time is 2.6 years.

"I would encourage other companies interested in becoming more energy efficient to check into Focus on Energy's technical services and project incentives," said Eaton.

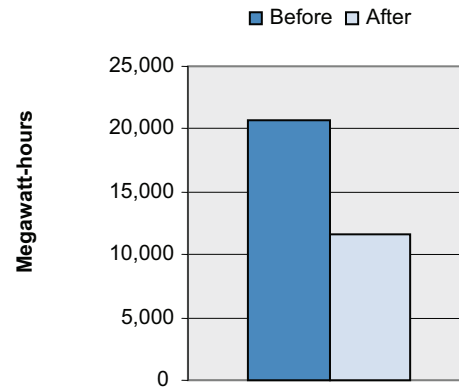
HOW CAN FOCUS ON ENERGY HELP YOU?

Focus on Energy provides specialized best practice support for Wisconsin industries, including project evaluation assistance, measurement and evaluation of savings, financial assistance for stalled projects, training opportunities, tools to manage energy, and third party review. For more information call **800.762.7077** or visit **focusonenergy.com**



* Calculated average CFM/kW before installation, from plant data.

Electricity Savings



Note: The system also saves 135,000 therms per year.