

**Energy Engineering Innovations,
Supported by Creative Financing Result in...**

Award Winning Solution



Weetabix Energy Recovery Benefits

- Reduced the energy consumption of the compressed air equipment by combining two compressed air systems in separate buildings into one. The entire facility is now supplied by one Atlas Copco ZR250VSD-FF, 335 HP oil-free, two stage air compressor with integrated variable speed drive control.
- Reduced the cost to dry the compressed air to the plant. Heatless desiccant dryers were removed from operation and replaced with an MD heat of compression desiccant air dryer that utilizes virtually no energy.
- Improved the plant air quality by removing oil lubricated compressors from operation in the Packaging Building, reducing pressure drop and eliminating hazardous waste. The entire campus is now supplied with oil-free, low dew point compressed air.



In 2011 Atlas Copco AB was named among the Top 100 most innovative companies in the world by *Forbes* magazine.

Weetabix, the leading British breakfast cereal manufacturer, operates a manufacturing facility in Clinton, Massachusetts. The 300,000 sq. ft. plant runs 24 hours a day, 7 days a week. In 2010, Weetabix partnered with National Grid to conduct a comprehensive audit of their compressed air utility. The audit identified several potential areas of savings including replacement of the existing compressed air equipment.

Recently, Weetabix implemented a compressed air system upgrade project which includes an innovative method for recovering and reusing heat that is a natural result of compressing any gas, including air. The project was recently recognized by the prestigious Association of Energy Engineers of New England as the top compressed air project for 2010.

"This is the Association's highest award for compressed air efficiency projects," according to Ron Whelan, Sales Manager for Atlas Copco Compressors LLC in West Springfield, MA. Whelan's team configured and supplied the project's oil-free compressed air and energy recovery systems.

"This project offered many opportunities to improve energy efficiency, and we employed every energy savings technology Atlas Copco offers," says Whelan.

"Weetabix is now saving money on electricity and natural gas in several different ways, including heat of compression energy recovery, variable speed drive air compression, high efficiency air drying, and combining

two separate compressed air systems into one oil-free system. Any of these upgrades would be a good energy saving project on its own, but doing them all is what created award winning results."

National Grid, which supplies both electricity and natural gas for the Weetabix plant, was also instrumental in the success of the project. National Grid provided a financial incentive equal to 50% of the project's total cost and then offered to finance the balance on Weetabix's monthly electric bill at 0% for 24 months.

Energy Saving Technology Made the Project Possible

Weetabix has been an Atlas Copco customer for many years, and the seeds of this project go back as far as 2003 when Whelan did his first air demand survey at the plant. "We talked about the opportunity to reduce energy costs and submitted several proposals over the years," Whelan recalls, "but it was Atlas Copco's Energy Recovery system that took them over the top."

Atlas Copco's Energy Recovery system uses water cooling to capture the heat of compression so the heat can be reused. In the case of Weetabix, it is used to pre-heat make-up water before it enters a steam boiler. This substantially reduces the amount of natural gas required to boil the make-up water into steam.

"Weetabix uses large volumes of steam in the cereal making process," Whelan explains, "and in order to provide a steady supply of steam, make-up water is continually added to the gas-fired boiler. City water is the source, and





since it is about 55°F, a tremendous volume of natural gas was burned to heat it enough to create steam. With the Energy Recovery system, that 55 degree city water now flows first through a heat exchanger that captures the heat of compression from an Atlas Copco ZR250VSD-FF air compressor. The heat exchanger increases the temperature to 185°F. The hot water is then directed to the boiler inlet to create steam.

Further energy savings, as well as compressed air quality improvements, were gained by combining two separate compressed air systems into one. “The main building and packaging building piping networks are connected by a 3” line that was previously valved off,” says Whelan. “The main building had a 200-hp Atlas Copco oil-free compressor that operated independently from two (75 and 60HP) oil-lubricated compressors in the packaging building. By replacing all three with one 250 kW Atlas Copco oil-free Variable Speed Drive compressor, we now supply oil-free air to both buildings and produce it precisely according to demand.”

An upgraded air dryer saved even more. “In the packaging building, Weetabix operated a heatless desiccant dryer,” according to Whelan. “It was effective at maintaining dewpoint, but required a lot of compressed air to purge the desiccant vessels to remove accumulated moisture. During this regeneration cycle, the air compressor’s energy consumption was increased to produce the required purge air. That amounts to a very wasteful use of costly compressed air. The new system at Weetabix employs the unique Atlas Copco MD desiccant

dryer, which provides extremely dry air for virtually zero energy cost by utilizing the excess heat from the ZR250VSD compressor for regeneration. The MD dryer wastes no purge air and its electrical cost is equivalent to a light bulb.”

A new closed evaporative cooling system was installed with a variable speed drive cooling fan. Since the majority of the heat load of the air compressors is used in the Energy Recovery process described above, the energy consumption of the tower is reduced to practically zero. Whenever the fan is called on to operate, power is saved through variable speed fan operation as the previous tower fan was constant speed.

Innovative Financing Made the Project Happen

When Whelan initially presented Atlas Copco’s comprehensive solution concept to Weetabix, management loved the idea but balked at the cost. “Businesses know they need to invest capital to cut costs,” Whelan says, “but Weetabix didn’t have the capital budget available to make a project of this scope happen.”

National Grid, the local electric utility, analyzed Atlas Copco’s proposal and determined that the return on an investment of \$470,000 was so good that they offered Weetabix a 50% incentive under their Energy Initiative Program. Weetabix was still unable to commit to the project even though their capital investment was reduced by \$235,000. National Grid went a step further and offered to finance the remaining investment for Weetabix

Energy Recovery

The ZR250VSD-FF package is outfitted with the Atlas Copco Energy Recovery option. This innovative system uses water to cool the air compressor and delivers water at 185F to preheat the Weetabix boiler make-up water. This significantly reduces plant consumption of natural gas.

on their electric bill in 24 equal monthly installments at 0% interest.

Weetabix obtained corporate approval for the project and the equipment was ordered. Atlas Copco contracted IMEC to perform a turnkey installation. IMEC is a full service mechanical contracting firm located in Ayer, MA that specializes in the installation of cooling and compressed air equipment. Startup commissioning occurred at the end of 2010.

Outcomes

Now, in addition to substantial energy savings, Weetabix enjoys the productivity and reliability benefits of new machinery featuring the latest technology, oil-free compressed air plant-wide, and new equipment warranties.

“Weetabix could not be more pleased with the results of this project,” says Weetabix plant manager Rich

Guerrero. “We were able to upgrade our compressed air equipment and recapture the waste heat for our boilers. National Grid’s assistance with both the incentive monies and financing was essential in making the project move forward. Atlas Copco assumed full responsibility for the installation with minimal impact to Weetabix staff. We are saving money every month and enjoying oil-free, low dew point compressed air in all of our manufacturing areas.”

“In two years and three months the project pays for itself, and after that all the energy savings goes straight to the bottom line,” Whelan observes. “It wasn’t completely ‘free’ because the amount added to the monthly electric bill is not fully offset by monthly energy savings, but it’s close. This project is unique because even with the large amount of money involved, the customer didn’t have to write a check.”

Financial Summary

Total Project Cost	\$471,510.00
National Grid Electric Incentive	\$182,250.00
National Grid Gas Incentive	\$ 53,505.00
New Project Cost	\$235,755.00

Return on Investment

Annual Electrical Savings	803,900 kWh
Annual Electrical Cost Reduction	\$77,174.00 (\$.096/kWh)
Annual Natural Gas Savings	31,476 Therms
Annual Gas Cost Reduction	\$27,213 (\$6.83/1000 cu. ft.)
Total Annual Cost Reduction	\$104,387
Projected Payback Period	2 years 3 months

