SIX-MONTH INTERNSHIP

CNH AMERICA LLC

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COMPANY BACKGROUND

CNH America, LLC is a global leader in the manufacturing of construction and agricultural equipment. The company totaled $13.8 billion of revenue in 2009. With approximately one million square feet under roof and a workforce of more than 400 employees. The Burlington site manufactures tractor loader/backhoes, rough terrain forklifts and landscaping tractors under the Case Construction name. Through World Class Manufacturing, CNH is set to have its products meet Tier 4 emission standards by 2014.

PROJECT BACKGROUND

This is the third year that CNH has participated in the Pollution Prevention Intern Program. The goal of the 2010 project was to perform an energy audit of the entire facility. During the summer, the intern focused primarily on the compressed air system and the electric motors used at CNH. Fall projects included heat regeneration, cooling systems, and lighting retrofits.

INCENTIVES TO CHANGE

CNH strives to employ development tactics that are environmentally and socially sustainable. The company is not only committed to minimizing the footprint that its products have on the environment; it is also devoted to decreasing the environmental impact of its production processes. An energy audit of the facility will show which systems consume the most energy and identify opportunities to improve efficiencies.

RESULTS

Compressed Air Audit: The intern first conducted a compressed air audit of the facility. Compressed air accounts for more than ten percent of the electricity used at CNH. Because several processes use compressed air, production is directly affected by its availability. Tests showed that an estimated 29 percent of the system's capacity was lost to leaks. An ultrasonic leak detection survey was performed and approximately 72 percent of the leaks in the system were tagged for repair. Fixing these leaks and implementing an ongoing leak management program would allow CNH to reduce the percentage of system capacity lost to leaks to less than 10 percent.

The intern then examined compressed air applications and determined that modifications to equipment used in the paint system could produce considerable savings. The paint must be continuously agitated or it will coagulate. Compressed air pumps and agitators are much less efficient than their electrical counterparts. If CNH were to switch from pneumatic agitation to electric agitation, the company could save more than 80,000 kWh per year.

The air compressors are operating at a pressure much higher than what is required to run production. If the pressure of the system were lowered to what is necessary, CNH could save 9 percent on the electricity consumption of its compressors.

Closed Loop Compressor Cooling: Two large operations in the facility require cooling water: the compressors and the experimental test facility. The purchase price of the water typically represents only approximately 25 percent of the price to send the water to the wastewater treatment facility. City water is currently being used as a one-pass coolant to cool both of these systems. If cooling systems were purchased to close the cooling loop on these operations, city water consumption at the plant could be reduced by more than 90 percent.

Supplemental Chiller: A designated cooling tower for the experimental lab is undersized for the operations it currently services. During the summer months the tower overheats and during the winter months the tower's pipes freeze. Adding a supplemental chiller that uses an ethylene-glycol and water mixture would eliminate the weather related inefficiencies and down-time. The supplemental chiller would also include a computer system that could automate and control both of the systems for additional operational savings.

Electric Motor Survey: CNH utilizes several hundred motors for various processes, so the intern took an inventory of the electric motors and their applications in the facility. Although there are many direct drive applications, several motors transmit their power through v-belt drive systems. These v-belt drives lose substantial efficiency due to friction and excessive bending in the belts. New technology in synchronous drive systems eliminates many of these losses and allows for an increase in the efficiency of power transmission of between 5 percent and 9 percent. The addition of synchronous drives would save CNH more than 290,000 kWh of electricity annually.

The intern also studied how the electric motors at CNH were used and found that certain motors could be shut off. With a few small modifications to the applications that currently use three 50 hp motors, the motors could be shut off, saving 541,444 kWh annually.

Heat Recovery Ventilator: Because space heating accounts for a large percentage of the natural gas used at CNH, the intern examined the option of regenerating process heat as space heating. The convection ovens currently used to dry painted parts require that the air be continuously exhausted out of the baking area. A large exhaust fan was found, which would be an excellent candidate for an efficient heat recovery unit. The unit could be installed to capture approximately 65 percent of the wasted heat. According to the fan specifications and the temperature of the air being moved, approximately 78,000 therms of heat could be captured each winter.

Lighting Retrofit: Two parts of the facility need lighting retrofits. One of these will be used as a manufacturing area in the future and the other is used as a fabrication area. Both areas require higher quality light than can be acquired through the current method of lighting. Replacing 261 of the existing 400 watt fixtures with LED fixtures would save more than 570,000 kWh annually.

CONVENTIONAL AIR POLLUTANTS AND GREEN HOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO_2	SO_2	CH_4	N_20	CFC	PM-10
1,808.89	9.21	948.10	419.36	21.96	0.24

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
REPAIR COMPRESSED AIR LEAKS	$22,906	309,122 KWH	IN PROGRESS
ONGOING LEAK MAINTENANCE PLAN	$7,635	103,040 KWH	RECOMMENDED
E-FLO ELECTRONIC AGITATION	$5,943	80,202 KWH	RECOMMENDED
LOWER SYSTEM PRESSURE	$7,300	98,515 KWH	IMPLEMENTED
CLOSED LOOP COMPRESSOR COOLING	$21,343	18,434,293 GALLONS WATER	RECOMMENDED
SUPPLEMENTAL CHILLER	$133,217	30,091,867 GALLONS WATER	RECOMMENDED
SYNCHRONOUS BELT DRIVE RETROFIT	$21,765	293,718 KWH	RECOMMENDED
SHUT OFF E-COAT BLOWERS	$40,121	541,444 KWH	RECOMMENDED
HEAT RECOVERY VENTILATOR	$58,000	78,378 THERMS	RECOMMENDED
LED LIGHTING RETROFIT	$42,941	573,430 KWH	RECOMMENDED