ZOETIS

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COMPANY PROFILE
Once a component of Pfizer, Zoetis became a standalone company in 2012, and established its global presence as the largest company in the animal health industry. Zoetis discovers, develops, manufactures and commercializes a diverse portfolio of animal health medicines and vaccines. They cater to the needs of veterinarians, livestock farmers, and companion animal owners. With more than 60 years of experience in animal health, Zoetis sells product in more than 100 countries, supports 8 different species of animals, and provides approximately 300 varying product lines.

PROJECT BACKGROUND
The mission of this project is to improve the efficiency of the mechanical systems to reduce energy usage and costs associated with the energy demands at Zoetis. The focus was to evaluate the efficiency of the chilled water system and identify opportunities to reduce energy usage. However, all the mechanical systems and procedures are integrated to a degree and are subject to the same analysis. Once opportunities are identified, cost and energy efficient strategies are to be researched in order to identify the most beneficial and feasible solutions.

INCENTIVES TO CHANGE
Being a world leader in the industry of animal health, Zoetis requires a highly controlled environment for its testing, production, and inventory. Maintaining these strict specifications can be a major source of energy and resource consumption. Zoetis employs continuous improvement strategies and is constantly seeking alternative methods, procedures, and technologies to optimize their energy efficiency. A significant amount of capital is already invested into their energy bill, and with electricity rates set to increase, this becomes an even greater priority. By recognizing the primary energy consumers, strategies can be developed to alleviate the financial impact and also minimize the environmental footprint left behind.

RESULTS
Chiller Configuration Optimization: Two identical, air-cooled, screw-type chillers provide cooling for one of Zoetis' auxiliary buildings using an equal load-bearing strategy. Since an equal capacity is drawn from each chiller, there are often times when more compressors are activated than are necessary. An uneven load bearing strategy could help optimize the operating efficiency of the chillers and reduce the number of chillers operating concurrently. In an uneven load bearing strategy, a lead chiller would be established and subject to a near-full load before a second lag chiller is introduced and given a partial load based on the current demand. Staging the operation of the chillers would improve the chiller system's aggregate efficiency and reduce energy consumption.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
CHILLER CONFIGURATION OPTIMIZATION	$8,350	131,535 kWh	RECOMMENDED
PUMP CONFIGURATION OPTIMIZATION	$2,350	47,122 kWh	RECOMMENDED
VARIABLE FREQUENCY DRIVE (VFD) INSTALLATION	$5,000	56,790 kWh	RECOMMENDED
PIPING, VALVE, AND TANK INSULATION	$3,850	7,790 Therms 34,765 kWh	IN PROGRESS
OPTIMIZED DRAFT REGULATOR (ODR)	$41,800	82,603 Therms	RECOMMENDED

Pump Configuration Optimization: Two pumps operating at approximately 50 Hz in parallel are used to satisfy the flow requirements of a given chiller system. When one chiller is active, a single pump has the capacity to supply sufficient flow to the system provided its frequency is increased to 60 Hz. Increasing the frequency of the active pump and shutting off a second pump while one chiller is active could make the system more efficient and help preserve the life of the pumps.

Variable Frequency Drive (VFD) Installation: Two pumps operating in a hot water circuit are currently controlled using throttle valves. Restricting pump discharge or rerouting flow-through bypasses can increase energy usage. Additionally, throttle valves can often be a source of corrosion, erosion, emissions, leaks, and cavitation. There are signs of cavitation in the system, which can be detrimental to equipment health and cause inefficiencies in the system. VFD's are the most efficient means of flow manipulation as they automatically regulate and adjust pump speeds. Along with reducing energy usage, VFD's improve pump reliability, decrease associated maintenance, augment longevity, allow for soft starts, and avoid cavitation.

Piping, Valve, and Tank Insulation: Insulation of piping, valves, and tanks serves a variety of purposes. Most obvious, insulation reduces the amount of energy loss that occurs through heat transfer to or from a surface. Safety hazards are also avoided with insulation, as exposed piping can cause burns, create uncomfortable working conditions, emit higher CO_2 levels, and condensate dripping off of chilled water pipes can create slippery conditions. A well-insulated system is more efficient because the working fluid is kept at an optimal temperature. Insulating specific areas of piping and equipment at the plant could reduce both electric and heat energy use.

Optimized Draft Regulator (ODR): Currently three boilers, equipped with ancillary components such as economizers and pre-heated combustion air intakes, provide heating for the Zoetis facility. By focusing on the draft method, the boilers can be made even more efficient using ODR's. The ODR's purpose is to slow the combustion air moving through the stack to provide more contact time between that hot gases and the water in the boiler vessel. Controlling the flue gas velocity will enhance thermal and combustion efficiencies and encourage a cleaner and more complete fuel burning.