2009-2011 INDIANA ENERGY MANAGEMENT PILOT

Angola Wastewater Treatment Plant

Who we are

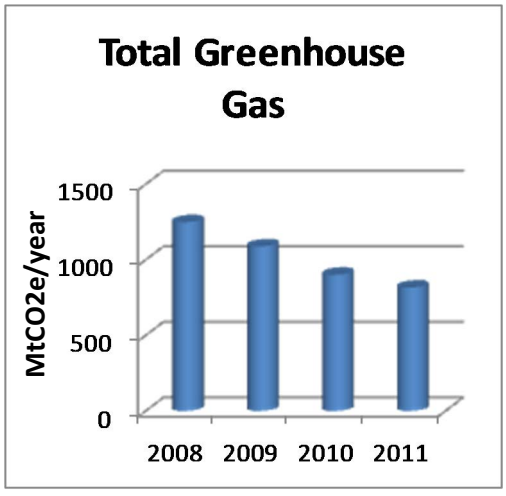
The Angola Wastewater Treatment Plant (WWTP) is a 1.7 million gallon per day (MGD) conventional activated sludge treatment plant with nutrient removal, aerobic sludge digestion and ultraviolet disinfection. It serves a population of approximately 8,200. A staff of eight employees is responsible for maintaining the treatment plant as well as over 50 miles of sanitary sewers and 20 pump stations. The treatment plant is can handle peak flows in excess of 4.1 MGD with 2.5 million gallons of flow equalization for wet weather flows. Located in northwest Indiana, the WWTP discharges to Pigeon Creek, a zero low flow stream within the Great Lakes Basin.

Angola WWTP

Electricity Usage

2008: 1.771 mWh
2009: 1.546 mWh
2010: 1.276 mWh
2011:1.156 mWh

Greenhouse gas (GHG) avoided as a result of improvements: 433 metric tons carbon dioxide equivalent (2008 baseline compared to 2011).*



Project Success Story

Staff at the Angola WWTP are proactive about energy improvement and plant performance. At the start of the Pilot in 2009, the WWTP was aerating activated sludge tanks with multi-stage centrifugal blowers that were more than twenty years old and nearing the end of their useful life. These blowers consumed approximately 500,000 kilowatt hours (kWh) of energy annually and accounted for more than 30% of the plant's energy usage. With support from an Energy Efficiency Conservation Block Grant (EECBG) issued by the Indiana Office of Energy Development, Angola replaced these blowers with high-efficiency Turblex blowers and targeted a 20% reduction in net energy consumption by December 2011. In addition to the new blowers, meters and control valves were added at each aeration basin to more closely monitor and adjust airflow to meet target dissolved oxygen concentrations.

In 2010, Angola hired Wastewater Solutions, Inc. (WSI) to conduct a process optimization audit of the WWTP and identify further energy-saving opportunities. The audit identified potential electrical savings of $31,000 to $55,000 annually by (1) configuring the new Turblex blowers to aerate the digester as well as to activated sludge, (2) add process flexibility to enhancing nitrification/dentrification with less blower demand, (3) improve sludge yield by optimizing return and waste activated sludge rates, (4) improve digester capacity, and (5) reduce the volume of wet weather flows requiring equalization, pumping and aeration.

Greenhouse gas emissions avoided are equivalent to


Removing 84.9 vehicles from the road for a year

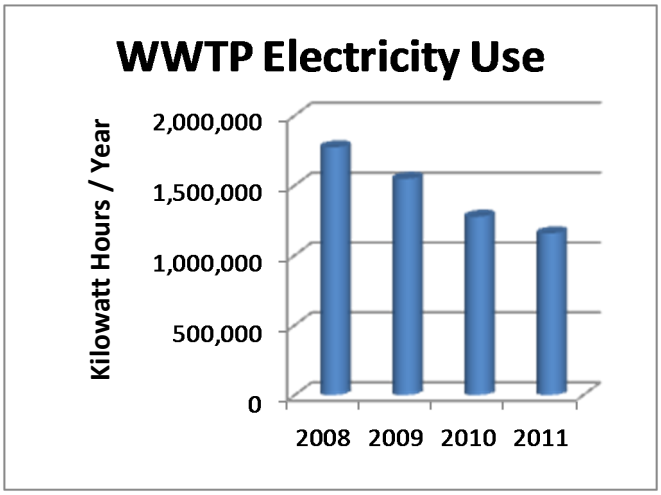

Electricity for 54 homes for a year

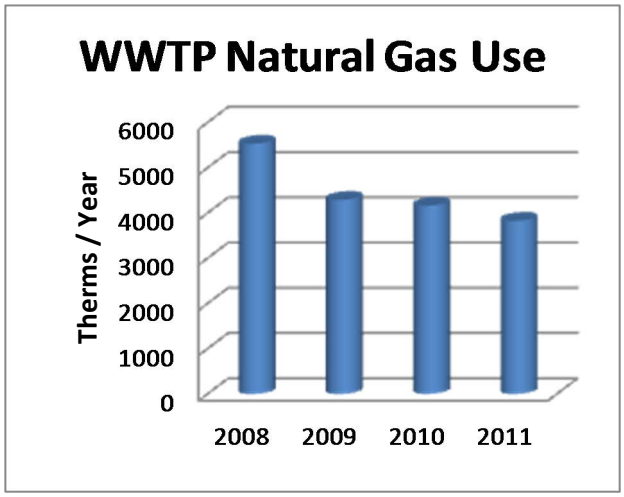

2.4 Railcars of coal


1,007 Barrels of Oil

*Green house Gas Equvalencies calculated using USEPA calculator (http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Documented Results





Key Improvements

Goal	Improvement Process	Annual energy saving (kWh)	Implementation cost	Annual cost saving	Simple pay-back, years
Lighting and General Energy Reduction	Replace all fixtures to high efficiency T8 fixtures, with occupancy sensors in selected areas.	20,000	$0	$160	10 Years*
Season heating of "Dry Can" pump stations	To keep exposed pipes from freezing during cold weather, the control room is heated to ~45 F, reduced from 70 F.	31,250	$0	$2,500	Immediate
Digesters Supplemental Aeration	SOP to control when second blower is brought online.	30,000	$0	$2,500	Immediate
Flow Equalization-Aeration	Issue SOP to control when and how the EQ Blowers are operated	84,000	$0	$6,700	Immediate
	TOTAL PROJECT	165,250		$11,860	

*(Funded 100% DOE Grant, act. Payback = 0 years)