



## 2009-2011 INDIANA ENERGY MANAGEMENT PILOT



# Mishawaka Wastewater Treatment Plant

### Who we are

The Mishawaka wastewater treatment plant (WWTP) is an 11 million gallon per day (MGD) conventional activated sludge plant with advanced nitrogen and phosphorus removal and anaerobic sludge digestion. It serves a population of 50,000. Annual peak wet-weather flow from the combined sewer system is in the range of 59 MGD. With a staff of 26 employees, the Mishawaka Wastewater Division is responsible for the proper operation of its wastewater treatment facility as well as the City's 29 lift stations and 23 combined sewer overflow (CSO) structures. It also is responsible for administering the city's combined sewer control plan.



### Electricity Usage

**2009: 5.430 gWh**

**2010: 4.873 gWh**

**2011: 4.915 gWh**

**Greenhouse gas (GHG)  
avoided: 559 Metric tons car-  
bon dioxide equivalent (2011  
compared to 2009 baseline)**

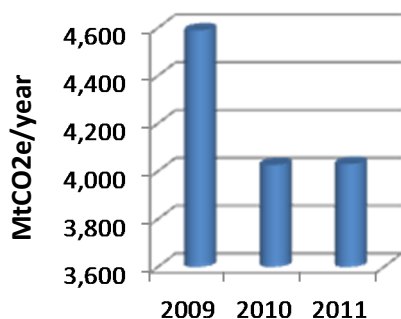
### Project Success Story

A major facility upgrade and expansion in 2008 included energy-efficient features such as fine bubble diffusers and a high efficiency turbo blower. The expansion included premium efficiency motors and VFDs on all large pump applications. Since then, electrical energy intensity has been consistently around 1,200 kilowatt hours per million gallons (kWh/MG). The high electrical energy performance and biogas utilization to offset purchased natural gas are reflected in the facility's EnergyStar™ Portfolio Manager rating of 85.



*Aeration is energy-intensive process. Close monitoring of dissolved oxygen is essential.*

### Total Greenhouse Gas



The 2008 upgrade included two new boilers and heated draft-tube digester mixers. The facility was fully converted from steam heat to a hot-water system. New boilers use biogas as fuel for buildings and process heat. One boiler burns natural gas. The facility set a goal to reduce natural gas use and started to fine-tune building and process heat loads using a central supervisory control and data acquisition (SCADA) system, also installed during the upgrade. The SCADA system helps staff manage and monitor building, process, electric, heating, and air-handling systems, reducing labor and energy costs. In all, the upgrade and optimization reduced natural gas consumption by over 26% (2011 compared to 2009), which is impressive considering the upgrade added heating needs by an estimated 35% due to increased building area, safety code-mandated increases in building ventilation, and the addition of an anaerobic digester.

Greenhouse gas  
emissions  
avoided are  
equivalent to



**Removing 110  
vehicles from the  
road for a year**



**Electricity for 70  
homes for a year**



**3 Railcars of coal**

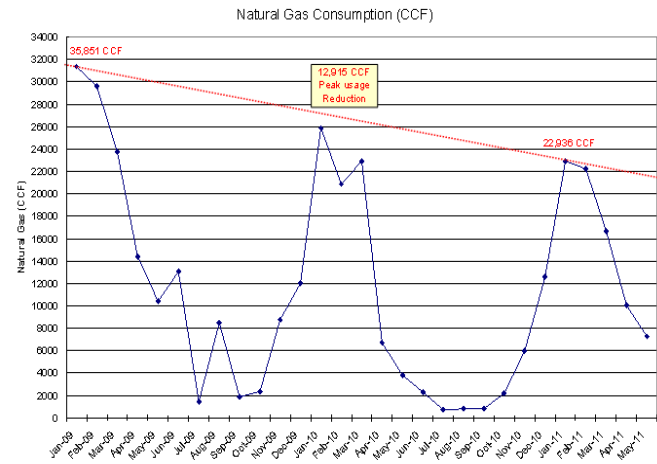


**1,300 Barrels of Oil**

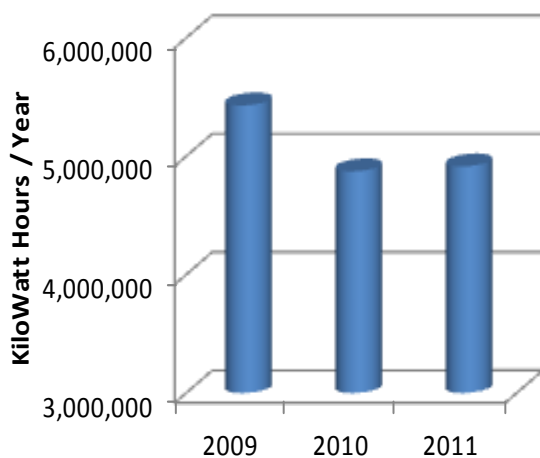
## Documented Results



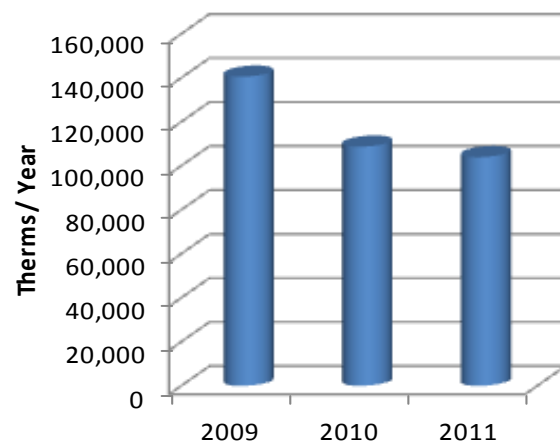
Facility staff monitor the energy gains of new high-efficiency turbo blower.



### Electricity Usage (Mishawaka WWTP)



### Natural Gas Usage (Mishawaka WWTP)



## Key Improvements

| Process                 | Targeted goal               | Improvement                                             | Annual energy saving       | Implementation cost (\$) | Annual Saving (\$) | Simple Payback (years) |
|-------------------------|-----------------------------|---------------------------------------------------------|----------------------------|--------------------------|--------------------|------------------------|
| Boiler / Heating System | Reduce natural gas usage 5% | Fine tune and make seasonal adjustments                 | 41,093 kWh (35% reduction) | \$0                      | \$32,282           | 0                      |
| Electric Supply         | Reduce electrical cost      | Changed tariff rate and implemented aeration blower SOP | 0                          | \$0                      | \$72,000           | 0                      |



### Energy meter on main feed

*"After we started this program, we started tracking our energy usage more closely. Smart meters record our peak demand and when it occurred."*