



Case Study: Fayetteville, TN

2015 Update



Overview & 2015 Update

During the spring of 2011, the U.S. Environmental Protection Agency, Region 4 - Atlanta (EPA R4), and the Tennessee Department of Environment & Conservation (TDEC) assembled a team to conduct an Energy Management Initiative (EMI) for Tennessee Water and Wastewater Utilities. In August 2011 Fayetteville, TN Mayor John Underwood accepted the invitation to be one of the seven utilities to participate in the EMI.

About the City of Fayetteville

Fayetteville is a city of approximately 7,000 people about 90 miles south of Nashville and is the County Seat of Lincoln County, population approximately 31,000. Water and Wastewater services are provided to the City by Fayetteville Public Utilities (FPU), which also provides electricity, natural gas, and telecommunications service to the City and parts of Lincoln County.

Fayetteville Wastewater Plant

The Fayetteville Wastewater Treatment Plant (WWTP) treats approximately 1.5 million gallons per day (mgd) of municipal wastewater with an influent BOD₅ of approximately 225 mg/l. The plant uses the Orbal oxidation ditch process and is designed to treat 3.35 mgd at average daily flow conditions, 7.7 mgd peak daily flow, with two parallel process trains. The final effluent is discharged to the Elk River at mile 90, with monthly average NPDES effluent limits for both BOD₅ and suspended solids of 30 mg/L. The WWTP consistently produces a high quality effluent with BOD₅ values averaging 5-8 mg/l. and Total Suspended Solids values averaging 5-9 mg/l.

Optimizing Operations:

Energy Savings

Each oxidation ditch has two 50-hp and two 25-hp aerators; normally one 50-hp aerator is operating continuously, and one 25-hp aerator is running part-time in each ditch. Additional aerators may be used during higher flow periods.

The plant has aerobic digesters/storage tanks with coarse bubble diffusers for oxygen and mixing using 125-hp blowers for each tank. The team identified that the digester aeration run times could be reduced with no problems, saving a significant amount of energy.

Next Steps

Fayetteville has utilized their energy savings to invest in additional equipment at the WWTP that will allow additional energy savings in the future. Luminescent Dissolved Oxygen (LDO) probes have been installed in the aeration basins and are being connected to the WWTP control system to give real-time monitoring of the oxygen levels and allow better control of the aerators and blowers. The plant management continues to implement energy saving measures including changing to one-ditch operation for half the year and lowering the

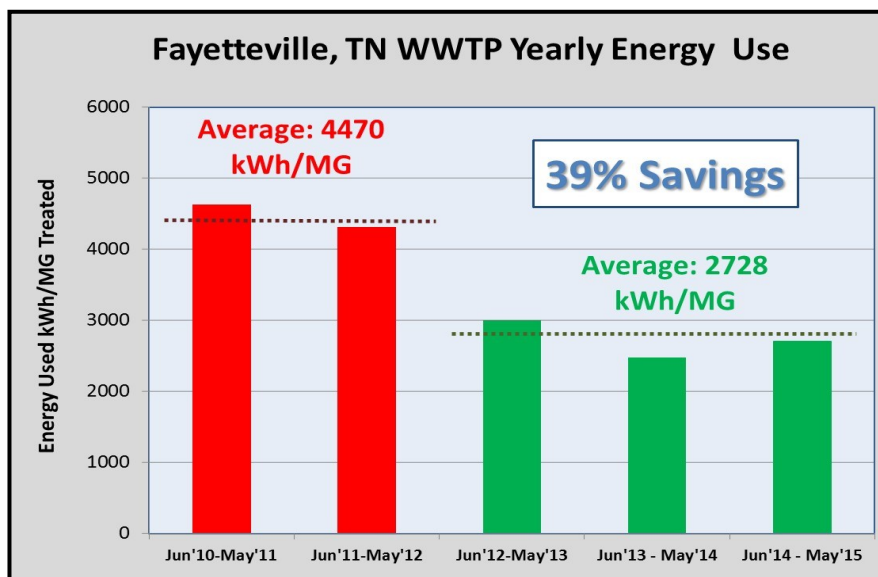


Fayetteville Wastewater Treatment Plant

aeration basin operating DO concentrations. Fayetteville is now evaluating plant upgrades that will allow additional energy savings and even greater effluent nutrient reductions at minimal cost.

Results Summary (little or no implementation cost):

- ◆ Cumulative Energy Savings: Over 3,300,000 kWh
- ◆ Cumulative Cost Savings: Over \$250,000
- ◆ Cumulative CO2 Reduction: Over 2,900 Tons
- ◆ Effluent Nitrogen Reduction: Over 50% Total N



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