



Massachusetts Executive Office of Energy and Environmental Affairs
Department of Environmental Protection

Energy Management Pilot for Public Wastewater and Drinking Water Plants
A Coordinated Approach to Advance Municipal Energy Savings and Greenhouse Gas Reductions

April 2008

For this pilot, MassDEP and MA Division of Energy Resources (MA DOER) have secured auditing services to conduct “no-cost” energy audits (electric, natural gas, and fuel oil) at 14 wastewater and drinking water facilities.

Project Purpose: The purpose of this pilot project is to reduce the amount of energy Massachusetts municipal facilities currently use to treat wastewater and drinking water, thereby reducing greenhouse gas emissions and other air pollutants and saving towns money.

Overview: MassDEP will coordinate a targeted pilot project involving a total of 14 municipal wastewater treatment plants and drinking water treatment facilities (small, medium, and large) through energy auditing, assessments for renewable & clean energy possibilities (e.g. solar, wind, out-fall turbines, combined heat & power), and support for implementation of energy-related projects. MassDEP will mobilize an array of public and private partners to provide technical and financial support.

Justification: Cities and towns in Massachusetts spend approximately \$150 million per year in electricity costs to treat 662 billion gallons of wastewater and drinking water. Approximately 30% of a municipality’s total energy use (and as much as 35 – 40% of a treatment plant’s operating budget) involves treating drinking water and wastewater. Since the cost to produce new electricity in Massachusetts is nearly three times the cost to conserve electricity through energy efficiency (9.1 cents per kilowatt-hour versus 3.2 cents per kilowatt-hour), finding efficiencies for treatment facilities has tremendous potential for municipal cost and energy savings.

The energy required to treat wastewater and drinking water generates significant amounts of air pollutants and greenhouse gases. *If the target energy reductions of this pilot are achieved and expanded throughout the entire municipal wastewater and water utility sector, the resulting total annual emissions would be reduced approximately 200,000 tons of CO₂, 760,000 pounds of sulfur dioxide (SO₂), and 250,000 pounds of nitrogen oxide (NO_x).*

Pilot Project Goals: The proposed pilot project has three main goals:

- 1) Develop energy management plans for each of the 14 pilot facilities that will seek to **reduce the annual electric consumption and costs of treating waste water and drinking water by 20%**.
- 2) Develop a model(s) for the strategic use of public funding assistance to significantly reduce or fully finance the capital municipal costs needed for project implementation.
- 3) Assess the feasibility of expanding this energy savings project as a replicable model for other waste water/drinking water treatment facilities in Massachusetts and elsewhere.

Municipal Participants:

- **Drinking Water Facilities:** Ashland, Easton, Falmouth, Lee, New Bedford, Townsend, and Worcester.
- **Wastewater Facilities:** Barnstable Wastewater Treatment; Charles River Pollution Control District (Bellingham, Dover, Franklin, Medway, Millis, Norfolk, Sherborn and Wrentham); Falmouth Wastewater Treatment; Greater Lawrence Sewer District (Andover, Lawrence, Methuen, North Andover, and Salem, NH); Lowell Regional Wastewater Utility (Chelmsford, Dracut, Lowell, Tewksbury and Tyngsboro); Pittsfield Wastewater Treatment; and Upper Blackstone Wastewater Pollution Control District (Auburn, Holden, Millbury, Rutland, West Boylston and Worcester).

Pilot Project Partners:

- Investor-owned electric utility/energy efficiency providers: Cape Light Compact, National Grid, NSTAR, Western MA Electric, and Unittel
- Investor-owned gas utility/energy efficiency providers: Bay State Gas, Berkshire Gas, KeySpan, NSTAR, and Unittel
- Massachusetts Division of Energy Resources
- Massachusetts Technology Collaborative – Renewable Energy Trust
- EPA New England
- UMass Amherst – Center for Energy Efficiency & Renewable Energy
- Consortium for Energy Efficiency

Pilot Project Components

- **MassDEP Project Oversight and Coordination:** MassDEP will provide project oversight and coordination of the multiple partners.
- **Energy Use Benchmarking:** US EPA Region I conducts initial energy benchmarking at all participating wastewater facilities using their new ENERGY STAR tool.
- **Energy Audits:** For this pilot project, electric and gas utilities will provide facility energy audits (costing approximately \$10,000 each) that will help quantify energy uses/costs and identify potential reductions/savings via conservation.
- **Renewable Energy Feasibility Assessments:** The Massachusetts Technology Collaborative 's (MTC) Renewable Energy Trust would provide renewable energy technical assessments in order to identify any fatal flaws in pursuing wind power, bio-energy, solar, outfall micro-turbines, etc.
- **Combined Heat and Power (CHP) Analyses:** UMass Amherst's Northeast Combined Heat and Power (CHP) program will screen 5 municipal wastewater sites for CHP/energy saving opportunities; further detailed feasibility analysis will be performed on 1 – 2 wastewater plants.
- **Financial Support for Implementation:** A variety of Massachusetts's government sources of funds could be coordinated to support implementation of conservation and renewable energy projects at these facilities, including: MTC Renewable Energy Trust grants, State Revolving Fund (SRF) low-interest loans, Mass DOER's Energy Conservation Improvement and Alternative Energy, and possible Environmental Bond Fund grants for debt service. For many of the conservation and efficiency projects, payback can be as low as 2 to 3 years.

Project Tasks and Target Timelines

Task	Year 2007			Year 2008						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
MassDEP Invitation to Participate in Pilot –Select (7) WWTP & (7) DW Sites	XX	XX								
Project Partners Coordination / Kickoff Meetings			XX	XX						
Press Event –Project Partners			XX							
Energy STAR Benchmark				XX	XX					
Conduct Utility- Subsidized Energy Audits					XX	XX				
Prescreen (7) WWTPs for CHP Energy Saving Opportunities				XX						
Prescreen 14 Sites for Renewable Energy Savings Opportunities (solar, wind, hydro, biomass)				XX	XX					
Conduct CHP Initial Feasibility Analysis for 1-2 WWTPs					XX	XX				
Conduct MTC Initial Feasibility Assessments on All Suitable Sites					XX	XX				
Draft Reports & Data Analysis							XX	XX		
Develop Proposed Model for Financial Support for Implementation						XX	XX	XX		
Develop Energy Saving Plans for Each Pilot Facility								XX	XX	
SRF / DOER Energy Project Solicitation & Development									XX	XX
Implement Pilot Energy Savings Plans & Adopt a "Plan-Do-Check-Act" management systems approach									Ongoing →	Ongoing →

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