

*Water Treatment Plants:
Sustainable and Energy Efficient Improvements*



Case Studies of Technologies Implemented at Water Treatment Plants

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Case Study of Energy Efficient, Sustainable Improvements and Technologies Implemented at Water Treatment Plants





Introduction and Acknowledgements

Presenters:

- Andrew Casolini Dal Bo, PE LEED AP
- Brian Sibiga, PE

Client Acknowledgements:

- Town of Grand Island
- Niagara County Water District
- City of Oswego



Energy Efficient Equipment and Operational Upgrades

- Modification to distribution and transmission system
- Pump station modification
- Pump and motors
- VSD
- Automated control systems
- Automatic data acquisition





Energy Efficient Equipment and Operational Upgrades

- Photovoltaic's
- Geothermal heat pumps
- Filter media
- Solid handling
- SCADA controls
- Chemical feed systems





Energy Efficient Equipment and Operational Upgrades

- Onsite hydro turbines
- Process modifications





Implementation Options

- Employee installation
- Conventional design and public bidding
- Design Build
- Energy Performance Contracting



Operator Training

- Technical skill sets
- Standard operating procedures
- Preventative maintenance
- Asset management



ROI

- Annual energy cost prior to implementation
- Annual energy costs savings
- Annual operational cost savings
- Measurement and Verification (M & V)



Town of Grand Island

- Location: Erie County, NY
- Capacity: 1.75 MGD daily avg; 2.5 MGD daily max
- Customers: approximately 20,000
- Treatment: conventional
- Water Source: Niagara River



Grand Island Equipment and Operational Upgrades

- VSD
- Automated controls
- Automated data logging
- Energy controllers
- Transmission main improvements
- Tube settlers





Grand Island Equipment and Operational Upgrades

- Lighting upgrades
- Water meter replacement
- Remote water meter reading





Implementation

- Employee installation
- Conventional design and public bid
- Energy Performance Contracting



ROI for Energy Performance Contracting

- Prior to implementation:
 - Total billings = \$3, 400, 000
 - Electric and gas = \$634, 000
- Post implementation:
 - Water revenue = Increased by \$343, 868/yr
 - Electric and gas savings = \$87, 000/yr
 - Water purchase savings = \$200,000/yr
- Total cost = \$4,850,000
- Grants = \$330,000
- Savings = \$630,868
- ROI = 7.7 years

Town of Evans
Water System Consolidation

Meter Account & Location:
Meter Account No. 3031410
Service Address 681 JEFFERSON AVE.
Location - distance tied to house front corners
Curb Box Location - distance tied to house front corners

Old Meter Information:
Old Size 5/8x3/4
Old Make NEPTUNE
Old Number 39246511
Old Registration No. 1820512783
Old Seal No.
Old Meter Reading 0200
No. of Digits in old meter 5

New Meter Information:
New Size 5/8x3/4
New Make NEPTUNE
New Number 85459944
New Registration No. 1820512783
New Seal No.
New Meter Reading 0
No. of Digits in new Meter 7

Installation Information:
Meter Quadrant Location

1	2	3
4	5	6
7	8	9

 BLDG: FRONT

Installation Notes

Status REPLACED
Date Completed 6/10/2008
Time Completed 12:04

WD Contractor Inspection
Inspection Status Passed
Date Approved 7/7/2008
Approved By CHC

Contractor Photos
Old Meter Photo
New Meter Photo

Construction Notes and Comments
There are no notes or comments for this meter.
Enter New Comments and Notes Here... Add

Photos / Documents / Attachments
There are no photos or attachments for this meter.
Attach a new photo / document
File Browse
Type Pre-construction
Description Submit Document



Niagara County Water District

- Location: Niagara County, NY
- Capacity: 15 MGD daily avg; 35 MGD daily max
- Customers: approximately 150,000
- Treatment: conventional with permits allowing Direct Filtration
- Water Source: Niagara River



NCWD Equipment and Operational Upgrades

- VSD and motor
- Automated controls
- Automated data logging
- Transmission main improvements
- Pump station upgrades
- Backwash pump station
- Chemical change out





Implementation

- Employee installation
- Conventional design and public bid
- Energy demonstration project



ROI for Conventional Design and Public Bid

- Prior to implementation Electric = \$982, 000/yr
- Post implementation Electric = \$200, 000/yr
- Construction Cost = \$1, 450, 000
- Grants = \$335, 000
- ROI = 5.5 years



City of Oswego

- Location: Oswego County, NY
- Capacity: 6 MGD daily avg; 17 MGD daily max
- Customers: approximately 18,000
- Treatment: conventional
- Water Source: Lake Ontario





Oswego Equipment and Operational Upgrades

- Rebuilding Finished water pumps
- New motors and VSD
- Automated pump control
- SCADA system with remote telemetry improvements
- Filter valve actuators
- Coagulant feed system
- Lighting system controls



Implementation

- Energy Performance Contracting
- Municipal Lease
- Energy Smart Grant Program



ROI for Conventional Design and Public Bid

- Prior to implementation: Electric = \$694,378/yr
- Operation and Maintenance Savings = \$58,528/yr
- Energy Savings = \$95,892/yr
- Grants = \$270,000
- Construction Cost = \$2,423.918
- ROI = 13.94 years



Q & A





Thank You

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