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

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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**
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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