- New York Headquartered Professional Services Company
- 77 Year Old Firm with a Staff over 270 people
- 1 of 17 companies accredited as an ESCO by the National Association of Energy Service Companies
- US DOE Qualified
- Long-Term Relationships
- Professional Credentials
A program that helps create a world where capital improvements can pay for themselves... freeing municipalities from having to impose more burdens on ratepayers or rely on grant funding.
Why is Energy Management and Operational Savings a Focus?

1. Tight Budgets/Property Tax Cap
2. Energy Costs – Increasing and Volatile
3. Infrastructure – Aging and Maintenance Intensive
4. Tax Payers Expect to do More with Less
5. Public Relations Cost/Benefit/Environmental Justification
Why is Energy Management and Operational Savings a Focus?

OBJECTIVES

1. Save Money, Reduce Energy, Operational, Maintenance Costs
2. Increase Revenue
3. Meet More Stringent Water Quality Limits
4. Integrate Energy Efficiency into Capital Improvement Programs
Why is Energy Efficiency a Focus?

2017 State Energy Efficiency Scorecard Rankings

Most Improved
Ranks 1-10
Ranks 11-20
Ranks 21-30
Ranks 31-40
Ranks 41-51

https://aceee.org/state-policy/scorecard
A program that helps create a world where capital improvements can pay for themselves... freeing municipalities from having to impose more burdens on ratepayers or rely on grant funding.
ICE Master Plan

Integrating Energy & Operational Savings into CIP plans

- Many improvements planned as part of CIP plans reduce operating costs
- Asset renewal value of replaced items incorporated
- Short payback items are combined with longer payback items to bring total project payback within goals

Implementing an ICE Master Plan

- Investment Grade Assessment
- NYSERDA FlexTech Program (50% Grant for Plan)
- Key to incorporate Pro Forma based financial analysis as overlay and presentation of results developed
ICE Approach

PLANNING PHASE → DESIGN PROJECT IMPROVEMENTS → IMPLEMENTATION → RESULTS
Planning Phase

Make an Informed Decision!
Mix of longer payback with shorter payback energy conservation improvements.

<table>
<thead>
<tr>
<th>ENERGY CONSERVATION MEASURE NO.</th>
<th>FACILITY IMPROVEMENT MEASURE</th>
<th>TOTAL MEASURE COST</th>
<th>TOTAL ANNUAL SAVINGS</th>
<th>SIMPLE PAYBACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control System and Blower Upgrades</td>
<td>$309,120</td>
<td>$31,543</td>
<td>9.8</td>
</tr>
<tr>
<td>2</td>
<td>Pump Controls and Optimization</td>
<td>$124,657</td>
<td>$10,840</td>
<td>11.5</td>
</tr>
<tr>
<td>3</td>
<td>Motor Improvements</td>
<td>$43,217</td>
<td>$3,425</td>
<td>12.6</td>
</tr>
<tr>
<td>4</td>
<td>Boiler Replacement &amp; Controls</td>
<td>$175,772</td>
<td>$6,392</td>
<td>27.5</td>
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<tr>
<td>5</td>
<td>Lighting Improvements</td>
<td>$261,622</td>
<td>$33,780</td>
<td>7.7</td>
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<tr>
<td>6</td>
<td>Building Envelope Improvements</td>
<td>$20,987</td>
<td>$5,672</td>
<td>3.7</td>
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<tr>
<td>7</td>
<td>Photovoltaic System</td>
<td>$275,819</td>
<td>$18,146</td>
<td>15.2</td>
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<tr>
<td></td>
<td><strong>PROGRAM TOTALS - Recommended Measures</strong></td>
<td><strong>$1,211,194</strong></td>
<td><strong>$109,798</strong></td>
<td><strong>11.0</strong></td>
</tr>
</tbody>
</table>
Sample Cashflow

Savings & Debt Service

Cash Flow

Savings
Debt Service ($)
Cash Flow

Installation
1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20

$0  $50,000  $100,000  $150,000  $200,000  $250,000

$0  $200,000  $400,000  $600,000  $800,000  $1,000,000  $1,200,000  $1,400,000  $1,600,000  $1,800,000
Wastewater Treatment Plant ECM – 3: Solids Dewatering Upgrades and Polymer System

### Measure Summary

<table>
<thead>
<tr>
<th>Energy Savings</th>
<th>kW/Year</th>
<th>mmBtu/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Demand Savings</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Electrical Energy Savings</td>
<td>71,912</td>
<td></td>
</tr>
<tr>
<td>Fossil Fuel Savings</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total Equivalent CO₂ Gas Savings</td>
<td>35,806</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost Savings</th>
<th>Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Dollar Savings</td>
<td>$7,368</td>
</tr>
<tr>
<td>Fossil Fuel Dollar Savings</td>
<td>$0</td>
</tr>
<tr>
<td>Operational &amp; Maintenance Savings</td>
<td>$106,183</td>
</tr>
<tr>
<td>Total Dollar Savings</td>
<td>$113,550</td>
</tr>
</tbody>
</table>

### Direct Project Costs

| Total Measure Cost | $1,357,200 |

### Payback

| Simple Payback | 12.0 Year(s) |

---

(1) Environmental CO₂ Gas Savings Estimated Using Conversions By: EPA
Design Project Improvements

Water
Wastewater
Buildings/Facilities
Project Improvements – Water Treatment Facilities

- Pumping and Pump Station Upgrades
- Filtration System Upgrades
- Variable Speed Drives and Motor Replacements
- Automated Control Systems
- Low Headloss Valves
- Tube Settlers
- Chemical Optimization
- Residual Managements Upgrades
- Energy Management Systems/SCADA
- Water Meters and AMR
Project Improvements – Wastewater Treatment Facilities

- Aeration Diffuser Upgrades
- Pump and Headworks Upgrades
- Automated Control Systems
- Blower Upgrades
- Chemical Optimization
- Solids Handling Upgrades
- Digestion Upgrades
- Energy Management Systems/SCADA
Raw Water and High Service Pumping, Sedimentation, Filtration and Controls Upgrades

Annual energy Savings: $95,892
Revenue Increases and O&M Savings: $370,528
Energy Incentives: $270,000

Oswego, NY
Town of Grand Island, NY

Water & Sewer

Water Revenue Increase: $343,868

Energy Savings: $66,345

O&M Savings: $15,639

Energy Incentives: $278,251

Simple Payback: 9 Years
A comprehensive ICE evaluation was performed on the six WWTPs making up the County System

- Over $45 million of integrated energy and capital improvements
- Over 13 million KWHrs of electrical savings and $1.25 of O&M savings annually
- $2.3 million in energy incentives
- 15 year payback when including asset renewal for replacement of aged equipment
Onondaga County, NY WWTP

Dewatered sludge feeding

First drying zone
Temp: 170-120°C

End drying zone
Temp: 80-99°C

Sludge Disposal Cost $2.8M Annually
Sludge Dryer Cost $13M (installed)
Dryer Fuel & Power Cost $500,000
Sludge Disposal Savings -$1.9M
Simple Payback 9.5 years
<table>
<thead>
<tr>
<th>ECM #</th>
<th>Description</th>
<th>% Energy Save</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a</td>
<td>Influent Pump Station - Modify Existing Check Valves</td>
<td>48%</td>
</tr>
<tr>
<td>8</td>
<td>Post Aeration Blower Upgrades</td>
<td>85%</td>
</tr>
<tr>
<td>10</td>
<td>Boiler Burner Controls</td>
<td>10%</td>
</tr>
<tr>
<td>11</td>
<td>Retro-commissioning</td>
<td>14%</td>
</tr>
<tr>
<td>14b</td>
<td>Oxygen Basin Mixer Upgrades w/VFDs (Lightinin Mixers)</td>
<td>64%</td>
</tr>
<tr>
<td>15 / 17</td>
<td>Aeration Blower Upgrades (Turbo Blowers)</td>
<td>59%</td>
</tr>
<tr>
<td>18d</td>
<td>Replace RAS Pumps Only</td>
<td>81%</td>
</tr>
<tr>
<td>19</td>
<td>Sludge Transfer Pump Upgrades</td>
<td>74%</td>
</tr>
<tr>
<td>25</td>
<td>Variable Flow Pumping</td>
<td>69%</td>
</tr>
<tr>
<td>26</td>
<td>Retro-commissioning</td>
<td>13%</td>
</tr>
<tr>
<td>27</td>
<td>Steam Boiler Plant Optimization</td>
<td>10%</td>
</tr>
<tr>
<td>28a</td>
<td>Fleet Maintenance Garage IR Heaters</td>
<td>57%</td>
</tr>
<tr>
<td>28b</td>
<td>Plant Maintenance Garage IR Heaters</td>
<td>58%</td>
</tr>
<tr>
<td>28c</td>
<td>Large Vehicle Garage IR Heaters</td>
<td>44%</td>
</tr>
<tr>
<td>35</td>
<td>Laboratory Controls</td>
<td>53%</td>
</tr>
<tr>
<td>37</td>
<td>Computer Power Management Software</td>
<td>19%</td>
</tr>
</tbody>
</table>
Village of Westfield, NY – WWTP Improvements

Existing Conditions & Deficiencies

- Majority of equipment is original and beyond operating life
- Maintenance costs are rising
- Existing surface aerators are energy inefficient and limited to treat high organic loading
- Icing issues in winter months
- No grit removal system
- Existing liner failure in basins
Village of Westfield, NY – WWTP Improvements

- Existing basins consist of: First and Second Stage Aeration Basins with Mechanical Surface Aerators
- Fine bubble and ultra fine bubble diffused aeration systems were evaluated
- Samples of influent were collected and analyzed
Village of Westfield, NY – WWTP Improvements

- Convert Both Second Stage Aeration Basins to Diffused Air Consisting of:
  - Ultra Fine Bubble Diffusers
  - (3) Turbo Blowers
  - Automated Dissolved Oxygen System for Controls
  - Upgrade of Stage 1 to equalization basins

- Benefits include:
  - Increase Energy Efficiency and Savings, while doubling the amount of air to the basins
  - Increase Standard Oxygen Transfer Rate (SOTR) and Oxygen Transfer Efficiency (OTE)
  - Better control of basins to accommodate fluctuating plant flows and organic loading
City of Dunkirk, NY

• New York State Water Grant
  • $10,175,000 that includes a 0% loan and a $2,543,750 grant

• NYSERDA Flex Tech Program Grant
  • Economically sustainable capital improvement program
  • Replaced a combination of failing and inefficient assets to reduce financial burden

• Triple Bottom Line Approach
  • Develop a project scope that saves money, replaces failing or outdated equipment and is environmentally sustainable utilizing green infrastructure improvements

Approach allows City to replace failing equipment with utility bill savings and stay ahead of regulatory requirements and enforcement
City of Dunkirk, NY

- Bar Screen and Grit System upgrades
- Aeration Turbo Blower improvements
- LED Site and Interior Lighting Improvements
- Solids Dewatering Improvements
- Emergency Generator for WWTP
- Treatment plant heating and ventilation improvements
- Energy management and process automation (SCADA) improvements
- Boiler and natural gas well upgrades
- Pumping upgrades
Project Improvements – Building Opportunities

- LED Interior & Site Lighting
- Lighting Controls
- Energy Management Systems
- HVAC Equipment Upgrades/Replacements
- Motors & Variable Speed Drives
- Computer Power Management System
- Occupancy Controlled Ventilation
- Infrared Heating Technology
- Retro-commissioning
- Water Conservation
- Building Envelope
- Street Lighting and “Smart” Technologies
Annual Energy Savings: $63,853

Energy Incentives: $111,200
UPGRADES

Lighting
HVAC Controls
Boiler/Burner Replacement
Domestic Hot Water Upgrades
Roof Replacement
New Windows
Ozone Laundry
Water Conservation
Building Envelope
JAIL IMPROVEMENTS

- Utilized In-house County Labor
- Increased Life of Jail by 20 yrs
- Improved Equipment Reliability
- Improved Employee & Visitor Environment
PROJECT SUMMARY

- Total Project Cost: $1,474,371
- Total Energy Savings: $1,757,788 over equipment life
- Energy Program Funding: $111,200

Annual Equivalent Savings

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars Removed From the Road</td>
<td>43</td>
</tr>
<tr>
<td>Barrels of Oil Saved</td>
<td>511</td>
</tr>
<tr>
<td>Houses Energy Use</td>
<td>19</td>
</tr>
<tr>
<td>Number of Trees Planted</td>
<td>5,686</td>
</tr>
</tbody>
</table>
CASE STUDY
HORSEHEADS, NY

Water & Sewer
Revenue Increase: $114,621

Energy Savings: $86,459
Annual Savings
$461,759

Simple Payback
8.35 Years

Included wiring, pole and mast arm improvements where needed.
1. Studies
2. Design Bid Build
3. Design Build
4. Professionally Led Design Build
5. Energy Performance Contracting
Energy and Utility Incentives

Prescriptive Programs
- Rebate per unit
- Simple and low effort
- Limited energy efficiency measures

Custom Programs
- Incentive on total savings & costs
- Broader scope of eligible measures
- Pre-approval required
- Requires calculation of energy savings and costs
Conclusion - ICE Benefits

1. Save Money, Reduce Energy, Operational, & Maintenance Costs
2. Increase Revenue
3. Integrate Energy Efficiency into Capital Improvement Programs
Questions? and Thank you!

For more information please contact:

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Adam Tabelski
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877.293.6335