

Smart Management for Small Communities Ellicottville, New York



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





Introduction and Acknowledgements

Paper Authors:

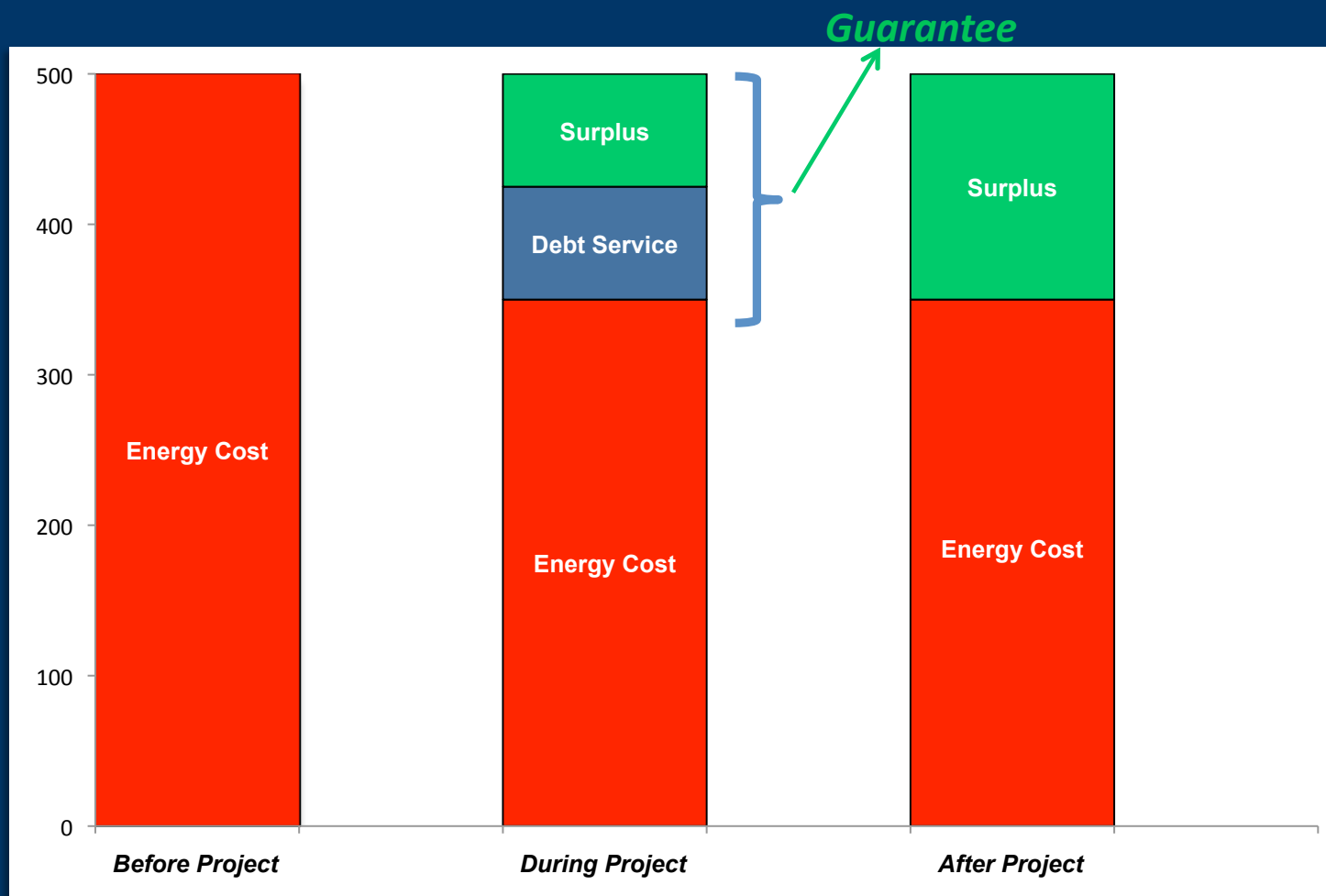
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Client Acknowledgements:

- Town of Grand Island
- City of Beacon
- Town of Webster
- Town of Newfane
- City of Kingston
- Town of Chenango
- Oneida County Sewer District
- Erie County DEP Big Sister Creek



What is Performance Contracting?





- Repurpose wasted energy dollars into long term assets
- A positive cash flow makes projects “self funding”
- Neutral or positive budgetary impact
- Enhance existing revenue streams





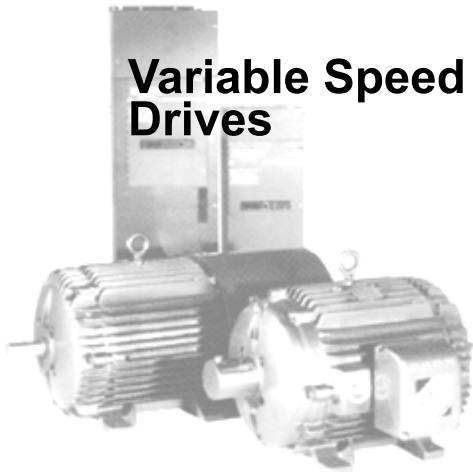
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Energy Conservation Measures

Lighting / Lighting Controls



Variable Speed Drives



Energy Management Systems



Equipment Upgrades / Replacement

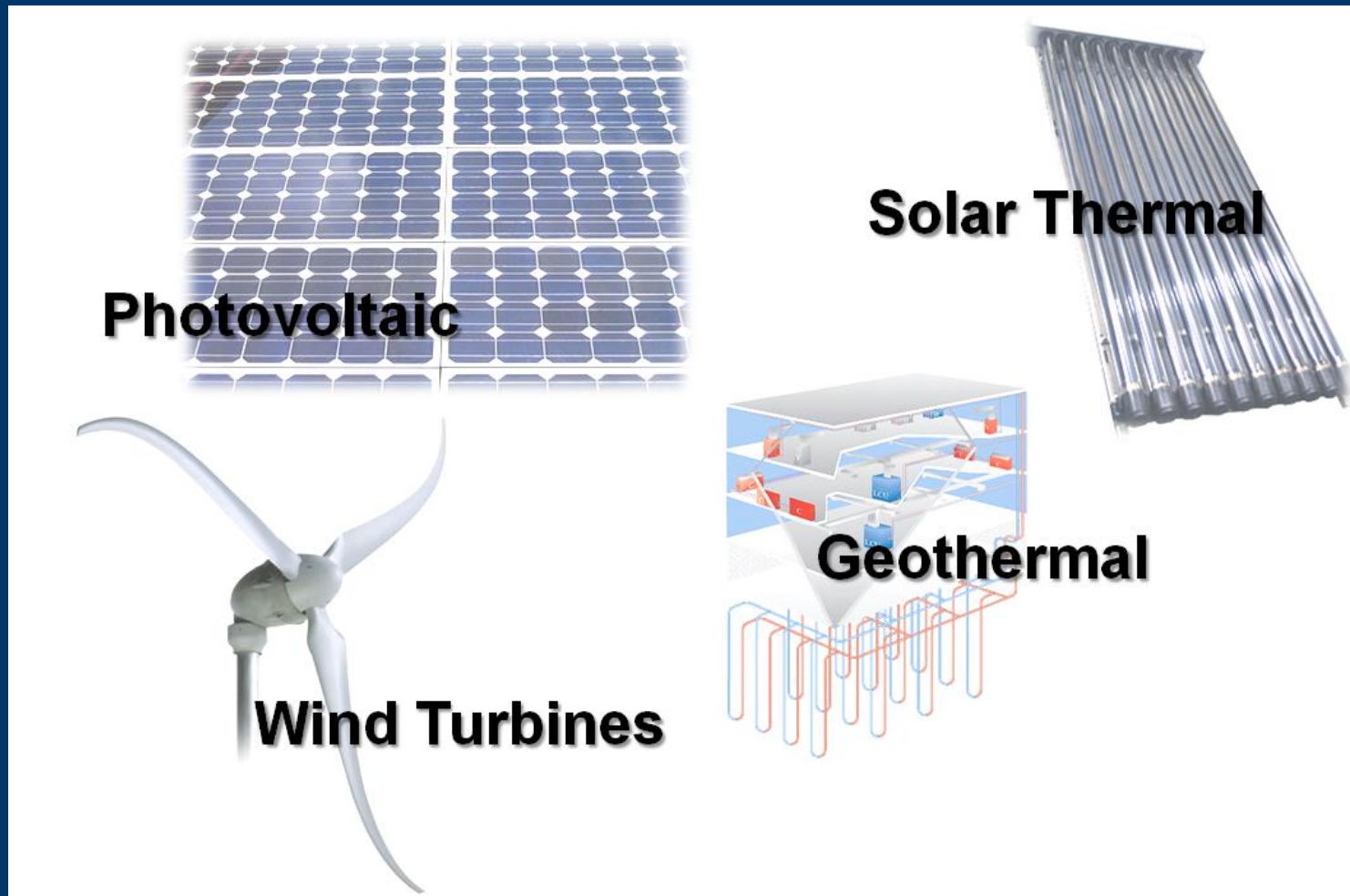


energy services





Renewable Technologies





Case Study Improvements

- Lighting
- HVAC
- Building envelope
- Enhanced sludge dewatering
- Premium efficiency motors
- Low energy sludge thickening





Project Improvements

- Digester mixing systems
- Enhanced anaerobic digester gas utilization
- Dissolved oxygen control system
- Pumping control systems
- Aeration diffusers
- Blower upgrades (turbo)





What are the benefits?



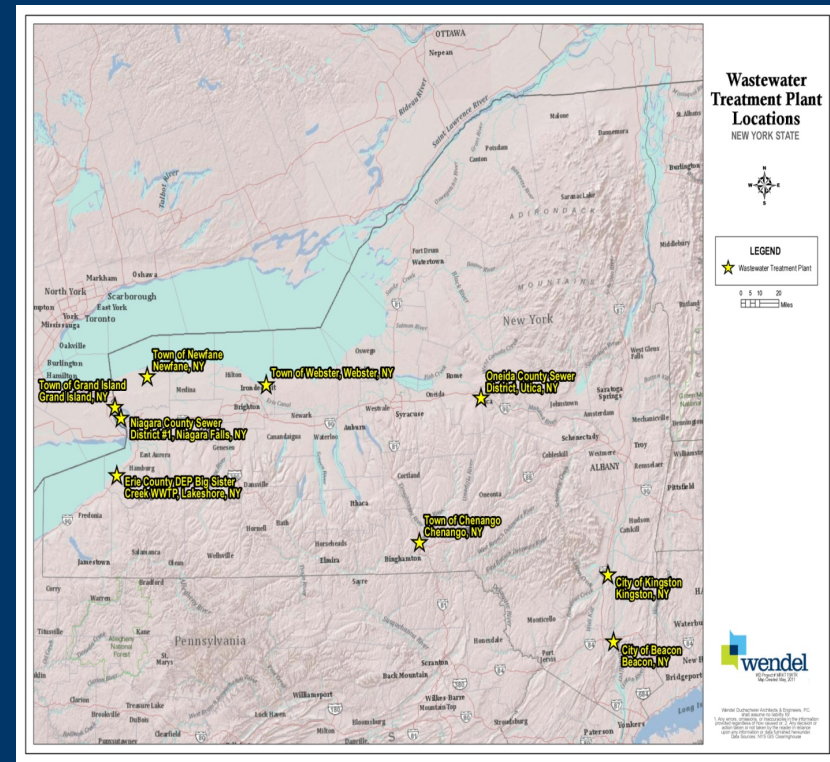
- Energy savings are guaranteed
- Accelerated and simplified project implementation
- The ESCO acts as the general contractor for the project
- A single point of contact





Planning Phase - Detailed Study

- Investment grade energy audit
- Equipment run hours and/or equipment kW
- Facility usage
- Operational savings





Implementation Methods

- Projects included energy efficiency improvement that were implemented by employee installation directly and through traditional design, bid, build model
 - Town of Newfane
- Remaining projects were implemented through energy performance contracting where savings generated by the improvements are utilized to cover the equipment procurement and installation costs



Case Study - Results

ROI

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



Town of Newfane

Total Savings = \$117,850 per year

ROI = 5.6 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Measured Energy/ Oper. Savings	Project Cost	Energy Incentives	Return on Investment
Aeration System	\$65,000	\$84,000	\$250,000	\$86,000	1.95 years
Filtration System *	\$2,000	\$3,600	\$250,000	\$7,600	67.0 years
DO Control System	\$23,450	\$25,250	\$260,000	\$60,000	7.9 years
Belt Press Modifications	\$5,000	NA	\$50,000	NA	10.0 years



Oneida County WPCF

Total Savings = \$125,750 per year

ROI = 6.4 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Measured Energy Savings	Project Cost	Energy Incentives	Return on Investment
DO Control System	\$50,000	\$57,000	\$150,000	\$110,000	0.70 years
Influent Pump Station	\$27,500	\$35,000	\$425,000	\$60,000	10.4 years
Sauquoit Creek PS	\$18,450	\$20,000	\$325,000	\$39,000	14.3 years
Lighting Upgrades	\$15,000	\$13,750	\$200,000	\$88,660	8.1 years



Town of Grand Island

Total Savings = \$45,775 per year

ROI = 8.9 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Measured Energy Savings	Project Cost	Energy Incentives	Return on Investment
Surface Aerator Upgrade	\$11,275	\$17,275	\$314,000	\$13,200	17.4 years
Influent Pump Station	\$5,500	\$4,500	\$79,900	\$6,650	16.3 years
PSA and Blower System	\$20,000	\$24,000	\$62,500	\$29,000	1.4 years



City of Kingston

Total Savings = \$135,595 per year

ROI = 8.7 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Measured Energy/ Oper. Savings	Project Cost	Energy Incentives	Return on Investment
UV System Upgrade	\$35,750	\$37,200	\$430,000	\$20,640	11.0 years
Digester Mixing	\$45,460	\$43,200	\$356,000	\$48,900	7.1 years
Settled Sewage Pumps*	\$11,570	NA	\$135,000	\$11,500	10.7 years
Sludge Thickener	\$42,350	\$38,500	\$325,000	\$25,000	7.8 years
Lighting Upgrades	\$5,125	\$5,125	\$48,500	\$2,550	9.0 years



Town of Webster

Total Savings = \$56,711 per year

ROI = 9.0 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Measured Energy Savings	Project Cost	Energy Incentives	Return on Investment
PumpMotor Upgrades	\$5,197	\$9,296	\$54,100	\$8,200	4.9 years
DO Control Upgrades	\$5,040	\$6,215	\$48,000	\$8,900	6.3 years
Digestion Methane Recovery	\$44,500	\$41,200	\$425,000	NA	10.3 years



Town of Chenango

Total Savings = \$79,170 per year

ROI = 8.8 years

Efficiency Improvement Measures	Projected Energy/Oper. Savings	Project Cost	Energy Incentives	Return on Investment
DO Control System	\$4,870	\$73,500	\$3,800	14.3 years
SBR and Blower Upgrade	\$18,400	\$311,750	\$15,000	16.1 years
Solids Dewatering Upgrade	\$55,900	\$330,000	NA	5.9 years



City of Beacon

Total Savings = \$121,103 per year

ROI = 10.5 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Project Cost	Energy Incentives	Return on Investment
Pump and Motor Upgrades	\$27,160	\$695,000	\$11,875	25.2 years
Boiler, HVAC and Lighting	\$7,000	\$107,000	\$4,000	14.7 years
Air Supply Blowers	\$38,315	\$478,000	\$44,025	11.3 years
Belt Press and Polymer	\$48,628	\$51,846	NA	1.1 years



Erie County Big Sister Creek

Total Savings = \$130,685 per year

ROI = 7.3 years

Efficiency Improvement Measures	Projected Energy/ Oper. Savings	Project Cost	Energy Incentives	Return on Investment
Lighting Upgrades	\$6,370	\$59,750	\$3,465	8.8 years
DO Control System	\$24,670	\$150,500	\$57,450	3.8 years
Energy Mgmt. System	\$58,200	\$654,500	\$30,000	10.7 years
RAS Pump Upgrades	\$26,970	\$54,550	\$15,210	1.5 years
Digester Aeration Blower	\$14,475	\$182,550	\$36,200	10.1 years



Conclusions

- Municipalities face growing operation and maintenance budgets
- Managing energy consumption is critical
- Annual Operating budgets can be lowered leveraging ECM's
- EPC implementation is a demonstrated process that effectively lowers your energy budget
- Planning is critical....understand how you spend your money
- Have a champion on the Owners side of the project team
- RESULTS



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Q & A





Thank You

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