

Drinking Water State Revolving Fund Green Project Reserve

- Interim -



Sugar City Drinking Water Project **SRF Loan #DW 1806 (pop. 1,367)** **\$3,700,000**

Interim Green Project Reserve Justification

Business Case GPR Documentation

1. INSTALLS SCADA FOR REMOTE MONITORING (ENERGY Efficiency). GPR Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings.* (\$50,000).
2. INSTALLS PREMIUM ENERGY EFFICIENT MOTOR/VFD CONTROLLER FOR NEW WELL (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient ...new pumping systems...including VFDs* (\$30,000).
3. INSTALLS RADIO-READ CAPABILITY ON EXISTING WATER METERS (Water Efficiency) Categorically GPR-eligible per Section 2.2-4: *Retrofitting/adding AMR capabilities or leak equipment to existing meters* (\$60,000)

1. SCADA CONTROL TECHNOLOGY

Summary

- Energy efficiency from the installation of a SCADA system for remote electronic sensing of the water storage tank and pumping system.
- Loan amount = \$3,700,000
- Estimated energy efficiency (green) portion of loan = 1.4% (\$50,000) (design estimate)
- Estimated annual energy and labor savings = \$9,500 per year.

Background/ Results

- The SCADA system is part of the project at the well site pump house building.

Energy Efficiency Improvements

- Remote SCADA monitoring saves labor costs = 1 person 1 hour per day = \$9,500/yr in labor costs.

Conclusion

- Total SCADA savings would be approximately \$9,500 per year in labor costs = payback of 5.3 years, therefore SCADA costs are GPR-eligible.
- **GPR Costs:**
SCADA = \$50,000
Total = \$50,000
- **GPR Justification:** SCADA system costs are GPR-eligible by a Business Case per 3.5-7¹: *automated and remote control systems (SCADA) that achieve substantial energy savings.*

¹ Attachment 1, April 21, 2012 EPA Guidance for Determining Project Eligibility

2. ENERGY-EFFICIENT PUMP/ VFD

Summary

- The City will purchase and install a premium energy-efficient booster pump with a variable frequency drive (VFD).
- Loan amount = \$3,700,000
- Estimated energy efficiency (green) portion of loan = 0.8% (\$30,000) (design estimate)

Background

- The City requires an additional well to meet City water demands. This will require a new 1,500 gpm vertical turbine well pump.
- The City requires an additional storage tank to provide the storage capacity required for current demand. A series of three (3) new booster pumps will be provided with the new storage tank.
- Provision of VFDs on the pumps will provide a much tighter range for pressure fluctuation. The VFDs will save energy by assisting in maintaining constant system pressure; it will also reduce electrical consumption at times of pump start-up.

GPR Justification

The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD². Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Premium Efficiency Motors**
 - The vertical turbine pump has a premium efficiency 150 hp motor (95.0% efficient) at an additional cost of approximately \$4,000. Standard efficiency motors are typically 15 to 30 percent lower in cost than premium efficient motors³. A standard efficiency 150 hp motor has an efficiency of approximately 92% at 75% full load. If the pump runs for 1,730 hours per year at 3% higher efficiency, an energy savings of approximately 5,813 KWH per year will be realized. At \$0.08/KWH, the City will see a total cost savings of \$465 per year. At \$465 per year of energy savings using a premium efficiency motor, the payback period for the cost differential between a standard and premium efficiency motor (\$4,000) is 8.6 years, which is less than the 20-year useful life of the pump/motor.
 - The booster pumps are horizontal centrifugal pumps with premium efficiency (95.0% efficient) motors. The 60 hp and 30 hp premium efficiency motors cost approximately an additional \$6,000 total. A standard efficiency motor has an efficiency of approximately 92% at 75% full load. If the pumps run for 1081 hours per year at 3% higher efficiency, an energy savings of approximately 5,804 KWH per year will be realized. At \$0.08/KWH, the City will see a total cost savings of \$465 per year. At \$465 per year of energy savings using a premium efficiency motor, the payback period for the cost differential between a standard and premium efficiency motor (\$6,000) is 12.9 years, which is less than the 20-year useful life of the pump/motor.
- **Variable Frequency Drive (VFD)**
 - The combined annual energy savings for utilizing a VFD with a premium motor is estimated to be 26,158 KWH per year @ \$0.08/KWH = cost savings of \$2,090 per year. This equates to an energy reduction of 36%. This assumes that the average pumping rate with a VFD will be reduced from the peak rate of 900 gpm for the pump to an average of 441 gpm.



Conclusion

- The premium efficiency motor and VFDs for the well house are GPR-

² NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

³ Page V. Energy Efficient Motor Selection Handbook, Washington State Energy Office

eligible since the motor payback period (8.6 years for the well pump and 12.9 years for the booster pumps) is less than the useful life of the pumps/motors (20 years) and the combined premium efficiency motor and VFD achieve greater than 20% reduction in energy consumption.

- **GRP Costs Identified:** New premium energy efficient pump/motor and VFD = \$30,000.
- **GPR Justification:** Categorical and Business Case per GPR 3.2-2 & 3.4.1: *projects that achieve a 20% reduction in energy consumption; if there is less than a 20% reduction in energy efficiency, then it may be justified using a business case; energy savings and payback ... [must] not exceed the useful life of the asset; also, per 3.5-9: VFDs can be justified based upon substantial energy savings.*

3. UPGRADE WATER METERS

Summary

- Installation of radio-read capability on all previously installed metered water service connections. In addition to the new water meter radio-read component, the overall project also includes a new groundwater well, booster pump, storage tank and distribution piping.
- Loan amount = \$3,700,000
- GPR portion of FY15 Amendment (AMR) = 1.6% (\$60,000)

Background

- The City currently sets utility rates based on metered flows and is in the process of increasing rates to cover operating and capital costs, including this project.
- In order to better manage the system and conserve water, this project proposes to install radio read units at all meters so that they can be read more regularly and leakage can be detected and addressed more rapidly.

Recommendations

- The installation of radio reading equipment on the existing meters is intended to improve the City's ability to recover cost of water use by improving accuracy and frequency of meter reading.

Conclusion

- Metering of water consumption is an important conservation measure because providing a structured water rate based on usage will provide an incentive for system users to conserve water.
- Installing radio-read capability on water meters will allow the City to more accurately track water loss and leakage.
- **GPR Costs:** Installing radio-read capability on all water meters = \$60,000
- **GPR Justification:** The project is Categorical GPR-eligible (Water Efficiency) per Section 2.2-4: *Retrofitting/adding AMR capabilities or leak equipment to existing meters*⁴.

⁴ April 21, 2010 EPA Guidance for Determining Project GPR-Eligibility, Attachment 2, p. 7