Cabinet Mountains Water District Drinking Water Project

SRF Loan #DW2008 (pop. 2100)

$7,914,000

Preliminary Green Project Reserve Justification[1]

Categorical GPR

1. INSTALLS PRESSURE REDUCING VALVES (Water Efficiency). Categorical GPR per 2.2-12: *Installing water efficient devices.* ($xxxx).

Business Case GPR Documentation

2. INSTALLS A SCADA SYSTEM (Energy Efficiency) Business Case GPR per 3.5-1: *energy efficient retrofits…;* also, per 3.5-7: *automated and remote-control systems (SCADA) that achieve substantial energy savings* ($xxxxxx).
3. INSTALLS PREMIUM ENERGY EFFICIENT WELL PUMPS/VFD CONTROLLERS (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient …new pumping systems…including VFDs* ($xxxxx).
4. INSTALLS ADVANCED FLUORESCENT LIGHTING (Energy Efficiency). GPR Business Case per 3.5-6: *Upgrade of lighting to energy efficient sources (such as…compact fluorescent, light emitting (LED) diode…).* ($xxxx)

[1] Information in red font—along with all data, including all costs— to be provided by the loan recipient in the GPR Technical Memorandum due at the time of final design approval.

1. PRESSURE SUSTAINING VALVES

Summary

- Pressure Sustaining Valves will be installed to ensure a preset pressure in the system is maintained.
- FY19 Loan amount = $7,914,000
- Energy savings (green) portion of loan = y% ($xxxxxx) (Preliminary estimate)

Background

- The Naples existing Pressure Sustaining Valve will be replaced with a combination Pressure Sustaining/ Reducing Valve.
- In addition, a Pressure Sustaining Valve will be installed at the Black Mountain Booster Station to maintain pressure in the Paradise Zone when the tank is filling.

Existing PRV Vault

Results

- Pressure Sustaining Valves will be installed or replaced to ensure system pressure is maintained.

Conclusion

- Pressure Sustaining Valve installation = $xxxxxxx
- The PRVs are categorically GPR-eligible as they qualify as water efficient devices.
- **GPR Costs Identified**:
  PRVs installed = $ xxxxxxx (Preliminary cost estimate)
- **GPR Justification**: The PRVs are Categorically GPR eligible (Water Efficiency) per Section 2.2-12[2]: *Installing water efficient devices…*

[2] Attachment 2. April 21, 2011 EPA Guidance for Determining Project Eligibility

2. SCADA CONTROL TECHNOLOGY

Summary

- Energy efficiencies will be realized from new SCADA system to improve remote electronic sensing and control of the water system.
- Loan amount = $7,914,000
- Estimated energy efficiency (green) portion of loan = xx% ($xxxxxxx)
- Estimated total annual energy and labor savings = $ xxxxxxx

Background / Results

- Installing a supervisory control and data acquisition (SCADA) will considerably reduce labor costs, reduce energy consumption, and monitor the system.

Energy Efficiency Improvements

- The new SCADA system will monitor activities throughout the drinking water system.
- The central SCADA computer will be located at City Hall.
- This will result in energy savings to the City by minimizing the troubleshooting and travel time of system operators, maximize the life of the system equipment, and providing automated reports of the system that allow the City to make informed decisions about their water system.
- Remote SCADA monitoring saves labor costs = 1 person 5 hours per day in the summer + 1 person 3 hour per day in the winter = $37,500/yr. in labor costs.[3]

Conclusion

- Preliminary Estimate: SCADA savings would be approximately $ xxxx per year in labor costs = payback of 4 years, therefore SCADA costs are GPR-eligible.
- Additional details, including cost savings, will be delineated during the design stage by the design engineer in the GPR Technical Memorandum.
- **GPR Costs**:
  SCADA =**$** xxxx
- **GPR Justification**: SCADA system costs are GPR-eligible by a Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings.*

[3] Cost savings to be delineated by the engineering design consultant.

3. New Premium Energy Efficient Pumps & VFDs

Summary

- Willowbrook Estates will install a new replacement well for their potable water system including a new premium energy-efficient pump, and equipped with a variable frequency drive (VFD). They will also install a new premium energy-efficient pump in their primary well.
- Loan amount = $7,914,000
- Estimated energy efficiency (green) portion of loan = $ xxxxxxx (yy%)

Background

- The community is supplied by two groundwater sources, Well #1 (North Well) and Well #2 (South Well). Both well provide water directly to the system in a single pressure zone using hydro-pneumatic tanks for low water usage periods.
- Well #2 is the primary water source and Well #1 is the backup well.
- In May of 2015, the pump motor in Well # 2 (primary source) unexpectedly failed, leaving the community to rely on Well # 1 (back-up) as the sole source for water. With water demand being greater than the well pump could supply, the motor for the Well No. 1 pump faulted, resulting in a depressurization of the distribution system. This occurred three separate times in May 2015, creating a potential risk of contamination within the system.

Calculated Cost Effectiveness of Improvements[4]

Motors/VFDs:

The Baseline Standard Practice (BSP) for comparison is a standard Epact motor not controlled by a VFD[5].

1. *Crossport Well*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Annual Energy usage = 38,120 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr

[4] WEG Electric Motor Payback Tool, energy cost @ $0.10/kWh.

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

Energy usage, w/ VFD = 22,970 kW-hr

- Replacing the old pump with a new premium pump with a VFD results in an approximate xx% energy reduction.

2. *Parker Canyon Booster Station*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Annual Energy usage = 38,120 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr
  Energy usage, w/ VFD = 22,970 kW-hr

Installing new premium pumps with VFDs results in an approximate xx% energy reduction.

3. *Highland Booster energy efficient duty pumps and larger pumps/VFDs*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Annual Energy usage = 38,120 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr
  Energy usage, w/ VFD = 22,970 kW-hr

Installing new premium pumps with VFDs results in an approximate xx% energy reduction

4. *Black Mountain Booster Station new primary duty pump/VFD.*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Annual Energy usage = 38,120 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr
  Energy usage, w/ VFD = 22,970 kW-hr

Installing new premium pumps with VFDs results in an approximate xx% energy reduction

5. *Mountain Meadows Road Booster Station two pumps.*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp

Annual Usage = xxxx hrs (operation throughout the year)
Annual Energy usage = 38,120 kW-hr

- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr
  Energy usage, w/ VFD = 22,970 kW-hr

Installing new premium pumps with VFDs results in an approximate xx% energy reduction

6. *Kootenai Trail booster station with two pumps/VFDs*

- **BSP: Standard Epact Pump - no VFD**
  Motor rating = X hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Annual Energy usage = 38,120 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
  Motor rating = Z hp
  Annual Usage = xxxx hrs (operation throughout the year)
  Energy usage = 22,970 kW-hr
- **Energy Reduction - comparing premium pump with VFD to BSP**
  Energy usage, w/o VFD = 38,120 kW-hr
  Energy usage, w/ VFD = 22,970 kW-hr

Installing new premium pumps with VFDs results in an approximate xx% energy reduction

Conclusion

- When compared to the Baseline Standard Practice, the combined annual energy savings for utilizing premium pumps and VFDs is estimated to be xxxxxx kWh/year per motor/VFD system - corresponding to an energy reduction of approximately yy%.
- The energy-efficient pumps/VFDs are categorically GPR eligible as they are cost-effective with a payback period within the life of the system, assuming power cost of $0.10 per kWh.
- **GRP Costs Identified**:
  Pumps ($xxxx) + VFDs ($yyyy) = **Total = $zzzzzzz**
- **GPR Justification**:
  The Pump/VFD systems are Categorically GPR eligible (Energy Efficiency) per Section 3.2-2 page 9[6]: *Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR; also, per 3.5-9: VFDs can be justified based upon substantial energy savings.*

[6] Attachment 2. April 21, 2010 EPA Guidance for Determining Project Eligibility

4. Energy Efficient LIGHTING

Summary

- Energy efficiency from the installation of energy efficient lighting at tanks and pump stations.
- Loan amount = $7,914,000
- Estimated energy efficiency (green) portion of loan = $ xxx (yy %)
- Estimated annual energy savings = $ xxxx per year.

Background / Results

- The lighting system is part of the project at the tanks and pump station upgrades.

Energy Efficiency Improvements

- Energy efficient T-8 magnetic fluorescent lighting is approximately 28% more energy efficient than standard T-12 magnetic fluorescent lighting for relatively the same light output.
- LED lighting is approximately 58% more energy efficient than typical high pressure sodium lighting for relatively the same light output.

Conclusion

- **GPR Costs**:

  Advanced Fluorescent Lighting = $ yyyyy
  LED Lighting = $ xxxxxxx
  Total = $ xxxxxxx

- **GPR Justification**: Advanced fluorescent lighting and LED lighting is GPR-eligible by a Business Case per 3.5-7: *Upgrade of Control Building lighting to energy efficient sources such as.....compact fluorescent, light emitting diode (LED).*