Drinking Water State Revolving Fund FY15 Green Project Reserve

- Interim -

City of Rexburg FY15 Water System Project

SRF Loan #DW 1502 (pop. 26,500)

$11,100,000

Interim Green Project Reserve Justification

Business Case GPR Documentation

1. INSTALLS NEW PREMIUM ENERGY- EFFICIENT PUMPING SYSTEMS (Energy Efficiency). Categorically GPR-eligible per 3.2-3: *NEMA premium efficiency motors*; also a Business Case GPR per 3.5-1: *…new pumping systems (includes variable frequency drives).* ($184,000).

2. INSTALLS SCADA IMPROVEMENTS TO ENHANCE REMOTE MONITORING (ENERGY Efficiency). GPR Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings*. ($217,000).

3. INSTALLS PRESSURE SUSTAINING VALVES (Water Efficiency). Categorical GPR per 2.2-12: *Installing water efficient devices.* ($10,230).

Prepared by the State of Idaho SRF Loan Program

October 2016

1. New Premium Pumps & VFDs

Summary[1]

- New premium energy-efficient pumps and VFDs will be installed in the system.
- Loan amount = $11,100,000
- Energy savings (green) portion of loan = 1.7% ($184,000)

Background

- To assist in meeting and maintaining future water demands in the system, the project will provide new wells at the North Well Reservoir and at Madison High School. Each well will be provided with a premium energy-efficient 100-hp turbine pump.
- A new booster pump station will also be provided as part of the Madison HS well/tank complex; the pump station will contain two premium energy-efficient 75-hp pumps with VFDs.
- A new booster pump will be added to the North Well booster pump station; the pump will be a premium energy efficient 150-hp pump with VFD.

Energy Efficiency Improvements

Motor Analysis: **Well Pumps**- North Well Reservoir and Madison High School (2) 100-hp turbine pumps

- Energy savings of the Premium motor over the EPAct motor = 3,158 kWh/yr. = $315.80/yr. EPAct motor cost = $50,000; Premium motor cost = $52,000. Pay-back for the cost difference = **6.3 years**.

Motor Analysis: **Madison HS Booster Pump Station** - (2) 75-hp pumps

- Energy savings of the Premium 75-hp motor over the EPAct motors = 3,803 kWh/yr. = $380.30/yr. EPAct motor cost = $23,500; Premium motor cost = $25,000. Pay-back for the difference = **3.9 yrs**

Motor Analysis: **North Well Booster Pump Station** - 150-hp pump

- Energy savings of the Premium motor over the EPAct motor[1] = 2,156 kWh/yr. = $216/yr. EPAct motor cost = $73,500; Premium motor cost = $75,000. Pay-back for the difference = **11 years**.

VFD Analysis: **Madison HS Booster Pumps**:

- WITH A VFD: 260,413 kWh/year savings = $26,041/year, payback for $13,000 VFD = **0.49 years**

VFD Analysis: **North Well Booster Pump**:

- WITH A VFD: 259,700 kWh/year savings = $25,970/year, payback for $13,000 VFD = **0.51 years**

Conclusion

- The premium energy-efficient pump/VFDs are categorically GPR-eligible as they are cost effective i.e their payback periods do not exceed the life of the equipment.
- **GRP Costs Identified**:

NEW WELLS	Pumps:	2 @ $52,000 ea =	$104,000
BOOSTER STATIONS	Pumps:	3 @ $13,667 ea =	$41,000
	3 VFDs:	3 @ $13,000 =	$39,000
		Total =	**$184,000**

- **GPR Justification**: Business Case GPR-eligible (Energy Efficiency) per Section 3.2-3[2]: *"NEMA Premium energy efficiency motors";* and Section 3.5-1: *"Energy efficient…upgrades, or new pumping systems…including VFDs."*

[1] City of Rexburg Water Facilities Planning Study, December, 2014 Keller Associates

[2] Attachment 2. April 21, 2010 EPA Guidance for Determining Project Eligibility. Page 19.

2. SCADA Improvements

Summary

- The City of Rexburg uses a SCADA system to operate the majority of its wells and to collect information on pump operation, pressures, and storage volumes within the system.
- Loan amount = $11,100,000
- Estimated energy efficiency (green) portion of loan = 2% ($217,000) (engineers estimate)
- Estimated annual energy and labor savings = $52,000 per year.

Background[3]

The Facility Plan concluded that the current SCADA is insufficient to meet the monitoring and operational requirements of the water system and documented the following concerns:

- Age and reliability of current SCADA main computer.
- Lack of redundancy for main computer.
- Lack of redundancy for remote stations.
- Effectiveness of serial radio communication compared to other available technology.

Energy Efficiency Improvements

- The following SCADA improvements will be implemented:

Improvement	Purpose
Replace Main Computer, Software, and Upgrade Remote Stations	Improve reliability by replacing aging equipment and adding redundant main computer.
Programmable Logic Controllers (PLC's)	Allows each remote station to function independently if communication with the main computer is lost.
Ethernet Based Radios	Allows the main computer to communicate with each remote station simultaneously. Allows remote programming of PLC's.
Local Pressure as Secondary Control at North Well Boosters	Will activate North Well Boosters to maintain adequate local flow in the event of a sudden, large demand (such as a fire) north of the Teton River.

Conclusion

- Total SCADA savings would be approximately $52,000 per year in labor and energy costs = payback of 4.2 years; therefore SCADA costs are GPR-eligible by 3.5-7.
- **GPR Costs**: SCADA = **$217,000** (engineering estimate)
- **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] City of Rexburg Water Facilities Planning Study, December, 2014 Keller Associates

3. Pressure Reducing Valves[4]

Summary

- Pressure Reducing Valves will be installed to ensure a preset pressure in the system is not exceeded.
- Loan amount = $11,100,000
- GPR-eligible = <1% ($10,230) (bid price)

Background

- The system is hydraulically unstable in that customer pressures can be exceeded during the day. High pressure can have deleterious impacts on water fittings and equipment, requiring additional maintenance and early replacement. High pressure also results in water inefficiencies.

Results

- Installing pressure-reducing valves (PRVs) is the most important feature for controlling the pressure fluctuations in the system, and reducing overuse of water.

Conclusion

- Pressure Reducing valves (PSV) installation = $10,230
- The PSV is categorically GPR-eligible as it is a water efficient device.
- **GRP Costs Identified**: 7 PRVs installed = 7 x $1,462 = **Total = $10,230** (bid price)
- **GPR Justification**: The PRVs are Categorically GPR eligible (Water Efficiency) per Section 2.2-12[5]: *Installing water efficient devices…*

[4] Bid Tabulation, low bid, Edstrom Contracting, April 18, 2016
[5] Attachment 2. April 21, 2011 EPA Guidance for Determining Project Eligibility