Drinking Water State Revolving Fund Green Project Reserve
- Preliminary -

City of Iona Drinking Water Project

SRF Loan #DW 1805 (pop. 1,803)

$1,133,250

Preliminary Green Project Reserve Justification[1]

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*. ($xxxx).
2. INSTALLS ADVANCED FLUORESCENT LIGHTING (Energy Efficiency). GPR Business Case per 3.5-6: *Upgrade of lighting to energy efficient sources (such as…compact fluorescent, light emitting (LED) diode, etc).* ($xxxxx)
3. 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* ($xxxxx).

The State of Idaho SRF Loan Program
February 2018

[1] The loan recipient will update all information, including data in red font, in the GPR Technical Memorandum submission

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 = $1,133,250
- Estimated energy efficiency (green) portion of loan = x% ($xxx) (conceptual estimate)
- Estimated annual energy and labor savings = $xxxx per year.

Background/ Results[2]

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

Energy Efficiency Improvements

- Remote SCADA monitoring saves labor costs = x people y hour per day = $xxxx/yr in labor costs.

Conclusion

- Total SCADA savings would be approximately $xxxx per year in labor costs = payback of z years, therefore SCADA costs are GPR-eligible.
- **GPR Costs**:

  SCADA = $xxxx
  Total = $xxxx

- **GPR Justification**: SCADA system costs are GPR-eligible by a Business Case per 3.5-7[3]: *automated and remote control systems (SCADA) that achieve substantial energy savings*.

[2] 6-22-15 Correspondence with Project Manager
[3] Attachment 1, April 21, 2012 EPA Guidance for Determining Project Eligibility

2. Energy Efficient LIGHTING

Summary

- Energy efficiency from the installation of advanced fluorescent lighting in the interior of the well site pump house building.
- Energy efficiency from the installation of light emitting diode (LED) lighting at the exterior of the well site pump house building.
- Loan amount = $1,133,250
- Estimated energy efficiency (green) portion of loan = x% ($xxxx) (conceptual estimate)
- Estimated annual energy savings = $xxx per year.

Background/ Results[4]

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

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.[3]
- LED lighting is approximately 58% more energy efficient than typical high pressure sodium lighting for relatively the same light output.[4]

Conclusion

- **GPR Costs**:

  Advanced Fluorescent Lighting = $ xxx
  LED Lighting = $ xxxx
  Total = $ xxxx

- **GPR Justification**: Advanced fluorescent lighting and LED lighting is GPR-eligible by a Business Case per 3.5-7[5]: *Upgrade of Control Building lighting to energy efficient sources such as.....compact fluorescent, light emitting diode (LED).*

[4] 2-9-18 Discussion with Project Manager

3. ENERGY-EFFICIENT PUMP/ VFD

Summary

- The City will purchase and install premium energy-efficient vertical turbine pump in the new well and a variable frequency drives (VFDs).
- Loan amount = $1,133,250
- Estimated energy efficiency (green) portion of loan = x% ($xxxx) (conceptual estimate)

Background

- Provision of VFD on the pump will provide a much tighter range for pressure fluctuation. The VFD will save energy by assisting in maintaining constant system pressure; it will also reduce electrical consumption at times of pump start-up.

GPR Justification

Motors/VFDs:

The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD[5]. Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Proposed Pump - no VFD, standard Epact efficiency motor**
  Type: Vertical Turbine Hollow Shaft
  Efficiency 82%; Flow 1,400 gpm; 2.02 mgd; Head 265 ft.
  Motor rating = 125 hp; Motor type = standard efficiency (93.0% assumed at 75% of full load[6]); existing avg. flow = 115 hp
  % operation = 33% (average day flow/pump output)
  % Annual Usage = 50% (average daily operation throughout the year)
  Energy usage = xxxxxx kW-hr

- **Proposed Pump - no VFD, with premium efficiency motor**
  (95.4% assumed at 75% of full load); existing avg. flow = 112.24 hp
  % operation = 33% (average day flow/pump output)
  % Annual Usage = 50% (average daily operation throughout the year)
  Energy usage = xxxxx kW-hr
- **Proposed Pumps - VFD operation with premium efficiency motor**
  Efficiency 82%; Head 230 ft; Motor rating = 125 hp; Motor type = standard efficiency (95.4% assumed at 75% of full load); BHP, existing avg flow = 90.75 hp
  % operation = 33% (average day flow/pump output)
  % Annual Usage = 50% (average daily operation throughout the year)
  Energy usage = xxxxxx kW-hr

Conclusion

- By installing a premium pump/VFD in the new well, the City can save up to $xxxx/yr. in energy costs
- The VFDs are cost effective as the payback period is less than the life of the equipment.
- **GPR Costs:** VFD = **$xxxxx**
- **GPR Justification**: The VFD systems are Business Case GPR-eligible, qualifying per Sect. 3.5-1 (Energy Efficiency)[7]: "*Energy efficient… new pumping systems… (including variable frequency drives (VFDs))" which are cost-effective.*

[5] NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.
[6] http://www.copper.org/environment/sustainable-energy/electric-motors/education/motor_text.html
[7] 2012 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2