Drinking Water State Revolving Fund Green Project Reserve

- Interim -

Hidden Estates FY12 Drinking Water System Project

SRF Loan #DW 1207

$200,000

Interim Green Project Reserve Justification

Business Case GPR Documentation

INSTALLS PREMIUM ENERGY EFFICIENT PUMP WITH VFD IN THE NEW NORTH WELL PROJECT (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient …new pumping systems… (including a variable frequency drive (VFD)*) ($41,000).

State of Idaho SRF Loan Program

April 2014

NEW PUMPING SYSTEMS

Summary

- In order to meet requirements for source redundancy, Hidden Estates Water Association (HE) is constructing the North Well project which will have an energy efficient pump equipped with a variable frequency drive (VFD).
- Loan amount = $200,000
- Energy savings (green) portion of loan = 20.5% ($41,000)
- Simple pay-back period = 5-7 years

Background

- The capacity of the existing well does not supply the current peak summer water demand. According to IDAPA, the Association also does not presently meet the source redundancy requirement.
- A new ground water well has been specified for the Association. To achieve optimal energy efficiency, the system design specifies an energy efficient pump with a VFD controller.
- The VFD contributes to energy efficiency as it allows the pump to operate at a reduced horse power or drive frequency, requiring less energy than a standard drive which operates at a set frequency independent of flow requirements.

Results

- The pump specified for the project is a 15 HP Franklin Electric submersible pump 3ph/230vac/3450rpm 125 GPM @ 246' TDH.
- It is assumed the pump will operate continuously (8760 hr/yr) on an approximate normal distribution duty cycle.
- The pump will be equipped with a VFD. The VFD will save energy by assisting in maintaining constant system pressure; it will also reduce electrical consumption at times of pump start-up. The VFD specified is a Yaskawa 40hp/230vac, NEMA 12 enclosure.

GPR Justification

Motor Analysis

- The difference in motor efficiency from a regular drive to an energy efficient motor is 73% to 91%.
- Energy efficient motor energy savings = $2,869/yr[1]; payback period = 5 years.

VFD Analysis:

- VFD cost = $26,000; estimate pump operation = 8760 hr/yr (normal distribution duty cycle), motor efficiency = 91%, and energy costs = $0.09/kWh;
- Annual cost savings of the VFD over standard drive = $5.0[2] with a payback period of 5.1 years[2]

Conclusion

- By installing an energy efficient pump/VFD on a new well the Association can save up to $2,874/yr. in energy costs
- Payback periods: Pump = 5 years; VFD = 5.1 years.
- **GPR Costs**: VFD = $26,000
  Pump = $15,000
  Total = $41,000
- **GPR Justification**: The project is Categorically GPR-eligible per Section 3.2-3 (Energy Efficiency) *NEMA premium efficiency motors*; also per a Business Case by Section 3.5-1: …*new pumping systems (includes variable*

[1] WEG Electric Corp. Motor Energy Savings Estimator at http://www.weg.net/green/us/save-money.html, energy cost @ $0.09/kWh
[2] WEG Electric Corp. VFD Energy Savings Estimator at http://www.weg.net/green/us/save-money.html

frequency drives)[3].

[3] 2011 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.