

Drinking Water State Revolving Fund Green Project Reserve
- Preliminary -



City of Moscow FY14 Water System Improvements
SRF Loan #DW 1406 (pop. 24,534)
\$4,300,000

Preliminary Green Project Reserve Justification
(Phase II Only)

Business Case GPR Documentation

1. INSTALLS NEW ENERGY-EFFICIENT VFDs AND PREMIUM EFFICIENCY MOTORS ON BOOSTER PUMPS (Energy Efficiency). GPR Business Case per Section 3.2-3: *“NEMA Premium energy efficiency motors”*; and Section 3.5-1: *“Energy efficient...upgrades, or new pumping systems...including VFDs.”* (\$XXXXXX).

1. PREMIUM EFFICIENCY MOTORS AND VFDs¹

Summary

- The City received a loan totaling \$4,300,000. This loan is for a new well, well house, transmission system improvements and replacing/upgrading six booster stations. This Interim GPR is only for Phase 2 Booster Station Upgrades only which consists of upgrading two booster stations (Ponderosa and Indian Hills).
- Categorical energy efficient (green) portion of loan = **1.6% (\$66,854)**. This includes the costs associated with both booster station upgrades. (Preliminary Conceptual Estimates)
- Annual Energy savings = **30%**

Background

- The Ponderosa Booster Station component of the project will replace the existing below-grade pump station with an above-grade station capable of more efficiently providing domestic capacity via **two** variable frequency drive (VFD) pumps and two dedicated fire pumps (duty/standby). All pumps will be equipped with premium motors.
- The Indian Hills Booster Station component of the project consists of replacing the existing pump station with an above-grade facility capable of more efficiently providing domestic capacity via **two** variable frequency drive (VFD) pumps and two dedicated fire pumps (duty/standby). All pumps will be equipped with premium motors.
- The existing booster station pumps operate below 50% efficiency due to the large range of demands in the zone. Additionally, recycle lines are installed to allow the pumps to meet low demand periods. This makes the booster stations very inefficient compared to booster stations that are sized for varying demands.

Results

- Premium efficiency motors save on average 3-7% over standard efficiency motors
- The table lists equipment that will have premium efficiency motors and/or will be controlled by VFDs.

Ponderosa Booster Station	HP	Variable Frequency Drive	Premium Efficiency Motor
Ponderosa Booster Pump 1	3	Yes	Yes
Ponderosa Booster Pump 2	5	Yes	Yes
Ponderosa Booster Pump 3 (Future)	5	Yes	Yes
Ponderosa Fire Pump 1	100	No	Yes
Ponderosa Fire Pump 2	100	No	Yes
Indian Hills Booster Station	HP	Variable Frequency Drive	Premium Efficiency Motor
Indian Hills Booster Pump 1	5	Yes	Yes
Indian Hills Booster Pump 2	7.5	Yes	Yes
Indian Hills Booster Pump 3 (Future)	7.5	Yes	Yes
Indian Hills Fire Pump 1	100	No	Yes
Indian Hills Fire Pump 2	100	No	Yes

Energy Efficiency Improvements

- Equipment without premium energy-efficiency motors and VFDs result in a power usage of **181,000 kW-hr** per year at an annual power cost of **\$17,500**.

¹ Document is Preliminary only; at the completion of the design phase, a GPR Technical Memorandum will be submitted defining engineering estimates of performance, based on project specifications. All information in red font will be updated.

(CONT.) PREMIUM EFFICIENCY MOTORS AND VFDs

- Equipment powered by premium efficiency motors with VFDs result in a power usage of 125,000 kW-hr per year at an annual power cost of \$12,200.
- The use of premium energy-efficiency motors and VFDs results in a power savings of 56,000 kW-hr per year and an annual cost savings of \$5,300.

Conclusion

- By using VFDs and providing premium efficiency motors, the City will reduce their power needs by approximately 56,000 kW-hr per year and annual power costs by approximately \$5,300 each year – a 30% overall savings in energy and costs.
- The equipment is GPR-eligible due to the 30% reduction in energy consumption and the payback on the investment (< 5 years) which is substantially less than the useful life of the equipment.
- **GPR Costs:** (Final Construction Costs)

Equipment Name	Cost
Variable Frequency Drivers	\$16,484
Premium Efficiency Motors	\$50,370
∴ FY15 Total =	\$66,854

- **GPR Justification:** Business Case GPR-eligible (Energy Efficiency) per Section 3.2-3²: “NEMA Premium energy efficiency motors”; and Section 3.5-1: “Energy efficient...upgrades, or new pumping systems...including VFDs.”

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