

Drinking Water State Revolving Fund

“Green Project Reserve”

**Business Case for
High Efficiency Pumps**



Lone Chimney Water Association

MECE 211179



Summary

- Lone Chimney Water Association proposes the use of high efficiency pumps and motors along its transmission line to reduce energy consumption and pumping costs.
- Projected energy savings are about 26%. At a cost of \$0.11 per kW-h, this amounts to an annual savings between \$17,316 and \$28,896.

Background

Lone Chimney Water Association is planning the construction of two pump stations along its transmission line. This transmission line will convey water from Stillwater's water treatment plant at a design flow of 1,000 gal/min. The total head to be pumped against is 580 ft. The total amount of water to be pumped will average 15 million gallons per month, but could be as high as 25 million gallons per month.

Calculations

The power required to convey 1,000 gal/min at 580 ft of total dynamic head is given by the power equation as 146 HP (108.9 kW). If the price of electricity is assumed to be \$0.11 kW-h, then Table 1 shows the calculations in energy savings.

Table 1: Energy Efficiency Calculations

	Standard Efficiency	High Efficiency	
Pump Efficiency (%)	65.0	82.0	
Motor Efficiency (%)	85.0	92.0	Monthly
Total Efficiency (%)	55.3	75.4	Savings
Monthly Pumping Cost at 15 mil gal	\$4,990	\$4,068	\$1,443
Monthly Pumping Cost at 25 mil gal	\$8,325	\$6,787	\$2,408

Run-time for pumping is calculated as the monthly total flow divided by the design flow rate of 1,000 gal/min.

Conclusions

- High efficiency pumping equipment will reduce energy consumption and pumping costs by about 26% annually. This amounts to an annual savings between \$17,316 and \$28,896.
- If the pumps cost \$120,000 to purchase, then the payback period will be between 4 and 7 years.



Cost Estimate
 Water Supply Improvements
 For Lone Chimney Water Association
 Prepared 2/2/2012

Treated Water 12" Transmission Line from Stillwater

MECE Project Number: 211179

Item No.	Quantity	Unit	Description	Unit Cost	Cost
1	60700	LF	12" PVC C909 CL200 Water Line	\$23.50	\$1,426,450.00
2	16	EA	12" Gate Valve and Box	\$2,500.00	\$40,000.00
3	2	EA	Package Booster Station w/o VFD	\$155,000.00	\$310,000.00
	4	EA	High Efficiency Pumps (VFD)	\$30,000.00	\$120,000.00
4	1000	LF	Turnpike Bore	\$225.00	\$225,000.00
5	200	LF	Highway Bore	\$225.00	\$45,000.00
6	1	LS	Master Meter with Box and Tie-In	\$15,000.00	\$15,000.00
7	400	LF	Creek Crossing Bore	\$85.00	\$34,000.00
8	170	LF	County Road and Driveway Bore	\$60.00	\$10,200.00
9	65980	LF	Tracer Wire	\$0.25	\$16,495.00
10	5	EA	Interconnections	\$5,000.00	\$25,000.00
11	5280	LF	12" PVC C909 Bypass Line	\$23.50	\$124,080.00
12	1	LS	Chlorination	\$182,500.00	\$182,500.00
13	8	EA	Air/Vacuum Relief Valve	\$1,500.00	\$12,000.00
					Construction
					\$2,585,725.00
					Contingency
					\$258,572.50
					Total Construction Cost
					\$2,844,297.50
					Engineering Fee (Study & Report)
					\$11,825.00
					Engineering Fee (Basic Services)
					\$205,325.00
					Resident Project Representative
					\$85,000.00
					Survey & Construction Staking
					\$51,650.00
					Land and ROW Data Acquisition
					\$20,660.00
					Bond Council at 3%
					\$85,329.00
					Local Council at 1.25%
					\$35,554.00
					Financial Advisor at 1.25%
					\$35,554.00
					Other Fees
					\$3,510.50
					Environmental Information Document
					\$18,000.00
					DEQ Permit
					\$3,295.00
					Total Project Cost
					\$3,400,000.00