

Green Project Reserve Business Case

**Village of Birchwood
Washburn County, WI**

**Upgrade WWTF and Collection System Improvements
CWFP No. 5321-01**

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I. GENERAL INFORMATION

A. Introduction

This business case demonstrates that the Village of Birchwood WWTF Upgrade and collection system improvements project achieves identifiable and substantial “green” benefits in the project component listed below. This business case was developed according to the “2010 Clean Water and Drinking Water State Revolving Fund 20% Green Project Reserve: Guidance for Determining Project Eligibility” publication, dated April 21, 2010.

B. Project Need & Scope

This project is intended to provide the Village of Birchwood with the necessary facilities to adequately treat the current and future design wastewater flows and loadings from the Village. The project includes the construction of a new head works building, installation of new aeration equipment in lagoons 1 & 2 along with covers. The construction of a Moving Bed Bio-Reactor (MBBR) to meet nitrogen limits, the replacement of 2 lift stations within the Village, upgrades at three other lift stations including pumps and SCADA systems at each station. This project will also include all necessary piping modifications, site grading, electrical service work, controls, power distribution, and restoration to provide a complete project to the Owner.

II. PROJECT JUSTIFICATION

A. Technical

According to CWSRF Technical Guidance project 3.5-6, the proposed project cost for replacement of pre-Energy Policy Act motors is a viable green project. The Village is proposing to replace the existing pumps in lift station 1, 2, and 4 with high efficiency pumps. Lift station 3 will receive a second pump to reduce wear and tear on the pumps and provide redundancy to the station. The pumps that are being replaced have reached the end of their useful life and the sewer system cannot operate without pumps in the lift stations. The capital cost for the pumps is required whether a high efficiency pump or standard efficiency pump is installed. The cost savings for the Village will be the electrical saving for operating a high efficiency pump. The payback for the differential costs of the standard vs. premium efficiency motors is 6.27 years or about ½ the life of the pump motor.

B. Financial

See attached calculations.

CWF GREEN PROJECT ELEMENTS

Birchwood

	Material	Installation	Engr/Admin	Total
Green Infrastructure				Total= \$0
Water Efficiency				Total= \$0
Energy Efficiency				Total= \$165,200
3.5-6 Replacing Pre-Energy Policy Act 1992 Motors				
Lift Station 1 pump replacement (High Efficiency)	\$65,700	\$0	\$2,500	\$68,200
Lift Station 2 pump replacement (High Efficiency)	\$39,000	\$8,000	\$1,500	\$48,500
Lift Station 4 pump replacement (High Efficiency)	\$39,000	\$8,000	\$1,500	\$48,500
Energy Efficiency				Total= \$161,500
Lift Station 1 pump replacement (Standard Efficiency)	\$64,000	\$0	\$2,500	\$66,500
Lift Station 2 pump replacement (Standard Efficiency)	\$38,000	\$8,000	\$1,500	\$47,500
Lift Station 4 pump replacement (Standard Efficiency)	\$38,000	\$8,000	\$1,500	\$47,500
Cost Differential for Standard Efficiency VS. Premium Efficiency	\$3,700			
Electrical Savings cost for Premium Efficient Pumps/ Year	\$638			
Years required for payback of cost differential	5.80 years			

**Birchwood
Pump/ Motor Upgrades
Electrical cost comparison**

Existing Motors/ Pumps			Proposed Motors/ Pumps		
Lift Station 1			Lift Station 1		
Brake Horsepower	15	15.00	Brake Horsepower	15	15.00
Motor Efficiency		80%	Motor Efficiency		95%
Pump Horespower	18.75	18.75	Pump Horespower	15.79	15.79
kW	13.99	13.99	kW	11.78	11.78
kW*hr/yr - assuming 8 hr/day operation		40844	kW*hr/yr - assuming 8 hr/day operation		34395
		\$0.09 /kW*hr			\$0.09 /kW*hr
Annual Electric Cost		\$3,676	Annual Electric Cost		\$3,096
Lift Station 2			Lift Station 2		
Brake Horsepower	2	2.00	Brake Horsepower	2	2.00
Motor Efficiency		80%	Motor Efficiency		95%
Pump Horespower	2.50	2.50	Pump Horespower	2.11	2.11
kW	1.87	1.87	kW	1.57	1.57
kW*hr/yr - assuming 2 hr/day operation		1361	kW*hr/yr - assuming 2 hr/day operation		1146
		\$0.09 /kW*hr			\$0.09 /kW*hr
Annual Electric Cost		\$123	Annual Electric Cost		\$103
Lift Station 4			Lift Station 4		
Brake Horsepower	2	2.00	Brake Horsepower	2	2.00
Motor Efficiency		80%	Motor Efficiency		95%
Pump Horespower	2.50	2.50	Pump Horespower	2.11	2.11
kW	1.87	1.87	kW	1.57	1.57
kW*hr/yr - assuming 4 hr/day operation		2723	kW*hr/yr - assuming 4 hr/day operation		2293
		\$0.09 /kW*hr			\$0.09 /kW*hr
Annual Electric Cost		\$245	Annual Electric Cost		\$206
Total Energy Cost per/ Day Operation		\$4,044	Total Energy Cost for 24 hr/ Day Operation		\$3,405
Total Electrical Savings		\$638			
Energy Efficiency Increase		16%			