

MOTOR CHALLENGE

Project Fact Sheet



A Business Case Study

TOWN OF TRUMBULL PUMP OPTIMIZATION PROJECT YIELDS \$60,000 NET PRESENT VALUE

TOTAL VALUE ADDED

Net Present Value: \$60,000
Internal Rate of Return: 52%
Payback: 1.9 years

BENEFITS

- Reduced energy consumption by almost 44%
- Reduced cleaning and maintenance
- Extended equipment's expected life
- Increased system capacity 25%
- Decreased noise

The Town of Trumbull was looking for a way to increase the operating performance of one of its 10 sewage pumping stations. Built in 1971, the station consisted of twin sewage handling pumps (40-hp direct drive, wound rotor motor) vertically mounted below ground, handling 340,000 gallons of raw sewage per day. The system used one pump to handle the entire peak flow under normal operation, and used the second pump in only extreme conditions. Each pump rarely operated more than five minutes at a time. The system experienced frequent breakdowns, occasional flooding, and sewage spills.

Decision

With the help of ITT Flygt Corporation (new-pump manufacturer), engineers investigated total system performance and decided to add a smaller, 10-hp pump with direct online motor starters and a level control system with float switches. The new pump handles the same volume as the original pumps during non-peak periods, but runs for longer periods of time. The old pumps handle infrequent peak flows. The 2 compressors for the bubbler level control system and the 2 circulating pumps for the old motor control system were also eliminated, and lighting efficiencies were implemented.

EXISTING 40-HP PUMP MOTOR



Rationale

This decision produced the following results:

- u **Reduced energy consumption by almost 44%** due to:
 - lower outflow rate reduced losses in the piping system
 - lighting system upgrades
 - elimination of the bubbler level control and cooling water pumps
- u **Reduced cleaning and maintenance** requirements (supplies and labor) and associated downtime
 - eliminated the need to replace 2 mechanical seals per year
 - new, submersible pump is much easier to swap out if repair/replacement is needed
- u **Extended equipment's expected life** due to longer operating times and reduced power input
- u **Increased system capacity 25%**, potentially deferring need for additional pump stations
- u **Decreased noise** from new pump, improving relations with local residents

These modifications can be **easily replicated** at other sites (new sites or retrofit). A new pump site under construction in Trumbull is using the submersible pump technology and saving an additional \$10,000 - \$12,000 by eliminating the need to dig a second hole.

Value Added:			
Equipment Cost, fully installed:		\$12,000	
Annual Savings:			
Energy savings	\$2,600	31,900 kWh/yr	
Maintenance Savings:			
Supplies	\$1,800	2 seals/yr * \$900 each	
Labor	\$1,800		
	Total	\$6,200	

Incremental Cashflow Analysis

(\$Thousands)	Time (years 0 - 12)												
(years)	0	1	2	3	4	5	6	7	8	9	10	11	12
SAVINGS													
Energy		2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Supplies		1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Labor		1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
COST	12.0												
Incremental (12.0) savings	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
	Time (years 13 - 25)												
(years con't)	13	14	15	16	17	18	19	20	21	22	23	24	25
SAVINGS													
Energy	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Supplies	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Labor	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Incremental Savings	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
NET PRESENT VALUE													\$60 ¹
INTERNAL RATE OF RETURN													52%

¹Cashflows are discounted at 7%.



Motor Challenge, administered by the Office of Industrial Technologies, is a voluntary partnership program with U.S. industry to promote the use of energy-efficient electric motor systems. Thousands of industrial partners have joined Motor Challenge and are improving their, and in turn, the Nation's competitiveness and efficiency.

Motor Challenge assists the OIT Industries of the Future by identifying near-term gains in energy efficiency these industries can achieve by adopting existing technologies.

PROJECT PARTNERS

Town of Trumbull
Trumbull, CT

ITT Flygt Corporation
Trumbull, CT

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

The OIT Information Clearinghouse
Phone: (800) 862-2086
Fax: (360) 586-8303
<http://www.motor.doe.gov>

Visit our home page at
www.oit.doe.gov

Please send any comments, questions, or suggestions to
webmaster.oit@ee.doe.gov

Office of Industrial Technologies
Energy Efficiency
and Renewable Energy
U.S. Department of Energy
Washington, D.C. 20585

