



Energy Consumption Case Study #1

Ocean View Condominium
5202 South Atlantic Avenue
New Smyrna Beach, FL 32169

Conditions:

124 units, 8 story apartment/condominium, upper middle income, 2 bedroom/2 bath, kitchen & washer, w/ pool, (78% occupancy).

200 gpm. @ 173 ft. Total Head, (100 GPM. each pump @ 102 FT. TDH.) 30 PSI minimum suction.

Lag Pump running in reserve, due to failed PRV with no independent check valves.

Excessive sound transmissions, adjacent to dwelling unit master bedroom. No piping Flex connectors.

System:

SynchroFlo Duplex, Model ES, Constant run Lead, Lag, 50% x 50% load split, almost no redundancy, 5 hp, 208 volt, 3 phase, 60 Hz.

Pump #1 bearing damaged, and Pump #2 running in overload most of the time.

Shut off head 118 psi. No bladder tank installed, lead pump runs continuously on manual mode.

System Thermal Purge inoperative. Solenoid Clogged, and one electric thermal probe inoperative.

Set-up Prior to Retrofit:

Installed E-MON KW totalizer at 9:00 AM on February 19, 1999.

Removed E-MON at 9:00 AM on March 1, 1999.

Run time: 264 hours (11 days).

448 Total KW x \$.08 / KW, (average cost per KW) = \$35.84 (11 days)

\$35.84

11 days = \$3.26 per day average energy cost.

\$3.26 / day x 365 days / year = \$1,189.90

Equipment Modifications:

- 1) Installed new Delta P Booster Systems, Inc. Duplex Pump-Variable Frequency Drive Lead/Lag Pump Controller with two each, AC TECH Model M3250B, 5 hp, 200-240 volt, 3 phase, variable frequency drive inverters, with PID control.
- 2) Provide and installed two each Baldor 5 hp, 208-230/460 volt, 3500 rpm, 3 phase, Premium Efficiency Class F insulated ODP motors.
- 3) Provided and installed two each 4" Braided stainless steel flexible connectors on suction and discharge of the pump system.
- 4) Raised booster system and installed six each 2" diameter x 1-5/8" high shear rubber vibration isolators.

Set-up after Retro-fit:

Installed EMON KW totalizer at 9:45 A.M. on March 2, 1999,

Removed EMON at 9:00 A.M. on March 12th, 1999

Run time, 264 hours, (11 days)

128 Total KW x \$.08/KW = \$10.24 (11 Days)

\$10.24 = \$.93 per day average energy cost (11 Days)

\$.93/day x 365 Days/Year = 339.45 annual operating cost.

\$339.45 = .29 (29 % of previous energy cost of \$1,189.90)

Cost Savings = 71% cost savings with Variable Speed System

Notes:

~ This system was set up from its original design in the most inefficient design mode possible, constant run lead pump with demand cycling for the lag.

~ There were no complaints after the modifications and the management decided to repeat the modifications in the adjacent building with the variable speed scheme.



Energy Consumption Case Study #2

Date: June 8th, 2001

Job: The Inlet at New Smyrna
2801 North Peninsula Ave.
New Smyrna Beach, FL. 32169

Retrofit Triplex Booster with Bladder Tank with Duplex VFD Controller

Conditions:

Triplex domestic water pressure booster system, 20 story condominium. Triplex with 7.5 HP. Jockey Pump Lead, and two 15 HP Lag pumps. 2 ea. 119 gallon bladder tanks on 15th floor level.
Design GPM = 250 GPM. @ 260 FT. TDH. 50 GPM X 125 GPM X 125 GPM LOAD SPLIT.
Jockey pump staged off when either Lag pump ran.

Lead Jockey Pump – Grundfos CR8-80U 7.5 HP, 3450 RPM. 208 VAC, 3 PHASE. 50 GPM. @ 260 FT. TDH.

Lag Pumps – ITT/AC Model 2000, 2.5" x 2" x 9", 15 HP. 3450 RPM. 208 VAC, 3 PHASE. 125 GPM. each @ 260 FT. TDH.

Before Retrofit:

Lead Pump active. Disabled stand-by Lag pump such that the same Lag pump came on each time. Installed total KW meter on system primary power.

Date/Time Installed: 9:30 AM Friday August 24, 2001 Removed Wednesday 9:15 PM, August 29, 2001 143.75 hours total monitored time.

Results:

Ran system a total of 143.75 hours, total KW of 706.3 KW used.
4.91 average KW per hour x 24 hours = 117.84 KW / day

After Retro-fit:

Both 15 HP pumps running in Lead/Lag operation on Duplex VFD control.

Installed KW meter on September 4th, 2001, 10:45 AM. Removed KW totalizer on September 9th, 2001 10:30 AM.

Results:

System ran a total of 144.25 hours, total KW of 456 KW. 456 KW. Average KW per hour of 3.16 KW
3.16 average KW per hour x 24 hours = 75.84 KW / day

36% savings over non-VFD system.

117.84 KW / day

- 75.84 KW/ day

42 KW/ day savings x 365 days/ year = 15,330 KW per year

15,330 KW x \$.08 KW = **\$1,226.40 annual savings.**