Energy Assessments – The Process, Benefits, Funding and Savings

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Lonnie Russell, CEM

Energy Audit Bullet Points

- Utility bill analysis to include rate verification and explanation
  - Correct rate?
  - Demand Charge?
- Develop Energy Conservation Measures (ECM) List to include low cost/no cost and capital
  - Estimated paybacks (ROIs) and project costs
  - Operational strategies to reduce utility costs
- Identify funding opportunities

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Reasons to consider an energy audit

- Problem equipment could be replaced or updated using lower interest (and some free) energy efficiency money.
- Have a far better understanding of the energy usage of your facility, and actions that can be taken to reduce it. Many of these actions may be low cost / no cost.
- Understand the sources of money for energy efficiency projects, and what actions need to be taken to get the money
- Positive environmental impact
- Lower operating costs!

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Required information

- Utility (energy) usage data
  - At least one year, preferably 2
- Average, Design and annual MGD processed
- Influent and Effluent requirements
- Assistance with the description(s) of operation

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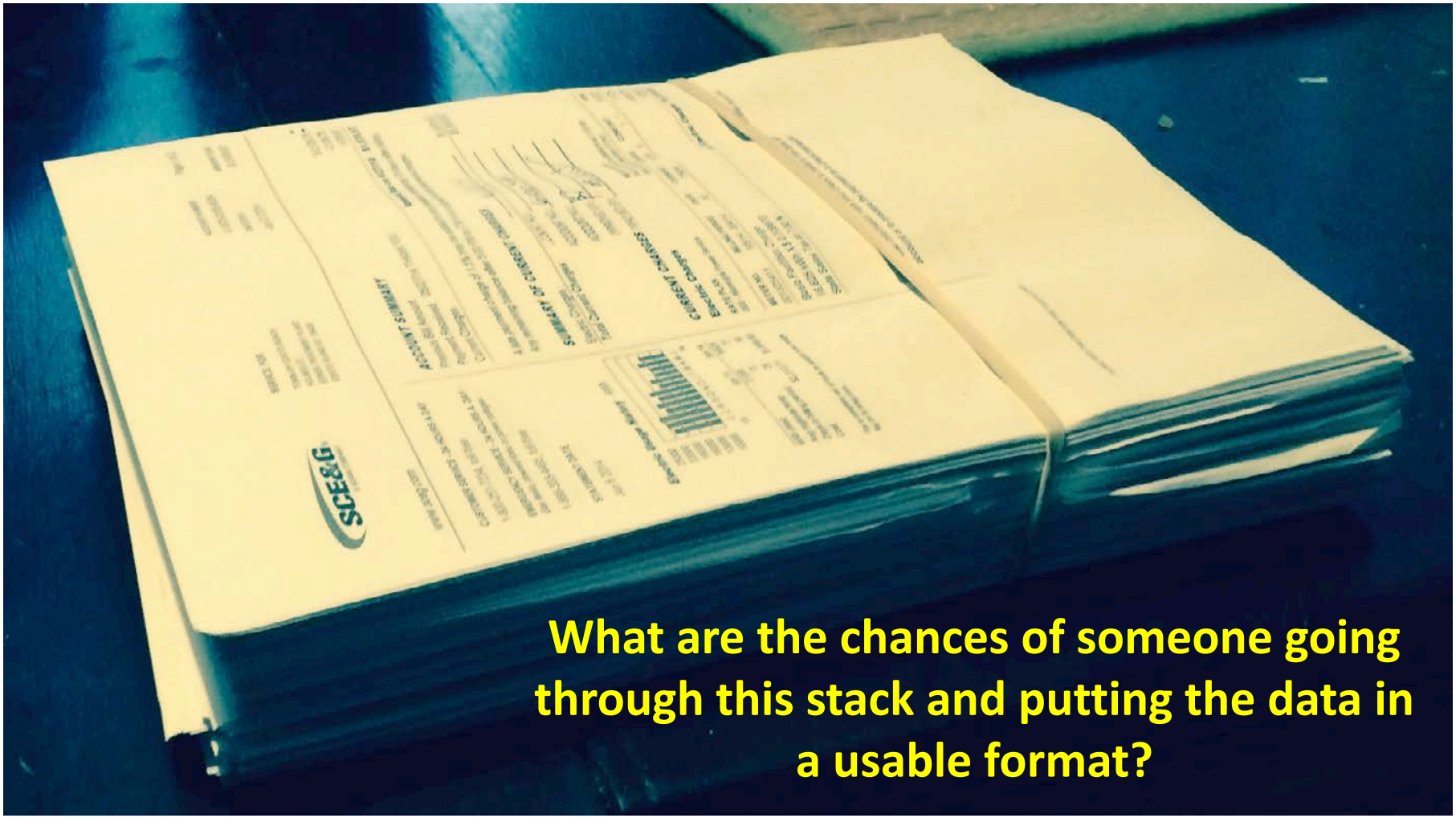
Utility Data Details

If possible, an online account needs to be set up. These are

- **Free**
- **Very valuable**
- **Easy to set up (I can help)**
- **A huge timesaver**

Would you rather have this?



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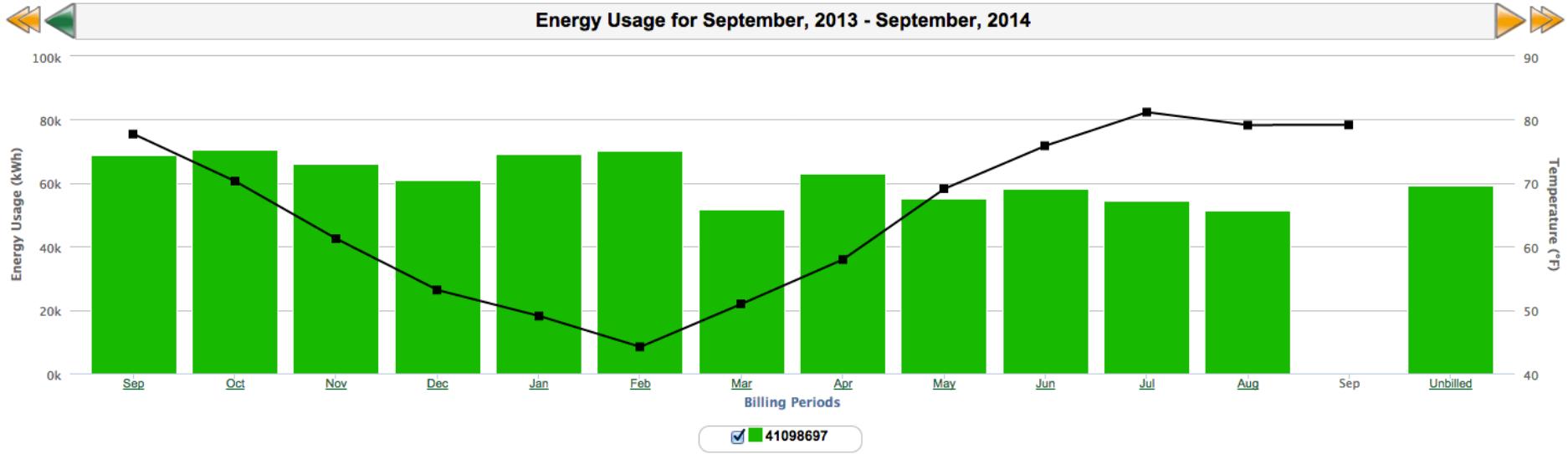
Or this?



Usage	
Meter:	41098697
High Usage:	70,656
Low Usage:	51,264
Average kWh Usage:	61,469.54
Total kWh Usage:	799,104

Weather	
Average Temperature:	65° F
High Temperature:	97° F
Low Temperature:	16° F

This particular utility can even break your usage into daily and is looking at hourly. No more waiting for the bill for any unwanted surprises!

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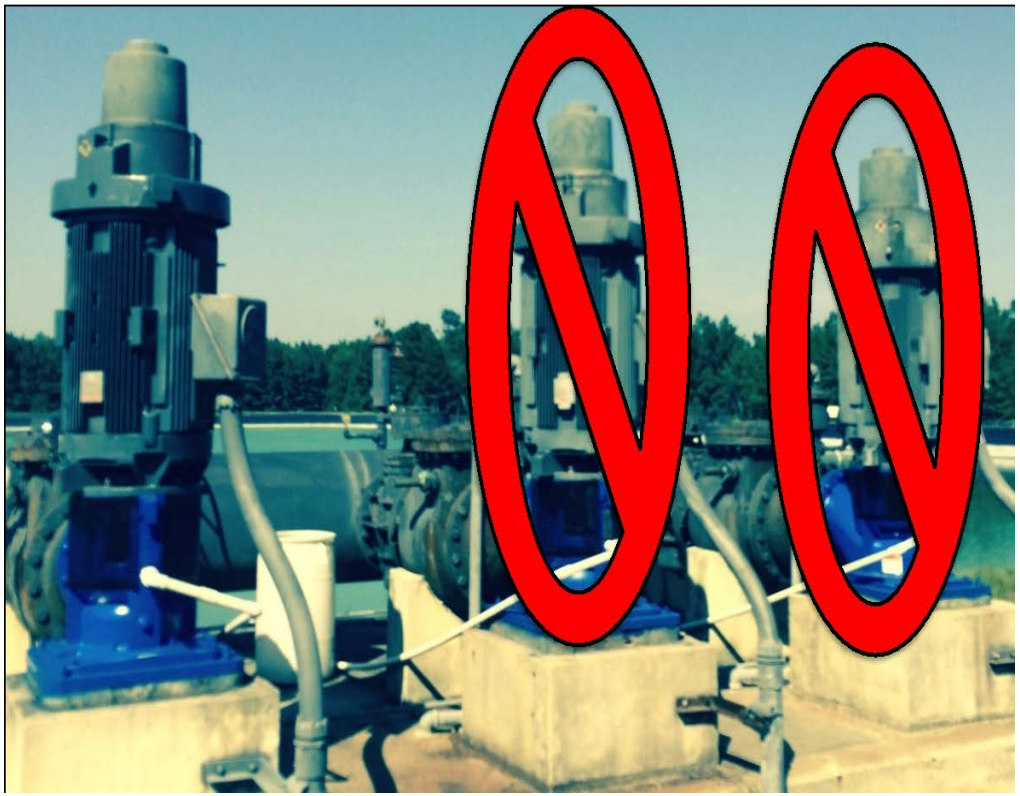
Understanding your rate can help cut costs.

This old water treatment plant is now only used as an office for the waste water operators. However the old rate was still in place, costing this small town about $1,000 a year.



This facility had a significant demand charge. They were not aware that it costs them about $2,000 for each 300 Hp effluent pump that they started. They need to try to only operate one pump at a time..

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Why is data so important and who should see it?

Many times, the utility data is never reviewed. It is basically a clerical function for someone at the town hall to pay the bills. If there is a huge spike, sometimes the utilities department will get a phone call, but that is as far as it goes.

There are more reasons than just energy efficiency for the water / waste water manager to know their energy usage. Energy usage can be used to identify equipment problems.

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Knowing the fuel/energy consumption and work accomplished is a measure of the system performance. It not only is an efficiency indicator; it is also a troubleshooting tool. In the case of the 1989 Accord, 29 MPG was normal. If it started dropping, it was a sign there was an issue. Ex. MPG dropped to 27 and the distributor rotor was found to be worn. On replacement, the MPG went back to 29. This same technique can be used to identify pump issues and to know which pump costs the least to operate.

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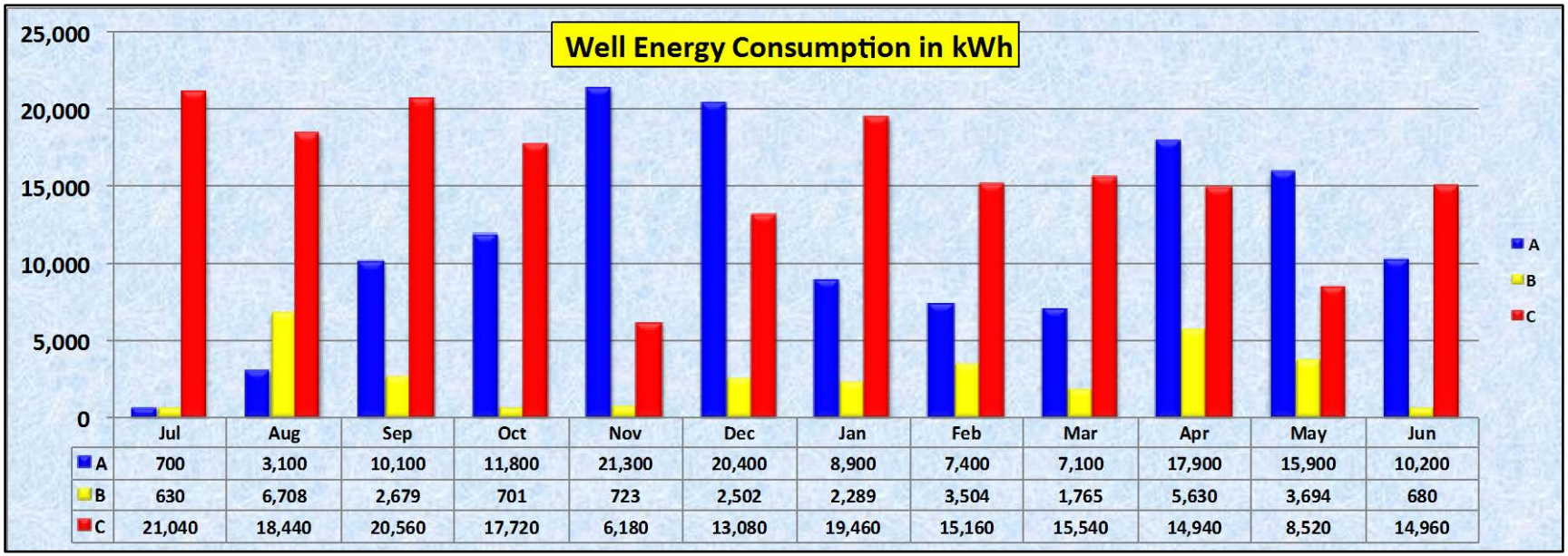
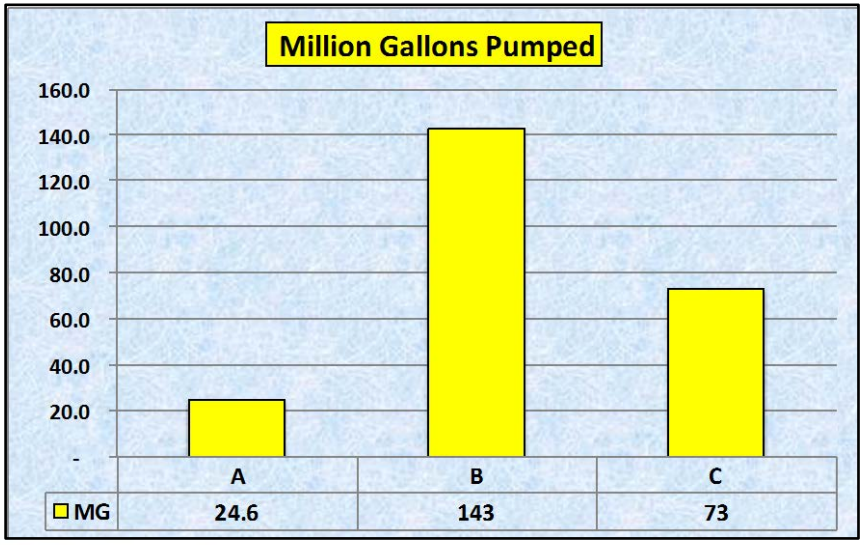
Real-World Well Analysis



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
A	700	3,100	10,100	11,800	21,300	20,400	8,900	7,400	7,100	17,900	15,900	10,200
B	630	6,708	2,679	701	723	2,502	2,289	3,504	1,765	5,630	3,694	680
C	21,040	18,440	20,560	17,720	6,180	13,080	19,460	15,160	15,540	14,940	8,520	14,960



	A	B	C
MG	24.6	143	73

Just like the Honda, we have the fuel usage and the work performed. If we put it all together, we can see how the wells are doing, compared to one another.

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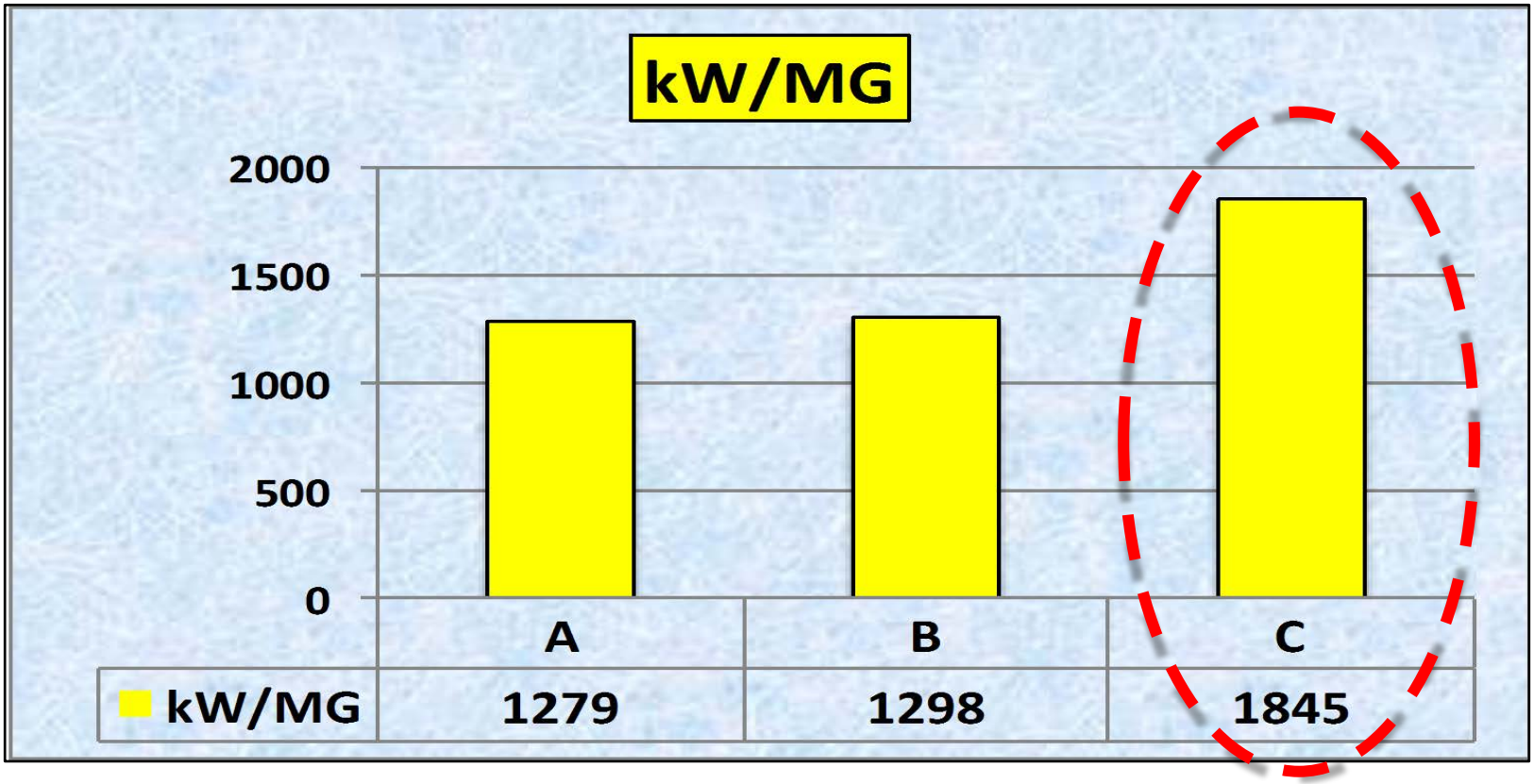
Real-world Well Analysis Findings



Well C uses 40% more power to do the same amount of work. Just moving some of this load over to another well can save thousands of dollars a year. Actions such as these gain credibility and make it easier to get money for future projects. No tools were required, just looking at the data.

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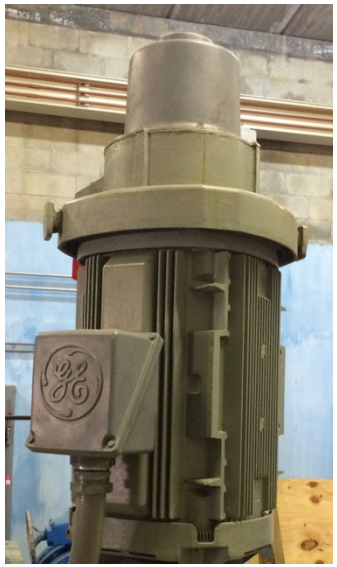
Motors

Motors typically make up 90% of the potable water load (pumping) and 70% or more of waste water system (aeration and pumping). They are the single most important thing to look at regarding energy usage in these systems.



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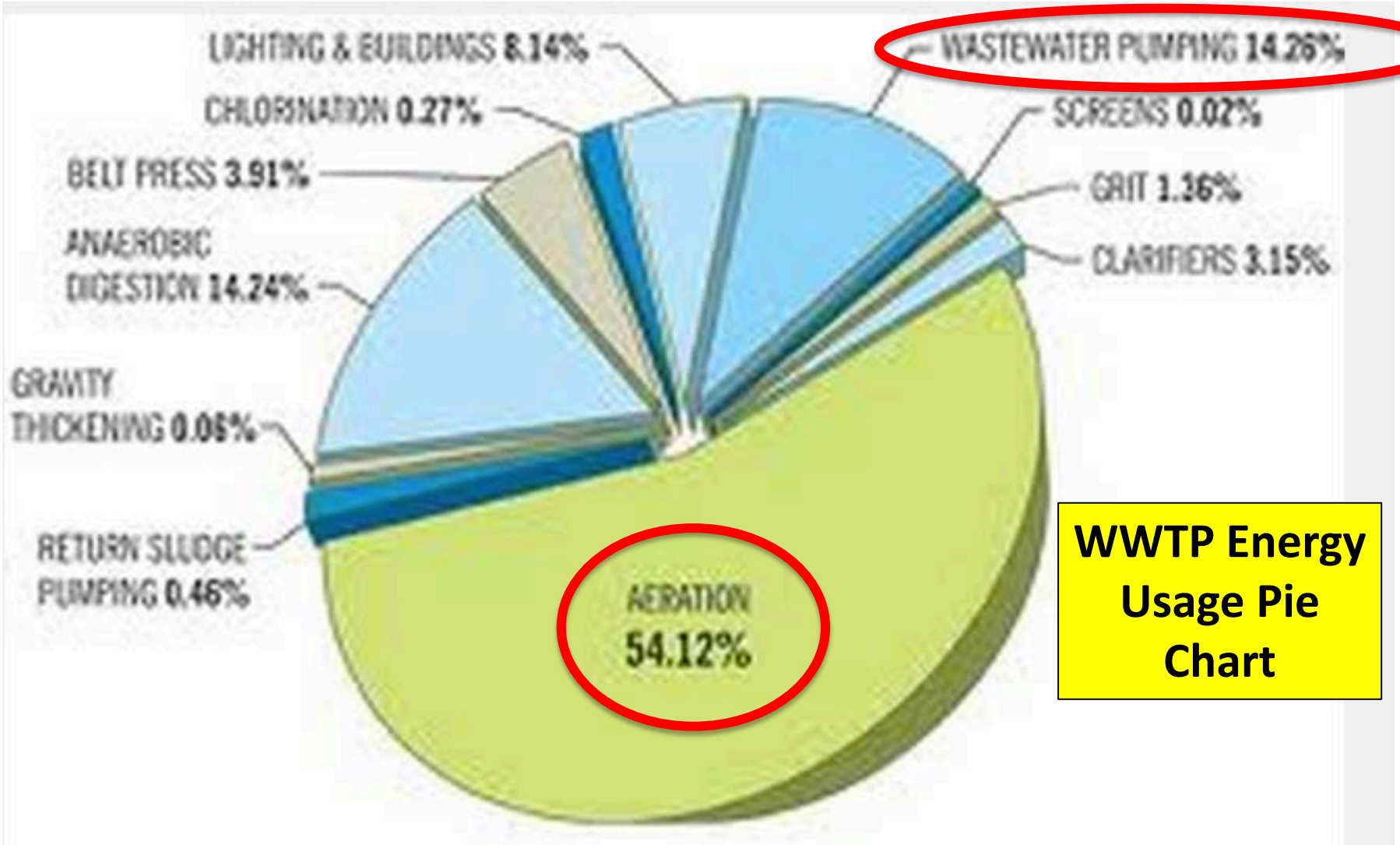

WWTP Energy Usage Pie Chart

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Annual Electrical Operating Costs for electric motors

Motor Size	Cost per Year	
	8 cents / kWh	11 cents / kWh
1 kW	$610.80	$963.60
10 kW	$7,008.00	$9,636.00
25 kW	$17,520.00	$24,090.00
50 kW	$35,040.00	$48,180.00
1 horsepower	$679.56	$934.41
10 horsepower	$6,795.66	$9,344.04
25 horsepower	$16,989.14	$23,360.08
50 horsepower	$33,978.28	$46,720.15

Assumptions: Operating 8,760 hours per year at full load. Also, for horsepower-related calculations, average standard electric motor efficiency for 1,800 RPM and totally-enclosed fan-cooled (TEFC) motor of the indicated size.

Lifecycle cost of an electric motor is far more than purchase price, so get an efficient one!

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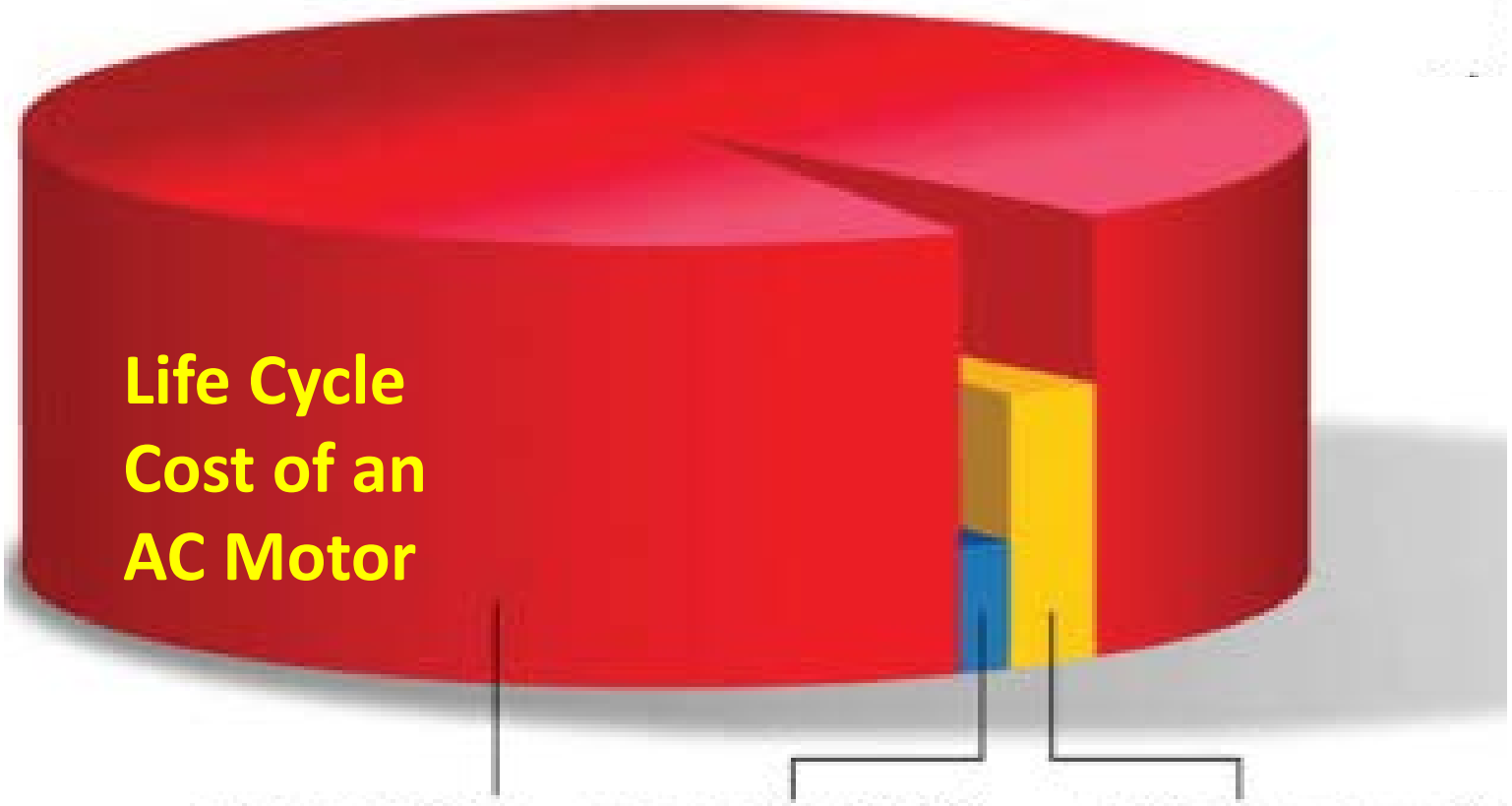

Always purchase the premium efficiency motor since the majority of the total lifecycle cost will be energy! If a larger motor runs > 7500 hours, the difference between a standard efficiency motor and a premium one can be recovered in 1 year!

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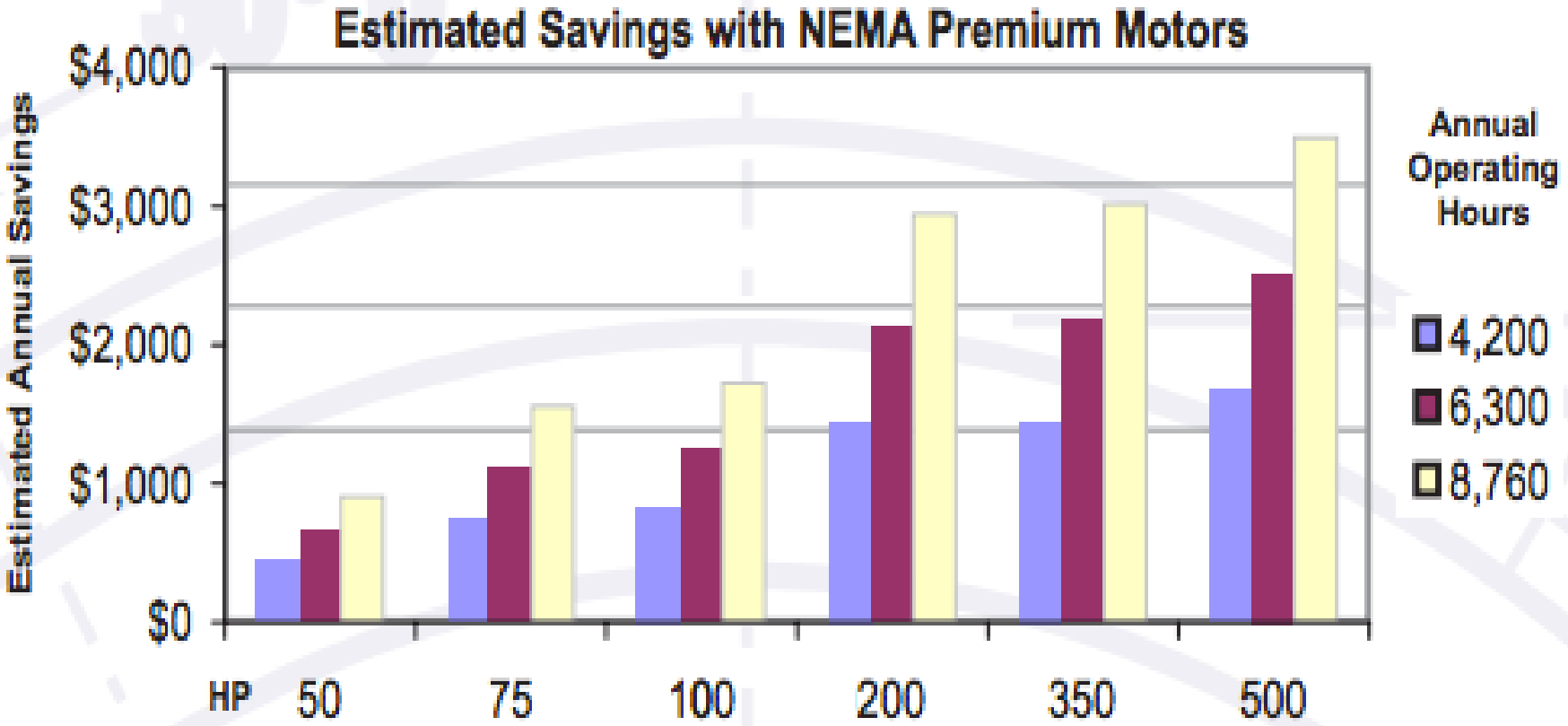

Source: MDM Motor Planning Kit 2.1. Calculation assumes a 1800 rpm TEFC motor and $0.075/kWh electric cost.

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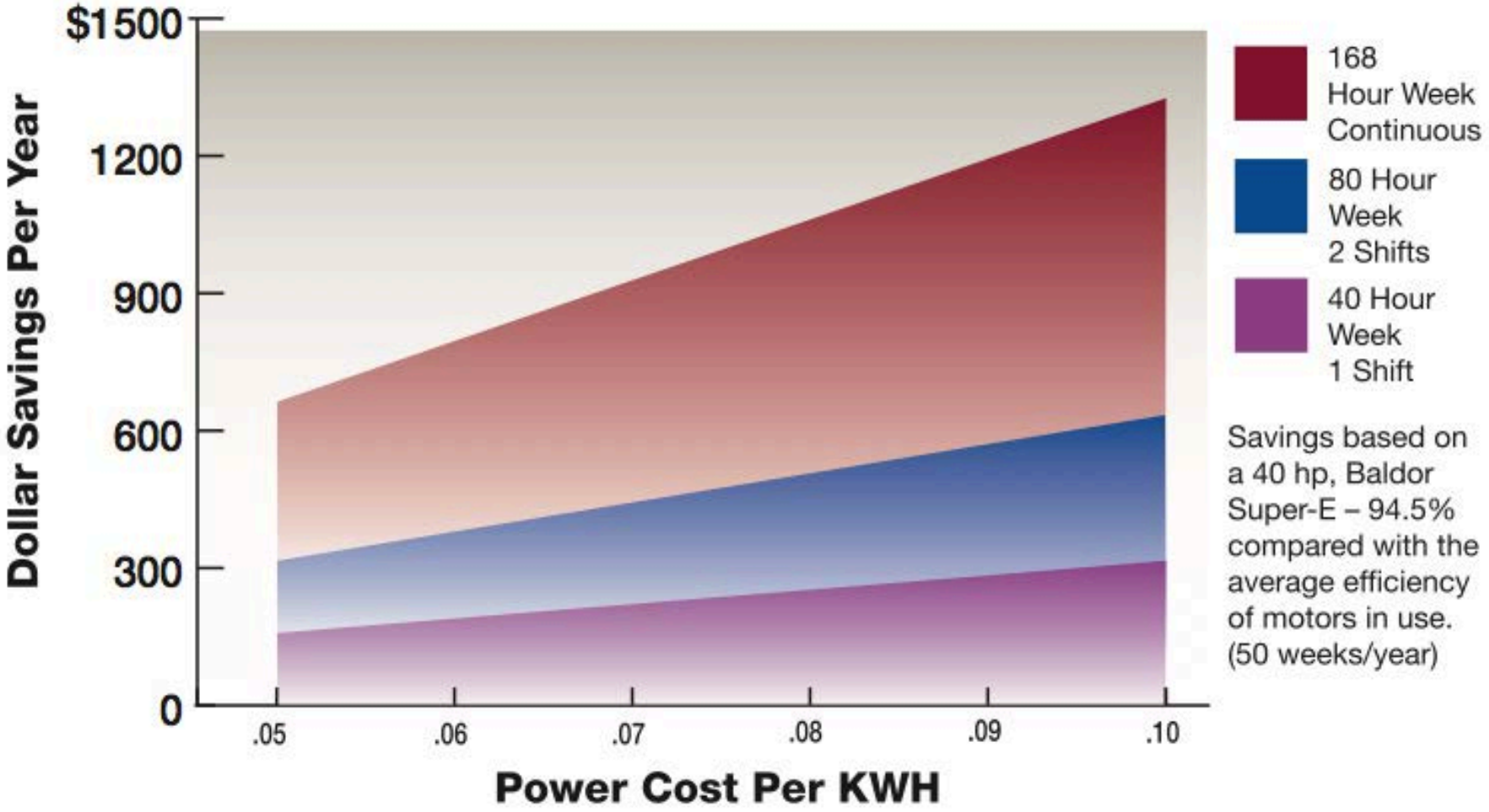
What is Higher Efficiency Worth?



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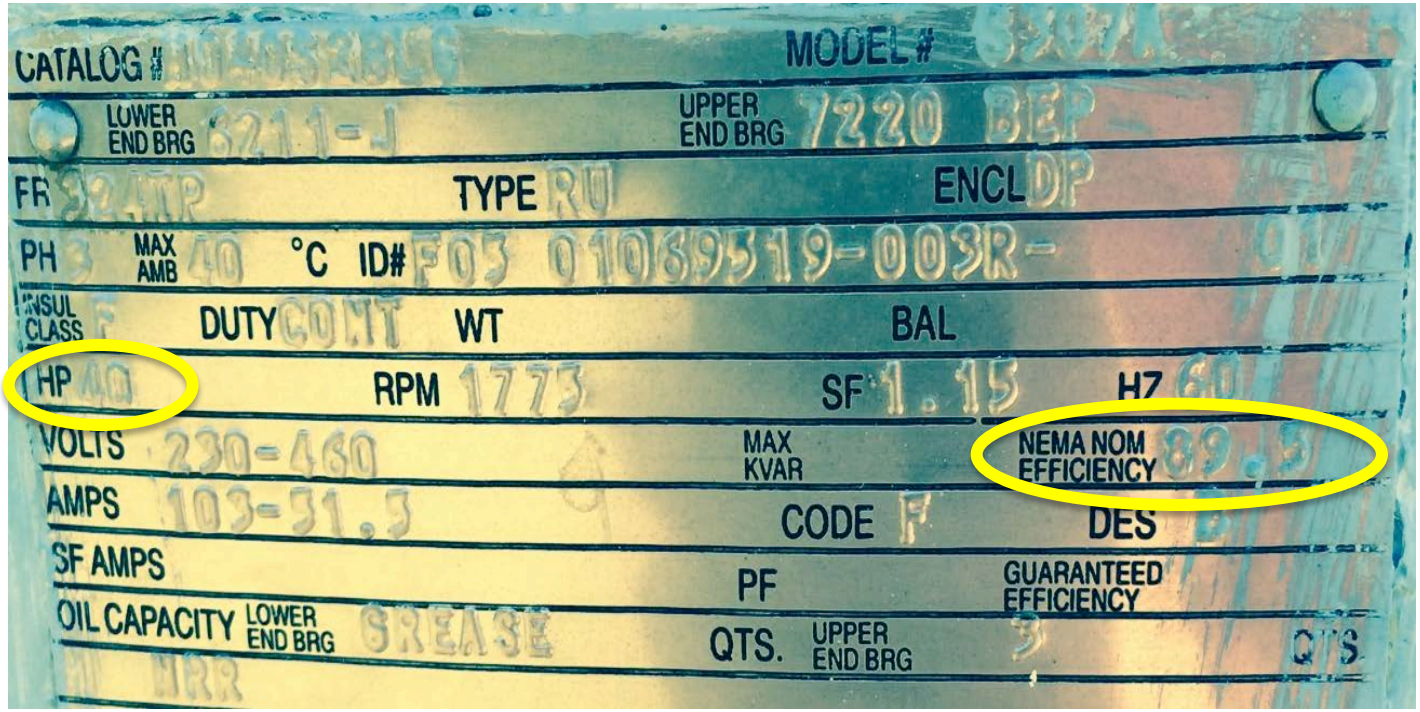
A real world scenario



Let us assume this vertical turbine 40 Hp 89.5% efficient motor fails. We have to make a decision on whether to get it rewound, replace it with standard efficiency, or replace it with high efficiency.

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Crunch the numbers (rebuild, replace and HE)

Motor	Cost	Hp	Efficiency	Convert Hp to kW	% load	$ per kWh	Hours	Annual Operating cost	Savings	Payback for new motor (no failure)	Payback for new motor verses rewind	Payback for new HE motor vs. Std. Motor
Existing	n/a	40	89.5%	33.3	75%	0.1205	5000	$ 15,066	$ 736	5.09	2.94	1.02
New Std	$ 3,000	40	89.5%	33.3	75%	0.1205	5000	$ 15,066				
New HE	$ 3,750	40	94.1%	31.7	75%	0.1205	5000	$ 14,329				
Rewind	$ 1,582	40	89.5%	33.3	75%	0.1205	5000	$ 15,066				

A new HE motor will save $736 a year. The cost difference between rewinding the motor and buying a new HE motor will be recuperated in 3 years and the cost difference between an HE motor verses a Std motor will be recuperated in 1.02 years.

Remember, a HE motor is typically a better built motor (more copper, tighter tolerances etc..). This motor will likely last longer than a standard motor, further enhancing the savings.

** $ per kWh is calculated by taking the total electric bill divided by the total kWh*

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Submersible Pumps

Motor Type	Efficiency			Power Factor			Full Load RPM	Starting Current Amps
	1/2	3/4	Full Load	1/2	3/4	Full Load		
VHS (Standard eff.)	91.5%	92.0%	92.0%	0.8	0.86	0.875	1,770	1,450
Submersible	81.4%	85.7%	87.0%	0.67	0.775	0.81	1,750	1,860

For urban applications where noise and aesthetics are a major concern, these may be a good option. For most applications, however, their significantly lower efficiency makes their life cycle cost much higher than a vertical turbine. Many of these do not make their efficiency data ready available.

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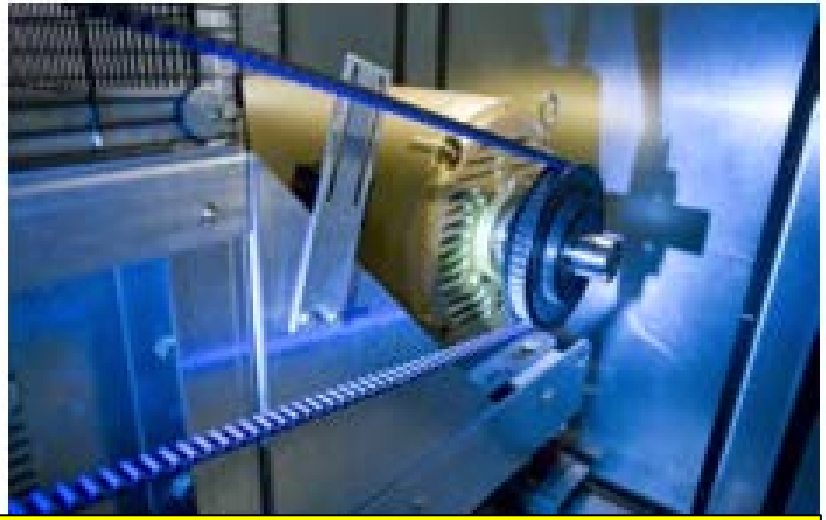

A notched belt, left, runs cooler and has a higher efficiency than a standard V-belt. A synchronous belt, right, can maintain high efficiency over a wide load range and requires minimal maintenance.

- **Notched belts are typically 2% more efficient than V belts and require no new sheaves.**
- **V Belt tension should be checked every 3 to 6 months: maintenance intensive.**
- **Synchronous Belts Operate At a Constant 98 - 99% Efficiency Over the Life of the Belt**
- **V-Belt Efficiency Declines Over Time (Up To 10% Or More). if you hear chirping or squealing you are losing over 10%.**
- **Synchronous Belt Drives Are *On Average* 5% More Efficient Than V-Belt Drives**

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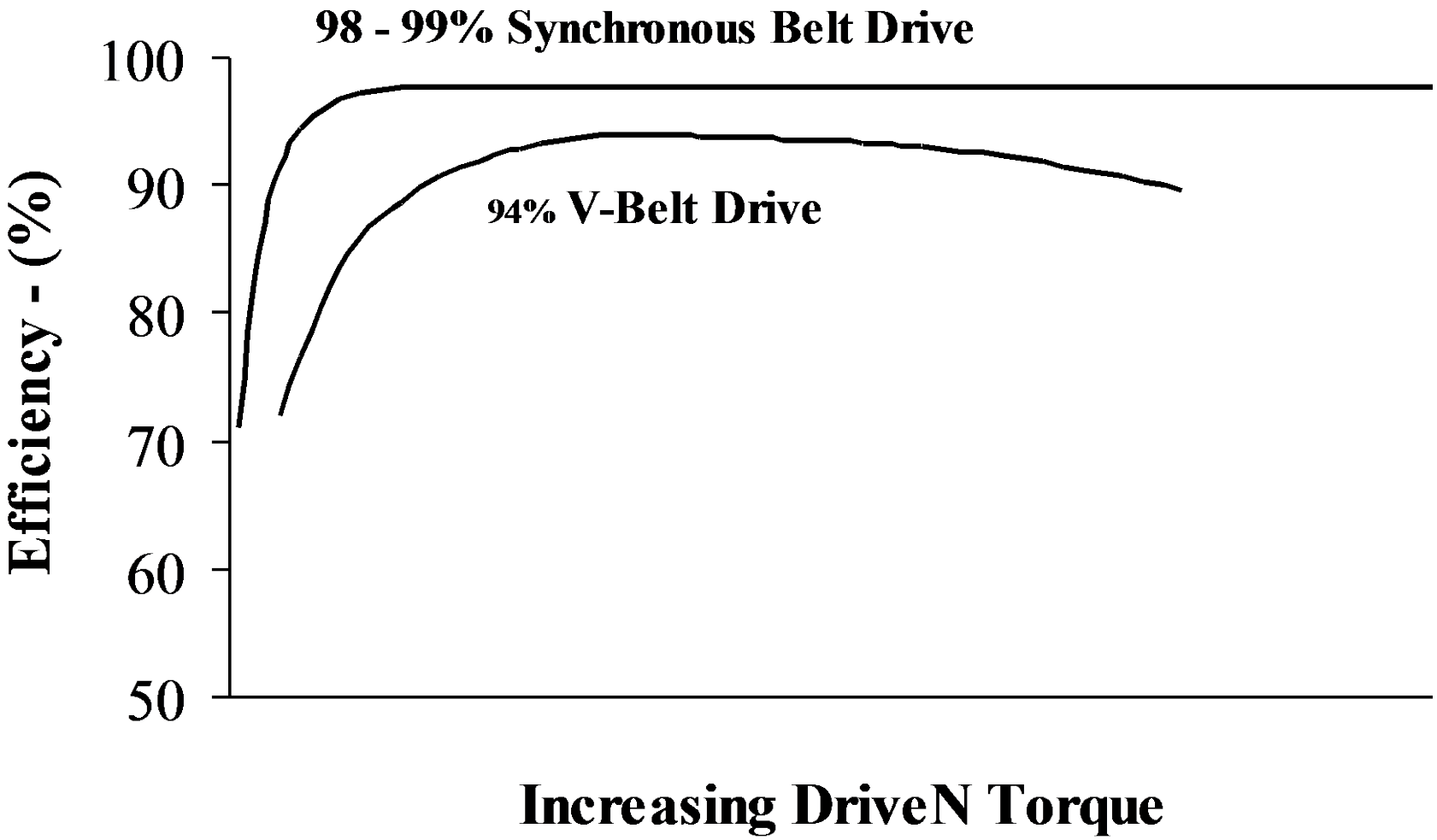
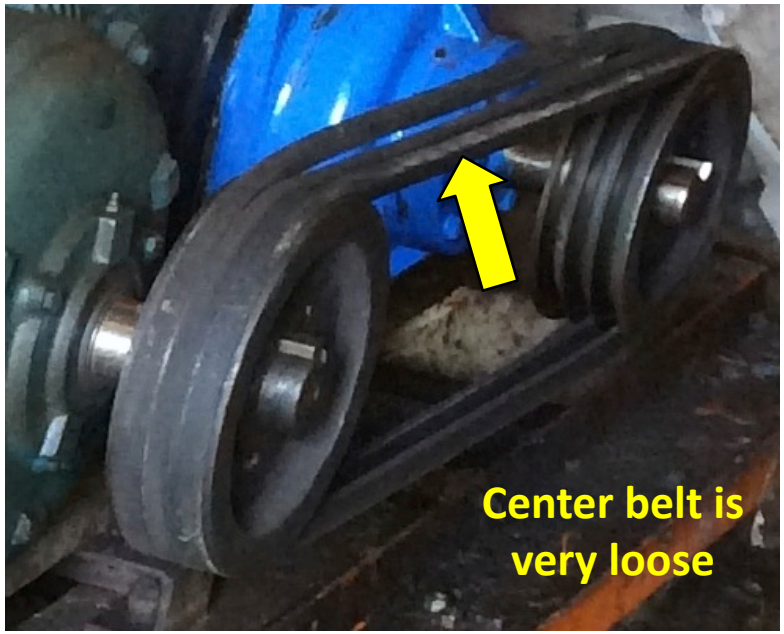

98 - 99% Synchronous Belt Drive
94% V-Belt Drive
Efficiency - (%)
100
90
80
70
60
50
Increasing DriveN Torque

Possible Applications



Lift stations are often belt driven and would be a good application for notched or synchronous belts. Vendor can provide free training on how to properly install and maintain belts. Soft starts or VFDs will extend belt life. Since V belt sheaves typically need changed after the 4th set of belts, that would be the cheapest time to convert.

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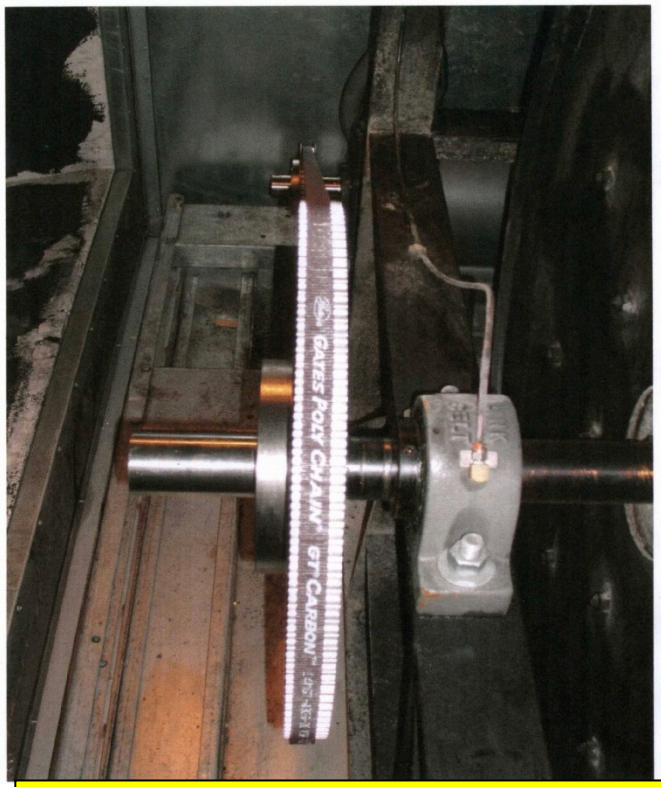

Case Study: 75HP 6 groove V-belt to 1 Poly Chain Carbon belt 13/16” wide. Annual Savings $2,792 payback time 4 months.

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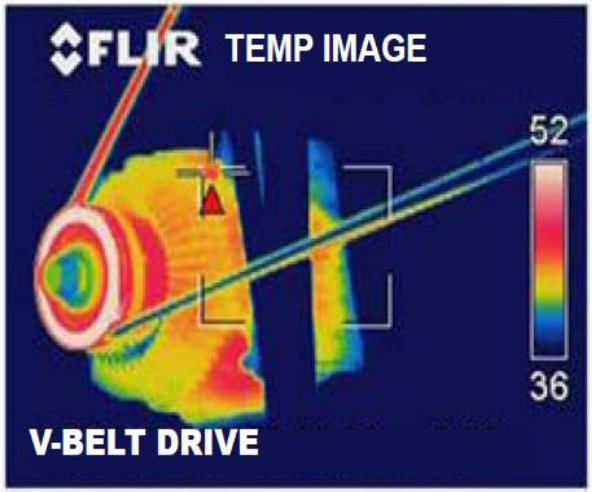
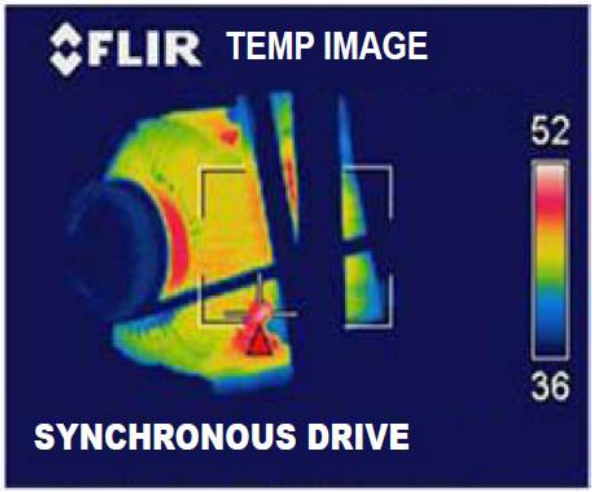
Thermal images of V-belt drive vs. synchronous belt drive

V-belt drive



Synchronous belt drive



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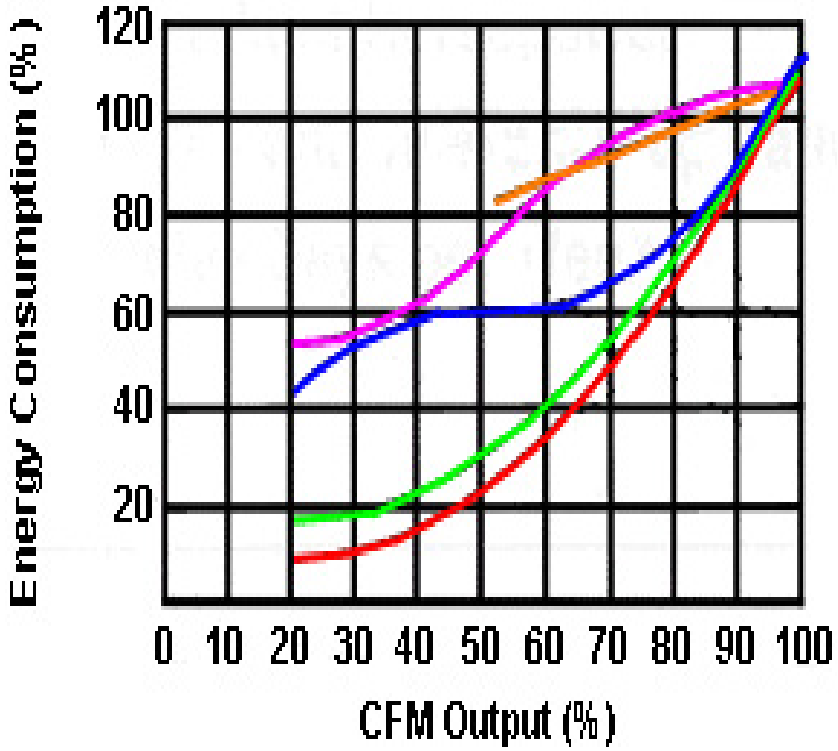
Variable Frequency Drives (VFD's)

Any centrifugal pump or blower that is currently being mechanically throttled or does not need to run at full load 100% of the time



Key:

- Variable Frequency Drive
- Eddy Current Drive OSH
- Variable Inlet Vanes
- Discharge Damper
- Eddy Current Drive Hi SH

A 50% reduction in flow actually reduces horsepower requirements by 87.5%

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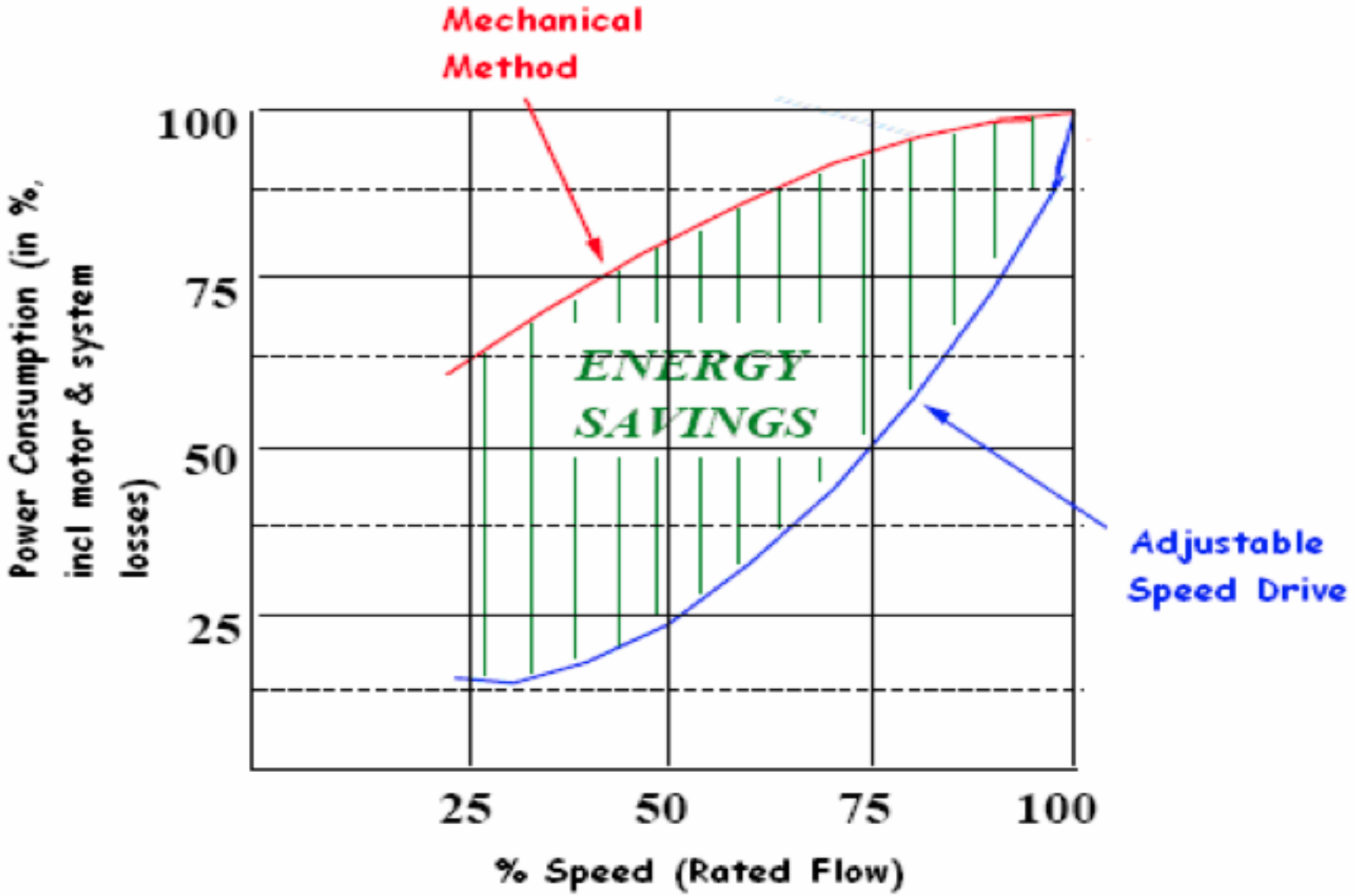
Mechanical
Method
100
75
50
25
Power Consumption (in %, incl motor & system losses)
ENERGY
SAVINGS
Adjustable
Speed Drive
25
50
75
100
% Speed (Rated Flow)

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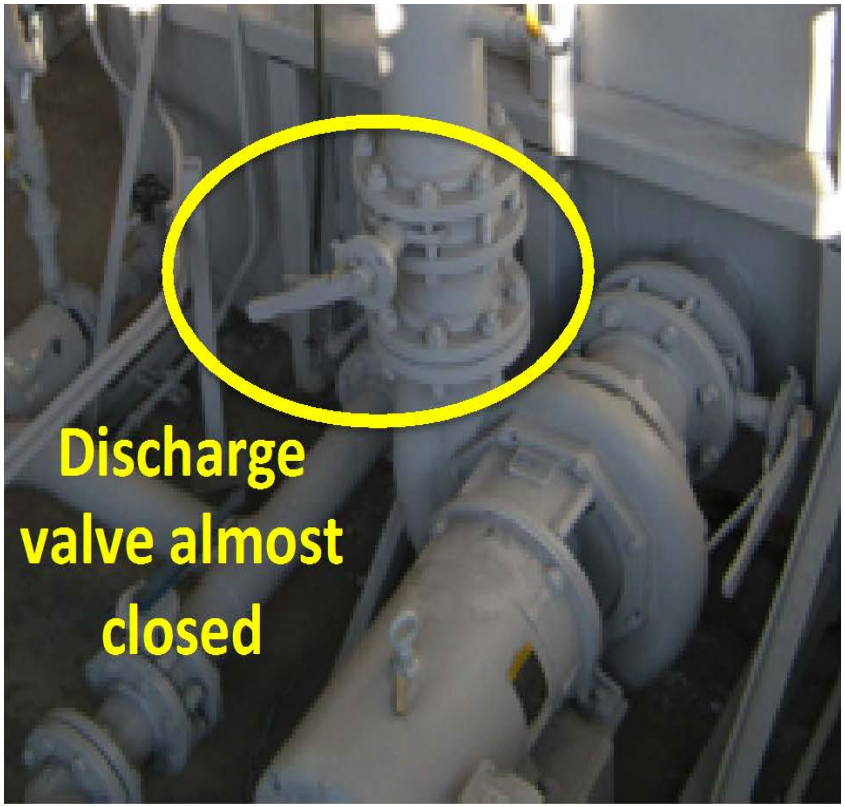
Possible VFD Opportunities



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Analogy #1: Automobile Speed Control

Hold foot on brake, increase motor RPMs to 3,000, gradually release brake and start driving, using brake for speed control!

A little rough on equipment and hard to control?

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Analogy #2: Horse Speed Control

Need to slow horses down? No Problem!

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Horses move at constant speed and are slowed down with the addition of a calibrated boulder. Different boulders for different field types.

Operate slower and/or longer where possible

Raw Water Pumps are usually sized for the maximum capacity of the Water Treatment Plant. Rarely is this much horsepower necessary. This are a very good candidate for VFDs.

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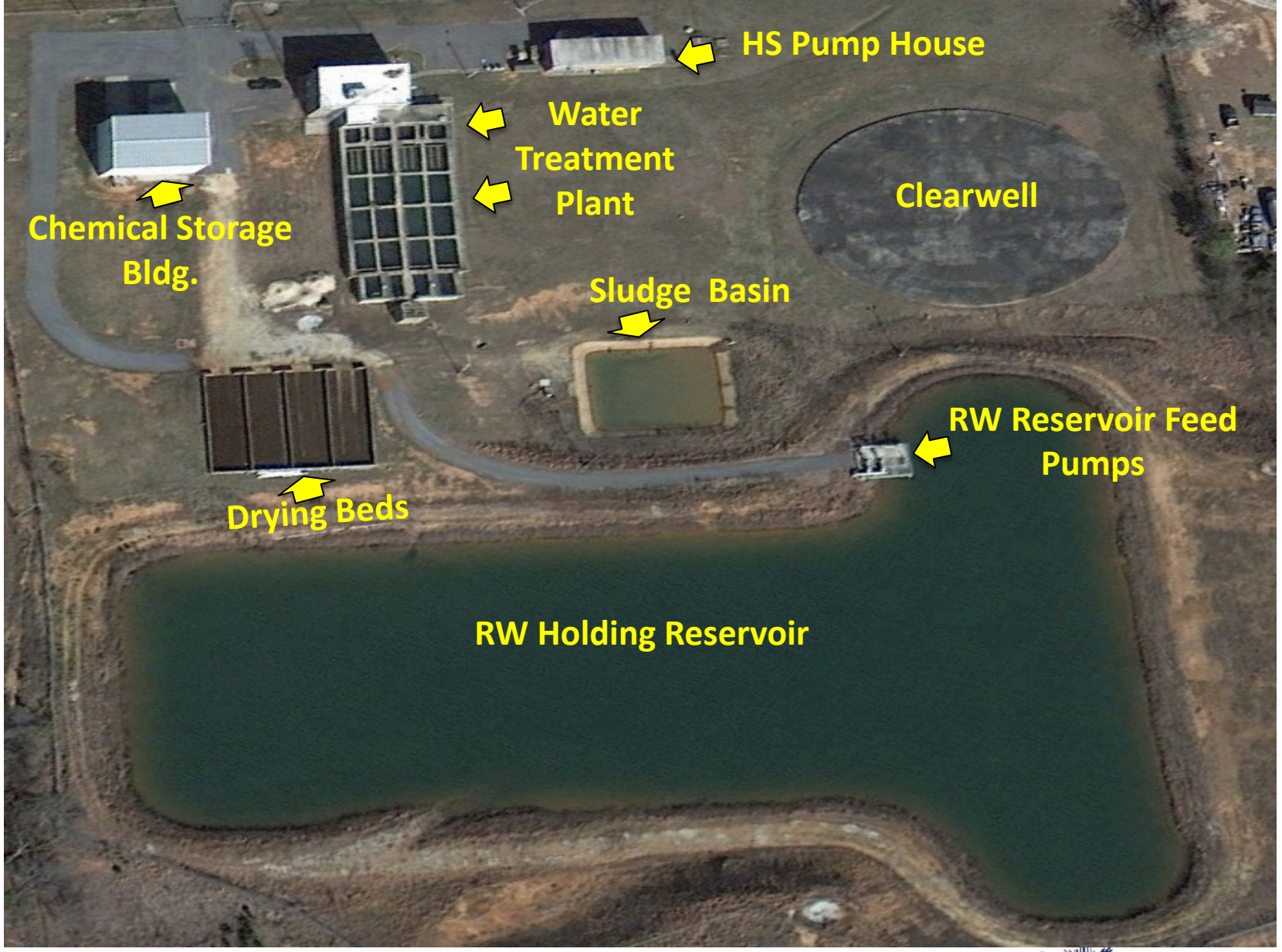
HS Pump House
Water Treatment Plant
Clearwell
Chemical Storage Bldg.
Sludge Basin
RW Reservoir Feed Pumps
Drying Beds
RW Holding Reservoir

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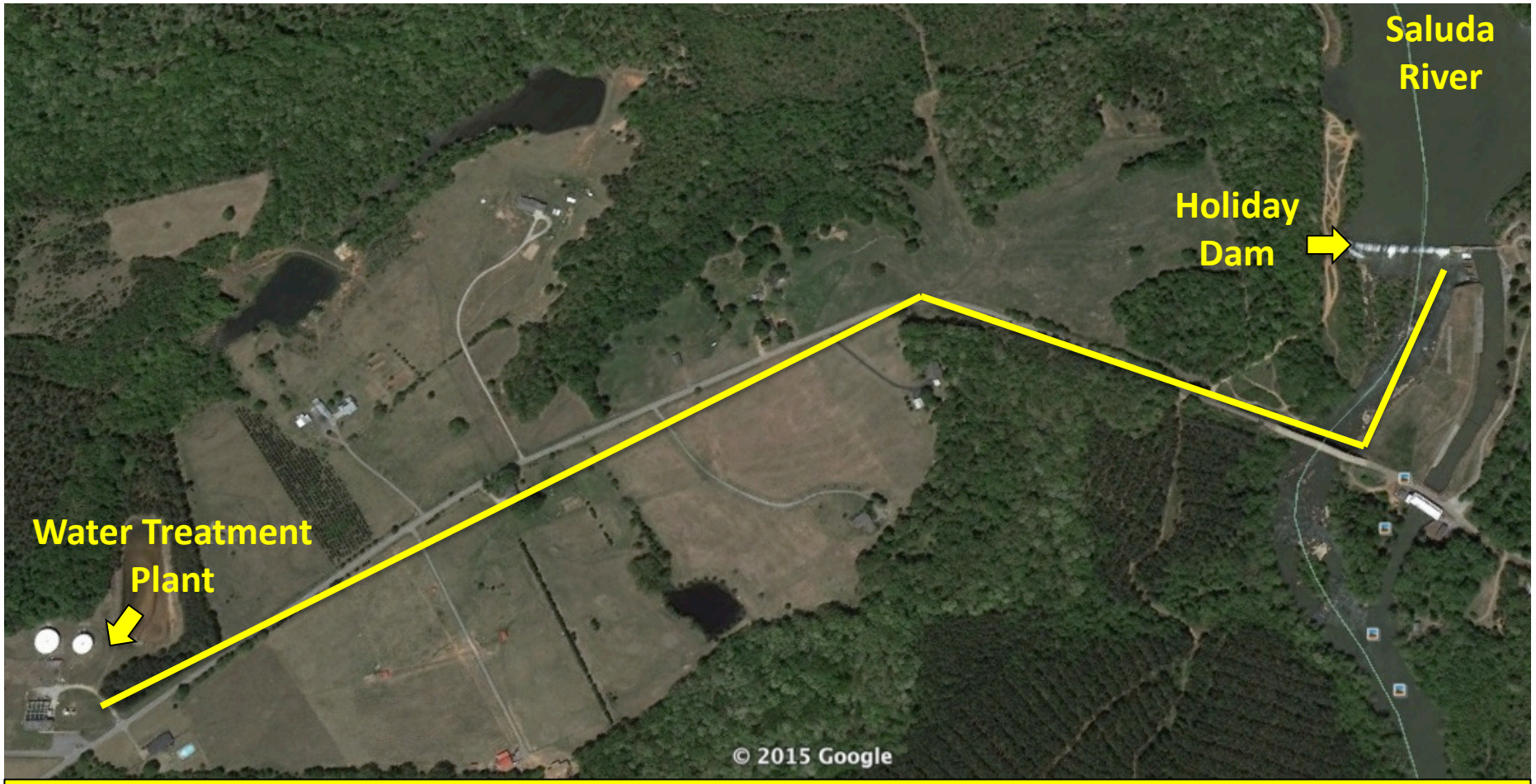

RW path (estimated) is approximately 1 mile from the Saluda river to the WTP

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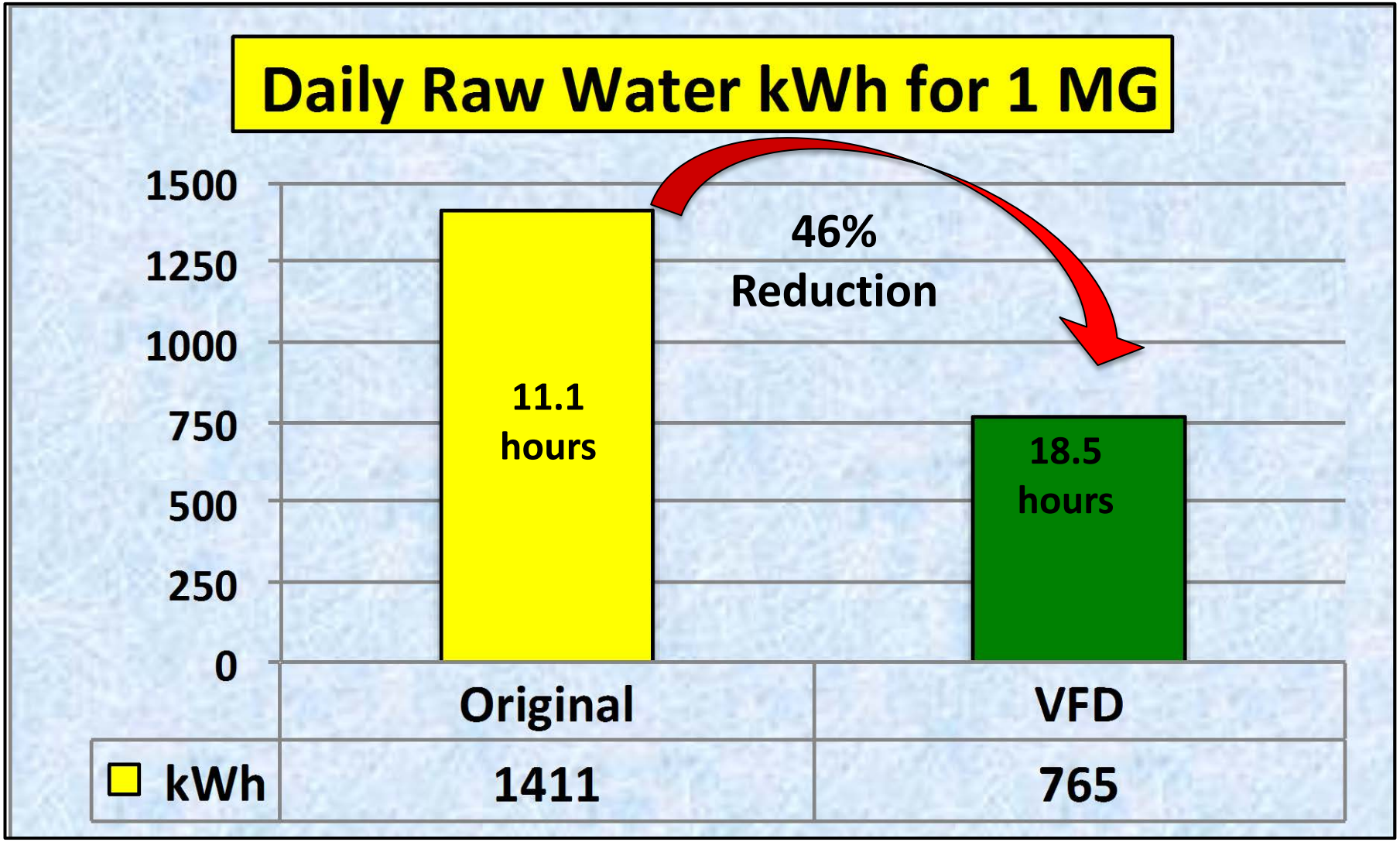
Daily Raw Water kWh for 1 MG
1500
1250
1000
750
500
250
0
46%
Reduction
11.1
hours
18.5
hours
Original
VFD
kWh
1411
765

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VFD verses Soft Start

Make sure you know the difference

- **A soft start is specifically used to slowly ramp up a motor to minimize the current inrush and minimize the stress on electrical and mechanical components. I am referring to the electronic soft start, which works much as a VFD.**
- **A VFD can do the exact same thing as a soft start, but continues to stay in the circuit and control the speed of the motor after it has started up. A VFD should not be used in place of a soft-start, however, unless the speed of the motor can be slowed down at least 5%.**

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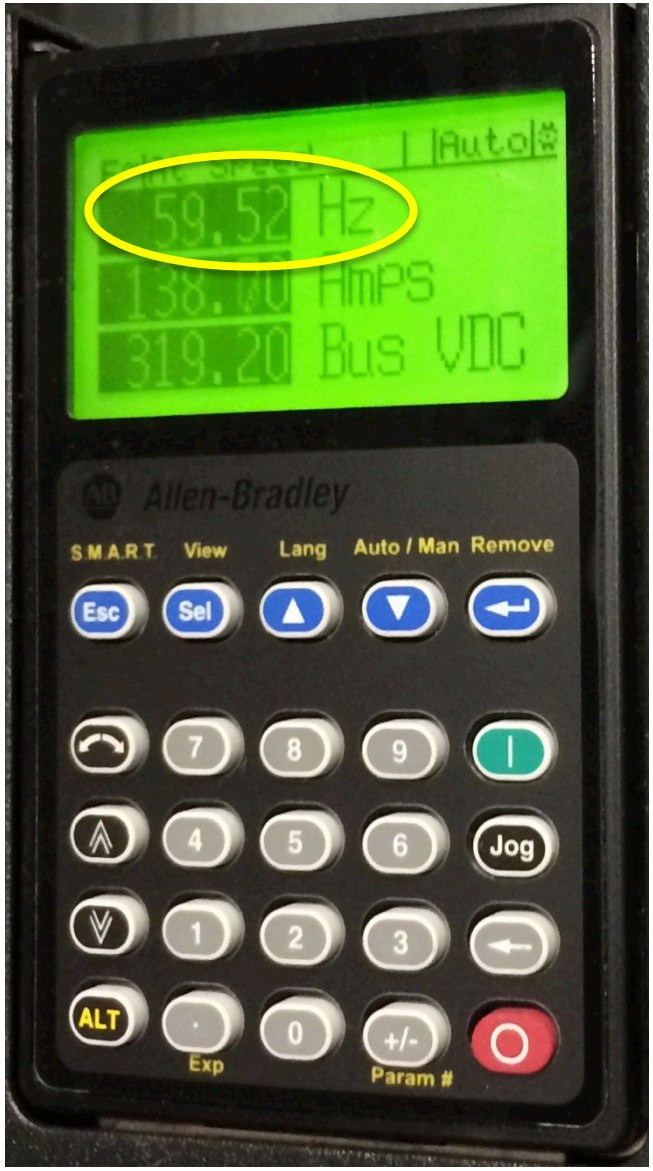

Do not install a VFD if there is no operation at reduced speed. Operating a VFD at 100% will actually consume more power than if the VFD was not there at all. There is one exception; some newer models have the capability to bypass the VFD and go back to normal, across-the-line control (but even this should not be purchased unless lower speed operations is going to occur).

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VFDs have many other advantages other than energy savings:

- Automatically converts single phase to 3 phase (Allows for 3 phase motors (more robust) with single phase supply power)
  - This is a really big deal to those that have suffered through those old phase converters!
- Extended equipment life. Examples:
  - Belts
  - Couplings
  - Check valves
  - Piping
- Inherent power factor correction
  - This can help prevent getting penalized by the electric utility for low power factor
- Matches the motor to the load
- Reduces restrictions in the system
  - Valves
  - Dampers
  - Bypasses

Some Vendors May Offer A Free Trial!

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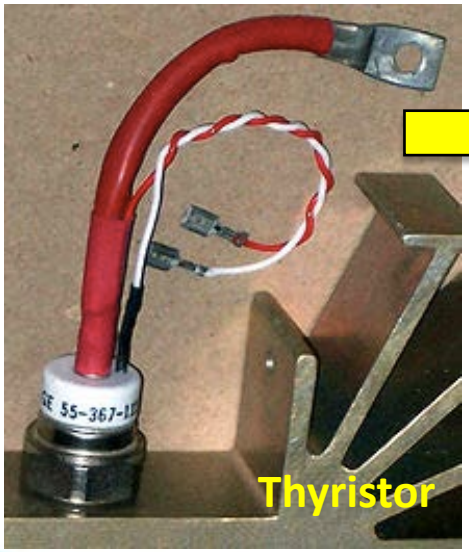
VFD Concerns: Time to leave the 80's!

There is still distrust of VFDs because of the issues with the early models. They were big, expensive, unreliable and difficult to troubleshoot. The bypass came about because of these reliability issues. Those days are now in the past. Floor mounted units are now modular and easy to swap out. Thyristors have been replaced by much more reliable and faster switching IGBTs.



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Typical VFDs with bypasses

If you have concerns about equipment uptime, repair skills, or spare parts by all means specify a bypass for your VFD. This prevents the Saturday night 2AM failure from being much worst than it has to be!

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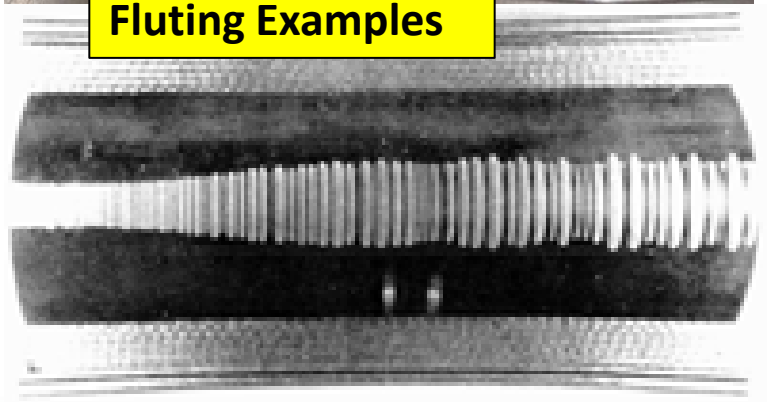
Bearing Fluting

VFD induced currents on the shaft can damage bearings. This can be prevented by a shaft grounding ring or grounding brushes (more popular methods)

Fluting Examples



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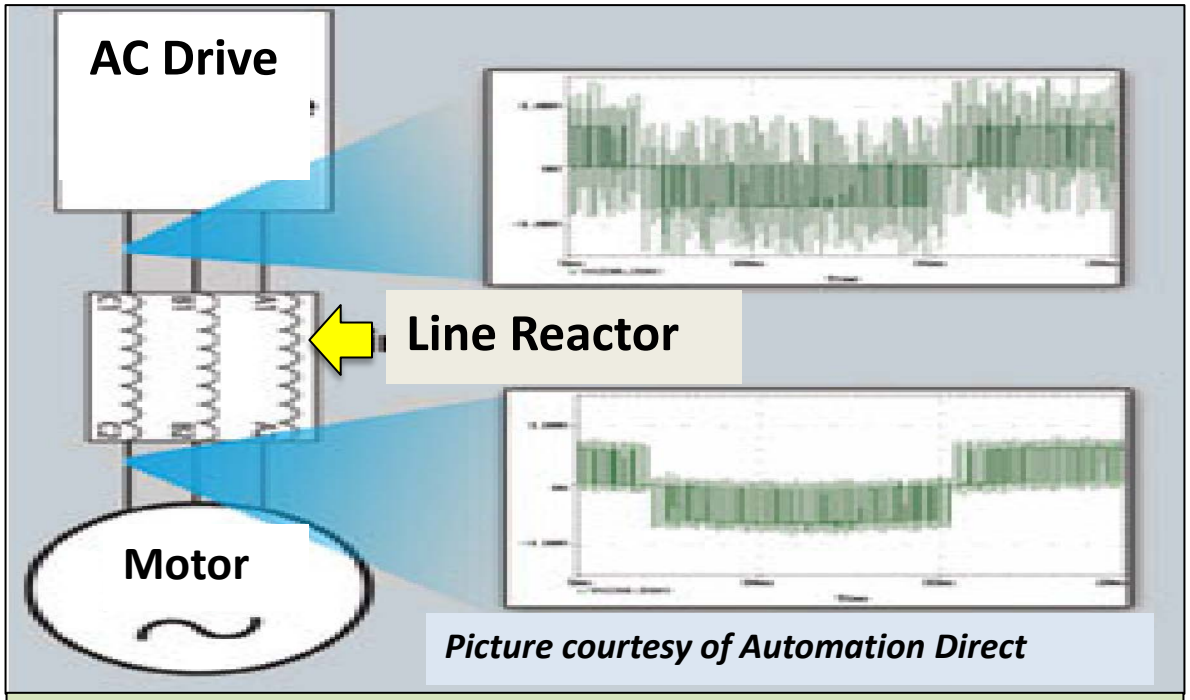
Harmonics

Always consider harmonics, especially if there is a long distance between the VFD and motor.



Line Reactors are just one of several methods to reduce VFD harmonics in the motor circuit.

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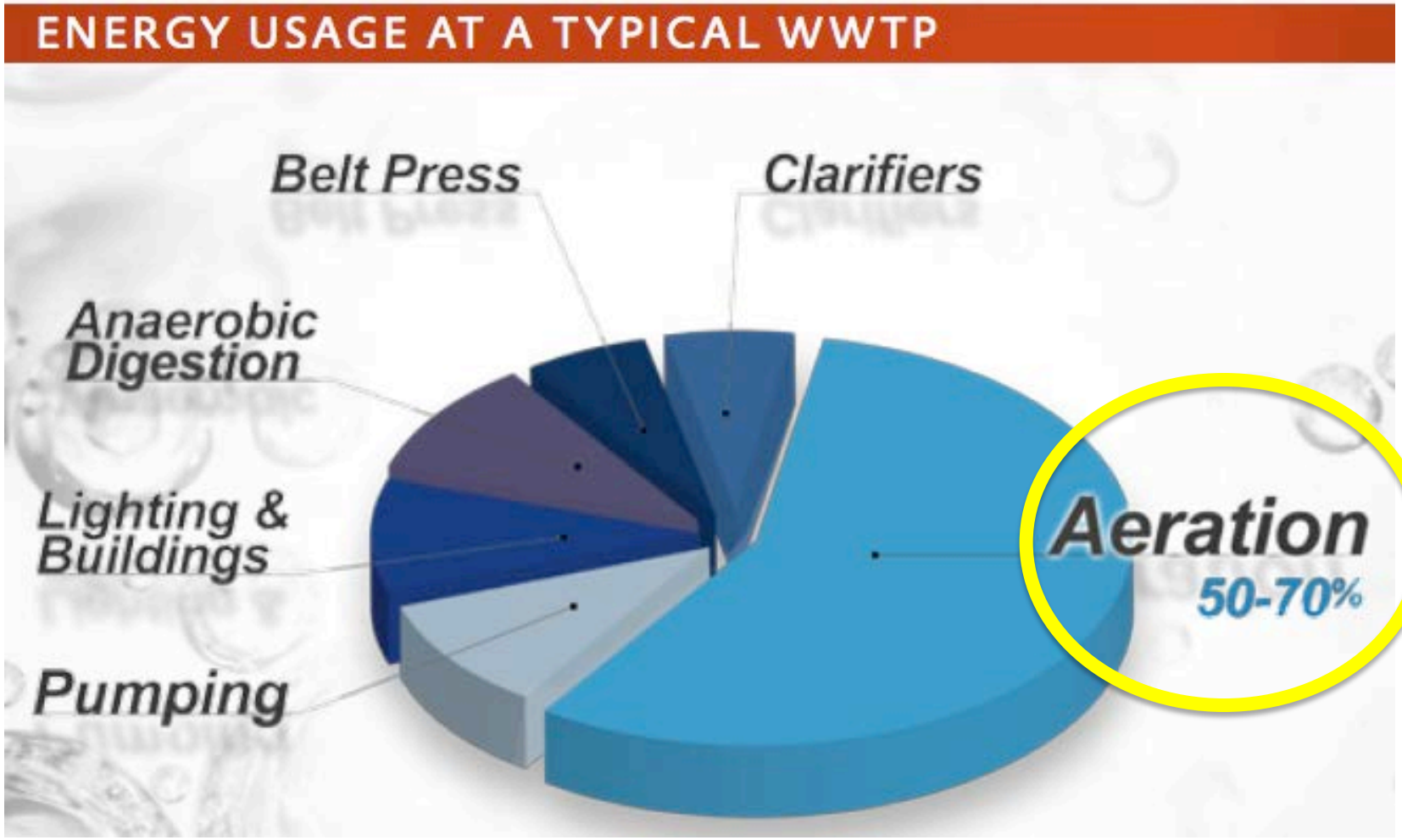

It is not uncommon for the single biggest load of a municipality to be the aeration system(s)

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These systems, called oxidation ditches (street name “orbitals” or “racetrack”) use a rotating disk or brush mechanism that provides aeration and velocity. These are inefficient and very maintenance intensive. An efficient upgrade would separate the aeration from the velocity component.

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For lagoon applications, floating aerators are popular, but they are horribly inefficient. Most have no feedback loop so they run 24/7 or are on timers that are based on worst case scenarios (a one time anomaly causes too defensive operation) .

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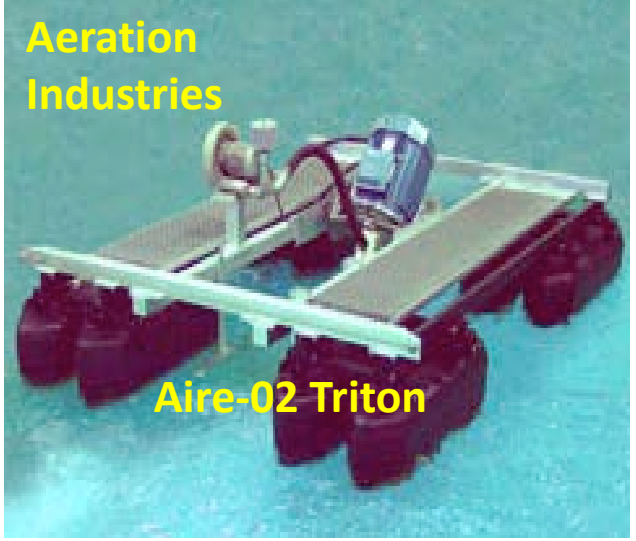

Here are some systems being used to replace lagoon floating mechanical agitators. The Lagoon Master (top middle picture) is being trialed at Bamberg and they have seen $30,000 in savings in the last 6 months.

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The blowers for the aeration of this “activated sludge” plant run 24/7 no matter what the load on the plant is. This would be a good opportunity for VFD control based on the actual DO level. Some control systems can look at the influent and anticipate what the load will be and set the DO accordingly. Excess DO is excess energy use!

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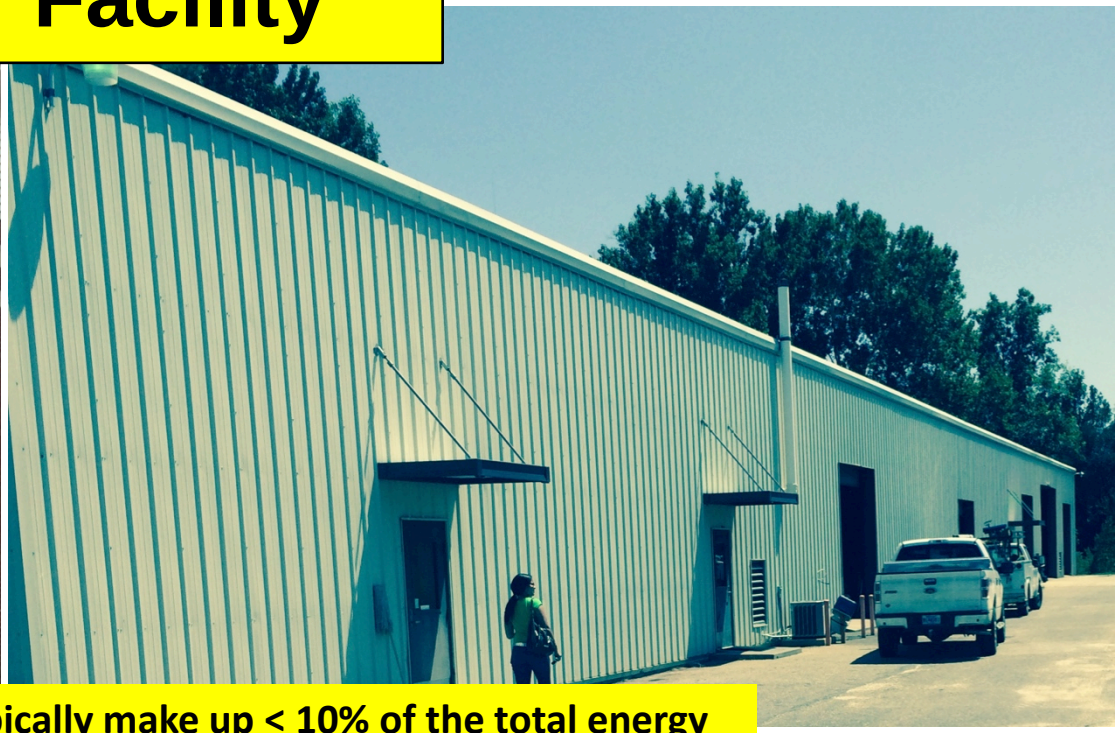
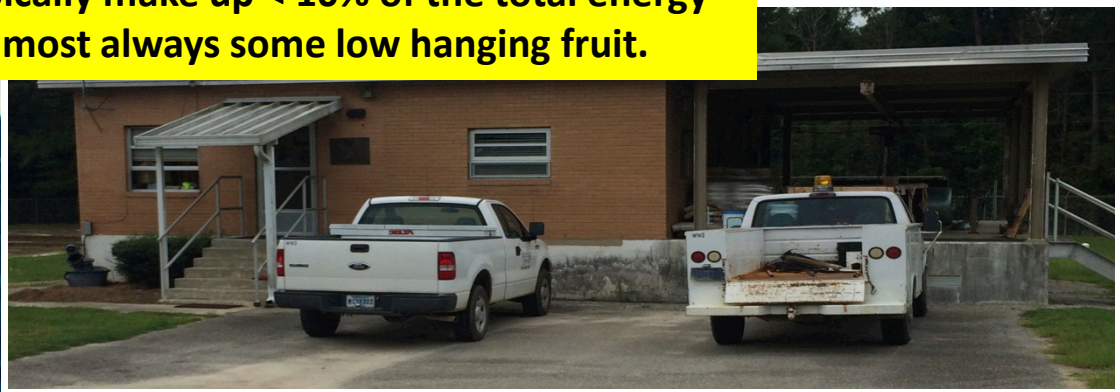
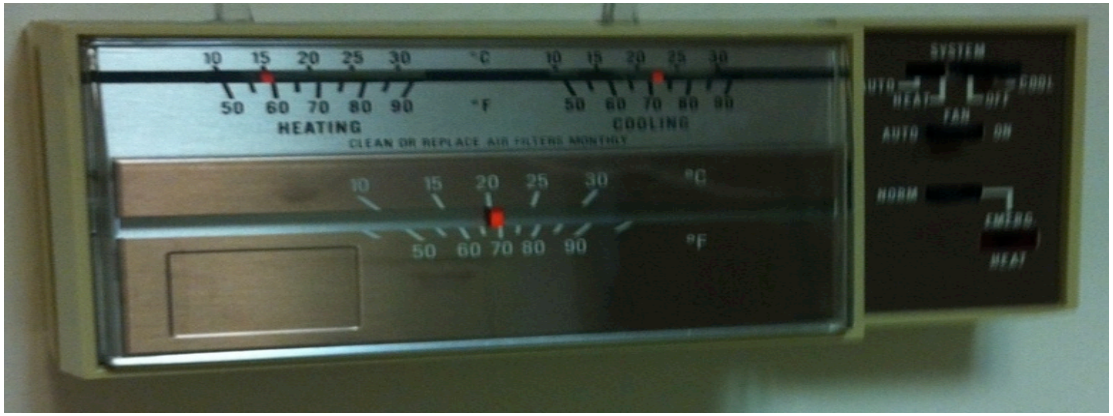
Facility

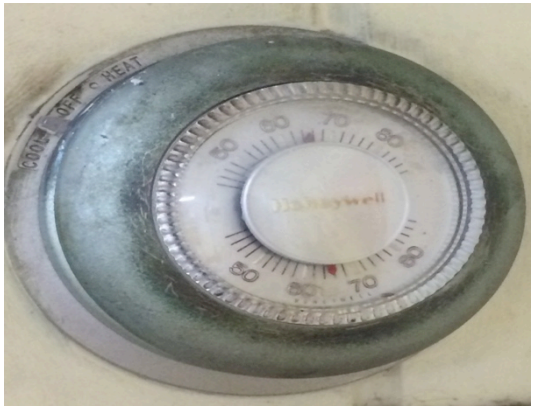


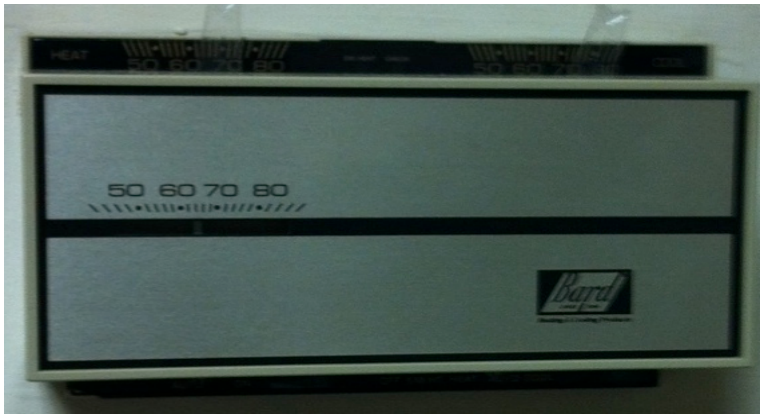
Though facilities typically make up < 10% of the total energy usage, there is almost always some low hanging fruit.

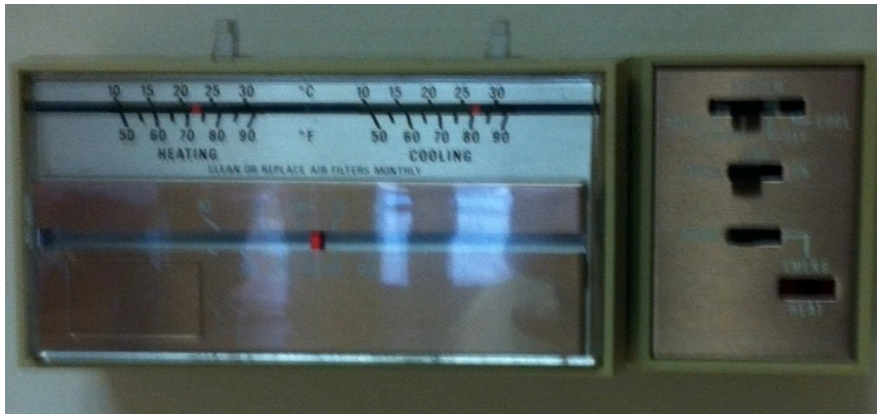


SCRWA









If these exist in your facility, <u>it is time for an upgrade</u>! Installing programmable thermostats can reduce the HVAC energy usage by 50% or more. It is rare to see any programmable thermostats in a water or wastewater facility. This is an easy fix.

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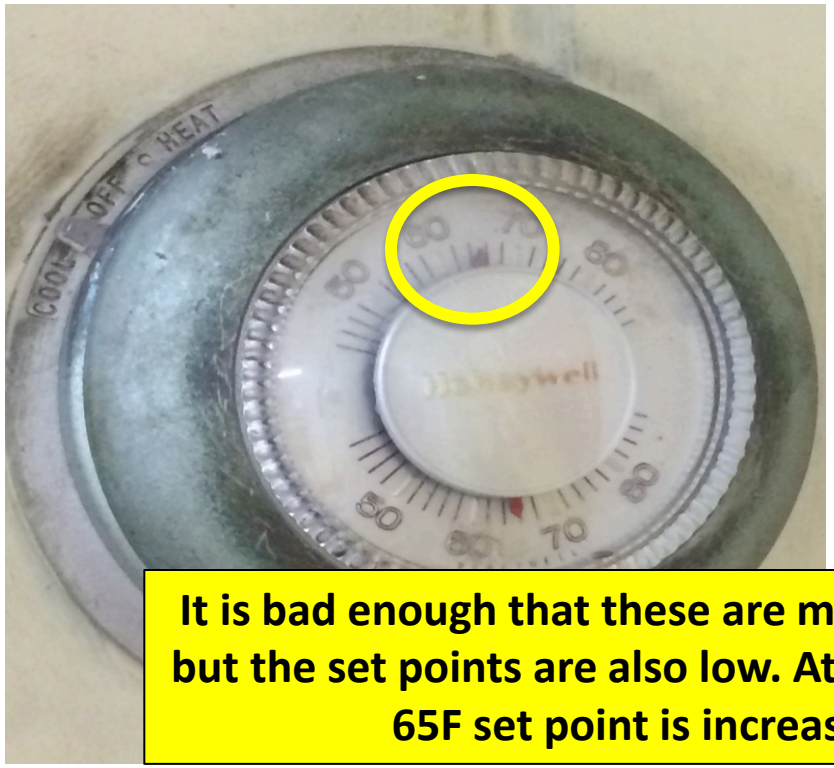
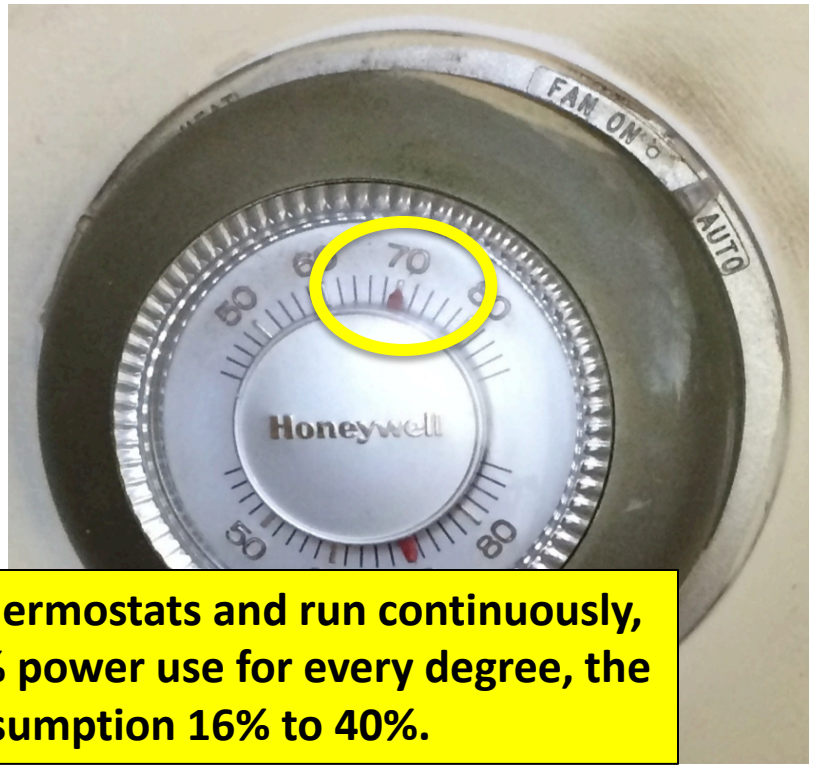
Where should the occupied temperature set points be kept?





It is bad enough that these are manual thermostats and run continuously, but the set points are also low. At 2% - 5% power use for every degree, the 65F set point is increasing consumption 16% to 40%.

Use ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) temperature band (standard 55)

- **68F -74F in winter**
- **73F – 78F in summer**
- **Humidity < or = 60%**

Typical numbers for a facility would be 70F winter and 75F summer.

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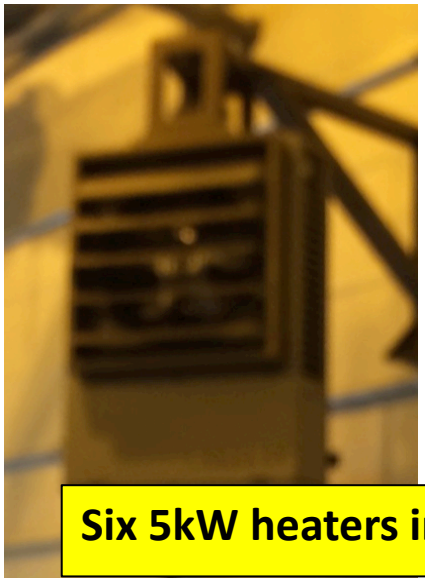
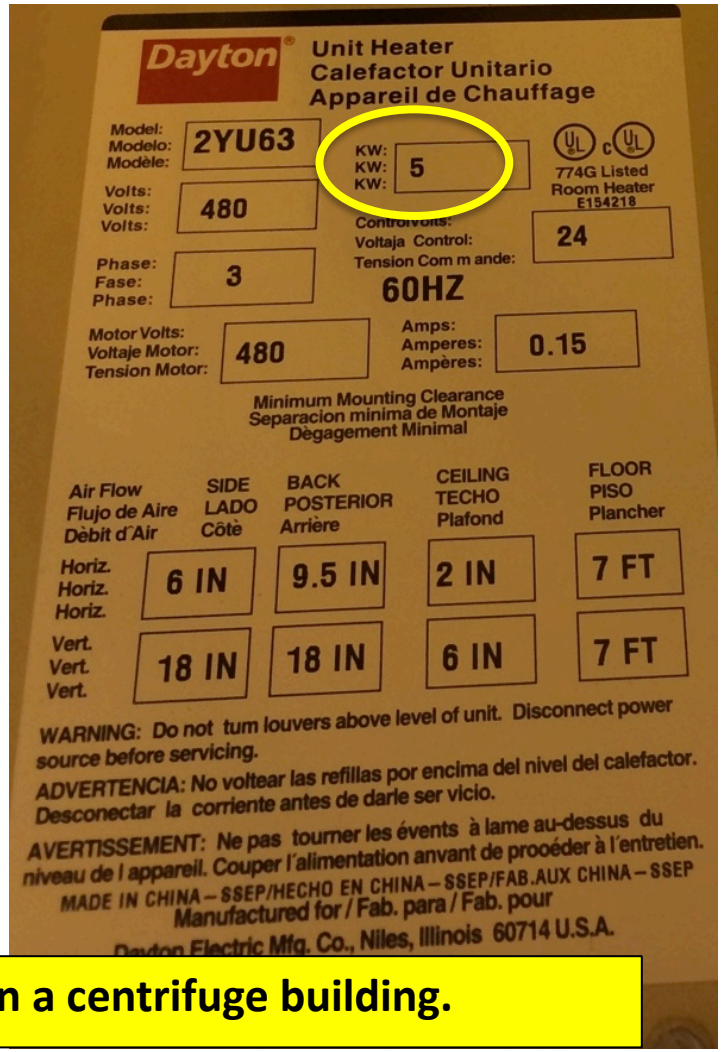
Space Heaters





Six 5kW heaters in a centrifuge building.

I frequently see electric space heaters used in non-occupied spaces. These should be used for freeze protection only and not to keep the space up to 70F or more. They are very expensive to operate. The example here costs over $3 an hour to operate! That adds up very quickly. Consider infrared bulbs for small pump houses. They do not warm the air, but will warm any surface (such as pipe) that they are aimed at.

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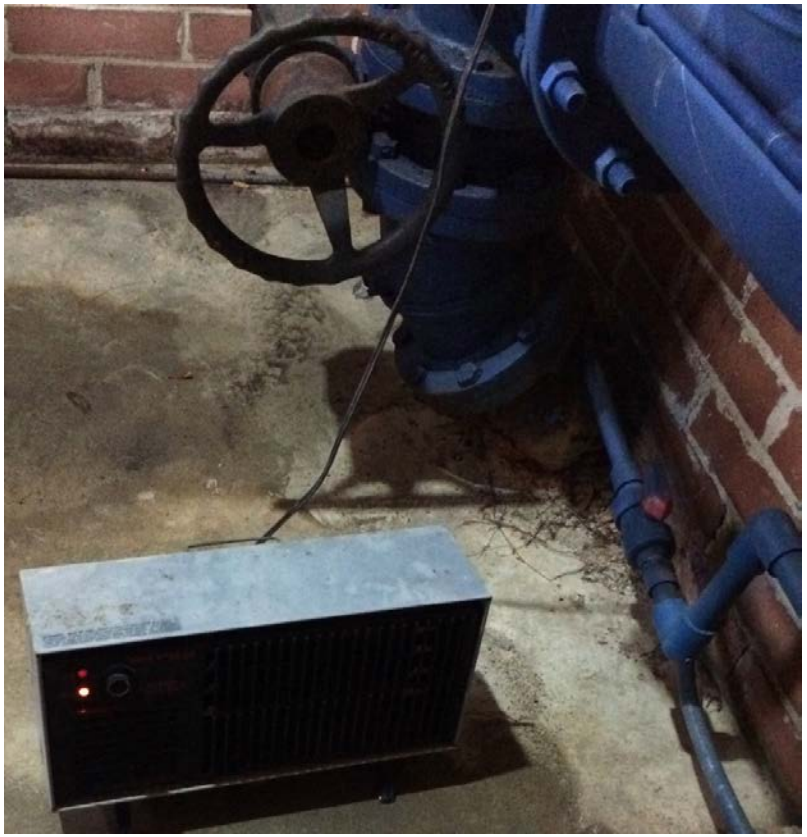
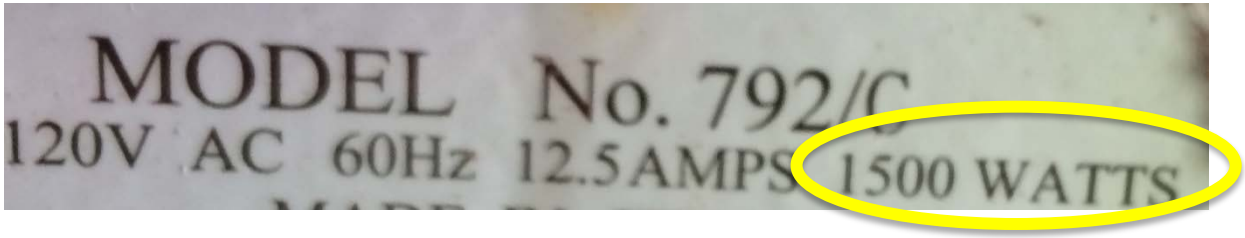
Pump House/Chlorine Shack Heaters





Costs over $100 per month!

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Heat the pipes, not the air! Use of a Thermocube receptacle and infra-red ”chicken lights” is less expensive than heating the air of an entire room with a space heater and is adequate for freeze protection. The receptacle turns on at 35F and off at 45F.

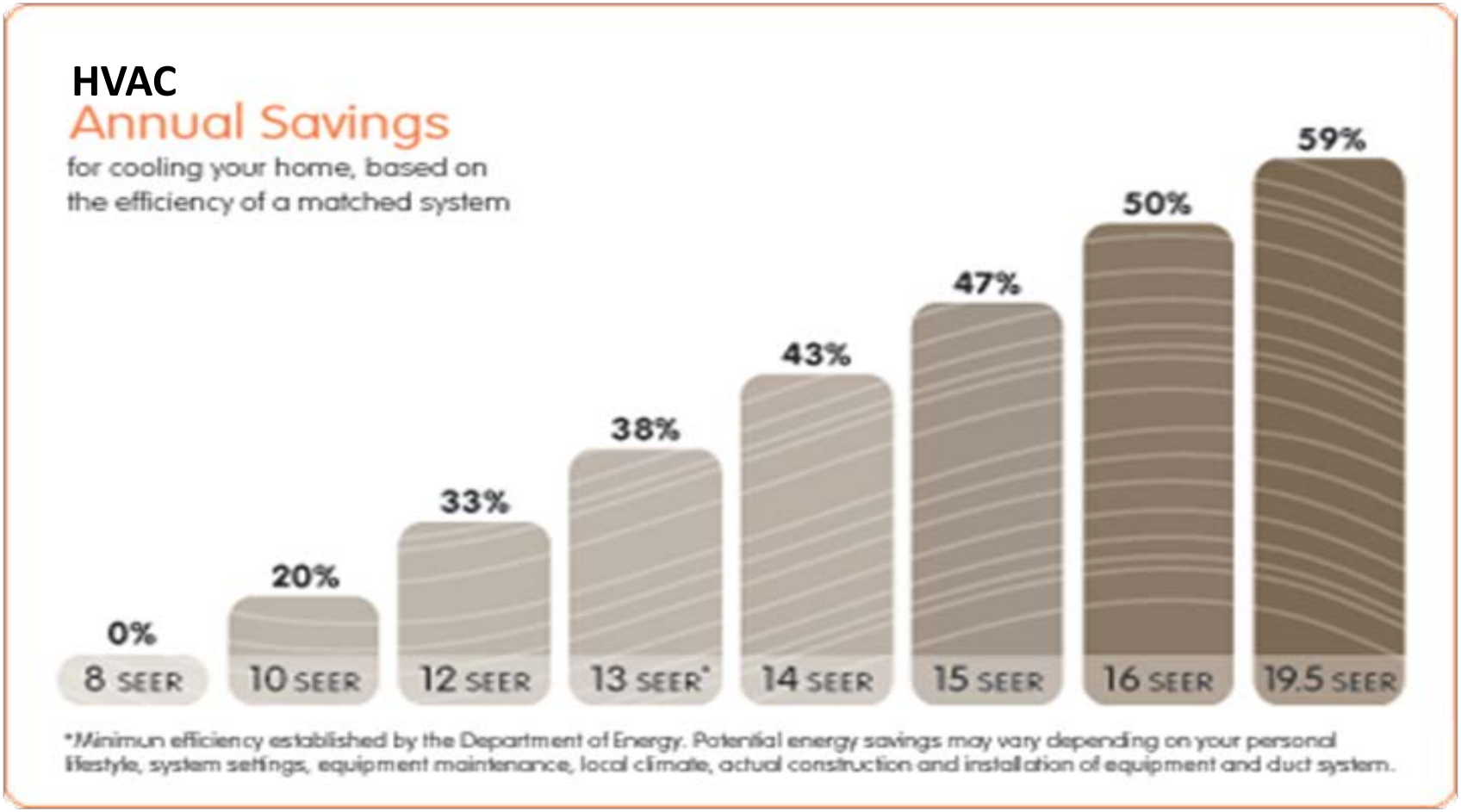
SCRWA

Smart Thermostats

Smart thermostats, such as this Ecobee, do far more than just schedule. They have advanced control algorithms such as optimum start/stop and currently offer free data collection and storage. These can be accessed remotely via smart devices and have customizable reset abilities and access.

SCRWA

HVAC



One thing to consider also is if an hvac unit (resistance heat) needs replaced and it is not a heat pump, it should be upgraded by replacing it with a heat pump. A heat pump will use far less energy to heat (especially above 40F) than an electric resistance heater (about 4 times less).

SCRWA

Vending Misers

- Install Vending Miser on soda machines: http://www.usatech.com/energy_management/energy_vm.php
- Shuts down the compressor and lights when people are not in the area
- Can have a payback of less than one year
- Simple to install requiring little technical skills
- Sometimes soda vendor will supply for free
- Soda still stays cold

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SCRWA

Refrigerated Water Fountains

Use of a programmable receptacle can reduce water fountain power use by 30%

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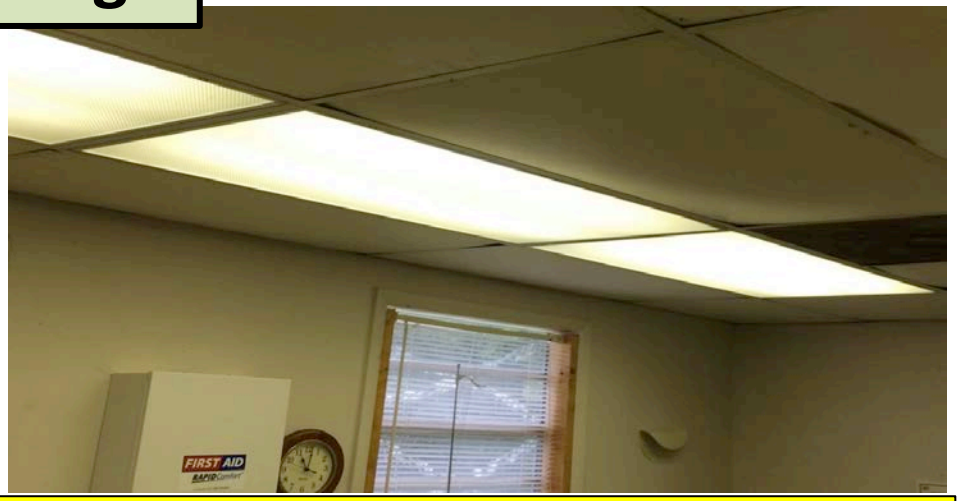
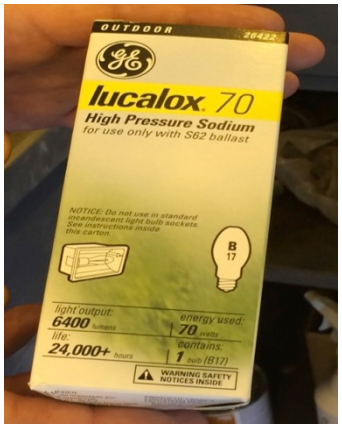
Lighting



This lighting is the older magnetic ballast T12 lighting, which is inefficient, can cause headaches and is becoming obsolete.



This high pressure sodium (HPS) lighting is inefficient, very yellow (poor color rendition).

LED lighting would be a noticeable improvement and could reduce energy usage 50% or more.

SCRWA

This LED floodlight is a good replacement for the existing Quartz floodlights.

LED Tubes are great to replace T12 bulbs

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3 out of 4 outdoor HPS area flood lights were stuck on. This is usually indicative of a faulty or dirty photo eye. These are good candidates for an LED upgrade.

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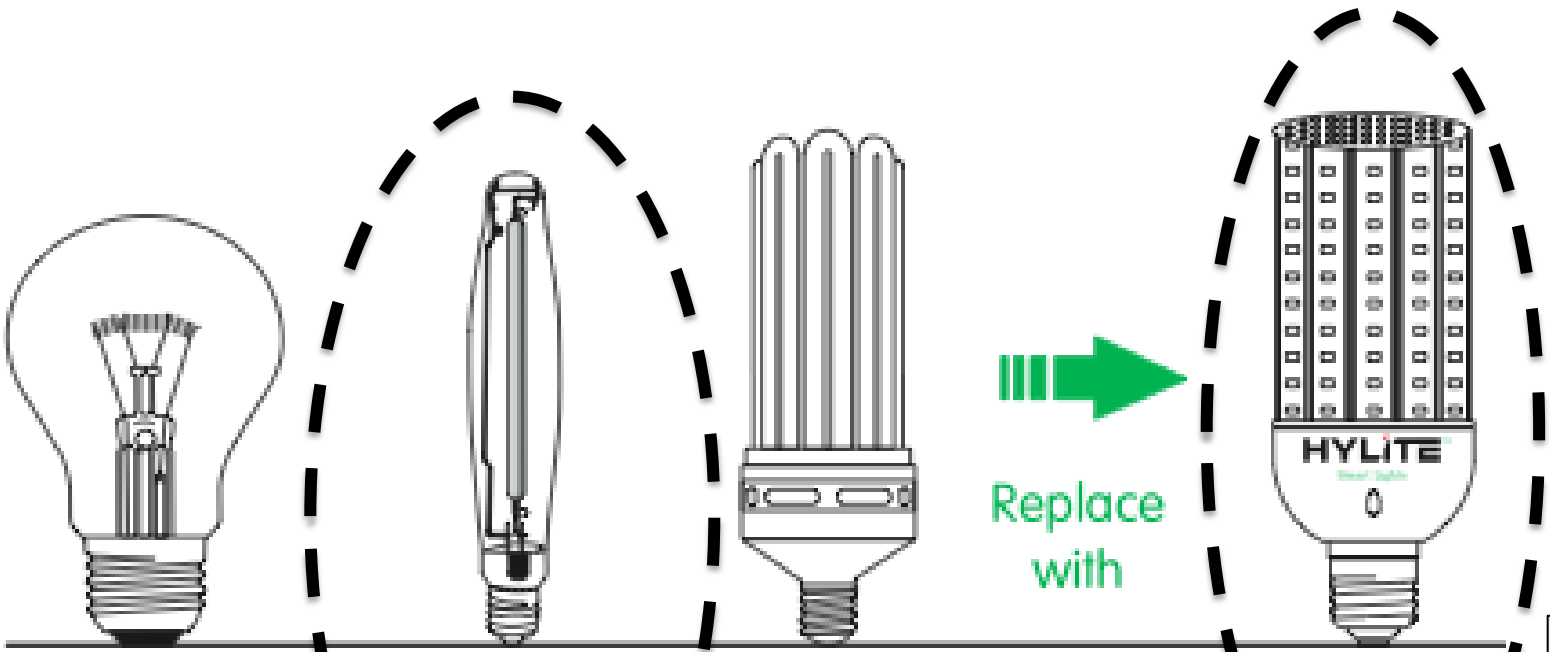

* Does not include Ballast Loss, Maintenance and Replacement Lamp Savings and Disposal Costs which can amount to additional Savings of 30~50%!

The 50watt "Arc Cob" will offer significant savings and better light than 250watt high pressure sodium outdoor lights.

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LED Lighting Advantages

- Low maintenance Costs
  - Big driver for outdoor lighting such as street lighting. HID only good for 10,000 – 25,000 hours
- Energy Efficient
- Eco Friendly
  - No mercury and low UV
    - Attract less insects
- Long Life and Durable quality
  - Much more resilient than traditional fluorescent and incandescent bulbs
- Instant Lighting Brightness and works great in cold
- Typically do not burn out but dim over time
- Focused light: requires no reflectors
- Frequent switching does not harm> Ideal for applications that require frequent on-off cycling
  - Possibility of whole new controls strategy
- Works excellent with controls: motion and dimming
- High CRI (Color Rendering Index)

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LED Lighting disadvantages/concerns

- Can be expensive though that has greatly changed in the last 2 years
- Operating in high temperatures can reduce life
- Can be the Wild West of lighting
  - Technology is evolving fast and some players may not have good quality
  - Standards are still being worked out

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Existing Fixtures					
	Quantity	Wattage	Total kWh	Operating Cost	
T12-4	190	192	85,363	$10,244	
T12-2	5	96	1,123	$135	
T8-4	42	113	11,070	$1,218	
400 watt MH	16	464	13,363	$1,791	
Total			110,920	$13,387	
Proposed new fixtures					
	Quantity	Wattage	Total kWh	Rebate per fixture	Net Cost Each
T8-2	190	56	25,040	$33.92	$4.08
T8-2	5	56	655	$10.00	$28.00
T8-2	42	56	5,504	$14.16	$23.84
T8-6	16	221	6,359	$60.80	$164.20
Savings			Initial Investment	Payback (years)	
	kWh	Dollars			
T8-2	66,358	$7,631	$1,916	0.25	
T8-6	7,004	$939	$2,627	2.80	
Total	73,362	$8,070	$4,544		
Combined Payback (in years)				0.56	

This spreadsheet is a very handy tool in obtaining buy-in for lighting projects. Be sure to research any available rebates: they can be very lucrative.

SCRWA

Existing Fixtures								
Fixture	Location	Qty	Bulbs	Fixture Wattage	Operating Hours	Total kWh	Bulb Count	Operating Cost
T12-2L 8'	WTP pipe galley, filter	24	2	123	2,600	7,675	48	$1,068
T12-3L 4'	WTP throughout	4	3	115	2,600	1,196	12	$166
T8-3L 4'	WTP office area	17	3	88	5,840	8,737	51	$1,216
High Bay MH	Bleach Building	4	1	455	2,600	4,732	4	$659
MH area flood	Raw Water	1	1	295	4,380	1,292	1	$88
MH area flood	WTP	3	1	295	4,380	3,876	3	$264
Total						23,632		$3,198

Proposed new fixtures								
Fixture	Location	Qty	Bulbs	Fixture Wattage	Operating Hours	Total kWh	Bulb Count	Net Cost Each Fixt
LED-2L 8'	WTP pipe galley, filter	24	2	72	2,600	4,493	48	$40
LED-3L 4'	WTP throughout	4	3	39	2,600	406	12	$24
LED-3L 4'	WTP office area	17	3	39	5,840	3,872	51	$24
LED High Bay	Bleach Building	4	1	150	2,600	1,560	4	$180
LED area flood	Raw Water	1	1	100	4,380	438	1	$230
LED area flood	WTP	3	1	100	4,380	1,314	3	$230
Total						12,082		

Savings				Initial Investment	Payback (years)
Fixture	Location	Reduced kWh	Dollars		
LED-2L 8'	WTP pipe galley, filter	3,182	$443	$960	2.17
LED-3L 4'	WTP throughout	790	$110	$96	0.87
LED-3L 4'	WTP office area	4,865	$677	$408	0.60
LED High Bay	Bleach Building	3,172	$216	$720	3.34
LED area flood	Raw Water	854	$58	$230	3.96
LED area flood	WTP	2,562	$174	$690	3.96
Total		15,426	$1,678	$3,104	
Combined Payback (in years)					1.85
Combined ROI					54%
Avg $/kWh Day WTP	*$0.1392*	*Avg $/kWh Night WTP*	*$0.0680*	*RW Avg Night*	*$0.0680*

This spreadsheet is a very handy tool in obtaining buy-in for lighting projects. Be sure to research any available rebates: they can be very lucrative.

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Lighting Summary

- Eliminate frequently used T12
- Eliminate incandescent and HID (HPS, MH)
- Consider motion sensing where it makes sense
  - Prefer “vacancy sensor” because it still requires a manual turn-on and can be manually turned off

Lighting Rebates are becoming very lucrative. For the first time, recently I have recommended LED lighting, because the prices have dropped so much and the rebates are attractive.

EX. PAR38 replacement.
LED bulb= $36.00
Rebate = $30.00
Net cost = $6.00 for a bulb that only uses 15watts (compared to 65watts) and has a very long lifespan

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Domestic Hot Water

Electrical Resistance Water Heaters should only be scheduled during normal work schedules. The mechanical timer has been commonly used for water heaters for many years, but the electronic timer does not lose the timer settings on a power outage and can have battery back-up. Natural Gas should be considered if possible.

SCRWA

Refrigerated Drinking Fountains

Use of a programmable receptacle can reduce water fountain power use by 30%

SCRWA

Summary of Facility ECM's

HVAC (can account for up to 70% of Bldg. energy consumption)

- Schedule
- Set points
- Humidity Control
- Outside Air

Lighting (can account for 10%-30% of Bldg. energy consumption)

- Eliminate incandescent, HID and frequently used T12

Domestic Hot Water, Drinking Fountains

- Is the equipment too big and does it need to be on all the time? Tankless?

Building Envelope

- Repair air leaks (duct especially) first

Office

- Ensure computers, monitors and other office equipment goes to sleep or is turned off when not in use.

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USDA Funding

USDA Program	Total Funds Available	Purpose (What is the program's goal?)	Program Type (How does it work?)	Eligible Applicants (Who can apply?)	Eligible Areas (What is rural?)	Authorized Purposes (What can funds be used for?)	Typical Amount of Assistance	Rates & Terms (rates subject to change)	Key to Success	When to Apply
REAP Renewable Energy & Efficiency Grant	$63.3 MM $735,761 SC allocation	Financing for renewable energy generation systems or energy efficiency improvements	USDA makes grants to small rural businesses & farmers	Rural small businesses (using SBA definition) & agricultural producers	Areas outside the urbanized edge of cities of >50,000 population	Grants for renewable energy systems (wind, biomass, biofuel, digesters, solar, geothermal, & micro-hydro); for purchase & installation of business energy efficiency	$500,000 for renewables; ≤$250,000 for efficiency (not to exceed 25% of project cost)	Grant	Application requirements can be complex, so consult with USDA well in advance of application deadline. **≤ $20,000 grants strongly favored!**	Applications invited annually in the spring; award via national competition
REAP Energy Guarantee Rural Energy Guaranteed Loan	$264.4 MM $6.7 MM SC allocation	Provide incentive for business lending for renewable energy or energy efficiency improvements	USDA guarantees business loans made by banks to small businesses & agricultural producers	Banks and other commercial lenders who make loans to rural businesses	Areas outside the urbanized edge of cities of >50,000 population	The loans guaranteed can be used for the purchase & installation of renewable energy systems or for energy efficiency improvements	85-60% loan guarantees on $50,000 to $25MM loans.	Negotiated by business & lender. Fixed or variable rates, typically near Prime (No balloons)	Lender-driven: There must be a bank willing to make the loan that USDA guarantees. May be combined with a REAP grant.	Year round
REAP Energy Audit Grant	$2.4 MM (no separate SC Allocation)	Support the cost of conducting energy audits for small rural businesses & farmers	USDA makes grants to support the cost of providing rural business energy audits	State or local governments, tribes, colleges, or electric coops & publicly owned utilities	Area served must be outside the urbanized edge of cities of >50,000 population	Grants to defray part of the cost of conducting detailed energy audits for rural businesses (business is expected to pay 25% of audit cost)	≤$100,000	Grant	Very competitive national awards. Experienced, multi-county or statewide programs favored; programs with cost per audit of ≤$2,000	Twice-a-year. Annual competition at national level
§9003 Biorefinery Assistance Guaranteed Loans	$225 MM (no separate SC allocation)	Provide an incentive for business lending that will finance for advanced biofuel commercialization	USDA guarantees business loans made by banks to non-corn starch ethanol biorefineries	Banks and other commercial lenders who make loans to rural businesses	Area served must be outside the urbanized edge of cities of >50,000	The loans guaranteed can be used for development of commercial-scale biorefineries producing advanced biofuels	**80% on loans up to $80MM; 70% on loans to $125MM; $60% on loans $250MM**	Negotiated by business & lender. Fixed or variable rates, typically near Prime (No balloons)	Technically superior proposals that commercialize emerging technologies; strong feasibility study	Once-a-year. Annual competition at national level
SSDPG Small Socially Disadvantaged Producer Grant	$3.4 MM (no separate SC Allocation)	Foster business success of coops of small, minority agricultural producers	USDA makes grants for technical assistance projects	Coops with ≥75% women or minority membership assisting small, minority producers	Areas outside the urbanized edge of cities of >50,000 population	The grant can be used for feasibility or market studies, product improvement, training or legal advice.	≤$200,000	Grant	Preference for experience & projects that help the most farmers & smaller, poorer communities.	Once-a-year. Annual competition at national level.
VAPG Value-Added Producer Grant	$19.3 MM (no separate SC Allocation)	Support producers in ventures that will increase the return on their agricultural commodities.	USDA provides matching grants for value-added ventures	Farmers, ranchers, foresters, fishers – inc. coops, agricultural producer groups, & joint ventures	No rural area requirement.	Grants for planning or working capital to operate value-added ventures, including on-farm renewable energy. Minimum 1:1 match required.	≤$100,000 (planning); ≤$300,000 (working capital)	Grant	Application requirements are complex, so consult with USDA well in advance of application deadline.	Once-a-year. Annual competition at national level
RCDG Rural Coop Development Grant	$7.9 MM (no separate SC allocation)	Support centers to assist cooperatives	USDA makes grants to centers for rural cooperative development	Universities and nonprofit economic development groups	Areas outside the urbanized edge of cities of >50,000 population	Grants are used to operate Centers that assist rural cooperatives.	**$250,000 – ≤$300,000**	Grant	Funding is limited, so these grants tend to go only for projects helping the neediest areas.	Once-a-year. Annual competition at national level

State Office - South Carolina	Columbia	
Vernita F. Dore, State Director		803-765-5163
Gregg White, Program Director	gregg.white@sc.usda.gov	803-765-5881
Specialists:		
Shannon Legree	shannon.legree@sc.usda.gov	803-235-3150
Debbie Turbeville Agricultural Marketing Specialist	debbie.turbeville@sc.usda.gov .	843-669-9686, x133 (Florence)
Website for eligibility:	http://eligibility.sc.egov.usda.gov/eligibility/welcomeAction.do?NavKey=home@1	

Contact us:

SC Area Offices	Area Directors/Specialists	Emails	Telephones
Northwest A.O. I (Anderson, Spartanburg)	Ken King, Area Director	Ken.king@sc.usda.gov	864-224-2126, x115
West A.O. II (Orangeburg, Aiken)	Jesse Risher, Area Director	Jesse.risher@sc.usda.gov	803-649-4221, x117
Northeast A.O. III (Florence, Sumter)	Dwayne White, Area Dir.	dwayne.white@sc.usda.gov	843-669-9686, x140
Southeast A.O. IV (Colleton, Kingstree)	George Hicks, Area Director	george.hicks@sc.usda.gov	843-669-9686, x140
North A.O. V (Chester) (Richland)	Fred Ducey, Area Director	fred.ducey@sc.usda.gov	803-581-1906

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USDA Community Facilities Grant Assistance

www.rurdev.usda.gov "Committed to the future of rural communities"

Florence Area
Stewart Hucks
843-669-9686
ext. 137

Orangeburg Area
Judy Capehart
803-534-2409 ext. 123

Walterboro Area
Nickie Toomes
843-549-1822, ext. 123
Fax: (855) 789-1155
nickie.toomes@sc.usda.gov

Anderson to Cherokee (Northwest)
Larry Durham
864-224-2126 Ext 116

Maximum Federal Grant:	**IF:** Population:	**AND** Median Household Income:
75% of eligible project costs	5,000 or less	$26,346 or less
55% of eligible project costs	12,000 or less	$30,737 or less
35% of eligible project costs	20,000 or less	$35,128 or less
15% of eligible project costs	20,000 or less	$39,519 or less

To better utilize limited funds, the maximum amount of grant assistance is further limited to the minimum amount needed for the project to be feasible and this amount shall not exceed **50 percent of a State's annual allocation or $50,000**, whichever is greater.

Can be used for equipment or energy efficiency projects.

SCRWA

State Revolving Fund (SRF)

The State Revolving Fund (SRF) program provides low-interest rate loans for building or repair to wastewater and drinking water plants or distribution systems and storm water quality improvement projects. The program is managed by the Department of Health and Environmental Control (DHEC) and the Budget and Control Board (BCB).
http://www.scdhec.gov/HomeandEnvironment/BusinessesandCommunities-GoGreen/EnvironmentalGrantsandLoans/StateRevolvingFund/

Within the SRF is a green component that allows for lower interest rates for projects that qualify as "green project reserve" (GPR). Some of the SRF money has to be allocated to these projects. Usually these projects are broken out from larger projects.

SCRWA

NRWA

The NRWA (National Rural Water Association) has a Rural Water Loan Fund (RWLF) specifically designed for small water and wastewater facilities. The RWLF was established through a grant from the USDA/RUS (Rural Utility Services). Here are some key points:

Low interest rate (currently 3%)

Maximum term of 10 years

$100,000 maximum or 75% of the project costs, whichever is less

http://nrwa.org/initiatives/revolving-loan-fund/

SCRWA

Prescriptive Rebate Measures

- Offered on a per-unit basis. Examples:
  - Lighting
  - HVAC
  - Refrigeration
  - Vending Miser

SCRWA

Custom Rebate

- Any project not covered under prescriptive that can meet the requirements
- Must **prove** it saves energy (kWh)
- Must have a reasonable payback
- Utility can pay an incentive up to 50% of the total cost
- Need pre-approval
- Ex. Process VFDs, SCADA

SCRWA

Technical Assistance Incentives

- **Available to existing facilities that use 500,000 kWh or more per year**
- Covers **50%** of one technical assistance service cost every three years up to:
  - **$10,000** if using less than 2 million kWh per yr
  - **$20,000** if using greater than 2 million kWh per yr
- Types of Services
  - Feasibility studies
  - Comprehensive energy audits
  - Retro-commissioning services

Progress Energy
TRADE ALLY

SCRWA

Private Financing

Energy Efficiency Financing					
Company	Contact	Phone #		Email	Notes
		Office	Cell		
Susquehanna Finance	Paul Lee	856-756-3582		paul.lee@susquehanna.net	
Eco-Tech Funding	Emanual Dewick	440-681-8326	206-509-7212	manny@eko-techfunding.com	
Graybar	Kevin Benson	314-573-2508		Kevin.Benson@graybar.com	proposal tool
Northwrite Agile Volt	Patrick O'Neal	503-636-0300	503-890-0300	poneill@northwrite.com	*MESA
Infinite Energy Solutions	Ted Eschrich		248-210-7180	ted@ies-led.com	Municipal Service Contracts / Shared Savngs
Enerlinc	Matthew Smith	317-577-0337		msmith@enerlinc.com	
Building Energy	Ross Reida	503-807-2141		ross.reida@buildingenergy.com	
Ascentium Capital	Alex Depping	281-348-0334		AlexDepping@AscentiumCapital.com	
Noesis	Kerin LeClair	512-684-8446 Ext:1170		kleclair@noesis.com	Annual Contract Fee but many additional support services
**Managed Energy Services Agreement*					

These companies specialize in "no money out of pocket" energy efficiency financing.

SCRWA

ConserFund **from the SC Energy Office**

- Low-cost loan program (currently 2%) available for energy efficiency improvements in
  - State Agencies
  - Schools
  - Public Colleges and Universities
  - Private Non-profit Organizations
- Loans available for 100% of eligible project costs
- Projects can be lumped together under one loan (in fact it is encouraged!)
- As long as payback is 8 years (can sometimes be stretched to 10) or less, support fees (such as energy audit or engineering) can be rolled into the loan.
- $25,000 minimum and $500,000 maximum *per year*

SCRWA

ConserFund Advantages

The biggest advantage of ConserFund is the loan structure

- Loans are structured so that the loan can be repaid out of utility bill savings
- Because of this, the loan presents a net savings on your annual budget- You save more than you pay!
- Loan repayment starts *after* project completion so that utility savings can accrue before you make any payments on your loan
  - Payments can be delayed for up to a year after project is completed.

SCRWA

Questions?

SCRWA