The Top 10 Things Every Golf Course Manager Should Know

to reduce energy and carbon

some background…

GRG THE GOLF RESOURCE GROUP

Environmental & Turf Services, Inc.

CARBONSAVE FOR GOLF™

A joint effort between Dr. Stuart Cohen and The Golf Resource Group

goals of our work

- **SAVE COURSES MONEY!**
- *educate the industry*
- do our best to accumulate quantities
- *use utility outreach programs to foster upgrades*
- Do our part to help position golf as a leader in the new era of sustainability

the Top 10 list…

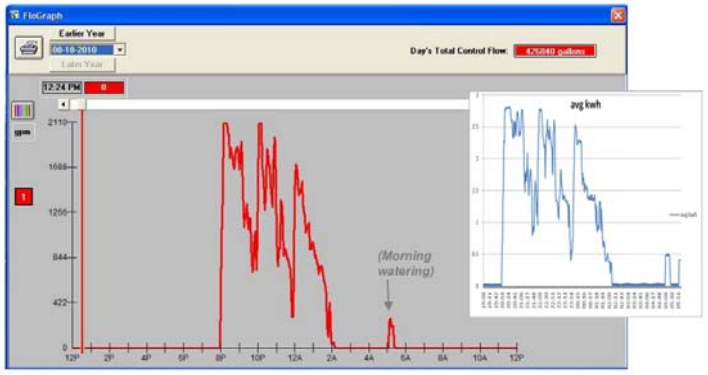
1. Increase Pump Efficiency
2. Understand Central Control Efficiency
3. Take pumps off-line during the year
4. Manage when carts are being charged
5. Reduce water use to save water AND energy
6. Become Efficient First!
7. Vanpool employees around the course/facility
8. Maximize the efficiency of maintained areas
9. Not all turf is created equal
10. Turn off your equipment!

Kilowatt Hours per Acre Foot*

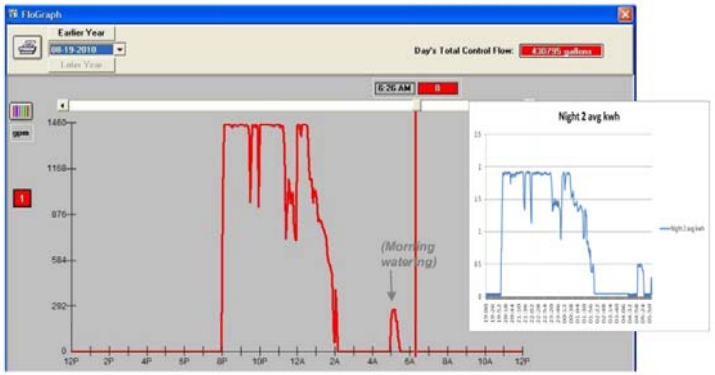
- **Excellent**
- **Good**
- **Fair**
- **Poor**
- **Very Poor**
- **Worst**

*Source: The Golf Resource Group

Desert Mountain Golf Club – Renegade Course
Scottsdale, AZ



Flow Graph #1 (in red). Inset is the corresponding kWh use during the irrigation cycle of night #1.



Flow Graph #2 (in red). Inset is the corresponding kWh use during the irrigation cycle of night #2.

Night #1 – No adjustment (2,100 gpm)

- *426,840 gallons pumped*
- *634.53 kWh*
- *484.4 kWh/AcFt*

Night #2 – Reduced flow (1,450 gpm)

- *430,795 gallons pumped*
- *597.22 kWh*
- *451.7 kWh/AcFt*

Night #2 reduced energy use by 6.75%

#2 - Understand your Central Control

SAVING OPPORTUNITY:

- ✓10% to 30% overall station energy reduction
- ✓$1,500 to $4,500 per year *($0.10/kWh ave)* per typical (3) - 75hp pump system

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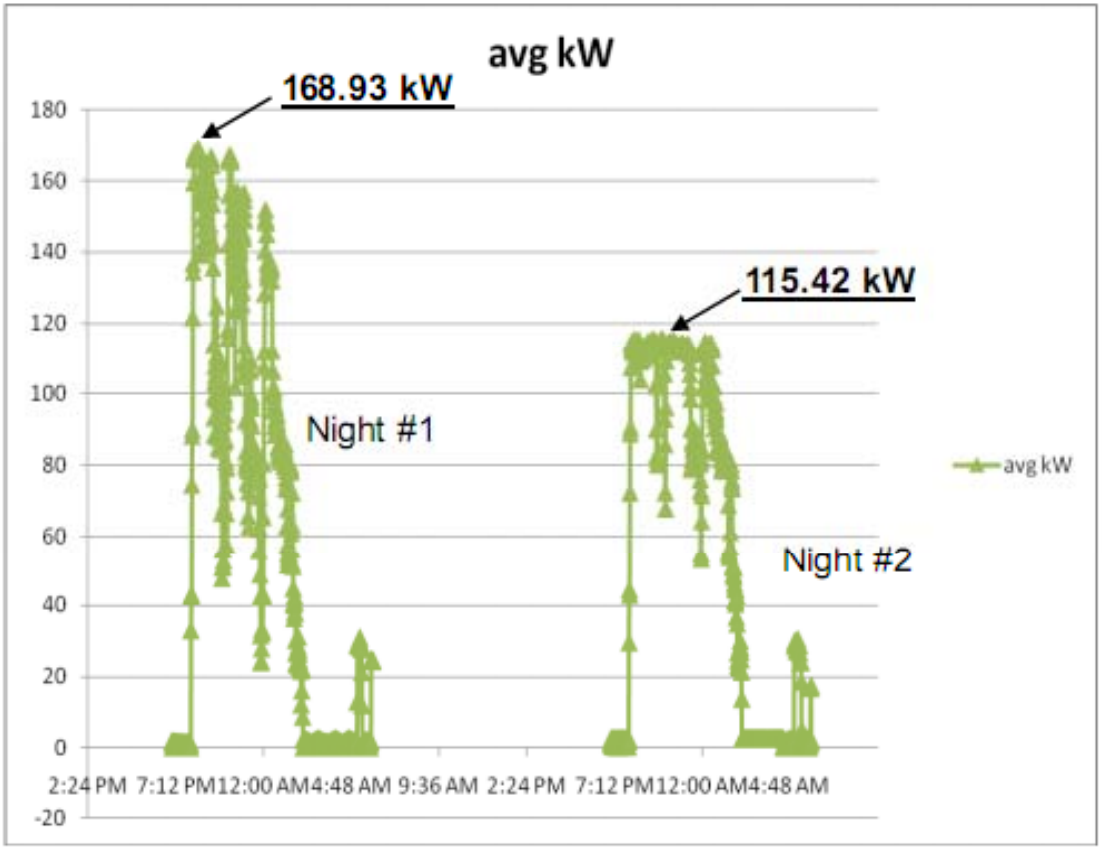

Figure 4.2.4 The maximum average kW demand was recorded during the overnight monitoring.

#3 - Take pumps off-line during the year

SAVING OPPORTUNITY:

- 168.93 kW – 115.42 kW = 53.51 kW
  - ✓ *PG&E (CA) = $0.00/mo savings*
  - ✓ *SMUD (CA) = $355.84/mo savings*
  - ✓ *APS (AZ) = $100.59/mo savings*
  - ✓ *Xcel (CO) = $800.65/mo savings*

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TORO
0124

UgMO™


WaterSwitch
WET
OFF
DRY
Soil Moisture Switch
IRROMETER


42.6 Ac.
31.1% reduction
SOLAR
WATER
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

#5 - Reduce water use

SAVING OPPORTUNITY:

- ✓ 1 acre of irrigated turf = 250,000 – 1,000,000 gallons/year (.75 - 3.0 acft/year)
- ✓ *Eliminating 3.0 acft of water can reduce energy use by over 5,000 kWh/yr*
- ✓ *Water cost savings = $0 to $3,000/acre/yr*
- ✓ *Energy savings = $500/acre/yr*
- ✓ *plus possible reductions in kW demand $*

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= $0.11 per watt

= $4.75 per watt

#6 - Become efficient first!

- *CFL Calculations:*

  26-watt CFL replaces a 60-watt incandescent bulb (60 watts minus 26 watts = 34 watts)

  Cost = $3.99

$3.99 ÷ 34 watts = $0.117 per AC watt

- *Solar Calculations:*

  Last solar project estimate =
  $4.50 per DC watt or $4.75 per AC watt

#6 - Become efficient first!

SAVING OPPORTUNITY:

- ✓ 10,000 to 250,000 kWh savings for efficiency improvement projects
- ✓ $1,000 - $25,000 savings/year
- ✓ Some paybacks less than 1 year, with rebates

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Interesting, strategic mowing patterns can be accomplished by tailoring equipment constraints to the design of the golf course features.

Bunker design on the left results in 30%-50% less maintenance than the bunker on the right.

#8 - Maximize the efficiency of maintained areas

SAVING OPPORTUNITY:

- ✓ 50% reduction of hand labor budget around features
- ✓ Fuel budget for mowing = 5 - 8,000 gallons
  5% reduction = 250 - 400 gal
- ✓ Savings estimate: $5,000 - $15,000/year

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An example of focusing efforts on main play areas. Note how rough is watered and fertilized to blend into natural grasses and out-of-play areas.

#9 - Not all turf is created equal

SAVING OPPORTUNITY:

- ✓ Reduce fertilizer use in roughs by 50%
- ✓ Reduce mowing and fuel use by 5-10%
- ✓ **Increase in growth regulator by 40% (5-8 gal)**
- ✓ Increase pesticide use by 5-20%
- ✓ Cost savings = neutral?

Note: CO2 emissions of 1 gallon of primo = 1 gallon of gasoline

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U.S. News MONEY BUSINESS & ECONOMY

The PC's Dirty Little Secret: It Wastes Power Shamelessly

But you can buy Energy Star models—and turn them off, too

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

ENERGY STAR

THE CBS INTERACTIVE BUSINESS NETWORK

YAHOO! GREEN

How to cut office equipment's operating costs: turn it off

Answers.com® | WikiAnswers®

user-generated content: report abuse

When to turn off pool pump to save energy? [Improve]

In: Energy Conservation [Edit categories]

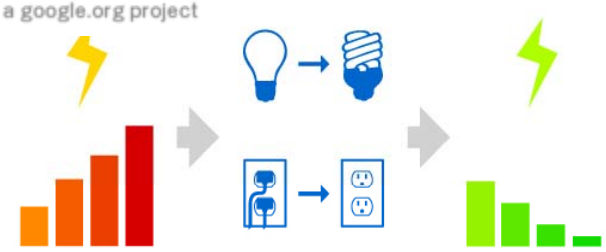
California Energy Commission

Consumer Energy Center

Eliminate wasted energy. Turn off lights in unoccupied rooms. Unplug that spare refrigerator in the garage if you don't truly need it - this seemingly convenient way to keep extra drinks cold adds 10-25 percent to your electric bill. Turn off kitchen and bath-ventilating fans after they've done their job - these fans can blow out a house-full of heated air if inadvertently left on. Keep your fireplace damper closed unless a fire is burning to prevent up to 8 percent of your furnace-heated air from going up the chimney.

Google powermeter

a google.org project



Track your energy. Use less. Save energy & money.

Want a lower bill? Cut your energy usage

Summary

- Must assess and establish a ‘Baseline’
- *A reduction of a carbon footprint will lead to verifiable cost savings*
- Reduce energy to make the largest impact on your footprint

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