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# Approach to Conserve Water & Power in Southern California

Andy Slack

Spot Water Management, Inc.

[aslack@spotwater.com](mailto:aslack@spotwater.com)

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# Current power & water utilities issues

## *Summary*

- Energy & water costs are rapidly increasing
- Need to create more incentive monies for end users to upgrade/replace equipment to improve efficiency
- Cooperation between power and water utilities and their rebate programs is needed
- Most water purveyors do not have the mechanisms or people in place to service a large landscape's or golf course's needs
- Water utilities are only looking 'inside the box' for rebate program ideas
- There is little understanding of water & energy use in the golf industry and even less available expertise as to how a golf course or large landscape site should manage its use

# Southern California Edison Golf Energy Efficiency Program

## *Who is Involved*

- Parties involved with program
  - **SCE – Southern California Edison** –Utility for the majority of S. California
  - **GRG - Golf Resource Group** – Marketing Company - administering the rebate program for Golf Energy Efficiency Program
  - **AESC - Alternative Energy Systems Consulting** – Engineering firm performing the calculations
  - **SWM - Spot Water Management, Inc.** –Irrigation expert – Audit work & inputs on pump station, uniformities & irrigation efficiencies. Made recommendations for upgrades/improvements to irrigation system & pump stations to improve energy & water efficiency.



# Southern California Edison Golf Energy Efficiency Program

## *Information on the program*

- Pilot Program to the Golf Course customer segment
- Golf was not being served – other market segments within SCE, thought was covered by others – hospitality, restaurant, etc.
- SCE rebate program was a sub program to the Ag Energy Efficiency Program (AEEP)
- Rebates were not always pump (Ag) related – lighting, HVAC, cart charging
- Additional rebate incentives were available that were not part of the AEEP program
- Rebates were based on kWh saved in the first year, as little as \$0.08 per kWh up to of \$0.14 per kWh



# Southern California Edison Golf Energy Efficiency Program

## *Information on the program*

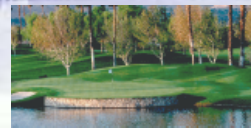
- Flat rate rebate – ‘express incentives’ for installing premium efficient motors – dependent upon motor size
- Direct install program – used for mass change outs of lighting on large commercial properties such as HOAs
- Preferred criteria for audit
  - At least a 10-15 year old irrigation system
  - Large energy user
  - Multiple golf courses/site
  - Multiple pump stations



# Southern California Edison - Golf Energy Efficiency Program

## *How the process worked*

- SCE advertised the program to golf courses in their service territory
- GRG or SWM contacted courses and scheduled audits
- SCE supported through customer reps, web site, and call center
- Historical Use data was pulled through Utility Company
- Based on opportunity, customer was forwarded to specialist for appointment
- SWM set appointment for a site visit & performed audit



### INTRODUCTION

Staples Marketing is offering the Agricultural Energy Efficiency Program (AEEP) for Golf Course Customers (The Golf Course Program), an incentive program designed specifically to facilitate the implementation of cost effective, energy-efficient hardware for the golf courses in the SCE service territory. This program provides a cost-benefit analysis for new and retrofit golf course pumping/irrigation equipment and practices in the SCE region, and incentives for purchase/installation of new equipment. The Golf Course Program provides for additional incentives from participating pumping systems manufacturers. An entire facilities audit will be offered to determine additional savings.



Administered by



### Project Eligibility

The Golf Course Program is available to all golf course customers within the SCE service territory with projects that result in quantifiable improved energy efficiency and/or a reduction in peak electricity demand. Eligibility requires at least one meter on an eligible rate schedule.

### Provided Documentation

As a part of The Golf Course Program, a completely FREE energy audit will be done to the pumping system and adjoining buildings. The provided documentation will describe the existing hardware, the associated inefficiencies of that hardware, the recommended improvements and a cost-benefit analysis of the proposed improvements. This audit will be provided at NO COST to the customer. Recommended installation contractors will also be provided.

### Application Process

All participants must submit an application in order to qualify for the program. A letter acknowledging the receipt of the application will be sent to the applicant within 7 days. The Golf Course Program team will review all applications for eligibility and completeness. Applications will be reviewed and processed in the order they were received. Incomplete applications will not be processed, applicants will be notified and application will be held until all information is received. Applicants will be placed on a priority list based on project start date and level of potential savings. Incentives are available on a first come, first serve basis.

### The AEEP Program Team

Staples Marketing & Golf Resource Group  
228 Santa Monica Blvd.  
Santa Monica, CA 90401  
Phone: (480) 206-1134  
Fax: (240) 597-5814  
email: [energyteam@staplesmarketing.com](mailto:energyteam@staplesmarketing.com)

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IRRIGATION  
ASSOCIATION





# Southern California Edison - Golf Energy Efficiency Program

## *How the process worked*

- On site audit by SWM took 1-4 hours depending on the size/scope of the site
- Primary focus was on pump stations but also looked extensively at:
  - Pumps: well, recirculation, fountains
  - Irrigation central: hydraulics, scheduling, groupings, programming
  - Sprinklers: type, pressure regulation, nozzling, spacing, uniformities
  - As-built: pipe size, sprinkler spacing, looping
  - Clubhouse: HVAC & cooling towers, walk-in freezers/ refrigerators, lighting – building and landscape
  - Carts: cart charging systems
- 1-2 month turnaround on report delivery

### Application for Enrollment



Applicant Information			
Name of Golf Course			
Name as it Appears on Utility Bill			
Name of Contact Person	Title		
Office Phone #	Fax #		
Email Address	Cell Phone #		
Address (Where Audit Completed)			
City, State, Zip (Where Audit Completed)			
Mailing Address (if Contact Person)			
City, State, Zip (if Contact Person)			
SCE Account # and Rate Schedule			
Taxpayer ID Number (SSN/EIN)		Tax Status (Individual, Partnership, Corp., Exempt)	
Golf Course Information			
Project Timeline		Funding Approved?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending
Type of System	<input type="checkbox"/> Vertical Turbine <input type="checkbox"/> Centrifugal	Manufacturer & Year Installed:	
Number of Pumps / Flow	___ Pumps / ___ Gpm at ___ Psi	Ave. Run Hours per Year:	Hours
Current Pump Tests Available?	<input type="checkbox"/> Yes (please include) <input type="checkbox"/> No	Do you have a booster pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Flow meter?	<input type="checkbox"/> Yes Type: _____ <input type="checkbox"/> No	Maintenance Pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Programmable Control?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Irrigation As-Built Available?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Participated in any SCE Energy Audits before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you currently use Time Management Load Control?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Contact Name for questions concerning Irrigation System		Contact Phone #	





# Southern California Edison Golf Energy Efficiency Program

*How the process worked – typical older pump station*





# Southern California Edison Golf Energy Efficiency Program

*How the process worked – newer pump station*



# Southern California Edison Golf Energy Efficiency Program

*Sample rebate information & estimated kWh savings*

#	Measure Description	Energy and Cost Savings			Project Payback		Payback with Incentive		
		Demand Savings (kW)	Annual Energy Savings (kWh)	Estimated Cost Savings (\$/yr) <sup>1</sup>	Estimated Measure Cost <sup>2</sup>	Estimated Simple Payback (yr)	Estimated Potential SCE Incentive <sup>3</sup>	Estimated Net Measure Cost	Estimated Simple Payback Period (yr)
1	High Zone Pump Station Main Motors	0.0	26,814	\$1,754.02	\$12,500	1.1	\$2,145.15	\$10,354.85	2.8
2	High Zone Pump Station Motors	0.0	6,150	\$861.01	\$15,000	17.4	\$710.00	\$14,290.00	16.6
3	Low Zone Pump Station Main Motors	0.0	12,257	\$1,716.05	\$12,500	7.1	\$980.60	\$11,519.40	6.7
4	Low Zone Pump Station Motors	0.0	2,776	\$188.60	\$15,000	18.6	\$460.00	\$14,540.00	17.4
5	Well Pump Upgrades <sup>4</sup>	0.0	41,669	\$5,811.66	\$10,000	5.1	\$1,111.52	\$26,666.48	4.6
Total		0.0	89,667	\$12,551.15	\$85,000		\$7,629.27	\$77,370.73	

<sup>1</sup> assumes 30.14/kWh rate

<sup>2</sup> Estimated measure cost was provided by one pump service provider. Customer shall verify all installation costs.

<sup>3</sup> Incentive For New Motors is based on Express Efficiency rates.

<sup>4</sup> Energy Savings Based on SCE Pump Services Report



# Southern California Edison Golf Energy Efficiency Program

## *Deliverables to SCE customer*

- Written report on potential energy efficient upgrades at property
  - Change out lighting
  - Install curtains on walk in freezers
  - Install cart charging system
- Recommendations on energy efficient upgrades for pump station and irrigation system
  - Premium efficient motors
  - Jockey pump
  - VFD
- Estimated kWh usage for major pump station components
- Estimated kWh savings if upgrades installed/performed

### Existing Pump Baseline Data Testing

#### Description:

The pump station at Chaparral Country Club consists of (4) total pumps. Of these, only (1) 50 HP, an (2) 100 HP pumps are currently being used. The station is fitted with a small pressure maintenance pump (PM) that is not being used as the pump is broken. The station is a Cloudburst Engineering station and was installed in 2004.

	Pump #1	Pump #2	Pump #3	Pump #4
Motor	US Electric	US Electric	US Electric	PM (not used)
HP	50	100	100	
RPM	1780	1780	1780	
Model	R998301-609	R9913-01-60	D09-5332A-H	
Motor Eff.	94.5	n/a	94.5	
PF	n/a	n/a	n/a	
Pump	n/a	n/a	n/a	
VFD Make	Siemens			
VFD Model	Micromaster 440			

Baseline annual energy use listed below is the 3 year billing history average obtained from SCE. Peak demand was also obtained from SCE records. The pump station is fitted with (2) meters, 349M-1097, which is a TOU meter and 2416-2180. Billing history for both meters was added together to determine the total pump station annual energy use. Historical water flow was provided by golf course in the form of 10 year billing history from Coachella Valley Water District (CVWD). The average water use over the past 3 years was utilized to be consisted with annual energy use estimate.

<sup>1</sup> Historical flow acre ft/year

861.4 acre ft

<sup>2</sup> 3 year average annual energy usage (meter #349M-1097)

372,848.80 kWh

<sup>2</sup> Peak demand (meter #349M-1097)

169 kW

<sup>2</sup> 3 year average annual energy usage (meter #2416-2180)

73,063.80 kWh

<sup>2</sup> Peak demand (meter #2416-2180)

0 kW

Total Pump Station Energy Use

445,912.60 kWh

Total Pump Station Demand

169.00 kW

<sup>1</sup> obtained from CVWD

<sup>2</sup> obtained from SCE

Chaparral Country Club  
1-Aug-07

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# Southern California Edison - Golf Energy Efficiency Program

## *Deliverables to SCE customer*

- Estimated kWh savings for each upgrade made
- Estimated rebate monies customer would receive if they made upgrades
- Estimated financial savings from rebates as well as kWh savings
- Financial feasibility & ROI including the number of years to pay off investment for making upgrades
- Post Inspection/Installation form



### Agricultural Energy Efficiency Program For Golf Course Customers Installation Report

Project Name: \_\_\_\_\_ Project Sponsor: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Application #: \_\_\_\_\_  
(Date that equipment was installed and operating properly)

#### Energy/On-Peak Demand Savings and Incentive Adjustment

For measures with changes made during installation, use this section to calculate the revised installed energy usage, energy savings, peak demand reduction, and incentives. Attach the appropriate calculation backup: the output from the Estimation Software, Calculate Energy Savings Total or the calculation sheet to that document the engineering calculations. For Calculated Savings measures with no changes, fill in only the Energy Savings, Energy Incentive and Demand Reduction from the Approved Application (from Form 3).

Energy Savings					
Calculated Measure #	Baseline Usage (kWh)	Installed Usage (kWh)	Energy Savings (kWh)	Incentive Rate (\$/kWh)	Energy Incentive (\$)
1					
2					
3					
4					
5					

Calculated Energy Savings Total: \_\_\_\_\_ kWh      Calculated Savings Incentive: \_\_\_\_\_

On-Peak Demand Reduction			
Calculated Measure # from above	Baseline On-Peak Demand (kW)	Installed On-Peak Demand (kW)	On-Peak Demand Reduction (kW)
1			
2			
3			
4			
5			

On-Peak Demand Reduction: \_\_\_\_\_ kW

**Total Project Cost (\$)**

\_\_\_\_\_

**Incentive Rates**

Lighting    \$0.15 / kWh    Other    \$0.10 / kWh

AC/EC    \$0.14 / kWh

\*The incentive is capped at 60% of each measure installed cost. Project totals are limited to \$60,000 in incentives. An adjustment may be made after review of project costs.

#### Installation and Operation Statement

\_\_\_\_\_, (Project Sponsor or representative), the undersigned, hereby certifies that the Energy Efficiency Measures have been installed, functionally tested, and proven capable of operating and being maintained to perform in conformity with their design intent. The installation date of operation of the Energy Efficiency Measures and any required move monitoring data collection per approved M&V plan, are also certified. Check the appropriate box:

- ☐ No changes to the proposed measures have been made since the Application and the Project Sponsor verifies that the Application approved savings calculations are correct.
- ☐ Due to changes to the proposed measures, appropriate adjustments in the savings calculations have been made.

Signature: \_\_\_\_\_ Name (please print): \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

# Southern California Edison Golf Energy Efficiency Program

## *Results of program*

- Approximately 4.5 million kWh saved annually
- Approximately \$620,000 /year saved
- Reached 125 golf courses (out of 320)
- 55 energy savings projects/sites
- Program developed sub-programs with:
  - City of Palm Desert
  - 23 courses in the Palm Desert partnership



# Southern California Edison Golf Energy Efficiency Program

## *Success of SCE GEEP*

- Estimated kWh savings
  - For entire program ~ 4.5 million
  - Per customer ~ 50,000-100,000 kWh
  - Largest customer ~ 325,000 kWh/\$45,000
- Number customers that took advantage of program ~ 50
- Identified opportunity with not just golf courses but entire developments
- Customers were overwhelmingly in support of program
  - Timing was not good due to downward trend of economy
- Developed process for statewide effort & process to take to other regions of the country



# Golf Energy Audit Program

## *Areas for improvement*

- Issues with SCE program

- Incentive money was not enough to tip the scale to get more movement/upgrades done
  - Adding a water utility partner would improve action
- More money used for administrative cost portion than preferred
- Not as much public money available in areas other than CA yet
- Need to look at all upgrades (pumping, irrigation, lighting, HVAC, etc.) for financial analysis to make more sense for facility
- Concept really only works if paying high amount for kWh (\$0.11-\$0.14/kWh) or having high use during peak times
- More education is needed in the golf development market segment on energy & water use



# Water Savings Program Proposal

## *Leverage Energy Audit Programs*

- Water Purveyor to partner with local power utility
  - Double or triple incentive available for upgrades to end users
  - Increase of incentives creates greater likelihood that energy & water efficient upgrades will be made
- Same data gathered on irrigation system
  - Much of the irrigation data gathered for energy audit is of use for an irrigation audit for large turf/landscape sites
- Water pumped = energy used – mutual benefit
  - The less water used, the lower the operational cost for customer, & power & water utilities – everyone wins



# Water Savings Program Proposal

## *Leverage Energy Audit Programs*

- Will require better record keeping and use data
  - Utilities will have to work together to help customers benefit from savings
- Better development health
  - Reduced costs of development
  - Greener philosophies
  - Better quality in landscape
  - Increased awareness in community





# Water Savings Program Proposal

*Encourage more water savings*

- Data needed from site
  - Irrigation Central database
    - Scheduling of irrigation
    - Hydraulics
    - Organization/setup
  - Sprinkler type/model/nozzle
    - Room to improve performance
    - Spacing
  - Operating pressure
  - Uniformity
  - Annual water use
  - Irrigated acres



# Water Savings Program Proposal

*Encourage more water savings*

- Potential improvements
  - Central programming
    - More efficient operation/scheduling of irrigation
    - Improve hydraulics
  - High efficiency nozzles
    - Improve system uniformities to apply less water
  - Install soil moisture sensors
  - Weather station
    - Apply water that is lost from ET





# Water Savings Program Proposal

*Encourage more water savings*

- Additional improvements
  - ET controllers – with web central
    - Popular solution currently
    - Garbage in = garbage out – if old controllers were operated properly there would not be a need for these
  - Improve spacing issues
    - Expensive undertaking but can help significantly
  - Increase uniformity
    - Bottom line is less water need be applied if improve uniformity



# Water Savings Program Proposal

## *Deliverables to end user*

- Written report on potential water efficient upgrades at property
  - Change out sprinklers/nozzles
  - Improve scheduling in irrigation central
  - Redo hydraulics in central
  - Reprogram irrigation central
  - Change sprinkler spacing
  - Add looping to system
  - Lower pressure output of PS
- Estimated A-ft savings if upgrades installed/performed
- Estimated \$\$ savings for potential water saved by making upgrades
- Rebate monies available to customer from WD/energy utility

### Existing Pump Baseline Data Testing

#### Description:

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# Water Savings Program Proposal

## *Potential water & energy savings – example calculations*

- Potential water savings
  - 10 large turf properties ~ 100 acres each
    - Water use - ~ 300 A-ft/year/site -> ~ 3000 A-ft of water used/year
  - 10% water savings/year ~ 300 A-ft less usage
    - Water cost savings ~ \$300/A-ft x 30 A-ft/yr/site -> \$9,000 less in water cost/site/year
- Potential energy savings
  - 10 large turf properties ~ 100 acres each
    - Energy use - ~ 300,000 kWh/year/site -> ~ 3,000,000 kWh of energy used/year
  - 10% energy savings/year ~ 30,000 kWh less usage/year
    - Energy cost savings ~ \$0.12/kWh x 30,000 kWh/yr/site -> \$3,600 less in energy cost/site/year
- Combined potential savings
  - \$9,000 + \$3,600 = \$12,600 savings per year for a 100 acre site





# Water Savings Program Proposal

## *Summary*

- Power & Water utilities should partner up more frequently to provide customer with more rebate/incentive money to make water/energy efficient upgrades to irrigation system equipment
- Audit site visits can be combined to gather valuable information for both water & power evaluations and recommendations
- Specialized knowledge of large irrigation systems is needed to provide this service to customers
- HUGE potential savings in water use and energy use in large metropolitan areas





# Approach to Conserve Water & Power in Southern California

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Spot Water Management, Inc.

[aslack@spotwater.com](mailto:aslack@spotwater.com)

408.288.8153x101

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