STATE OF CALIFORNIA
PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

Edmund G. Brown Jr., *Governor*

April 3, 2012

Advice Letter 3247-G/3925-E

Brian K. Cherry
Vice President, Regulation and Rates
Pacific Gas and Electric Company
77 Beale Street, Mail Code B10C
P.O. Box 770000
San Francisco, CA 94177

Subject: SCE and PG&E Request to Provide Stand-Alone Solar-Powered Water Circulators as a Measure in the 2010-2012 Energy Efficiency Portfolio

Dear Mr. Cherry:

Advice Letter 3247-G/3925-E is effective November 12, 2011.

Sincerely,

Edward Randolph

Edward F. Randolph, Director
Energy Division

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Akbar Jazayeri
Vice President of Regulatory Operations

October 13, 2011

ADVICE NO. 2640-E
(Southern California Edison Company – U 338-E)

ADVICE NO. 3247-G/3925-E
(Pacific Gas & Electric Company – U 39 M)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA
ENERGY DIVISION

SUBJECT: Southern California Edison Company and Pacific Gas and Electric Company Request to Provide Stand-Alone Solar-powered Water Circulators as a Measure in the 2010-2012 Energy Efficiency Portfolio.

In compliance with Decision (D.)09-12-022, Southern California Edison Company (SCE), and Pacific Gas and Electric Company (PG&E) hereby submit for filing this advice letter showing stand-alone solar-powered Water Circulators to be cost-effective on a stand-alone basis.[1] All necessary supporting documentation is attached hereto.

PURPOSE

The purpose of this advice letter is to provide the information required by the California Public Utilities Commission (Commission) in Ordering Paragraph No. 2 of D.09-12-022.

BACKGROUND

On March 16, 2007, PG&E filed a Petition to Modify D.05-04-051 to include Stand-alone Solar Powered Equipment within the Policy Rules' Definition of Energy Efficiency (EE) Measure. This Petition was filed after PG&E became aware of new solar water circulation technology that could potentially capture significant cost-effective energy savings. The request to include solar-powered water circulators in the 2006-2008 EE Portfolio was approved in D.07-11-004.

[1] Stand-alone Cost Effectiveness was determined by the Total Resource Cost (TRC) and Program Administrator Test.

In the same 2007 Petition, the CPUC denied PG&E's request for categorical approval of stand-alone renewable technologies as EE measures. Subsequently, on July 30, 2009, PG&E filed a second Petition to Modify D.05-04-051 to Include Stand-Alone, Non-Generating Renewable Powered Equipment within the Policy Rules' Definition of an Energy Efficiency Measure.

To clarify outstanding issues regarding categorical approval of stand-alone renewable measures and to codify stand-alone solar-powered water circulation technologies as EE measures, the Commission issued D.09-12-022 (Decision), effective December 17, 2009, to modify D.05-04-051 and D.07-11-004. This Decision categorically approved solar powered water circulation technologies; however, as the Decision states, "allowing new technologies to be included as EE measures does not automatically allow funding of these measures."[2] Instead, the Decision clarifies that the funding of such measures should follow an advice letter process. Through submission of this advice letter, SCE and PG&E hereby request approval for solar powered reservoir circulator technology to be included in their 2010-2012 EE Portfolio (and any portfolio extensions thereto). Project information as part of the custom measure and project archive (CMPA) shall be maintained with this approved advice letter.

SCE and PG&E submit that the proposed measure is cost-effective under the following circumstances, discussed in greater detail herein:

- On a stand-alone basis using both the Total Resource Cost Test (TRC) and the Program Administrator Test (PAC);
- For the first proposed installation; and
- Under a reasonable range of installation scenarios which may be subsequently installed.

PROPOSAL

The solar-powered circulator technology (SPCT) discussed above and herein is a non-generating EE measure typically used to drive mixing in water supply and wastewater treatment systems. While floating on the surface of a body of water, the device continuously draws water through an intake valve and spreads it across the surface in a "near-laminar long-distance flow pattern."[3] This motion is powered by a stand-alone motor and solar panel configuration, thereby offsetting potential electricity use from conventional technologies. SPCT has been successfully implemented in potable water tanks and reservoirs, wastewater ponds and lagoons; and it also has been used to improve water quality in freshwater lakes, reservoirs and estuarine environments. SPCT utilization is scalable in project size and provides EE and renewable energy benefits as well as a range of water quality and treatment process benefits.

Attachment A to this Advice Letter includes the required information showing cost-effectiveness for this measure. Attachment B to this Advice Letter includes technical

[2] D.09-12-022, p.6 and p.8.

[3] "The SolarBee solar powered water circulator: An Innovative Water Treatment Process." p.1.

specifications on the technology for informational purposes. Attachment C includes details on the energy reduction potential of SPCT in SCE's Industrial Energy Efficiency Program.

No cost information is required for this advice filing.

This advice filing will not increase any rate or charge, cause the withdrawal of service, or conflict with any other schedule or rule.

TIER DESIGNATION

Pursuant to General Order (GO) 96-B, Energy Industry Rule 5.1, this advice letter is submitted with a Tier 1 designation.

EFFECTIVE DATE

This advice filing will become effective on November 12, 2011, the 30th calendar day after the date filed.

NOTICE

Anyone wishing to protest this advice filing may do so by letter via U.S. Mail, facsimile, or electronically, any of which must be received no later than 20 days after the date of this advice filing. Protests should be mailed to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, California 94102
E-mail: jnj@cpuc.ca.gov and mas@cpuc.ca.gov

Copies should also be mailed to the attention of the Director, Energy Division, Room 4004 (same address above).

In addition, protests and all other correspondence regarding this advice letter should also be sent by letter and transmitted via facsimile or electronically to the attention of:

For SCE:

Akbar Jazayeri
Vice President of Regulatory Operations
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770
Facsimile: (626) 302-4829
E-mail: AdviceTariffManager@sce.com

Leslie E. Starck
Senior Vice President
c/o Karyn Gansecki
Southern California Edison Company
601 Van Ness Avenue, Suite 2030
San Francisco, California 94102
Facsimile: (415) 929-5540
E-mail: Karyn.Gansecki@sce.com

For PG&E:

Brian Cherry
Vice President, Regulation and Rates
Pacific Gas and Electric Company
77 Beale Street, Mail Code B10C
P.O. Box 770000
San Francisco, California 94177
Facsimile: (415) 973-6520
E-mail: PGETariffs@pge.com

There are no restrictions on who may file a protest, but the protest shall set forth specifically the grounds upon which it is based and shall be submitted expeditiously.

In accordance with Section 4 of GO 96-B, SCE is serving copies of this advice filing to the interested parties shown on the attached GO 96-B and R.09-11-014 service lists. Address change requests to the GO 96-B service list should be directed by electronic mail to AdviceTariffManager@sce.com or at (626) 302-4039. For changes to all other service lists, please contact the Commission's Process Office at (415) 703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

Further, in accordance with Public Utilities Code Section 491, notice to the public is hereby given by filing and keeping the advice filing at SCE's corporate headquarters. To view other SCE advice letters filed with the Commission, log on to SCE's web site at http://www.sce.com/AboutSCE/Regulatory/adviceletters.

For questions, please contact Laura Kimes at (626) 302-0689 or by electronic mail at Laura.Kimes@sce.com.

Southern California Edison Company

Akbar Jazayeri

AJ:lk:jm
Enclosures

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER FILING SUMMARY
ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Southern California Edison Company (U 338-E)

Utility type:
☑ ELC ☐ GAS
☐ PLC ☐ HEAT ☐ WATER

Contact Person: James Yee
Phone #: (626) 302-2509
E-mail: James.Yee@sce.com
E-mail Disposition Notice to: AdviceTariffManager@sce.com

EXPLANATION OF UTILITY TYPE
ELC = Electric GAS = Gas
PLC = Pipeline HEAT = Heat WATER = Water

(Date Filed/ Received Stamp by CPUC)

Advice Letter (AL) #: 2640-E
Tier Designation: 1

Subject of AL: Southern California Edison Company and Pacific Gas and Electric Company Request to Provide Stand-Alone Solar-powered Water Circulators as a Measure in the 2010-2012 EE Portfolio

Keywords (choose from CPUC listing): Compliance

AL filing type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #:
D.09-12-022

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL:

Summarize differences between the AL and the prior withdrawn or rejected AL[1]:

Confidential treatment requested? ☐ Yes ☑ No

If yes, specification of confidential information:
Confidential information will be made available to appropriate parties who execute a nondisclosure agreement.
Name and contact information to request nondisclosure agreement/access to confidential information:

Resolution Required? ☐ Yes ☑ No

Requested effective date: 11/12/11
No. of tariff sheets: -0-

Estimated system annual revenue effect: (%):

Estimated system average rate effect (%):

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected:

Service affected and changes proposed[1]:

Pending advice letters that revise the same tariff sheets: None

[1] Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this filing, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Ave.,
San Francisco, CA 94102
jnj@cpuc.ca.gov and mas@cpuc.ca.gov

Akbar Jazayeri
Vice President of Regulatory Operations
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770
Facsimile: (626) 302-4829
E-mail: AdviceTariffManager@sce.com

Leslie E. Starck
Senior Vice President
c/o Karyn Gansecki
Southern California Edison Company
601 Van Ness Avenue, Suite 2030
San Francisco, California 94102
Facsimile: (415) 929-5540
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Attachment A: Proof of Cost-effectiveness for Solar Powered Water Circulator

Per D.09-12-022, IOUs wishing to use a stand-alone solar measure must "clearly show that a proposed stand-alone solar device is cost-effective….for the first proposed installation and will be cost-effective under a reasonable range of installation scenarios." The E3 calculator embedded below as attachment 1, and is preceded by narratives providing rationale as to why this measure is cost effective according to these specified parameters.

1) **The E3 calculator results show this measure to be cost-effective using TRC and PAC for the first proposed installation.**

The first proposed installation for this SPCT measure will be at Oso Lake operated by Santa Margarita Water District. The inputs to the attached E-3 calculator reflect values proposed by this project., and the resulting TRC and PAC values are expressed as positive. In the measurement of the calculation without allocated costs, the TRC and PAC are 1.86 and 9.78 respectively. The TRC "measures the net cost of a demand-side management program as a resource option based on the total cost of the program including both the participants costs and the utility's cost" (D.07-09-043). More details on this installation, the technology overall, and energy savings potential are included in attachments B and C.

2) **This measure will be cost-effective under a reasonable range of installation scenarios which may be subsequently installed.**

The Solar Powered Circular Technology (SPCT) was originally developed in 1998 and has evolved over the last 10 years. Each SPCT unit is typically equipped with three floatation pontoons, a brushless motor, and three 80-watt solar PV panels that charge onboard batteries along with SCADA compatible control systems. The battery system that allows for continuous day and night operation is driven entirely by solar power. The drive motor is a direct drive, with a direct current motor that contains no gearbox. For this reason, in some critical applications (notably primary cells in wastewater applications), the SPTC can be connected to the grid for added redundancy and insurance. SPTC units have a 25-year life, with a need to replace the battery every 5 to 15 years. The unit has flow rates ranging from 950 to 10,000 gallons per minute (gpm).

SCE and PG&E look forward to installing many more installations of this measure, as there are many potential applications. This technology supports most industrial process/method(s) that require the constant movement of water (potable), waste water (non-potable) or other large amount of liquid. The SPCT (often called 'solar bee') is an energy efficient solution to water and wastewater customers (i.e. municipalities and water districts) that have a need to keep large areas of liquid (pond/lagoons) in constant motion. Availability of capital dollars to pay for the project is a major constraint of these customers. Many are in the position of having to secure bond dollars, therefore a big driver to move forward is a low ROI. The incentives help to buy down the cost and lower the ROI.

To date, most installations are motor-driven mechanical aerators and mixing is required to reduce algae as well as provide oxygen to enhance treatment. For SCE, the SPCT technology was first proposed to the Irvine Ranch Water District (IRWD) in February 2007 as a demonstration project under previous authorization in 2006-2008. IRWD chose to convert three lagoons from mechanical aerators to SPCT. In this installation, the projects metrics are:

Table 1.2: Lake Forest - solar mixers		
Savings Summary	Project Total	Measure 1: Solar Mixers
Annual Electricity Savings [kWh]	485,842	485,842
Demand Savings [kW]	55.5	55.5
Average Electricity Rate [$/kWh]	0.120	0.120
Annual Elect Cost Savings	**$58,301**	$58,301
Cost Summary		
Measure Cost [$]	$200,000	$200,000
IEEP Incentive [$]	$38,867	$38,867
Net Measure Cost [$]	**$161,133**	$161,133
Simple Payback (Years)		
Without IEEP Incentive	**3.4**	3.4
With IEEP Incentive	**2.8**	2.8

This project also involved the installation of dissolved oxygen analyzers which were then equipped with a signal (wireless) to the system's supervisory control and data acquisition (SCADA) system. The SPCT technology is easy to implement and can be done by most on-site personnel; this helps these customers manage the first cost of project implementation.

For PG&E, recent projects in the previous program cycle show an estimate of 4,900,000 kWh savings per project across 6 projects. The average simple payback period for these projects is 3.7 years. The table below lists the projects implemented since 2007 within the CALPOP program:

Facility Name	Utility	Annual Savings (kWh)	KW Savings	Project Cost	Simple Pay Back (years)
City of Los Banos	PG&E	959,529	109.5	$ 884,289	7.68
City of Lemoore	PG&E	795,693	91.3	$ 149,497	1.57
Chester PUD	PG&E	855,722	-	$ 273,407	2.66
Sanger- Industrial	PG&E	446,472	-	$ 261,399	4.88
Town of Windsor	PG&E	284,652	32.5	$ 135,057	3.95
Lamont	PG&E	1,567,760	179.0	$ 252,251	1.34
				Average	3.68

Future installations for SPCT may include use in raw water storage reservoirs, freshwater recreational lakes, wastewater facilities, stormwater basins, and potable water systems. SCE and PG&E field personnel report that customers anticipate a rise in the implementation of these systems. The technology is attractive for two primary reasons:

1) Low capital cost. Most facilities can easily fund without an extensive capital review process which is typical for this customer segment.

2) Typical installations are not labor intensive; with retrofits ranging from 2-3 days.

Figure 1. SCE's E3 Calculator showing cost-effictiveness of solar-powered water circulator installation.

Solar Powered Circulator Technology - SCE 10-12 4g2_AL Filing.zip

PROGRAM NAME	Statewide Industrial Energy Efficiency Program - SCE-SW-003
BUDGET	
Administrative Costs	
Overhead and G&A	$ -
Other Administrative Costs	$ -
Marketing/Outreach	**$ -**
Direct Implementation	
d.i. User Input Incentive (No reba	$ -
d.ii. Rebate	$ 34,082
d.iii. Direct Install Labor	$ -
d.iv. Direct Install Materials	$ -
d.v. Upstream payments	$ -
Activity	$ -
Installation	$ -
Hardware & Materials	$ -
Rebate Processing & Inspection	$ -
EM&V Costs	**$ -**
Budget	**$ 34,082**
Costs recovered from other sources	**$ -**
Budget (plus other costs)	**$ 34,082**
PROGRAM IMPACTS	
Program Reductions for Measures installed through 2020	
User Entered kW (kW)	57
Net Jul-Sept Peak (kW)	57
Net Dec-Feb Peak (kW)	58
Net NCP (kW)	58
Net CEC (kW)	-
Annual Net kWh	321,887
Lifecycle Net kWh	4,828,310
Annual Net Therms	-
Lifecycle Net Therms	-
Program Reductions for Measures installed through 2020	
User Entered kW (kW)	57
Net Jul-Sept Peak (kW)	57
Net Dec-Feb Peak (kW)	58
Net NCP (kW)	58
Net CEC (kW)	-
Annual Net kWh	321,887
Lifecycle Net kWh	4,828,310
Annual Net Therms	-
Lifecycle Net Therms	-
Cost Effectiveness for all measures installed through 2020	
TRC	
Costs	$ 155,747
Electric Benefits	$ 289,810
Gas Benefits	$ -
Net Benefits (NPV)	$ 134,063
BC Ratio	1.86
PAC	
Costs	$ 29,619
Electric Benefits	$ 289,810
Gas Benefits	$ -
Net Benefits (NPV)	$ 260,191
BC Ratio	9.78
Levelized Cost	
Levelized Cost TRC ($/kWh)	
Discounted kWh	2,488,762
Cost	$ 0.06
Benefits	$ 0.12
Benefit-Cost	$ 0.05
Levelized Cost PAC ($/kWh)	
Discounted kWh	2,488,762
Cost	$ 0.01
Benefits	$ 0.12
Benefit-Cost	$ 0.10
Levelized Cost TRC ($/therm)	
Discounted Therms	-
Cost	#DIV/0!
Benefits	#DIV/0!
Benefit-Cost	#DIV/0!
Levelized Cost PAC ($/therm)	
Discounted Therms	-
Cost	#DIV/0!
Benefits	#DIV/0!
Benefit-Cost	#DIV/0!

Energy Division File sheet "Attachment II" Total Electricity and Gas Emission Reductions

	2010	2011	2012	2013	2014	2015	2016
	Total	Total	Total	Total	Total	Total	Total
Annual CO2 Emission Reductions (tons)	0	177.792	0	0	0	0	0
Lifecycle CO2 Emission Reductions (tons)	0	2666.88	0	0	0	0	0
Annual NOx Emission Reductions (tons)	0	0.023355	0	0	0	0	0
Lifecycle NOx Emission Reductions (tons)	0	0.350329	0	0	0	0	0
Annual SO2 Emission Reductions (tons)							
Lifecycle SO2 Emission Reductions (tons)							

Emission Annual Reductions (2010-2012)	
Electric Annual CO2 (tons) - 2010	-
2011	178
2012	-
Electric Lifecycle CO2 (tons) - 2010	-
2011	2,667
2012	-
Electric Annual NOX (tons) - 2010	-
2011	0.02336
2012	-
Electric Lifecycle NOX (tons) - 2010	-
2011	0.35033
2012	-
Electric Annual SO2 (lbs) - 2010	
2011	
2012	
Electric Lifecycle SO2 (lbs) - 2010	
2011	
2012	
Gas Annual CO2 (tons) - 2010	-
2011	-
2012	-
Gas Lifecycle CO2 (tons) - 2010	-
2011	-
2012	-
Gas Annual NOX (tons) - 2010	-
2011	-
2012	-
Gas Lifecycle NOX (tons) - 2010	-
2011	-
2012	-
Gas Annual SO2 (lbs) - 2010	
2011	
2012	
Gas Lifecycle SO2 (lbs) - 2010	
2011	
2012	

Data below not currently used in Energy Division workbook	
Levelized Cost RIM ($/therm)	
Discounted Therms	-
Cost	#DIV/0!
Benefits	#DIV/0!
Benefit-Cost	#DIV/0!
Levelized Cost RIM ($/kWh)	
Discounted kWh	2,488,762
Cost	$ 0.17
Benefits	$ 0.12
Benefit-Cost	#DIV/0!
RIM	
Costs	$ 429,425
Electric Benefits	$ 289,810
Gas Benefits	$ -
Net Benefits (NPV)	$ (139,615)
BC Ratio	0.67

Impacts for all programs installed trhough 2020	
Net July-Sept Peak (kW)	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
Net Dec-Feb Pk (kW)	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
0	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
Annual Net kWh	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
Lifecycle Net kWh	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
Annual Net Therms	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-
Lifecycle Net Therms	
Clothes Dryer	-
Clothes Washer	-
Consumer Electronics	-
Cooking	-
Dishwasher	-

Attachment B: Technical Specifications for the First Proposed Installation

SCE hereby presents technical specifications for the first proposed installation of this measure. Please refer to PDF embedded below.

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Section 1 Executive Summary

The Southern California Edison Industrial Energy Efficiency (IEE) Program is designed to assist SCE's industrial sector customers with productivity-improving and energy savings investments. This Program Analysis Report was prepared to summarize the findings at Oso Lake, operated by the Santa Margarita Water District.

Oso Lake is a 130 acre open water body with an estimated maximum depth of 65.3 ft and an estimated average depth of 21.8 ft. The water sources are primarily wastewater treatment facility Title 22 recycle water. To prevent this water from being stagnant and producing excessive algae, a bubbler system is currently used for mixing. The proposal is to replace this bubbler system, which operates with a 100 hp motor, with four solar mixers.

This will eliminate the use of the 100 hp motor entirely. This motor is currently used 5,643 hours per year. The estimated savings is 378,691 kWh/y. The solar unit implementation cost is $204,828. After incentive payment, the estimated simple pay-back is 5.8 years.

1.1 Facility Electricity Usage

There is only one service account associated with the Oso Lake location on El Toro, Mission Viej, CA and there is only one single unit connected to this meter (a 100 hp motor). Account details, as detailed in the SCE data base, are summarized in **Table 1.1.**

Table 1.1: Facility Electricity Usage Data

Customer Name	Service Street Address	Service City Name	Zip	Annual MWh
Santa Margarita Water District #3-316-1035	20731 El Toro	Mission Viej	CA 92692	379

The power demand noted in the data base is 91 kW. The data base cites an annual power consumption of 379 MWh.

1.2 Summary of Energy Efficiency Opportunities

Table 1.2 shows a summary of the project proposal. Currently there is a bubbler system with a 100 hp Ingersoll Rand electric driven, single stage, screw compressor motor (and diffusers in the lake), which is assumed to operate at 90% motor load. The base line demand is therefore 100 hp x 0.7457 kW/ hp x 0.90 = 67.1 kW. If the motor efficiency is 91%, the IEE Program baseline is 67.1 / 0.91 = 73.8 kW. The unit operates the equivalent

of about 8-9 months per year for 18 hours per day, i.e. 5,643 hours per year, with a total annual consumption of 378,691 kWh/y.

Table 1.2: Oso Lake Solar Mixers

Savings Summary	Project Total	Measure 1: Retrofit 4# Solar Mixers in Oso Lake
Annual Electricity Savings [kWh]		
From Existing Equipment	378,691	378,691
Using IEE Program Baseline	378,691	378,691
Demand Savings [kW]		
From Existing Equipment	67.1	67.1
Using IEE Program Baseline	73.8	73.8
Average Electricity Rate [$/kWh]	0.080	0.080
Annual Elect Cost Savings	**$30,295**	$30,295
Cost Summary		
Measure Cost [$]	$204,828	$204,828
IEEP Incentive [$]	$30,295	$30,295
Net Measure Cost [$]	$174,533	$174,533
Simple Payback (Years)		
Without IEEP Incentive	**6.8**	6.8
With IEEP Incentive	**5.8**	5.8

At $0.08 per kWh (average), the annual saving for the District will be $30,295 upon elimination of the air lift bubbler system. The proposal is to replace the function of the bubbler system with four solar mixers, which run entirely on solar power and will not be hooked up to mains power. The incentive amount payable to the District would be $30,295 upon approval and implementation of the project, with a simple pay-back of 5.8 years after incentive payment.

1.3 Next Steps: Implementation

The next step in the IEE Program process is for the Santa Margarita Water District (SMWD) to sign the IEE Program Agreement, which contains Application Information, Participant Information, and Payment Information.

SMWD will then receive a Funding Letter from SCE, indicating that the project has been approved for the IEE Program.

A post installation inspection may be required for this project; your IEE Program contractor will make the necessary arrangements if one is needed. Upon completion of the post installation inspection (if needed) the IEE Program contractor will complete and submit the Project Completion Certification, which you will need to sign and is your acknowledgement that the project is installed to your satisfaction.

The incentive check will be sent in accordance with the IEE Program Agreement you signed. A Utility Bill Credit Authorization form will need to be signed and submitted if you would prefer that your incentive be applied to your utility bill.

After the post-installation inspection is completed, SMWD will complete and forward the sign-off documentation and documents pertinent to invoicing the contractor(s) for the project. SCE will then prepare the incentive check, and forward it to SMWD or your designated payee.

Section 2 Project Team and Facility Information

2.1 PROJECT CONTACTS

The key project team members and their contact information are listed in **Table 2.1** below.

Table 2.1: Project Analysis Report Contacts

Name	Role	Organization	Contact Information
Steve Francis	Project Manager	SMWD	Office Phone: 949-279-4866 Cell Phone: e-mail: stevef@smwd.com
Maud de Bel	Bacgen Project Lead	BacGen Technologies	Office Phone: 206-932-2382 Cell Phone: 206-459-9418 e-mail: maud@bacgen.com

2.2 FACILITY DESCRIPTION

Figure 1 Aerial Photograph of Oso Lake

Figure 1 shows an aerial photograph of Oso Lake, also called Upper Oso Reservoir. The reservoir is located near 21131 Los Alisos Boulevard, Rancho Santa Margarita, Orange County, CA 92688. Oso Lake is an open water body covering an area of between 45 acres and 130 acres (depending on the amount of water in storage). The average depth is 21.8 ft and the estimated maximum depth is 95 ft. The water sources are storm water run-off, irrigation run-off and wastewater treatment facility Title 22 recycle water. To prevent this water from being stagnant and producing excessive algae, a

bubbler system is currently used for mixing. Currently there is a bubbler system with a 100 hp Ingersoll Rand electric driven, single stage, screw compressor motor (and diffusers in the lake). For calculation purposes, the data base value of 378,691 kWh annual consumption has been used. The motor operates an estimated 5,643 hours per year.

2.3 ENERGY EFFICIENCY OUTLOOK

This project will be evaluated by the Orange County Council of Boy Scouts of America, the engineering firms involved (Ashwill and Associates and PACE engineering), and the SM Water District Board. Subsequent to Board approval, a budget allocation will be made. For large projects, project implementation would typically occur in the next fiscal year. This project is planned for implementation in 2008 if approved.

Section 3 Energy Efficiency Opportunities

This proposal covers providing an alternative mixing source for Oso Lake, which is operated by the Santa Margarita Water District. The premise of the savings is to replace the mixing function of the existing air lift bubbler system, with a circulatory, gentle type of mixing which has an intake at greater depth and prevents a large area of the lake from being stagnant. There is no treatment function required of the old or the new equipment (just mixing). The solar mixers have a pumping capacity of 10,000 gallons per minute. The approximate volume of the lake is between 320 and 923 million gallons. The estimated turnover time is 2-6 days.

3.1 Process Equipment Measures

3.1.1 Measure-1: Adding Solar Mixers

Existing Conditions

- A diffuser system, powered by one 100 hp motor at 90% capacity and 91% motor efficiency.
- The total annual power consumption is 100 x 0.7457 x 5,643 x 0.90 x 1/0.91 = 378,691 kWh/y.

Recommended Action

- Install 4# solar powered mixers. There is no mains power consumption associated with this mixer. The old bubbler system will no longer be in use.

Energy Savings Calculations

- The total saving is 100 x 0.7457 x 5,543 x 0.90 x 1/0.91 = 378,691 kWh/y.

Financial Impacts

The total cost for implementation, including hardware and installation, is $204,828. After incentive payment, the payback for the District is under 6 years.

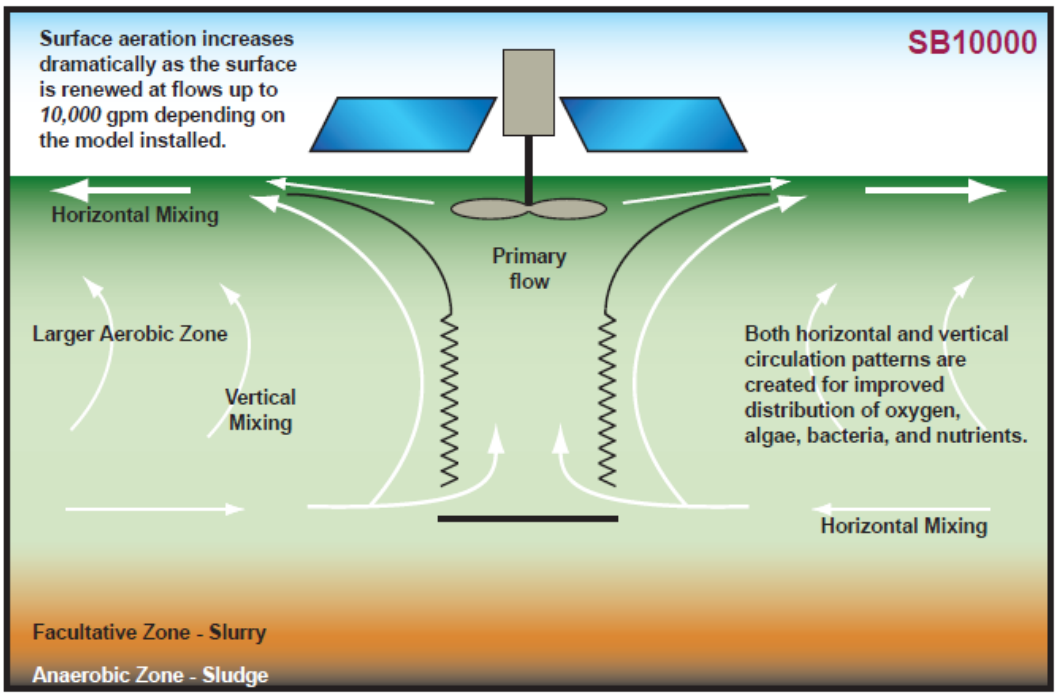
Measure 1: Retrofit 4# Solar Mixers in Oso Lake	
Savings Summary	
Annual Electricity Savings [kWh]	
From Existing Equipment	378,691
Using IEE Program Baseline	378,691
Demand Savings [kW]	
From Existing Equipment	67.1
Using IEE Program Baseline	73.8
Average Electricity Rate [$/kWh]	0.080
Annual Elect Cost Savings	**$30,295**
Cost Summary	
Measure Cost [$]	$ 204,828
IEEP Incentive [$]	$30,295
Net Measure Cost [$]	**$174,533**
Simple Payback (Years)	
Without IEEP Incentive	**6.8**
With IEEP Incentive	**5.8**

Attachment C: SCE's Industrial Energy Efficiency Program
Solar Powered Circulator Technology (SPCT)

1. Technology Description

This document details the energy reduction potential of Solar Powered Circulator Technology (SPCT) in SCE's Industrial Energy Efficiency Program.

Solar-Powered Circulator Technology (SPCT) is an emerging technology that uses solar-powered equipment to drive mixing in water supply and wastewater treatment systems. One manufacturer, SolarBee, utilizes a patented near-laminar radial flow process that provides high-flow, long-distance circulation™ (LDC).[1] Below is an image of a 10,000gpm rated SolarBee in a wastewater application.



In addition to water treatment processes, SPCT has been successfully implemented in potable water tanks and reservoirs, wastewater ponds and lagoons; it also has been used to improve water quality in freshwater lakes, reservoirs and estuarine environments. SPCT utilization is scalable in project size and provides energy efficiency and renewable energy benefits as well as a range of water quality and treatment process benefits.

Based on its wide applicability, SCE plans to deliver this measure to the Industrial/Agricultural market sector. Refer to Section 2 for sample calculations of different applications SPCT.

2. E3 Input Details & Sources

Measure Effective Useful Life
EUL is estimated at 15 year life. This is consistent with the DEER EUL for High Efficiency Motors.

Net-to-Gross Ratios
The NTG value was obtained from the "Updated DEER NTGR Values – 053008" on the DEER website as required by Version 4 of the California Public Utilities Commission (CPUC) Energy Efficiency Policy Manual. The relevant NTGR for this measure is shown in Table 1 below.

Table 1. Net-to-Gross Ratio

Measure Name	Delivery Method	Efficiency and Capacity Descriptor	Target Market	NTG
New Measures not Otherwise Addressed OR Existing Direct Installed measures for Hard to Reach markets	New innovative delivery strategies designed to minimize free ridership OR Direct Installation to Hard to Reach Markets	-	Nonresidential Markets with Very Low Measure Market Share (<5%) OR Hard-to-Reach Markets	0.85

Time-of-Use Adjustment Factor
As directed by the CPUC in decision 06-06-063 dated June 29, 2006, time-of-use (TOU) adjustment factors are to be applied for residential A/C and commercial A/C (packaged and split-system direct-expansion cooling) measures only. The specific TOU adjustment factors are inherent in the avoided-cost calculation performed in the E3 calculator. In order to apply the TOU adjustment factor correctly to each measure, the following equation was used to calculate the "% Eligible for TOU AC Adjustment" value found in the summary table:

$$\%TOU = 100 \times \frac{kW_{AC}}{kW_{Total}}$$

where kW_{AC} is the kW savings associated with the A/C unit, and kW_{Total} is the total kW savings for the sum of kW measures. The specific values and results are summarized in Table 2.

Table 2. TOU Adjustment Factors

Measure	kW_{AC}	kW_{Total}	%
SPCT Sample Project 1	0	67.1	0

Load Shapes

The difference between the base case load shape and the measure load shape would be the most appropriate load shape; however, only end-use profiles for some sectors are available. Therefore, the closest load shape chosen for this measure is the Industrial load shape for Target Sector Industrial. See Table 3 for a list of all Building Types and Load Shapes. See the KEMA report for a more thorough discussion regarding the load shapes for this measure.[2]

Table 3. Target Sectors and Load Shapes

Building Type	E3 Alt. Building Type	Load Shape
Industrial	Industrial	Industrial

3. Energy Savings & Demand Reduction Calculations

Solar Powered Circulator Technology (SPCT) Projects typically entail the partial or complete replacement of mechanical, grid connected brush aeration and pond mixing equipment. As SPCT units are typically stand-alone units, the energy and demand benefits are generally measured against the existing system. Following is a brief summary of a project which demonstrates the application of SPCT in an aerated lagoon.

SPCT Sample Project

Open water body covering an area between 45 acres and 130 acres (depending on amount of water storage). Average depth is 21.8 ft and estimated maximum depth is 95 ft. Water sources are stormwater run-off, irrigation run-off and wastewater treatment facilities.

The premise of this project was to "replace the mixing function of the existing air lift bubbler system, with circulatory, gentile type of mixing which has intake at greater depth and prevents a large area of the lake from being stagnant."

Existing Conditions
Bubbler System: 100hp motor, single stage, screw compressor motor (and diffusers in the lake). Operating 5,643 hrs/yr with a load factor of 90%, and motor efficiency of 91%.

Proposed Measure
Replace bubbler system with a Solar mixer with a pumping capacity of 10,000 gpm.

Annual Energy Consumption

= (Motor Horsepower x 0.746kW/hp x Op. Hours x Load Factor) / Motor Efficiency

= (100hp x 0.746kW/hp x 5,643 Hrs/yr x 0.90) / 0.91 = **378,691 kWh/Yr**

Demand Savings

= Annual Energy Consumption/ Operating Hours

= 378,691 kWh/Yr / 5,643 Hrs = **67.1 kW**

Since the SPCT require no power to operate, the energy savings experienced by the facility are equivalent to the existing unit's annual power consumption.

4. Financial Analysis

Base Case Cost

For this type of project it's assumed the customer would not be making any upgrades on their working system. Therefore the base case cost is assumed to be zero. Their alternative is to make no changes to their existing system. However, the base case cost is derived to be used in the calculation of incremental measure cost.

Gross Measure Cost

The following table shows the typical cost for SPCT project and the respective application:

Table 4. Net-to-Gross Ratio

SPCT Application	Project Cost	Payback
Lake (Reservoir)	$ 204,828	6 years

Measure Cost including hardware and installation is $204,828.

References

1. Solar Bee, http://www.solarbee.com/technology. Wastewater application Schematic Design of 10,000 gpm unit. WWBEN20080408.

2. Final Report - Load Shape Update Initiative - KEMA / JJ Hirsch and Assoc. / Itron Inc. - November 17, 2006)

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