

Going Green: Irvine Unified School District Goes Solar



Green California
Schools Summit:
December 10, 2009

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Irvine Unified School District Presenters

- Michael Parham - Board Member
- Gwen Gross - Superintendent
- Mark Sontag - Curriculum
Coordinator for Math and Science



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The Irvine Unified School District

- 27,000 students
- 38 sites
- 2,500,000 square feet of roof space
- 544 acres
- 2,609 employees



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IUSD's Energy Plan

- Reduce electrical usage
- Develop curriculum to enlist students as the catalyst for change
- Implement solar projects to link curriculum, facilities and usage
- Develop community and municipal partnerships



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Ingredients for Success

1. District Vision and Leadership
2. Partnership between M&O, Facilities, Curriculum and Business Services
3. Communication with staff and community
4. Start small; Existing contracts
5. Enlist support – “What can you do to help?”
6. Changing a culture of behavior
7. Students as a catalyst for change



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A Vision for Energy Self-Sufficiency

- Five Components
 - Facilities
 - Grounds/Landscaping
 - District Vehicles
 - Curriculum
 - Corporate/Community Partnerships



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Changing the Culture

- Removing from Classrooms:
 - Aquariums
 - Pets
 - Personal Refrigerators, Microwaves, Coffee Pots
- Automatic Computer Shut Down
- Combining Summer School Sites
 - Modifying Summer School Hours/Facilities
- Classroom Inspections/System of Notices
- E-Green Newsletter



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Everyone Doing Their Part

Please Help Us to Save Energy

This appliance is in violation of line 9 of the District's energy conservation measure which states,

"Remove personal refrigerators, space heaters, coffee mug warmers, microwaves, toasters, fans, air purifiers and any other unapproved energy using appliance."

If you have any questions or concerns, feel free to contact Joe Hoffman, Director, Maintenance and Operations, 949-337-5159.



THIS UNAUTHORIZED ELECTRIC APPLIANCE IS IN VIOLATION OF THE DISTRICT'S ENERGY CONSERVATION MEASURE

Please Remove By: _____

REVINE UNITED SCHOOL DISTRICT
MAINTENANCE AND OPERATIONS

WARNING
NOTICE TO COMPLY
WITH DISTRICT ENERGY CONSERVATION MEASURE

THIS APPLIANCE IS IN VIOLATION OF AN ORDER TO
ELIMINATE UNAPPROVED AND UNAUTHORIZED
USE OF APPLIANCES

<small>BY:</small>	<small>DATE:</small>	<small>LOCATION:</small>
<small>APPLIANCE LEFT ON</small>	<small>COMPLIANCE LEFT ON</small>	
<small>AND DISCONNECTED LEFT ON</small>	<small>RE-ELECTRIFIED OR REWIRING</small>	

DESCRIPTION

***THE SYMBOL LETTER AND/OR ANY UNAUTHORIZED ELECTRIC APPLIANCE THAT ARE IN VIOLATION OF THE DISTRICT'S ENERGY CONSERVATION MEASURE.

THE STAFF MEMBER IN POSSESSION OF UNAUTHORIZED APPLIANCE WILL BE RESPONSIBLE FOR REMOVAL OR DE-ENERGIZING.

DISTRICT REPRESENTATIVE: _____

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Electrical Consumption

Year	Total Kwh	Total \$
2007-2008	23,488,686	\$4,003,098
2008-2009	22,093,790	\$3,870,133
Difference	1,394,896 (-5.9%)	-3.3%

Dates	Total Kwh	Total \$
7/1/08 – 9/30 08	5,425,482	
7/1/09 – 9/30/09	4,981,070	\$ 90,527
Difference	444,412 (-8.2%)	

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Automating Progress Monitoring

- SchoolDude.com:
 - Scheduling software (FSDirect)
 - Utility tracking software (UtilityDirect)
 - Work order automation software (MaintenanceDirect)
 - Invoiced an equivalent of \$24.68 per student to recover costs for after hours use of our facilities, saving over \$600,000
 - Utility tracking software, allowed more visibility of our billing practice and use, saving over \$250,000
 - 14,000 Work Orders through MaintenanceDirect, saving over 7,000 hours of staff time

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IUSD Goes Solar!


IUSD - RANCHO SAN JOAQUIN MIDDLE SOLAR PV SYSTEM

NON-PENETRATING ROOFTOP MOUNTING SYSTEM
LAT: 33.7°N | ORIENTATION: 219° | TILT: 20°

TOTAL SYSTEM:
248,480 KW DC STC PHOTOVOLTAIC ARRAY
216,373 KW AC CEG PHOTOVOLTAIC ARRAY

MAJOR EQUIPMENT:
(324) SUNTECH 270W PV MODULES (PTC RATING: 242.80W)
(77) STRINGS OF (12) MODULES EACH
(1) SATCON 250kW (480V) INVERTERS (96% EFF.)





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REV	DESCRIPTION	BY	DATE

IUSD - RANCHO SAN JOAQUIN MIDDLE
6815 WENBURY CT, PUEBLO, CA

PROJECT NO: 0900000000
DATE: 12/16/2009
DRAWN BY: [Name]
CHECKED BY: [Name]

PV ARRAY LAYOUT

PROPOSAL SUBMITTAL P-0

Introduction to SPG Solar & SunEdison

- The SPG Solar/SunEdison team is comprised of the leading solar contractor in the education industry & North America's largest Solar Energy Services Provider
 - Over 110MW of commercial scale projects built
 - 60MW+ in California
 - Vast DSA Experience
 - Deep understanding of school system specific issues & concerns



Introduction to SPG Solar & SunEdison

- Largest Power Purchase Agreement (PPA) Provider in North America
- Most advanced monitoring platform on the market
- Local field offices for construction, service, and maintenance



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Who is the RIGHT PPA Partner?

- Key questions to ask:
 - How strong is their financial backing?
 - Will they be here for 20 years?
 - Who are their investors, and what is their key motivation?
 - Is my partner a downstream channel to unload panels for a large manufacturer?
 - How strong is their supply chain?
 - Will the technology I am signing off on be available when it is time to build?



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Who is the RIGHT PPA Partner?

- Do they own & operate their own projects or do they subcontract?
 - If something goes wrong, will I be stuck in the middle of a finger pointing match?
- What is their performance ratio?
 - How well do their systems actually perform and how large is that sample size?
- How many PPAs have they signed?
 - Of those signed, how many of them are actually operational?



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Watch Out for Legal Issues

- Collaborated with Fagen, Friedman & Fulfrost (Kathleen McKee)
 - Protects school district interests
 - Answers questions that arise while working with solar partner/financing group
 - Review legal documents
 - Assist with School Board resolution
 - Assist with School Board Public Hearing



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Client Connect

- Monitoring Solutions
 - Load Monitoring
 - Track facility electric usage in real time (gross or net)
 - Energy (kWh) & Demand (kW)
 - Improve facility operations
 - Budget/verify utility bills
 - Energy cost monitoring
 - View utility costs
 - Calculated daily from published tariffs
 - Available in 15 minute intervals



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Client Connect Video

- http://www.sunedison.com/client_connect.php
- Show the Client Connect Demo Video



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Solar Summary

- Under the terms of the partnership, the Irvine Unified School District would incur no upfront costs. SunEdison would own, maintain, and operate the solar power systems, with IUSD purchasing energy with long-term predictable pricing.
- This is expected to be the largest solar deployment for a public school system in the state, if not the country. The district's savings has been conservatively estimated at approximately \$17 million over the next 20 years.



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Solar Summary

- This unique partnership would also pave the way to the development of a valuable curricular component. Utilizing an Internet-based monitoring system, students would be able to track solar energy production and consumption at their sites in real time, while taking part in lessons on how solar panels work and how weather impacts energy production.
- The agreement will be a game-changer in IUSD's ongoing campaign to conserve, recycle and explore new technologies in the pursuit of sustainability.



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Solar Summary

- Will generate over 6.6 million kilowatt hours of solar energy alone based on the projected 21 sites to be developed for IUSD.
- Will generate over 120 million kilowatt hours of solar energy over 20 years based on the projected 21 sites to be developed for IUSD. That is enough energy to power over 11,000 avg. US homes for one year.
- Will offset a projected 127 million pounds of CO₂ over 20 years based on the projected 21 sites to be developed for IUSD. That is equivalent to removing over 12,000 cars off the road for a year.



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Questions for Board Members

- Am I fulfilling my fiduciary responsibility to maximize the value of each dollar that we spend?
- Is there a way to squeeze more money from facilities to support the General Fund and, therefore, the learning experience of the child?
- What is a realistic goal that can be accomplished in our district? Staff has a lot on their plate, and I don't want to ask them to jump at every whim.



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Questions for Board Members

- What will my fellow board members buy into and how can we reach a true 5-0 consensus?
- What can we do that will engage students, faculty and the community at large? Ideally, we would want the public to agree with what we pursue, and we want to demonstrate that this project is the highest and best use of our resources during these fiscally challenging times.
- What is the potential for this project to pay for itself and over what period of time?



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Questions for Board Members

- Am I accepting staff and outside advisors' assumptions about electricity/gas usage levels and rates? If rates go up faster, what is our exposure? What level of control do we have over the utilities' ability to charge whatever rate they wish? Am I in a position to dictate use and/or rates, and, if not, what level of control should I have?
- How does this project change what we currently do from the students' viewpoint?



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Questions for Board Members

- Conservation efforts sound and feel good. Does this project move the needle on lowering energy costs?
- What is the timeline for quantifiable results that we can demonstrate to the public? If we are going to make a splash and generate public support, does this project have the scalability to get us there? What is a realistic timeline?



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Student Perspective

What Would the World Be Like in 2050?

What would the world be like 41 years from now?

No more dirty skies

Or oceans

We may one day

Be able to swim with the wild dolphins and other creatures of the sea

They wouldn't need any protection

We would have more understanding and pity

For animals of the land, sea, and the sky

We would have green technology

Even the city would be clean


With fresh air

Everything would be perfect 41 years from now

continues



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**If we didn't go green
The land, sea, and the skies
Would be a wretched place
The skies would be polluted
Everywhere you see
The sky would be brown
As well as the sea
The land would be littered
With unpleasant things
The world would be the dirtiest 41 years from now
We must choose our path, go green or not
For our home.**

Matthew Kwak; 6th Grade; Bonita Canyon

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New or Existing Corporate And Community Partnerships



- The Energy Coalition
- The City of Irvine
- The Irvine Company
- Irvine Public Schools Foundation
- The Arnold and Mabel Beckman Foundation
- Irvine Valley College and the University of California, Irvine
- Edison
- Sempra
- Irvine Ranch Water District
- National Fuel Research Center (UCI)
- Solar Power: SPG Solar
- Sun Edison
- Wind Turbines: WindTerra
- Vehicle Conversions: Fuel Systems
- Solid Oxide Fuel Cells: Siemens SOFC

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Summary

- District leadership and vision is essential
- Communicate with staff the following:
 - Utility costs will continue to rise
 - Every dollar saved is an additional dollar for other uses
 - Talk the talk and walk the walk
 - Imperative to educate students about the future
 - Develop student green teams
 - Find a project to link facilities with curriculum



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In the end it will be human power – insight, innovation, entrepreneurship, and most of all leadership – that rises to meet these challenges. Unleashing this human power is, in many ways, the key to the next 100 years.

(A One Tonne Future, p. 73)



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Additional Information or Questions

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