PFMG SOLAR

Partners For Many Generations

Paramount Unified School District Board Study Session

Energy Engineered Solar Solutions

August 12, 2015

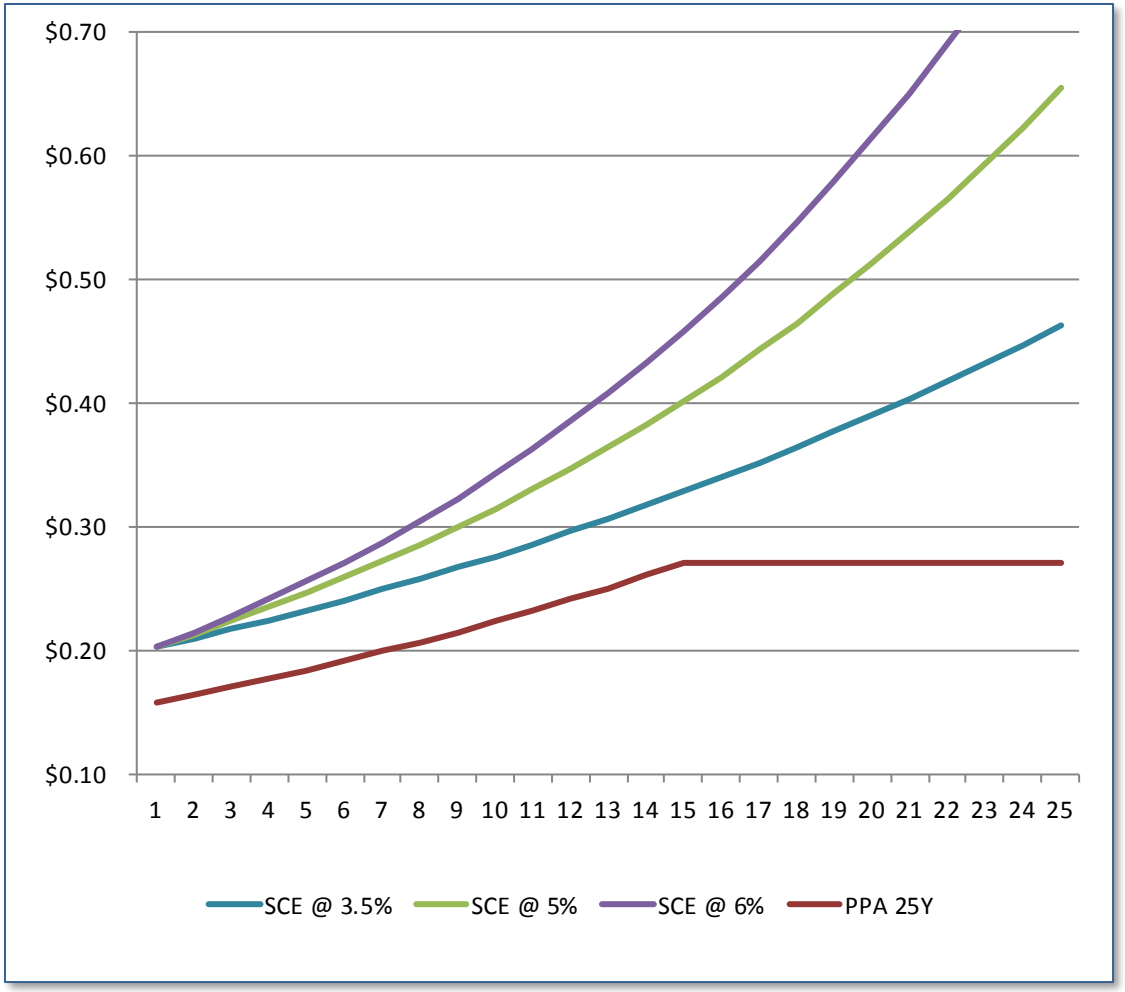
Solar Project Benefits

- **Positive Impact to General Fund**
  - $780,000 in the first 5 years
  - $13.9 Million over 25 years
- **Educational Enrichment**
  - Curriculum with solar as the center piece
- **Local Hiring**
- **Improved Campus Security and Safety**
  - Improved lighting in parking lots for path of travel
- **Shade for Students, Cars and the Community**
- **Community Partnership**
  - Tailored support
- **Environmental and Human Health Benefits**
- **Positive PR for the District**

Savings Summary

Savings Projections	
Savings Projection Years 1-5	$780,000 - $970,000
Cumulative Savings Projection, Years 1-25	$13,970,000 - $17,250,000
Power Purchase Agreement (PPA) Terms	
Capital Costs	**$0.00**
1st year PPA rate per kWh (aggregate)	$0.1583
PPA annual rate increase, to Year 15	3.90%
PPA annual rate increase, from Year 16 to end of term	0.00%
PPA term	25 years
Historical Consumption Data (for proposed meters)	
Total 12-month energy usage (kWh)	8,588,520
Total 12-month electricity cost during analysis period	$1,700,413
Average electricity rate on current tariff	$0.1914
Projected Utility Costs	
Average electricity rate on current tariff for 12-month period following projected solar operation date	$0.2027
Average utility annual rate increase	5.0%
Proposed Solar System	
Mounting type	Parking Canopy and Elevated Structure
Solar system size (kW DC)	3,522
Number of sites	18
Projected 1st year production (kWh)	5,896,000
Solar offset of historical usage	69%

Solar Versus SCE

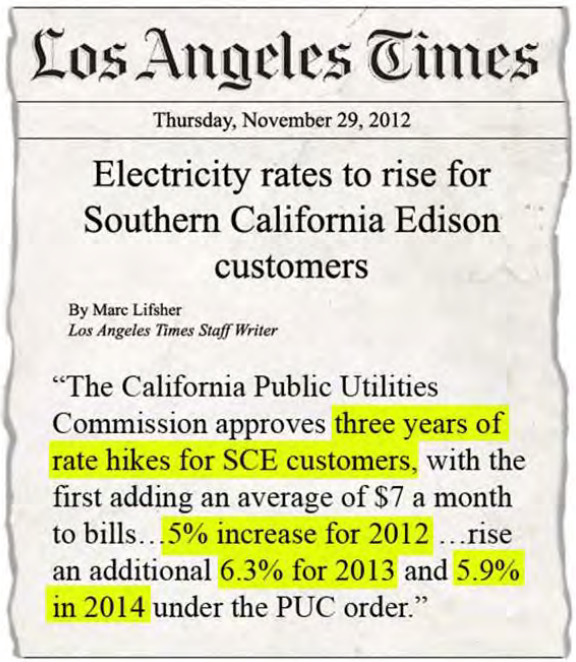


Utility Rates Continue to Rise

California Commercial Sector Historical Electricity Prices

Source: Energy Information Administration
(http://www.eia.gov/beta/state/seds/data.cfm?incfile=/state/seds/sep_prices/com/pr_com_CA.html&sid=CA)
(http://www.energyalmanac.ca.gov/electricity/index.ht

Southern California Edison (SCE)



Los Angeles Times

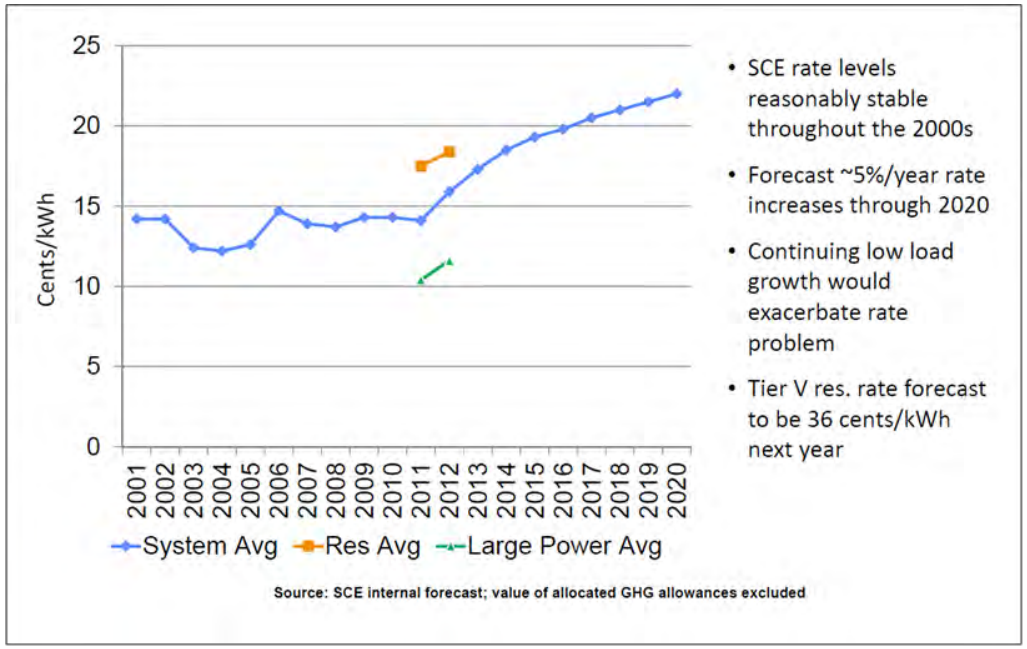
Thursday, November 29, 2012

Electricity rates to rise for Southern California Edison customers

By Marc Lifsher
Los Angeles Times Staff Writer

"The California Public Utilities Commission approves three years of rate hikes for SCE customers, with the first adding an average of $7 a month to bills…5% increase for 2012 …rise an additional 6.3% for 2013 and 5.9% in 2014 under the PUC order."

- **SCE raised rates over 10% in 2013**
- **SCE has raised rates by an additional 10% since the beginning of 2014**
- **SCE projects approximately 5% rate escalation through 2020**



Source: SCE Internal Forecasts
2011 IEPA Annual Meeting
Kevin R. Cini, Vice President, Energy Supply and Management, SCE

The Look of Solar: Shade Structures

Parras Middle School
Redondo Beach Unified School District

Los Amigos School
Palmdale School District

The Look of Solar: Shade Structures

Tulita Elementary School
Redondo Beach Unified School District

Jefferson Elementary School
Redondo Beach Unified School District

The Look of Solar: Carports

Palmdale Learning Plaza
Palmdale School District

La Mesa Junior High School
Wm. S. Hart Union High School District

The Look of Solar: Carports

Chaffey High School
Chaffey Joint Union High School District

Alta Loma High School
Chaffey Joint Union High School District

Power Purchase Agreement

- **Zero Capital Cost to Paramount Unified School District**
- **PFMG Solar Designs, Builds and Maintains Solar Energy Systems**
- **Tax Incentives Monetized**
- **Technology**
  - Tier 1 components
- **Increases Benefit of Prop 39 Funds**
- **End of PPA Term Flexibility**
  - System removed at no cost to District
  - System purchased at fair market value
  - PPA renewed

Paramount USD Solar Project Details

- **Positive Impact to General Fund**
  - $780,000 in the first 5 years
  - $13.9 Million over 25 years

Site Name	Mounting Type	System Size kW-DC	Estimated 1st Year kWh
Alondra Middle School	Elevated Structure	341.00	559,000
Buena Vista High School	Elevated Structure	155.00	254,000
Collins Elementary School	Elevated Structure	111.60	188,000
District Office	Parking Canopy	86.80	144,000
Gaines Elementary School	Parking Canopy	74.40	117,000
Hollydale Grade School	Parking Canopy	296.67	482,000
Jackson Middle School	Parking Canopy	183.21	297,000
Jefferson Elementary School	Parking Canopy	159.96	257,000
Keppel Elementary School	Elevated Structure & Parking Canopy	153.45	247,000
Lincoln Elementary School	Parking Canopy	192.51	309,000
Los Cerritos Elementary School	Elevated Structure	197.16	329,000
Mokler Elementary School	Parking Canopy	155.00	264,000
Paramount Adult School	Parking Canopy	174.84	282,000
Paramount High School West Campus	Elevated Structure & Parking Canopy	260.40	441,000
Paramount Park Middle School	Elevated Structure & Parking Canopy	198.40	413,000
Roosevelt Elementary School	Parking Canopy	235.60	384,000
Tanner Elementary School	Parking Canopy	179.80	306,000
Wirtz Elementary School	Parking Canopy	130.20	214,000
Zamboni Elementary School	Elevated Structure & Parking Canopy	235.60	409,000
Total		**3,521.60**	**5,896,000**

PFMG SOLAR
Partners For Many Generations

#1 Solar Partner for Schools

106 K-12 Schools at 14 Districts

PFMG Solar

- **The Solar Leader for Southern California Schools**
  - 106 schools at 14 school districts
  - Energy Engineered
  - No Change Orders
- **Partnership**
  - Exceptional Client References
  - Educational Enhancements (Internships, Mentoring Programs, Scholarships, SkillsUSA)
- **Construction with District Needs in Mind**
  - DSA experts- 100% close-out of DSA numbers
- **Safety**
  - Enhanced Electrical Safety Specifications

Powering Schools = Empowering Students

- **Use solar systems as labs for students**
- **Algebra, math, economics, writing**
- **Proven success of the program**

  Palmdale High School, students made a 14% overall gain on their test scores

Hands on learning – touring school systems and observing system performance data online

CALIFORNIA
Common Core State Standards

AVUHSD students participating in their week-long solar unit.

Educational Partnership = Enrichment Programs

PFMG SOLAR
Partners For Many Generations

A Successful Project = Community Involvement

California Government Code 4217

- **Designed to allow public agencies to take advantage of time sensitive incentives**
- **Provides flexibility and procurement for solar energy projects**

School District	Date of Approval
William S. Hart Union High School District	Board of Trustees Resolution Approval – February 16, 2011
County of Orange	Board of Supervisors Meeting Minutes – October 5, 2010
Palmdale School District	Board of Trustees Resolution Approval – April 27, 2010
Antelope Valley Union High School District	Execution of PPA - March 10, 2010
Castaic Union School District	Board of Trustees Approval – July 19, 2012
Hughes Elizabeth Lakes Union Elementary School District	Board of Trustees Resolution Approval – September 10, 2011
Keppel Union School District	Board of Trustees Approval – March 14, 2013
Wilsona School District	Board of Trustees Resolution Approval – May 19, 2011
Chaffey Joint Union High School District	Board of Trustees Approval – December 10, 2013
City of Palmdale	City Council Approval – August 1, 2012
Redondo Beach Union School District	Board of Trustees Approval – June 10, 2013
San Gabriel Unified School District	Board of Trustees Resolution Approval - August, 26, 2014
Pomona Unified School District	Board of Education Resolution Approval - November 12, 2014
Saddleback Valley Unified School District	Board of Education Resolution Approval – April 2, 2015
Alta Loma School District	Board of Trustees Approval – May 20, 2015

Partners for Many Generations
Providing value to the Communities we serve

PFMG SOLAR
Partners For Many Generations

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
A	Elevated	12	320	99.20	270°	7°
B	Elevated	12	600	186.00	180°	7°
C	Elevated	12	180	55.80	270°	7°
			1,100	341.00		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
	Alondra MS	V349N-015333	1,100	341.00	A,B,C

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 966 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

Solar Array
Meter Location ID
Point of Interconnection
Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
ALONDRA MIDDLE SCHOOL	PARAMOUNT USD	16200 DOWNEY AVE PARAMONT, CA 90723	Date:	6/16/2015
			Drawn by:	CES

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
A	Elevated	12	360	111.60	180°	7°
			360	111.60		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
1	Collins ES 1	259000-077182	360	111.60	A

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 569 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

Solar Array
Meter Location ID
Point of Interconnection
Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
COLLINS ELEMENTARY SCHOOL	PARAMOUNT USD	6125 COKE AVE LONG BCH, CA 90805	Date:	6/16/2015
			Drawn by:	CES

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
A	Carport	6	40	12.40	180°	7°
B	Carport	12	240	74.40	180°	7°
			280	86.80		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
	DO 1	259000-029028	280	86.80	A,B

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 191 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

- Solar Array
- Meter Location ID
- Point of Interconnection
- Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
PARAMOUNT USD DISTRICT OFFICE	PARAMOUNT USD	15110 CALIFORNIA AVE PARAMONT, CA 90723	Date:	6/16/2015
			Drawn by:	CES

Z:\01_Projects Sales\Paramount USD\PFMG Engineering\Array Layouts (13)\2015-06-16_Schematic Layouts\DO_S01_ces_2015-06-16.png 6/25/2015 33.6 SAS Template Version: v82, Release Date: 06/24/2015

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
A	Carport	6	114	35.34	180°	7°
B	Carport	9	261	80.91	270°	7°
C	Carport	12	348	107.88	270°	7°
D	Carport	9	234	72.54	270°	7°
			957	296.67		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
	Hollydale GS	V349N-002747	957	296.67	A,B,C,D

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 308 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

Solar Array
Meter Location ID
Point of Interconnection
Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
HOLLYDALE MIDDLE SCHOOL	PARAMOUNT USD	5511 CENTURY BLVD SO GATE, CA 90280	Date:	6/16/2015
			Drawn by:	CES

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
A	Carport	12	240	74.40	270°	7°
B	Carport	12	240	74.40	270°	7°
C	Carport	12	84	26.04	270°	7°
			564	174.84		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
1	Paramount AS 1	259000-025817	384	119.04	A,B,C
2	Paramount AS 2	259000-025933	180	55.80	B
			564	174.84	

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 1015 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

- Solar Array
- Meter Location ID
- Point of Interconnection
- Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
PARAMOUNT ADULT SCHOOL	PARAMOUNT USD	14507 PARAMOUNT BLVD PARAMONT, CA 90723	Date:	6/16/2015
			Drawn by:	CES

SCHEMATIC LAYOUT OF PROPOSED SOLAR SYSTEM

TABLE OF SOLAR ARRAYS

Location ID	Racking Type	Modules in Rise	# of Modules	Size DC kW	Azimuth	Tilt
D	Carport	12	540	167.40	180°	7°
E	Carport	7	300	93.00	180°	7°
A	Carport	12	200	62.00	270°	7°
B	Carport	12	200	62.00	270°	7°
C	Elevated	12	240	74.40	270°	7°
			1,480	458.80		

TABLE OF UTILITY METERS

Location ID	Meter Name	Meter Number	# of Modules	Size DC kW	Connected to Arrays
2	aramount HS W Camp	V349N-000264	840	260.40	D,E
1	Paramount Park MS	V349N-018164	640	198.40	A,B,C
			1,480	458.80	

Arrays were designed assuming a crystalline silicon PV module of nominal power = 310W
Total estimated conduit length = 1631 ft

NOTES

1. Results of easement reports may affect final placement of solar arrays
2. Trees and/or other obstructions will have to be removed, trimmed or relocated
3. A detailed analysis of the effect of shade on the arrays has not been performed
4. A soil analysis has not been performed
5. It is assumed that the site is not in a designated flood plain
6. Arrays may be divided into 4,000sf sections with a 1' gap for earthquake safety

LEGEND

- Solar Array
- Meter Location ID
- Point of Interconnection
- Proposed Conduit Run

N

PFMG SOLAR
Partners For Many Generations
7777 Center Avenue, Suite 200
Huntington Beach CA 92647
(714) 408-2982
www.pfmgsolar.com

Site Name:	Project name:	Site Address:	Revision:	S01
PARAMOUNT PARK MS / PARAMOUNT HS WEST CAMPUS	PARAMOUNT USD	14608 PARAMOUNT BLVD PARAMONT, CA 90723	Date:	6/16/2015
			Drawn by:	CES