

Cost Effectiveness Review of Chevron ES Solar PV Proposal

OCTOBER 13, 2009

This review is based on a Chevron Energy Solutions (CES) proposal for Solar Photovoltaic Panels and Carport Structures, dated October 2, 2009, and a price update given on October 13, 2009 of \$8,118,505.00.

To satisfy California Government Code Sections 4217.10 to 4217.18, the Department of General Services (DGS) estimated cumulative savings on the District's electrical bill. The District is expected to save \$7,607,776.48 in the first 30 years of the project (Chart 1). Without the solar panels, the District will have paid \$27,222,525.33 in electrical bills; the solar PV system will have provided a 35% reduction from the business-as-usual cost.

Based on Chevron ES's own solar electric production table on page 2-4 of the October 2nd proposal and PG&E's E-19 electrical rate, this analysis determined that the avoided cost based on usage reduction is \$177,098.04. Reduced demand could contribute further savings. Net-metering (which would allow the District to sell excess peak electricity back to PG&E) could also further increase savings. This analysis does not include those as the information was not provided in the Chevron ES's proposal; their estimate also does not include demand reduction or net-metering. Their quoted \$214,928.00 savings ("avoided cost") is based on a \$0.14/kwh average rate. It appears that CES may have overstated their savings estimates since the cost of electricity generated by the solar PV system is \$0.11/kwh. Their proforma on page 2-8 assumes an avoided cost of \$268,288.00. This discrepancy calls into question the accuracy of their proforma. This analysis also does not factor in the price of Renewable Energy Credits (RECs). The Department of General Services intends to retire the RECs.

Chevron ES also estimated cumulative savings based on a 4% escalation of utility rates. However, the California State Department of General Services advises that public entities in California use an escalation figure of 2.29%, which includes inflation.¹ This analysis uses the 2.29% escalation rate.

This analysis thus estimates \$400,000 in inverter replacement costs every 15 years and \$15,289 in annual maintenance costs. Though the Chevron ES team has said the inverters warranty is good for 25 years, it does not mean that Chevron ES will replace the inverters for regular wear-and-tear at no cost, even if a replacement is needed within the 25 year window.

With the above assumptions (Table 1), DGS projects a payback of 34 years. The projected savings at year 34 – including all rebates and incentives – is \$8,163,411.76. Using a 5% discount rate, the projected savings at year 35 is \$1,479,947.25. The initial cost of the project is \$8,118,505. At year 35 with a 5% discount rate, the net-present-value of the project is \$1,471,806.09. The same model utilizing Chevron ES' utility escalator of 4% would yield a payback at 26 years (Table 2 and Chart 2).

When accounting for the cost of financing to the Alameda County property owners (Chart 2), the solar PV does not have a payback under both CES estimate nor the DGS estimate. The NPV cost of the solar system including the cost of financing the system (4.884% over 29 years) is \$3,860,114.72. though the system would have produced a savings of \$1,848,281.31.

For more information or questions about this analysis, please contact Dr. Sadiq Ikhaor, Vice Chancellor for General Services for the Peralta Community College District.

Item		Escalator
Capital Expenditure		
System Cost (\$)	\$8,118,505.00	
Payments	1	
INCENTIVES & REBATES		
CSI PBI for public entities (\$/kwh)	\$0.26	
Total Rebates & Incentives	\$1,968,018.11	
GENERATION		
System DC Rating (kW)	1200.0	-0.70%
AC Rating - 23% conversion loss (kW)	924.0	-0.70%
Price of Electricity @ Peak	\$0.15645	4.00%
Generation (kwh) @ Peak	513,970	-0.70%
Value of Electricity Generated @ Peak		
Price of Electricity @ Mid	\$0.10446	4.00%
Generation (kwh) @ Mid	577,799	-0.70%
Value of Electricity Generated @ Mid		
Price of Electricity @ Off Peak	\$0.08193	4.00%
Generation (kwh) @ Off Peak	443,434	-0.70%
Value of Electricity Generated @ Off Peak		
Total Generation (kwh)	1,535,203	
Total Value of Solar Electricity	\$177,098.04	
SREC (\$/Mwh)	\$0.00	
MAINTENANCE & INVERTER		
Inverter (replacement cost at 15 years)	-\$400,000.00	1.50%
Maintenance	-\$15,289.00	1.50%

Table 1 - Year 1 Electrical Production with assumed escalators; Total Rebates and Incentives; and assumed maintenance costs.

Using CA-DGS escalators, payback occurs at Year 35	
Cumulative Savings	\$8,163,411.76
NPV of Cumulative Savings	\$1,479,947.25
NPV of Original Capital Expenditure	\$1,471,806.09

Using Chevron ES escalators, payback occurs Year 26	
Cumulative Savings	\$8,850,326.96
NPV of Cumulative Savings	\$2,370,545.20
NPV of Original Capital Expenditure	\$2,174,527.92

Table 2 - Different utility rate escalators yield different payback lengths.

¹ (<http://www.green.ca.gov/LCCA/model.htm>).

Chart 1: Yearly Comparison, Cost of Electricity to PCCD with and without Solar PV

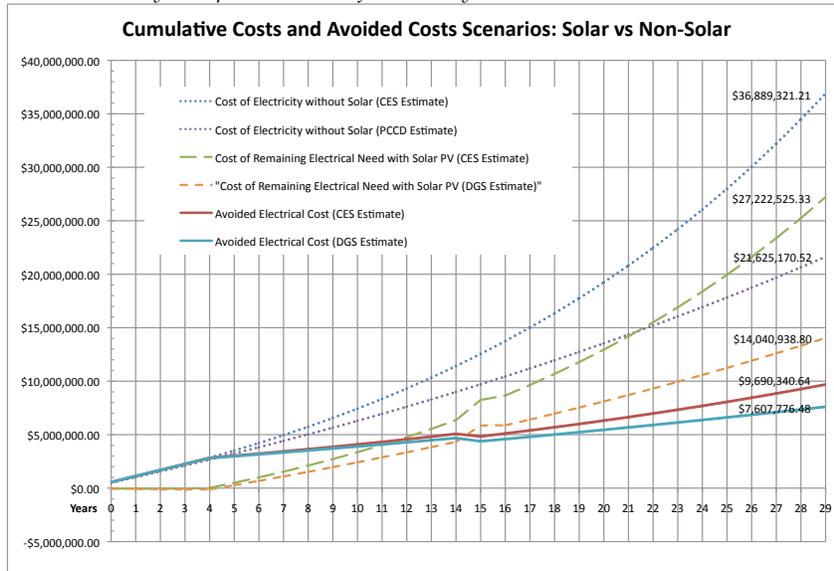


Chart 2: Cumulative Cash Flow Analysis of Chevron ES proposal

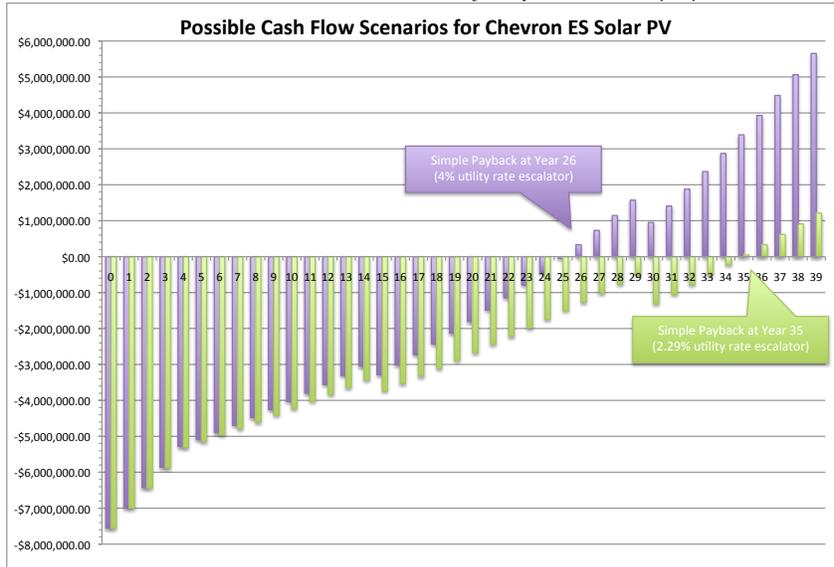


Chart 3: NPV of Cumulative Savings compared to NPV of System Cost

