

# Renewable Energy Alternatives

for

## Napa Sanitation District

Gopal Shanker  
May 21, 2014

# PG&E Electricity Bill Summary

Item	Peak Demand (kW)	Demand Charges	Usage (kWh)	Energy Charges	Total Bill	Unit Cost (\$/kWh)
Current	1,233 (Summer)	\$245,008	5,264,153	\$466,601	\$711,609	\$0.1352
Additional	557 (Winter)	\$89,000	1,773,912	\$163,104	\$252,104	\$0.1421
<b>New Projected</b>	<b>1,631 (Summer)</b>	<b>\$324,557</b>	<b>7,038,065</b>	<b>\$629,704</b>	<b>\$954,261</b>	<b>\$0.1356</b>

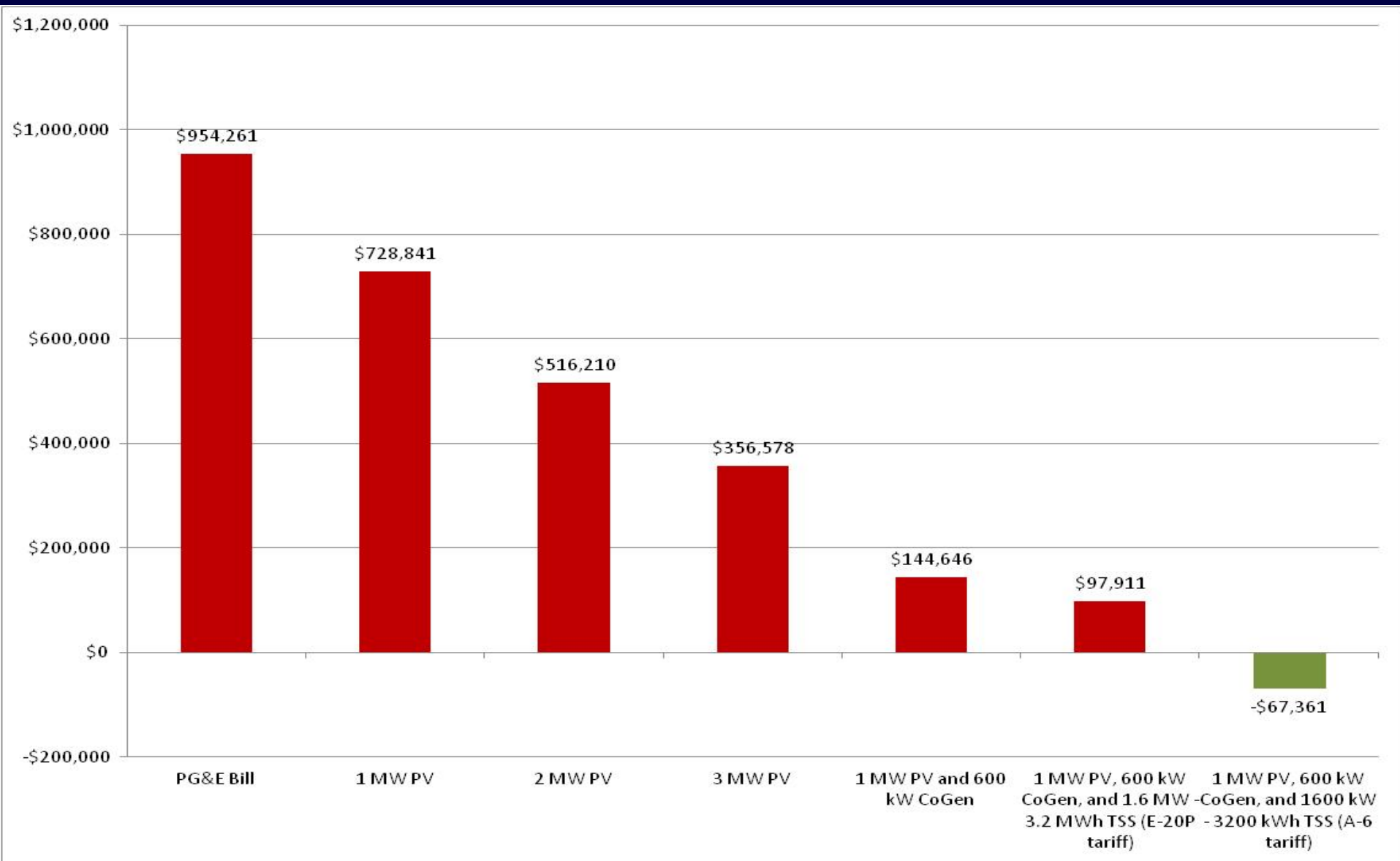
# PG&E Bill Reduction

Renewable Energy Alternative and Tariff	Demand Reduction (%)	Energy Reduction (%)	Bill Reduction
1 MW PV (E-20P)	15%	24%	24%
2 MW PV (E-20P)	19%	49%	46%
3 MW PV (E-20P)	19%	73%	63%
1 MW PV, 600 kW CoGen (E-20P)	51%	97%	85%
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (E-20)	29%	95%	90%
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (A-6)	74%	95%	107%

# Projected PG&E Bill (Annual)

Renewable Energy Alternative and Tariff	New Peak Demand (kW)	New Demand Charges	New Usage (kWh)	New Energy Charges	New PG&E Bill
1 MW PV (E-20P)	1,380 (Summer)	\$268,634	5,322,519	\$460,207	\$728,841
2 MW PV (E-20P)	1,328 (Winter)	\$265,935	3,606,973	\$250,275	\$516,210
3 MW PV (E-20P)	1,328 (Winter)	\$263,636	1,891,427	\$92,941	\$356,578
1 MW PV, 600 kW CoGen (E-20P)	798 (Summer)	\$132,342	224,344	\$12,305	\$144,646
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (E-20)	1,166 (Winter)	\$98,721	358,039	-\$810	\$97,911
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (A-6)	429 (Winter)	\$0	343,679	-\$67,361	-\$67,361

# Projected PG&E Bill (Annual)

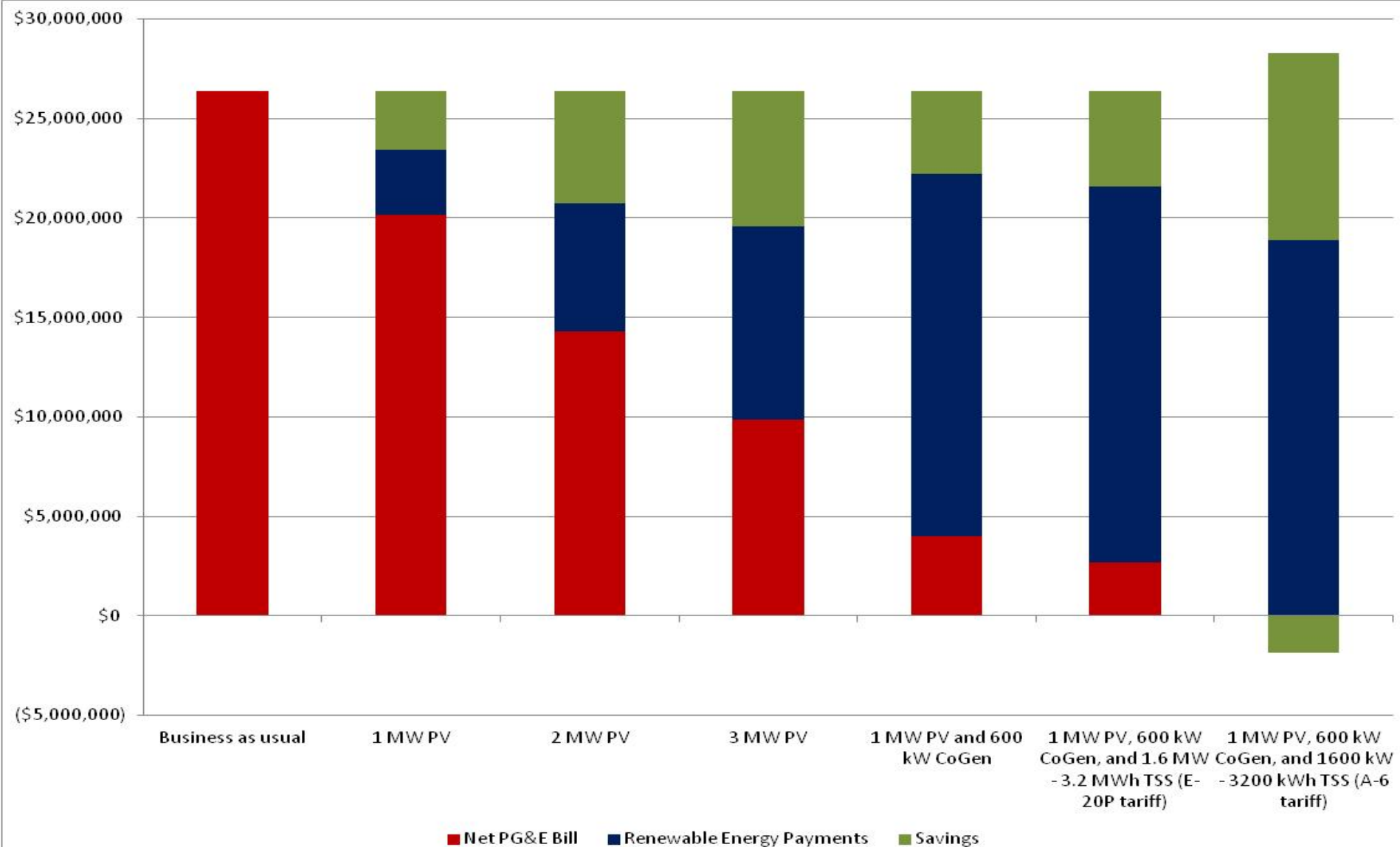


- Discount Rate for NPV calculation: **2.88%**
- PG&E and PPA Escalators: **3%**
- Solar PPA Rate: **\$0.1175 / kWh**
- Solar Purchase Price in year 7: **\$1.5M / MW**
- Real Energy PPA Rate: **\$0.106 / kWh**
- Tesla Stationary Storage Charges: **\$25K / year**
- NEM and tariffs available for 20 years

# Payments and Savings over 20 years

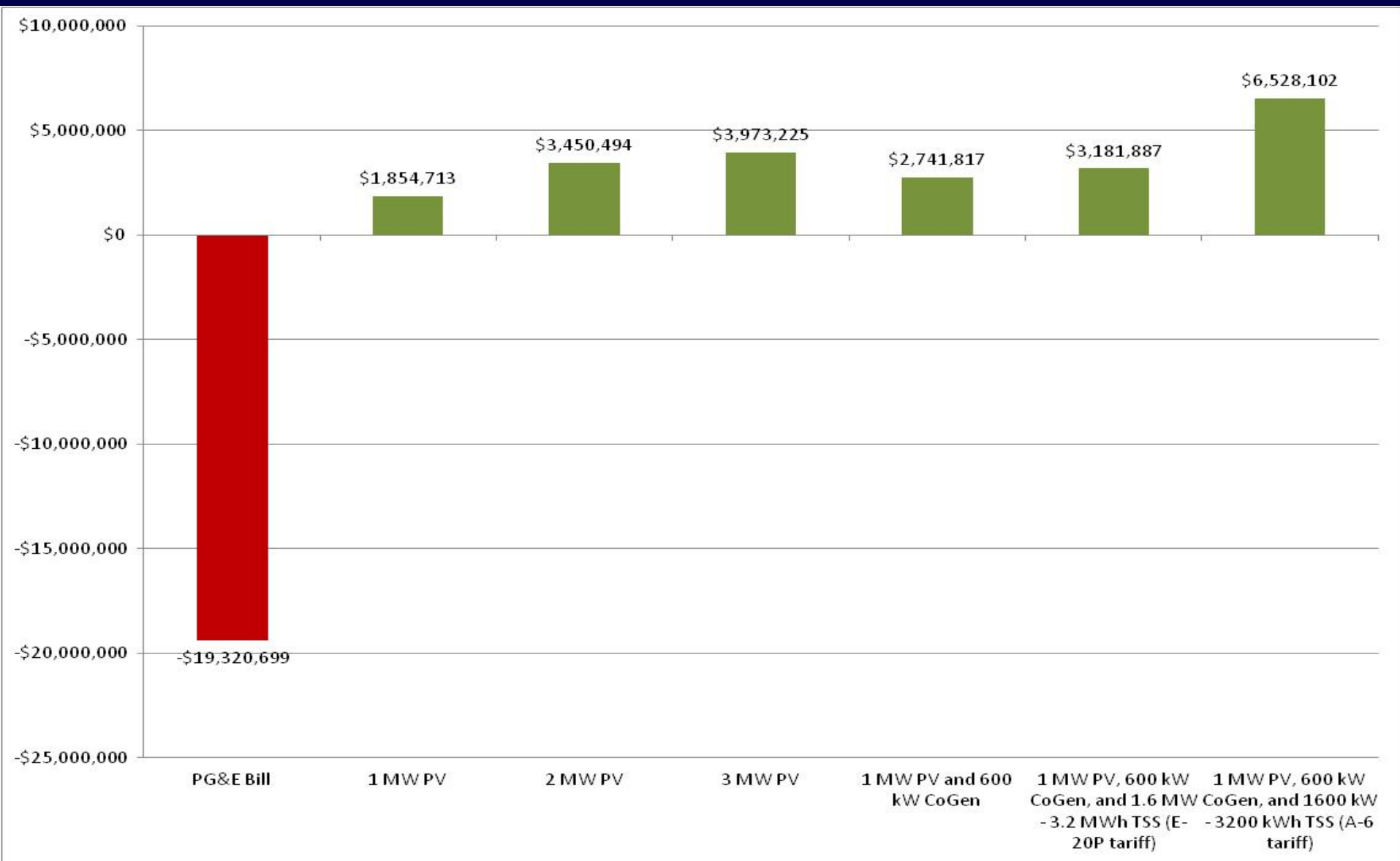
<b>Renewable Energy Alternative and Tariff</b>	<b>PG&amp;E bill Payments</b>	<b>Renewable Energy Payments</b>	<b>Cumulative Savings</b>	<b>Net Present Value of Savings</b>
Business as usual	\$26,410,593	\$0	\$0	\$0
1 MW PV (E-20P)	\$20,171,758	\$3,230,548	\$3,008,280	\$1,854,713
2 MW PV (E-20P)	\$14,286,879	\$6,461,096	\$5,662,611	\$3,450,494
3 MW PV (E-20P)	\$9,868,826	\$9,691,644	\$6,850,126	\$3,973,225
1 MW PV, 600 kW CoGen (E-20P)	\$4,003,301	\$18,186,378	\$4,220,914	\$2,741,817
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (E-20)	\$2,709,831	\$18,878,290	\$4,822,472	\$3,181,887
1 MW PV, 600 kW CoGen, 1.6 MW/3.2 MWh TSS (A-6)	-\$1,864,306	\$18,878,290	\$9,396,609	\$6,528,102

# 20-yr Cum Payments and Savings

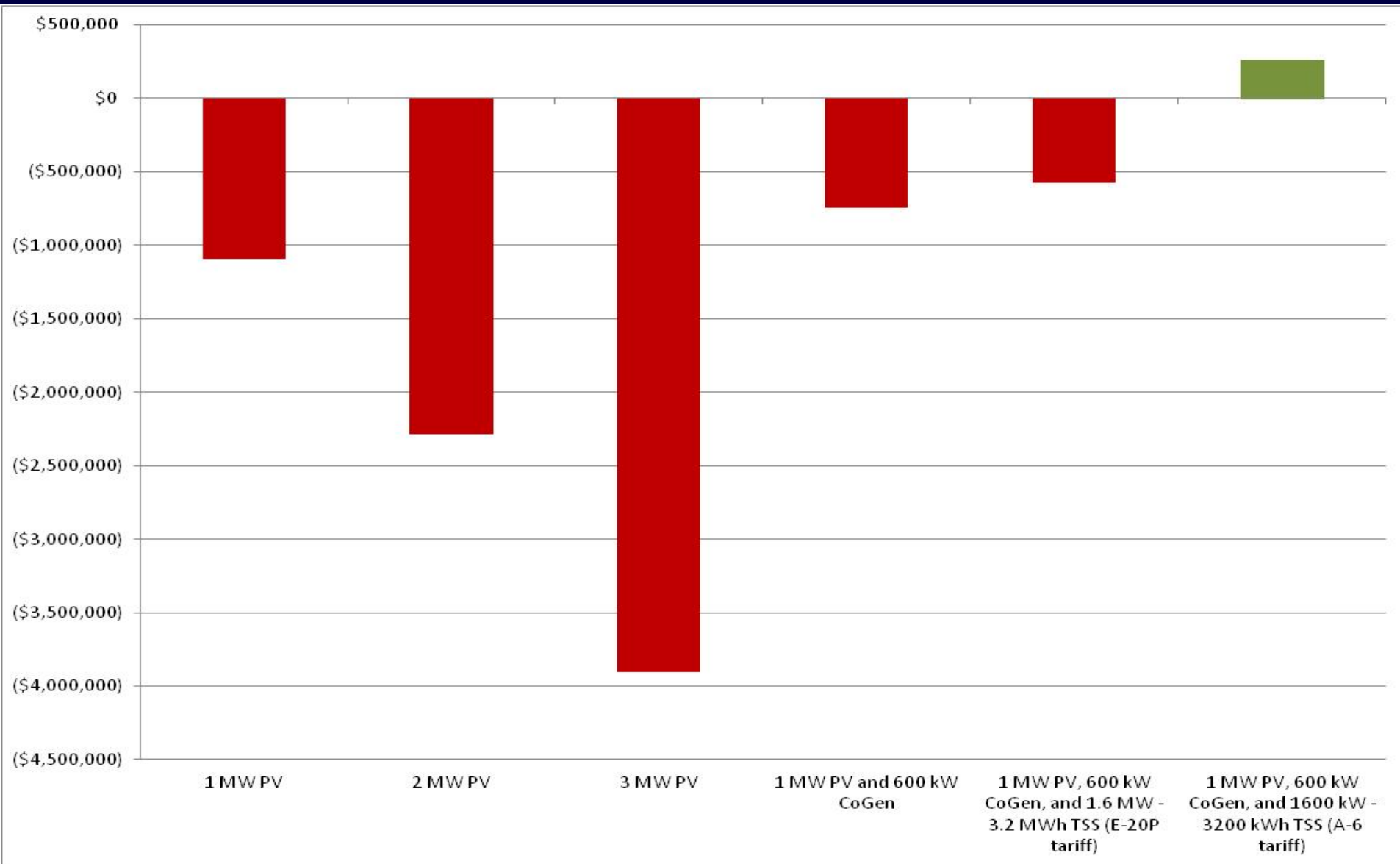




# NPV of Renewable Energy Options



# Worst Cum. CF Position (year 7)



- 1 MW PV
  - 2014: RFP, Vendor Selection, Construction, Interconnection
- +600 kW CoGen
  - 2015: Real Energy
- +1600 kW/3200 MWh
  - 2015: Tesla Stationary Storage: SGIP Application, Contract
- NSD to submit Rule 21 pre-application or interconnection application to PG&E
  - PG&E has confirmed that renewable energy generation and storage solution is acceptable with a few caveats

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