

SOLAR PHOTOVOLTAIC (PV) FEASIBILITY STUDY AND PROPOSAL

FOR

THE CITY OF CALISTOGA

GOPAL SHANKER
DECEMBER 6, 2016

- Calistoga has 31 electricity meters and is a customer of PG&E and MCE
- MCE became Calistoga's electricity supplier for
 - 5 meters in unincorporated Napa County in February 2015
 - 26 meters within city limits in September 2016
- Proposing two PV systems for:
 - Direct offset of waste water treatment plant meter
 - Indirect offset of portion of 16 other meters
- Disregarding 14 smaller meters

EVALUATED METERS AND BILLS

#	Meter #	Meter Location	PG&E Tariff	Annual Usage (kWh)	Actual PG&E Bill	Unit Cost (\$/kWh)
1	100 951 3119	WASTE WATER TREATMENT PLANT	E19S	1,393,891	\$94,672	\$0.0679
2	100 884 6661	POOL	A10SX	152,164	\$25,914	\$0.1703
3	100 882 0480	POLICE STATION	E19S	98,834	\$19,262	\$0.1949
4	500 002 7331	RECLAIMED BOOSTER PUMP	E19S	89,501	\$19,010	\$0.2124
5	100 678 2088	MT. WASHINGTON PUMP	A1X	86,220	\$16,301	\$0.1891
6	100 884 8339	FIRE HOUSE	A1X	57,795	\$12,322	\$0.2132
7	100 673 1193	WATER TREATMENT PLANT	A10SX	66,339	\$8,943	\$0.1348
8	100 907 2334	PUBLIC WORKS BUILDING	A1X	27,717	\$5,816	\$0.2098
9	100 870 9629	NBA PUMP	A1X	27,704	\$5,757	\$0.2078
10	100 949 8893	CITY HALL	A1X	22,147	\$4,829	\$0.2180
11	100 978 0253	MONHOFF RECREATION CENTER	A6	14,613	\$3,924	\$0.2685
12	100 949 8944	MUSEUM	A1X	15,635	\$3,381	\$0.2163
13	100 686 5724	FIEGE TANK PUMP	A1X	23,046	\$3,125	\$0.1356
14	100 677 6880	TENNIS COURT LIGHTING	A1X	13,629	\$2,788	\$0.2046
15	100 658 4585	COMMUNITY BUILDING	A1X	11,658	\$2,586	\$0.2218
16	100 984 7188	RECLAIMED BOOSTER PUMP	A1X	11,126	\$2,465	\$0.2215
17	100 996 8288	PINE STREET LIFT STATION	A1X	10,915	\$2,429	\$0.2225

ELECTRICITY BILL AND PV SYSTEM SUMMARY

Meter	Current Tariff	Electricity Usage (kWh)	Calculated Electricity Bill	Unit Cost
WWTP	E-19S	1,398,616	\$203,939	\$0.1458
RES-BCT meters	Various	742,137	\$146,628	\$0.1976
All	Various	2,140,753	\$350,567	\$0.1638

Meter	PV system Size (DC kW)	Post solar tariff; NEM 2.0	Electricity Production (kWh)	Electricity Bill Savings	Electricity Usage and Bill Offset
WWTP	607	E-19S Option R	979,094	\$140,498	70% 69%
RES-BCT meters	363	A6-Gen; various	585,890	\$93,793	79% 64%
Total	970	Various	1,564,984	\$234,291	73% 67%

- Combined PV System Size: 970 kW DC
 - Fixed Tilt, premium modules to reduce array footprint
- 1st year production: 1,565 MWh
- 1st year electricity bill savings: ~\$234K
- Total installed cost: ~\$2.78M - \$3.6M
 - Varies depending on design considerations
 - Includes \$400K allowance for PG&E interconnection
 - Includes \$90K for Récolte Energy
- PG&E escalator: 2% (worst case scenario)
- Interest rate for loan and NPV calculation: 3%
- Loan term: 15 years

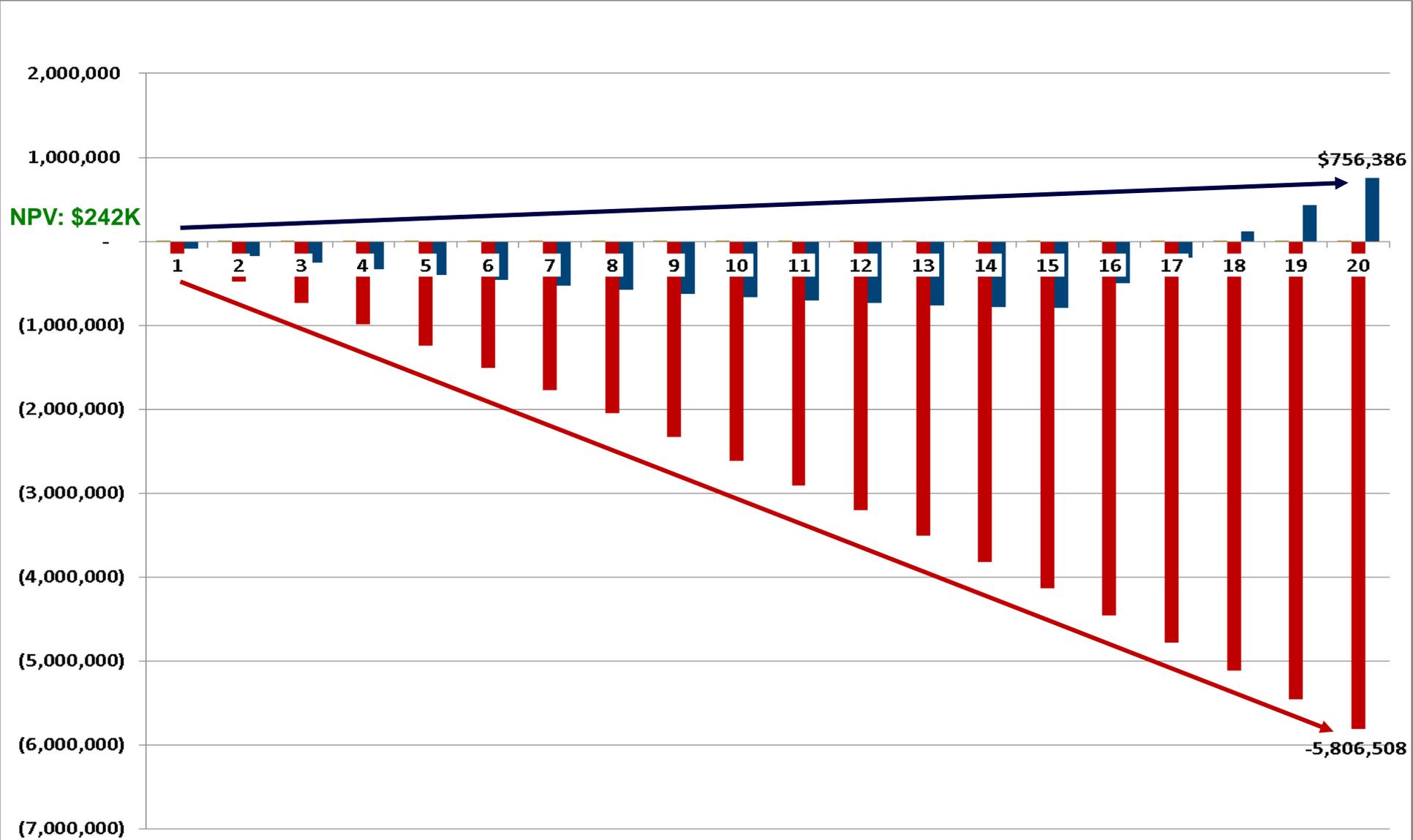
FINANCIAL BENEFITS

<u>Metric</u>	<u>Loan</u>	<u>Cash</u>
• 20-year Cumulative Savings	\$756K	\$1.69M
• Net Present Value	\$242K	\$235K
• Cash Flow Payback	18 years	15 years
• IRR	5.58%	3.66%

COMBINED CASH FLOW STATEMENT

Year		1	2	3	4	5	10	15	20	Total	
PV System Size (kW DC)	970	Interest Rate				3.00%					
Unit Cost per kW	\$3,746	Term (years)				15					
Installed Cost	\$3,633,209	PG&E electricity inflation rate				2.00%					
Annual Electricity Bill Savings	\$234,291										
Benefits / (Costs)											
Loan payments		-\$304,341	-\$304,341	-\$304,341	-\$304,341	-\$304,341	-\$304,341	-\$304,341	\$0	-\$4,565,122	
Inverter Reserve / Insurance	\$25	-24,250	-24,250	-24,250	-24,250	-24,250	-24,250	-24,250	-24,250	-485,000	
Avoided Electricity Costs		238,977	243,756	248,631	253,604	258,676	285,599	315,325	348,144	5,806,508	
Cumulative Electricity Costs		-238,977	-482,733	-731,365	-984,969	-1,243,645	-2,616,730	-4,132,726	-5,806,508		
Annual Benefits / (Costs)		-89,615	-84,835	-79,960	-74,987	-69,915	-42,992	-13,267	323,894	756,386	
Cumulative Benefits / (Costs)		-\$89,615	-\$174,450	-\$254,410	-\$329,397	-\$399,313	-\$669,185	-\$796,147	\$756,386		
<i>Net Present Value (loan)</i>	\$242,282										
<i>Internal Rate of Return (loan)</i>	5.58%										
Cash Flows (cash purchase)	-\$3,633,209	\$214,727	\$219,506	\$224,381	\$229,354	\$234,426	\$261,349	\$291,075	\$323,894	\$1,688,299	
		-\$3,418,482	-\$3,198,976	-\$2,974,594	-\$2,745,240	-\$2,510,814	-\$1,258,979	\$135,767	\$1,688,299		
<i>Net Present Value (cash purchase)</i>	\$235,225										
<i>Internal Rate of Return (cash purchase)</i>	3.66%										

CUMULATIVE COSTS VS. SAVINGS (LOAN)



PV ARRAY LOCATION



- Approve Services and Fees Agreement
- Meter and site survey
- Soils Report, CEQA
- PG&E
 - Interconnection Study
 - Tariff Review
- Financing alternatives: Cash, Loan, Lease, PPA
- Request for Proposals
- Vendor Selection
- Construction
- Interconnection
- Bill True Up

- Vendor-, technology-, financing-neutral Owner's Representative
 - Accept payments from Clients only
- Maximize effectiveness of vendor
- Maximize financial benefits of solar
 - Leverage Récolte Energy's fees
 - Improve vendor terms and guarantees
- Primarily responsible for passage of NEMA legislation, regulation, and tariff
- Advocate on your behalf with PG&E / MCE

- Napa Valley Unified School District
 - [Don Evans](#), School Planning & Construction, 707.253.6281
- Napa Sanitation District
 - [Robin Gamble](#), Engineer, 707.258.6031
 - [Jeff Tucker](#), CFO, 707.258.6012
- Kenwood Elementary School District
 - [Bob Bales](#), Superintendent, 707.833.2500
- El Dorado Hills Fire Department
 - [Dave Roberts](#), Fire Chief, 916.933.6623 x.1011
- Sonoma Valley Unified School District
 - [Louann Carlomagno](#), Superintendent, 707.935.4246
- Contra Costa County Office of Education
 - [John Hild](#), Director II, General Services, 925.942.3333

Gopal Shanker
President
Récolte Energy

(707) 480-1960

gopal@recolteenergy.com

www.recolteenergy.com