Clean Coalition

Chumash Casino Solar+storage considerations

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Making Clean Local Energy Accessible Now

21 October 2022



- Clean Coalition confirms expected savings for the Chumash Casino Resort:
 - **Previous aggregate economics:** Based on 5% utility escalator, 25-year cumulative cash purchase savings were forecasted to be \$14.6 million over 25-years with a 11% IRR.
 - No battery at the CCR Hotel meter
 - Includes SGIP savings of \$292k
 - No ITC
 - PG&E rate schedules with energy, delivery, and demand charges
 - 2019 load data for all three meters (CCR Hotel, New Tower, HVAC)
 - Updated aggregate economics: Based on 5% utility escalator, 25-year cumulative cash purchase savings are forecasted to be \$20.3 million over 25-years with a 17.3% IRR.
 - Battery added to CCR Hotel meter, used to be solar only
 - No SGIP
 - 40% Direct Pay ITC (30% ITC + 10% Indian Lands adder) calculates out to \$2.48 million in savings
 - PG&E rate schedule with PG&E delivery & demand charges, and 3CE's 3CPrime energy charges.
 - 2019 load data for New Tower and CCR Hotel meters. 2020 load data was used for the HVAC meter



	Chumash Casino Resort - Solar PV System Details by Meter											
	Meter Lo	ad Details	Solar PV System Details and Cost									
					Solar as a		Solar PV					
Meter Location	Total Annual		Solar PV	Solar PV	Percentage of	Solar PV	Sytem Cost					
	Load	Peak Demand	System Size	Generation	Meter's Load	System Cost	per Watt					
	kWh	kW	kWdc	kWh	%	\$	(\$/W)					
CCR Hotel	1,096,898	231	650	1,110,534	101%	\$2,112,971	\$3.25					
New Tower	7,154,490	1,248	851	1,451,656	20%	\$2,765,750	\$3.25					
HVAC	2,921,689	950	293 497,132		17%	\$644,600	\$2.20					
Total	11,173,077	2,429	1,794	3,059,322	27%	\$5,523,321	\$3.08					

	Chuma	ash Casino Reso	rt - Battery Ener	gy Storage Syste	em Details by M	eter		
	Meter Loa	ad Details	Details Battery Energy Storage System Sizing and Cost					
					Battery			
				Battery	Storage	Battery	Battery	
Meter Location	Total Annual		Battery Power	Energy	System	Storage	Storage Sytem	
	Load	Peak Demand	Capacity	Capacity Dimension		System Cost	Cost per kWh	
	kWh	kW	kW	kWh	sq ft	\$	(\$/W)	
CCR Hotel	1,096,898	231	100	186	33	\$228,036	\$1,226	
New Tower	7,154,490	1,248	100	186	33	\$228,036	\$1,226	
HVAC	2,921,689	950	100	186	33	\$228,036	\$1,226	
Total	11,173,077	2,429	300	558	99	\$684,108	\$1,226	



	Chumash Casino Resort - Total Project Cost, Incentives, and 25-Year Cumulative Savings & IRR with 5% Utility Cost Escalator											
	Rate Sc	chedule		Project Cost a	nd Incentives		Project Economics					
				Incentives								
	Pre Solar &	Post Solar &		(30% Direct		25-Year						
Meter Location	Storage PG&E	Storage PG&E		Pay ITC & 10%		Operations &	25-Year	25-Year				
	Rate Schedule	Rate Schedule	Total Project	Indian Land	Total Net	Maintenance	Electrical Bill	Cumulative				
	with 3CPrime	with 3CPrime	Cost	adder)	Project Cost	Cost	Savings	Savings	IRR			
	Current	Future	\$	\$	\$	\$	\$	\$	%			
CCR Hotel	B19S	B19S Option S	(\$2,340,536)	\$936,214	(\$1,404,322)	(\$507,415)	\$7,610,104	\$5,698,367	14%			
New Tower	B20S	B20S	(\$2,993,786)	\$1,197,514	(\$1,796,272)	(\$629,270)	\$12,035,419	\$9,609,877	17%			
HVAC	B19S	B19S	(\$872,636)	\$349,054	(\$523,582)	(\$290,986)	\$5,849,928	\$5,035,360	26%			
Total	-	-	(\$6,206,958)	\$2,482,782	(\$3,724,176)	(\$1,427,671)	\$25,495,451	\$20,343,604	17%			

25-year economic details with 5% utility escalator & Direct Pay 30% ITC + adders - CCR Hotel + Casino HVAC + New Tower



3.2 Cash Purchase

Assumptions and Key Financial Metrics

IRR - Term	17.3%	Net Present Value	\$8,379,026	Payback Period	5.9 Years
ROI	327.8%	PV Degradation Rate	0.50%	Discount Rate	5.0%
Energy Cost Escalation Rate	5.0%	Federal Income Tax Rate	0.0%	State Income Tax Rate	0.0%
Total Project Costs	\$6,206,958				

Years	Project Costs	PV & Generator O&M / Equipment Replacement	Direct Pay ITC	Electric Bill Savings	Total Cash Flow	Cumulative Cash Flow
Upfront	-\$6,206,958	-	-	-	-\$6,206,958	-\$6,206,958
1	-	-\$14,352	\$2,482,783	\$580,670	\$3,049,101	-\$3,157,857
2	-	-\$14,639	-	\$605,811	\$591,172	-\$2,566,685
з	-	-\$14,932	-	\$632,016	\$617,084	-\$1,949,601
4	-	-\$15,230	-	\$659,326	\$644,096	-\$1,305,505
5	-	-\$15,535	-	\$687,788	\$672,253	-\$633,252
6	-	-\$15,846	-	\$717,447	\$701,601	\$68,349
7	-	-\$16,163	-	\$748,353	\$732,190	\$800,539
8	-	-\$16,486	-	\$780,555	\$764,070	\$1,564,609
9	-	-\$16,816	-	\$814,108	\$797,292	\$2,361,901
10	-	-\$17,152	-	\$849,063	\$831,911	\$3,193,812
11	-	-\$17,495	-	\$885,480	\$867,985	\$4,061,797
12	-	-\$17,845	-	\$923,415	\$905,570	\$4,967,366
13	-	-\$18,202	-	\$962,930	\$944,728	\$5,912,094
14	-	-\$18,566	-	\$1,004,088	\$985,522	\$6,897,616
15	-	-\$18,937	-	\$1,046,954	\$1,028,017	\$7,925,633
16	-	-\$647,216	-	\$1,091,597	\$444,381	\$8,370,014
17		-\$19,702	-	\$1,138,086	\$1,118,384	\$9,488,398
18	-	-\$20,096	-	\$1,186,496	\$1,166,400	\$10,654,798
19	-	-\$20,498	-	\$1,236,902	\$1,216,403	\$11,871,201
20	-	-\$20,908	-	\$1,289,381	\$1,268,473	\$13,139,674
21	-	-\$361,398	-	\$1,405,985	\$1,044,587	\$14,184,261
22	-	-\$21,753	-	\$1,465,959	\$1,444,206	\$15,628,468
23	-	-\$22,188	-	\$1,528,416	\$1,506,228	\$17,134,696
24	-	-\$22,632	-	\$1,593,453	\$1,570,821	\$18,705,517
25	-	-\$23,084	-	\$1,661,173	\$1,638,088	\$20,343,605
Totals:	-\$6,206,958	-\$1,427,671	\$2,482,783	\$25,495,451	\$20,343,605	-

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Chumash Casino solar+storage layout





	Meter I	oad and Solar PV	Sizing						
	Total Capacity	PV Production	Consumption	Percentage of					
Meter Location	(kWdc)	(kWh)	(kWh)	Total Load					
CCR Hotel	650	1,110,534	1,096,898	101%					
New Tower Exp.	851	1,451,656	7,154,490	20%					
Casino HVAC	293	497,132	2,921,689	17%					
Total	1,794	3,059,322	11,173,077	27%					

Energy Storage System Size									
	Battery Power	Battery Energy							
	Capacity	Capacity							
Meter Location	(kW)	(kWh)							
CCR Hotel	100	186							
New Tower Exp.	100	186							
Casino HVAC	100	186							
Total	300	558							

Notes

- 1. We recommend a traditional NEM interconnection at each of three meters summarized above to optimize savings and minimize installation cost.
- Building plans for each of the parking garages have been preliminarily reviewed by structural engineer. Layouts show maximum system size for louvered canopy design.
- Energy Storage systems are recommended at two of the three meter locations. The marginal benefit of installing batteries behind the CCR Hotel meter is low due the relatively low demand charges on its billing rate structure.



	HVAC Meter Sensitivity Analysis - 25-year Cumulative Savings & IRR from Energy Toolbase Using Socomec Batteries										
				Cumulative Savings and IR	Rs per Sola	ar + Storage System Size Combi	nation				
Solar (kW) 10		100 kW / 186 kWh		200 kW / 372 kWh 300 kW/ 558 kWh		0 kW / 0 kWh	0 kW / 0 kWh				
		25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR		
HVAC	293	\$5,035,360	26.1%	\$5,527,565	23.8%	\$5,716,879	21.5%	\$4,131,451	27.7%		
HVAC+CCR	943	\$11,020,893	19.6%	\$11,511,158	19.2%	\$11,793,160	18.7%	\$10,208,311	19.6%		
All	1,794	\$17,398,325	16.3%	\$18,025,017	16.3%	\$18,403,512	16.1%	\$16,509,680	16.1%		
-	0	\$1,236,379	26.1%	\$1,433,699	18.0%	\$1,651,246	15.1%	\$0	0.0%		

	CCR Hotel Meter Sensitivity Analysis - 25-year Cumulative Savings & IRR from Energy Toolbase Using Socomec Batteries										
	Cumulative Savings and IRRs per Solar + Storage System Size Combination										
Solar (kW) 100 kW / 186 kWł		100 kW / 186 kWh		200 kW / 372 kWh 300 kW/ 558 kWh				0 kW / 0 kWh			
		25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR		
CCR	650	\$5,698,368	14.0%	\$5,759,322	13.3%	\$5,750,988	12.6%	\$5,023,923	13.7%		
-	0	\$375,497	11.7%	\$353,228	7.0%	\$340,963	5.1%	\$0	0.0%		

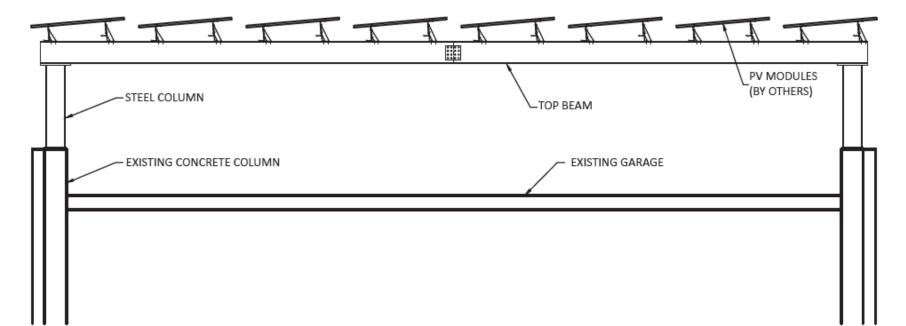
	New Tower Meter Sensitivity Analysis - 25-year Cumulative Savings & IRR from Energy Toolbase Using Socomec Batteries												
				Cumulative Savings and IR	Rs per Sola	ar + Storage System Size Combi	nation						
Solar (kW) 100 kW / 186 kWh 200				200 kW / 372 kWh		300 kW/ 558 kWh		0 kW / 0 kWh					
		25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR	25 Year Cumulative Savings	IRR				
NT	851	\$9,609,877	17.0%	\$10,040,269	16.7%	\$10,269,452	16.3%	\$8,623,623	16.6%				
NT+HVAC	1,144	\$12,386,615	18.8%	\$12,796,895	18.4%	\$13,041,178	17.9%	\$11,369,747	18.5%				
All	1,794	\$16,926,841	16.0%	\$17,419,394	15.9%	\$17,705,908	15.7%	\$16,256,155	15.9%				
-	0	\$756,703	18.7%	\$1,051,614	14.7%	\$1,273,925	12.7%	\$0	0.0%				



Backup slides

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"Louvered" Garage Solution



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Louvered canopy design

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Louvered Canopy Design

Advantages to Louvered Design

- Solar Modules are accessible for maintenance technicians and cleaners
- Solar modules can be mounted at a steeper tilt. The steeper tilt improves electricity production and reduces soiling.
- There is better airflow improving structure fire safety.

New parking garage – column location

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Steel Column Locations

- The installation will not eliminate parking spaces.
- Steel columns will be mounted to the top of existing concrete bollards.
- Existing light standards will be removed and replaced with under canopy lighting.



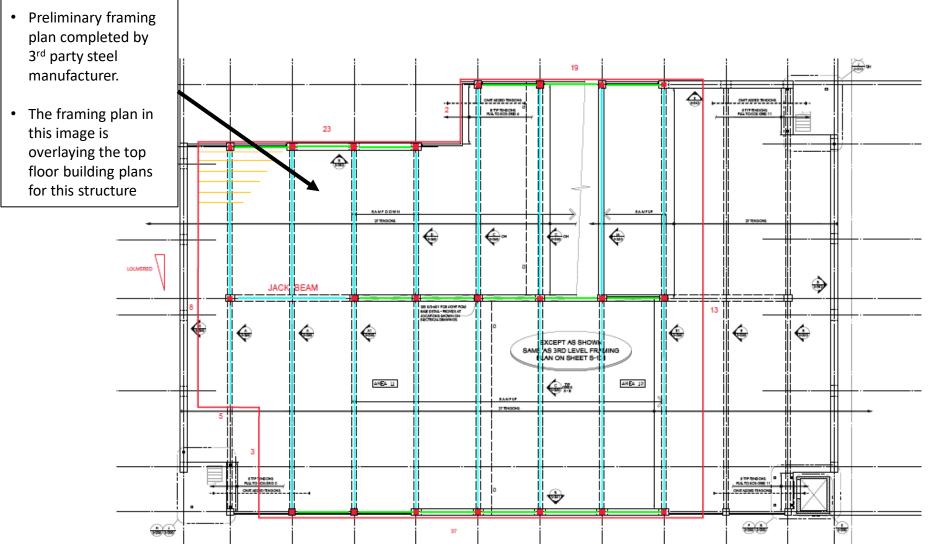
New parking garage – solar capacity



Solar Capacity • 470 x 445watt Solar Modules • 209 kWp to be dedicated to the CCR Hotel meter. Louvered Canopy Design

New parking garage – framing plan





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Old economics – 8 February 2021

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Old valet garage – framing plan



Framing Plan

- Preliminary framing plan completed by 3rd party steel manufacturer.
- The framing plan in this image is overlaying the top floor building plans for this structure

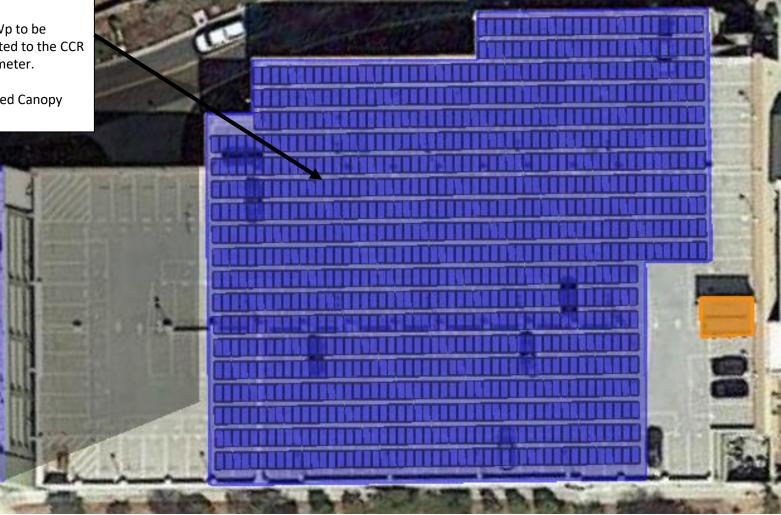


Old valet garage – framing plan



Solar Capacity

- 991 x 445watt Solar Modules
- 441 kWp to be ٠ dedicated to the CCR Hotel meter.
- Louvered Canopy ٠ Design

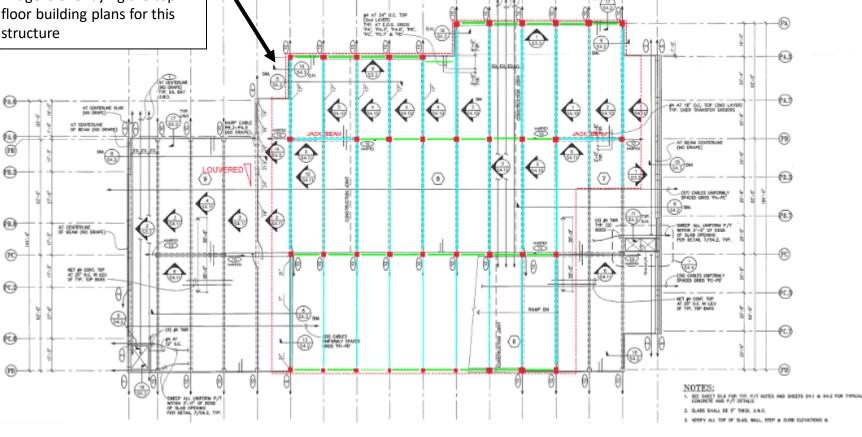


Old valet garage – framing plan



Framing Plan

- Preliminary framing plan completed by 3rd party steel manufacturer.
- The framing plan in this image is overlaying the top floor building plans for this structure



Self-parking garage – column location



Steel Column Locations

- The installation will not eliminate parking spaces.
- Steel columns will be mounted to the top of existing concrete bollards.
- Existing light standards will be removed and replaced with under canopy lighting.



Self-parking garage – solar capacity



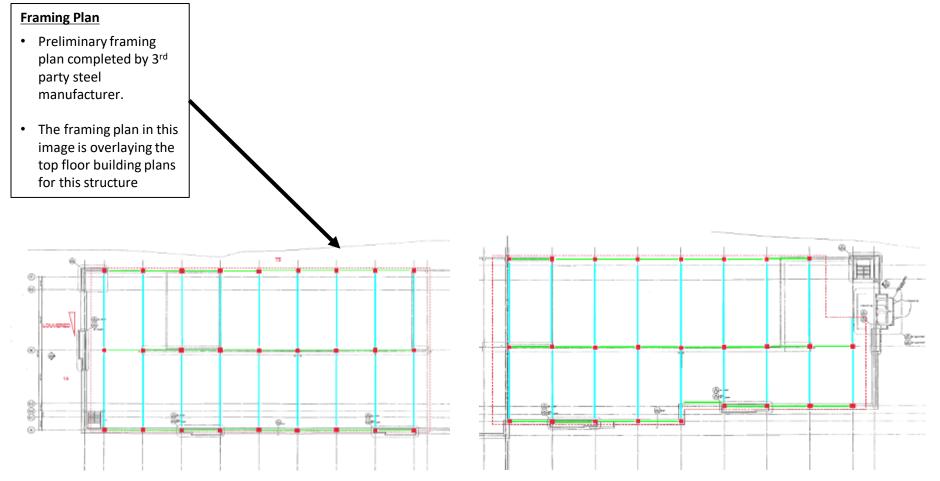


- 1,912 x 445watt Solar Modules
- 851 kWp to be dedicated to the New Tower Exp. meter.
- Louvered Canopy Design



Self-parking garage – framing plan



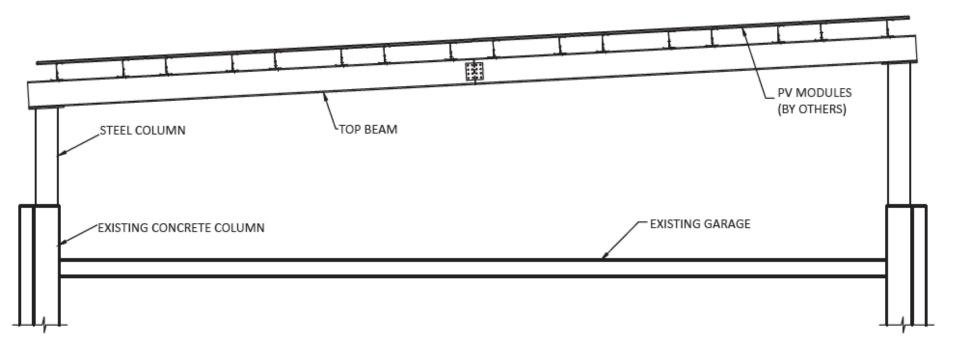


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Full Coverage Canopy Design

"Full Coverage" Garage Solution



Full coverage canopy design

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Full Coverage Canopy Design

Advantages to Full Coverage Design

- Larger systems sizes can be achieved with the same amount of steel.
- Less steel per watt installed results in lower total system price.



25-year economic details with 5% utility escalator

25-year economic details with 5% utility escalator -CCR Hotel + Casino HVAC + New Tower



25-year economic details						
Site	Chumash Casino					
Meter #	3-Meter Aggregate					
Starting PPA rate (\$/kWh)	\$ 0.17					
PPA annual escalation rate (%)	0.0%					
PV annual degredation (%)	0.5%					
Utility cost escalator (%)	5.0%					
BESS annual capacity degredation (%)	1.0%					
Initial Solar O&M (\$/kW-DC)	\$ 8.08					
O&M annual escalation rate (%)	2.0%					
PV size (kW-DC)	1794.2					
BESS power capacity (kW)	500					
BESS energy capacity (kWh)	992					
PV+BESS Net Cost	-\$ 6,739,376					

PPA Simple Savings (25-year)	\$ 10,226,639
Cash Purchase Simple Savings (25-year)	\$ 14,576,935
Cash Purchase IRR (25-year)	11%

25-year economic details with 5% utility escalator -CCR Hotel + Casino HVAC + New Tower



			BESS available																
			for daily																
			cycling -																
			percent of				Total Cash	C	Cumulative Cash							Т	otal Cash	Cu	umulative
			original	E	Electric Bill	Flo	ow (for PPA		Flow (for PPA							Flov	v (for cash	Cas	h Flow (for
Year	PPA	A Payments	(%)		Savings		customer)		customer)	Sys	stem Costs	Inc	entives		0&M	р	urchase)	casł	h purchase)
Year 1 -	-\$	517,362	100%		540,474	\$	23,112	\$	23,112	-\$	6,739,376	\$	292,348	-\$	14,497	-\$	5,921,051	-\$	5,921,051
Year 2 -	-\$	514,775	99%		563,966	\$	49,190	\$	72,303					-\$	14,787	\$	549,179	-\$	5,371,873
Year 3 -	-\$	512,201	98%		587,685	\$	75,483	\$	147,786					-\$	15,083	\$	572,602	-\$	4,799,271
Year 4 -	-\$	509,640	97%		611,641	\$	102,001	\$	249,787					-\$	15,384	\$	596,257	-\$	4,203,014
Year 5 -	-\$	507,092	96%	· ·	635,846	\$	128,754	\$	378,541					-\$	15,692	\$	620,154	-\$	3,582,860
Year 6 -	-\$	504,557	95%		660,311	\$	155,754	\$	534,296					-\$	16,006	\$	644,305	-\$	2,938,555
Year 7 -	-\$	502,034	94%		685,047	\$	183,013	\$	717,309					-\$	16,326	\$	668,721	-\$	2,269,834
Year 8 -	-\$	499,524	93%		710,066	\$	210,542	\$	927,851					-\$	16,653	\$	693,413	-\$	1,576,421
Year 9 -	-\$	497,026	92%	\$	735,381	\$	238,355	\$	1,166,206					-\$	16,986	\$	718,395	-\$	858,026
Year 10 -	-\$	494,541	91%	\$	761,006	\$	266,465	\$	1,432,671					-\$	17,325	\$	743,681	-\$	114,345
Year 11 -	-\$	492,068	90%	\$	786,954	\$	294,886	\$	1,727,557					-\$	17,672	\$	769,282	\$	654,937
Year 12 -	-\$	489,608	100%	\$	822,367	\$	332,759	\$	2,060,316	-\$	925,281			-\$	18,025	-\$	120,939	\$	533,998
Year 13 -	-\$	487,160	99%	\$	858,544	\$	371,384	\$	2,431,700					-\$	18,386	\$	840,158	\$	1,374,156
Year 14 -	-\$	484,724	98%	\$	895,519	\$	410,795	\$	2,842,495					-\$	18,754	\$	876,765	\$	2,250,921
Year 15 -	-\$	482,300	97%	\$	933,328	\$	451,028	\$	3,293,523					-\$	19,129	\$	914,199	\$	3,165,121
Year 16 -	-\$	479,889	96%	\$	972,009	\$	492,120	\$	3,785,643					-\$	19,511	\$	952,498	\$	4,117,618
Year 17 -	-\$	477,489	95%		1,011,601	\$	534,112	\$	4,319,755					-\$	19,901	\$	991,700	\$	5,109,318
Year 18 -	-\$	475,102	94%		1,052,145	\$	577,043	\$	4,896,797					-\$	20,299	\$	1,031,845	\$	6,141,163
Year 19 -	-\$	472,726	93%		1,093,683	\$	620,957	\$	5,517,754					-\$	20,705	\$	1,072,978	\$	7,214,141
Year 20 -	-\$	470,363	92%	\$	1,136,261	\$	665,899	\$	6,183,653					-\$	21,120	\$	1,115,142	\$	8,329,283
Year 21 -	-\$	468,011	91%		1,179,926	\$	711,915	\$	6,895,568					-\$	21,542	\$	1,158,384	\$	9,487,667
Year 22 -	-\$	465,671	90%	\$	1,224,725	\$	759,054	\$	7,654,622					-\$	21,973	\$	1,202,753	\$	10,690,419
Year 23 -	-\$	463,343	89%	· ·	1,270,711	\$	807,369	\$	8,461,991					-\$	22,412	\$	1,248,299	\$	11,938,718
Year 24 -	-\$	461,026	88%	\$	1,317,937	\$	856,911	\$	9,318,902					-\$	22,861	\$	1,295,076	\$	13,233,795
Year 25 -	-\$	458,721	87%	\$	1,366,458	\$	907,737	\$	10,226,639					-\$	23,318	\$	1,343,140	\$	14,576,935
Totals -	-\$	12,186,953		\$	22,413,591	\$	10,226,639									\$	14,576,935		



- Proceed with a streamlined solicitation process:
 - Design well defined requirements and package into a Request For Proposal (RFP).
 - Establish standardized load profiles and proposal forms.
 - Invite a limited number of parties to propose, including the ones that have already submitted unsolicited proposals.
- Evaluate proposals
- Select the top proposal to proceed into detailed design
 - Likely requires a limited Chumash Casino commitment to the party (~\$50k).



Important considerations at this stage of the project development which are still outstanding and present potential costs, production impacts, or delays are as follows:

- Utility Interconnection Expense Until a schematic design is created and presented to the utility for Engineering Review, there is the potential for utility side transformer or grid infrastructure costs to be imposed on the project. Given the site demands, this cost increase is unlikely, however it is a potential and should be identified.
 - Mitigation would be to authorize a limited design effort to develop and submit to the utility for review and formal approval. Estimate cost \$15,000
- Airport Proximity Given the proximity of the airport to the rooftop and garage array locations, there may need to be an FAA review and evaluation and/or permit for the array. Any costs for these reviews or permits are not included and are unknown.
 - Mitigation would be to authorize a limited design effort to develop and submit array layouts for review and formal approval or comment. Estimated cost \$ 7,500
- Fire Sprinklers Local Fire should be consulted regarding any requirements for the garage array and if fire sprinklers will be required. It is not expected, especially with the louvered design as it would allow for smoke exhaust vs a monolithic flat array. No costs for fire sprinklers have been considered at this time.
 - Mitigation would be to authorize a limited design effort to develop and submit array layouts for review and formal approval or comment. Estimated cost \$7,500 (same cost for array development for FAA submittal, not an additional cost)
- As requested, this project analysis is based on merit labor pricing and does not include as the base analysis Union or Prevailing Wage Labor Rates. Premium for Union or Prevailing Wage would be approximately 5-10%.