



Ojai Valley Community Resilience Center (CRC)  
370 Baldwin Rd, Ojai, CA 93023

## Solar Microgrid Feasibility Study

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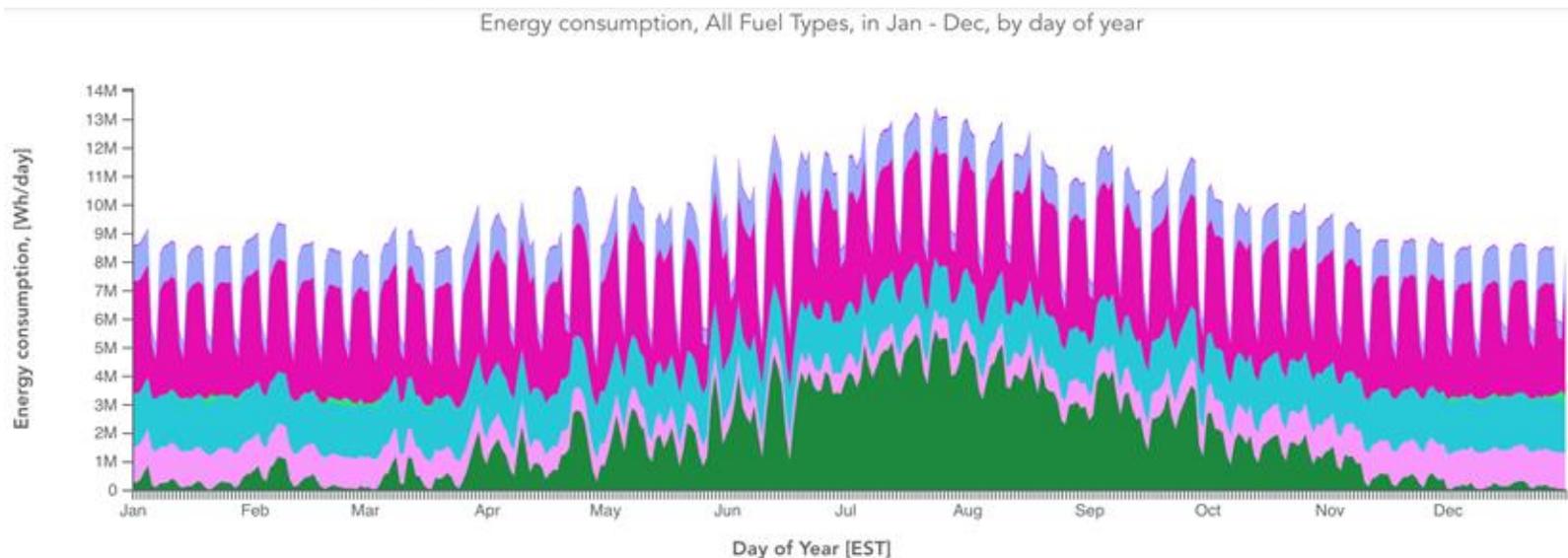
The Ojai Valley Load Pocket (OVLV) spans 11.5 miles of territory within Ventura County.

- The Ojai Valley receives the bulk of its electricity from two 66kV distribution lines that run north from the Santa Clara substation through the Sulphur Mountain range.
- Due to Ojai Valley being a targeted local grid area served by a single distribution substation, it makes it a perfect candidate for a front-of-the-meter Community Microgrid.
- The Ojai Valley Community Resilience Center will provide critical renewables-driven resilience to the community at 370 Baldwin Rd via a behind-the-meter Solar Microgrid.
- In a future Community Microgrid, Solar Microgrids like this will provide Distributed Energy Resources (DERs) and decrease the amount of new solar and storage required to bring resilience to the community over a larger grid area.



ComStock, developed by the National Renewable Energy Laboratory (NREL), models the entire U.S. commercial building stock to simulate energy consumption.

- Applied filters to approximate the new Community Resilience Center's baseline electricity usage:
  - Square footage: 21,000
  - HVAC and water heating fuel: electricity
  - ASHRAE ICC Climate Zone: 3B
  - Comstock building type: Small office
- Electric vehicle charging not included

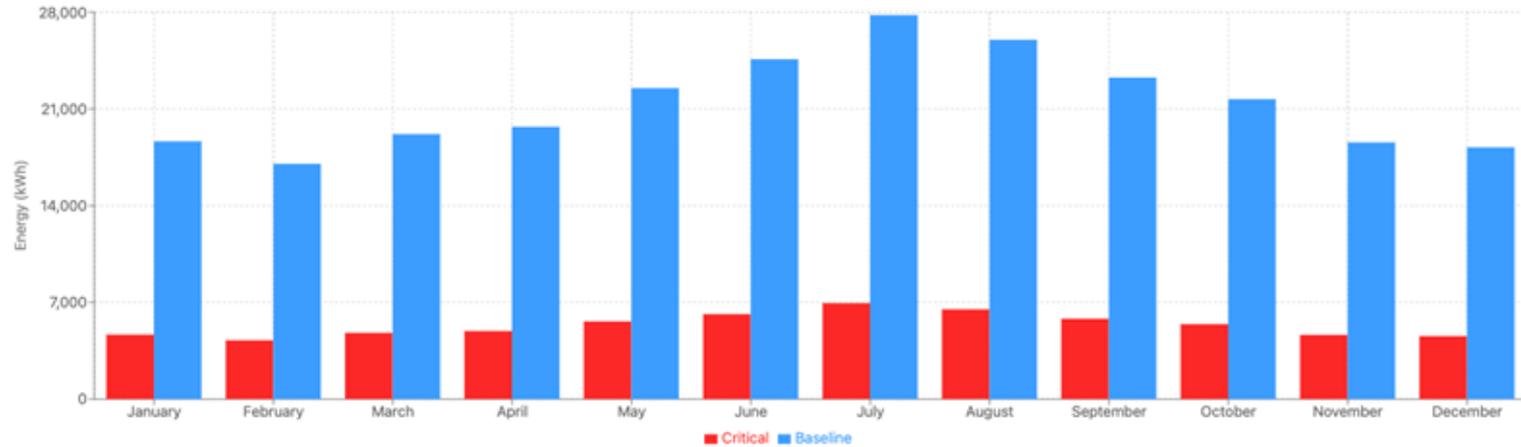


Legend:

- Electricity: Cooling
- Electricity: Exterior Lighting
- Electricity: Fans
- Electricity: Heating
- Electricity: Interior Equipment
- Electricity: Interior Lighting
- Electricity: Refrigeration

# Summary of load profiles

Monthly Energy Consumption



Total Monthly and Daily Max, Average, and Min Electricity Usage by Profile Type

Month	Baseline				Critical			
	Max Daily [kWh]	Average Daily [kWh]	Min Daily [kWh]	Monthly Total [kWh]	Max Daily [kWh]	Average Daily [kWh]	Min Daily [kWh]	Monthly Total [kWh]
January	670	602	451	18,655	167	150	113	4,664
February	698	608	453	17,025	175	152	113	4,256
March	767	618	453	19,173	192	155	113	4,793
April	817	657	469	19,704	204	164	117	4,926
May	972	726	518	22,500	243	181	130	5,625
June	1,003	820	522	24,598	251	205	130	6,149
July	1,064	896	675	27,789	266	224	169	6,947
August	996	839	602	26,001	249	210	150	6,500
September	935	775	556	23,264	234	194	139	5,816
October	839	700	524	21,705	210	175	131	5,426
November	742	619	454	18,574	186	155	113	4,643
December	674	588	451	18,219	168	147	113	4,555
<b>Annual Total</b>				<b>257,207</b>				<b>64,300</b>

**Baseline Load Profile created in ComStock based on a small office in Ojai of similar size  
Critical Load Profile was set at 25% of the Baseline Load Profile**

# Net Zero Energy solar siting - 149 kWdc (103% NZE)



**Ojai Valley CRC**  
370 Baldwin Rd, Ojai, CA 93023

**Total annual load (ComStock):**

- BLP: 257,207 kWh
- CLP: 64,300 kWh (25% of BLP)

**Peak Load (ComStock):**

- BLP: 70 kW
- CLP: 17 kW (25% of BLP)

**Solar annual generation (149 kW)**

- Year 1: 264,034 kWh
- Year 15: 246,141 kWh

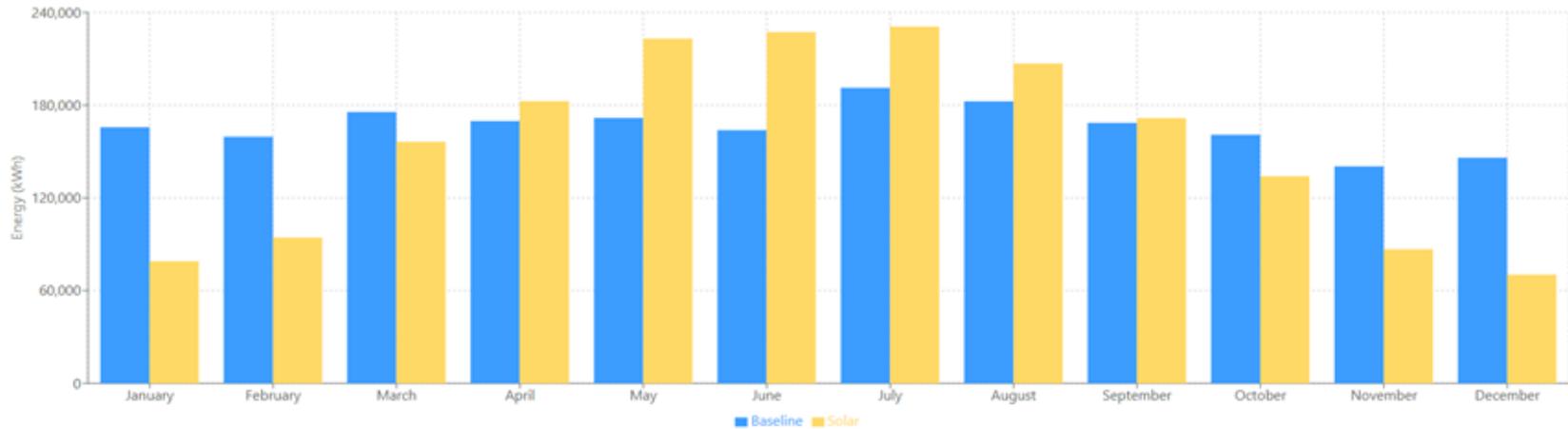
**Battery Storage Sizing:**

- Year 1: 300 kW / 609 kWh
- Year 15: 300 kW / 398 kWh

- Tree
- New BTM solar
- CRC defined keepout zone
- Meter
- Potential BESS location

# BLP and 149 kWdc solar (Year 15)

Monthly Energy Consumption and Solar



Total Critical Load Required (TCLR) Summary

Month	Baseline				Solar				TCLR (Max Daily Load – Average Daily Solar) (kWh)
	Max Daily (kWh)	Average Daily (kWh)	Min Daily (kWh)	Monthly Total (kWh)	Max Daily (kWh)	Average Daily (kWh)	Min Daily (kWh)	Monthly Total (kWh)	
January	670	602	451	18,655	535	390	106	12,082	280
February	698	608	453	17,025	710	490	113	13,714	208
March	767	618	453	19,173	879	691	139	21,422	76
April	817	657	469	19,704	983	792	208	23,770	25
May	972	726	518	22,500	1,024	829	266	25,688	143
June	1,003	820	522	24,598	1,028	892	297	26,750	111
July	1,064	896	675	27,789	1,000	927	371	28,744	137
August	996	839	602	26,001	949	890	696	27,592	106
September	935	775	556	23,264	859	769	279	23,073	166
October	839	700	524	21,705	754	593	151	18,392	246
November	742	619	454	18,574	576	459	139	13,768	283
December	674	588	451	18,219	443	360	72	11,146	314
<b>Annual Total</b>				<b>257,207</b>				<b>246,141</b>	<b>11,066</b>

314 kWh  
Max Daily  
TCLR  
(Year 15)

Ojai Valley CRC - BESS Sizing for 370 Baldwin Rd			
Baseline Load Profile Peak Load (kW)	Year 1 Standard Option BESS Power Capacity (kW)	Year 1 Standard Option BESS Energy Capacity (kW)	Year 15 Standard Option BESS Energy Capacity (kW)
70	300	609	398

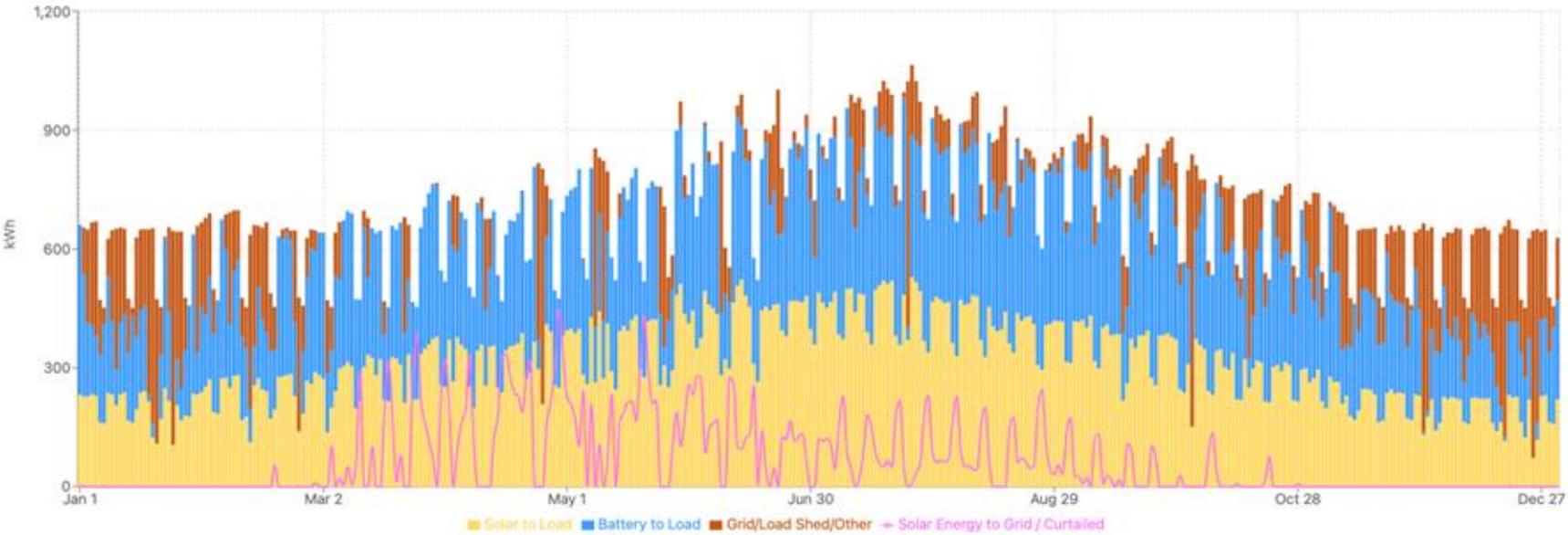
## Solar Microgrid resilience results at year-15 (after 15 years of 0.5% solar & 3% BESS degradation)

- **BLP worst-case resilience duration:** 30 hours (398 kWh / 314 kWh)
- **BLP average resilience duration:** 55 hours (398 kWh / 175 kWh)
- **BLP percentage of indefinite resilience:** 36%

# Energy Flow Diagram (Year 15)



Baseline Load Profile Daily Energy Flow



Baseline Profile Energy Flow Summary

	BLP Total Annual Load (kWh)	Annual Solar Generation (kWh)	Total Solar to Load (kWh)	Total Battery to Load (kWh)	Grid Import/Load Shed/Other (kWh)	Solar Energy to Grid/Curtailed (kWh)
Energy	257,206	246,140	113,713	102,376	41,116	23,830
Percentage of Load	100.0%	95.7%	44.2%	39.8%	16.0%	9.3%
Percentage of Solar	104.5%	100.0%	46.2%	41.6%	16.7%	9.7%

## Project Resources (Year 1)

- **Solar PV:** 149 kWdc via 253 Q Cells, Q.PEAK DUO XL-G11S.3 / BFG 590 (590W) modules
  - Racking: Fixed Tilt and Carport
  - Orientation: Various
  - Tilt: Various
  - Azimuth: Various
- **Inverters:** 125 kWac via 2 Sunny Tripower CORE1 62-US (SMA) inverters
- **Optimizers:** 177 kWac via 253 TS4-A-O (700W) Tigo Energy optimizers
- **Battery Energy Storage System:** 300 kW / 609 kWh via 1 HES L Socomec Battery

Ojai Valley CRC Total Project Cost Summary						
Solar System Cost	Solar Cost per Watt dc	BESS Cost	BESS Cost per kWh	Total Project Cost	40% BESS Investment Tax Credit (ITC) for being an Energy Community	Total Net Project Cost
\$ (566,695)	\$ 3.80	\$ (913,500)	\$ 1,500	\$ (1,480,195)	\$ 365,400	\$ (1,114,795)

Ojai Valley CRC - Solar Microgrid Savings based on the Baseline Load Profile (Year 1)					
Electric Bill Cost		Energy Cost		Demand Cost	
Before / After	Savings	Before / After	Savings	Before / After	Savings
\$76,623 / \$14,276	\$62,347	\$60,531 / \$4,017	\$56,514	\$12,942 / \$7,110	\$5,833

# 25-year economic cashflow

Years	Project Costs	PV O&M / Equipment Replacement	Electric Bill Savings	Direct Pay ITC	PV Generation (kWh)	Total Cash Flow	Cumulative Cash Flow
Upfront	-\$1,480,195	-	-	-	-	-\$1,480,195	-\$1,480,195
1	-	-\$746	\$62,347	\$365,400	262,287	\$427,000	-\$1,053,195
2	-	-\$761	\$64,494	-	260,976	\$63,732	-\$989,462
3	-	-\$777	\$66,700	-	259,664	\$65,923	-\$923,539
4	-	-\$792	\$68,965	-	258,353	\$68,173	-\$855,366
5	-	-\$808	\$71,290	-	257,041	\$70,482	-\$784,884
6	-	-\$824	\$73,675	-	255,730	\$72,851	-\$712,033
7	-	-\$841	\$76,121	-	254,418	\$75,280	-\$636,753
8	-	-\$857	\$78,626	-	253,107	\$77,769	-\$558,984
9	-	-\$874	\$81,192	-	251,796	\$80,318	-\$478,666
10	-	-\$892	\$83,818	-	250,484	\$82,927	-\$395,739
11	-	-\$910	\$86,504	-	249,173	\$85,594	-\$310,145
12	-	-\$928	\$89,249	-	247,861	\$88,321	-\$221,824
13	-	-\$947	\$92,052	-	246,550	\$91,105	-\$130,719
14	-	-\$965	\$94,912	-	245,238	\$93,947	-\$36,772
15	-	-\$985	\$97,828	-	243,927	\$96,843	\$60,071
16	-	-\$313,962	\$123,712	-	242,615	-\$190,249	-\$130,178
17	-	-\$1,025	\$127,881	-	241,304	\$126,856	-\$3,322
18	-	-\$1,045	\$132,157	-	239,993	\$131,112	\$127,790
19	-	-\$1,066	\$136,541	-	238,681	\$135,475	\$263,264
20	-	-\$1,087	\$141,033	-	237,370	\$139,945	\$403,210
21	-	-\$1,109	\$145,633	-	236,058	\$144,523	\$547,733
22	-	-\$1,131	\$150,340	-	234,747	\$149,209	\$696,942
23	-	-\$1,154	\$155,154	-	233,435	\$154,000	\$850,942
24	-	-\$1,177	\$160,073	-	232,124	\$158,896	\$1,009,838
25	-	-\$1,200	\$165,097	-	230,813	\$163,896	\$1,173,734
<b>Totals:</b>	<b>-\$1,480,195</b>	<b>-\$336,863</b>	<b>\$2,625,392</b>	<b>\$365,400</b>	<b>6,163,745</b>	<b>\$1,173,734</b>	<b>-</b>

## Financial Metrics

Payback: 17.0 Years

ROI: 79.3%

10 Year IRR: (5.6%)

20 Year IRR: 2.9%

## Assumptions

Utility Escalator: 5.0%

Federal tax rate: 0.0%

State tax rate: 0.0%

Modeling: Before Tax

- 5% Utility Cost Escalator
- Rate: GS-2-TOU (option E has better savings than option D)
- Southern California Edison (SCE)
- Rate Effective Date: 1/1/2026

When at least 10% of the total load can be maintained indefinitely and an additional 15% or more of the load can be maintained for at least 80% of the time, then a 25% VOR adder is warranted. In the case of the Ojai Valley CRC, since 36% of the Baseline Load Profile (BLP) can be maintained indefinitely, the VOR is calculated by multiplying what the utility electricity bill would be in Year 1 for the BLP, without the Solar Microgrid, by 25%.

The 5% annual utility bill escalator is applied to the SDG&E electricity bills, which accounts for the annual increases in the VOR calculations.

More information on the Clean Coalition's VOR123 methodology can be found here:

<https://clean-coalition.org/disaster-resilience/>

25 Year  
Value of Resilience (VOR)

Year	VOR
1	\$ 19,156
2	\$ 20,114
3	\$ 21,119
4	\$ 22,175
5	\$ 23,284
6	\$ 24,448
7	\$ 25,671
8	\$ 26,954
9	\$ 28,302
10	\$ 29,717
11	\$ 31,203
12	\$ 32,763
13	\$ 34,401
14	\$ 36,121
15	\$ 37,927
16	\$ 39,823
17	\$ 41,815
18	\$ 43,905
19	\$ 46,101
20	\$ 48,406
21	\$ 50,826
22	\$ 53,367
23	\$ 56,036
24	\$ 58,837
25	\$ 61,779
<b>Totals</b>	<b>\$ 914,248</b>

## Solar Microgrid system sizing

- Solar system: 149 kWdc
- Battery Energy Storage System (with Microgrid capabilities): 300 kW / 609 kWh (Socomec HES L)

## Economic results:

- Cash Purchase (\$3.80/W solar, \$1,500/kWh BESS):
  - Total project cost: **(\$1,480,195)**
  - 40% BESS Investment Tax Credit (ITC): \$365,400
  - Total net project cost: **(\$1,114,795)**
  - Total 25 Year O&M cost (panel cleanings, inverter & BESS replacement): **(\$336,863)**
  - 25 Year electric bill savings: \$2,625,392
  - **25 Year net cumulative savings: \$1,173,734**
  - 25 Year Value of Resilience (VOR): \$914,248

## Resilience results at year-15 (after 15 years of solar & BESS degradation):

- **BLP worst-case resilience duration:** 30 hours (398 kWh / 314 kWh)
- **BLP average resilience duration:** 55 hours (398 kWh / 175 kWh)
- **BLP percentage of indefinite resilience:** 36%

## Recommendations:

- Move forward with developing a Solar Microgrid at 370 Baldwin Rd to take advantage of the trifecta of economic, environmental, and resilience benefits.

Backup slides

## **Mission**

To accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise.

## **Renewable Energy End-Game**

100% renewable energy; 25% local, interconnected within the distribution grid and ensuring resilience without dependence on the transmission grid; and 75% remote, fully dependent on the transmission grid for serving loads.

## Creating Groundbreaking Models

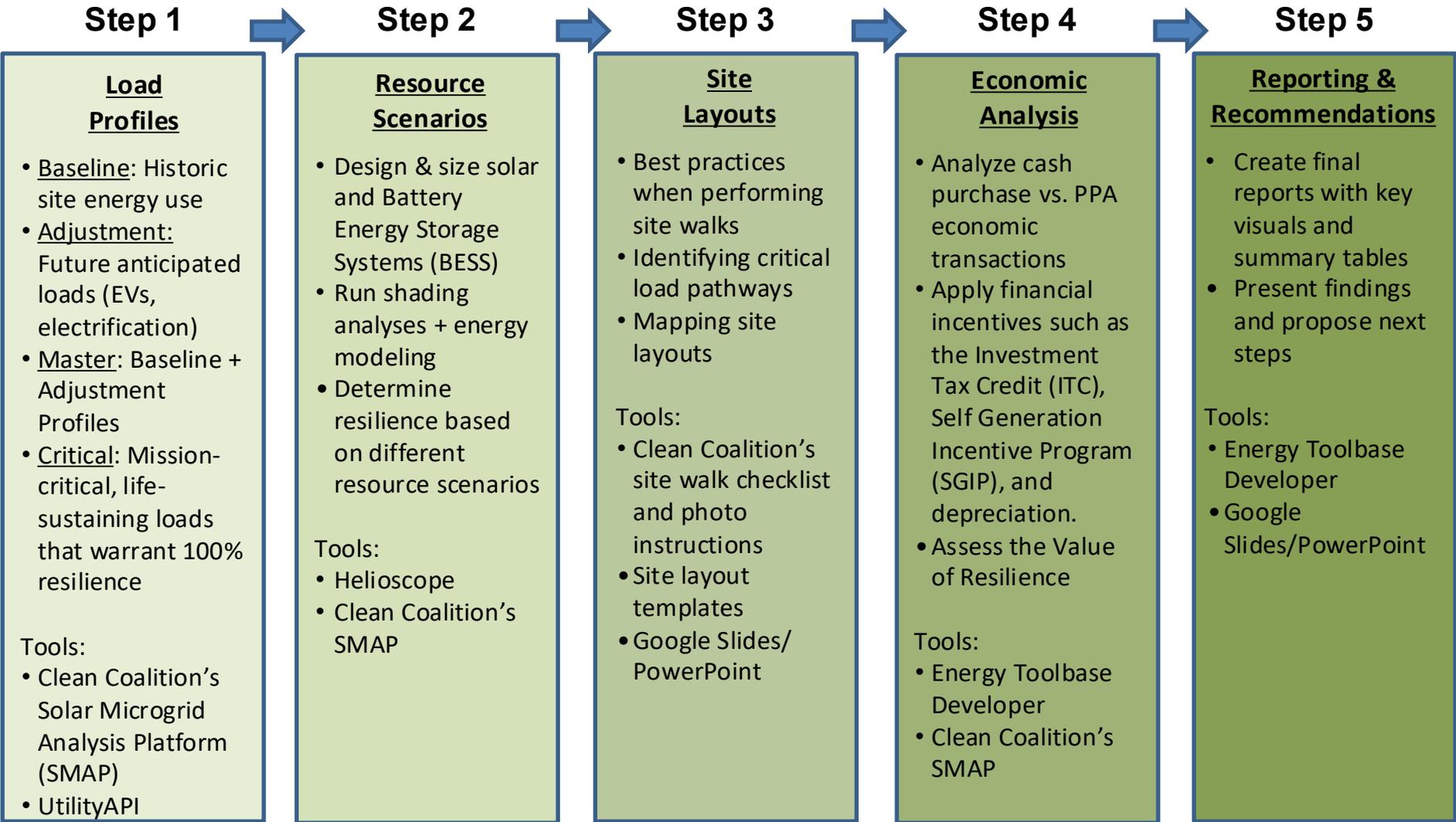
The Clean Coalition designs and stages cutting-edge Community Microgrid & Solar Microgrid projects that can be replicated in any utility service territory. By showcasing the value and feasibility of these projects, and the vast potential for siting distributed energy resources in the built environment, we're helping proliferate clean local energy and community resilience.

## Facilitating Real-World Projects

At the Clean Coalition, we base our work on concrete project experience. The projects we design highlight the regulatory and policy issues that are impeding the development of clean local energy projects, and the tools and best practices needed to overcome those barriers.



- **Economic**
  - Provides electricity costs savings compared to buying electricity from the utility.
  - Provides value-of-resilience (VOR) compared to implementing & operating a fossil-fueled generator.
  - Provides a fixed cost of electricity compared to rapidly rising utility costs.
- **Environmental**
  - Provides solar electricity, a pure renewable energy resource.
  - Optimizes grid citizenship by reducing peak usage of the grid when it is most stressed, during the peak periods, which throughout California are currently 4-9pm.
  - Eliminates energy losses associated with traversing transmission & distribution grids. Losses are due to resistance and congestion, both of which are generally exacerbated by distance. Typically, 15% of remotely generated energy is lost.
  - Reduces the environmental impact of central generation, which typically consumes open space for the generation & transmission assets.
- **Resilience**
  - Provides 100% ride-through during grid outages of limited durations. Any ride-through duration can be accommodated with cost being correlated to duration.
  - Provides optionality for indefinite resilience for at least the most critical loads, again with cost being correlated to the percentage of load being served with 100% resilience.
  - Accommodates optional fossil generation as an emergency backup resource that can be minimized.



<u>Load Type</u>	<u>Definition</u>
<b>Baseline load profile</b>	The historical annual usage of electrical loads per site that forms the basis for creating the master load profile.
<b>Adjustment load profile</b>	Adjustments for anticipated EV Charging Infrastructure (EVCI), electrification, energy efficiency, and new facilities.
<b>Master load profile</b>	The forecasted annual load profile used for this study's analysis, created from the baseline load profile plus adjustments for anticipated EV Charging Infrastructure (EVCI), electrification, energy efficiency, and new facilities.
<b>Critical load profile</b>	Annual load profile of the critical loads.
<b>Critical loads</b>	Electrical loads that are necessary to be provided with 100% energy resilience during grid outages
<b>Total Critical Load Required (TCLR)</b>	Total amount of energy required to serve the critical loads over the specified time period.