TerraVerde ENERGY

LVMWD/JPA Battery Energy Storage Systems (BESS) & Resiliency Financial Analysis Results Summary

A. Project Descriptions

Group 1: NEM Solar PV + BESS

Group 1 Sites	Project Type	Solar PV Size (kWdc)	Annual Solar Production (kWh)	Solar Energy Offset (%)	BESS Size (kWh)	BESS Size (kW)	Annual BESS Demand Reduction (kW)	BESS Demand Offset (%)	Annual Savings from Solar PV	Avoided Cost, Solar PV	Annual Savings from Demand Red.	Annual Savings from Arbitrage	Resiliency Duration (full load support)
Westlake PS	NEM Solar (no BESS)	320	554,716	85%	N/A	N/A	N/A	N/A	$ 18,633	$ 0.0627	N/A	N/A	N/A
Westlake FP	NEM-A								$ 16,152				
HQ Main Meter (Bldg 8)	NEM Solar + BESS	305	531,262	85%	232	58	333	43%	$ 19,080	$ 0.0689	$ 11,457	$ 102	15hrs
HQ Bldg 7	NEM-A								$ 9,326				
HQ HVAC Bldg 7	NEM-A								$ 3,907				
HQ Chiller Bldg 8	NEM-A								$ 4,309				
Composting Facility	NEM Solar + BESS	1,292	2,250,459	85%	1,392	348	2,151	45%	$ 98,387	$ 0.0576	$ 55,562	$ 4,449	14hrs
RLV Farm	NEM-A								$ 34,199				
Group 1 Totals:	**NEM Solar + BESS**	**1,917**	**3,336,437**	**85%**	**1,624**	**406**	**2,484**	**45%**	**$ 200,993**	**$ 0.0602**	**$ 67,019**	**$ 4,551**	

Group 2: Standalone BESS

Group 1 Sites	Project Type	BESS Size (kWh)	BESS Size (kW)	Annual BESS Demand Reduction (kW)	BESS Demand Offset (%)	Annual Savings from Demand Red.	Annual Savings from Arbitrage	Resiliency Duration (full load support)
Warner PS	BESS	1,160	290	1,668	48%	$ 13,014	$ 6,423	13hrs
Tapia TP	BESS	2,088	522	4,708	20%	$ 70,185	$ 4,152	1hrs
JPA Recycled Water PS	BESS add to NEM Solar	2,088	522	3,447	19%	$ 58,911	$ 12,214	15hrs
Lift Station #1	BESS	464	116	259	27%	$ 5,491	$ 1,184	4hrs
Agoura Booster Station	BESS	232	14	81	56%	$ 1,251	$ 151	48hrs
Group 2 Totals:	**BESS**	**6,032**	**1,464**	**10,164**	**22%**	**$ 148,852**	**$ 24,124**	

B. Project Economics Summary (Cash Purchase & 3rd Party Ownership Options)

Group 1: NEM Solar PV + BESS, Cash Purchase Option

Group 1 Sites	Project Type	Qty of Projects	SGIP Incentive Category	Total SGIP Incentive Value	Total Project Cost Est.	Projected Yr 1 Gross Savings*	Projected Yr 1 Ops Costs	Savings Term	Cumulative Net Savings**	Payback
Group 1 Totals:	**NEM Solar + BESS**	**3**	**Resiliency Adder**	**$812,000**	**$8,134,132**	**$272,563**	**$91,820**	**25yrs**	**$150,985**	**24yrs**

*: Includes projected savings from new NEM solar PV + BESS (demand reduction & TOU rate arbitrage)

**: Includes projected savings from new NEM solar PV + BESS, plus SGIP incentives and solar RECs

Group 1: NEM Solar PV + BESS, 3rd Party Ownership Option

Qty of Projects	Project Type	Qty of Projects	SGIP Incentive Category	Total SGIP Incentive Value	Solar PV PPA rate***	Projected Yr 1 Gross Savings*	Projected Yr 1 Ops Costs**	Savings Term	Cumulative Net Savings****	Payback
Group 1 Totals:	**NEM Solar + BESS**	**3**	**Resiliency Adder**	**N/A**	**$0.1069/kWh**	**$272,563**	**$431,745**	**25yrs**	**($1,270,608)**	**N/A**

The 3rd Party Owner retains the SGIP incentives (and ITC benefits for Group 1 projects). LVMWD/JPA have no capital costs

*: Includes projected savings from new NEM solar PV + BESS (demand reduction & TOU rate arbitrage)

**: Operations costs include: solar PPA payments, BESS shared savings payments, and AMS costs for solar + BESS

***: Solar energy PPA rate is for three solar PV projects (1.92MWdc total), and is fixed for 25yrs (0% annual escalation)

****: Includes projected savings from new NEM solar PV + BESS, plus solar RECs

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Group 2: Standalone BESS, Cash Purchase Option

Group 2 Sites	Project Type	Qty of Projects	SGIP Incentive Category	Total SGIP Incentive Value	Total Project Cost Est.	Projected Yr 1 Gross Savings*	Projected Yr 1 Ops Costs	Savings Term	Cumulative Net Savings**	Payback
Group 2 Totals:	BESS	5	Resiliency Adder	$2,824,900	$3,941,649	$172,976	$22,490	15yrs	$2,370,689	6yrs

*: Includes projected savings from BESS demand reduction + TOU rate arbitrage

**: Includes projected savings from BESS demand reduction + TOU rate arbitrage + SGIP incentives

Group 2: Standalone BESS, 3rd Party Ownership Option

Group 2 Sites	Project Type	Qty of Projects	SGIP Incentive Category	Total SGIP Incentive Value	Total Project Cost Est.	Projected Yr 1 Gross Savings*	Projected Yr 1 Ops Costs**	Savings Term	Cumulative Net Savings*	Payback
Group 2 Totals:	BESS	5	Resiliency Adder	N/A	N/A	$172,976	$158,060	15yrs	$1,488,693	immediate

The 3rd Party Owner retains the SGIP incentives (and ITC benefits for Group 1 projects). LVMWD/JPA have no capital costs

*: Includes projected savings from BESS demand reduction + TOU rate arbitrage

**: Operations costs include: BESS shared savings payments to 3rd Party Provider, and BESS AMS costs

C. Financial Analysis Inputs & Assumptions

- Historical Interval Data Sets: May 2019 – May 2020
- SCE Rates: June 2020 (Grandfathered TOU periods for the Recycled Water PS, ending in 2024)
- SGIP Incentives: "Resiliency Adder" budget incentives = $0.50/Whr (PBI projections include SGIP rules re: threshold battery sizing, threshold durations, ITC considerations, GHG emissions reduction rqmts, charge/discharge cycling rqmts)
- Solar Energy Production Estimates: PVWatts production simulation for existing and proposed PV systems
- SCE Annual Cost Escalation: 3%
- BESS Project Cost Estimate: Varies by individual battery size. Weighted Average used for BESS portfolios and solar PV + BESS portfolios (Group 2 cost: $628/kWh, BESS portion of Group 1 cost: $701/kWh), and do not include switchgear upgrades or interconnection costs associated with microgrid control systems.
- Solar PV Systems Cost Estimate: $2.40Wdc
- Solar Energy PPA rate: $0.1069/kWh, 0% annual escalation
- Solar RECs Price (25yr average): $0.0113/kWh
- Asset Management Services (AMS) Cost for BESS: $1,000/battery per year + 3% annual escalator
- Asset Management Services (AMS) Cost for Solar PV (PPA): $0.0100/kWh + 3% annual escalator
- Asset Management Services (AMS) Cost for Solar PV (District/JPA owned): $0.0200/kWh + 3% annual escalator
- Warranty Period: 15 years
- 3rd Party Ownership Contract Term: 15 years
- BESS Life Expectancy: 15 years
- Solar Energy PPA Contract Term: 25 years
- "Worst Day" BESS Duration Values: Day with highest consumption (kWh) using historical interval data sets (May 2019 – May 2020). Assumes battery is 100% charged at start of power outage, and any applicable solar PV systems will produce 75% of its expected production