Case Study

Energy Resiliency Planning for Building Portfolios

AESC's Solution for One California State Agency

Market Sector

Government Agency

Objective

One CA state agency needed to assess a subset of their building portfolio to determine which buildings could cost effectively become energy resilient and estimate costs to include in their annual budget. The resulting plan would help prioritize and inform future energy efficiency and solar with storage projects that enable critical locations to stay powered on during utility outages.

Approach

This agency utilized AESC's Building Energy Resiliency Planning Services to obtain an expedited resiliency evaluation, including remote energy use analysis for 70+ buildings, 45 of which received a follow up efficiency analysis along with a solar and storage financial analysis.

By the Numbers

70+ Buildings
assessed in as few as 3 weeks

6,400+ kW
Solar generation potential

3,200+ kWh
Battery storage potential

Nearly $500k
in estimated annual cost savings

Losing power is a losing proposition for state agencies, many of whom have critical infrastructure and buildings that can't afford to shut down.

Increasing occurrences of extreme weather events, along with California utilities proactively shutting off power, means power outages are much more common now than ever before. State agencies with critical building infrastructure need to find solutions to avoid such disruptions. However, with hundreds of buildings in their portfolios, many don't know where to start.

AESC's expedited, remote resiliency evaluation informed this Agency on how to proceed.

Using utility electric interval and billing data, AESC evaluated the potential for each building to pursue energy efficiency, install renewables and pair that with battery energy storage, to reach their target resiliency timeframe.

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The Resiliency Ranking Table ranks each building on its resiliency potential, based on its combination of EE, renewable and storage potential. Those in green are the best options, and those in blue are the next best.

Building	Sq. Ft.	EE Savings (kWh)	EE Savings (%)	Solar System (kW)	Battery Capacity (kWh)	Solar + Battery Payback (Purchase)	Solar + Battery Savings (PPA)	kWh Savings per sq. ft.
A	72,474	191,000	23%	500	20	13	$30,604	2.6
K	20,346	45,000	18%	180	20	13	$11,278	2.2
C	73,454	36,000	4%	230	336	17	$5,741	0.5
O	26,027	75,000	23%	228	20	13	$14,732	2.9
EE	82,680	71,000	8%	350	20	14	$17,137	0.9
G	11,708	37,000	20%	100	34	16	$3,063	3.2
DD	48,883	116,000	16%	240	65	14	$14,006	2.4
Q	124,100	112,000	14%	500	20	14	$21,257	0.9
B	73,336	59,000	7%	580	53	11	$51,015	0.8
D	73,882	36,000	4%	530	20	13	$29,809	0.5
S	20,000	59,000	15%	220	144	12	$19,730	3.0
P	16,719	45,000	23%	50	22	13	$4,284	2.7
KK	73,870	63,000	6%	275	42	13	$15,773	0.9
FF	65,755	56,000	9%	280	356	13	$20,221	0.9
U	7,834	10,000	13%	51	20	13	$5,178	1.3
NN	18,650	27,000	3%	260	81	11	$28,551	1.4
E	11,639	21,000	16%	93	20	11	$12,571	1.8
T	24,463	36,000	18%	150	40	15	$8,395	1.5
J	36,550	31,000	8%	260	20	11	$25,378	0.8
M	20,606	17,000	18%	60	20	12	$7,352	0.8
X	29,511	15,000	4%	240	20	14	$11,933	0.5
H	39,224	19,000	5%	210	50	13	$18,341	0.5
I	15,010	12,000	9%	92	20	8	$18,250	0.8
BB	41,339	20,000	4%	205	83	12	$18,637	0.5
QQ	30,443	26,000	8%	85	80	15	$5,345	0.9
V	6,111	5,000	10%	28	20	11	$4,561	0.8
F	169,410	83,000	6%	250	745	19	$1,825	0.5
Y	12,000	10,000	17%	27	20	13	$3,323	0.8
R	3,344	3,000	10%	22	20	13	$2,114	0.9
W	8,456	7,000	13%	38	20	14	$3,202	0.8
L	5,813	3,000	10%	15	20	13	$1,659	0.5
AA	7,354	4,000	10%	31	20	15	$1,795	0.5
RR	22,300	11,000	5%	25	150	18	$1,502	0.5
CC	3,137	2,000	8%	7	60	21	$245	0.6
N	47,296	40,000	7%	45	559	21	-$2,992	0.8
Z	2,528	1,000	6%	6	20	20	-$26	0.4
HH	191,866	94,000	5%	0	0	NA	NA	0.5
II	125,005	297,000	14%	0	0	NA	NA	2.4
MM	115,804	99,000	5%	0	0	NA	NA	0.9
LL	233,906	115,000	5%	0	0	NA	NA	0.5
JJ	342,000	168,000	4%	0	0	NA	NA	0.5
GG	100,687	50,000	5%	0	0	NA	NA	0.5
PP	43,024	21,000	5%	0	0	NA	NA	0.5
OO	18,560	50,000	21%	0	0	NA	NA	2.7

Low-cost, quick remote assessments to jump-start energy resiliency efforts.

The Process

The work started with reviewing energy usage data for each building. Some buildings were disqualified from further analysis due to factors such as extremely low energy use or insufficient utility data. The remaining buildings were run through AESC's energy modeling platform, Praxis.

Praxis identified the energy efficiency potential in each building, along with the amount of solar and storage necessary for self-sufficiency. Initially the report was run with a target timeframe of two days. With feedback from the Agency, AESC quickly revised the report to reflect six hours of self-sufficiency.

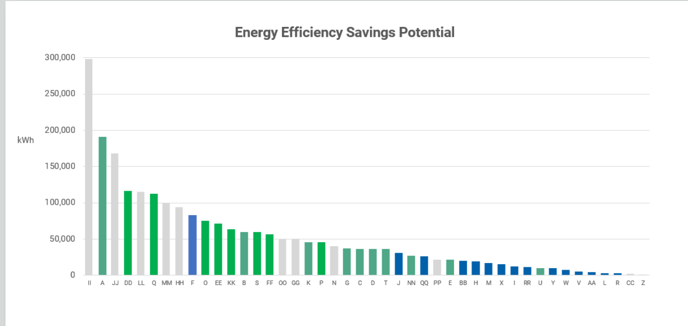
The Results

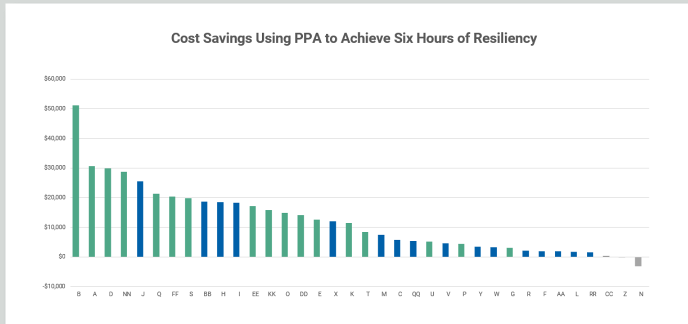
While all buildings had energy efficiency (EE) potential, in both scenarios there were several buildings that had no potential to cost-effectively reach the target resiliency timeframe. For example, there were small buildings in wooded areas with no discernable place to host a photovoltaic (PV) array, and large buildings whose solar + battery needs were too large to be practical.

As expected, when moving from two days to six hours, the number of buildings that could cost-effectively become resilient increased. For example, looking at one metric – the ability to generate revenue using a power purchase agreement (PPA) – in

The EE Potential Graph shows which buildings have the best EE potential. The highest-ranking resiliency opportunities are in green and blue. It is worth noting that even if there is no resiliency potential, many buildings have excellent EE opportunities.

The Cost Savings Graphs demonstrates the buildings with the best financial cases for the resiliency when a solar PPA is deployed.





Are you wondering how to make your buildings energy resilient?
Contact us to discuss how we can help you get started.

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the two-day period, approximately one-third of the buildings ranked positively, and in the six-hour time period that percentage jumped to 77%.

Each building received an individual report outlining the various opportunities to save energy, and the financial analysis around the solar and storage pairing. However, with so many buildings, the individual reports were overwhelming. Thus, to simplify decision making, a portfolio-level report was created that ranked the buildings on several factors (see images).

Prioritizing Buildings for Resiliency

Armed with this information, the Agency now knows which buildings to start with when investigating resiliency. This will begin with on-site investigations to dive deeply into the specific EE measures and the exact location and confirmation of sizing for the solar and battery. This resulting report should include line drawings, a power flow analysis, and specifics for equipment that needs to be purchased. A high-quality report will provide sufficient information to be used in the procurement process – such as an RFP.

As a low-cost, quick to produce report, the remote assessments proved an excellent way to jump-start the Agency's efforts. The data provided a high-level view of all buildings, helping the Agency understand the potential at each. In general, portfolio-level prioritization reduces the need for site visits that might otherwise cause operational interruptions, as it focuses those efforts only where there is the best potential. Additionally, the system costs data provided valuable input for annual budgets and the creation of an energy plan across the portfolio.

Building Energy Resiliency Planning with AESC

AESC's behind-the-meter resiliency work continues, as we help our customers pair electric and gas EE and demand response with solar, wind, and gas renewable solutions plus energy storage.