SOL VISTA

White Paper

Installing Energy Storage at Your Hotel

Recent advancements in battery technology, rising electricity demand rates, and the advent of no/low-risk financing models have made energy storage systems a financially attractive option for hoteliers. However, critical questions remain for hotel managers and owners even after they have decided to invest in energy storage: What is the best way to finance the system and how can it generate the highest ROI?

In this white paper, we'll evaluate the costs, benefits, and risks of a proposed hotel energy storage system given three financing options and using *actual* utility cost and use data. California is currently the only state that offers rebates to mitigate upfront system costs, and therefore energy storage is not financially viable in other states until they develop similar programs.

System Size

In this scenario a hotel in San Diego, CA is installing a **36 kW/60 kWh** energy storage system consisting of two modular 18 kW batteries. The hotel is 175,000 square feet, 210 rooms, and has an average monthly electricity maximum demand of 318 kW. The proposed system has the capacity to offset grid demand consumption during peak hours by 36 kW for two hours at a time, enough to counteract any spikes in demand that may occur.

System Costs

The implementation costs of the proposed system total **$67,800**, broken down in Figure 1:

Figure 1: System Costs

Item	System Specs	Cost Estimate	Cost
Li-ion battery cells	60 kWh	$500/kWh	$30,000
Inverter	36 KW	$500/kW	$18,000
2 x Controllers/Monitors		$1,500 each	$3,000
Installation, permitting, and transportation		35% of total project	$16,800
			$67,800

Expected Cost Savings

This hotel's peak demand rate ranges from $24-$46 per kW throughout the calendar year. Using an effectively programmed 36 kW/60 kWh energy storage system, the hotel can expect year one utility bill savings of $16,000 by decreasing its peak demand charges.

Financing Options

Based on its location, the project is eligible for California's Self-Generation Incentive Program (SGIP). Using the program's 2016 incentive rate of $1.31 per watt[1], capped at 60% of total project costs, the potential rebate amount is **$40,680**. Because the system is greater than 30 kW, the SGIP pays 50% of the rebate immediately following implementation and 50% annually based on actual demand offsets over the first 5 years.

The hotel also has the option of working with a vendor-sponsored financing program. We'll consider three sub-scenarios for financing the project: **(1) No vendor financing**, **(2) Shared savings plan**, and **(3) Subscription plan**. For each financing scenario, the costs, savings, and payback timeline for the 36 kW/60 kWh system are detailed over a 10-year period in Figure 2 and Figure 3.

Scenario 1: High risk, High reward – No vendor financing

In this scenario, the buyer pays the full upfront system cost out-of-pocket and pays a recurring annual fee of $1,020 for management and control software. The buyer will reap all future utility savings but is responsible for any maintenance costs. This financing structure suits buyers willing to invest their own capital upfront, confident in the savings.

Unless rebates are awarded, it is not viable to invest in an energy storage system in this scenario.

Scenario 2 – No risk – Shared savings plan

Here the buyer pays zero upfront system costs and instead pays the vendor from actual demand cost savings. Typical agreements allow owners to keep 40% of the savings while paying the other 60% to the vendor. In this structure, the vendor retains the $40,680 rebate and it is accounted for in the shared-savings agreement terms. Control software fees are included.

This option is ideal for buyers who do not want to risk their own capital upfront, but who may be willing to pay more in the long run if savings are in-fact realized.

Scenario 3 – Low/medium risk - Subscription plan

In this case the buyer pays zero upfront system costs and instead pays a fixed monthly fee regardless of the actual savings realized. For a 36 kW system, fees typically range from $250 to $1,250 depending on a variety of factors. Here the buyer is paying a $750 monthly fee which drops by 50% after 5 years. The rebate is retained by the vendor and factored into the monthly subscription fee. Control software fees are included.

This financing structure is ideal for buyers who do not want to spend their own capital upfront, but are still willing to assume some risk in the system's ability to yield strong annual savings.

[1] SGIP advanced energy storage incentive rate as of Feb. 2016, per 2016 SGIP handbook.

Figure 2: Costs and Savings for All Financing Scenarios

Year	0	1	2	3	4	5	6	7	8	9	10
All Scenarios											
Utility Savings	$0	$16,000	$15,200	$14,440	$13,718	$13,032	$12,380	$11,761	$11,173	$10,614	$10,084
Scenario 1a: Self finance (No SGIP Rebates)											
System Costs	$67,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Recurring Software Costs	$0	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020
Net	-$67,800	$14,980	$14,180	$13,420	$12,698	$12,012	$11,360	$10,741	$10,153	$9,594	$9,064
Cumulative Savings	-$67,800	-$52,820	-$38,641	-$25,221	-$12,523	-$512	$10,849	$21,590	$31,743	$41,337	$50,401
Scenario 1b: Self finance (SGIP Rebates)											
System Costs	$67,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Recurring Software Costs	$0	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020	$1,020
Rebates	$20,340	$4,068	$4,068	$4,068	$4,068	$4,068	$0	$0	$0	$0	$0
Net	-$47,460	$19,048	$18,248	$17,488	$16,766	$16,080	$11,360	$10,741	$10,153	$9,594	$9,064
Cumulative Savings	-$47,460	-$28,412	-$10,165	$7,323	$24,089	$40,168	$51,529	$62,270	$72,423	$82,017	$91,081
Scenario 2: Shared savings											
System Costs	$0	$9,600	$9,120	$8,664	$8,231	$7,819	$7,428	$7,057	$6,704	$6,369	$6,050
Net	$0	$6,400	$6,080	$5,776	$5,487	$5,213	$4,952	$4,704	$4,469	$4,246	$4,033
Cumulative Savings	$0	$6,400	$12,480	$18,256	$23,743	$28,955	$33,907	$38,612	$43,081	$47,327	$51,360
Scenario 3: Subscription											
System Costs	$0	$9,000	$9,000	$9,000	$9,000	$9,000	$4,500	$4,500	$4,500	$4,500	$4,500
Net	$0	$7,000	$6,200	$5,440	$4,718	$4,032	$7,880	$7,261	$6,673	$6,114	$5,584
Cumulative Savings	$0	$7,000	$13,199	$18,639	$23,357	$27,388	$35,269	$42,530	$49,203	$55,317	$60,901

*Assumptions: Annual discount rate: 12%, annual battery degradation rate: 5%

Figure 3: Payback Period, NPV, and IRR for All Financing Scenarios

Model	Payback (yrs)	NPV	IRR
Scenario 1a: Self finance (No Rebates)	5.32	$2,409	-3.2%
Scenario 1b: Self finance (Rebates)	2.77	$37,413	27.4%
Scenario 2: Shared savings	N/A	$30,389	N/A
Scenario 3: Subscription	N/A	$34,325	N/A

Conclusion

Like all investments, energy storage must meet specific ROI requirements to be financially feasible. In the hospitality sector, energy storage is flourishing only in California due to the availability of incentives coupled with the state's growing electricity demand costs. Thus, investment in batteries is a wise strategy for savvy California hoteliers.

The buyer's decision on how to finance the system will ultimately depend on the level of risk it is willing to assume. The shared-savings plan offers the lowest-risk, but lowest-reward option. The subscription plan is medium-risk, but results in a high net present value compared to the shared-savings plan. Self-financing the system is the highest-risk option, but in turn presents a solid payback period of under 3 years. There are additional pros and cons of self-financing, including flexibility in managing the asset but responsibility for any future maintenance costs.

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