

Projected Capital Cost of Battery Backup for Overcast Days

A Briefing Paper of the **Practical Policy Institute of Hawaii**

Calculation step	Value
Projected 2045 annual electricity demand for Oahu ¹	12,000 GWh
Assume 70% of power generation is solar	× 0.70
Equals annual solar generation	8,400 GWh
Divided by 365 days	÷ 365
Equals daily solar generation	23,000 MWh/day
On overcast days, assume 80% sun occlusion	× 0.80
Equals daily backup needed	18,400 MWh/day
Assume five days of backup for reliability	× 5 days
Equals total battery capacity needed	92,000 MWh
Times projected cost per kWh installed ²	× \$147
Equals capital cost for battery backup³	\$13.5 billion

Notes and Sources

- (1) Hawaii Climate Change Mitigation and Adaptation Commission, Hawaii Climate Action Pathways, 2025.
- (2) Assumption based on the low range (vs. mid or high) of National Renewable Energy Laboratory projections (2025 update) for 2035. The cost assumed is intended to show the best-possible case, which PPIH views as unlikely given Hawaii's unique situation: high land cost, shipping, higher pricing for provider risk, etc.
- (3) Ratepayers will likely be repaying at least double the capital cost, as the battery farm provider is entitled to recover capital cost, a rate of return, and throughput charges. HECO's estimated cost to ratepayers for the \$220 million Kapolei Energy System battery farm is \$500 million over 20 years. Doubling the above capital cost and dividing by 20 years results in **a charge to ratepayers of \$1.35 billion per year**, which is additive to solar farm generation cost. At the projected 2045 energy demand level above, net of assumed customer-sited solar generation, this equates to \$0.15 per kWh chargeable to all ratepayers.

It is also important to note that battery farm batteries will likely have to be replaced after 20 years, vs. thermal plant infrastructure life well in excess of 30 years.

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