# Battery Sizing for 10kW Off-Grid Solar

Table of Contents



## What Really Determines Your Battery Capacity Needs?

Let's cut through the technobabble. How large a battery is needed for 10kW off-grid solar ultimately boils down to three non-negotiable factors:

Imagine you're hosting Thanksgiving during a winter storm. Your solar panels might produce 30% less power due to snow cover, while your energy demand spikes with electric ovens and extra lighting. This real-world scenario explains why "10kW solar" doesn't directly translate to battery size.

### The Memory Foam Effect of Energy Storage

Lithium batteries act like memory foam for energy - they expand and contract based on demand. Highjoule's MatrixFlexTM system uses adaptive compression algorithms that:

- Automatically adjust depth of discharge (DoD)
- Predict weather patterns via integrated meteorology APIs
- Prioritize critical loads during shortages

## Surviving the 72-Hour Blackout Test

Post-Hurricane Ian (2022) taught us a brutal lesson: 58% of Florida's off-grid solar systems failed within 48 hours. Why? Underestimated autonomy days. Let's break down actual consumption patterns:

| Appliance | Wattage | Daily Runtime |
|---|---|---|

Medical Refrigerator150W24h
Septic System Pump500W45min
LED Lighting15W6h

"But wait," you might ask, "doesn't my solar array recharge the batteries daily?" Not necessarily. During December's polar vortex, Highjoule's Minnesota clients saw 11 consecutive days of