Peak Shaving Battery Size and Demand Saving

Battery power and energy to cap a load peak at a target demand from peak, duration and shape, depth of discharge and efficiency, with the demand charge saving.

Method: Peak-shaving storage sizing

Input parameters

Unit system: SI

Parameter	Value	Unit
Peak demand	1,200.0	kW
Target demand limit	1,000.0	kW
Duration of the peak above the limit	3.0000	h
Peak shape factor (1 flat, 0.5 triangular)	60.000	%
Usable depth of discharge	90.000	%
Discharge efficiency (battery and inverter)	93.000	%
Demand charge (per kW per month)	12.000	

Calculated results

Parameter	Value	Unit
Battery power rating	200.00	kW
Energy to shave	360.00	kWh
Battery nameplate energy	430.11	kWh
Demand charge saving per year	28,800	
Storage duration at rated power (h)	2.1505	

Notes for this case

• Energy above the limit = (P_pk − P_lim)·t·k_s; nameplate = energy/(DoD·η_d). Size on the worst day of the billing period, leave margin for forecast error, and check that the battery recharges between peaks.

Formula and method

$$P_b = P_{pk} - P_{lim}, \quad E = P_b t\, k_s, \quad C = \frac{E}{DoD\, \eta_d}$$

Variables

P_{pk}	Peak demand	W
P_{lim}	Target demand limit	W
t	Duration of the peak above the limit	s
k_s	Peak shape factor (1 flat, 0.5 triangular)	-
DoD	Usable depth of discharge	-
η_d	Discharge efficiency (battery and inverter)	-
c_d	Demand charge (per kW per month)	-
P_b	Battery power rating	W
E	Energy to shave	J
C	Battery nameplate energy	J
S	Demand charge saving per year	-
C/P_b	Storage duration at rated power (h)	-

Method and standards

Peak shaving.

Assumptions and limits

- Single daily peak; constant efficiency.

References

Peak-shaving storage sizing

Report details

Report reference	FCC-0XTM-4DNE (the same inputs always give the same reference)
Generated	23 November 2026, 18:00 UTC
Calculator	Peak Shaving Battery Size and Demand Saving
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/batteries-ups/peak-shaving-battery-size

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.