

Formula 1

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Formula 2

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Formula 3

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Related Content

Title	Type	Slug
Energy vs. Power Sizing: kWh/kW Trade-Off Analysis	sub_page	energy-vs-power-sizing
Fire Suppression System Sizing for Lithium-Ion Containerized BESS	sub_page	fire-suppression-sizing-bess
Basic Sizing	tool	basic-sizing
UL 9540A Test Report Template (PDF)	resource	ul9540a-test-report-template
NFPA 855 BESS Siting Checklist v2.1	resource	nfpa855-bess-siting-checklist

Detailed Explanation

IEC 62548:2017 specifies requirements for the design of photovoltaic arrays in off-grid applications, emphasizing system-level safety, energy autonomy, and resilience under variable environmental and

load conditions. Unlike grid-tied standards (e.g., IEC 62109 or IEC 61215), IEC 62548 explicitly addresses standalone hybrid configurations where energy generation, storage, and dispatch must be co-optimized without utility support. The sizing checklist translates these normative requirements into actionable engineering steps—including irradiance-based PV yield modeling using long-term meteorological data (e.g., NASA SSE or PVGIS), probabilistic load profiling with diversity and peak demand factors, battery depth-of-discharge (DoD) and cycle-life derating, generator runtime optimization to minimize fuel use and wear, and comprehensive loss accounting (wiring, MPPT, inverter, temperature, soiling, aging). Crucially, it mandates verification of fault protection coordination (e.g., overcurrent, DC arc-fault, ground-fault detection), thermal management for battery enclosures, and redundancy planning for critical loads. Practitioners apply the checklist iteratively during conceptual, preliminary, and detailed design phases—and often embed it within digital tools (e.g., HOMER Pro, PVsyst + custom scripts) to automate compliance reporting and sensitivity analysis.

Key Components

#	Component
1	Photovoltaic Array Sizing & Layout
2	Battery Energy Storage System (BESS) Capacity & Chemistry Selection
3	Hybrid Controller & Power Electronics (Inverter/Charger/MPPT)

Applications

#	Application
1	Remote rural electrification (e.g., health clinics, schools, villages)
2	Telecom base station power supply in disconnected regions
3	Mobile or temporary off-grid installations (e.g., mining camps, disaster relief units)

Related Concepts

#	Concept
1	IEC 62548:2017
2	Energy Autonomy Ratio
3	Loss Factor Methodology (LFM)

Tags

off-grid, hybrid-energy-system, IEC-compliance, PV-sizing, battery-storage-design

Off-Grid Hybrid Sizing Checklist (IEC 62548 Compliant)