

☐☐ Start Here — Solar & Power Systems Guide

This book covers everything about powering LoRa mesh nodes - from USB-powered indoor nodes to fully autonomous solar installations capable of running for years between battery replacements. Note that all outdoor solar nodes still require routine periodic maintenance (panel cleaning, gasket and desiccant replacement, and battery health checks) - "autonomous" means it self-recharges, not that it is maintenance-free. See the [Cold Weather Operation](#) page for the seasonal inspection schedule.

☐☐ Quick Answers

- "[How big a solar panel do I need?](#)" → [Sizing a Solar System for Your Climate](#) (canonical sizing page)
- "[Which battery chemistry?](#)" → [LiFePO4 vs LiPo vs Lead Acid](#)
- "[Which charge controller?](#)" → [Charge Controller Selection and Configuration](#) (canonical charge-controller page)
- "[How much power does my node use?](#)" → [Power Consumption by Platform](#)

☐☐ What's In This Book

This book has grown several overlapping pages on the same topics (sizing, charge-controller selection, and mains power). To avoid confusion, the index below links **every** page and marks which one is **canonical** for each topic. When numbers disagree between an alternate page and the canonical one (for example derate factor, depth-of-discharge, or per-node energy), **trust the canonical page**. The alternates are retained for now but are being consolidated.

Power Fundamentals

- [Current Draw & Power Budgets](#)
- [Power Consumption by Platform](#)

- [Power Consumption Measurement Methods](#)

Battery Selection

- [Battery Chemistry Guide](#)
- [LiFePO4 vs LiPo vs Lead Acid for LoRa Deployments](#)
- [Battery Sizing for LoRa Mesh Nodes](#)
- [Battery Management Systems and Protection Circuits](#)

Solar System Design

Solar sizing: several sizing pages exist. [Sizing a Solar System for Your Climate](#) is the **canonical** sizing page - use its method and numbers.

- [Sizing a Solar System for Your Climate](#) (**canonical sizing page**) - Peak Sun Hours (PSH) tables for US cities. PSH is the number of daily hours of full-strength sun your location effectively receives.
- [Sizing Your Solar System](#) - alternate sizing page (overlaps the canonical one; defer to the canonical page where numbers differ)
- [Choosing a Solar Panel for LoRa Nodes](#) - panel selection and panel-sizing detail
- [Solar Panel & Charge Controller Selection](#) - alternate combined panel + charge-controller page (overlaps both the canonical sizing and canonical charge-controller pages; defer to the canonical pages)
- [Solar Panel Mounting and Orientation](#) (**canonical tilt/orientation page**)

Charge controllers: several charge-controller pages exist. [Charge Controller Selection and Configuration](#) is the **canonical** charge-controller page.

- [Charge Controller Selection and Configuration](#) (**canonical charge-controller page**)
- [Charge Controller Selection and Wiring](#) - alternate charge-controller page (overlaps the canonical one; defer to the canonical page)
- [Charge Controllers: PWM vs MPPT](#) - background on the two controller types

Wired Power

Mains power: two mains-power pages exist. [AC Mains Power for Permanent Node Installations](#) is the **canonical** mains page.

- [AC Mains Power for Permanent Node Installations](#) (**canonical mains page**)
- [Mains Power for Permanent Installations](#) - alternate mains page (covers USB voltage-drop and cable-run detail; defer to the canonical page where guidance differs)
- [Power-over-Ethernet for Outdoor Node Deployments](#)

System Wiring and Safety

- [Wiring a Solar Power System for LoRa Repeaters](#)
- [Monitoring Battery State via Meshtastic Telemetry](#)
- [Cold Weather Operation](#)

➔ Related Books

- [DIY Build Guides](#) - Complete solar repeater builds
- [MeshCore Repeaters](#) - Pro solar repeater build walkthrough
- [FAQ](#) - Solar and power FAQ section

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