SIZING GUIDE

How to Size an Off-Grid Solar System

The five-number method, start to finish — loads, battery, array, inverter, controller — with worked Canadian examples.

Neighborhood Solar Store
neighborhoodsolarstore.ca

Sizing an off-grid system is five numbers, worked out in order. Here's the whole method on one page.

Step 1 — Daily energy use (Wh)

For each device: **watts × hours per day**. Add them all up. This single number drives everything else.

> Cabin: ~1,000–2,500 Wh/day · Year-round home: ~5,000–12,000 Wh/day. Use a fridge's label Wh, not nameplate watts × 24.

Step 2 — Battery bank

Battery (Wh) = daily Wh × days of autonomy ÷ depth of discharge. Lithium = 0.9 usable, lead-acid = 0.5. Most Canadian setups plan 2 days of autonomy.

Example: 6,000 Wh/day × 2 ÷ 0.9 = 13,333 Wh ≈ a 13kWh lithium bank.

Step 3 — Solar array

Array (W) = daily Wh ÷ peak sun hours ÷ 0.75 (the 0.75 covers real-world losses). Size for your WORST month if you're there year-round.

PRAIRIE PEAK SUN HOURS	USE WHEN...
Summer: 5–6 hrs	Summer-only cabin
Winter: 1.5–2.5 hrs	Year-round home/cabin — **size for this**

Example: 6,000 ÷ 2.5 ÷ 0.75 ≈ 3,200W ≈ six 620W panels for a Saskatchewan winter.

Step 4 — Inverter

Size to your **largest loads running at the same time** — not the daily total. Add surge headroom (motors and pumps pull up to 3× their running watts on startup). Cabin: 2,000–3,000W. Full home: 6,000–12,000W.

Step 5 — Charge controller

Use an **MPPT** controller (not PWM) — it harvests 15–30% more energy, which counts most in winter. Many modern setups use an all-in-one inverter/MPPT unit that simplifies the wiring.

Want a free custom design for your setup?

We're Neighborhood Solar Store — a Canadian solar retailer shipping panels, inverters, batteries and complete systems Canada-wide. Tell us what you want to power and we'll design a complete system and quote it, free, no obligation. Free lifetime technical support on every order.

✉ **support@neighborhoodsolarstore.ca** ☎ **(306) 620-2532** **neighborhoodsolarstore.ca**

This guide is general information from Neighborhood Solar Store, shared to help. Final system design should be confirmed with NSS or a qualified electrician. © 2026 Neighborhood Solar Store.