

Residential Off-Grid Mountain Cabin RESILIENT OFF-GRID POWER FOR REMOTE HOMES

CHALLENGE

Remote mountain properties face energy reliability challenges year-round. These interconnected challenges create energy vulnerability where conventional systems fail during critical isolation periods.



WINTER EXTREMES

Temperatures to -40°C with heavy icing and extended winter storms with heavy snow loading ($50+ \text{ kg/m}^2$).



ACCESS BLOCKADES

Avalanche zones and washed-out roads cause seasonal isolation.



VARIABLE WINDS

(3-25 m/s) Disrupt conventional systems – HAWTs stall below 10 m/s while diesel generators struggle with gust response.



GRID ISOLATION

Prohibitive connection costs (\$50k+) in rugged terrain.



WILDFIRE SEASON

Smoke haze cuts solar generation.
Fuel transport bans.



LIGHTNING EXPOSURE

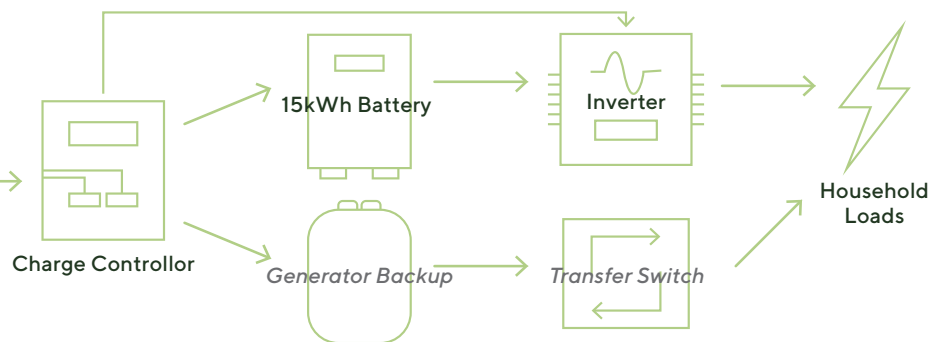
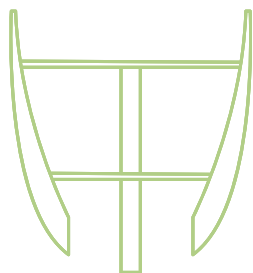
Risk of damage to tall structures during peak exposure periods.

SOLUTION

A system featuring one Aura 1kW turbine (pole-mounted on a high point) + a 15kWh battery bank + a backup generator. With an extremely low 5.5 km/h startup speed, our turbine captures more energy—minimizing downtime and maximizing output. Ice-resistant blade profile and hardened components ensure winter reliability. Smart controls prioritize renewables, using batteries overnight. A small backup propane generator provides redundancy.

The Viridis Wind Power™ Aura 1kW VAWT system delivers reliable power through specialized engineering:

Viridis Wind Power™ Aura 1kW Turbine



Key Resilience Features

ULTRA LOW WIND CAPTURE

5.5 km/h startup ensures output during temperature inversion periods when solar fails

ICE-SHEDDING VERTICAL BLADES

Utilize centrifugal force and, if required, hydrophobic coatings to **prevent snow accumulation**

COLD HARDENED COMPONENTS

Lubricants made to withstand specific cold weather conditions, and **sealed bearings**

COMPACT FOOTPRINT

Avoids tree clearing in constrained sites

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Key Outcomes

90%+ annual energy from renewable sources

Reliable performance in heavy snowfall conditions

Significant reduction in generator use vs/ solar-diesel systems

Near-silent operation preserving wilderness tranquility (**35 dB at 15m**)

WHERE TRADITIONAL SOLUTIONS FALTER:

SOLAR

Becomes **ineffective when snow-covered**;
Smoke haze during wildfire season **hinders solar generation**;
Large footprint, requires significant space;
Rooftop mounting limitations due to orientation, structural issues, size limitations;
Higher upfront costs can be a barrier for many home owners;
Intermittent production (sun dependent) produce less electricity on cloudy, rainy, or snowy days, and none at night;
Geographic limitations—higher latitudes, frequent cloud cover generate less power.

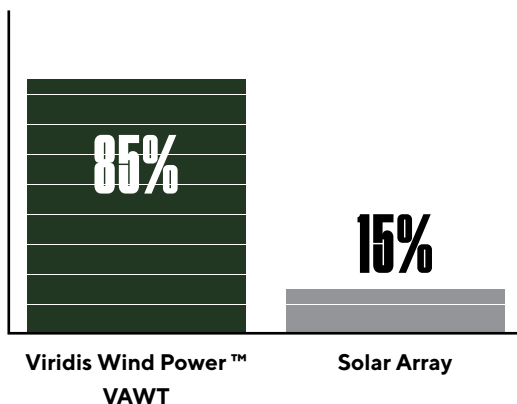
DIESEL

Fuel price volatility—geopolitical instability, supply chain disruptions, refining costs, tariffs, make fuel costs unpredictable;
High greenhouse gas emissions which is a primary driver of climate change;
Require **risky seasonal fuel transport** where wildfires or winter storms may close access roads;
High operating cost;
Create **significant noise pollution** during operation, which can be disruptive to communities, wildlife, and sensitive environments;
Unpleasant diesel **exhaust odor**;
Require **regular and intensive maintenance**, adding to **operational costs and downtime**;
Spill and **contamination risk** to soil and groundwater, requiring **costly remediation**;
Oil extraction and refining processes **consume large amounts of water** and can lead to **water pollution**;
Increasingly stringent **emissions regulations** may require **costly upgrades**.

HAWTs

Stall in low winds and excessively high winds force shutdowns;
Visually intrusive, leading to opposition from local communities and **potential restrictions in scenic areas**;
Noise pollution from gearboxes, and blade rotation;
Higher upfront costs for purchase, site preparation (foundations, access roads), and electrical infrastructure;
Larger foot print and site constraints: necessity for strong, consistent winds, favorable topography, distance from significant obstacles;
Installation **requires specialized heavy equipment**;
Maintenance at high altitude for gearboxes and generators is **complex, hazardous, and costly**;
Localized ecological impacts from site preparation and access roads;
Decommissioning old turbines and **recycling massive composite fiberglass blades** is currently **challenging and costly**.

Winter Uptime Comparison: Winter Reliability



EXTENDED PRODUCT LIFESPAN

COMPONENT	LIFE EXPECTANCY	MAINTENANCE
Blades	20+ years	Visual inspection annually
Bearings	10 years	Sealed, zero lubrication
Electronics	15 years	Dust removal and inspection of connections, annually

**Residential Off-Grid Mountain Cabin
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TECHNICAL DIFFERENTIATION: MOUNTAIN OPTIMIZED ENGINEERING

Our vertical-axis design provides fundamental advantages in alpine environments:

**BLADE
PERFORMANCE
EXCELLENCE**



Viridis Wind Power's patented blade design enables an **ultra low startup of 5.5 km/h.**

Carbon fiber construction **withstands 100+ kph gust loading, ice loading and extreme temperature cycling.**

Vertical orientation prevents snow accumulation that plagues horizontal turbines.

Environmental Impact

1. WATERSHED PROTECTION

Our systems eliminate fluid contamination risks inherent in conventional solutions:

Zero operational fluids: Sealed drivetrain requires no lubricant changes (vs. HAWT gearbox oil)

Battery safety: Non-toxic battery chemistry options available (LFP)

3. SUSTAINABLE LIFECYCLE

Material advantages validated by third-party Life Cycle Assessments:

High recyclability: Aluminum towers and composite blades exceed solar panel recyclability

Minimal site impact: Micro-foundations require no concrete in sensitive soils

4. FIRE RESILIENCE

Critical for wildfire-prone regions:

No ignition sources: Absence of hot exhaust or electrical arcing

Fire-resistant materials: Blades withstand radiant heat exposure

2. WILDLIFE PRESERVATION

Our vertical-axis design demonstrates inherent wildlife advantages:

Silent operation: Prevents auditory habitat disruption common with diesels/HAWTs

5. MICROCLIMATE INTEGRITY

Preserving alpine ecosystems:

No tree clearing: Compact footprint and turbulent-flow tolerance

Land preservation: Minimal ground disturbance vs. solar farm grading

Our patented blade design, optimised orientation, and use of advanced, lightweight materials allow for more efficient clean energy production at a lower overall cost.