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Recently, readers have been eager to try out the idea of installing a solar power system at home to power their air conditioners for free, as described in the article “How to Install a Solar Power System at Home to Power Your Air Conditioner for Free.” However, while the idea is appealing, reality is harsh. Many have commented that while solar panels are affordable and inverters are acceptable, batteries are simply too expensive. What about at night when there’s no sun? How can I use electricity then??? Well, today we’ll share a tip on how to use solar power on a low budget.

1. Preferred Solution: Grid-Connected System + Smart Scheduling (Battery-Free)

This solution is suitable for areas with a stable power grid. The core idea is to use the electricity generated during the day for your own use, and instead of storing excess electricity, install a reverse meter to sell it back to the national grid.

Photovoltaic panels generate electricity in conjunction with the grid. In a grid-connected solar system, when solar power is insufficient, the system can automatically purchase electricity from the grid to supplement it. The system only requires photovoltaic panels and a grid-connected inverter, with costs over 40% lower than off-grid systems with energy storage.

Additionally, in many regions of China, installing a solar system qualifies for policy subsidies. For example, in Hubei Province, residential photovoltaic systems receive a subsidy of 0.1–0.2 yuan per kilowatt-hour, and some areas also offer equipment installation subsidies.

Select a grid-connected inverter with a “bidirectional meter” to directly sell electricity to the grid. The inverter’s built-in management system automatically switches between power consumption modes, making it simple and convenient.

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II. Reducing Battery Capacity: Hybrid Systems + Demand Optimization

China’s power infrastructure is relatively well-developed, with few areas experiencing power outages. If 24/7 solar power supply is required, small-capacity batteries can be used to support critical loads such as lighting and refrigerators, reducing capacity to 3–5 kWh (from the original requirement of over 10 kWh), significantly lowering costs.

High-power appliances like washing machines can be scheduled to operate during peak solar power generation hours (10 AM to 3 PM), reducing reliance on energy storage or the grid.

Combining “photovoltaic + small battery + grid” with a smart controller, some inverters have built-in smart control, set to “load priority” mode: direct power supply from photovoltaic on sunny days; small-capacity battery backup on cloudy days; grid as the final backup. Install time-of-use pricing outlets (tens of dollars each) to automatically start devices during low-price periods.

III. Recommendations: Calculate first, then act

1. Many urban dwellers have small balconies. For self-built houses or villas, measure the roof to ensure it

can accommodate ≥20□ of photovoltaic panels (generating 3–5 kW of electricity);
2. Check policies. Consult the local power grid company about subsidies (e.g., Hubei Province offers a subsidy of 0.1 yuan per kWh);
3. Choose smart: Select inverters or all-in-one units with active management systems to dynamically optimize power generation and consumption strategies.

Batteries are no longer a mandatory component for residential solar systems! Through the combination of “grid-connected power sales + intelligent scheduling,” it is entirely possible to achieve “zero-battery” efficient power usage. Technological advancements (perovskite, intelligent EMS) and policy support (subsidies, peak-off-peak electricity rates) are continuously lowering barriers, enabling ordinary households to easily embrace green energy freedom.

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