

FRANKLINWH

Reliability Essentials



Introduction

Exceptional reliability from day one is what homeowners want in a home energy management system. Do your research to purchase a system that works when you need it.

Today's homeowners are looking for solar energy combined with home energy management systems and battery storage for two key reasons: backup power during outages and providing energy freedom from the ever increasing costs of grid energy.

With all the options on the market, find a system for homeowner peace of mind-knowing the system just works, that their homes and families are protected from the risks and damages of power loss and high utility bills.

Many recent news headlines recall record heatwaves stressing utility grids to the max, causing rolling blackouts and dangerously hot conditions inside homes. Conversely you may want protection from a winter storm induced outage, where the furnace fan or heat pump needs electricity to prevent water pipes from freezing. Several homeowners have reported their FranklinWH systems continuing to keep the lights on during Hurricanes Beryl (2024), Helene (2024) and Ian (2022), even after intense flooding and widespread loss of grid power.

Utility bills are expected to continue to rise faster than inflation due to previous infrastructure underinvestment and national electrical load growth from renewed domestic manufacturing and Artificial Intelligence (AI) datacenters. Nationally, the US Bureau of Labor Statistics shows electricity costs rose 3.1% for the last 12 months, greater than the 2.7% national CPI growth rate. Homeowners are purchasing a solar and battery system to reduce or eliminate their utility bills, receiving an attractive guaranteed rate of return on their investment.

What do you need as a homeowner?

Customers want a system that performs so seamlessly that they forget the system is there. A homeowner's only exposure to an outage should be a phone notification that tells them that there has been an outage. They are often surprised by the notification because there's no perceptible change in what they're doing, such as watching TV while cooking dinner.

Near zero RMA percentages, high levels of reliable performance during storm events and stable off-grid operation characterize a successful experience for homeowners and for installers.

Energy independence and bill savings should not be delivered to homeowners only some of the time. When you pay for something, you expect it to work. Purchase of a home energy system with solar and battery storage can be a significant investment, depending on system size; so there are high expectations of the system working when you need it to work.

What we have

Energy management is at the heart of successfully maintaining power in a home and reducing electrical bills. The best systems have an intelligent energy management controller including an energy management system (EMS). The most flexible systems have an AC coupled battery that stores energy from whatever sources are available to maintain seamless power to home electrical loads including appliances, ACs, refrigerators and lights. Residential power sources vary widely across the country, including solar, standby generators and the utility grid. Homeowners will appreciate the flexibility of incorporating standby and portable generators as well as EVs with 240 V AC outputs, which are typically not able to be connected to other home systems.

A system that is proportionately designed to match the needs of the home is important. The home loads need enough power and power capacity to keep the appliances running for an extended period. Local installation partners can help to properly size your system as many homes vary with their power requirements when performing whole home back up.

Reliable home systems begin with design. The R&D team should have extensive experience in power systems, but that knowledge doesn't stop with the technical aspects of the system. Usability matters. For example, the FranklinWH system is designed to be easy to install, use and maintain.

The next step is using quality materials. A system is the sum of its parts and the R&D team should only choose premium Tier 1 components with focus on performance and longevity. This component selection process differs from other home battery manufacturers because it is optimized for reliability and longevity rather than the upfront budget. Premium electrical components are affordable relative to the labor costs of system service or installation. Paying slightly more for premium electrical components has an outsized impact on system Levelized Cost of Electricity (LCOE) and length of service life time beyond the warranty period.

The energy management system hardware is not the only thing that goes through rigorous testing. Homeowners and installers work with home energy management systems, to use and maintain, through software; and we pride ourselves on ensuring our systems, both hardware and software, provide reliable operations.

The result of the focus is an extremely low failure rate.



It's not just a reliable product, it's service

Reliable energy solutions require top notch service. Our support team operates seven days a week 12 hours a day for homeowners, installers, and partners.

Most issues are resolved remotely, reducing the need for on-site visits and empowering homeowners with online resources to troubleshoot independently. Customer satisfaction should consistently score in the 90th percentile, demonstrating our commitment to delivering high quality service.

Installers benefit from fewer post installation issues thanks to a support structure which strives to minimize installation errors and ensure partner installers have the tools they need to succeed. The service team should continue to scale to maintain fast and efficient support crews as growth is achieved by leveraging new support technologies, ensuring both homeowners and installers can rely on us for long term system reliability.

Storm Hedge

Weather events are causing an increasing amount of grid outages across the US. Most home batteries have a storm preparation mode, which is a feature that scans the National Weather Service (NWS) for storm watches and storm warnings. For example, when a storm watch or warning is issued for the homeowner's area, the FranklinWH system will transition from Time of Use or Self-Consumption modes into back up standby mode and charge to 100% State of Charge (SOC) in preparation for a utility grid outage. After the NWS alert expires, the FranklinWH system will return to its previous operational mode. FranklinWH's storm preparation mode is known as Storm Hedge.

From May 2022, when the first batch of FranklinWH systems were installed, through December 31, 2024:

- About 160,000 hours of Storm Hedge events across a national fleet of installed FranklinWH systems.
- 1900 utility grid outages during Storm Hedge mode.

Storm Hedge has guarded against not only hurricanes, but also against smaller storms that still have the potential to knock down tree limbs and knock out power to homes. NWS alerts are not issued lightly and we take our job seriously when guarding power to your home. People have lots of other items to worry about during a weather event and FranklinWH is proud to provide reliable back up power to bring peace of mind to occupants and their families.



Total Percentage of Successful Islanding

Islanding is an industry term for when a property is running off-grid, whether that is a farm that never connects to the utility or if it's a power outage in your neighborhood. Your home battery manufacturer should be proud to provide reliable back up during the vast majority of times when the utility grid has an outage or has poor electrical quality. The utility grid may be lost completely or the utility grid power quality may fall out of published acceptable ranges. Loss of power from the grid stops operation of home appliances. Appliances may be damaged when utility power quality falls out of published acceptable ranges. Some examples of power quality issues may be over-or under-voltage conditions which at the very least will result in flickering lights or may cause damage to sensitive electronics.

From May 2022 to December 31, 2024, 98% of islanding events were successful and resulted in smooth operation of the home electrical loads after separation from utility grid power. The FranklinWH system was able to keep home electrical equipment operating smoothly using a combination of aPower batteries, solar photovoltaic (PV), a standby or portable generator and other power sources. A balance of power demand in kilowatts (kW) and power capacity in kilowatt-hours (kWh) is essential for maintaining smooth back up while off-grid.



Typical reasons why islanding is not successful

The 2% of islanding events that were not successful most often occurred during the first 3 months after the FranklinWH system was installed. FranklinWH Service Team records indicate installation issues were the root cause. FranklinWH Certified Installers must all pass an online certification course where they learn best practices on how to properly install the system. However, there are issues that pop up in some new systems.

Top tier residential energy management systems are easy to install and commission properly. However, the rest of the full home system may not be. Systems may include solar PV and standby generators which both may be complex to install and configure. Additionally, each electrical utility has its own set of regulations which may require more configuration during the FranklinWH commissioning process.

FranklinWH has the simplest commissioning process on the market relative to home energy management system peers with the commissioning process most often taking less than 15 minutes to complete. We continuously work on streamlining the process and making it easier and faster with fewer areas which could result in a failed islanding attempt. Over time FranklinWH expects the percentage of successful islanding events to increase from 98% with continued refinement of quality controls in the installation and commissioning process.

Homeowners and installers receive a message on the FranklinWH App when the system has a fault during islanding. Most often the homeowner and installer receive these codes during the first 3 months of system operation. The homeowner may be coming up the learning curve as they realize what can and cannot be turned on at the same time for their system. Installers may need to fix one or two of the many back-up system electrical connections. System commissioning best practices institute a testing and quality control process by the installer to catch most mistakes before they leave the site.

A successful system design process includes full analysis of system off-grid performance expectations, which has a typically proportionate relationship to the cost of the system. A modestly sized system may not be able to simultaneously run multiple large home loads such as air conditioners and electric stoves. A whole home back-up system can run most large appliances at the same time but can likely not support an intentional test scenario where all the largest appliances are turned on at the same time while off-grid. A maximum off-grid performance system can likely support most of the largest home loads running at the same time for extended periods.

100% Off-Grid Systems – Performance Statistics

FranklinWH is the only one of the major top five energy management and battery system manufacturers that fully warrants off-grid performance—that is how confident we are in the system’s off-grid capabilities. Off-grid performance is core to our identity. As of December 31, 2024, only 1.4% of the installed FranklinWH fleet is permanently off-grid, but that same extended outage islanding capability is part of every installed FranklinWH System. The aPower X’s 12-year, 43 MWh throughput warranty is intentionally simple. The aPower 2 extends the simple warranty to 15 years or 60 MWh throughput, whichever comes first.

Systems that are 100% off-grid with no electrical utility grid connection have 96.6% uptime. Similar to regular grid-tied systems, these faults are concentrated in the first three months of operation, while homeowners are learning what they can and cannot turn on at the same time.

Load management features such as the aGate’s optional Smart Circuits Module, can serve to automate operation of the largest loads to maintain system uptime. Smart Circuit loads may be shed when first going off-grid, at user defined SOC levels, or manually, as the customer requires. For example, an air conditioner is connected to the load management circuit and the circuit is configured to load shed at 25% SOC. The AC will run off-grid using a combination of solar PV and aPower battery power until the aPower SOC reaches 25%. The Smart Circuit will then shut off power to the AC, preserving power for essential loads such as the lights and the refrigerator.

Homeowners can be confident in maintaining their daily lives and in bringing security to their families in the event of an extended outage. The utility grid may go out, and who knows when it will come back on; but with a high quality home battery, this is not a concern. Large capacity batteries with high warranted throughput also serve to offset utility grid usage during peak periods in Time of Use (TOU) utility tariff areas.

Up time for grid tied and off-grid systems is expected to continue to improve going forward as user education is improved through the home energy management system app. System kilowatt (kW) power is also expected to increase as power electronics technology continues to improve. More loads will be able to be run with higher kW systems, but the system constraint will then shift to the available kWh capacity available for system run time.

100% off-grid systems also need to account for seasonal overcast conditions when solar production may be severely limited for weekly periods. During this time battery SOC may trend downwards to zero percent over multiple days of low solar resources. Additional power can be introduced to the home system using a standby generator, portable generator or electric vehicle with 240 Vac output.

Almost no RMAs

FranklinWH’s highly conservative design and manufacturing process results in return merchandise authorization (RMA) levels much lower than the industry average. The chart below shows RMAs in the past 32 months from May 1, 2022, to December 31, 2024. Testing, testing and more testing throughout the design and manufacturing process enables most equipment hardware problems to be caught before the system is installed.

An RMA occurs when the FranklinWH service team receives a call from the homeowner or installer and the FranklinWH troubleshooting process is not successful. We send out new replacement hardware, provide the installer partner reimbursement for their expenses, while arranging for the FranklinWH hardware to be returned to our facilities.

PRODUCT	aGate	aPower
Rate	0.02%	0.11%

The leading cause of damaged equipment leading to a RMA is an issue during installation. There are many electrical connections to be made during the installation process.

Sometimes, very rarely, mistakes are made that permanently damage the hardware. Due to the quality of the system and the installation certification required of our installers, the numbers show this is very low. Our Service Team’s goal is to quickly diagnose the problem, attempt a repair and issue new hardware if that repair is not successful.

We expect the RMA rate to drop even further as our R&D and manufacturing teams learn from the issues, and as we update our training to improve the already excellent performance of our installers. The result is a system with higher inherent process quality controls and design safety margins in each aspect so fewer user errors can be made on behalf of the homeowner or the installer.

Company Background

The FranklinWH research and development team comes from the data center uninterruptible power supply world where 100% uptime is essential for mission critical data services. Homeowners get the same design, manufacturing, testing and verification for powering their lives and providing peace of mind to their families during a grid outage.

Reliable off-grid operation is synonymous with FranklinWH.

Conclusion

Homeowners expect a stable reliable system that does what is expected with as minimal as possible work from the installer. Installers want to address homeowner needs while remaining profitable so they can maintain the relationship with the homeowner for the duration of the warranty. Our job is to make hardware that enables your life to remain stable as a homeowner or to enable your business as an installer to remain profitable.

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