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# SOLAR ENERGY AND STORAGE

BY STEVE PANOSIAN



**EXPERIENCING POWER OUTAGES**, even if rare, generally means an electric service disruption that may last minutes, hours, or worse, days. Regardless of the size of the home, and especially those who work out of their homes, the power disruption also means a disruption in conducting business. Combining this reality with the rising cost of energy we arrive at why more homeowners are considering the various solar and home power storage investment options.

Personally speaking, since purchasing two smart thermostats for my home this past April, my average energy reduction in kWh usage compared to last year is about -12 percent, but

the average energy cost reduction was -5 percent. It's clear to me that to get ahead of energy costs requires an investment in solar.

So, I ask myself — how do I increase the value of our home, reduce our home's reliance on the grid, reduce our energy usage cost, and provide a solution for a power outage event? So, for giggles, I Googled this question, and the result was quite astonishing. The links ranged from the low-hanging fruit remedies like installing LED light bulbs, to more robust solutions which we'll be speaking about in this article.



## *addressing the rising demand and cost of energy*

The soaring cost of energy is impacting everyone and it's quite evident that every residence should be outfitted with some level of solar power to help chip away at the dependence on energy from the grid. The simplest examples I'm considering are things like a solar-powered attic fan that will help cool the home, and outdoor dusk to dawn solar-powered accent and flood lights. But the big leap that we need to decide over the next year is a whole home energy solution.

However, in my research, addressing energy for an entire home is complicated and I'm not convinced that jumping into solar is the answer. In my past TD Magazine article about power management, clearly, a smart home needs to include the ability to manage the entire home's power usage. Considering all the options and combinations, in my case, I will also need to consider residential power storage, a smart breaker panel, solar power, and an energy management sys-

tem that will automate my home's energy usage. And finally, because of where we live, determining whether an investment in a stand-alone power generator for backup redundancy is a prudent measure.

## *breakthrough designs – solar shingles*

It's clear that the proliferation of solar technology is bombarding consumers with texts, phone calls, mailings and emails promoting lease and sales programs. Cost aside, the aesthetics of a roof filled with ugly black panels are not much different than placing a big screen TV in an intelligently and aesthetically designed room. Of course, the TV industry has introduced solutions like Art Modes that fill the TV screens — when OFF — with pleasing images of art or pictures that are intended to make the technology disappear.

This leads us to several new design developments that address the roofline aesthetics surrounding solar panels. While

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delivering the power contribution objective, GAF, a leader in roofing, has introduced the Timberline Solar™ shingle that installs like a regular roof. Sleek, uniform lines, no bulky panels, just shingles that generate clean electricity. GAF's brand credibility combined with their national network of trained roofers, the solar shingle option is a viable consideration for new construction or for those looking to replace a roof and invest in solar power.

And then there is Tesla, which introduced its solar tile as an alternative to solar panels and is a great option for adding solar energy to a home. Tesla roof tiles are made with tempered glass that is more durable than standard roofing tiles and are offered in four different styles to choose from — textured, smooth, Tuscan or slate-styled solar roof tiles, and they have a lifetime warranty. The tiles mimic the look of a traditional roof; the idea is to make the technology transparent, and also interesting. Tesla claims that many of its customers enjoy being solar trendsetters. My bet, there's a Tesla EV parked in the garage, too!

## *Tesla energy solar and Powerwall*

Tesla has the advantage of enjoying a highly recognized brand for EV, Solar Panels and Power Storage and has an in-house team of professionals that have installed more than 3.6 GW of clean solar energy across 400,000 roofs — the equivalent of 10 million traditional solar panels.

Tesla's storage solution, the Powerwall, offers the ability to store energy for later use and works with solar to provide key security and financial benefits. Each Powerwall system is equipped with energy monitoring, metering and smart controls for owner customization using the Tesla app. The system learns and adapts to your energy use over time and receives over-the-air updates to add new features and enhance existing ones.

Scaling power backup needs, the Powerwall system can be composed of one to ten Powerwall combinations including the Powerwall+ model. If integration with a power generator is required, Powerwall can be added to a system with a back-



SOLAR CAPTURE WITH BATTERY STORAGE PROVIDE 24-HOUR ENERGY CAPABILITIES.

up generator connected with an external Automatic Transfer Switch (ATS) or a Manual Transfer Switch (MTS). However, the Powerwall and generator are not directly integrated which means Powerwall cannot be charged by the generator.

In an outage, Powerwall responds immediately and provides backup power before the generator can detect the outage. The generator is turned on only when the Powerwall has a low charge, or if loads exceed Powerwall's maximum output. When grid power returns, the generator will turn off and Powerwall can again charge from solar. If Powerwall is installed with an MTS, manual operation of the switch is required to power the home with the generator.



## *Savant's Power System brings together every facet of the residential energy experience*

As the smart energy experience evolves, it has become more than just the addition of solar panels. Smart solutions should bring together smart electrical panels, battery storage solutions, electric vehicle chargers, and a growing variety of incoming power sources including on-grid power, emergency generator and solar power. One particular company that is prominent in the design-build custom installation market that also appeals to the mass market is Savant.

As part of the home's foundation, every residence should start with a smarter electrical panel. The Savant Power System uniquely allows for any electrical panel to be modernized and delivers the benefits of flexible load management. Savant Power Modules are compatible with all industry-leading panel types and allow for control of a range of project sizes — from just a few main-use circuits to all the circuits in a home — Savant has pre-configured packages to support projects up to 800+AMPs with options that include single- and three-phase solutions.

Savant Power Modules, in conjunction with the Savant app, enables homeowners to select any combination of circuits they want to deactivate during a time of peak power pricing or during a power outage. The app also intuitively delivers critical insights, including tips for maximizing generator capacity and extending available battery life.

Most importantly, Savant's Smart Power Modules, combined with generator and battery storage, all work together as one seamless solution to create a powerful microgrid designed to maximize efficiency and reliability for the homeowner.

Savant has announced integration with several leading energy storage and inverter manufacturers, including advanced integration features with all-new Savant branded solutions, designed in partnership with Sol-Ark and HomeGrid, powered by Lithion. Advanced integration allows for the Savant app to not only manage circuits throughout the home but also report key insights such as battery state-of-charge and historical trends, allowing for specialty modes including storm watch-mode, eco-mode and off-grid mode, plus support advanced on-and off-grid energy scenes.

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I asked the Savant folks whether the Savant Power System solution can address the need for a redundant backup gas-powered generator using natural gas or propane and the short answer was, “Yes”.

They explained that a Savant energy management solution, “can effectively manage extended grid outages by delivering visibility and automation that helps extend battery life as well as seamlessly incorporating emergency generator power”, and that, “our software platform optimizes the system so that the generator operates at peak efficiency and allows the generator to power critical portions of the home and/or recharge batteries”. And according to Savant, their AI-based software platform delivers a level of personalization and optimization for the homeowner, unlike any other energy management solution.



In the case of an off-grid solar energy system, the objective is to expand the hours of grid autonomy for the homeowner, and each home has varying exposure to sunlight. If a generator is present, the Savant Power System will intelligently leverage solar and available battery storage when available, calling on the emergency generator to charge the batteries and/or power the home as needed. The Savant Smart Power Modules are used to identify which loads are critical during an outage, so both battery life and generator capacity can be maximized.

## *Generac backup generators, storage and solar integration*

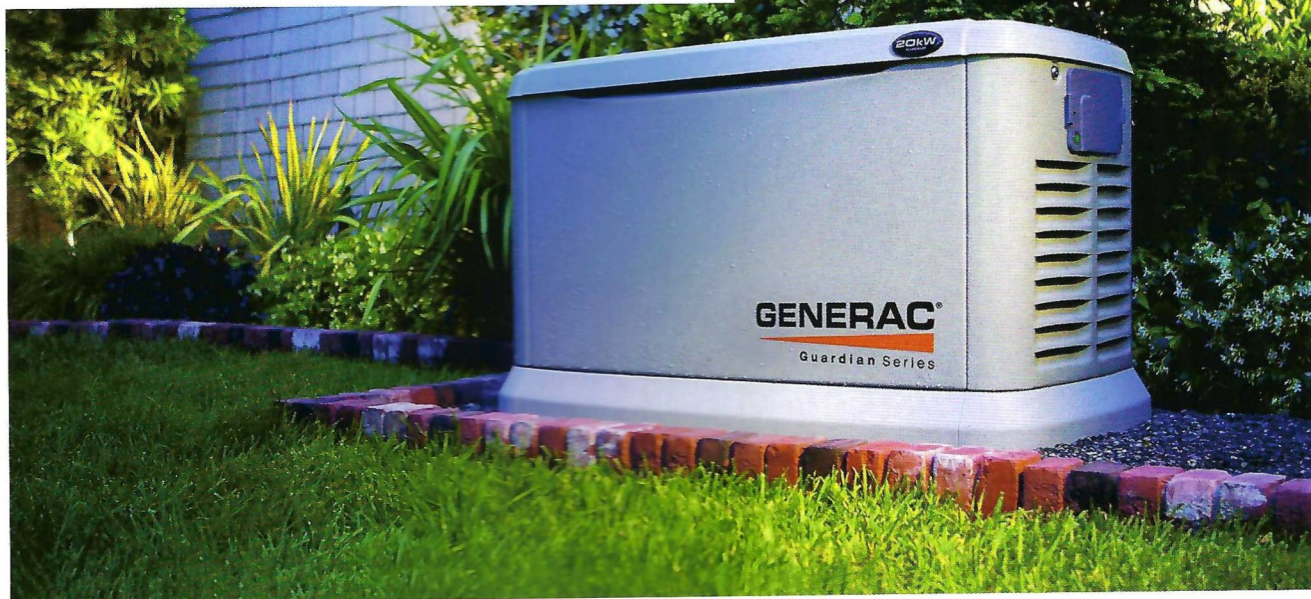
Savant is the only company offering specifiers and technology integrators this level of scalability across the energy management category.

Savant makes it easy to monitor and control every circuit, optimizing efficiency and reducing costs without compromising comfort and convenience. By combining onsite energy generation, integrated battery storage, generator control and flexible load management, a Savant Power System delivers complete control of energy assets plus the security of grid independence.

Generac, the national leader with a long history in backup generators, is also providing a clean energy solution to its portfolio of energy products.

According to Generac, in the last 10 years electrical outages have tripled, affecting over 25 million households. These trends are turning more homeowners to solar to provide electricity for their homes and reduce their dependence on the power grid. Russ Minick, Chief Marketing Officer and President of Energy Technology at Generac commented, “Many homeowners want to invest in a clean energy system, but there are those that want or need protection for those





multi-day or multi-week outages. They want more than even the largest solar + battery storage system can provide on its own." Minick added, "Our new Generac PWRgenerator gives homeowners all the benefits that solar can offer, plus the reliability of a generator, in a quiet and ultra-efficient package."

Homeowners looking for a solution to integrate solar power and store excess energy generated on a sunny day and use it at night when peak demand charges are high, or in the event of a power outage, Generac has introduced the Generac PWRcell. It is a whole home backup battery solution that can be paired with a solar panel system to store energy to power a home overnight, during high time-of-use rates, and during power outages. Generac's PWRcell comes with an Automatic Transfer Switch (ATS) and Smart Management Module (SMM). During a power outage, the PWRcell will automatically supply power to the home or essential appliances. The PWRcell is able to detect an outage and turn it on in a fraction of a second, meaning an outage might not even be noticed. The company also supports an energy monitoring system that features its PWRview app which is controllable

via a mobile device and also allows for setting daily or monthly goals for energy expenditure.

Generac makes it clear that most solar panel systems are required by code to disconnect from the grid during an outage, meaning they will not work during a power outage. However, the PWRcell automatic load management allows it to disconnect from the grid but continue to store solar energy and supply power to your home during an outage.

I am finding that the evolution of the solar energy market is moving at a rather fast pace and the game-changing new and important options consist of power storage backup, a smart energy management system solution, and determining the need for backup redundancy.

The next step for me is calculating the costs involved and determining if I have enough roof space and sunlight for a system that will reduce my dependence on the grid to near zero.

