Let’s change the world together

Who we are:

Credentials

- FL Certified Solar Contractor: CVC56965
- FL Certified Electrical Contractor: EC13008547
- FL Certified Roofing Contractor: CCC1331878

Stats:

- Founded 2/24/2014
- 1,250+ PV Systems installed throughout Florida
- Approx. 16.34 MW Roof Top Solar PV installed and 32.8 GWh of Energy Produced
- 53 full time W-2 employees in 3 offices: Doral, Vero Beach, Orlando

Who we are:

Daren Goldin, Founder/CEO

- BS Structural Engineering – University of South Florida
- MS Civil Engineering in Construction Management – University of Texas at Austin
- Worked for GCs installing: schools, auditoriums, commercial interiors, homes, college buildings, telecommunication and a utility scale solar farm.

Today We Will Cover:

- Driving factors for growth in terms of recent event motivators (weather events, Pandemic)
- Comparison to generators
- Driving factors for growth in terms of technological innovations
- Growth of popularity for battery backup in recent years in the residential market (past 2-3 years)
- Conversation about what a typical PV/Battery backup system would look like on an average home and conversation about extreme cases (mega-mansions)
- How we size systems for customers
- Future trends in residential battery backup (V2G, V2H, VPP)

Residential: Battery Back Up

- As climate change becomes more sever, major weather events will worsen, causing more power outages, for longer durations.
- The Corona Virus has also emphasized importance of “sheltering at home”
- Battery backup (with solar) is the most effective way to ensure that the lights can stay on in an outage.

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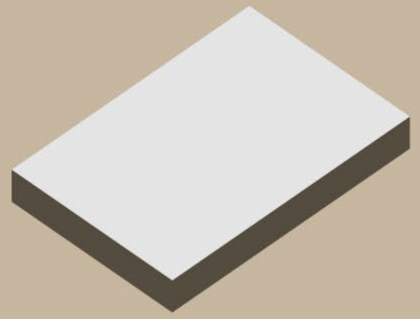
WHY CHOOSE A BATTERY OVER A GENERATOR?

Powerwalls are like having a generator with **free fuel** and **zero maintenance** for life.

BATTERY	GENERATOR
	
You **generate your own fuel** each day when combined with solar	You need to rely on **buying fossil fuels** to keep your generator running.
Batteries require **zero maintenance.**	Generators **require maintenance.**
It's **quiet**, **mountable**,and can be kept **indoors or outdoors.**	It's **loud**, takes up a **lot of room**, and can only be **outside due to offgassing.**
Powerwall is **always ready** in case of a disaster.	Maintenance professionals are **saturated with requests** as a hurricane approaches

Residential: Battery Back Up

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NATIONAL

Majority Of Hurricane Laura Deaths Linked To Improper Use Of Portable Generators

September 1, 2020 · 9:45 PM ET

RACHEL TREISMAN

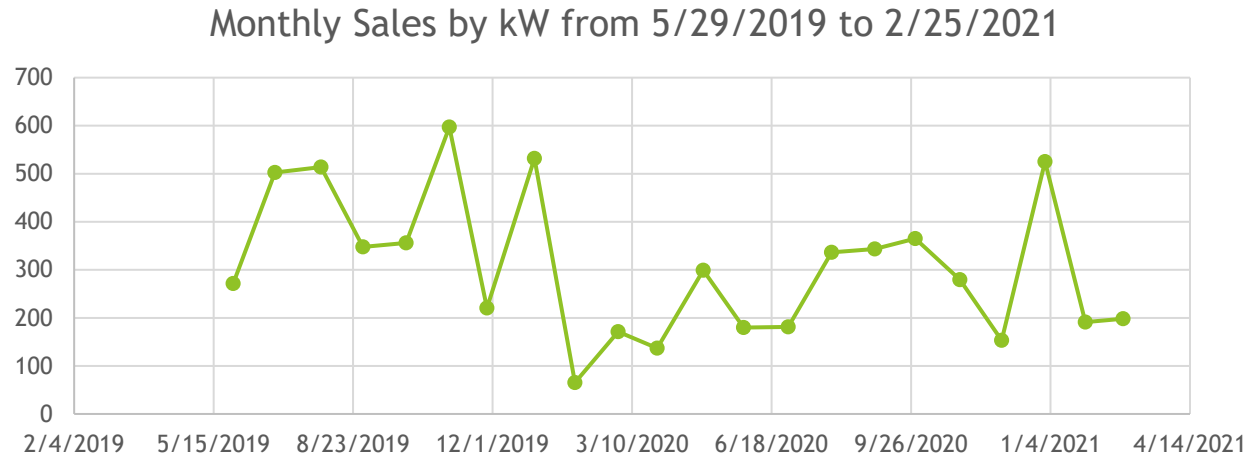
Hurricane Laura left scattered debris and damaged homes in Lake Charles, La. last week. The state has reported 15 deaths associated with the storm, with more than half of those attributed to improper use of portable generators.

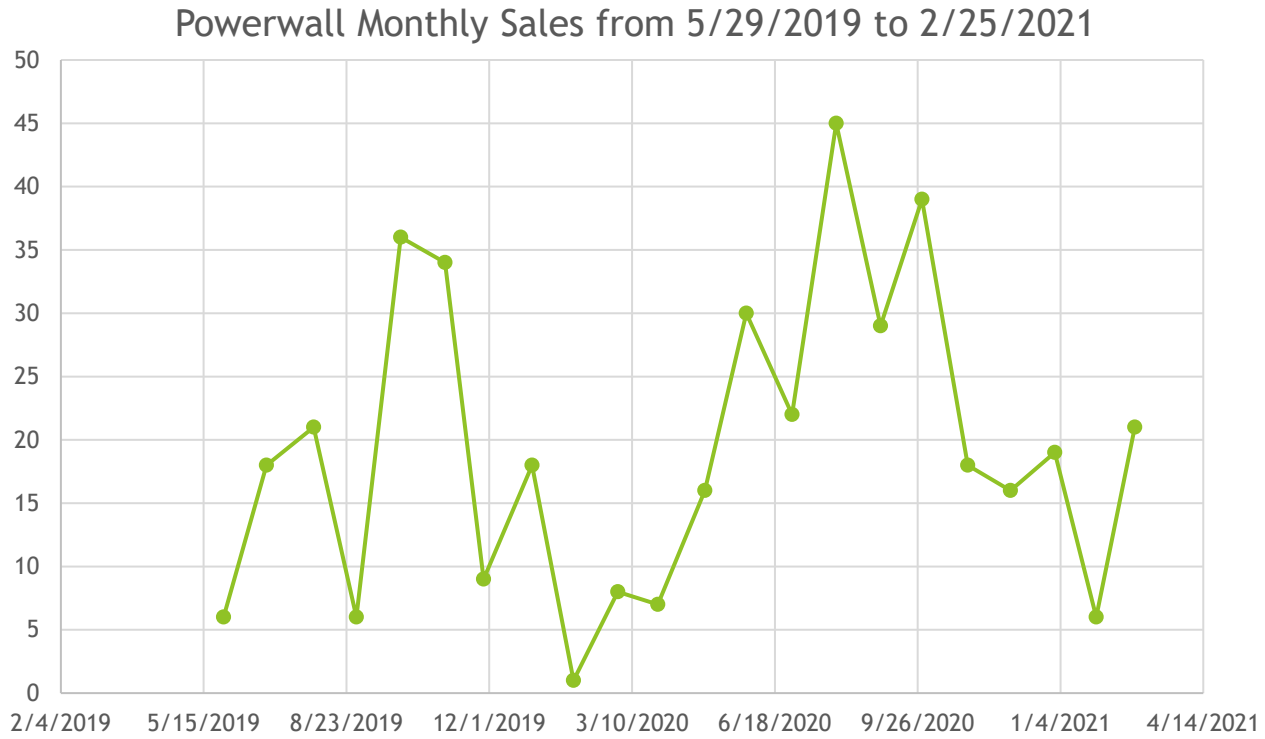
David J. Phillip/AP

Eight of the 15 hurricane-related deaths confirmed by the Louisiana Department of Health are attributed to carbon monoxide poisoning from portable generators, which can provide life-saving power in emergency situations but also pose a deadly threat if used incorrectly.

Tech Innovations that Changed the Game

- AC-coupled batteries have a built-in inverter
- Connecting multiple batteries means adding up current (amps) in addition to adding up energy (kilo-Watt hours)
- Welcome to the world of whole-home backup
- Works universally with any type of grid-tied inverter
- Easy retrofit to existing PV systems, no need to replace any existing equipment
- Systems are modular and ready for future expansion – you can add more batteries as needed in the future





Growth of Solar PV versus Battery Backup

Typical Backup System on an Average Size Residence

- 2 Tesla Powerwalls
- 1 Tesla Backup Gateway
- 1 Inverter for 11.76 kW PV system
- Backing up 200 Amp service for the home


TESLA
TESLA
WARNING
WARNING

Backup System on a Large Residence

- 7 Tesla Powerwalls
- 2 Tesla Backup Gateways
- 3 Inverters for 30 kW system
- Backing up (2) 200 Amp service for the home

The Array from the (7) Powerwall System

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HOW MANY POWERWALLS DO I NEED?

You have to calculate both your home's maximum **current** and average **energy** needs to determine how many you need.

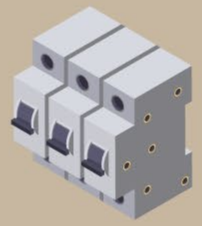
ENERGY

Stored energy is the amount of stored electricity much like the amount of water stored in a jug.

CURRENT

Is the amount of flow of electricity much like the flow of water through a valve.

CURRENT



What is the rating of the largest breaker in the distribution panel?

÷ 30 amps of a single Powerwall = **The number of Powerwalls you need**

ENERGY

$$\frac{\text{(annual) kWh}}{(2*365)}$$

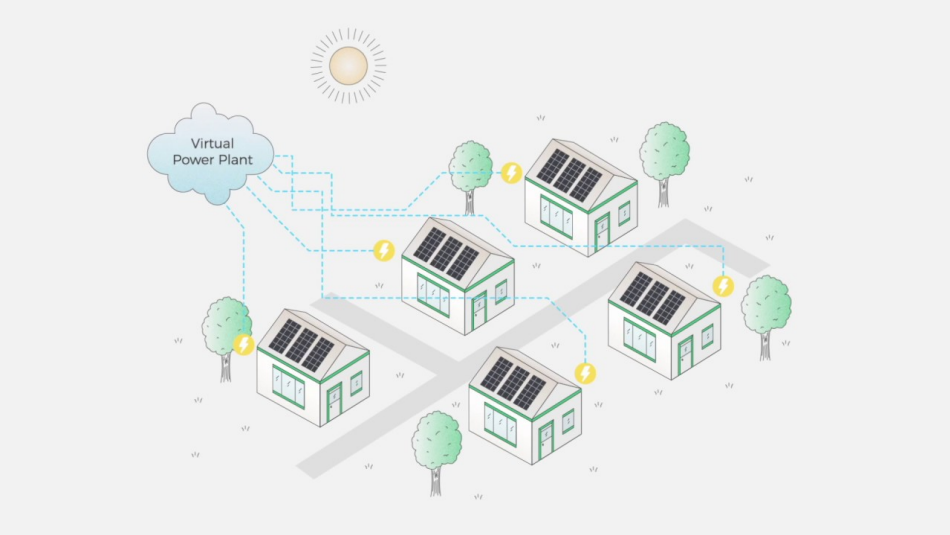
half of average daily energy consumption

*This assumes the home is equipped with a full offset solar pv system

÷ 13.5 kWh of a single Powerwall = **The number of Powerwalls you need**

CHOOSE THE HIGHER OF THE TWO TO KNOW HOW MANY POWERWALLS YOU'LL NEED.

*This graphic is provided for the purpose of estimation. Customers are still responsible for selecting the correct equipment for their needs.



The Future of Residential Battery Backup

- Homeowners and utilities can benefit by using the batteries for backup and for peak load shaving
- Possible models of splitting cost of backup with utility and allowing utilities to tap into batteries when not in backup mode
- This model could help utilities shut down carbon-heavy “peaker-plants”
- V2H Technology can help backup higher capacity while saving money on batteries that are installed fixed to home