



renvu

FORTRESS
 *Power*
SECURE YOUR ENERGY



Advanced **lithium**
storage made **simple**

...with Fortress Power and Renvu
Energy Storage Partners

Fortress Power Company Introduction

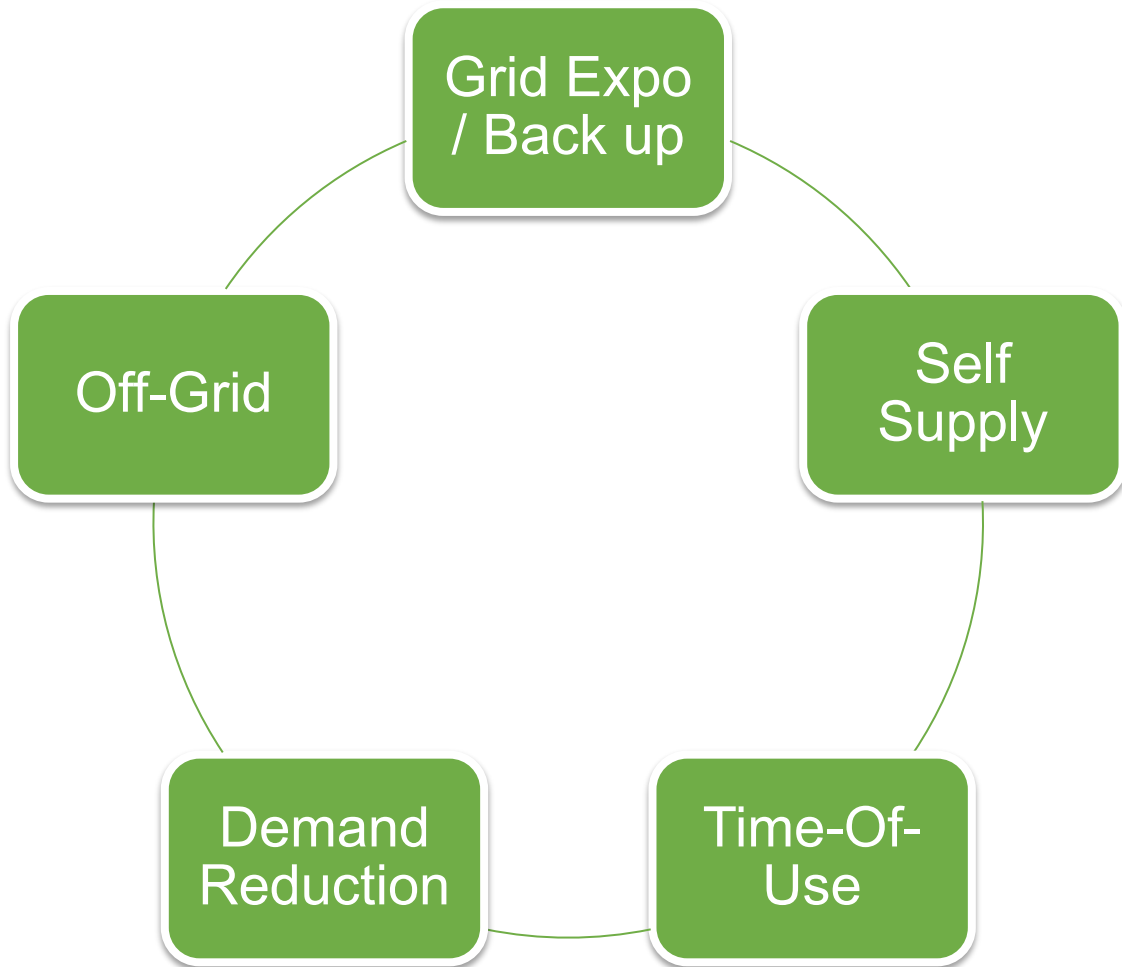
U.S. Headquarters

*We manufacture safe Lithium Iron Phosphate battery for both **residential** and **commercial** applications*

- U.S. Headquarters: Southampton, PA
- Founded in 2016; Owned by a group of Investment bankers and Solar Veteran
- 30,000 S.F. Main Facility for R&D, Sales and Logistics
- + 2 Warehouses in CA and FL
- Installs in US, Canada, Central Caribbean, South America, Europe and Africa
- Exclusive Lithium Battery Supplier for SEPTA & Hydro Quebec



Fortress Power Company Introduction



Back Up Your Facility

Power your facility when the grid is off; keep solar panels running during outages. Run Generators more efficiently



Allows “Self Supply”

Install PV where grid prohibits back feed



Maximize Your PV Production

Store excess solar power for later use.



Save Money on your Electric Bill

Charge the batteries at off-peak times; discharge them during peak periods. Peak Shaving to lower demand.

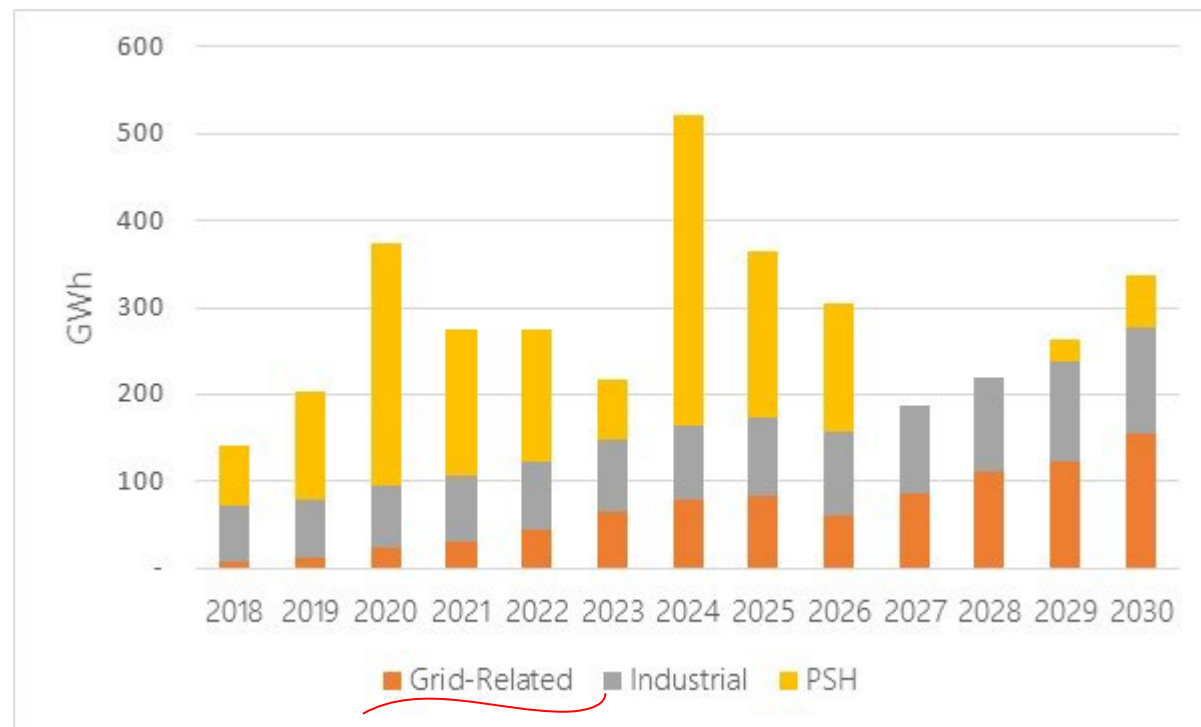


Tax and Incentives

26% ITC available if it's powered by solar; enjoy state and utilities rebates

Department of Energy Analysis: Why Storage?

- By 2030, stationary deployments will exceed 150GWh
- 27% Annual Growth for Grid-Related Storage Applications
- The Largest Market? North America >41.1GWh



Department of Energy. (December 2020) Energy Storage Grand Challenge: Energy Storage Market Report. Retrieved from [Energy.Gov](https://www.energy.gov/eere/energy-storage/energy-storage-market-report)

Global annual stationary-source projections by sector

Why Storage?

Battery Affordability

- The cost of solar has fallen over 20% over the past 5 years
- By 2029, seeing 46% price reduction in Lithium Battery Cells

Rising Incentives

- 26% Federal ITC Extension
- State-Wide Incentives (SGIP, GMP, State-Wide Rebate Programs)

Shifting Mindset

- Fear
- High Emphasis on Renewables
- Political Administration Charge



Fortress Power Product Line

LFP-5 & 10



eVault 18.5

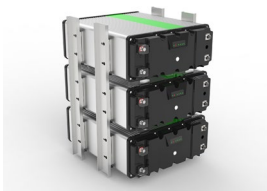
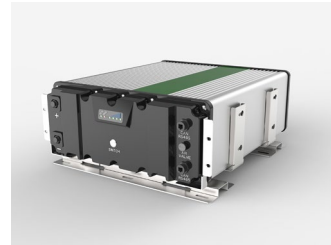
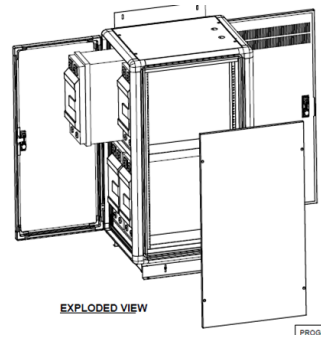


eFlex 5.4



New Product-eFlex (48V)

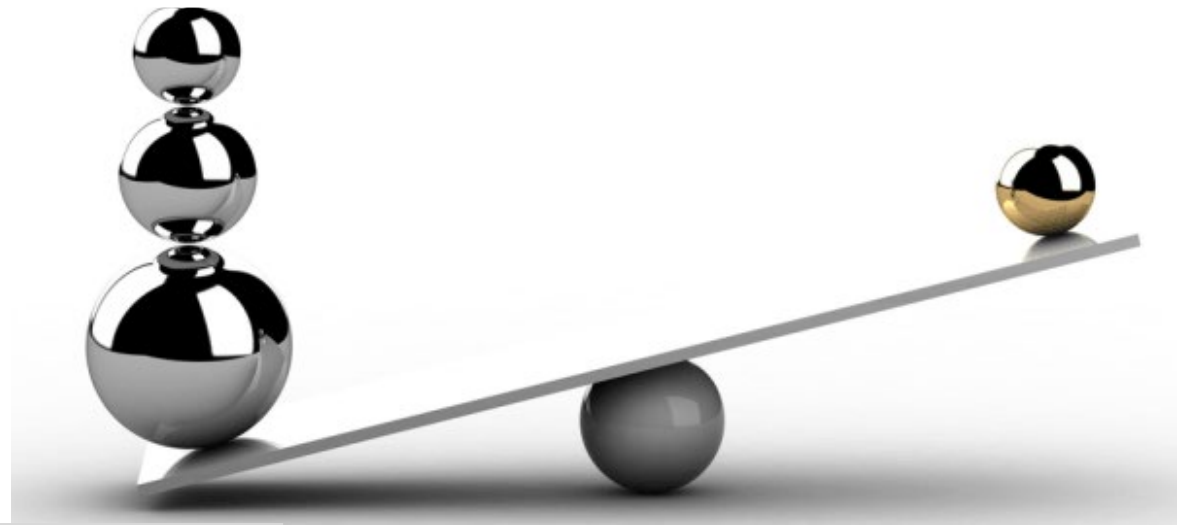
SMART ■ MONITORING FROM ANYWHERE ■ FLEXIBLE INSTALL



- Stackable: up to 80 kWh
- Residential ESS, Commercial & Industry Power Back Up, Railway, Telecommunication, Military, Off-grid
- Data logging
- Wi-Fi APP Monitoring
- Wall-mounting, Floor-Standing, Shelf Mount Solution

Technical Specifications

	eVault 18.5	eFlex 5.4	LFP-10	LFP-5K-48V	LFP-5K-24V
Total Energy [KWH]	18.5	5.4	10.2	5.1	5.1
Capacity [AH]	360	105	200	100	200
Battery Voltage [V]		48V			24V
Max. Charge Current (Continuous) [A]	160	100	80	80	45
Max Discharge Power (Continuous) [KW]	9 (180A)	5 (100A)	5 (100A)	4 (80A)	1 (45A)
Peak Output [KW]	12 (240A)	6.6 (130A)	7.5 (150A)	7.5 (150A)	2 (95A)
Parallel Stacking	12	15	2	3	3
LCD Monitoring	Yes	No	No	No	No
Communication	CAN/RS485	CAN/RS485	N/A	N/A	N/A
Breaker	250A	125A	150A	125A	-
Warranty	5/10 years; up-to 6,000 cycles				



Battery Technology Comparison

Two types of Battery Management Systems

	LFP-5 & 10	eVault 18.5 & eFlex 5.4
BMS Type	Mosfet-based	Contactor-based
Overcharge and Deep Discharge Protection	✓	✓
Over-heat & Low Temp. Protection	✓	✓
Over-Current Protection	✓	✓
Short Circuit and Open Circuit Protection	✓	✓
Cell monitoring and balancing	✓	✓
Communication with Inverters		✓
Communication between units in parallel		✓
Remote monitoring		✓
Cell Type	Cylindrical	Prismatic

LFP vs NMC vs LiPo

We incorporate the safest technology available into our batteries

	Fortress Power	Tesla, LG Chem, Panasonic	Humless
Chemistry	Lithium Ferro/Iron Phosphate (LFP) or LiFePo4	Lithium Ion or Nickel- Magnesium - Cobalt (NMC)	Lithium Polymer or LiPo
Safety	✓	X	X
Eco-friendly	✓	X	X
Thermal Stability	✓	X	X
Life Cycles	6000	< 3000	< 1500
Degradation Rate		LFP < NMC < LiPo	
Energy density		LFP < NMC < LiPo	

Highest Safety Standard



Lithium Iron Phosphate Technology (Fortress Power)



Nickel-Manganese-Cobalt Technology (Tesla)

View [\(1\) LFP and NMC Safety Test Soltaro V1 0 - YouTube](#) on YouTube

Comparison of different Battery Technologies

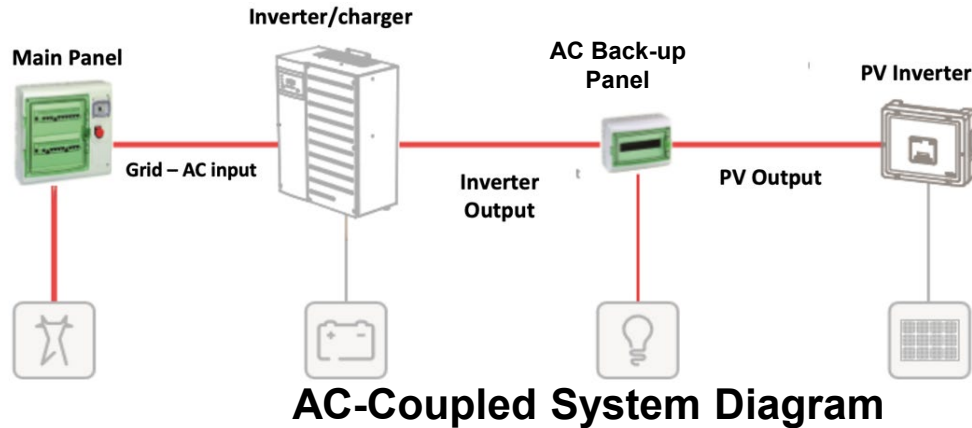
	LFP	Lithium Ion	Li-Polymer	Flooded LA	AGM	Nickel Iron
Round trip efficiency	98%	95%	95%	80%	88%	65%
The Homeowner Cost of 10 kWh	6,900	6,500	4,500	1,200	2,200	18,000
Cycle Life @ 80% DOD	6,000	2,800	1,500	300	500	8,000
Off Grid Years	16.4	6.8	4	1	1.4	21.9
Energy Throughput in MWH	47	21.5	11.5	1.9	3.5	41.6
Cost per kWh	0.14	0.30	0.40	0.74	0.57	0.19
Safety	Yes	No	No	No	No	Yes
Free Maintenance	Yes	Yes	Yes	No	Yes	No

Energy Throughput: The total amount of energy a battery can be expected to store and deliver over its lifetime



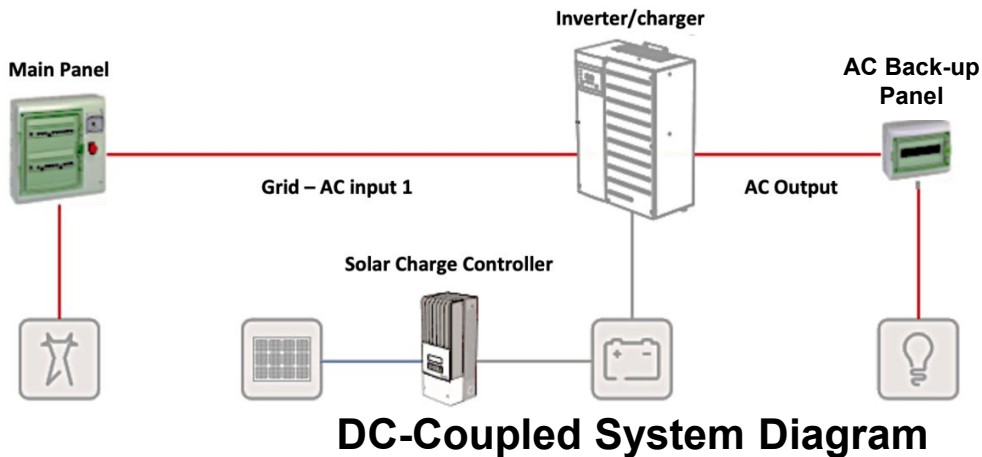
**Design Guide for PV +
Storage**

AC vs DC Coupled Solution



Application for AC coupled solutions

- *When retrofitting to existing PV systems*
- *For new installations that require module level rapid shutdown*



Application for DC coupled solutions

- *For new installation*
- *No additional PV inverter*
- *More efficient*

Compatible Inverters

COMPATIBLE WITH MOST 48V CHARGERS AND HYBRID INVERTERS!

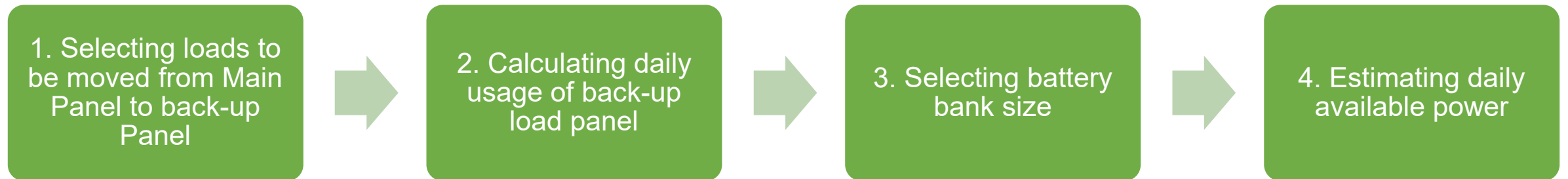
Brand	Inverter/Charger Mode	Configuration
Schneider **	Conext XW MPPT charge controller; Conext XW+ and XW pro series;	AC or DC coupled
Outback	Skybox, FLEX max charge controller (48V), FLEXpower series (48V); Radian series (48V); FXR(A) and FXR (E) series (48V); GVFX and GVFX series (48V);	AC or DC coupled
Magnum	MS 4448PAE; MS 4048-20B; PT-100 Charge Controller	AC or DC coupled
SMA**	SUNNY ISLAND 4548-US/6048-US; SUNNY ISLAND 3.0M/4.4M/6.0H/8.0H	AC coupled
Sol-Ark**	8 KW & 12 KW Inverter	AC or DC coupled
Victron	Phoenix VE.Direct Inverter; MultiPlus and Quatro Inverter/Charger; Skylla-TG Charger; General; Color Control or Venus GX	DC coupled
Morning Star	TriStar MPPT 600V; TriStar MPPT; Tristar PWM	DC coupled
Midnite Solar	Solar Classic 150, 200 & 250; Solar Classic 150, 200 & 250-SL	DC coupled

** We are establishing close-loop communication with those inverters!

Fortress Energy Storage Sizing Tool

Simplifies Battery Size Design

Automatically size Up Energy Storage for Backup



Available to our authorized installers

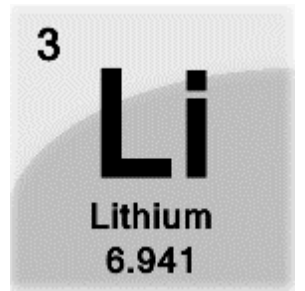
Sizing Resources

- [Fortress Power Resources Web Page](#)
- [Fortress Power YouTube Channel](#)
- [Energy Sage Sizing Tool](#)
- [Energy Toolbase Sizing Tool](#)



Before you choose...

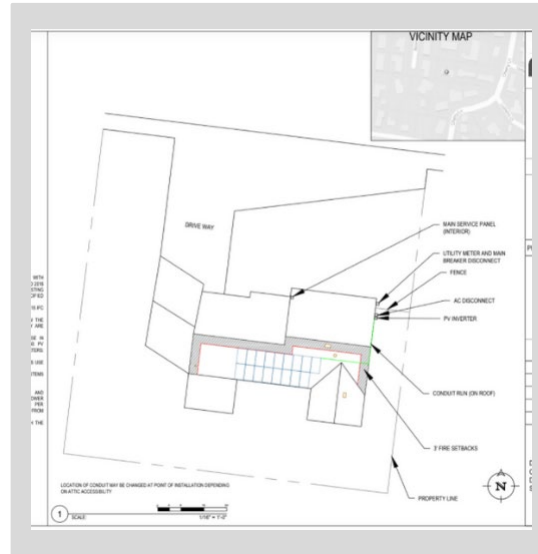
Know the **7 lithium characteristics** that can significantly affect system behavior. Consider them carefully before you “drop lithium in”



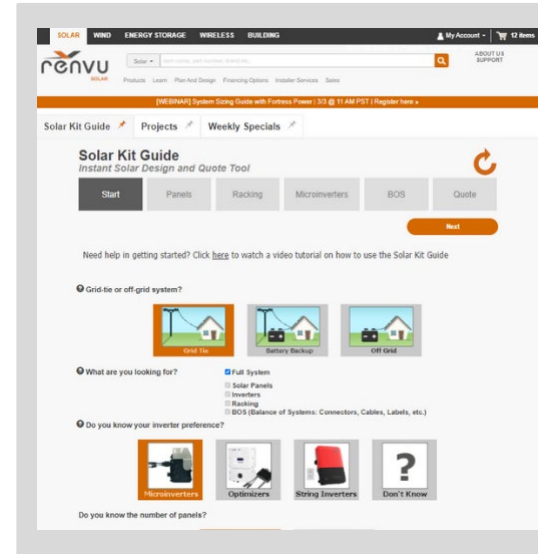
1. Battery Management System (BMS)	Electronic system for balancing and protecting cells (including thermal protection). If a BMS isn't in the battery you'll need one in your system
2. Narrow voltage range	Less fluctuation or “travelling” between low and high SOC. Requires more data monitoring to measure SOC
3. Cold temperature charging	Lithium can be damaged if charged in too cold conditions. To ensure health, you'll want a “foldback” feature that can throttle-back charging in cold conditions
4. Full discharging	Can cause “chemical death.” Sometimes the LVD point is not correlated with SOC
5. Low self-discharge	Extended float or stand-by periods are OK, making lithium ideal for systems that aren't frequently used (such as cabins) which might make scheduling more complex
6. High charge/discharge rate (C-rate)	More energy density means faster charging and discharging, and can benefit from inverter/chargers that can more quickly “stuff” electricity into them
7. Higher upfront cost...	...but generally much longer cycle life. Which means system economics and ROI can be more complex to calculate for end-users in order to understand the value proposition



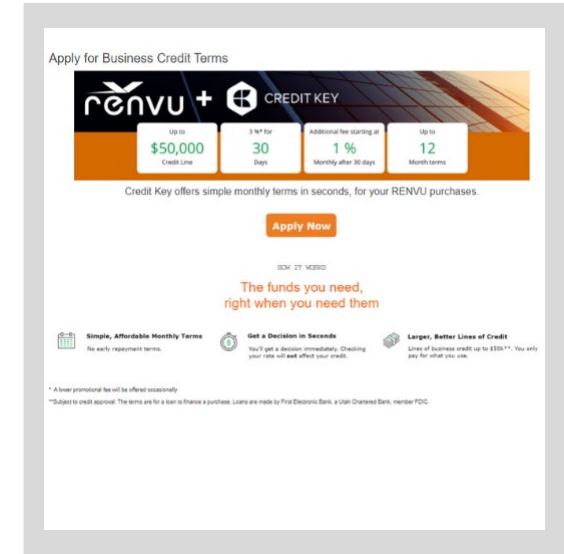
Mega-Watt Club



Engineering Services & Permit Packages



Online Quote & Design Assistance



Financing Options

BLIKIR

USA

Made in the USA



25 Year Warranty



Sturdy Design



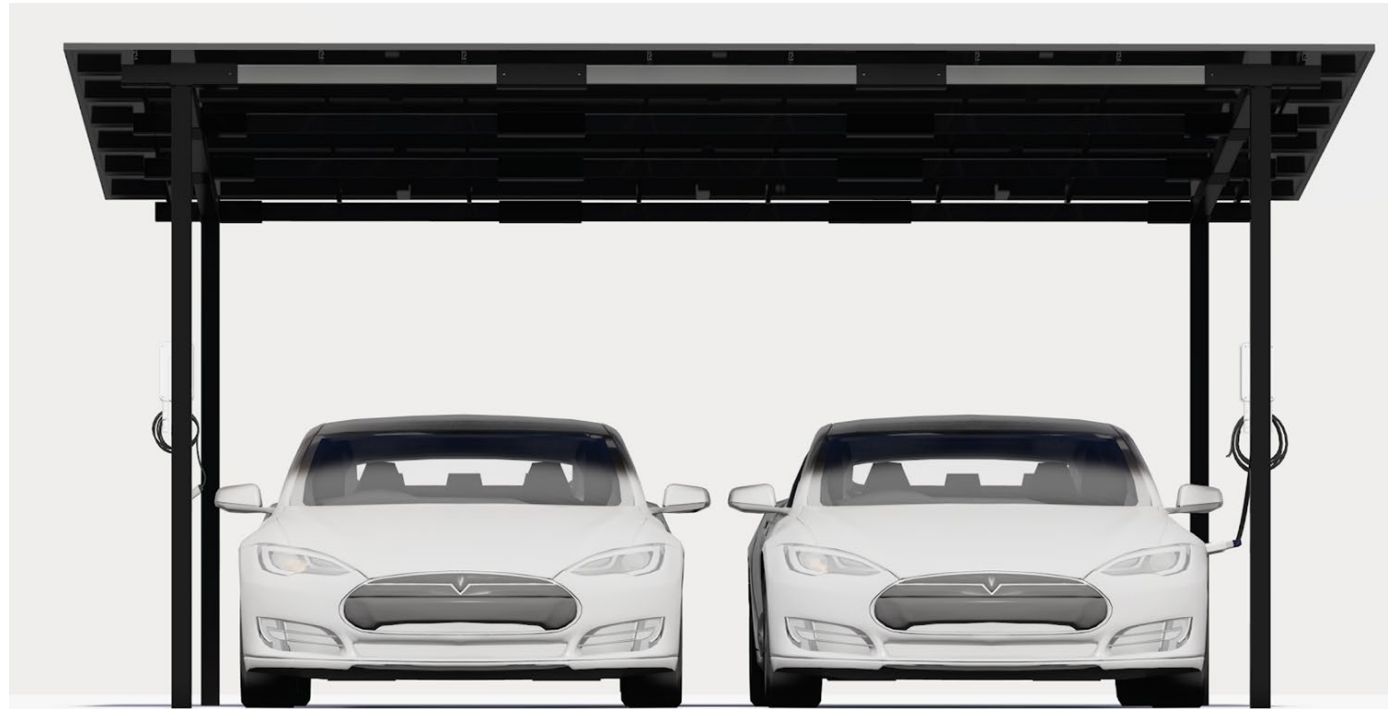
Easy installation



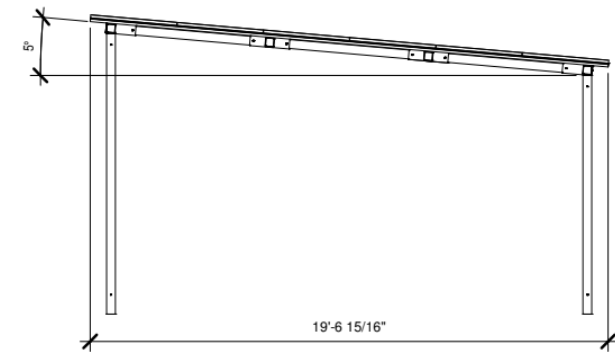
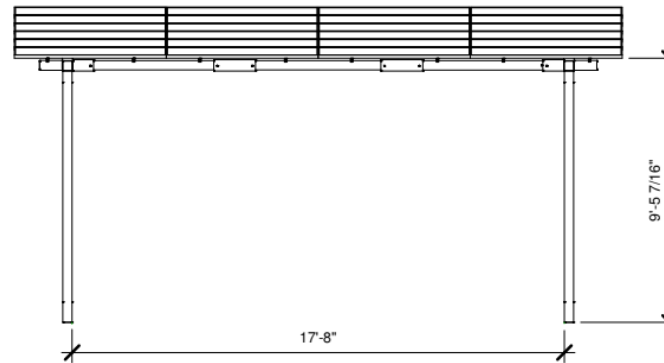
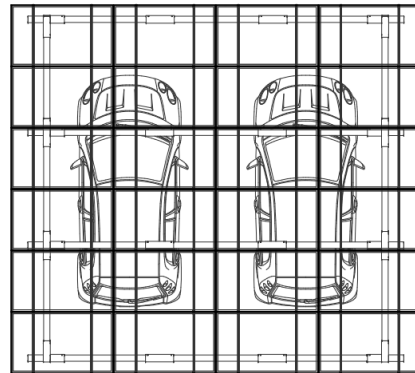
Light Tools



Versatile

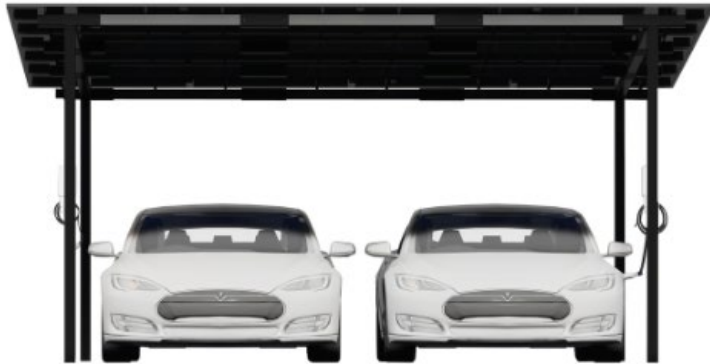


- 24 x 60/120 cell Panels
- 18ft x 18ft x 9ft
- Sealed Surface
- 5° Tilt
- Pier depth only 2'
- 30 PSF Snow/120 MPH Wind Load



BLIKIR

Residential Solar Carports & Canopies



BLIKIR

Price: \$8,900 (\$1.10/W)

BLIKIR



Price: \$14,900 (\$2.00/W)
Price after 26% ITC: \$11,026

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FORTRESS
Power
SECURE YOUR ENERGY

18.5kWh



Sol-Ark
Energy insurance for your facility



12K



Price: \$29,600 (\$3.98/W)
Price after 26% ITC: \$21,904



Authorized Installer Program



**Submit
Application
Form**

**Install
Three
Carports**

**Sign
SPA**

**Unlock
Partner
Benefits**



Thank You & Contact Us

**If you want to go fast, go alone;
if you want to go far, go together!**



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For More Information:

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[Solar Kit Guide Tool](#)

[BLIKIR Solar Carports](#)

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