



# Fortress Power

Energy Storage Systems

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## TOPICS

- POLICY AND MARKET OPPORTUNITIES
- FORTRESS POWER BATTERY SYSTEMS
- DARFON HYBRID INVERTER
- DEALER BENEFITS



# MARKET OPPORTUNITIES

U.S Annual Energy Storage Market Size, 2016-2022E (Million \$)

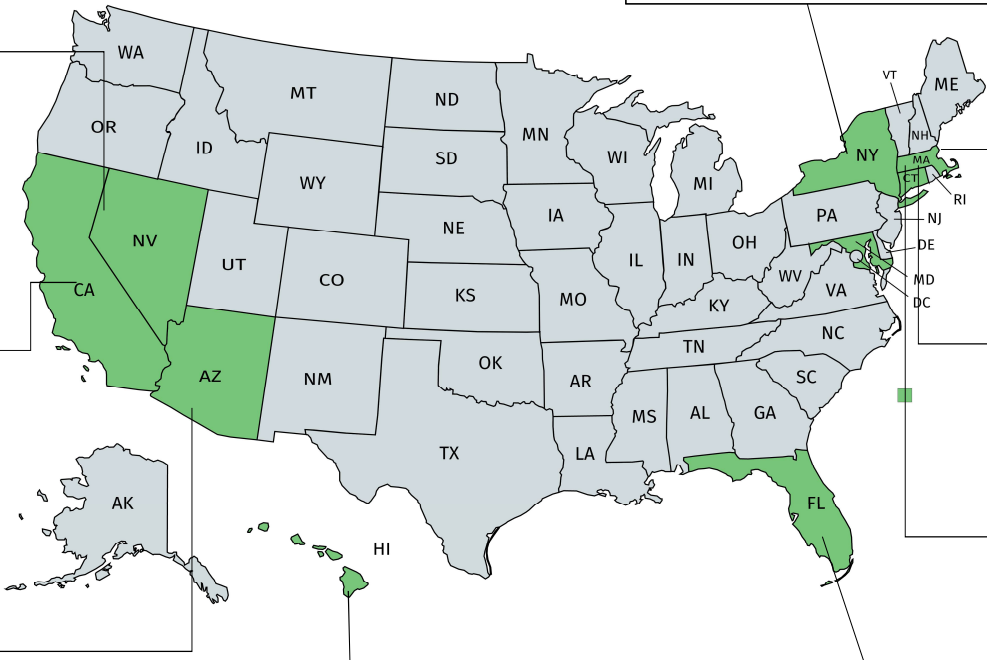


Source: GTM Research



# POLICY

States with favorable policy ■



**Nevada PUC** approved new NEM rules

**California** approved SGIP Budget for funding low-income communities. Governor signed AB 546 into law to streamline storage permitting.

**Arizona** proposed tariff program to encourage adoption of non-residential storage to address peak demand.

**Hawaii PUC** issued new program rules for net metering: Smart Export and CGS+.

**New York** targets 1.5GW energy storage by 2025

**Massachusetts** investigates if energy storage should be net metered and if net metered systems can have capacity bid into ISO-NE's Forward Capacity Market.

**Connecticut DEEP** opened round 4 of its microgrid program which includes an incentive for storage

**Maryland** passes 30% tax credit for residential and commercial storages.

**Florida JEA** approved a storage incentive and new NEM compensation structure for early 2018

Source: GTM Research



# BENEFITS OF ENERGY STORAGE



**Back Up Your Facility**



**Save Money on your Electric Bill**



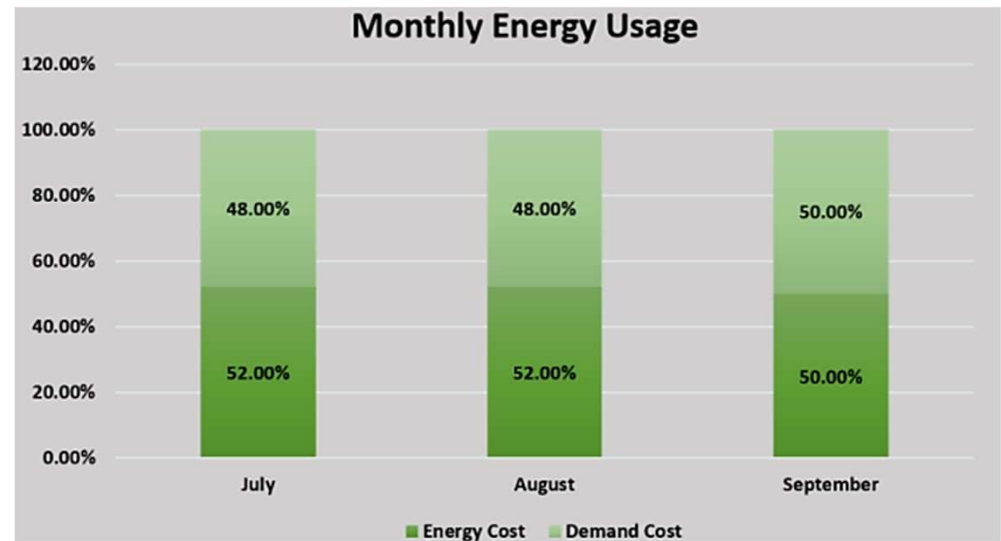
**Maximize Your PV Production**



**Tax and Incentives**

## Additional Benefits for Business

- Reduce Demand Charge
- Demand Response
- Bonus Depreciation



## COMPANY INTRODUCTION

We are a world-leading battery manufacturer that brings high power density automotive lithium ferrite phosphate batteries to the energy sector.



U.S Headquarters  
Southampton, PA



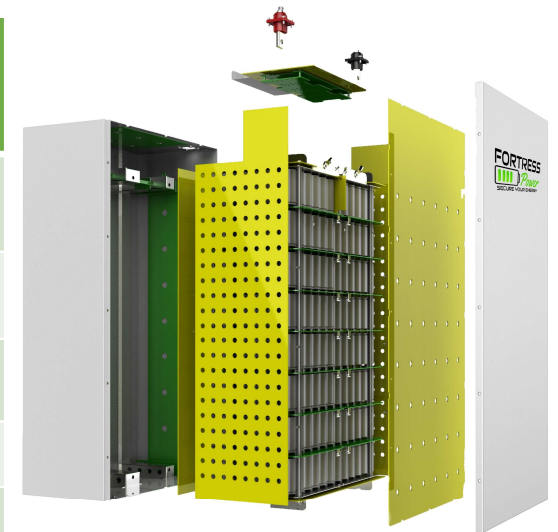
Manufacturing Facility  
Hangzhou, China



## TECHNOLOGICAL ADVANTAGES

We Use The Safest Lithium Technology – Lithium Ferrite Phosphate

	FORTRESS Lithium Ferrite Phosphate (LFP)	OTHERS (i.e. Tesla, LG Chem) Lithium Nickel Manganese Cobalt (NMC)
Safety	✓	X
Eco-friendly	✓	X
Operating Temperature	-4 – 140 °F	14 – 113 °F
Peak Power Output	LFP > Lithium Ion	
Rate of Capacity Loss	LFP < Lithium Ion	
Life Cycles	LFP > Lithium Ion	



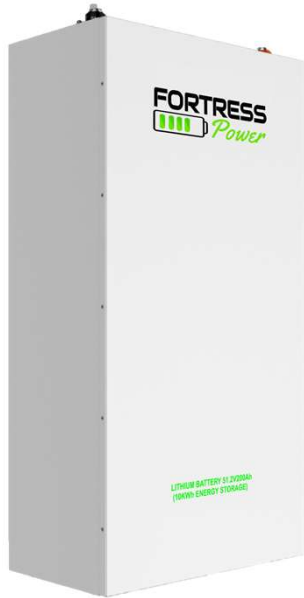
Fortress Power Battery - 10 KWH



## PRODUCTS

Here are some of the products we offer to homes:

Fortress**Power** Lithium Battery



(10/15 KWh)

Fortress**LIT** series – Stand-alone solar LED lamps



Fortress**GO** series – Portable storage systems





## FORTRESS POWER LITHIUM BATTERY

Size	LFP- 10	LFP- 15
Total Energy (kWh)	10.24	15.36
Max. Charge Current (Continuous) [A]	100	100
Max. Discharge Current (Continuous) [A]	100	100
Max. Pulse Current (for 10 sec) [A]	200	200
Capacity [Ah]	200	200
Voltage [V]	48	48
Charging Temperature [F]	-4 to 140	
Storage Temperature [F]	-4 to 131	
Dimension [H xW x D, inch]	33 x 16.4 x 9.4	33 x 16.6 x 13.4
Weight [lbs]	286	429
Depth of Discharge	80%	
Warranty	10 years	

FortressPower Lithium Battery



**SAFE • AFFORDABLE • EASY TO INSTALL**



## FORTRESSGO SERIES



**FortressGo – 444 Wh**  
(500W AC output)

Compact and portable lithium smart battery systems are made for your home or the outdoors with a built-in inverter, charger and battery management system.

Multiple outlets allow you to connect your appliances easily.

**FortressGo – 5000 Wh**  
(3000W AC output)



**FORTRESS**  
 **Power**  
SECURE YOUR ENERGY

## FORTRESSLIT SERIES

- Approx. 5 Minutes to Install
- No Wiring
- Affordable



- 25W Solar Panel
- 10W LED; 1100 Lumens
- 3.2 Volts/25 amp hour LFP Battery
- 8 hours operating time
- 5 year Warranty

## COMPETITIVE ADVANTAGES



Competitively Priced  
& Affordable



Easy to Install & User  
Friendly



High Performance



Consistent Reliability



Highest Safety Standard



Compatible with Many  
Inverters & Chargers

## DARFON HYBRID INVERTER – H5001



The compact, easy to install, and efficient smart hybrid inverter.



# Darfon Company Profile

Darfon Solar



# Why choose Darfon?

## **Darfon is...**

- A large, profitable international company with staying power
- Strategically positioned itself for the PV market
- Ready to adapt to the growing market



# About Darfon Electronics

A BenQ Group Company

## Darfon Electronics Corp.

Established	May, 1997
Revenue	\$800 Million
Employees	12,000 (2017)
Global Patents	1,200 (2017)
Headquarter	Taoyuan, Taiwan
US Office	Mountain View, CA

## BenQ Group

Established	2001 (Spun off from Acer)
Revenue	> \$25 Billion
Employees	> 100,000
Global Patents	15,000
Headquarter	Taiwan





# Core Products

## OEM/ODM Business

Input Devices	Integrated Components & Materials	LED Lighting
Keyboards (Desktop, Laptops)	Ceramic Capacitors	Industrial Can Lighting
Mice	Power Inductors	Light Bulbs
Cases (Smart Phones, Tablets)	Transformers	Track Lighting
Power Adapters	Solar Paste	Bay Lamps
Battery Packs		LED Bars
TV & PC Power Modules		Warehouse Lighting
		Office/Household Lamps

## Branded Business

Darfon Solar	Darfon Innovation
Micro Inverters	BESV Electric Bikes
Hybrid Inverter Products	
Li-ion Battery for Storage	

# Worldwide Core Customers





# DC vs AC coupled

## ❑ DC-coupled solution

A DC coupled solution is where the PV array connects directly to the Hybrid inverter.

- More efficient
- Cheaper in a new installation
- Simpler to install as a new installation

## ❑ AC-coupled solution

An AC coupled solution allows for an easier interface for a previously installed system by using the existing inverter.

- Less efficient as there is an extra conversion taking place.
- Easier and less expensive as you can typically use the existing inverter as it is
- Simpler to install in front of an existing inverter
- No high voltage DC

# Darfon's DC-coupled Solution

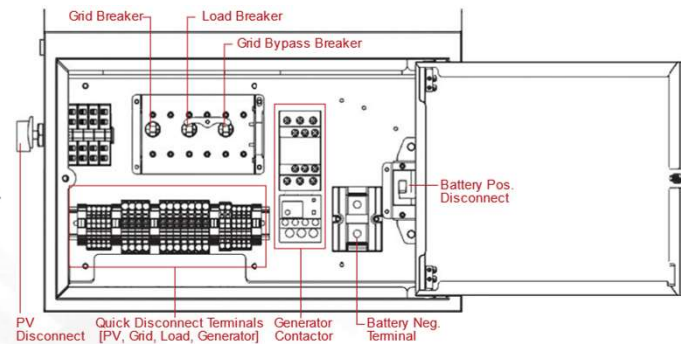
H5001 Hybrid Inverter



## Simplicity & Easy-to-install

It integrates PV inverter, charger inverter, control, communication, distribution box, and auto-transfer, all in one unit.

Distribution Box





# Prioritize Power Balance

## H5001 Modes of Operation

It prioritizes flow and balances supply and demand from the batteries, PV modules and utility. It supports a wide range of applications.

Operating Mode		Priority from PV input to			Priority for load from		
		Load	Batt.	Grid	PV	Grid	Batt.
1. Back-up (default)		2	1	3	1	2	3
2. Residential		1	2	3	1	3	2
3. Back-up w/o Feed-in		2	1	x	1	2	3
4. Residential w/o Feed-in		1	2	x	1	3	2
5. Time of Use	Off-peak Period	2	1	3	1	2	3
	Peak Period	1	2	3	1	3	2
6. Time of Use w/Batt. Feed-in	Off-peak Period	2	1	3	1	2	3
	Peak Period	1	3	2	1	3	2



# Specifications

PV Input	Grid Input	Grid Output	Critical Load
Up to 6.5kW	Up to 5kW	0 to 24A Feed-in Current	5kW Cont. Output
2 independent MPPTs	Auto-transfer Relay Rating: 48A	L-L: 211 to 264VAC $\pm$ 3.0V	5.5/6.5/7.5kW Surge power at (40/5/1sec)
Max. 13A per string	20ms Typical Transfer Time	59.4 to 60.4Hz $\pm$ .05 Hz	0 - 21A Output Current
Voc: 120~500V	240 Split Phase	Rule 21 Compliant	Voltage 240 2P
Mppt: 250 - 430	50/60 Hz		50/60 Hz



# H5001 Battery Charger Specifications

- Max charge current: 60A
- Max discharge Current: 150A
- DCV range: 42 – 60 (48 nominal)
- Battery Types
  - AGM
  - Gel
  - Li-ion
  - LFP
  - Custom

# AC-Coupled Hybrid Inverter

- ✓ Designed to be retrofitted to existing PV systems
- ✓ Compatible with most pv inverters available on the market
- ✓ Compact and fully-integrated
- ✓ Available in Q2 2018







# Why Darfon ESS Solutions

## Solutions on the market

- Are difficult to install
- Are expensive
- Evolved from off-grid market
- Are not reliable
- Have volatile battery chemistries

## Darfon ESS solutions

- Are Easy to install
- Are affordable
- Have Solid Engineering
  - Programmable operation
  - Simple connectivity
- Work with all common chemistries



# G-Series Micro Inverters

## Features & Benefits

### **G320**

- Handles new higher powered modules
- 60 or 72 cell modules
- 240, 208, 277 VAC
- Up to 19 inverters per circuit with 30A breaker
- Maximum AC extraction!

### **G640**

- 2 modules per inverter
- Lower cost per watt
- Faster installation
- Lower cabling costs
- Up to 9 inverters per circuit with 30A breaker
- Separate MPPT for each module

# DEALER BENEFITS

## Dealer Benefits

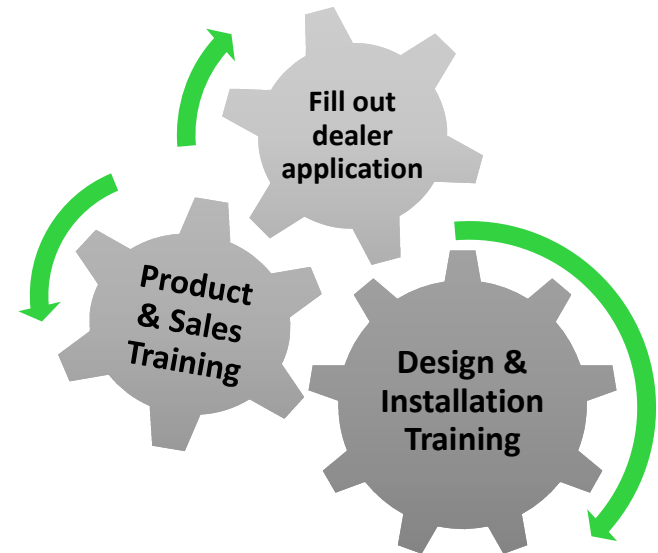
Sales & Marketing Support

Product & Webinar Training

Great Dealer Discount Price

Logistic Support

## How to Become an Authorized Dealer



## THANK YOU – Contact Us!

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