Power Backup System

Comparison

# Battery Chemistry

The batteries in power backup systems differ from one another depending on the materials used to create them. These differences are called “chemistries.” Most power backup systems use one of two chemistries, Lithium Nickel Manganese Cobalt Oxide (Li NMC) and Lithium Iron Phosphate (LiFEPO4). Each has their advantages and disadvantages, but LiPE04 batteries are superior when it comes to emergency applications.

The table below compares features important to using power backup systems in an emergency:

|  |  |  |  |
| --- | --- | --- | --- |
| Feature | EcoFlowLiPEO4 | Bluetti - LiPEO4 | YetiLi NMC |
| **Cycle Life:**How many times a battery can be charged. A higher number means a longer lifespan. | 3,500Approx. 10 years | 3,500Approx. 10 years | 500Approx. 2-3 years |
| **Depth of Discharge:**How much battery can be drained without causing damage over time.  | 100% | 100% | 20% - 80% |
| **Stability:**How the battery performs at elevated temperatures. | Does not overheat / not flammable | Does not overheat / not flammable | Can overheat / flammable |
| **Cold Weather Performance:** | Reduced | Reduced | Reduced |
| **Energy Density:**Weight of battery required to hold the same amount of energy.  | Heavier | Heavier | Lighter |
| **Discharge Rate:**How quickly does the battery drain when not in use? | ~ 3% per month | ~3% per month | ~ 4% per month |

**In summary:**

* Ecoflow and Bluetti systems can last up to 7x longer than the Yeti
* Ecoflow and Bluetti systems can be charged to 100% and drained to 0% without damaging the battery significantly over time, unlike the Yeti. Note: 80% charging is still recommended for each system to ensure optimal battery health over time.
* Ecoflow and Bluetti systems use a battery chemistry that is not flammable.
* Ecoflow and Bluetti systems are heavier than the Yeti. (see Dimension section below)

# Charging

Charging speed and the options for charging a power backup system differ widely. Options include:

* Wall outlet
* Solar
* Car battery
* EV Charging Stations

Each of these options can provide power at different rates. Higher rates mean faster charging. Certain systems also enable combining the options above for even faster charging speeds. Power is provided in Watts. Higher Watts equals faster charge times.

|  |  |  |  |
| --- | --- | --- | --- |
| Charge Option | EcoFlow | Bluetti | Yeti |
| **Wall Power:** | 1800 Watts2.7 hours – full charge | 1800 - 3000 Watts2 hours - full charge | 230 Watts\*14 hours – full charge |
| **Solar:** | 1600 Watts max input | 2400 Watts max input | 600 Watts max input |
| **DC Charging (car battery):** | 120 watts25+ hours | 120 watts25+ hours | 120 watts25+ hours |
| **EV Station:**  | 3400 watts1.7 hours – full charge | TBD | Not Available |
| **Combined Charging(wall + solar):** | 3400 watts< 2 hours – full charge | 4,200 - 5,400 watts~1.5 hour - full charge | Not Available |

**In summary:**

* Ecoflow and Bluetti charge 6x faster from a wall outlet.
(You can purchase a 600-watt power supply, $200, for the Yeti.)
* Ecoflow has 2.5x more solar charging capacity and Bluetti has 4 times more charging capacity than the Yeti.
* Ecoflow can be charged at EV charging stations, the Yeti cannot. TBD for the Bluetti though an adapter is not available in the Bluetti website as of 4/10/2023.
* Ecoflow and Bluetti systems can combine charging options for faster charging, the Yeti cannot.
* The Ecoflow and Bluetti systems include an internal AC charger. The Yeti system requires an external power supply.

# Performance

Power backup systems need to provide enough power to support critical electronics such as Ventilators and Oxygen concentrators for as long as possible. They also need to be able to handle the power demands of multiple devices connected at once and devices that use a lot of electricity such as chair lifts, well pumps or elevators. Important considerations include:

* **Battery capacity -** how long a battery can last on one charge (measured in watt hours) – larger batteries have more watt hours.
* **Efficiency** – how close the system comes to the advertised battery capacity.
* **Power output** - (measured in watts) – more power equals more, or more power-hungry, devices that can be plugged in at once.
* **Peak power** – or surge, determines how large of spike in power the system can handle without shutting down. Motors, refrigerators, and heaters all use elevated power when initially starting up.

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic | EcoFlow | Bluetti | Yeti |
| **Capacity:** | 3600-watt hours | 3072-watt hours | 3032-watt hours |
| **Efficiency\*:** | > 80%~ 2900-watt hours | 84%2590-watts hours | ~ 70%~ 2100-watt hours |
| **Power:** | 3600 watts | 3000 watts | 2000 watts |
| **Surge Power:** | 7600 watts | 7200 watts | 3500 watts |

**In summary:**

* Ecoflow and Bluetti have more rated capacity and are more efficient than the Yeti which results in about 25% more capacity (Ecoflow) and 15% more capacity (Bluetti). \*
* The EcoFlow and Bluetti provide more than 1.5x the power and can handle surges more than 2x higher than the Yeti.
* Peak power is not intended to be used for more than a few moments.

\* CIDE (Center for Inclusive Design and Engineering) has not completed its own efficiency testing on these systems. These numbers were derived from user tests reported on the internet.

# Features

Understanding and getting the most benefit out of power backup systems during an emergency often depends on the features and capabilities available. Some key features include:

* **Un-interrupted Power Supply (UPS)**, power backup capability that switches from wall power to the power backup system seamlessly when the power goes out.
* **Power Passthrough** - the ability for a system to pass through wall power when plugged into an outlet.
* **App control** – view and change settings on the power backup system from your mobile device.
* **LCD Display** – visible indication of remaining battery capacity
* **Expansion** – the ability to add external batteries to increase the capacity of the power backup system.

|  |  |  |  |
| --- | --- | --- | --- |
| Feature | EcoFlow | Bluetti | Yeti |
| **UPS:** | Yes\* | Yes | No\* |
| **App Control:** | Yes | Yes | Yes |
| **LCD Display:** | Yes – Large | Yes\* | Yes |
| **Expandable:** | Yes25,000 Wh | Yes 12,288 Wh | YesUp to 6,400 Wh |
| **AC Outlets** | 5 x 120V, 20A | 6 x 120V, 20A1 x 120V, 30A TT-30 | 2 x 120,16.5A |
| **USB Outlets** | 2 x 100 watt USB-C(Really Fast)2 x 18 watt USB-A(Fast)2 x 5v/3A USB-A | 1 x 100 watt USB-C(Really Fast)2 x 18W USB-A(Fast)2 x 5v/3A USB-A | 1 x 60 watt USB-C(Really Fast)1 x 18W USB-C(Fast)2 x 5v/3A USB-A |
| **Wireless Charging** | N/A | 2 x 15 watt chargers | N/A |
| **DC Outlets** | 1 x 12V, 10A1 x 12V, 30A (Anderson Outlet) | 1 x 24V/10A(Car Outlet)1 x 12V, 30A (Rv Outlet) | 1 x 12V, 10A(Car Outlet)2 x 360 watt(High Power Ports) |

**In summary:**

* Ecoflow and Bluetti can act as a UPS system for most electronic devices. The Yeti cannot. \*
* Ecoflow claims EPS capability versus UPS with a 30ms delay. However their Delta Pro system can support the power transition for a laptop.
* The EcoFlow’s display is larger and more visible than the Buetti and Yeti displays.
* Bluetti’s display has poor contrast and the interface elements are smaller than the Ecoflow.
* The EcoFlow provides more room for expansion.
* The Yeti’s 60 Watt USB-C port can be used to charge the device in 60+ hours, 0-full.

\* The Yeti can charge and power devices at the same time, however the manufacturer discourages doing so due to the potential for battery damage over time.

# Dimensions and Weight

|  |  |  |  |
| --- | --- | --- | --- |
| Specification | EcoFlow | Bluetti\* | Yeti |
| **Length** | 25” | AC300: 20.5”B300: 20.5” | 15.25” |
| **Width** | 11.2” | AC300: 12.5”B300: 12.5” | 10.23” |
| **Height** | 16.4” | AC300: 14.1”B300: 10.5” | 13.6” |
| **Weight** | 99 lbs | AC300: 47 lbsB300: 79.6 lbs | 69.78 lbs |

In summary:

* The Yeti and Ecoflow devices ship with integrated dolly’s
* The Yeti is significantly lighter than the Ecoflow and Bluetti systems
* The Bluetti system consists of two components. 1) power electronics and outlets, 2) External battery.