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STORE YOUR POWER – Not All Batteries Are The Same

What you need to know about batteries before investing

When making any kind of significant investment, it's absolutely vital you recognise the need to conduct the relevant research to ensure you don't spend your money poorly and regret the decision you make.

To help you understand the right questions to ask, specific to your needs we have created a small guide shown below.

Given it is a complicated issue we have found that most consumers when shopping around usually only ask the following 3 main questions when comparing the growing choice of storage systems

- 1 – How much energy can it store?
- 2 – How long is the warranty?
- 3 – How much does it cost?

Unfortunately, by only asking these simple questions you are prone to making a very expensive mistake.

If you can agree the 2 main reasons for you considering a residential battery system are either to store your excess unused solar power for use when you need it in the evening or to assist in the futureproofing of your home against ever increasing energy bills, then it becomes essential the solution you find meets your own unique set of circumstances both now and in the future.

Please note these items are not listed in any particular order, but we've tried to apply an element of common sense.

- **What background does the manufacturer have in battery storage or is it simply a cheap white labelled battery?**
- **What is the chemical composition of the power cell?**
- **How long will the battery last?**
- **What determines the lifetime of a battery?**
- **How quickly can you charge & discharge the power needed from your battery?**
- **Does the battery need to be inside or outside?**
- **How do you manage the performance of the battery?**
- **Will the battery operate with any and every provider and their specific Time of Use Tariffs?**
- **Will the battery work with my existing inverter?**
- **How heavy are the batteries what special fixings if any are required?**
- **Are the batteries scalable for future additions?**
- **How do you the customer monitor and manage the battery?**
- **How safe are the batteries?**
- **Where is the battery manufactured?**
- **What happens if the battery fails, who is responsible for repairing or replacing it?**
- **What happens in the event of a powercut?**
- **What is "Depth of Discharge" and How much real usable power is there ?**
- **Where is the customer services team located when I need help?**
- **Is the battery compatible with my other products?**



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ANSWERS TO IMPORTANT QUESTIONS

- **What background does the manufacturer have in battery storage or is it simply a cheap white labelled battery**

- A- Like most emerging markets the market has been flooded in recent years in the race to provide the best storage solution. Unfortunately it has also meant that the quality of the products can vary significantly due to a number of factors. Not the least of which is does the presenting brand of the battery actually manufacture the system, the answer is quite often “NO”.

Having no direct control over the quality of the manufacturing process or the materials used for the powercells does indeed mean the system will be cheaper and for this reason we only work with systems manufactured directly by the brand.

Our Preference is to work with Puredrive Energy due to their manufacturing pedigree and the fact they are manufactured right here in the UK at their factory in the Midlands.

- **What is the chemical composition of the power cell**

- There are in fact a great many types of chemical based batteries, however the majority of the manufacturers of residential storage systems for safety reasons primarily use Lithium Ion Phosphate (LifePo4) for the main power cell.

Some still use cobalt or manganese in their batteries and for this reason alone we will not install these products.

However, it's the quality and grade of materials used, combined with their % of mix that heavily influences the durability, stability and reliability of the power core.

As with any industry the lower the grade of materials used the poorer the level of performance will be received.

- **How long will the battery last**

- Batteries all come with standard warranties that are determined by 1 of the 3 aspects i.e. Timespan (10 years is the norm); Lifecycles or Energy Throughput, whichever comes round the soonest is when the warranty expires.

However most batteries will under normal conditions likely exceed the 10 year period either marginally or very significantly. Batteries lifespans are measured either in Cycles (A full charge & Discharge) or Energy Throughput in Megawatt Hours (MWh's)

There are essentially 4 main groups of cycles guaranteed by the various manufacturers i.e. 4500 – 6000 – 8000 – 10000.

In most cases a household will only use 1 cycle per day.

When you consider how expensive the cost of energy will be in 10-20-30 years which lifespan will provide you with the greatest level of return on your investment.



- **What determines the lifetime of a battery?**

- The 2 primary elements that determine the projected lifespan are :-
 - The quality and grade of materials being used in the
 - The BMS (Battery Management System)
- Most of the systems available in the marketplace use a generic open-source software to keep their costs down and ultimately means you the owner are then responsible for managing and monitoring your system.
However only a select few manufacturers have their own in-house R&D software teams that create world class leading software.

Puredrive Energy are such a company who we believe are best in class and have a system that allows both them and you to remotely monitor and manage or even fix your battery without having to come on site (issue dependant of course). There is more to the story than this though and we'll be happy to explain more when we talk.

- **How quickly can you charge & more importantly discharge the power needed from your battery?**

- "C" Rating is the term used to denote the charge rating of your battery. For residential storage systems they are either 0.5 C or 1 C.

Specifically The battery C Rating is the measurement of current in which a battery is charged and discharged at. The capacity of a battery is generally rated and labelled at the 1C Rate (1C current), this means a fully charged battery with a capacity of 10Ah should be able to provide 10 Amps for one hour

In real world terms this means you have a limited amount of power for a finite amount of time. The higher the C rating the more devices you can have on at the same time in your home without drawing any excess power form the grid at peak rates.

In our experience most of the batteries available have just a 0.5 C rating, which is why we use Puredrive's system with a 1 C rating as it improves the savings you will make every year.

- **Does the battery need to be inside or outside**

- How susceptible to weather, moisture, humidity, dust or sand is the battery you purchase. Where will you want place it in your property.

Only some batteries can operate in outside conditions and even then you have to understand what the temperature range is they can operate within, specifically during extreme cold or heat.

The IP (Ingress Protection) rating of the system is how they are graded for which environment they are suitable for.

Puredrive systems can work both indoors and outdoors.



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• **How do you manage the performance of the battery**

- The BMS (Battery Management System)

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• **Will the battery operate with any and every energy provider and their specific Time of Use Tariffs.**

- No is the answer for almost every battery as it's both determined by the inverter and the BMS being used. In fact with most of them you can only use it with a specific energy company's TOU tariff

Puredrive have developed their own PURASystem that provides you with complete energy provider independence as you can program the system to work with nay provider and any tariff.

This level of provider freedom quite simply means in the future when the energy market becomes more competition you can move to the provider and tariff of choice, which in turn maximises the savings you make and increases the return on investment to be achieved.

• **Will the battery work with my existing inverter**

- Maybe Yes, Maybe No is the immediate answer to this basis question as of course it all depends on the inverter you currently have.

First you need to understand that straight forward grid tied inverters are generally not compatible with batteries and you need what is known as a hybrid inverter

Basic inverters are only designed to convert the DC power your PV array generates into the AC power grid connection your home uses.

As batteries also store power in DC format you need an inverter that can manage the flow and conversion of energy between 3 different sources ie Grid/Home (AC); PV array (DC) & Batteries DC.

This is a complex process especially you take into account how and when you generate/consume power. Having a system that learns from the patterns that emerge of your consumption / generation usage is just as crucial as the battery itself.



- **How heavy are the batteries what special fixings if any are required**

- Battery density is very significant and subsequently the batteries can be extremely heavy. As such for health and safety concerns having the right location for them to either hang or stand needs to be taken into consideration.

Puredrive batteries are supported onto walls using anchor bolts directly into brickwork or heavy duty OSB/Fireproof Concreteboard which themselves are fixed to joists on the wall.

- **Are the batteries scalable for future additions**

- Most batteries these days are scalable but only to a certain extent of course. You can't simply keep adding one when ever you feel like it. In addition software upgrades to new generations can mean previous versions are not compatible with newer ones, please check with your installer prior to choosing a system.

- **How do you the customer monitor and manage the battery**

- It all depends on the manufacturer. Most use generic open source software that provides access to a cloud based system that you can access on your computer. Some have developed Apps that you can use on your mobile phone and for some basic models you still have to manually monitor and change the settings on the system itself.

Puredrive have developed an App for their PURASystem that allows you access to their full suite of products in a single location.

- **How safe are the batteries**

- No doubt you will have seen numerous stories in the news of EV cars catching fire as their battery spontaneously combusts.

This is due to what is known as Thermal Failure which usually occurs when there is a chemical failure in the powercell.

Some chemical batteries are more prone to this than others which is why we don't install any batteries with Cobalt or Manganese.

LifePo4 batteries are still capable of thermal failure, however when this happens they melt rather than burst into flames which is why the majority of the worlds manufacturers use this safe, stable composition.

- **Where is the battery manufactured?**

- There are various manufacturers all around the world but the vast majority of batteries are physically manufactured in China.

Puredrive's systems are manufactured right here in the UK at their plant in the Costwolds.

While some raw materials have to be sourced abroad the majority of the equipment materials are resourced right here in the UK for final assembly combined with their patented management software technology.



- **What happens if the battery fails, who is responsible for repairing or replacing it**

- This can be a very complex question depending upon the choice of battery you go with and what the specific fault is.

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If you have mismanaged the settings on your battery you could potentially have invalidated the warranty and as such you will have no recourse whatsoever

This is why we work with Puredrive as once the system has been setup and commissioned/registered on their servers there should be no need for you to alter any of the settings ever again.

If it then transpires there is a fault with the battery that's covered by the warranty Puredrive will repair or replace it either with their own field based technical team or by requesting we come back out to repair/replace it.

- **What happens in the event of a powercut**

This will depend entirely upon both the battery being purchased and how the battery has been installed. Very few batteries have automatic power supply built in. There is also the size of the electrical load in your home to consider and what level of Amp usage the battery can cope with.

Puredrive AC batteries have a UPS facility built in, however for protection it does have a limit to handle 20Amps at any one moment in time.

We usually advocate identifying 2 priority circuits and creating a secondary consumer unit, that can kick in should a powercut occur. These 2 circuits should be enough to allow you to have lighting, wifi and a few sockets that could be used allowing you to cook/watch TV and maintain your security system if you have one, as well as your boiler which of course will have an electrical supply too.

- What is "Depth of Discharge" and How much real usable power is there
- This is a self protection protocol built into batteries to ensure they cannot be fully drained. The more often you completely drain a battery the more damage you do to the power cell and the shorter lifespan you will have.

Think of your mobile phone and how these days you have to replace them almost every 2 years as the battery life has shortened considerably. How often do you take your charger out with you as well these days.

To avoid this, batteries will not let you drain it past a certain amount. Every battery manufacturer is different, but Puredrive have one of the best in the market at 90%, which means that for every 5kw of battery you have 4.5kw of usable stored power.



- **Where is the customer services team located when I need help**

- We find this a very common issue as a lot of the manufacturers still use overseas call centres and language barriers can cause an awful lot of frustrations.

Puredrive have their own dedicated in house team at their UK plant to help with all of your needs.

- **Is the battery compatible with my other products**

- In the majority of cases the answer is no as the software is only designed for 1 thing to store and discharge power to your home.

Puredrive have created a full suite of products to ensure software compatibility and enhance the full energy and financial savings that are to be achieved.