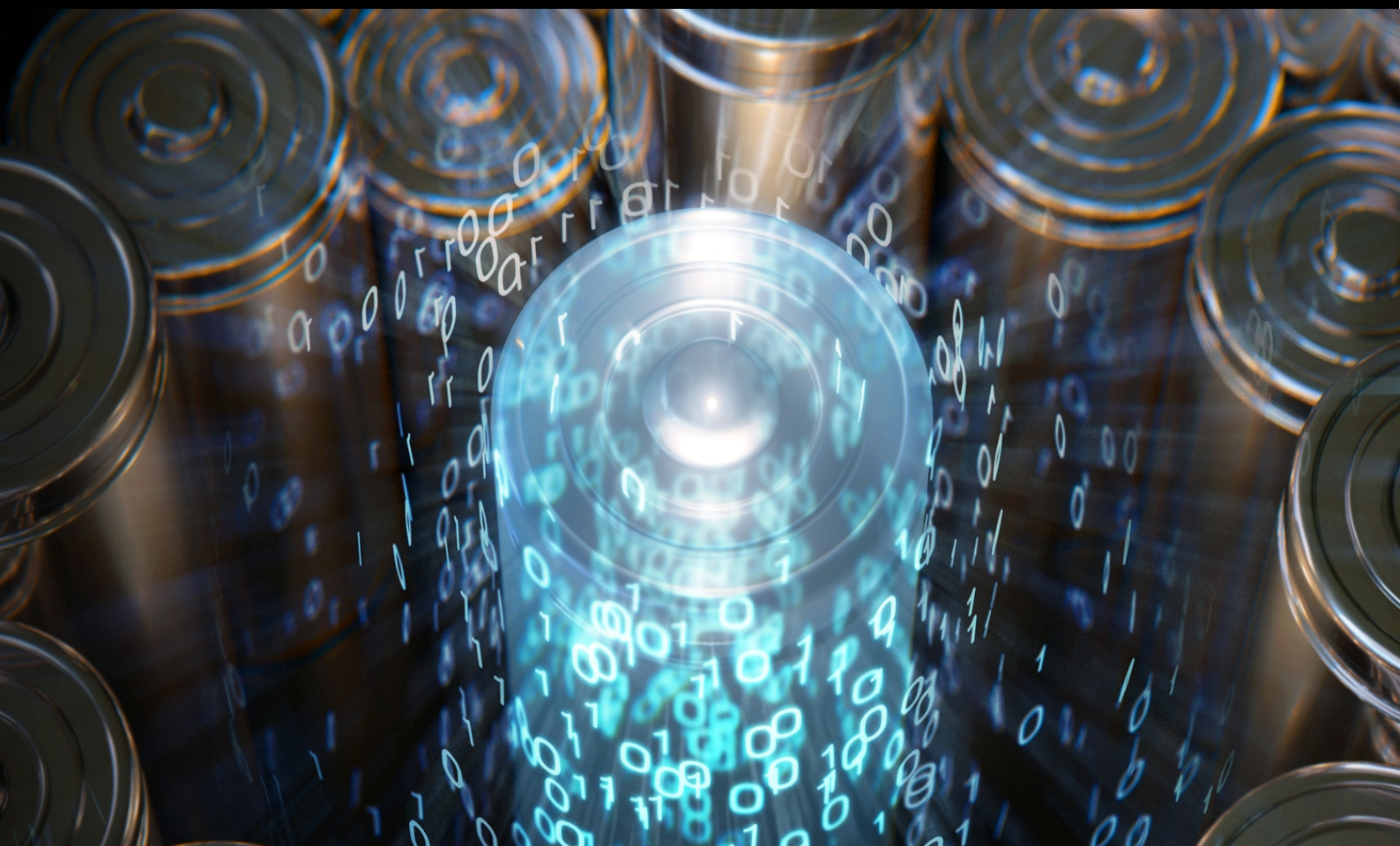




NEXT GEN E-RIDES

HOW TO ENSURE A LONG & HEALTHY BATTERY LIFE



www.nextgenerides.com.au

INTRODUCTION

Lithium-ion batteries are one of the main reasons why ebikes are now so mainstream. The lithium battery helped advance ebike technology by reducing the size and cost of batteries. By making ebikes that much more affordable and stylish the popularity increased year on year to the point where some 30 million ebike are manufactured in China every year!

We know that they are not the perfect solution as the mineral intense makeup of lithium, cobalt, nickel is not ideal and that the cost could still be lower, but they do have some major upsides. The batteries can operate in a variety of temperatures and can last a fair amount of time.

Many people are concerned about how long their lithium batteries should last, how they are best maintained, and when is the best time to charge your ebike. We will address all the questions and more so that you can get the most out of your ebike and when they do run out of juice, you'll know how to replace and recycle your used batteries.

So, let's dive in!

TOP 5 TIPS ON HOW TO CORRECTLY CHARGE YOUR BATTERY

1 FULLY CHARGE YOUR BATTERY BEFORE YOUR FIRST RIDE

It's hard not to just unwrap that ebike and hop on it and go for a ride but it's always recommended to fully charge your new ebike before taking it for a spin. There is a good reason for this as this initial charge ensures current is flowing through all battery cells and helps to condition the battery from the get-go. If you check your user manual it will almost certainly recommend this as well.



2

USE THE BATTERY CHARGER PROVIDED

This is a common mistake made by many owners. If you happen to misplace or lose your original battery charger don't buy an off-the-shelf replacement but instead buy a new one from the seller. Not only is it bad for your battery but in a worst-case scenario you could cause an explosion or fire with the wrong battery charger. Play it safe and stick to the original charger, it's not an expensive item and not worth the potential risks.

The wrong charger can cause an explosion or fire



3

CREATE A SAFE CHARGING STATION

In Australia lithium batteries are classified as dangerous goods. This is because there is a risk of fire with all lithium batteries. This is what is written on a typical warning label for transporting lithium batteries:



So, with that in mind it's key to designate a safe area to charge your battery. The best 2 options if you are charging in your home is in the centre of an empty garage floor or a sheltered area outside where any issues with a potential fire hazard is minimised.

Another key consideration is ensuring that the location is dry. If you are charging outside, ensure that it is shelter or there is zero chance of rain. It's best to charge at a time when you can switch off the charger once the battery is fully charged. We'll explain the reasons why later but suffice to say this is very important.

4

DON'T REGULARLY FULLY DISCHARGE YOUR BATTERY

Discharging your batteries down to 0% on a regular basis is harmful. This is purely because batteries don't have a charge memory.

The best approach is to do shorter discharges or battery use and equally shorter recharges. By taking this approach there is no additional stress placed on the battery and this will contribute to a longer battery life. The more regular you recharge your ebike the better. Aiming for a maximum of 50% usage of the battery power is a good rule of thumb.

It's ok if you do run down to 0% every now and then but it's best to avoid doing this as much as practically possible.

5

AVOID FAST CHARGING

Some suppliers provide a fast-charging option. This is simply due to additional heat that is generated when supercharging your battery. The additional heat can start to breakdown the battery cells which ultimately significantly reduce the battery life cycle. Most chargers don't have this functionality in any case, but if they do it's best to steer clear unless necessary.

The 4 pillars to improving your batteries lifecycle

PILLAR 1: TEMPERATURE

- 1 Minimise exposure to high temperatures in storage or use.
- 2 Minimise exposure to low temperatures, especially when charging.

PILLAR 2: CHARGE LEVELS

- 3 Minimise time spent at 100% charge
- 4 Minimise time spent at 0% charge

PILLAR 3: CURRENT

- 5 Avoid fast charging unless absolute necessary.
- 6 Avoid discharging devices more quickly than needed.

PILLAR 4: HAZARD

- 7 Avoid use or storage in high moisture settings.
- 8 Avoid mechanical damage, handle batteries with care.
- 9 Always follow the manufacturers instructions.

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WHEN IS THE RIGHT TIME TO REPLACE YOUR BATTERY?

Ideally you want to get around 1000 charges or more from your battery depending on the size, make and model. However, there are occasions when batteries may need to be replaced earlier. Here is a list of when your battery needs changing.

1 – End of lifecycle

This should be what you're aiming for. This is normally anywhere between 3-5 years for a decent lithium battery with regular usage that has been well maintained.

2 – Physical damage

This is obviously a less than ideal result but can occur because of dropping the battery if remotely charging it or because of road bumps, vibration or crashing your ebike. Usually, the battery becomes displaced which causes the cables to short out. If you notice any serious physical damage to your battery, you **MUST REPLACE IT IMMEDIATELY!**

3 – The battery no longer charges

This is like #1 and in short, the battery won't charge at all. None of the electrics will work either (lights, display) and it may be due to a dead battery. When the battery is in this state no amount of charging will make any difference. You can opt to get a professional to diagnose the problem or simply replace the battery.

4 – Reduced range and awful battery life

This is one of the most common complaints about batteries from riders of ebikes. When you change it in the circumstance will come down to how you use the bike and whether it starts diminishing from your enjoyment of riding. For most riders you will come to a point where it becomes too frustrating, and you know it's time to buy a new battery.

5 – Swollen battery

This is much harder to diagnose and may not appear obvious to the untrained eye. Swelling in batteries occurs due to incomplete chemical reactions that result in the creation of a gas.

The gas fills the battery and causes it to swell. Additionally, a battery can swell if its internal layers fail to properly separate chemicals and components. Leaving your ebike to operate with a swollen battery can cause serious harm. Replace your battery immediately it starts to swell.

6 – Hot battery

There can be several reasons for an excessively hot ebike battery but usually it's due to an external short circuit. If you store your battery near other metallic items, these items can act as a bridge between the positive and negative poles of the battery. If the battery is excessively hot it needs to be replaced urgently.

7 – Corrosion

Batteries that contain sulfuric acid release hydrogen gas. The gas then mixes with other elements around the battery leading to corrosion of battery terminals. Overcharging and undercharging could also lead to battery corrosion. You may need to thoroughly clean off the rust using a toothbrush and baking-soda solution. If this doesn't work, your battery may have outlived its purpose and may need to be changed. It's always advisable to leave any repairs of batteries to the professionals.

8 – Bad smelling battery

A battery may smell due to overcharging, freezing, or internal shorting.

The smell will resemble that of a rotten egg. It's a common occurrence for batteries that use a mixture of water and sulfuric acid. If not checked, the sulfuric acid could damage other parts of your electric bike. It sometimes produces smoke in severe cases. If it stinks change it.



IMPORTANT CONSIDERATIONS FOR CHANGING YOUR BATTERY

For many riders it'll be far easier to just contact the original seller and order a replacement battery. There are definite merits with this as you will have peace of mind that the battery will be compatible with your ebike. The downside with this is that you may want increased range or over time there may have been advancements in technology. It may even be that you weren't happy with the performance of the original battery. Here are some considerations should you want to go down this road.

1 - Know your battery specifications

It's very important that you first understand what type of battery you have (this will most probably be lithium-ion). If you're unsure how to determine this consult your user manual which should provide the detailed battery specifications.

2 – Battery size

Batteries come in an array of all shapes and sizes. You must know the exact size so that any replacement battery will fit on your ebike without the need of modifying. Once again, your user manual should provide this detail.

3 – Battery capacity

This will be expressed as Volts (usually 36 or 48V) and watt hours (Wh). The total battery capacity is calculated by multiplying these the volts x watt hours i.e., 48V 10Ah would be 480-watt hours capacity. This will help you to determine the likely range of the ebike. The higher this figure the further potential range the ebike will have.

4 – Age of replacement battery

Always check the date of the battery you are buying. As a rule of thumb, the battery should be less than 6 months old. You want the battery to be fresh and new and the older it is the more likely you are to have issues with it.





5 - The brand

The electric bike will have been set up for a particular brand of battery. It's best to stick with the same brand of battery for peace of mind. You can opt for a different battery supplier if you want but be sure to stay within the requirements and specifications set out in your user manual. If buying from a specialist ebike battery supplier, it would be best to discuss compatibility issues with them before making any purchase.

6 – Reserve capacity

The reserve capacity of a battery determines how long it can last at a particular current draw. A battery with a specification of 'RC @ 30A = 150 minutes' means that at 27°C, the battery supplies 30 amps of current for 150 minutes. The usable voltage normally considered for this measurement is 10.5 volts. Remember that the higher the current drawn, the lower the battery capacity will be.

7 - Battery style

The style of your battery will indicate how easily it will be to replace. If your ebike battery is integrated into the framework it will limit your replacement options. The more unique a battery style is the more likely the replacement price will be more. If you have a generic battery style that is mounted onto the frame it'll likely be cheaper and easier to replace.

8 - Battery quality

There are many battery manufactures in the market today. Some offer very affordable battery options on the surface. It's important however to do your research and determine if the battery will meet your needs. Low quality, cheap batteries will result in unreliable batteries that will have a far shorter lifespan than a higher quality battery that may cost more. You need to look at the costs over the life of a battery not just the upfront costs.

HOW TO INSTALL A REPLACEMENT BATTERY

Replacing your battery can be an easy job but it will depend on the ebike design. Not all things are made equal and some of the more integrated batteries can be difficult to replace. If you are at all uncertain about replacing the battery, take it to a professional. This could potentially save you time and money if you unknowingly damage the battery whilst installing.

If you have an easy to remove battery or are proficient then here is a typical process of changing a battery on an e-bike:

1. Unlock the battery kit. This could be done through a key or by unscrewing the bolts that hold the battery compartment together.
2. Unplug any wires that might be connected to the battery.
3. If the battery is held in place by clamps, loosen the clamps to release it.
4. Use your hand to support the battery as you carefully remove it from your bike.
5. Install the new battery and bolt it into place.
6. Ensure that all the clamps and anything else that was holding the old battery is safely reinstalled.
7. Reconnect all the wires and safely close the battery kit.

Note that some user manuals may provide detailed instruction. You could also contact the seller to provide this, or a retailer may include free battery install with your purchase. Again, don't be afraid to ask as you may be surprised that people are willing to help without charging you a thing.



BENEFITS OF CHANGING YOUR EBIKE BATTERY

Once you have replaced your old battery you should see several benefits. Some of the benefits are more obvious than others but in general you should see an improvement in your riding experience.

1. More power

A new battery provides more power to your electric bike. This is because it ignites the plug better and transmits electricity faster than an old battery. Most people will notice a sudden improvement after installing a new battery.

2. Better plug ignition

With a new battery, you get improved spark timing and better supply of power throughout the bike. This means that you will never experience any power delays as it sometimes is the case with old batteries.

3. Stable electrical supply

A new battery is less likely to experience minor issues that inhibit the smooth flow of electric current. Take for instance corrosion, internal shorting, and external shock. Unlike old batteries, new batteries are less susceptible to such problems.

4. Less rider stress

You're less likely to be worried about battery failure when using a new battery. One of the most important things to have while riding your ebike is some peace of mind. Unlike old batteries, new batteries are less likely to leave you stranded or inconvenienced.

5. Warranty

Buying a battery from an authorised shop means that you get to benefit from a warranty. Warranties promote quality and reliability. The longer the warranty, the higher the quality of the product bought. With a new battery, you get assurance that if it gets defective, the supplier will offer a solution for the defect.

6. An upgrade to newer technology

Battery manufacturers are continuously working to improve the performance of all types of batteries. For example, engineers are trying to build batteries that take less time to charge and provide power for longer periods. Replacing your battery means that you get to benefit from such innovations whenever they are available.

HOW AND WHERE TO RECYCLE YOUR USED EBIKE BATTERIES

When it comes to recycling of user ebike batteries the industry sadly has a long way to go. A lot of the issue stems from a lack of awareness. How do I recycle my batteries? Where do I recycle used lithium batteries? We will dive into those two questions and provide you with some helpful information to assist in helping the environment out a little when your battery finally ends its lifecycle.

HOW AND WHERE DO I RECYCLE MY BATTERIES

The first thing to note is that you must never use your local recycling or waste bins. Rechargeable batteries and lithium-ion batteries are hazardous and can product sparks potentially cause a fire in the truck or recycling centre. This includes laptops, mobile phones, power tools, and camera batteries.

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“You must never use your local recycling or waste bins. Rechargeable batteries and lithium-ion batteries are hazardous and can product sparks potentially cause a fire...”

There are 3 major outlets that you can recycle your used lithium batteries within Australia:

Battery World – Accept all battery types at all their retail outlets

Officeworks – Accept batteries at some of their stores, check prior to dropping off to confirm location and battery types accepted

Batteries 4 Planet Ark – For workplace or businesses you can order a safe and secure collection box with pick up service

You can also contact Envirostream who offer 3 different services for recycling your used batteries:

The infographic consists of three circular images arranged horizontally, connected by a dashed line. Each image is numbered in a green circle to its right. Below each image is a title, a short description, and a green button.

- 01 Collection units**: The image shows a green and black cardboard box with the text "Recycle your batteries here." and "Drop your batteries here." Below the title, it says "We provide collection units tailored to your needs and volume." The button is labeled "LEARN MORE".
- 02 Find a drop-off point**: The image shows a cardboard box with "Battery recycling drop off" and "Recycling your batteries here" printed on it, with several batteries and a red pen nearby. Below the title, it says "Dispose your batteries the right way." The button is labeled "FIND LOCATIONS".
- 03 Mailing options**: The image shows a cardboard box with a shipping label and a "Recycling your batteries here" sticker. Below the title, it says "For those unable to drop off spent batteries, Envirostream provides pre-paid collection boxes. Contact us with details of your needs and we'll send a collection box ASAP." The button is labeled "CONTACT US".

We all have a duty to do our part to reduce waste and increase the battery recycling rate. This can only happen by raising the awareness of the problem and changing our behaviours.