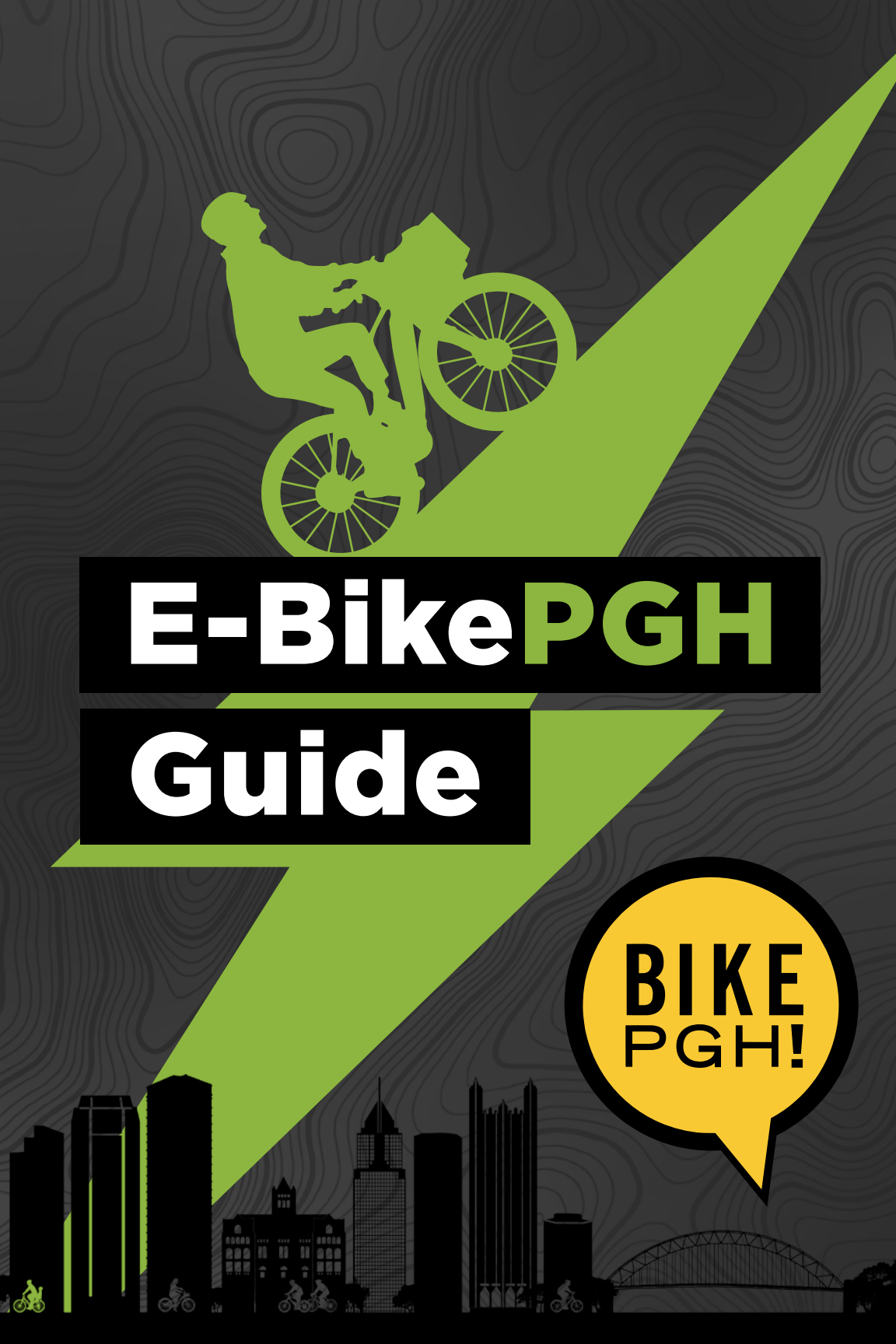
E-BikePGH
Guide
BIKE
PGH!

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Introduction:

For decades, bicycle advocates in Pittsburgh have striven to make our city safer and more accessible for everyone who bikes, but one particular challenge has kept many from enjoying bicycles as everyday transportation — our hills. Now, with the proliferation of electric-bike, or e-bike, technology, Pittsburgh's mountains are becoming molehills and riders can now commute further and faster with far less physical effort. What's more, the added power and cargo carrying capacity of e-bikes make them an economical, environmentally conscious, and fun alternative to individual car transportation.

When you ride an e-bike, you're riding with power, but as the saying goes, with great power comes great responsibility. Considering e-bikes' enhanced speed, potentially flammable lithium-ion batteries, and the changing legal landscape of the booming, under-regulated e-mobility market, there's a thicket of potential hazards to navigate.

Bike Pittsburgh authored this guide to help dispel confusion and empower readers with the knowledge to make informed, safe choices when purchasing, riding, and maintaining their e-bikes in order to have the safest and most rewarding experience possible. Read on and get rolling!

Reintroducing the Bicycle

Let's backpedal for a moment and cover some basics of the traditional bicycle we've all come to know and love. Modern bicycles tend to share these anatomical features:

ANATOMY OF A BIKE

Below is a diagram of a bicycle. You're not expected to know everything, but having some basic knowledge of parts can help make fixing things and identifying issues ahead of time much easier.

THE FRAME:

The bicycle's frame gives it structure and strength and informs how it operates. Frames may also be built for the rider to be in a reclining or recumbent position or with three or four wheels instead of two in the case of tricycles and quadracycles. All of the bicycle's component systems attach to the frame.

THE COCKPIT:

Where the rider interfaces with the bike is the cockpit. The cockpit consists of a saddle where the rider sits and a handlebar which steers the bike. Brake levers which control the bike's speed and shifters which change gears are also attached to the handlebars.

THE DRIVETRAIN:

The drivetrain propels the bike forward. It typically consists of a crankset connected to pedals which turn the rear wheel via a chain, belt, or shaft with chains being the most common. Drivetrains may be in single gear or multiple gear configurations. Different gear combinations (also called "speeds") affect how easy or difficult it is to pedal. High gears enable high speeds, low gears enable extra leverage for climbing steep grades or carrying additional weight. Shifters enable the rider to change gear combinations through components called derailleurs.

BRAKES:

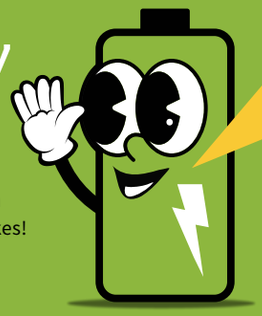
Brakes control the speed of the bike by grabbing a braking surface of a wheel with brake pads. Brakes most commonly come in the form of rim brakes, which grab the wheels' rims, and disc brakes, which grab discs also known as rotors attached to the wheel's hub. Disc brakes come in two main types: mechanical, which use an adjustable cable, and hydraulic, which uses pressurized fluid. Mechanical disc brakes may need regular readjustment to retain braking power.

THE WHEELS:

Wheels support your bike and enable it to roll down the road. The wheel typically consists of spokes which connect a hub to a rim. Between the rim and the road are rubber tires –typically inflated with air to cushion the ride and maintain traction. Bike tires are permeable meaning they will lose air pressure over time and need to be pumped up regularly. Different tire designs favor different types of terrain. Tires for hard and smooth surfaces tend to be smooth while tires for loose and rough surfaces have protruding knobs for grip.

MEET:
Battery Buddy!

Your source for expert tips and tricks as we learn more about E-Bikes!



SECURING WHEELS:

Many crashes happen because wheels are improperly secured to the bike. Make sure you know how to check your bike's wheel securing system. There are three main types:

- **Hub Nuts** are fastened onto the hub's axle with a wrench. Make sure to use a properly adjusted or correct sized wrench and tighten to the appropriate torque.

- **Quick Releases** allow the wheel to be installed and removed without tools. They consist of a skewer with a lever on one side that passes through the wheel's hub and clamps onto the bike's fork or frame with an adjustable nut. The adjustable nut must be tightened so that the lever tightens and properly fastens the wheel when it is in the closed position. **Never ride with an open, loose, or damaged Quick Release mechanism.**

- **Thru-axles:** These are hollow axles that slide into the hub's axle and thread into the bike's frame or fork. They may be tightened with a hexagonal allen key or lever (like a quick release.) **Make sure to tighten thru-axles per instructions and never use the wrong sized thru-axle for your bike's frame and fork.**

What is an E-Bike?

Now that we've reacquainted ourselves with the bicycle, what makes an e-bike an e-bike? Simply put, an e-bike is a bicycle with an electric motor, also called a drive unit, powered by a battery. In the United States, a legal e-bike **must have operable pedals,** meaning you can pedal it with or without any motor assistance, and a motor with no more than 750 watts of power. Different states have different legal definitions, but the industry consensus and at least 39 states recognize e-bikes as fitting into the following three classes:

CLASS 1:

A "Class 1 electric bicycle" is equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour.

CLASS 2:

A "Class 2 electric bicycle" is equipped with a motor that may be used exclusively to propel the bicycle and ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour.

CLASS 3:

A "Class 3 electric bicycle" is equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour. It is also equipped with a speedometer.

"E-MTB Identification Guide", International Mountain Bike Association

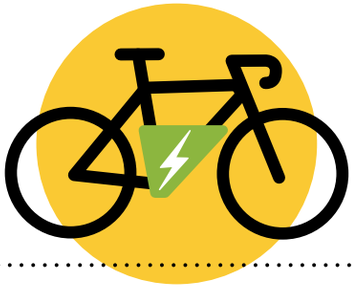
www.imba.com/sites/default/files/content/resources/2022-12/E-Bike%20Identification%20Guide.pdf

What is not an E-Bike?

Any vehicle that does **not** fit into the three class definitions may not be legally considered an e-bike. For example: vehicles without operable pedals (like scooters) or ones that can go above 28 mph under their own power without pedaling are not legally considered e-bikes and may be subject to different regulations.

E-Bike Class	Maximum Speed with Assistance	Can it be powered by throttle instead of pedaling?	Maximum Power	Does it have operable pedals?
1	20 mph	No	750 watts	Yes
2	20 mph	Yes	750 watts	Yes
3	28 mph	No	750 watts	Yes
Not legally an E-Bike	Greater than 28 mph	Yes	Greater than 750 watts	Yes or No

E-Bike Anatomy



These are the components that are particular to e-bikes. Without them, they'd just be conventional pedal bicycles.

- MOTOR
- BATTERY
- CONTROLLER
- THROTTLE

THE MOTOR:

There are four different types of motors, also known as drive units:

- **Front Hub:** Front hub motors are motors located in the hub of the front wheel. This system is most commonly used in conversion kits and allows the bike to be powered without pedaling.
- **Rear Hub:** Rear hub motors are motors located in the rear hub of the rear wheel. This system is commonly available on complete bikes sold as e-bikes. This motor often allows the bike to be throttled– or powered without pedaling.
- **Mid-Drive:** Mid-Drive motors are motors attached around the bottom bracket of the bike. This motor helps power the cranks and generally only applies power when the operator is pedaling. Mid-Drive motors are common on complete bikes sold as e-bikes and can also be used in conversion kits. Bikes with Mid-Drive motors typically do not have throttles.
- **Friction:** The simplest and least efficient of e-bike motors, friction motors turn a roller which contacts the front or rear tire adding extra propulsion. These are commonly found on inexpensive conversion kits.

BATTERY:

At the heart of an e-bike is the battery. Rechargeable lithium-ion batteries provide the efficient, long-lasting power that make modern e-bikes capable, safe, and reliable. E-bike batteries are typically detachable to allow for charging off the bike and replacement.

E-bike batteries come in a variety of types:

- **Frame Battery:** Battery mounts onto the bike frame

- **Integrated Battery:** Battery is integrated inside the bike frame

- **Rack Battery:** Battery attaches to the bicycle's cargo rack

- **Dual Battery:** Bike may have multiple batteries for additional range

High quality e-bike batteries have a Battery Management System (BMS) to prevent malfunctioning or overheating. **For this reason, only use batteries and chargers that are compatible with your e-bike's system. And never use a damaged battery or charger.** Contact the manufacturer or ask a local e-bike dealer if you have questions about replacing a battery or charger.

HOW MUCH POWER?

- Power, measured in Watts (W), is a measurement of how much energy can be delivered over time by an e-bike's motor. Regulations in the US limit the total power available to legal e-bikes to 750 watts. Some e-bike brands clearly label the power available to their motors while others do not. However, stated power can differ from how an e-bike feels and a test ride is often more useful than a physics lesson in knowing what kind of e-bike is right for you!

CONTROLLER:

Most e-bikes have controllers, also known as control units, that turn on and set the level of assistance. The levels of assistance may be referred to as modes and generally are in a scale of 0 through 4 or 5, or may also be labeled eco, touring, sport, or turbo. Some e-bikes do not have a controller, but offer a default, non-adjustable level of assistance.

THROTTLE:

A throttle is a device that allows the e-bike motor to be activated without pedaling. Throttles commonly come in a twist grip style. Because an e-bike with a throttle can be powered without pedaling, it can behave more like a moped or scooter.

TO THROTTLE OR NOT TO THROTTLE?

Class 1 and Class 3 e-bikes are pedal assist e-bikes also known as pedelecs. You must pedal to receive any assistance from the motor. The assistance cuts out at a certain speed based on the e-bike's class with Class 1 e-bikes limited to 20 mph and Class 3 e-bikes limited to 28 mph.

Class 2 e-bikes have a throttle which allows them to be powered without pedaling with throttle assistance cutting out at 20 mph. These e-bikes may be operated more like a moped or scooter.

Which option is best for you? That depends! Pedal Assist e-bikes have a more natural bike-like handling while throttled e-bikes have a rapid acceleration that can be helpful when starting from a stop, but can also feel more unwieldy when riding.

CONVERSION KITS:

Conversion kits allow a traditional bike to be converted into an e-bike by adding a motor (typically friction, front hub, or mid-drive), a battery, and a controller. Because of the added weight and speed of the electric motor, many traditional bikes are not safe to convert to e-bikes. Consult a local bike shop for advice on making a conversion.

The Types of E-Bikes

Whereas an e-bike's class refers to the level of and type of assistance provided by its motor and controller, its type refers to the overall design and intended usage of the bike. The four main types of e-bikes by their intended usage are: road/gravel or leisure, e-mountain bikes or e-mtbs, commuting or city e-bikes, and e-cargo bikes. Any of these types may be sold as Class 1, 2, or 3 e-bikes.

ROAD/GRAVEL AND LEISURE E-BIKES:

These e-bikes may come in the form of road, gravel (wider tires for rougher roads), or upright townie bikes.

E-MOUNTAIN BIKES:

E-Mountain bikes are primarily designed for riding off-road. They typically feature wide handlebars, powerful brakes, wide knobby tires, and suspension either in the front fork in the case of hardtails or within the frame itself in the case of full-suspension bikes.

COMMUTING OR CITY E-BIKES:

Perhaps the broadest category is the commuting or city e-bike. This can be any one of the aforementioned e-bikes which has been adapted for commuting with the addition of lights, racks, and/or fenders. It may also be specifically designed for commuting with these elements already integrated. Some city e-bikes also come in folding varieties for easy storage.

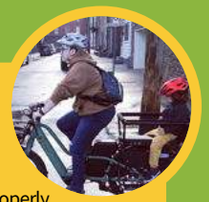
E-CARGO BIKES:

E-Cargo Bikes are similar to commuting or city e-bikes, but are designed specifically to carry additional cargo or passengers. Due to this capacity, the e-cargo style is greatly effective at replacing car trips to work, the grocery store, picking up kids from daycare, or even going on camping trips. They come in three main styles: compact cargo bikes, longtail cargo bikes, and box bikes.

Compact Cargo Bikes - Are closest in design to city and commuting e-bikes, but may have integrated front or rear racks designed for carrying additional weight in cargo or passengers.

Longtail Cargo Bikes - Have an extended frame allowing for additional cargo or passengers to be carried on the back of the bike. Special kits can be purchased to carry passengers (within certain weight limits) on the back of the bike.

Box Bikes - Or Bakfiets as they're known in The Netherlands, have a large cargo compartment or box on the front of the bike for carrying heavy cargo or passengers.



PRECIOUS CARGO When carrying passengers on your E-Cargo Bike, make sure to consult the manufacturer's instructions, obey weight and passenger capacity limits, and only use manufacturer-tested and approved passenger carrying equipment! Of course, make sure your bike is properly assembled and safety checked before riding with passengers, and follow all traffic laws.

Obtaining an E-Bike

Considering the added speed, power, and risk associated with e-bikes and their potentially flammable batteries (not to mention the often higher price tag), making an informed purchase decision is vital. We strongly recommend going to reputable bike shops that are e-bike dealers first and having a conversation with their staff about the e-bikes they sell and/or service, then go for a test ride!

THINGS TO CONSIDER WHEN SHOPPING FOR AN E-BIKE:

SAFETY & RELIABILITY

First and foremost, make sure you purchase a legally classified e-bike from a reputable brand. If the e-bike is not being classified as Class 1, 2, or 3, or is powered over 750 watts, it may not be a legal e-bike. Since an e-bike's lithium-ion batteries are potentially flammable,make sure the batteries and electrical system meet third party testing requirements from the Consumer Product Safety Commission (CPSC), and are certified to the UL 2849 Standard for Electrical Systems for E-bikes.

INTENDED USE

When choosing your e-bike, be sure to determine your needs and constraints. For example, will this bike be used for recreation, your commute to work, running errands, carrying cargo, or all of the above? For instance, if you're looking for a bike for commuting or running errands, you may want to purchase one that is easily compatible with a rack, fenders, and kickstand.

FIT & COMFORT

Once you've decided on the type of bike that's right for you, you need to find the right size for your personal height and weight. Some e-bikes are highly adjustable and can fit a wide range of rider heights whereas others are a more precise fit.

SERVICEABILITY

Like all bikes, your e-bike will need service. Some of the basic maintenance you can do yourself, but for warranty concerns and more complex repairs, you will need to make sure that a shop can service your bike. When buying an e-bike from a shop that is an authorized dealer, you can generally rely on them being able to service your bike and handle warranty issues. However, this may not be the case if you buy a bike online or used, so ask local bike shops if they can service such a bike before you buy. Lastly, when it comes to fixing flat tires, mid drive bikes will generally make it easier for you to remove wheels to fix flat tires, whereas hub drive wheels can be difficult to remove in that event.

WEIGHT

The motor, battery, and electronics will all make an e-bike heavier than a conventional bike, and a cargo bike built for heavy loads will be even heftier still. The motor tends to pull its own weight while riding it, but if you ever need to hand carry your bike up stairs or a ramp, the weight will quickly become apparent with many bikes weighing between 40 and 100 lbs. Take the bike's weight into consideration when making your purchase.

PORTABILITY

Some e-bikes, and particularly cargo bikes, can have longer wheelbases which makes them harder to store or to transport. Some e-bikes with tires wider than 3" may not fit in bus bike racks. If you anticipate needing to carry your bike up stairs, on a car, or on the bus rack, consider one that is light and small enough to meet your needs. You may also need a heavier duty rack to carry a heavier or longer e-bike on your car.

PRICE

Once you've narrowed down a bike by the above criteria, it's time to consider the price. Your budget is your budget, but don't be tempted to purchase at the lowest price point if the bike does not fit your particular needs. Bikes sold online at prices that seem too good to be true may fail in terms of safety and reliability, serviceability, and fit and comfort.

PURCHASING ONLINE

Although we believe buying an e-bike directly from shops that deal in them is the best option, several brands sell online, and these will need to be assembled. When buying online:

Research. Read reviews and ask a local shop their opinion. Ask an owner of a brand of e-bike for their experience.
Read the instructions. Make sure your bike is assembled safely and correctly. Incorrect assembly could result in a potentially fatal crash.
Ask a professional. Contact the manufacturer or bring it to a local bike shop for their professional help assembling and adjusting your bike.

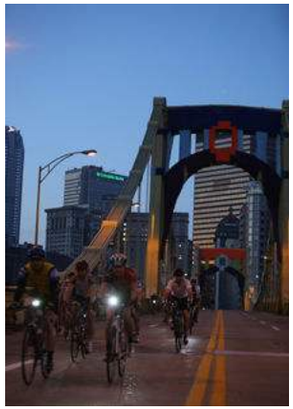
BUYER BEWARE

Because of the added expense and possible risks of e-bikes and their batteries, care should be taken to purchase only from a reputable dealer who can offer a warranty on the bike and its battery. If looking into used bikes, try to find certified resellers who can offer a warranty. Otherwise, you may be purchasing a defective product with little recourse if you need to replace expensive parts or batteries.

ELECTRIC BIKE SHARE

One great way to try a pedal assist e-bike is through POGOH, Pittsburgh's bike share system. **www.pogoh.com**

POGOH e-bikes provide a default nonadjustable level of assistance that can make riding around town easier and can even climb Pittsburgh's steepest hills! You can identify their e-bikes by the lightning bolt on the side!



Riding Your E-Bike Legally

A DEVELOPING LEGAL FRAMEWORK

Newly emerging e-mobility technology has created a legal grey area for e-bikes and other e-mobility devices on public roads, paths, and trails. It is vital to understand the legal requirements of your vehicle in your locality and to make sure that you are riding a legally conforming Class 1, 2, or 3 e-bike. Lastly, note that access rules between classes may also differ per locality with Class 1 e-bikes being allowed more broad access than Class 2 or Class 3 e-bikes.

LEGALLY RIDING YOUR E-BIKE ON THE ROAD

In Pennsylvania e-bikes are defined by law as:

"Pedalcycles with electric assist," so long as the e-bike's motor is under 750w, has a maximum speed of 20mph on a level surface when powered by the motor source only, weighs no more than 100 lbs. and has operable pedals.*

Pennsylvania law essentially treats users of legal e-bikes on roads the same as users of other pedalcycles (or bicycles.) For this reason, the regulations below are nearly identical to those for conventional bicycles.

*"Pennsylvania's E-Bike Laws" | peopleforbikes.org {https://wsd-pfb-sparkinfluence.s3.amazonaws.com/uploads/2020/01/E-Bike-Law-Handouts_PA_2020.pdf}

LICENSES AND HELMETS

Riders of e-bikes in Pennsylvania are not required to obtain a license or insurance to ride an e-bike or wear a helmet (although we strongly recommend them!), but **they must be at least sixteen years of age.**

NOT FOR KIDS!

According to PA law, **riders of e-bikes must be at least 16 years of age.** Because of the added speed, power, and weight of e-bikes, it is not only illegal, but unsafe to allow riders under the age of 16 to operate them.

LIGHTS & REFLECTORS

In Pennsylvania, riders of bicycles at night must have a front light and side and rear reflectors that are visible from at least 500 ft. Many e-bikes are equipped with integrated lights that are powered by the e-bike's battery, so no need to charge them separately.

RIGHTS AND RESPONSIBILITIES

On the road in Pennsylvania, riders of e-bikes have many of the same legal rights and responsibilities as riders of conventional bikes. These are:

- Obey stop signs, stop lights, posted speed limits, and all traffic controls.
- Bike riders must travel in the direction of traffic.
- Bike riders should travel in the rightmost lane that goes to their destination.
- Bike riders can exit the rightmost lane:
  - When overtaking a slower vehicle.
  - When making a left turn.
  - When moving around an obstruction
- Bike riders can ride on the shoulder in the same direction as traffic, but are not required to do so.
- Bike riders should not ride more than two abreast on the roadway.
- Motor vehicles must pass bicycles with at least 4 ft of space and only pass when it is safe to do so.
- Motor vehicle drivers and passengers shall not open their car doors until they know it is safe to do so.
- Bike riders should pass parked cars with sufficient space to avoid the 4 ft. "door zone."

"Bicycle Safety and Pennsylvania Laws." Pennsylvania Department of Transportation, https://www.penndot.pa.gov/TravelInPA/active-transportation/Pages/Bicycle-Safety-and-Pennsylvania-Laws.aspx

RIDING YOUR E-BIKE ON SIDEWALKS

Riding on sidewalks is generally allowed unless prohibited by local regulations, for instance, in business districts.

- Pedestrians have the right-of-way on sidewalks and bicycle paths. You must give an audible signal as you approach and pass a pedestrian.
- It is not a good idea to ride an e-bike on a sidewalk faster than people are walking. The added weight of the e-bike along with the speed differential between walkers and e-bike riders could result in injuries if there's a crash.
- Automobiles may not yield to bicycles being ridden across a crosswalk (at a trail crossing for example) as the bicycle is treated as a vehicle. A better choice is to dismount and walk your bike across.

You are not permitted to ride a bicycle on a sidewalk in a business district (except where permitted by official traffic control devices) or where there is a bicycle-only lane available.

"Bicycle Safety and Pennsylvania Laws." Pennsylvania Department of Transportation, https://www.penndot.pa.gov/TravelInPA/active-transportation/Pages/Bicycle-Safety-and-Pennsylvania-Laws.aspx

RIDING YOUR E-BIKE ON BIKE AND PEDESTRIAN PATHS AND TRAILS

Generally, e-bikes are permitted on paved bicycle-only trails. E-bikes can be fast, so be aware:

- Care should be taken to ride at the posted speed limit for the trail (generally 15 mph).
- Care should also be taken when overtaking slower trail users. Give an audible signal and pass with sufficient space.
- Slow down and wait to pass if there isn't enough space.

RIDING YOUR E-BIKE ON UNPAVED OR NATURAL SURFACE TRAILS

E-bike access on unpaved or natural surface trails can vary significantly by locale and access rules are constantly changing, so be mindful of local rules in the places where you ride.

- Care should be taken to ride at or below the posted speed limit for the trail (generally 15 mph).
- E-Bikes may not be allowed on trails designated as non-motorized only.
- Some trails may restrict e-bike access to Class 1 e-bikes only.

KNOW BEFORE YOU GO

E-bike access on trails can vary by locality. Know the rules of the trail system you want to ride before you take your e-bike with you!

https://elibrary.dcnr.pa.gov/GetDocument?docId=4865626&DocName=Biking_Rules_Fact_Sheet.pdf

Riding Your E-Bike Safely

USE AS INTENDED

Read your user's manual and understand the intended uses of your e-bike:

- Do not exceed your bike's weight limits for passengers and cargo.
- Do not use a bike in conditions it was not designed for i.e. using a road style e-bike on mountain bike trails.
- Never attempt to tamper with or modify an e-bike's battery, motor, or electrical system. This will void your warranty and can increase the likelihood of dangerous malfunctions.

DO THE ABC QUICK CHECK BEFORE EVERY RIDE!

A-Air Pressure:
Check your tires to make sure they are inflated to the proper pressure range (as labeled on the sidewall of the tire), and check for cuts or damage or debris stuck in your tires.

B-Brakes:
Squeeze your brake levers and check for a thumb-width gap between the lever and the handlebars. Brake levers should never touch handlebars when they are applied. Next rock the bike forward or backwards with the brakes applied. Neither wheel should be able to turn.

C-Chain:
Visually check chain for rust and damage and to see that it is lubricated. Lift your rear wheel off the ground and pedal forward to make sure the chain is able to turn the cogs of the rear wheel.

Quick:
Quick Releases must be properly adjusted and in the closed position with the lever facing inwards towards the bike. Ask a local shop if you have any questions about how to properly adjust and close your quick release mechanism.

Check:
Check the rest of your bike over. Make sure the handlebars are not loose by holding the front wheel between your knees and attempting to turn the handlebars. If they move, they will need to be properly tightened before riding.

BIKING 101 GUIDE!

For many more great riding tips check out BikePGH's original, Biking 101 Guide!

WEAR A HELMET

Although not required by law for riders of e-bikes over the age of 16, we strongly recommend wearing a helmet when riding an e-bike. The increased speed and power of e-bikes can increase the likelihood of high speed crashes, so wearing a properly fitting helmet for yourself and passengers is crucial.

PROPERLY FIT YOUR HELMET!

Follow this QR code for a quick guide to proper helmet fitting.

CONTROL YOUR SPEED

If riding your e-bike for the first time, practice on a safe, flat surface like a parking lot. Throttles can offer a high level of acceleration, so be careful and practice using your throttle gradually. Never throttle your bike when you are not sitting on it. When riding on trails or in traffic, follow the posted speed limit and ride at speeds suitable for the conditions.

RIDE AWARE

Be mindful of your surroundings and use caution. Other road users may have difficulty judging your speed and may attempt to turn or cut in front of you, especially when you're going uphill.

FASTER THAN YOU LOOK!

Be mindful that it can be hard to judge the speed of riders on e-bikes, especially when using a throttle, so ride defensively and don't expect other road users to appropriately yield to you.

BE CONSPICUOUS

Use front & rear lights at night - it's the law! Lights help in the rain, too. Wear bright / reflective clothing

BE PREPARED

Check the weather, dress accordingly. Use an Official Pittsburgh Bike Map to plan your route. Pack a multitool, pump, tire levers, spare tube, and anything you need to fix a flat. Bring a wrench if your e-bike has bolt-on wheels.

THE PITTSBURGH BIKE MAP

Find the best way around town with The Pittsburgh Bike Map!

ECONOMIZE YOUR POWER

Pedaling hard and fast on a high level of assist will quickly drain your battery. Ride on an easy gear with a smooth and quick rate of pedaling (or cadence) on a low to medium level of assist to get the most range. If you're traveling a long distance or have a heavy load, consider a multiple battery option.

RANGE ANXIETY?

Range is determined by battery capacity measured in Watt hours, but in practice also by factors such as the weight of the bike, rider, and cargo; how hilly the route is; and how efficiently its tires roll. Generally speaking, the harder you pedal and the more assistance you use from the motor, the shorter your range will be. If you are looking to maximize your range, consider using lower modes of assistance and lower gears on your bike which demand less power from the motor. ***Note:*** *sub-freezing temperatures can also decrease battery range.*

GEAR DOWN!

Pedal assist bikes can have a slight lag between when you start pedaling and when the assistance kicks in. This can be a problem when starting your bike from a stop, so try to anticipate your stops and shift your bike in an easy gear that way you can easily start up again!

Caring For Your E-Bike & Battery

E-BIKE

Your e-bike has largely the same maintenance requirements as a traditional bicycle, but with a few special considerations.

- Make sure your e-bike is properly assembled. Follow assembly instructions diligently or bring to a local bike shop for professional assistance.
- **Make sure your e-bike is properly adjusted and maintained.**
  - Because of e-bikes' additional weight and power, care must be taken to ensure brakes are properly adjusted and brake pads are in good condition to optimize stopping power.
  - E-bike motors can accelerate the wear on chains, so make sure to use e-bike specific chains and check for wear regularly.
  - Additional e-bike weight and speeds can accelerate tire wear, so make sure tires are properly inflated and in good condition.

MOTOR

- Read operator instructions thoroughly before use.
- Only use e-bike motors as directed in instructions.
- Do not attempt to modify the motor or speed management system.
- Bring your bike to a local dealer if there are any problems with the motor or if the controller display indicates any errors.

BATTERY

Read all operator instructions thoroughly before using and charging the battery. The below are guidelines, but follow your operators manual first!

- Only use the battery and charger that is compatible with your e-bike. Contact the manufacturer or ask a local bike shop if you're unsure.
- Make sure your battery is properly attached and locked to your frame before riding so that it does not fall off and become damaged.
- Do not use damaged, modified, or incompatible batteries. Ask your local bike shop if you need a replacement battery.

BATTERY (CONTD)

- Do not use a battery which is cracked, leaking, bulging, or otherwise showing signs of damage.
- Do not charge batteries unattended or continue charging them after charge is full.
- Do not cover the battery or charger with anything while charging.
- Ideally, charge batteries on a wire rack away from flammable material and near a working smoke detector and an ABC fire extinguisher.
- Store and charge batteries at room temperature.
- Store batteries between a 30% and 60% charge.

PREVENT BATTERY FIRES

E-bike fires have made national news, but e-bike batteries are safe if used properly. These fires are most likely to occur when the battery is being charged, so practice safe charging:

- Only use chargers that are compatible with your battery
- Never charge a damaged battery that is bulging or leaking
- Never leave your battery plugged into a charger unattended
- Never block hallways, doorways, or fire escapes with your e-bike or battery
- Keep a working ABC fire extinguisher and smoke detector near your charger

In order to ensure your battery is thoroughly tested and up to safety standards, look for batteries with the **UL 2849 certification**, the Standard for Electrical Systems for eBikes. This provides fire safety certification by examining the electrical drive train, battery, and charger system combinations in e-bikes.

CLEANING YOUR E-BIKE

Be careful to clean your e-bike without damaging its electronic system:

- Remove battery and controller before cleaning. If controller cannot be removed, cover with a plastic bag.
- Bike shampoos, diluted Simple Green, or even dish soap will work.
- Use a sponge or rag to clean the frame and components.
- Avoid high-powered solvents around motor and electronics.
- Do not use high pressure washers on your e-bike.
- Never apply lubricant to rotors or braking surfaces. Only use water or rubbing alcohol.
- Avoid getting battery contacts wet. Dry thoroughly before reinstalling the battery.
- After cleaning and drying, lubricate the chain with chain lube. Do not contaminate brake rotors or braking surfaces. Wipe off excess with rag.

STORING AND SECURING YOUR E-BIKE

Protect your investment! Your e-bike is a target for theft and its electrical system is susceptible to the elements.

- Store inside and under cover from precipitation whenever possible.
- Use a high quality lock when parking your e-bike and make sure the frame is locked to a fixed object, like a bike rack.
- Don't just lock your wheel(s) to a rack, your bike can be easily separated from them by a thief
- Remove your battery if your e-bike is parked for long periods of time, particularly in cold or wet weather.

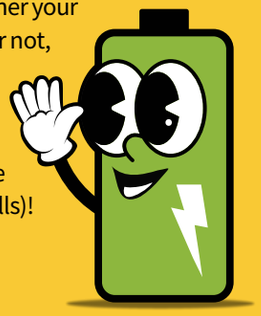
DISPOSE OF OLD BATTERIES PROPERLY

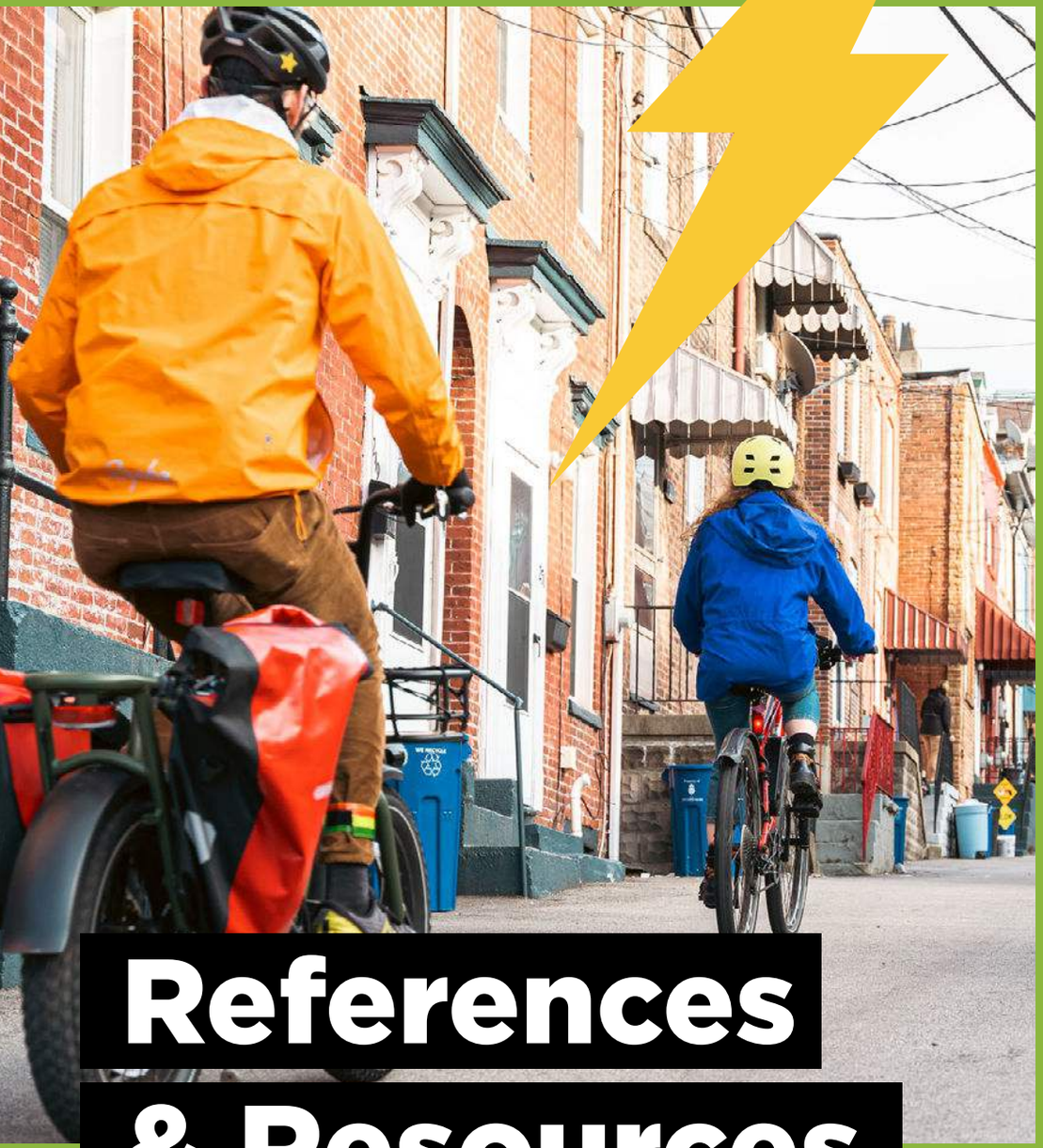
E-bike lithium-Ion batteries contain toxic and potentially flammable materials. For that reason, never dispose of an e-bike battery in the garbage or municipal recycling. Contact your e-bike dealer, loca lbike shop, or **Call2Recycle.org** to safely recycle a defective battery.

Conclusion

We hope this guide has helped to demystify the e-bike for you and has also demonstrated the great potential that this technology presents as a commuting gamechanger. So, should you make the leap to an e-bike? We think the technology is a great way to get back on a bike or even try it for the first time, particularly if Pittsburgh's strenuous topography has discouraged you from riding in the past. E-bikes can give you the power to top hills, slice through headwinds, keep up with faster riders, and better match the speed of road traffic.

With all that said, we don't think that speed alone is an e-bike's best asset, especially on bike and pedestrian trails where a conventional bike is typically fast enough on its own. Where e-bikes truly shine is in their ability to get more people riding, riding more often, and replacing single occupancy vehicle trips. For avid riders who commute by car, an e-bike or e-cargo bike may be the perfect tool to make bike commuting an option when it wasn't before. In fact, some cities are even offering subsidies to help people purchase e-bikes to replace car trips and that's something to advocate for nationally! We hope, after reading this guide, that you've found the answers to any questions you have about e-bikes. Down the road, whether your bike uses electricity or not, we hope you find the encouragement and the tools you need to bike more often in the city of bridges (and hills)!





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If you have any questions that we didn't cover in this guide, email us at ***info@bikepgh.org***

Legal disclaimer: This guide is for educational purposes only. All information has been written to the best of BikePGH's knowledge at the time of publication (2023), but may change at any time. Please review your local laws before riding, and use e-bikes at your own risk.

BIKE PGH!

ABOUT BIKEPGH

BikePGH is transforming our streets to make biking and walking commonplace for all Pittsburghers in order to improve our quality of life and reduce the harmful effects of car dependence in our communities. We believe that people need realistic options in order to change their transportation habits away from single occupancy car trips and toward biking, walking, and transit. Get involved at bikepgh.org.

ARE YOU A BIKEPGH MEMBER?

Members are the backbone of our work. Your membership strengthens BikePGH's collective call for safer streets. Joining makes you part of a community committed to safer streets for all of our neighbors, plus, you'll enjoy discounts at local bike shops and bike-friendly businesses!

Join us today: bikepgh.org/membership