Electric Bike Buyer's Guide

First, What Is An E-bike?

An electric bicycle is a regular bicycle that has been designed to incorporate a motor, rechargeable battery, and controls. The rider can rely on pedal power, battery power or a combination of the two, depending on leg tiredness, a headwind, hill grade, or just mood.

How Would I Go About Choosing An E-bike?

It all boils down to the style or type of e-bike that suits your purpose, how far you want to ride it, and what kind of performance you want out of it.

There is actually an e-bike designed for pretty much any purpose or combination of purposes you might have mind. For example you might want to:

- Find a low cost, fun and sweat-free way of commuting or running errands
- Engage in low impact, low intensity exercise
- Rediscover road or mountain biking abandoned for reasons of health or age
- Enjoy quiet and convenient access to camping and hunting areas

Pro Tip: Always shop for an e-bike with your purpose in mind.

Where We Come In

Our purpose here is to offer as briefly as possible sufficient information for someone new to e-bikes to make a sound and informed buying decision. As you scan through this material, your main consideration should be what you would use your e-bike for.

It is a fact that brick and mortar bike shops are in decline as more and more people make their purchases online. Furthemore, many brick and mortar bike shops are reluctant to stock e-bikes for fear of alienating their “purist” cycling clientele, who turn up their noses at e-bikes because “It’s cheating, you know.” While we think that snobby attitude is plain silly, it is nonetheless real.

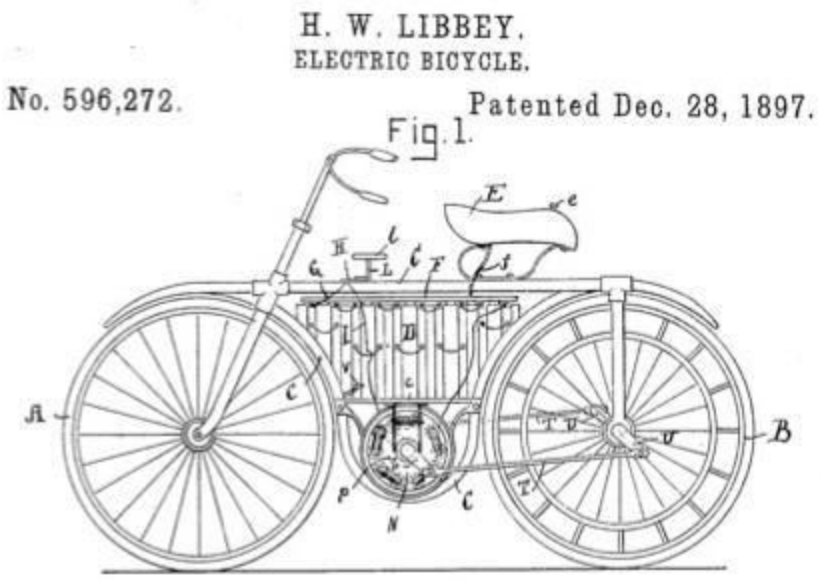
In addition, even if you can find a convenient brick and mortar e-bike store, it is unlikely to stock the range and variety of product that we offer online.

While a regular bicycle is well understood by pretty much everybody, it falls to the specialist online e-bike retailers to provide their customers with the necessary education and support in the relatively new world of electric bikes.

For our part, the absolutely most important thing is that our buyers make the right buying decision and are totally ecstatic about it once they are enjoying their purchase.

Some Historical Context

The e-bike is not a new idea. The first patent for an electric bicycle was issued in the late 1890s but the then state of technology (heavy batteries, motors, and frames) made the concept impractical.


H. W. LIBBEY.
ELECTRIC BICYCLE.
No. 596,272. Patented Dec. 28, 1897.
Fig. 1.

However revolutions in materials and battery technology since then has made the electric bicycle mainstream, especially in China (where most e-bikes are made) and Europe. The United States is a late adopter but electric bike ownership in the US is beginning to really take off.

Advances in battery technology brought us the relatively lightweight lithium ion battery now used in most e-bikes. Plus advances in material technology have enabled a rethink of bicycle frame design.

For example, bicycles were originally designed with top crossbars because they added necessary strength to the frame. This is because materials used 'way back then' were significantly weaker and/or heavier than are used now. Also, the first bicycle riders were men, hence the association of men's bikes with crossbars. However, when women took to riding bicycles at a time when women all wore skirts, the step through bicycle frame came into being in order to preserve modesty and decorum. Besides, since women are lighter than men, material strength was not so much of an issue.

However now, in the 21st century, material strength and weight is no longer a significant concern, except on the highest end performance bikes, where every ounce counts. Hence the greater acceptance and use of the step through frame bike as merely unisex.

Why an Electric Bike?

It's fun and it's good for you

E-bikes help people, generally seniors, who used to ride bikes get back into riding again. They used to enjoy the health and spiritual benefits of pedaling through the great outdoors but age and/or physical issues caught up with them and put an end to it. But now e-bikes are putting these seniors back on the road.

And it is not just seniors. More and more younger people, who until now may have been intimidated by the sight of mobs of athletic, crouched, spandex clad fanatics furiously pedaling through the neighborhood, are now intrigued by the alternative idea of an electric bike.

It's practical and makes environmental and economic sense

According to AAA (in September 2018), the average cost of driving a new car, based on driving 15,000 miles is $8,849 per year or $706 per month or 56 cents per mile. And the average car costs $35,000 compared to a very decent e-bike at $1,500.

According to the California Air Resources Board, more than half of commute trips, and three out of four shopping trips, are under five miles in length -- ideal for bicycling. In fact, forty percent of all trips are under two miles.This was from a National Personal Transportation Survey data done in 1990 but there is no reason to think it has changed.

Against this, consider that an e-bike does not need a license, or registration, or insurance. Plus parking is free and commuting is made easy because traffic problems almost disappear. A commuting rider can power past stalled traffic and if necessary dismount and walk around it. Besides, aside from commuting to work, you can put a basket on your e-bike and mosey down to the local supermarket with it.

And each battery charge costs only about 10 cents. Say that you get 25 miles out of a single charge, this gives you a cost per mile of around 4 cents. That is around 7% of the cost per mile of a car! Plus you are running your errand, having fun and getting some exercise all at the same time.

Types of Electric Bike

Drive Modes: Pedal Assist & Throttle

Pedal assist e-bike systems have a torque sensor that detects your pedaling and kicks in with assistance automatically. They provide a more natural bike riding experience than a throttle system. Pedal assist is good for a relaxed ride, which you can enjoy without having to hold the throttle in place. You just set the power level from low to high and the e-bike will provide power in proportion to your pedaling.

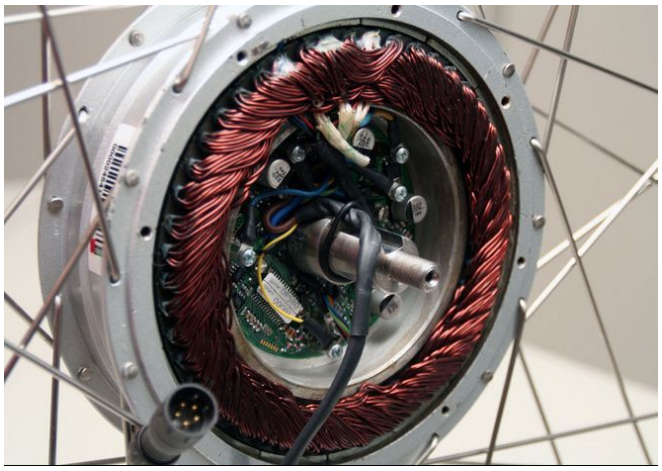
A twist throttle, just like the twist throttle on a motorcycle, will provide power on demand without the need to pedal. They are helpful for getting started from a standstill or giving a quick burst of power going up a hill. Some e-bikes are equipped with a thumb operated throttle.

Many e-bikes are equipped with both throttle and pedal assist modes. All e-bikes can be

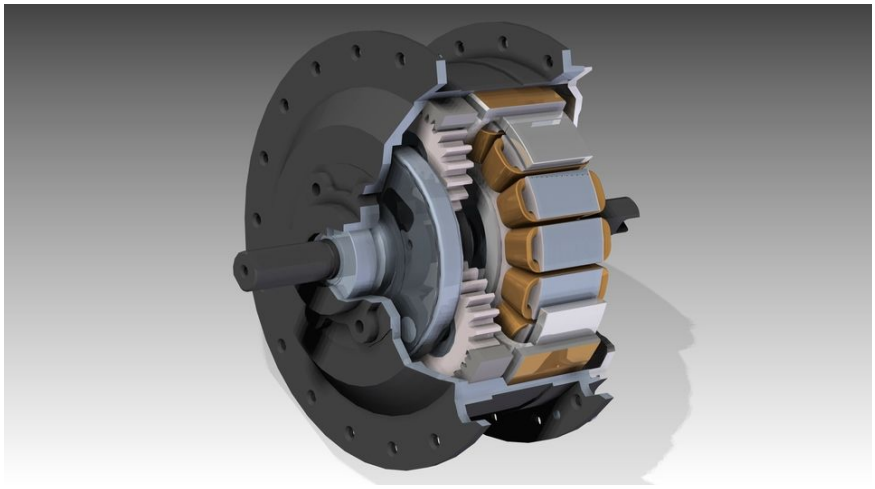
HUB Motors

Most e-bikes in America have hub motors. There are two types (gearless and geared) and which one is best depends on the rider's need:

Gearless HUB (direct drive): These are more durable, faster and quieter. On the other hand they drag when pedaled, have less range and are larger and heavier. They are better for regular commutes, most (not too steep) hills, general transportation, exercise and overall fun.



Geared HUB: These contain planetary gears and are smaller, lighter, and provide more torque and less drag when pedaled. On the other hand, they are less durable, noisier, and have a lower top speed. They are best for steep hills and heavy loads.



Mid Drive Motors

Mid drive motors are located at the pedals and are best suited to the more seasoned cyclist who is comfortable with frequent gear changing. They also require additional maintenance because of the added wear on the drive train. They are also considerably more expensive than the hub drive.

All About Batteries and Power

The Language

There is no need delve deep into electrical jargon. We can handle the basics of e-bike batteries and power with a refresher in high school physics.

Power is measured in Watts. The formula is Volts x Amps = Watts

An ampere (Amp) is a unit of measure of the rate of electron flow or current in an electrical conductor.

A Volt is a measure of the force propelling the electron.

An ampere hour (Ah, or amp hour) is the amount of energy stored in a battery that will allow one Amp of current to flow for one hour.

A Watt-Hour is a measure of the total amount of energy stored in a battery. The formula is Volts x Amp-Hours = Watt-Hours. This is important for e-bike shopping and we'll come back to it.

Battery Type

All the e-bikes we represent have modern lithium ion batteries. Older e-bikes use sealed lead-acid batteries (SLAs), the type typically used to start cars. While SLAs are quite cheap, they are very heavy and slow to recharge. A 6 lb lithium ion battery pack will take you as far as a 30 lb lead acid battery of equal voltage.

The battery comprises multiple cells connected together in a case that comes in many configurations, mainly dependent on how the battery is to be mounted.

Battery Placement

You will usually see e-bikes with batteries mounted either under the rear cargo rack or on one of the chassis tubes. For everyday riding or commuting, the rack-mounted battery is fine but the cycle purist, especially the off-roader, will prefer the tube-mounted battery for more even weight distribution and a lower center of gravity.

How far can I go on a single charge?

The simple but flip answer is: “Probably farther than you want to ride before your rear end complains.” The accurate but annoying answer is: “It all depends on the variables of rider weight, bike weight, tire pressure and type, terrain, weather, speed, age of the battery, how much you peda, and how hard you gun the machine.”

This brings us to an explanation of how batteries are sized so that you have an idea of what range to expect when shopping for an e-bike.

A battery’s size, that is the amount of energy stored in the battery, is measured in watt-hours. All batteries have a voltage rating and an amp-hour rating. You multiply the two together to arrive at watt-hours.

Watt-Hours is an objective measurement of the amount of energy stored in any battery. It is also the measure you should use when comparison shopping for e-bikes and comparing their respective batteries. Always use this measure as a cross-check against an advertised estimated range. There are no international standards for calculating and advertising e-bike range.

So, when comparing e-bike batteries, remember the formula: Volts x Amp-Hours = Watt-Hours

A rough rule of thumb is that you can expect to use from 12 to 24 watt-hours per mile. Granted, this is a very wide range but remember all the variables we talked about above.

But also remember that because two bikes have the same watt-hours, they do not necessarily perform the same. For example, Susie's e-bike has a 24 volt / 20ah battery and Jenny's e-bike has a 48 volt / 10ah battery. Both e-bikes have 480 watt-hours of energy and the same theoretical range. However, Jenny's e-bike has more power (volts) and if Jenny over-guns her e-bike, she will use more energy and not get as far as Susie.

Below we have set out a tabulation of approximate e-bike range estimates based on our 12 to 24 watt-hours per mile rule of thumb.

Volts	Amp-Hours	Watt-Hours	Range (24 watt-hours /mile)	Range (12 watt-hours /mile)
24	10	240	10	20
24	13	312	13	26
24	20	480	20	40
36	10	360	15	30
36	11	396	16.5	33
36	13	468	19.5	39
36	15	540	22.5	45
48	10	480	20	40
48	13	624	26	52
48	14	672	28	56
48	15	720	30	60
48	17	816	34	68

Batteries, Range, Weight and Cost

There are always trade-offs. In comparing one e-bike to another, remember that the greater the watt-hours, the longer the range, the heavier the bike, and the greater the cost.

Batteries, Power and Performance

E-bike batteries generally come in 24, 36, 48, and 72 volts. The higher the voltage rating, the more power the battery is able to deliver and the better the acceleration and hill climbing ability. Typical e-bike battery voltage is 36v with some at 24v and 48v. A 72v battery can deliver so much power that it will likely take the e-bike outside the official on-road bicycle classification. Besides, 72 volts can actually be an electric shock hazard.

In the United States, if the power or top speed of an e-bike is more than 750 Watts or 20 mph, it is not road-legal and is classified as a motorcycle with the attendant requirements of registration, insurance, and license plate. This is a highly specialized area of the e-bike world that we don't cover.

So Which Battery is Right for Me?

Just in case your eyes glazed over reading our explanation of batteries, here is rough but to the point guide to the right battery for you:

For most affordability but still a decent 15 - 30 mile estimated range a 36 volt / 10AH battery should be fine.

For a longer 22 - 45 mile estimated range or if you don't intend to pedal much, go with a 36 volt / 15AH battery

For a rider weighing more than 200 lbs or if you expect to deal with steep hills or head winds, go with a more powerful 48 volt / 10AH battery with an estimated range of 20 - 40 miles.

For best all round performance in both power and range, go with a 48 volt / 15AH battery with an estimated range of 30 - 60 miles.

The Controller

The e-bike's electronic controller limits the maximum power output of the battery and therefore the maximum speed of the bike. To keep them street-legal, most e-bikes

manufactured for the US market will have have a maximum 750 watt motor and come equipped with a controller limiting their speed to 20 mph.

So, how much power do I need in my e-bike?
This all depends on what you want to use your e-bike for. It also depends on your weight, the terrain you expect to encounter, and how sporty a performance you want out of your e-bike. The higher the rating of watts and volts for the e-bike, the greater the torque and acceleration it will deliver.

Pottering around: If you just want to tool around the neighborhood and get some low impact exercise, power does not matter so much and a 24v/250 watt setup should be adequate, although barely. If you are on the heavy side (over 200 pounds), you should increase the voltage/wattage.

Commuting: Here range is probably the main consideration and you should consider at least 36v/350 watts. Of course, 48 volts would give you better acceleration and agility in traffic.

Cargo: Carrying kids or pulling a trailer requires more power and probably three wheels.

Off-road: All limits are off. Get as much power (volts) and distance (watt-hours) as you can afford.

Consoles

The console is generally mounted on the handlebar and provides information on the e-bike's performance. On basic bikes this may simply be a battery charge indicator. On more advanced bikes the console may include an LCD display with speedometer, odometer, output indicator and energy meter.

Integrated Rack

If your intention is to commute or haul any kind of load, it is best to choose an e-bike with an already integrated stock rack. These are fitted to the bike by the manufacturer and will not interfere with the motor or wheels, which is a risk if you try to attach a rack found elsewhere as an afterthought.

E-Bike Styles

This is where we concentrate our thinking on what we want our e-bike for. You will readily see that the styles listed here are not mutually exclusive. For example, there are folding versions of commuter e-bikes. However, the objective here is to lay out the available variations of e-bike and juxtapose them with rider needs and characteristics.

Once you have decided on the type of e-bike that suits your purpose, you don't need to overly concerned as to whether you have the right battery/motor combination, since the manufacturer already has this figured out. Just be generally aware that the more volts and watts the e-bike has, the more power and pep. Also, the more watt-hours, the greater the range. Please see our explanation above.

Commuter E-Bikes

Commuter e-bikes are designed for going to work, school or just around town without breaking a sweat. They are for riders who would pedal a conventional bike, say, 20 miles to work and back every day and then ride for fun at the weekend. All this pedaling is not only exhausting, it just gets you to work in a muck sweat. But with an e-bike the ride is simply fun and sweat-free.

So now, people who would never have dreamt of biking to work, except in a nightmare, can seriously consider it.

Commuter e-bikes are also known as hybrid e-bikes because they have the wheels of a road bike (small to thin tires) and the handlebars of a mountain bike. This combination makes for good riding comfort and maneuverability.

Cruiser E-Bikes

Cruiser e-bikes (also known as beach cruisers) are similar to the commuter (or hybrid) e-bike but are a little more rugged and comfort-enhanced for a cushy ride. They have wide extra padded soft seats, thicker tires, and offer a more comfortable upright riding position. Some come with baskets or racks to help carry belongings.

Cruiser e-bikes are fine for errands downtown, relaxed leisure time riding, and tooling around the neighborhood. They will also handle sand and snow.

The commuter e-bike is designed for the mission of getting you where you need to go, whereas the cruiser e-bike is designed just for fun.

Comfort E-Bikes

These are similar to cruisers but ergonomically designed for people who find it difficult to lift their knees very high or have bad backs. A comfort e-bike has a seat that sits further back and a pedal position that is higher. Some even have back rests.

Fat Tire E-Bikes

The Fat Tire e-bike is the bicycle world's answer to the dune buggy. These are literally go-anywhere all terrain e-bikes. They will handle anything from city streets, to sandy beaches, to deserts and snow trails, and the great outdoors generally.

The principal distinguishing feature of the fat tire e-bike from other e-bikes is the tire itself, which is generally around 4 inches wide. This is what prevents it sinking into sand and snow and gives it great traction. It is also great for feeling confident in higher speed turns on regular road surfaces. Fat tire e-bikes also generally have sturdier frames.

In addition, a frequently overlooked benefit of the fat tire, certainly in a commuter or cruiser bike, is that it can obviate the need for front and rear suspension. This is because the tires themselves provide a great cushioned ride.

Folding E-Bikes

There is s folding version of every type or style of e-bike. So now you have personal transportation in an e-bike that you can take anywhere and keep anywhere you have limited space.

Live in an apartment? Got a boat? Got an RV? Got a plane? Then a folding e-bike is the perfect e-bike for you. Most folding e-bikes fit easily into a car trunk or closet.

Mountain E-Bikes

Also known as e-MTBs, mountain e-bikes are ruggedly designed for the punishment of outdoor adventures. However, most of them are limited to a street legal 20 mph. So

aside from being able to handle the rigors of the trail, the e-MTB remains a go anywhere e-bike.

A full suspension e-MTB has both a suspension fork in front and a rear shock. A hardtail e-MTB has no rear shock and is lighter and less expensive. Needless to say, it is also less comfortable.

Step Through E-Bikes

The step through e-bike is all to do with the design of the frame of the e-bike. It eliminates the upper crossbar.

The step through frame is especially beneficial for comfort, convenience and ease of use. It is great for Baby Boomer and Gen X riders and anyone with lower limb mobility issues. It is also well suited for delivery bicycles or trips with frequent stops.

The step through is also inherently safer than a crossbar bike because a rider who loses balance can simply step through the bicycle frame without getting tangled up in it.

A variety of e-bike styles come with step through frames, including cruisers, mountain bikes, fat bikes and folding bikes.

Step Over E-Bikes

The step over or crossbar design is structurally stronger and therefore lighter than a step through. This can matter a great deal in the world of regular or performance pedal-only road bikes, where ounces count. But in the e-bike world it is really a matter of style and personal preference.

The step over is traditionally associated with male riders but the unisex step through e-bike has gained and deserves acceptance among male Baby Boomer and Gen X riders.

E-Trikes

The three wheels of the trike bring obvious stability to the biking experience with battery power providing a pedaling boost. The riding position is upright or recumbent.

E-trikes come in many configurations. Some are simply for those desiring the biking experience but who have issues with balance. Others are designed for utility and cargo carrying capacity.

Electric Mobility Scooters

An electric mobility scooter is basically a plug-in rechargeable chair on 3 or 4 wheels. It is designed to help disabled or frail people get around, whether in their own homes, out shopping or travelling about the neighborhood. It does not require the rider to pedal.

When choosing a mobility scooter, consider these qualifiers:

1: Will you use the scooter indoors, outdoors or both?
2: Will you store the scooter indoors, in a garage, or outside?
3: Do you intend to travel with the scooter in a car or other vehicle?

The mobility scooters offered here fill at least one of these criteria.

Hunting E-Bikes

Hunting e-bikes are a variant of the Fat Tire e-bike. Although known as hunting e-bikes, they are also perfect for camping, fishing, or deep trail riding. All outdoors people are in tune with the environment and welcome this quiet, unobtrusive and sustainable means of convenient access to the wilderness.

Hunting e-bikes are generally designed for off-road use but, provided they do not exceed street-legal e-bike requirements (750 Watts or 20 mph), they can also be used around town.

Bike Trailers
Enhance your adventures with one of our bike trailers. Whether hunting, fishing, bikepacking, commuting, traveling, or any other type of adventure, you are sure to love the possibilities that adding a trailer can bring.

E-Bikes for Seniors
The electric bicycle is the perfect vehicle for seniors to help them on their journey to getting in shape and keeping fit, mobile, out and about, and socially engaged, especially with their children and grandchildren. The e-bike makes a family ride together a real possibility across all generations.

An important side benefit of riding an e-bike is that it also helps maintain a sense of balance. As seniors get older they are more prone to injury from falling. Riding any bike is a constant exercise of the sense of balance and helps seniors reduce the risk of injury from falls during other daily activities.

E-Bikes for Kids
We are a little ambivalent about including e-bikes for kids in our lineup, as we are a bit old school and believe that pedaling hard is good for the kid. However, neither are we spoilsports. E-bikes for kids are just plain fun! Also, in the same way as an e-bike helps the old legs of senior members keep up on a long family bike ride, the same can be said for the little legs of junior members. Besides, the fun kids have on their e-bikes is incentive for reduced screen time.

E-Bike Sizes: Men's vs Women's
Sizing an e-bike is not at all the same as sizing a conventional bike or race bike. Considerations for a conventional bike include leg power, a forward riding position and light weight. This is all to maximise physical riding and pedaling power and efficiency.

None of this is a consideration for an e-bike, where comfort is king and we are more concerned with getting on and off the e-bike easily, having a preferred handlebar position (upright or forward), and a lower seat for less leg strain.

Virtually all e-bikes are unisex or gender neutral and generally come in one size. However, in the industry, a step though (or low step) bike is thought of as a model that women prefer, since it makes getting on and off the bike easier. And, traditionally, a man's e-bike will be a step-over model with a high (standard) center bar.

However, the e-bike revolution has tossed tradition and a high crossbar or step-through is now a matter of personal preference. Seniors, people with mobility issues and people (such as those making deliveries), constantly hopping on and off, will generally prefer a step-through frame, regardless of gender.

Size differences as between men and women are handled by adjusting saddle height and sometimes handlebar height.

Cost

There is a wide price range in the e-bike market. This depends on many factors, including the quality of component parts, size and type of motor, size and type of battery, manufacturer, and other factors. A starter e-bike might run you around $700. A mid-range e-bike (where there is best value for money) is between $1,000 and $2,000, Very high performance is found at $3,000 and above.

Regardless of cost, we at ElectricBikesForAll offer financing, fast and free shipping, and a price match guarantee on all the e-bikes in our catalog plus a risk free purchase. So you can shop with us with confidence.

Plus you can contact our customer support team for help picking out your perfect e-bike. We look forward to working with you as you start out on your e-bike adventure.

The Upside and Downside of E-Bike Ownership

Upside

- Although not cheap, owning an e-bike is definitely inexpensive compared to owning a car
- It is an excellent mode of personal transportation, especially for short distance commuting
- It helps you keep fit while enjoying the outdoors
- No licence required
- It comes in configurations to suit different purposes

Downside

- Expensive initial investment
- An e-bike is heavier than a regular bike
- It has rather complex parts requiring greater maintenance than a regular bike

The Verdict

Based on the rapidly increasing numbers of happy e-bike owners in the USA, the jury has found that the e-bike is simply a Transport of Delight!