



E-BIKE BASICS

Decision Time Input

Abstract

The things to consider before purchasing an e -bike

Introduction

This document is intended to help guide those who are considering purchasing an e-bike.

The document asks the consumer what the intended use of the bike is: road, trail, gravel, or mountain and follows this with descriptions of the frame types, drive trains and wheel/tire/suspension choices to meet the consumer's needs.

Then it describes some practical issues outside of the bike itself.

The document takes advantage of the author's knowledge and the acquired experience of the members of the Probus Blue Mountain Cycling group.

Quick Do's and Don'ts

Do not buy a cheap, obscure branded e-bike from Amazon or Alibaba.

Many of these bikes do not have UL certified batteries and chargers and they are often a fire hazard. You can read many stories in the press about e-bike fires. Ensure you get a bike from a main brand that can assure you its batteries, chargers and motors meet and are certified to the UL (or EU or Canadian equivalent) standard.

Do ensure you can have your bike serviced locally.

E-bikes require service and maintenance so make sure you can get you bike maintained locally because, if you buy online and can't get the bike serviced locally, you may end up with an unusable bike. Bikes bought on-line often need adjustments, etc., when delivered and, of course, this will need to be done locally. Also, unless you have previous experience, you want to be able to see the bike and take a test ride.

Considerations to start narrowing down your choice.

1. **Where do you intend to ride:** road, trail (Georgian Trail as example), gravel (Old mail Road as example), or mountain (3 Stages as example) or a combination of road, trail and 'light gravel? Most e-bikes fall into the latter category.
2. **A step thru or top tub (step over) frame;** step thru frames make getting on and off the bike easier, HOWEVER, when selecting a step thru make sure there is plenty of room to lift your foot thru as some do not.
3. **Drop bar or Flat bar.** Select a bike with the position that is most comfortable to you. Bikes come in different configurations, from road style (drop bars) to commuter style (similar to a road bike, but configured with a flat bar), dual purpose (slightly more relaxed than a commuter) and usually with front suspension, cruiser (very up right like a Dutch bike). There are various categories of hard tail and full suspension mountain bikes. Later in the document examples of the types are highlighted with attention focused on road, commuter and hybrid.

4. **How far** do you intend to ride? and will you be doing a lot of hills? These factor into the range you will get from your battery. Obviously, your weight has an impact on this. A big consideration is how much power you will use. The bikes have several levels of power and if you use a higher level the distance you can travel goes down (obviously affected by wind also). If you intend to ride up to 50 K or so most bikes will handle this without an issue, if you want to go on longer rides, do a lot of climbing, or use a high level of assist this will have to be taken into consideration.

E-bike categories

There are many types of e-bikes, a lot of them are mopeds with peddles that don't work and many are heavy bikes with throttles that are really motorcycles as people simply use the throttle and never peddle.

There are three generally accepted categories. Class 1, assist up to 32km/hr, no throttle, Class 2, 32km/hr and having a throttle, class 3, 48km/hr, no throttle.

In Ontario, only 32km/hr speed capability and motors of no more than 500 watts are legal, but areas of the code are vague. In many states (not all) the 30mph (48km.hr) speed limit is legal. There is no mention, in Ontario about throttles. Many of the e-bikes we see are not legal, but nothing is enforced.

Dealers, in Ontario, only sell 32km/hr top speed and 500 watt or less e-bikes. Many are available with a throttle or 'walk mode' (5km speed to help walk to the bike).

E-Bike Build Options

Drive Train

1. **Hub Motors** (in the rear wheel) or bottom bracket motors (within the crank set). Bikes with bottom bracket motors are more stable than those with motors in the rear hub (do not get a bike with the motor in the front hub), especially at speed or on downhills, but they are somewhat more expensive. For casual riding a bottom bracket is nice, but not necessary.
2. **Drive trains** are generally single chain ring with a rear derailleur for multiple gears. There are belt drive systems available, but they are not mainstream. Disc brakes are standard.
3. A lot of difference in pricing is in **weight** –Weight is dependent on several factors including the type of bike (road versus hybrid as example). At the low-end of the weight scale are road bikes will come in at about 30lbs, commuter bikes will be in the 40lb range while hybrids weigh 55lbs or more.
4. **Tires and Suspension.** A lot of comfort comes down to tire size. Front suspension can add comfort for heavier bikes, especially on rough services. Bikes in the 40 lb range are very comfortable on 38-40mm tires with no suspension. Heavier bikes will most often use front suspension and 2-to-2.4-inch tires. Front suspension adds weight and complexity.

5. **Power** The bike senses the requirement to provide boost by either a cadence or torque sensor, unless you are using the throttle. A cadence sensor measures rotation when you peddle. A torque sensor measures the amount of pressure you are applying to the peddles. They both have pros and cons: this article explains the pros and cons if you are interested: Torque sensors are most often used with bottom bracket motors.

<https://www.cyclingelectric.com/in-depth/e-bike-tech-explained-torque-sensor-or-cadence-sensor#:~:text=A%20key%20point%20to%20conclude,intend%20to%20cover%20mileage%20often.>

Many higher end bikes now use a combination of these sensors.

Bike Examples

The following are examples of bikes from major brands that are available locally within the three categories which will be of interest to most Probus Blue Mountain members, those being road, commuter and hybrid.

These are not recommendations; they are simply examples of the bike types.

Road

These are 'drop bar' top tube bikes, with bottom bracket motors and no throttles, although there are a couple of brands that use light weight hub motors. At the high end of each brands' road e-bikes the bikes are almost indistinguishable from standard road bikes and their weight is around 30lbs. In most cases, they will come with 32 or 35mm tires, but can be fitted with wider tires which makes them suitable for gravel. They are aimed at road bike aficionados.

Review the specs of examples 1 and 2 to get the specs and pricing.

Example 1: Specialized Turbo Creo <https://www.specialized.com/ca/en/turbo-creo-sl>

Example 2: Trek Domane+ https://www.trekbikes.com/ca/en_CA/domane-plus/

Commuter Flat Bar Bikes

These are 'flat Bar sporty' bikes. They vary somewhat in drivetrain (bottom bracket or hub motor) They are in the 40lb range and there is usually both a top tub and step thru model. They do not have throttles.

Example 1, Specialized Turbo Vado SL, this is basically a road bike with flat bars:

<https://www.specialized.com/ca/en/turbo-vado-sl-40-eq/p/216533?color=348487-216533>

Example 2, Trek FX+, A light weight commuter bike

https://www.trekbikes.com/ca/en_CA/fx-plus/

Hybrid

These are what most of the PBM cycling group riders are riding. These bikes are either top tube or step thru frames. They have front suspension. They come with lights, fenders and rear racks. They have throttles. They generally start at around 55lbs and go up in weight from there. They come in

price ranges from about \$1800 on up. They are available from a multiplicity of brands, including the majors, such as Specialized, Trek, Cannondale and Cube to newer brands such as heybike with its Cityrun, which several of our members have, to iGo with its Discovery and Core lines. Their positions on the bike (geometry goes from very upright, such as the heybike to more of a hardtail mountain bike geometry on many of the others.

Conclusions

The first thing you must do is start narrowing down your choices by considering the answers to the questions on Page 2. Then, decide what type of bike you are interested in, road, commuter, or hybrid. Then you can consider price.

Also, unless you have experience, it is highly recommended that you go to the local dealer and try the bikes you are interested in as the website will not answer how you feel on the bike. In many cases members of the PBM cycling group have bikes, so look at the survey results and talk to you fellow members.

Additionally, you need to consider how you will transport the bike; the lightweight bikes can be transported on standard hitch bike racks or inside the vehicle (check your rack to see how much weight it is rated for). The heavier bikes will need a rack that can take their weight and you may need a ramp so that you can push the bike up onto the rack. See the comments in our rider survey comments document.

Now is a good time to buy an e-bike as prices have come down, substantially in some cases and there are discounts, both upfront and negotiable.

Other considerations,

Be prepared for the eventuality of running out of battery or of a mechanical problem. For instance, if you get a flat, you won't be able to change the tire/tube on a hub drive bike (need tools to disconnect the wiring etc.) plus there is the weight to consider even on a bottom bracket bike. Getting home can be a problem with any bike, but with an e-bike you have a bigger problem – how will you be able to arrange the ride home or to where your car is?

Many e-bikes will use tubeless tires; this is an advantage as you can run lower pressures and you are much less likely to get a flat, but tubeless tires need sealant every few months. There are several good calculators online that tell you what pressure to run (<https://silca.cc/pages/sppc-form>) The sealant will seal small holes and prevent a flat, but if the sealant is dried out it obviously won't work, so this needs maintenance. The same can be said for hydraulic brakes.