5 Things You must know before buying an ELECTRIC BIKE

1. Electricity, Water, and You

(How not to get electrocuted)

It rains. Some places get more rain than others. If your local weather-person is always 100% accurate than you don't need a waterproof E-bike. Meanwhile, back in the real world, most of us need a waterproof E-bike! Some E-bike manufacturers claim to have "water-resistant" bikes. Sure. Ok. Would you buy a "water-resistant" tent? Hell no. You want to be able to traverse Eastern India in monsoon season with your water-proof E-bike and spend the night in your water-proof tent.

Buying Tip: Make sure your electric bike will get you home when it starts to pour down rain. Then ask if they guarantee it.

2. You Cannot Climb Hills or Go Very Far without Gears

If you need a bike that can climb hills, read on…

You need to be able to change gears to climb hills well.

Putting the electric motor fixed at a single, fixed speed on an Electric bicycle is the easiest, most inexpensive way to install it. However- If your car only had one gear, say third gear- good hill climbing and reasonable top speeds may be challenging. The typical E-bike designer answers this challenge simply by dumping more power into the motor when climbing hills and accelerating.

That is like watching your kids blow their allowance and just giving them more money.

The additional power needed to climb hills and accelerate a fixed gear motor comes from the heaviest and most expensive part of any electric bike, the battery. Like your wallet, a battery does not have infinite resources-wasted energy sacrifices range and requires you to carry more expensive, heavy batteries to get where you need to go.

Additionally, when an electric motor is under too much load (like your legs would be if you tried to pedal uphill without shifting) it creates heat, much like your legs. Heat is wasted energy that kills electronics and motors-greatly decreasing the life of this product.

Buying Tip: Don't fall victim to the hype. If you are considering an electric bike, be sure and ask how the RANGE of the bike is affected by hills and start/stop conditions.

2. You Cannot Climb Hills or Go Very Far without Gears

AND remember-a 27 speed bike with a one speed motor is just silly. Why does the rider need gears and the motor does not? Because you can't hear the motor complain-it just dies: Leaving you stranded with a 90lb paperweight.

A bicycle is the most efficient mode of transportation on Earth because of the gearing system. The Optibike is the only electric bike made that uses the proven bicycle gearing system, allowing the rider and the motor to drive through the same gears.

The result: Optibike efficiency is unaffected by hills, so you wont tear through your battery on hills.

"I ran a few climbs up the 1400 vertical climb, which using the TF (Tidal Force Electric bike) will pretty much kill one battery at max of 18 mph, I did on the optibike with 1/3 of the battery at 21 mph. WOW, this bike ROCKS. I only wish I'd documented the TF better (dataloggers or what not) so I can really show the difference. But then I just don't care. If I never ride that TF again, it will be too soon."-John S. PhD, Reno Nevada

3. Safety First

(How to avoid getting into a dangerous situation)

Safety does not have to be boring.

Brakes

An electric bike travels 2-3 times faster than a conventional bicycle and weighs 2-3 times more. **If you want to be able to stop, you need disk brakes.** Disk brakes last longer, require less maintenance, and work very well in wet conditions. In the past, rim brakes were standard equipment on bicycles. As people began riding faster, such as the case with electric bikes, disk brakes like the kind used on motorcycles and cars became necessary to keep people alive. High quality, brand name disk brakes will provide you years of service.

Suspension

When traveling at speeds in excess of 20 mph on an electric bike, front and rear high quality, long travel suspension is crucial to your safety and comfort. **Imagine for a moment hitting a pothole at 25 mph without front and rear suspension.** You would be in rough shape. The suspension also protects the electronics of the electric bike from unnecessary bumps, prolonging the life of your investment. High quality, name brand front and rear suspension will keep your butt/seat relationship going smoothly.

3. Safety First

(How to avoid getting into a dangerous situation)

Lights

Integrated, waterproof headlights mean you can see and be seen. Motorcycles in many states are required to have head and tail lights on at all times. **Having a good, bright, integrated headlight keeps you from being hit by a car.**

4. The Wheels are the Worst Place for the Motor and/or Battery

Do you want a bike that handles like a Ferrari or a Semi?

We have already discussed why from a hill climbing, and accelerating perspective hub motors fail to perform. Another very important consideration with hub motors is the idea of unsprung mass. A very good complete write-up on this topic is here:

http://en.wikipedia.org/wiki/Unsprung_weight

The basic idea is that if you are in a vehicle with heavy wheels (hub motor, battery in wheel, etc) and a suspension- as you hit bumps the weight of the wheel is accelerated towards the vehicle and the rider making for a rough ride and poor handling. ALL high-performance racing teams know to keep the wheels light. NASCAR, Formula 1, Rally – across the board, these teams spend piles of money to shave grams out of the wheels. Some E-bike designers put the motor (heavy) and even the battery (really heavy) in the wheels, making for horribly uncomfortable handling machines.

4. The Wheels are the Worst Place for the Motor and/or Battery

"The real issue here is two fundamental things: unsprung weight and the gyroscope effect of the wheels. The high mass wheels develop a gyroscope effect (angular momentum) that makes them resist change in direction. This is the same effect that makes the bike hard to stop. The second effect is that of the unsprung weight which is the weight that is not isolated by suspension. The heavy wheels are also more frightening to ride since when you hit a bump the wheel (and the whole bike in the case of the rear) moves away from the ground. This then needs to be stopped and moved back to the ground before you can do anything. The heavier the wheel is the harder this is to accomplish and the more dangerous the bike is to ride."-John S. PhD, Reno Nevada

Buying Tip: When you're looking at the wheels and hubs, remember to think light.

5.How to Determine the True Range of an Electric Bike

(aka: How to avoid being ripped off)

This sounds like a fairly easy concept to grasp, but given some of the questionable mathematics used in calculating E-bike power, range, and run times you may want to do some math yourself before purchasing.

Here are the basics. For a more complete, step by step guide on:

Watts= volts x amps

This is pretty basic, but it is a good place to start.

Amp hours= how many amps the battery can discharge in an hour.

Watt hours = (amp hours) x (volts)

This is a big one…

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5.How to Determine the True Range of an Electric Bike

Lets take a look at the claims of one manufacturer:

Advertised battery Specs: 10ah battery 24volts
(=240 watt hours)

Advertised Range: 60 miles

(depending on weight, terrain etc)

Using this bike power calculator:

http://www.kreuzotter.de/english/espeed.htm

You can see that a 250 watts of power can push the rider about 18 miles per hour on flat ground. So to go 18 miles at 18 mph, you need 250 watt hours of energy.

This means that (10ah) x (24volts) = 240 watt hours

So this particular bike will run for a little less than an hour. At 18 mph, that's about 18 miles of range, not even close to 60.

Actual Range: 18 miles

Buying Tip: Be sure and crunch the numbers yourself before you believe the hype.

5 Things You Now Know To Look For When Purchasing an ELECTRIC BIKE:

1. **Is it Waterproof?**
2. **Does it have Gears?**
3. **Is it Safe?**
4. **Does is have Light Wheels & Hubs?**
5. **What is the Actual Range?**

Good Luck with your search! If you have more questions, visit www.optibike.com or call 303.443.0932