Electric Bicycle Types, Legal Status, and General Information

Pedal-activated bicycle	Throttled bicycle
Descriptions	
Works like a conventional bicycle with an electric motor added to assist only when the cyclist pedals. **Pedal-activated bikes are not self-propelled** (cannot move under their own power.) Motion and torque sensors control how power is added relative to pedaling, so the cyclist does not have to manage any non-bicycle controls (like a throttle) while riding. The distinctive characteristic of the pedal-activated bike is that the cyclist must pedal, so it handles and feels much like a conventional bicycle. The bicycle can also be pedaled with the motor turned off.	**Throttled electric bicycles are self-propelled.** When the rider turns a throttle, he/she is propelled by the electric motor without having to pedal (but can choose to pedal if desired).. The propulsion of this type of e-bike is similar to that of a moped. The bicycle can also be pedaled with the motor turned off.
Other names (there is no consistent international terminology so expect confusion)	
Pedelec (Europe), electrically-assisted bicycle or EAB, power assisted bicycle or PAB. (Note: Canadians seem to use the terms electric-assist or power-assist bicycle for any electric bike, while elsewhere it generally means a pedal-activated bike.)	Power-on-demand bicycle, electrically-propelled bicycle or EPB. (In Europe, throttled bikes are called e-bikes, but elsewhere that is usually a term for any electric bike.)
Legal status	
European Union: Pedal-activated electric bicycles are treated as conventional bicycles under the law provided they adhere to speed restrictions (motor cuts out above certain speed) and rules about maximum motor size. (Established throughout the EU since November 9, 2003, under EU Directive 2002/24/EC) **Japan: treated as conventional bicycles** under the law provided they adhere to speed restrictions and rules about maximum motor size.	**European Union: Throttled electric bicycles are treated as mopeds**. They require specific "Type Approval" with restrictions applied to the type such as adequate brakes, mirrors, etc. **Japan: Treated as mopeds**. **US and Canada**: Both types of e-bike are legal and federal law does not distinguish between them. States/provinces can enact their own legislation
Speed characteristics	
Both types can assist with take-off from standstill. Both adhere to maximum motor size as set by federal law, limiting their power. Both are designed to cut off the motor at a speed set by law (15-20 mph typically). **Because of the power cut-off, electric bikes generally cannot reach the top speeds of a fast conventional bike**, since the greater weight of an electric bike slows it down when the power is cut off. (It is possible to build	

a bicycle that circumvents these restrictions, which would make it illegal to use. This is far easier with a throttle bike than a pedal-activated bike, which uses more complex technology.)

Safety characteristics

Electric bikes are generally regarded as safe. In a 2000 Canadian study (see links below), a survey of 369 riders reported both types of electric bikes as equally safe. A Santa Cruz County program subsidizing electric bike purchases (see links below) reports a very high rate of satisfaction with them.

Both types of electric bikes can be safer than conventional bikes in certain situations. On uphill climbs, slow cyclists on conventional bikes often begin to weave, while bikes with power assist give enough boost to prevent this. Also, slow cyclists may be safer crossing intersections when they have power to get out of cross-traffic more quickly. Electric bike riders report more willingness to stop fully at stop signs, since getting back up to speed is much easier than on a conventional bike (See Canadian study - link below).

Advantages of electric bicycles

All electric bikes are excellent cost-saving modes of transportation compared to a car. According to electricvehiclesnw.com: "While riding, electric bike motors typically draw only up to a couple of hundred Watts on the average. Assuming that an electric bike is ridden 5 days per week and up to 15 miles per day [300 miles per month] the cost of charging may amount to about $1 per month (@12 cents/KwH)." Using these figures, **an electric bicycle gets the equivalent of *750 miles per gallon* at $2.50 per gallon**. If gas is $3.00 per gallon, this goes up to *900 miles per gallon*. Another way of putting it: you can ride an electric bike for more than two months (600 miles) before spending the same dollar amount charging it as for a single gallon of gasoline. By any measure, electric bikes are hugely beneficial for energy and cost savings compared to cars.

Pedal-activated bikes are excellent exercise for people with limited endurance or some physical limitations (such as knee problems) – often better than conventional bikes for some people because of the more even level of exercise, the ability to handle hills and headwinds without excessive difficulty, and assistance with take-off. See the Monash University study (link below) for information on the cardiovascular benefits of a pedal-activated bike.

All electric bikes are excellent for commuting because of the ability to overcome many of the obstacles to bicycle commuting that people cite: hills, tiredness at the end of the day, need to arrive at work without sweating, need to carry heavy things to work, the commute being a little too long. Electric bikes make all these problems much easier.

All electric bikes are quiet, generally similar to conventional bikes and unlike much noisier gas-powered bicycles (and cars).

Online resources

NOTE: This is posted in pdf form at www.janmcdonald.com with live links in the pdf to make navigating to these websites easy.

http://www.ecoact.org/Programs/Transportation_Solutions/Electric_Bike_Program/index.htm
Information on Santa Cruz County's rebate program for electric bikes. Program Overview (left menu bar) cites results of the program

http://www.tc.gc.ca/tdc/summary/13700/13732e.htm
A 2000 study of electric bikes by Transport Canada involving 369 cyclists riding 15,600 miles on both types of electric bikes.

http://www.cyclingpromotion.com/Power%20Assited%20Bicycles%20Monash%20Final%20report.pdf
A 2003 Australian study by Monash University advocating legalization of electric bicycles in Australia. Includes data on the cardiovascular benefits of a pedal-activated bike.

http://en.wikipedia.org/wiki/Electric_bicycle_laws
Some general info from Wikipedia about legal status of electric bicycles around the world.

http://www.ci.pasadena.ca.us/waterandpower/program_ev.asp
The city of Pasadena promotes electric bicycles on its website and uses them in the Pasadena Water and Power and Police departments.

Advocacy and General Interest Sites about Electric Bicycles:

www.electric-bikes.com
General information about electric bikes

www.pedelec.com (and twin site www.extraenergy.org)
German site with general electric bike and legal info.
http://pedelec.com/taipei/lectures/pdf/USA.pdf is a Powerpoint show about electric bike law in the US, including the then just-passed HR 727, which defines electric bikes at the federal level. A little out-of-date, but has some good info.

www.atob.org.uk
Website of the British magazine *A to B*, including general info about electric bikes, legal info, and reviews of models.

www.electricvehiclesnw.com
The website of a Seattle store including a number of articles about electric bikes and information about the difference between the two types of electric bicycles. Links to articles are found on the left side of the home page and under Info.