

How long do electric car batteries last

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These are much like a scaled up version of the lithium-ion (Li-ion) battery in your mobile phone - EVs don't use a single battery like a phone, they use instead a pack which is comprised of thousands of individual Li-ion cells working together. When the car's charging up, electricity is used to make chemical changes inside its batteries. When it's on the road, these changes are reversed to produce electricity.

EV batteries undergo cycles of "discharge" that occur when driving and "charge" when the car's plugged in. Repeating this process over time affects the amount of charge the battery can hold. This decreases the range and time needed between each journey to charge. Most manufacturers have a five to eight-year warranty on their battery. However, the current prediction is that an electric car battery will last from 10 - 20 years before they need to be replaced.

How a battery and the car's electric motor work together is surprisingly simple - the battery connects to one or more electric motors, which drive the wheels. When you press the accelerator the car instantly feeds power to the motor, which gradually consumes the energy stored in the batteries.

Electric motors also work as generators, so when you take your foot off the throttle the car begins to slow down by converting its forward motion back into electricity - this happens more strongly if you hit the brakes. This regenerative braking recovers energy that would otherwise be lost, storing it in the battery again and so improving the car's range.

A Lithium-ion (Li-ion) battery is a type of rechargeable battery used in electric vehicles and a number of portable electronics. They have a higher energy density than typical lead-acid or nickel-cadmium rechargeable batteries. This means that battery manufacturers can save space, reducing the overall size of the battery pack.

Lithium is also the lightest of all metals. However, lithium-ion (Li-ion) batteries contain no lithium metal, they contain ions. For those wondering what an ion is, an ion is an atom or molecule with an electric charge caused by the loss or gain of one or more electrons.

Lithium-ion batteries are also safer than many alternatives and battery manufacturers have to ensure that safety measures are in place to protect consumers in the unlikely event of a battery failure. For instance, manufacturers equip electric vehicles with charging safeguards to protect the batteries during repeated rapid charging sessions in a short period of time.

The kinetic energy caused by braking usually goes to waste. However, regenerative braking converts and stores thermal energy from brake pads and tyre's heat friction and reuses it to power the car.

Once an EV battery loses its capacity to power a vehicle, it can be used to power a home or building by

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contributing to a battery storage system. A battery energy storage system stores energy from batteries that can be used at a later time.

The battery on an electric car is a proven technology that will last for many years. In fact, EV manufacturers guarantee it. Nissan warrants that its electric car batteries will last eight years or 100,000 miles, for example and Tesla offers a similar guarantee.

This might seem remarkable when the battery in your mobile phone begins to wear out after only a couple of years, but during that time it might be fully charged and discharged hundreds of times. Each of these so-called charge cycles counts against the life of the battery: after perhaps 500 full cycles, a lithium-ion phone battery begins to lose a significant part of the capacity it had when new.

While that might be OK in a phone, it's not good enough for a car designed to last many thousands of miles, so EV manufacturers go to great lengths to make electric car batteries last longer. In an EV, batteries are "buffered", meaning that drivers can't use the full amount of power they store, reducing the number of cycles the battery goes through. Together with other techniques such as clever cooling systems, this means that electric car batteries should give many years of trouble-free life.

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