History of electric cars

The history of electric cars began in the mid 19th century, and the invention of the electric car is attributed to various inventors. In 1828, Ányos Jedlik, a Hungarian who invented an early type of electric motor, created a small car model powered by the then new type of engine. In 1834 in Vermont, Thomas Davenport invented the first American DC electric motor. Rechargeable batteries that provide a viable way to store electricity in the car did not exist until 1840. The invention of the improved battery technology in France in 1881, with the efforts of Gaston Plante and his countryman Camille Faure, finally opened the way for electric cars and their expansion in Europe. France and Great Britain were the first countries to support the development of electric cars.

Before improvement of the internal combustion engine, electric cars held many records regarding speed and range. Among the most important is breaking the record of 100 km/h on 29th April 1899. Although Thomas Davenport was among the first to install an electric motor into a vehicle, the electric car in the conventional sense was not developed until sometime around 1891.

Source: Electric and Hybrid Cars, Curtis D. Anderson and Judy Anderson
Due to technical limitations, the maximum speed of these earliest electric cars was approximately 32 km/h. At the beginning of 1900, despite their relatively low speed, electric cars had a number of advantages over their competition. They produced no vibrations, odours and noise associated with petrol-powered cars. Changing gears in petrol-powered cars was the hardest part of the driving, and electric cars did not require gear changes. Electric cars were popular among wealthy customers who used them exclusively in city traffic, so their limited range was not relevant. Electric cars also had the advantage because they did not require manual effort to start driving. Petrol-powered cars had handles for starting the engine on the front side which required the starting force. Electric cars were often sold as vehicles suitable for women drivers due to their easier operation. Early electric cars were even labelled as “women’s cars”.
At the turn of the century, 40 percent of American cars were powered by steam, 38 percent by electricity and 22 percent by petrol. Most of the early electric car were massive and with extravagantly designed wagons with luxurious interior full of expensive materials. These cars were produced for the upper class of very wealthy customers that stood out by owning such a car. Basic models of electric cars cost around $1,000 (approximately $28,000 today), and on average they cost about $3,000 (about $84,000 today). The sale of electric cars had its peak in 1912.
The First World War created a huge demand for electric vehicles in Great Britain and Europe. It is estimated that in 1914 the whole of Europe had approximately 3,200 electric vehicles (cars, buses...). Commercial electric vehicles were produced primarily in Europe. The safety of electric vehicles, their simple design and easy driving made them vehicles that even inexperienced and new, young drivers were able to drive. Norway and Sweden had on the market a large fleet of commercial electric vehicles and large energy hydropotential and were very promising markets after the war. Italy also generated electricity from hydropower, also representing a promising market for electric cars. Australia, Japan, Mexico and France were exporting electric vehicles in
large quantities so their future looked bright because the demand was high. After success at the beginning of the century, electric cars began to lose their position in the car market. This was a result of a series of events. In the 20’s of the 19th century, road infrastructure was improved and the way between American cities was opened. To use these roads, a vehicle with a greater range than that offered by electric cars was needed. The discovery of large oil reserves in Texas, Oklahoma and California led to the wide availability and affordability of fuel. The use of electric cars was limited to urban environments because of their low speed (not more than 24-32 km/h) and very limited range (50-65 km). Petrol-powered cars were now able to travel further and faster than equivalent electric cars. In 1912, petrol-powered cars became easier to drive due to the invention of Charles Kettering and his electric “starter”, which eliminated the need for a handle to start the petrol engine. Noise also became bearable due to the silencer, invented by Hiram Percy Maxim in 1897. Finally, the start of mass production of vehicles with petrol drive was initiated by Henry Ford. In 1915, the price of his car was $ 440 (today this is about $ 10,000), and a year later it even fell to only $ 360 (today this is about $ 7,700). In contrast, the price of similar electric cars was still increasing. In 1912, the price of an electric car was approximately $ 1,750 (today this is about $ 42,000). How did Henry Ford turn the then inferior car into the market leader? Not using technology, but using a better business policy. He understood the nature of the market and assumed that if people saw more Ford cars on the street they would want to buy the Ford brand. Low cost of car production and their availability launched an avalanche of demand. On 31st July 1971, electric car became the first vehicle the man drove on the moon and so it got became distinctive from all other cars. It was the Lunar Roving Vehicle, first deployed during the Apollo 15 mission. “Moon Buggy” was developed by the companies Boeing and Delco Electronics.

![Lunar Roving Vehicle](http://en.wikipedia.org/wiki/Lunar_Roving_Vehicle)

Although several years passed without public attention, the energy crises of the seventies and eighties led to renewed interest in electric cars. The Green movement in the 90’s and at the beginning of the 21st century made driving an environmentally-friendly car the political and fashion statement. Protection and conservation of the world’s natural resources have value, and pollution is harming all of us. Environmentally responsible consumers overwhelmed the market. The construction of infrastructure for charging cars, increasing incentives for the purchase and encouraging the green concept in public life could restore the electric cars their popularity of the 19th century.
At the time of launching their EV1 model on the market, GM did not adequately promote the car so they were accused of pandering to the wishes of CARB (Californian Air Resources Board), but only to still be allowed to sell all other environmentally inefficient cars, i.e. that they produced an environmentally friendly car only because of the imposed legal provisions.

Consumers were not allowed to buy EV1 cars, but they could only rent them for a fixed period, which means that all cars had to be returned to GM at the end of the lease term, without the option of purchase. After public protests of a group of GM’s EV1 drivers agitated because of the impossibility of buying their cars, GM transported the entire fleet of electric cars to a remote location and destroyed them! A group of activists recorded the whole action, and it is all documented in the film “Who Killed the Electric Car?”.

Picture: 15th of March 2005, the last EV1 was destroyed

Instead of encouraging consumers to buy EV1, GM decided to promote Hummer and convince people that this is what they really want and need. They also lobbied for state tax benefits ranging from $25,000 to a whopping $100,000 per car (or rather a mini-tank) which is the biggest “oil consumer” and also the largest car on the road weighing 3 tons! (the maximum tax benefits in 2002 for an electric car amounted to $4,000, and for a car of 3 tons in 2003 $100,000!)

Almost all manufacturers withdrew their electric vehicles from the market. Toyota offered its last RAV4-EVS on 22nd November 2002. However, they continued to support several hundreds of their customers and users of Toyota RAV4-EV. EV1 can now only be seen in two museums where they are exposed without engines.

One of the conclusions made in the documentary “Who Killed the Electric Car?” was that in the same way as it was necessary to pass the law on wearing seatbelts, putting airbags in cars, catalysts, etc., so the “clean cars” are too important for the “clean environment” to be left to the automotive industry to decide on their fate.

The energy crisis of 2000 brought renewed interest in hybrid and electric cars. In response to the lack of large manufacturers for the production of electric cars, a lot of small companies started to design and advertise electric cars to the public. In 1994, REVA Electric Car Company was established in Bangalore - India, as a joint venture of the Maini Group India and AEV of California. In many countries REVA does not fulfil the conditions of a motor vehicle eligible to drive on highways, and it is categorised in other classes, such as in the USA the so-called Neighbourhood electric vehicles (NEV) and heavy quadricycles in Europe. Until March 2011, REVA sold more than 4,000 vehicles around the world and it is available in 26 countries.

Pike Research estimate that in 2011 there were almost 479,000 NEV vehicles in the world. The top selling NEVs are Global Electric motorcars (GEM) vehicles, with more than 45,000 vehicles sold as at December 2010. The production of the Think City all-electric car, with a maximum speed of 110
km/h and a range of 160 km, was launched in 2008 by the Norwegian manufacturer Think Global, but due to financial difficulties the production was terminated. Over 1000 Th!nk vehicles were sold in several European countries and the USA. In June 2011, the company declared bankruptcy and the production was terminated. The new owner scheduled to restart the production in early 2012 with a slightly altered concept of Th!nk City.

Californian manufacturer of electric cars, Tesla Motors, in 2004 started the development of the Tesla Roadster model, which was first delivered to customers in 2008. Tesla Roadster is the first electric car adapted for American highways and available in serial production in the USA. From 2008 to December 2011, more than 2,100 vehicles were sold in 31 countries. Tesla was also the first to introduce lithium-ion batteries in its car production, and Roadster is the first car that has a range greater than 320 km on a single charge and can reach the speed of over 200 km/h.

In June 2012, the company Tesla Motors began delivering Tesla S model (sedan). This model saved the company, which was on the verge of collapse. Unlike Roadster, which is a sporty two-seater, Model S is a luxurious car for the whole family. The basic price of the Model S in the US market is about 60 thousand dollars, and this year they plan to deliver five thousand cars. The basic model comes with batteries that allow a range of up to 258 kilometres, but Tesla Motors also offers batteries of greater capacity that allow this model to have a range of up to 370 and
even up to 483 kilometres. Tesla Superchargers are fast-charging stations placed on traffic routes in North America. Currently, only six stations are active, but the plan is to have about a hundred of them by 2015. They are designed to fill about a half of the battery capacity in half an hour. This is additional 240 kilometres. These rapid charging stations are located in places where you would otherwise want to stop: near restaurants, cafes and shopping centres. In many places, solar cells are put on the roof of the charging stations so the electricity is produced from renewable energy sources.
Mitsubishi *i-MiEV* was launched in July 2009 for fleets of customers in Japan, and for other consumers in April 2010, followed by sales in Hong Kong and Australia through a leasing model. *i-MiEV* was launched in Europe in December 2010, including the same versions under other brands - Peugeot *Ion* and Citroën *C-Zero*. 
Nissan Leaf, presented on the Japanese and American market in December 2010, became the first modern all-electric car with zero tailpipe emissions that will be in mass production. According to Nissan, Leaf has a range of 160 kilometres. By December 2011, Leaf was delivered to France, Ireland, the Netherlands, Norway, Portugal, Spain, Switzerland and Great Britain. Since its launch on the markets in December 2010 by the end of 2012 more than 30,000 Leafs were sold worldwide. Nissan Leaf has thus become the best-selling electric car in the world.
Renault has turned its focus exclusively on the new generation of electric cars, skipping any intermediate step with possible hybrid models. This may be a risky move considering that the future of electric cars is still uncertain, and the number of sold hybrid cars is still increasing every day. But the way chosen by Renault is good as it does not distort the image created, and the concentration and coordination of the group that leads to a single goal in the future may mean the car market leader, in front of all who experimented with both hybrids and electric cars in their fleets. In 2011 the commercialization of serial electric vehicles Kangoo Z.E., Fluence Z.E., Twizy Z.E., and in 2012 also of the Zoe Z.E. model started.