



# What does Tesla's intellectual property reveal about the future of clean transportation?

CPA Global has carried out an in-depth patent analysis on Tesla's portfolio. Matt Luby asks what do Tesla's patents tell us about its future strategy?

**T**esla Motors is a world leader in innovation, pushing the boundaries of electric vehicles and introducing cleaner mobility to a growing consumer market. After reaching a **\$2.6 billion deal** with SolarCity, opening the Tesla **Gigafactory** in July 2016 and announcing its intention to acquire Grohmann Engineering - what does Tesla's intellectual property (IP) reveal about the future of clean transportation?

### **Tesla: where it began**

Tesla Motors (often shortened to Tesla) was founded in July 2003 by Martin Eberhard and Marc Tarpenning who financed the company until its first round of funding. It was at this stage that Elon Musk – a serial inventor and billionaire entrepreneur with a vision to *“change the world and humanity”* - was introduced to the company.

After joining Tesla's board of directors and taking on various roles, Musk was appointed CEO in 2008. He was quick to streamline Tesla's manufacturing and design processes, reducing 'burn rate' and building profit. The company soon gained widespread attention following its production of the Tesla Roadster in 2008 – the world's first electric sports car. The company's second vehicle, the Model S - an electric luxury sedan – debuted soon after in 2012. The Model S was the world's best-selling plug-in vehicle in 2015 and achieved global sales of 150,000 units in November 2016 - just four years and five months after its introduction.

Musk is an acclaimed entrepreneur, but he is most passionate about reducing global warming through sustainable energy production and consumption. As Tesla CEO, Musk is driving electric vehicle adoption to produce a greener future with cleaner transportation.

### **Tesla's globetrotting IP**

Tesla's IP portfolio is made up of more than 300 patent families, which are filed in a number of jurisdictions. Patents have been published in the US, China, Australia, India, UK, Germany, Mexico, China, and a number of other countries around the world.

Elon Musk is leading a global change in direction for the automotive industry and has backed green transportation as a key component of future vehicle design and city planning. 2008's Climate Change Act meant the UK (as one example) is now legally obliged to cut emissions by 80 percent before the year 2050, targeting 'net zero emissions' by the end of the 21<sup>st</sup> century. Electric vehicles enable a **40 percent reduction** in CO<sub>2</sub> emissions and their adoption could fast-track a cleaner, more sustainable future.

### **Self-driving cars: the next step?**

Tesla is the leading manufacturer of both electric vehicles and battery charging components. Now the company also looks set to make an assault on the autonomous vehicle industry. Since October 2016, all Tesla cars have been

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built with the necessary hardware for full self-driving capability: eight surround cameras; twelve ultrasonic sensors; and a forward-facing radar.

However, despite its reputation as a leader in self-driving technology, artificial intelligence (AI) technology is not prevalent in Tesla's IP portfolio. This is perhaps a surprise given that Musk is closely associated with [OpenAI](#), an AI research company that released its first batch of [AI software](#) in April. If introducing autonomous driving to the mainstream is not Tesla's current aim, what is the company working towards?

### **Investing in clean transportation**

Tesla's portfolio of patents relate to four key areas: electric battery connectors for electric vehicles; thermal management system for batteries of electric vehicles; charging technologies for electric vehicles; and range extension technologies for electric vehicles.

The trend in patenting battery technology demonstrates again that Tesla is working to encourage wider industry adoption of electric - rather than gasoline - powered vehicles. If battery life could be improved for vehicle, why would consumers not consider switching to electric?

In 2016, Tesla opened the doors of its state-of-the art Gigafactory battery plant in Sparks, Nevada. With 1.2 million square metres of floor space, the Gigafactory is the second largest building on Earth and by 2020 it will enable Tesla to make more battery cells than all other [lithium-ion battery makers combined](#). The plant delivers a 30 percent battery cost saving directly to the consumer and has resulted in the new Tesla Model 3 costing \$35,000, not \$100,000.

The Model 3 is set to be Tesla's first mass-market electric car, pushing production capacity to another level and introducing the benefits of electric vehicles to the mainstream. It would seem that Tesla's overarching patent strategy

is closely aligned to Musk's own corporate vision: invest in a future that promotes cleaner transportation.

The patenting of battery technologies clearly may provide other advantages too: improved design; a new market approach; better sales and new branding opportunities. Tesla's portfolio also includes patents related to the general manufacture of vehicles, including: sunroof layout; door hinges; door handles and frame parts. These patents relate specifically to Tesla's aesthetic.

Interest in Tesla's [Model S](#) luxury sedan, last year's gull-wing [Model X](#) SUV, and the lower cost Model 3 is at its highest point since the company was founded in 2003. Sales have boomed, its manufacturing capacity has matured and Tesla delivered more than 50,000 cars in 2015. Tesla's electric vehicles are becoming more popular, more advanced and appealing to a wider global audience.

### **A collaborative build**

Tesla's patents largely relate to battery power and charging, but where do the other vehicle components come from? Tesla uses a large number of suppliers to build its electric cars. The list of suppliers involved in building the Model S Sedan gives a glimpse of the intricacies of Tesla's design. The full list is classified but contributors include: Panasonic; ABC Group; Fisher Dynamics; Hitachi; Multimatic; MacLean-Fogg Co; Inteva Products; and Sika.

In the future there may be opportunities for Tesla to build elements of other cars and work with further suppliers, as it did in limited capacity for Daimler and Toyota's electric vehicles. Tesla could be a supplier of battery systems or motor systems in the future. The company appears to be inspiring the global car industry to work together to build electric vehicles and sustain the growing market.

### **A global electric vehicle network**

Tesla is making significant moves towards expansion in Europe and other countries. In the UK a £5,000 government

grant is now available for every person who purchases a Tesla Model S, alongside free road tax, exemption from the London congestion charge and other incentives to buy. In California the standard \$7,500 federal subsidy for electric vehicles is improved with a further \$2,500 rebate and additional access to carpool lanes. Subsidy programmes in the Netherlands and Norway have contributed to electric vehicles accounting for 20 percent of new car sales.

Tesla has even built its own network of electric 'supercharger' stations around the world, developing the standardised vehicle chargers before receiving financial help from the government or any other company. The charging stations facilitate a growing network of electric vehicles and can transform a city's approach to mobility - but it will take time to populate every city. If governments built more charging points, cities could establish a sustainable ecosystem far quicker.

### **Accelerating innovation**

How does Tesla manage its growing, global portfolio of IP? Can it control the threat of patent infringement? On June 12, 2014, Tesla **announced** it would not initiate patent lawsuits against anyone who in good faith, wants to use its technology: *"Tesla was created to accelerate the advent of sustainable transport, and this policy is intended to encourage the advancement of a common, rapidly-evolving platform for electric vehicles, thereby benefiting Tesla, other companies making electric vehicles, and the world"*.

Tesla generated a limited, open-source patent pool for the technologies used to build its electric vehicles — including for vehicle components, battery charging, energy storage and power optimisation. Why open up their patent portfolio to others? To build the size of the market and encourage others to abandon internal combustion engines and consider 'going electric'. As more people buy electric cars, the grid gets bigger and Tesla dominates a larger area of the automotive market. This isn't the first time this approach has been used. The inventor of instant ramen noodles, Momofuku Ando, was **quoted** as saying that *"It would be better to develop as a forest rather than stand alone as a single tree in a field by maintaining sole control [of the technology]"*.

Tesla continues to push the boundaries of automotive revolution – firstly demonstrating that electric cars could be better than gasoline-powered cars and now introducing cleaner mobility to a growing consumer market. Tesla is making the transition to electric vehicles for consumers easy by developing a vehicle with longer battery life, modern body work and cutting edge performance. By building the world’s biggest Gigafactory, publicly sharing its technology, and working with a large number of suppliers, Tesla is uniquely positioned to lead clean transportation globally. ■

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