

# **Electric Car News** EV Cars in the Fast Lane?



As a leading custom automotive lighting company, our passion drives us to stay on top of the latest auto trends--in this case electric car news.

Decades ago, the concept of an electric car for some, would have stirred up thoughts and images of a very futuristic, innovative and (possibly flying) vehicle.

But as time dictates...

Electric vehicles, although not flying presently, are innovative and are predicted to be very much the norm.

According to <u>Bloomberg New Energy Finance Forecast</u>, "The Electric Car Revolution is Accelerating". It projects electric cars will outsell fossil-fuel powered vehicles by 2038.



It kind of makes you wonder how we got back here...

Electric cars were actually more popular than combustion engine cars, in the 1800's. In fact, the <u>first electric car was created in 1832</u>.

In this article, I'll cover what EV's are, with a little history, forecast (alluded to that already), advantages and disadvantages, efficiency --how they work, tax credit and opportunity for suppliers.

And more.

Because this post is lengthy, I've included a table of contents below for your quick reference (feel free to jump around):

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### What are Electric Cars & a Little History That'll Blow Your Mind

An electric car is an automobile that is propelled by one or more electric motors, using electrical energy stored in rechargeable batteries. (source: Wikipedia contributors. "Electric car." Wikipedia, The Free Encyclopedia. )

I'll let you in on a secret...

An electric car uses electricity to propel itself forward instead of gasoline. This same electric car though may or may not be driverless.

I'm bringing this to your attention because this article is not focused on autonomous driving. Although it seems self-driving cars tend to be electric powered rather than gas powered at the present moment, they do not have to be.

"The presumption is that self-driving cars will be electric because that technology is expected to be mature by the time self driving cars become available, and because Tesla is expected to be selling self-driving cars before anyone. But there's no reason they have to be electric. "<u>Matt Wasserman</u>, writer for Forbes. Truth is autonomous technology is immensely disruptive to the auto industry. Many believe the shift to this technology and electrification go hand in hand.

Only time can answer the question:

What does the future realistically look like for self-driving cars in the auto sector?

Back to a little history...

As mentioned, the first electric car was created in <u>1832</u>.

In 1897, electric vehicles were used for the first time commercially in the United States. A survey conveyed electric cars were ideal because they were safer, cleaner, quieter and more economical than gas powered cars. Also that an electric car has less parts and low maintenance costs, and you can charge them anywhere.

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Let's insert 1908:

What happened?

Henry Ford introduced the mass produced and gasoline-powered Model T, which had a profound effect on the U.S. automobile market.

Failure is simply the opportunity to begin again, this time more intelligently. (Henry Ford - American industrialist, most known for the man behind the motorcar)

What do you think Henry Ford's take would be on the new shift to electric cars?

I think the most amazing part of the EV's -- is how long it's been around trying to navigate the bumpy road to full production.

I'll touch on the challenges in Chapter 3 (Pro's and Con's of Electric Vehicle) as to why it has not caught up with consumer adoption yet.

Let's fast forward to 2017 and beyond...



### Where EV's are Headed

Time for some facts & figures.

According to Bloomberg New Energy Finance:

Electric cars will be as cheap as gasoline models by 2025. "In just 8 years, pushing the global fleet to 530 million vehicles by 2040".

#### Why Electric Cars May Dominate the Auto Market by 2040



In conjunction, battery manufacturing capacity will triple in the next four years.

This will help auto manufacturers build less expensive models, which will increase the consumer adoption level and ultimately consumption.

"The global shift toward electric vehicles will create upheaval for the auto industry: from oil majors harmed by reduced gasoline demand to spark plug and fuel injection manufacturers whose products aren't needed by plug-in cars."

While traditional car suppliers may be hurt by EV growth, some commodities will get a lift, according to BNEF. Graphite, Nickel and Aluminum will experience an increase in demand.

Vehicle lighting may also be at the forefront with the emerging electric car trend. <u>Custom automotive lighting</u> that is more efficient, requires lower power and is LED driven will be beneficial in electric vehicles. After all, they rely on any and all stored electricity from batteries.

In a separate report, conducted by Morgan Stanley; Batteries May Power Future of Auto Industry; it was predicted EVs sales will comprise 51% of the market by 2040 and could reach a dominant 69% by 2050.

Here's an excerpt from the article answering two questions:

- 1. "Why have battery electric cars never been successful before?"
- 2. "Why is it different this time?"

"We think the key answer is that political and scientific concerns about the impact of CO2 and particle emissions on public health have risen sharply," says Harald Hendrikse, who covers the European auto sector."

He goes on to say...

"These concerns are driving regulatory change all over the world, which is significantly raising the cost of developing and producing the internal combustion engine–both petrol and diesel."

This would eventually lead to more expensive engines and higher cost for the consumer and / or lower profit margins for automakers.

The full range of what can be expected can only be laid out in the advantages and disadvantages of the new electric cars.

Will they take the fast lane? Or bumpy dirt road?...

### **Electric Car News - Pro's and Con's**

Electric Vehicles (EV) use electricity stored in batteries to power one or more electric motors instead of gasoline.

Let's take a closer look at the advantages and disadvantages:

#### Advantages to an Electric Vehicle:

- no tailpipe
- use no fuel, combustion, or exhaust systems
- when the batteries need recharging, you simply plug it in

#### Disadvantages to an Electric Vehicle:

the last pro is somewhat of a con...

What if you can't just plug it in?



source: car insurance comparison

Most owners of an electric car do handle the charging at home with private chargers. To enable a longer distance, they would need an EV charging station.

Not all is lost though.

According to Electrek, the U.S. now has 16,000 public electric vehicle charging stations with 43,000 connectors. In past years, it was almost non-existent.



The EV charging infrastructure in the United States still has a ways to go but it is making progress.

Is all this progress going to keep the EV car efficient?



### **Efficiency--How They Work**

This video will unveil the hidden technologies behind the Tesla Model S, which recently became the world's fastest accelerating car.

You will see how electric cars have achieved superior performance by "analyzing the technology behind the induction motor, inverter, lithium ion battery power source, regenerative braking and above all, the synchronized vehicle mechanism, in a logical, step-by-step manner".

#### How Does an Electric Car Work?



#### There are 6 important components of Electric Cars:

NJIT also discusses the most important parts including the battery, motor controller, electric engine, regenerative braking, drive system, energy efficiency and environmental impact.

Let's hone in on that last aspect--energy efficiency.

"It should come as no surprise that environmental impact is one of the most persuasive arguments for the electric car.

Research has indicated that even those all-electric vehicles charged using the dirtiest areas of the U.S. power grid still produce less pollution than gasoline-fueled cars. Electric vehicles reduce energy consumption in a number of ways, including by automatically turning the engine off while idle, which would not be efficient for conventional vehicles.

Plus, users of these cars can save \$1,000 or more annually compared to the cost of a gasoline-fueled vehicle."

Logical next question...

#### What does it cost to charge an electric car?

The cost of electricity throughout the U.S. varies much more than gasoline does, but its cost over time is more stable.

<u>Plug In America -- How Much Does it Cost to Charge an Electric</u> <u>Car?</u> "All of the electricity we use in America is domestically produced, and that's a large part of why the cost remains stable. The average cost of electricity in the US is 12 cents per kWh. Therefore, the average person driving the average EV 15,000 miles per year pays about \$540.00 per year to charge it.".

#### Energy.gov - Alternate Fuels Data Center

The article above entails charging plug-in electric vehicles at home, complying with regulations and electricity costs.

Two great tools to help determine a vehicle cost:

Vehicle Cost Calculator (Department of Energy-DOE)

Advanced Vehicle Testing Activity (Idaho National Laboratory)

The True Cost of Powering an Electric Car

Focus on low kilowatt-hours, not cost per gallon

#### Is it easy to charge an electric car?

All electric cars come with a standard charging cable that plugs into the car and, via a domestic plug, into a normal wall socket. It's the same plug you'd find on your TV, which means you can charge at home in your garage or on your driveway if you have an outdoor socket.

TheChargingPoint wrote a **Beginner's Guide on Electric Cars**.

It covers:

- Safety
- Practicality
- Charging
- Range
- Types
- Charge time
- Costs
- Environment
- Incentives
- Weather

How long does it take to charge an electric car?

To answer this question you need to understand the different aspects of charging.

Fleetcarma does a great job at defining some of the key terms.

**On-board charger:** The actual charging device for Level 1 and Level 2 charging comes factory-installed and is called the " on-board charger."

**Level 1 Charging:** The slowest form of charging. Uses a plug to connect to the on-board charger and a standard household (120v) outlet.

**Level 2 Charging:** Uses an EVSE (electric vehicle service equipment) to provide power at 220v or 240v and up to 30 amps.

**DC Fast Charging:** Some refer to this charging as Level 3 charging. In this case, the charger is a gas pump-sized machine.

Compared to the time you need to fill your tank with gas, EV drivers face much longer charge times.

#### **Typical Charging Times for Popular Vehicles**



image credit: FleetCarma

\* level 1 approximately 4 miles per hour

The time to charge a car could be as little as 30 minutes or up to 12 hours. It depends on your battery size and the speed of the charging point and car.



### Federal Electric Car Tax Credit

According to U.S. News & World Report, the "federal electric car tax credit is only available on certain electric and plug-in hybrid vehicles, and the maximum amount available on any vehicle is based on the capacity of its battery pack."

While all battery-electric vehicles presently available for sale are eligible for the full amount, not all plug-in hybrids are.

Here's a few facts:

- 1. Credit is only available for EV's that can be charged from an external source.
- 2. Credit also is only available on new vehicles (must come from the factory noted as "electric vehicles").
- 3. Pre-owned or those converted from gas to electricity are not eligible.
- 4. Those entitled to the credit, need to be the top name on the title of the vehicle.

5. Credit does not carry from year to year and it will only pay if you owe federal tax. (consult a tax professional for advice on alternative ways to help if you do not owe).

#### How Do You Obtain the Tax Credit for Your EV?

You'll need Form 8936 from the IRS for the most current year. The form is titled <u>Qualified Plug-in Electric Drive Motor Vehicle Credit</u>.

Here are a few more helpful resources:

Plug-In Electric Drive Vehicle Credit (IRC 30D)

Electric Vehicle Tax Credits: What You Need to Know

Federal Tax Credits for All-Electric and Plug-in Hybrid Vehicles

"All-electric and plug-in hybrid cars purchased in or after 2010 may be eligible for a federal income tax credit of up to \$7,500. The credit amount will vary based on the capacity of the battery used to power the vehicle. State and/or local incentives may also apply."



### **Opportunity for Suppliers**

It may be the right time to fully embrace electrification.

"For traditional auto parts suppliers, the electric car may prove to be the meteor that wipes out the dinosaur."



image credit: Flickr

Which Suppliers Will Survive the Electric Era?

A recent study from Paul Eichenberg; Detroit's Strategic Consultant

for the Automotive Industry, concludes as many as "75 of the industry's top 100 suppliers will face irrelevance by 2030 unless they establish a niche in the market for electrified cars."

In addition in "2020 or 2021, Continental expects its electric drive business will generate sales of about \$1.2 billion, up from an estimated \$152 million this year. To fuel this growth, the company announced it would spend an additional \$351 million by 2021 to <u>develop EV products</u>.

Some of the products they are developing are "EV charging systems, electric axles, AC/DC converters, battery management systems and electronics."

The Shift to Electric Vehicles is Accelerating - And Suppliers Should Take Notice

The looming adoption of EVs represents a tremendous opportunity for suppliers who are willing, able, and proactive enough to take advantage.

"The shift to electric cars means that OEMs (original equipment manufacturer) will be looking for suppliers who can use their expertise to make their lives easier, whether it be a component or more towards the software side."

If you are looking to break into the industry for the first time, consider the <u>prototyping methodology</u> models. It's important to understand prototype models are best utilized when the desired system needs to have a lot of interaction with end users. It allows you to design a working "prototype" or early sample of what's to come.

#### Who Will Become the World's Biggest Electric-Car Battery Supplier?

Three major companies compete today to supply the lithium-ion cells that make up the bulk of today's electric-car battery market.

#### Daimler Reveals New Battery Supplier for Future EVs

"SK Innovation is planning to strengthen its position in the global battery market with differentiated performance and technology, while reinforcing relationship with the current customers such as Daimler, to prepare for strong growth of the electric vehicle market"

#### Suppliers Likely Won't See Big Money From EVs for Years

BorgWarner CEO sees slow growth. "I think in about five years is when you see that move up," BorgWarner CEO James Verrier said at the Deutsche Bank Global Auto Industry Conference".

"If today is the baseline, in years five, six, seven you're going to see that ramp up.

Then it's going to grow at 20 per cent? Eighteen per cent? Seventeen per cent? None of us knows. But to get to that, you're going to have to see an inflection point in years four and five."



### **Final Thoughts**

For all my EV enthusiasts, National Drive Electric Week is an annual celebration and outreach effort that consists of EV activities staged in cities coast to coast and internationally.

The goal is to "share the experience of electric vehicle owners and bring information about the many reasons to adopt EVs to consumers, policymakers, the media, and the general public."

The future looks bright for the electric car.

Electrical engineers will be leading the change in the auto industry.

## Do You Have An Automotive Lighting Idea That You Want to Make a Reality?

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