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What Will Accelerate EV Adoption?

Survey Says: Wireless Charging

Introduction

As the most widely accepted method of transportation, cars have changed the way people live all over the world. Considering their impact, it's hard to believe that it's only been 100 years since the first mass-produced automobile became publicly available in the 1920s. Fast forward to 2021 and there are nearly 1.5 billion cars on earth (with 1 in 5 of those in the U.S).[1]

From seatbelts and power windows to anti-lock brakes and forward-collision warning, cars are continually evolving. With the advent of electric vehicles, this gradual evolution has become a revolution. The transition from internal combustion engine (ICE) vehicles to electric vehicles (EVs) will be as jarring of a change as the transition from horse and buggy to automobiles.

But as we're migrating from the old to the new, it's hard for us to shake loose of the framework we know. The one thing EVs have in common with their ICE predecessors today is plug-in charging—the literal reinterpretation of the gas pump. But unlike gas stations, charging stations aren't everywhere. As a consequence, adoption of EVs beyond the technology-loving early adopters will be challenging, because we can't quite get our minds around the differences between EVs and ICE vehicles. The result? Range anxiety.

What will take to get us over the hump?

To find out, WiTricity sponsored a study conducted by TideWatch Partners, an independent market research firm, to measure how people feel about EVs, charging alternatives, and both the barriers to and the drivers for adoption. We looked at existing EV owners, those who plan to purchase an EV sometime in the next 18 months ("EV Intenders"), and those who would consider one in the next 5 years ("EV Considerers"). This study has been initially conducted in the United States across more than 1,000 car owners, and the results are eye opening.

[1] "How Many Cars Are There In The World in 2021?" Hedges & Company. October 4, 2021.

The Summary

Consumers today see charging as a hassle for EVs. The hassle comes in multiple forms, but it's real. Wireless charging significantly reduces that hassle and increases the likelihood of EV purchase.

Overall, there are three key elements that need to come together that this whitepaper will detail.

1. **Education.** EV Intenders and EV Considerers worry about charging – but they shouldn't. EV Owners have largely conquered their fears, realizing that their average daily driving distance is well within range of modern EVs. (The clear exception is cross-country or long-distance driving, of course, but that's the exception, not the rule.) To accelerate EV adoption, we need to amplify the learnings from current EV owners to help others assuage their concerns.

2. **Better charging options that simplify life.** The availability of wireless charging options significantly increases the likelihood of EV purchase by all of those surveyed. Everyone agrees that wireless charging makes charging easier and more convenient. It's also safer, more reliable, and more accessible.

3. **Experience.** As a corollary to education, more EV owners will beget more EV owners. EV owners today have a Net Promoter Score (NPS) of 81 – off the charts.* As this community grows and shares their experiences, they will bring others along with them.

*NPS is a widely used market research metric to assess customer experience programs. It measures the loyalty of customers to a company or experience.

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First ... What is Wireless Charging?

Everyone has a different idea of what wireless charging is. To ensure consistency in respondents' answers, here's the description that was provided:

The wireless charging solution for electric vehicles is capable of charging vehicles simply by parking your car, truck, or SUV over the ground charging pad. The charger can be installed either on top of the driveway or garage floor, or directly in the ground. The device is available in low, mid, and high-ground clearance versions to handle the full range of passenger vehicles, SUVs, and light trucks. It is able to maximize efficiency and power delivery over a very broad range of parking alignment, battery voltage, and power conditions. All you have to do is park, so you don't have to remember to plug it in or turn it on, and it charges at the same speed as today's Level 2 plug-in chargers. It would work with any electric vehicle with wireless charging enabled.

It requires professional installation similar to 240-volt/Level 2 plug-in systems. There are no moving parts and can be installed indoors or out. It will operate in all temperatures and will function safely in rain and snow.

Owners are Attuned to Developments with Wireless Charging

Wireless charging is a new concept for many car owners. But it's not surprising that 65% of EV owners have heard something about the approach, compared to just 32% of Intenders and just 9% of Considerers. Although many people are confused concerning the details, there's very high interest in the concept.

I've heard they are working on a pad or unit to install in driveway or garage that you park over to use a wireless charger to charge your vehicle.

Seems like the simplest option to charging the car and it would definitely increase my likelihood of buying an EV.

Awareness of Wireless Charging Concept

EV OWNERS 65%

EV INTENDERS 32%

EV CONSIDERERS 9%

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Section 1

Education

EV Intenders and EV Considerers worry about charging – but they shouldn't. Charging away from home is respondents' greatest concern. In fact, "range anxiety" is one of the most common reasons considerers are still considering, and not intending. But range is not the issue. In fact, the average distance traveled per day is less than 100 miles – 97 miles to be exact, well within range of today's EVs. This need is easily addressed with home charging, and fully 74% of EV owners do most of their charging there. Only 14% report using a public facility, and 12% charge at work. Reinforcing the idea that range anxiety is not an issue is the data, which demonstrates that EV owners worry the least about range among all three respondent types. With the exception of cases of long-distance or cross-country travel, range should not be perceived as an issue.

WHY DO NEARLY

3/4 of the respondents do the majority of charging at home?

- Slow, consistent charge
- No need to worry
- Car is always charged in the morning
- Safe environment

Looking into the details, it's those people who have not yet purchased an EV, or intend to do so, who have concern. Sixty percent (60%) of the Considerers are worried about charging on a road trip. They also worry about the cost of charging away from home (49%) and charging at work (46%). In contrast, just 29% are worried about the hassle of charging at home.

Of course, if wireless charging stations were abundant in parking lots, curbside, and urban areas, charging for day-to-day travel wouldn't be such a hassle; you'd simply get a "power snack" every time you park. Most range concerns simply go away.

We need to amplify the learnings from current EV owners to help alleviate the concerns of others

EV Owners have largely conquered their fears, realizing that their average daily driving distance is well within range of modern EVs. To accelerate EV adoption, we need to amplify the learnings from current EV owners to help alleviate the concerns of others.

What is Power Snacking?

Just as you snack to replenish your energy throughout the day, your EV can snack as well. Power Snacking™ is your EV's ability to continually replenish its power supply each time you park – at home, office, restaurant, or store. Each snack extends your EV's range so range anxiety is no longer a concern. There's no worrying about safety due to bad lighting or unsafe neighborhoods. And no uncertainty about whether the plug works or not. With wireless charging pads buried underground, there's no vandalism, no maintenance, and no unsightly charging stations along the street or in the parking lot.

With wireless charging, power snacking is as easy as park and charge. Drivers do not have to deal with plugs and arms full of groceries or kids.

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Section 2

Better charging options that simplify life.

It's one thing to think about the concept of wireless charging, but how many consumers would actually be interested in purchasing a new EV if wireless charging was available? The availability of wireless charging options significantly increases the likelihood of EV purchase by all of those surveyed. Everyone agrees that it makes charging easier and more convenient. It's also safer, more reliable, and more accessible.

Owners were already likely to purchase an EV again (91% very or extremely likely), and the wireless solution pushes the likelihood of a new purchase even higher (93%). The likelihood of purchasing an EV when presented with a wireless solution significantly increases for Intenders (60% to 80%), and Considerers (35% to 59%) – speaking to the impact wireless charging can have on sealing the deal for EV purchase.

Digging deeper into consumers' interest level, nearly 60% think wireless charging is something all EV owners will want, and a nearly equal number think wireless charging should become the standard way to charge EVs.

Likelihood to Purchase EV with Wireless Charging Solution

EV OWNERS
95%

EV INTENDERS
80%

EV CONSIDERERS
59%

I think this is an extremely efficient way to charge, as you will never forget, and it will charge automatically. It solves the issue of having to plug in.

I LOVE the idea of just parking my car and it starts charging once I shut the car down!

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Interest in Wireless Charging is Very Strong

The survey results reveal an overwhelming interest in wireless charging for EVs, with 81% of the respondents across EV owners, intenders, and considerers – alike – stating they were "very" to "extremely" interested in an EV equipped for wireless charging. And if you add in "somewhat interested," that total rises to an incredible 96%.

Q: How interested are you in an EV that is equipped for wireless charging?

Very to Extremely Interested

96%	86%	86%	84%	77%	63%
EV OWNERS	EV INTENDERS	MALES	GENX	FEMALES	EV CONSIDERERS

According to a June 2021 forecast by IHS Markit, 32% of all U.S. cars sold in 2030 are expected to be fully electric, with another 4.2% expected to be plug-in hybrids. Given that 81% of American car owners today are very or extremely interested in wireless charging, that could be 65 million less vehicles using plug-in chargers ... and all the problems that come with them.

32% of all U.S. cars sold in 2030 are expected to be fully electric.[2]

[2] Automotive Industry Solutions-Research, Analysis, & Forecasts. IHS Markit.

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Why the Great Interest in Wireless Charging?

Nearly two thirds of consumers surveyed think charging an EV wirelessly is easier than a plug-in. They also find it more convenient. In fact, more than 63% would like to see wireless charging offered in public parking areas' EV charging stations.

The plug is an impediment to EV purchasing, particularly for the EV Considerers.

40% worry they'll forget to charge

39% worry the charger will be broken or get stolen

31% worry that another driver in the house will forget to charge

Early adopters of EVs have been primarily men. In California alone, some 70% of EVs registered have been registered to men. Charging stations aren't always in the most attractive (or safest) parts of town, and it's not surprising that people may feel vulnerable getting out of their car to wrangle with the plug. Our survey supports this:

Plug-in charging concerns plague both men and women.

MEN	EV CHARGING CONCERNS	WOMEN
29%	Charger lost or stolen	40%
27%	Forget to charge	42%
21%	It's a hassle	27%

With wireless charging becoming ubiquitous, and most new cars being sold with a wireless charging vehicle assembly (based on buyers' preference), consumers won't have to worry about stolen chargers, forgetting to plug, or even the hassle: they just park, and charge. Remember when cell phones were new, and we differentiated between our cell phones and our home phones (land lines)? Kids today don't even think of their phones as 'cell' phones – they're simply phones. It will be the same for charging. What was plug-in charging?

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Section 3

Experience

With a Net Promoter Score of 81, EV owners really like their EVs. They are the best advertisement for the industry and the more EV owners there are, the more non-EV owners will convert to electric vehicles. As the EV community grows and shares their experiences, they will bring others along with them.

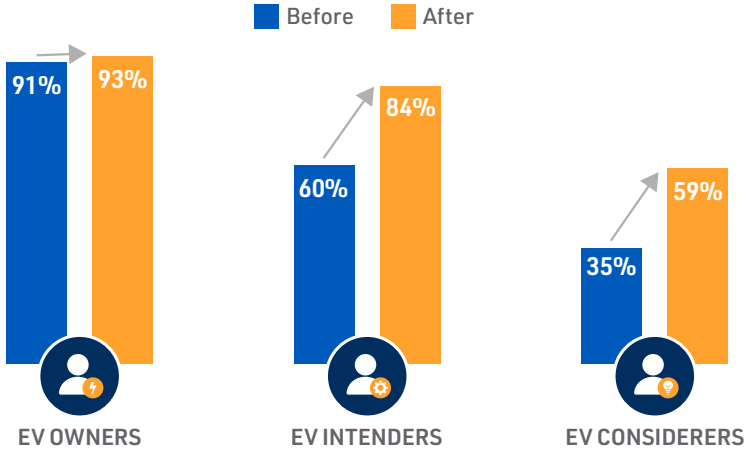
Going beyond the concept, car owners WANT wireless charging. In fact, 81% are very to extremely interested in it. This rises to 96% for EV Owners and 86% for Intenders. In other words, nearly everyone who owns – or intends to own – an electric vehicle is interested in wireless charging.

Wireless Charging Increases Purchase Interest

Owners are already likely to purchase an EV again, but the wireless solution pushes this desire even higher. For those considering an EV, the likelihood to purchase one with wireless charging increases dramatically.

Interest in EV Before and After Viewing the Wireless Solution

% Very or Extremely Likely to Acquire EV



Once someone sees the wireless charging solution, they're more likely to get a new EV – even if they already own one. While 91% of Owners are extremely or very likely to get a new EV in the next 18 months, the percentage jumps five points to 93% after viewing the wireless solution. The percentage jump for Intenders is even greater – 40% - from 60% for extremely, or very, likely to get a new EV in the next 18 months to 84% after viewing the wireless solution. And for those considering an EV, the likelihood to purchase in the next five years increases 68%.

Once someone sees the wireless charging solution, they're more likely to get a new EV – even if they already own one.

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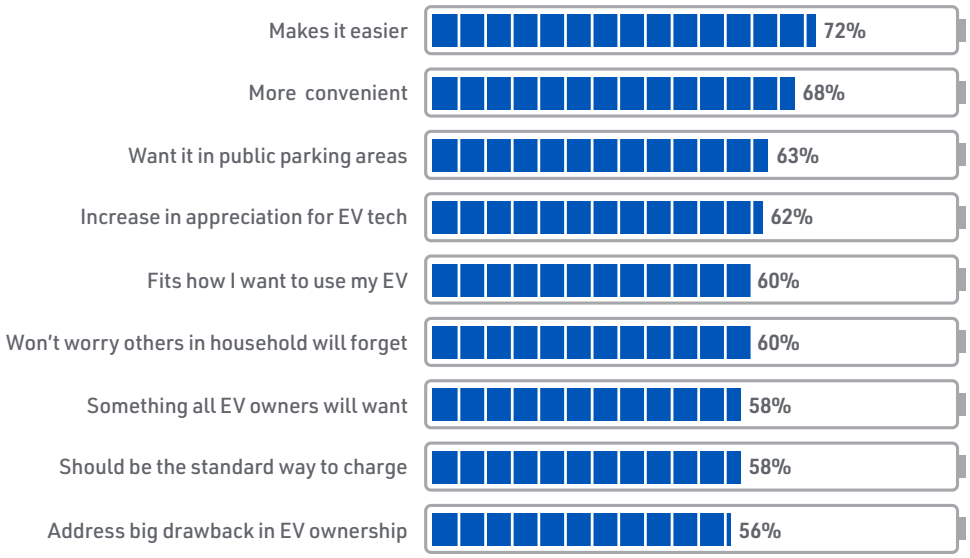
Why is Wireless Charging of Interest?

It comes down to two words: Ease and Convenience. 72% of all respondents say wireless charging will make charging easier while 68% say it will be more convenient. Sixty percent (60%) also feel that, with wireless charging, they won't have to worry about others in their household forgetting to charge the vehicle.



Conclusion

EVs are quickly moving beyond early adopters. In just a few short years, EVs will be the majority of vehicles available from car manufacturers. The 18-month timeline for Intenders is quickly shrinking as is the timeframe for Considerers. Wireless charging is part of this acceleration. Everyone agrees the wireless solution makes charging easier and more convenient, and most also say it is something they would like to see in public EV charging stations.

EV car owners want wireless charging and Intenders become Considerers and Considerers become Owners once wireless charging is available. Carmakers and Tier 1 suppliers need to accelerate their plans to include it across a broad range of vehicles.

Everyone *thought* charging plugs were a problem – from maintenance to hygiene and inconvenience to expense – but now we *know* it's a problem. As policy makers think about infrastructure, it's important to not just focus on DC Fast Chargers (DCFC). Yes, they're necessary for long-distance road trips, but we shouldn't try to recreate the massive filling station model when so many EV owners currently charge at home, and most people drive less than 100 miles a day. It's also important to ensure tech neutrality, not specifying "the plug" as incentives are offered through municipal, state, and federal programs. Drivers want wireless charging, and it should be available – along with DCFC – so drivers can power snack throughout their day.

The three key elements to accelerate adoption of electric vehicles is education, better charging options that simplify life, and experience.

The three key elements to accelerate adoption of electric vehicles is education, better charging options that simplify life, and experience. Along with these factors is planning. As the EV market grows and infrastructure plans are put into place, now is the time for builders and planners to look at new construction and work to bring the electrical conduit through to every parking space. It's time to make wireless charging a reality for urban dwellers – whether in single-family homes or multi-unit dwellings. Office, retail, hospital, and hotel construction should also include wireless charging in their parking lot designs so everyone who has an EV – or intending or considering purchasing one – can take advantage of easier, more efficient charging opportunities.

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WiTricity has many resources to help you stay informed about wireless EV charging.

- Stay in-the-know by subscribing to our monthly **newsletter:** https://witricity.com/newsletter
- Check out our other **white papers:** https://witricity.com/media/additional-resources
- Watch **videos** that bring wireless EV charging to life: https://witricity.com/media/videos
- Read our **blog** with posts featuring keen insights and information on the hot topics surrounding wireless EV charging: https://witricity.com/media/blog

About WiTricity

WiTricity is the pioneer in wireless charging for electric vehicles, leading the development and implementation of magnetic resonance technology across passenger and commercial vehicles alike. The company's products are backed by an extensive patent portfolio critical to ratified global EV wireless charging standards including SAE, ISO, and GB. Automakers and Tier 1 suppliers rely on WiTricity to help accelerate the adoption of EVs by eliminating the hassle of plug-in charging and setting the stage for future autonomy. Beyond EVs, WiTricity technology is indispensable to the wireless charging of all products, from consumer electronics to micro-mobility to robotics.

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