

From Grid to Charger – How the Electrical Contractor Can Win in the EV Space

Matthew Young, Business Development Leader, E-mobility Infrastructure, ABB

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KEY TAKEAWAYS

- EV adoption is rapidly accelerating, with multiple factors driving this acceleration.
- When considering the e-mobility market, it involves more than just the car.
- There are multiple aspects in creating the charging infrastructure.
- Opportunities in the EV market are available now and in the near future, for both infrastructure and service providers.
- ABB provides equipment to support the electrification of the infrastructure for electric vehicles.

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OVERVIEW

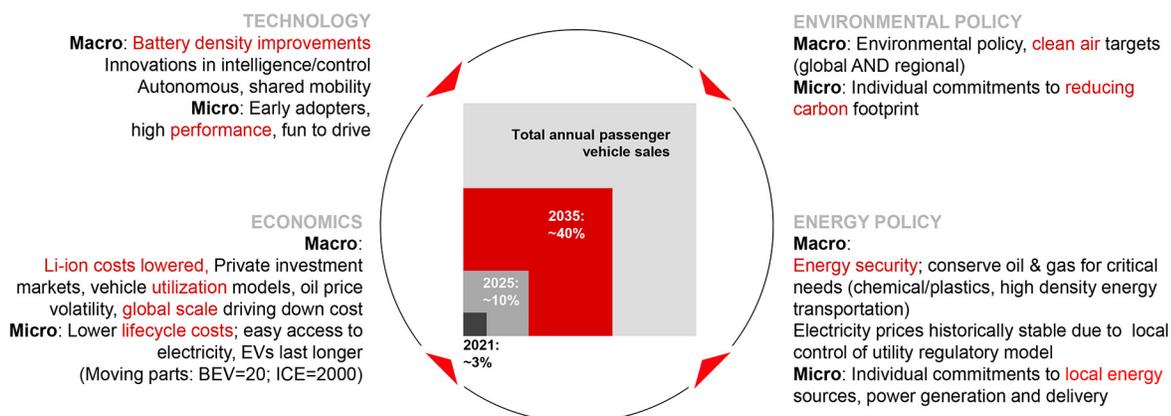
Electric vehicles (EVs) represented 4% of all new cars sold in the United States in 2021 and are projected to represent 30% of new cars by 2030. An entire infrastructure is required to support EVs, including chargers, gear and components, and upgrades to the electric grid. In total, e-mobility is predicted to be a \$100 billion market in the U.S. by 2030; this is a once-in-a-generation opportunity with enormous revenue potential for electrical contractors (ECs). EVs create additive revenue opportunities for ECs in both residential and commercial markets. Understanding where these revenue opportunities lie—now and in the future—as well as their funding sources can help savvy ECs win new business.

ABB understands the important considerations for grid-to-charger electrical distribution systems, charger types, power levels, equipment needs, and more. ABB offers world-class technology for a wide range of applications and installations in the EV market, helping ECs electrify the United States for EVs.

CONTEXT

Matthew Young shared information on trends driving EV adoption, what the EV market looks like now and in the future, opportunities for revenue for ECs, and how federal funding impacts the electrification market. He also discussed ABB's role in the EV market.

Figure 1: Reasons driving EV adoption and charging



KEY TAKEAWAYS

EV adoption is rapidly accelerating, with multiple factors driving this acceleration.

Changes driven by EV adoption are creating new revenue opportunities for ECs.

The actual number of electric vehicles sold in the US in 2021 doubled compared to 2020, ultimately reaching 4% market share by the end of 2021. Globally, electric vehicles represented 8.5% of car sales.

Electric vehicles sales are accelerating for four main reasons:

- **Technology.** Battery performance has improved, which in turn improves the performance of electric vehicles. "These cars are extremely fun to drive and have amazing performance," said Mr. Young.
- **Economics.** Meanwhile, battery cost is dropping, which is a major driver in the acceleration of EV adoption. In 2010, one kilowatt hour for a battery pack cost approximately \$1,200. In 2021, the cost was \$132. As the cost nears \$100 per kilowatt hour, EVs will be cheaper to produce than gas cars. Additionally, the cost of maintaining an electric vehicle has decreased over time. Finally, private investment both by auto manufacturers and others has surpassed \$500 billion.

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- **Environmental policy.** Significant changes in policy, including the infrastructure law in the United States, are driving climate policy and adoption of low-carbon technology. Almost every state now has a target for lowering emissions/EV adoption and incentives for charging.
- **Energy policy.** Utility regulation and utility commission proceedings and rate cases are providing funding for charging.

BloombergNEF predicts that by 2033, about 50% of vehicles sold in North America will be electric. Electric passenger cars are expected to comprise 30% of new sales in the United States by 2030. Electric transit buses are predicted to comprise 50% of all new bus sales by 2030.

This [growth of EVs] means that an estimated 13 million chargers will be needed in the U.S. . . . which is about \$100 billion of electrical hardware investment.

Matthew Young, ABB

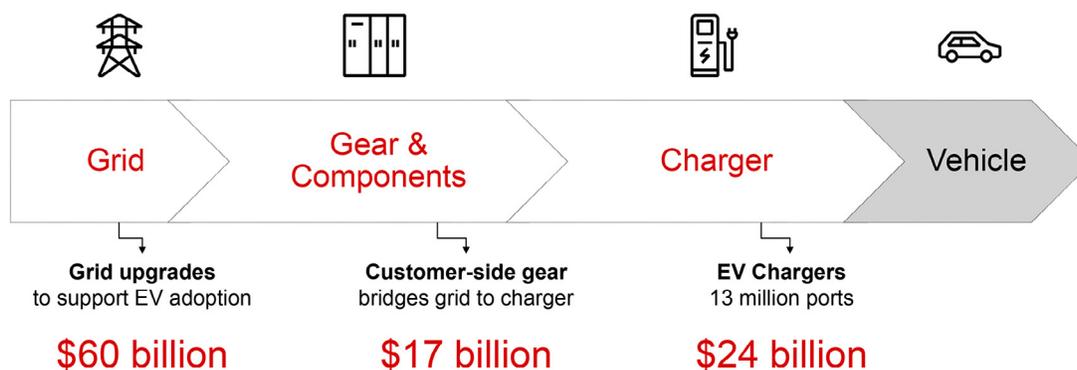
This accelerated adoption of EVs translates to a significant demand for chargers. In a 2020 report by the Brattle Group, it was estimated that for 20 million EVs on the road by 2030, 13 million chargers will be needed, representing approximately \$100 billion of electrical hardware investment and another \$20 billion of services. This trend is already occurring as in 2021 there was a 20% increase in the number of charger ports in the United States.

When considering the e-mobility market, it involves more than just the car.

There are four main parts to electric vehicle infrastructure and maintenance: the grid, the gear and components, the charger, and the vehicle.

As cars electrify, energy is going to move away from liquid refueling infrastructure toward electrical infrastructure. Each area of the market offers billions of dollars in opportunity. The total e-mobility infrastructure opportunity is estimated to be \$100 billion by 2030, composed of grid upgrades (\$60 billion), gear and components (\$17 billion), and EV chargers (\$24 billion).

Figure 2: Four main areas of e-mobility create a \$100 billion US addressable market by 2030



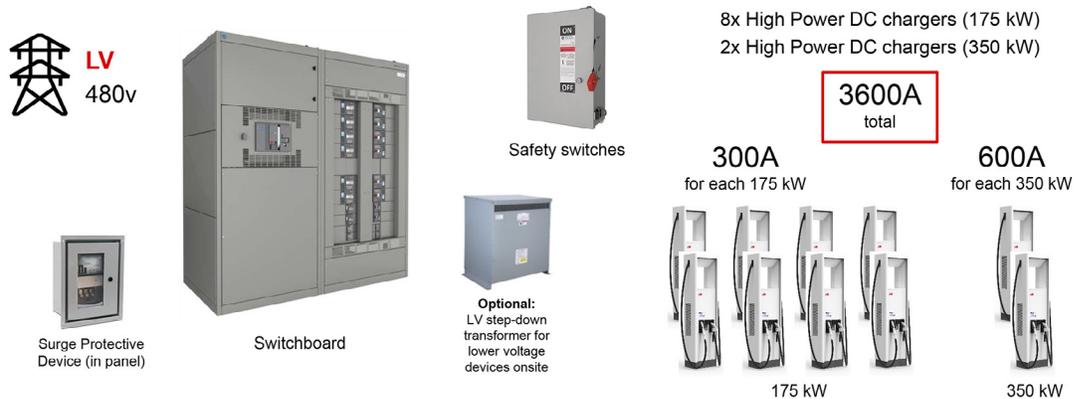
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Figure 3: Charger and gear electrical components to meet the requirements of one example application: DC High Power

DC High Power – 175 kW or 350 kW

Highway corridor travel, metro ‘charge and go’, large fleet, OEM R&D

5-30 minutes



Just outside of the grid, the market for chargers and the gear behind the chargers is predicted to be an additional \$40 billion. And, these estimates may be low. Based on recent accelerating trends, the total addressable market may now be \$110 or \$115 billion.

This means all new electrical infrastructure in a lot of places . . . it's just going to be a huge build that is going to be installed by electrical contractors and a lot of it is going to be invoiced by electrical contractors. It's a pretty game-changing time in the electrical space."

Matthew Young, ABB

There are multiple aspects in creating the charging infrastructure.

In the charger market, there are many different types of chargers, but two main types of charging:

- **AC** (alternating current). AC is usually measured in hours.
- **DC** (direct current). DC is usually measured in minutes, which is orders of magnitude faster than AC.

Power level measures (kilowatts) are based on the speed of charge for a given type of charger, which is dependent on the vehicle's ability to take a given speed of charge.

Application of chargers varies. For example, level 2 charging (available in most residences) is capable of charging a vehicle overnight, while level 3 DC fast charging can charge a car in less than an hour, with even higher-powered charging completed in less than 15 minutes.

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Upstream from the charger is the circuit breaker. Depending on the charger type, the upstream circuit breaker recommendation varies correspondingly, requiring a range of circuit breaker options as well.

On the services side, some end users opt for separate utility services for EV charging, whether to make it easier to meet grant funding requirements, to facilitate the addition of new servers and equipment rather than upgrade existing hardware, or to meet future bidirectional charging needs.

Start with where the customer is, where the end-user is, and what type of charger they are looking for. Then, do the back-of-the-envelope math on the upstream circuit breakers so you get a sense very quickly for what type of installation you're looking at.

Matthew Young, ABB

Opportunities in the EV market are available now and in the near future, for both infrastructure and service providers.

Large opportunities in the EV space exist now, such as building the electrical infrastructure for delivery fleets, charge point operators, convenience fuel stations, and charging integrators. Other opportunities coming soon include large rental fleets, hotel operators, commercial property managers, local fleets, multifamily dwellings, retail and shopping centers, large parking decks, and more. The government and utilities, as well as transit bus fleets and auto dealers, currently represent a significant opportunity for electrical contractors, with school bus fleets and airport operators close behind.

The National Electric Vehicle Infrastructure section of the Infrastructure Investment and Jobs Act provides a total of \$5 billion over five years to all 50 states for EV investment (including chargers related equipment, and electrical installation). The law has defined a goal of creating a national public charging network with a minimum of four 150-kilowatt chargers every 50 miles along major highways.

These opportunities do not only exist for the charger and gear for charging markets. Utilities also have significant EV opportunities, including:

- Electrifying their own fleets
- Forming or joining regional utility coalitions to create highway charging networks within their region
- Make-ready programs that go beyond the meter to produce a site ready for charging
- Grid upgrades, including transmission, distribution, grid-side energy storage, power generation, and more

Utilities all across the country have been preparing for this for years. If everybody switched to EVs immediately, the world would need about 25% more electricity than it makes now. I'm convinced that when people see the benefits of electric vehicles and the payback time on them, we're going to find a way to make it work. And the good news is that it's not a surprise for us. We will make it work.

Matthew Young, ABB

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Figure 4: Four main areas of investment for utilities

Utility fleets

Utilities will electrify their own truck fleets over time.



Roadside charging

Many utilities will build and operate roadside charging stations, opening new revenue streams. They may also join utility coalitions to create regional highway charging networks.



Make-ready programs

Utilities go beyond the meter to produce a nearly-complete “stub” site for a charger.

The utility locates, designs, builds, maintains, owns, and operates infrastructure connecting the customer meter to the charger without owning the charger itself.



Grid upgrades

Electricity demand will rise due to EV adoption and charging, requiring large investments from utility companies.

U.S. Utility Investments (20 million EVs by 2030) ¹



Three of the top potential funding sources for these investments include:

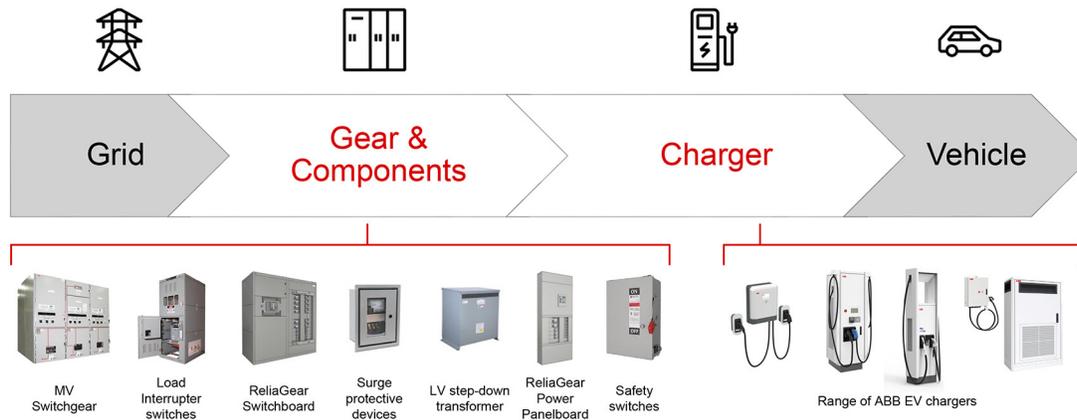
- **Utility rebates.** Utilities sometimes fund make-ready programs or offer make-ready rebates to end users where a complete “stub” site for a charger is installed.
- **State rebates.** Depending on the state, various departments, such as the Departments of Transportation, Energy, Commerce, or Ecology, or even city-level Departments of Transportation, sometimes offer rebates for the installation of EV charging electrical equipment and chargers. Twelve states have adopted the Zero Emission Vehicle program, which offers incentives for manufacturers and buyers to go electric.
- **Volkswagen (VW) settlement funding.** As part of a settlement with VW, funding was set aside to support clean vehicles and charging infrastructure across the United States. This is state funding awarded to cities, towns, and public agencies for local projects.

ABB provides equipment to support the electrification of the infrastructure for electric vehicles.

“ABB has been electrifying the United States for more than 100 years,” Mr. Young said. The ABB family of companies offers world-class EV market technology, including breakers, electrical boxes, panels, switchboards, and chargers, all built with innovations that make installation easier. And ABB’s reliable tech support and customer service provides the support you need, when you need it.

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Figure 5: ABB offers products for every phase of the EV market



ADDITIONAL INFORMATION

For more information, visit

<https://electrification.us.abb.com>

BIOGRAPHY

Matthew Young

Business Development Leader, E-mobility Infrastructure, ABB

Matthew Young is the U.S. Business Development Leader for E-mobility Infrastructure at ABB Electrification, a global leader in electrical products and solutions operating in more than 100 countries. At ABB, Matthew creates growth strategies for EV infrastructure and helps develop strategic partnerships for ABB in the grid-to-charger space. Prior to EV infrastructure, Matthew held leadership roles for communications teams across multiple industries.