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Deploying EV Chargers: The Gap Between Expectations And Realities

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Abstract

After years of preparation, the electric vehicle industry is gathering real momentum. However, while the outlook for growth is largely positive, several significant charging infrastructure and deployment issues must be resolved before purchase, installation, and deployment of electric vehicle charging stations becomes more seamless and less challenging. To attract business and retail organizations considering EV charger deployment, the EV industry must make charger installation as understandable, convenient, and easy as possible. Customers, in turn, need the information that will help them make the decisions required to effectively deploy and operate EV charging stations. The industry must also work across silos to make the process much more integrated—if not seamless—for its customers. At the very least, it has to provide consistent, useful tools and information for potential customers. This paper gives an overview of the purchasing and deployment process from the point of view of the customer, addressing ten of the most common disconnects between vendors and influencers in the "EV world" and commercial customers considering onsite deployment of EV charging.

Keywords: business model, charging, education, infrastructure, market

1 Introduction

After years of preparation, the electric vehicle industry is gathering real momentum. The impetus: realizations on the part of drivers and vendors that electric vehicles can play a significant role in reducing carbon emissions—and supporting stable U.S. energy policy.

However, while the outlook for EV industry growth is largely positive, a number of significant charging infrastructure and deployment issues must be resolved before purchase of electric vehicles—and, more crucially, purchase, installation, and deployment of electric vehicle charging stations—becomes more seamless and less challenging.

2 Current Landscape

2.1 Consumers: Supporting Behavior Change

Early adopters act as influencers of the mainstream market. Even though they accept some inconvenience, excessive frustrations will be relayed to family, friends, and community. Resolving these issues sooner rather than later will inspire influencers to share positive experiences—and speed EV adoption in general.

With EV adoption, as with many environmental practices, behavior change is necessary for widespread success—and behavior change becomes easier with added convenience. If the process for installing chargers is not convenient

and easy, fewer people will voluntarily make the change to EV.

Consumers considering EVs, for the most part, focus on the car rather than the charging. They expect charging to be turnkey and easy, seeing the details as someone else's problem. To attract consumers, the industry must take such attitudes as impetus to get this complex process right.

2.2 Businesses: Revenue Concerns

In turn, business and retail organizations considering EV charger deployment must understand that this activity is unlikely to produce revenue in its initial stages. Perhaps the decision does not "pencil out" for the CFO but makes long-term sense to the CEO or VP of marketing. Pursuing sustainability initiatives—and by doing so, retaining key employees—should be seen as a long-term investment.

2.3 The Hazards of Siloing

Participants in the EV charging industry tend to focus on their respective business silos: charging manufacturers develop hardware and software, utilities provide power, governmental agencies regulate, installers bid to complete the construction process. While this segmentation is understandable, it can have negative consequences for individuals and businesses exploring charging station deployment. These potential customers quickly become confused by a complex, nonlinear process that ranges from information gathering to decision points to deployment realities. To make the decisions required to effectively deploy and operate EV charging stations, customers must educate themselves about these issues and many more—and the way is far from clearly marked.

3 The Voice of the Customer

Evolvelectric is an independent San Francisco Bay Area electrical contractor with a focus on the EV charging market. This paper is based not on formalized academic or industry-sponsored research, but instead on our direct experience guiding and supporting our customers through the highly complex purchasing and deployment of EV charging stations.

At Evolvelectric, we believe that the EV industry must work across silos to make the process much more integrated—if not seamless—for its customers. Doing so means integrating those silos, understanding the nuances of customers' expectations and challenges. At the very least, the industry must provide consistent, useful tools and information for potential customers. If these issues are not addressed now—before the EV charging industry scales from early to mainstream adoption—the result will be widespread frustration, with a direct effect on the success of the industry.

For the last 18 months, Evolvelectric has worked to help residential customers, retail businesses, and commercial real estate customers understand the issues of EV charging. In this time, we've found again and again that customer expectations do not match up with the complex process required for actual EV charger deployment. Prospective customers must amass and understand enormous amounts of detailed information, execute on a highly complex workflow, and make numerous decisions. With limited support from charging manufacturers and corporations, they want someone to guide them through the process. They might turn to contractors to bid on and install the equipment—but most installers lack the professional-services perspective and experience needed to address corporate business model issues. Property owners and managers confronted with this disordered process and lack of resources become confused and concerned.

This paper provides an overview of the purchasing and deployment process from the point of view of the commercial customer, addressing ten of the most common disconnects between vendors and influencers in the "EV world" and commercial customers considering onsite deployment of EV charging. The hope is that presenting these issues can spur the industry to generate new solutions.

3.1 The Coming EV Revolution

Corporations and businesses often question whether or not the "EV revolution" is real. While they may find the production numbers of electric cars announced interesting, at this point business leaders seldom see such positive data reflected on the streets or at public charging environments. As a result, they may wonder if putting in a charging station is a necessity; they begin to question the financial implications of deployment and ROI. Most companies are in business to meet a need or serve a pent-up customer demand; in their eyes, a supportive senior executive or two, give or take a few youthful environmentalists, does not a commitment to EV charging make.

- **EV World Expectation:** "It's all good. If you install them, they will come."
- **Customer Reality:** "If this is real, how come I don't see it yet? And you're saying you want me to spend money on nonessentials now—in this economy?"

3.2 EV Charging: Business or Service?

Corporations are not yet comfortable with the idea of contracting with an EV service provider for long-term network services. The idea that they could be responsible for setting up fees for charging services is also challenging. It can be a further challenge to understand the business models of EV manufacturers. It can take years for even more traditional IT vendors to "crack" a corporation; to even be considered, vendors must be seen as stable over time.

- **EV World Expectation:** "Trust us to run these networks in partnership with you. We'll be economically fair and provide the features owners desire."
- **Customer Reality:** "I have to consider my vendor as an economic and technical partner, not just an equipment provider. That makes my risk of doing business greater, and my decision process more complex."

3.3 EV Charger Vendors, Networks, and Product Selection

Manufacturers' long-term business models are centered on charging for network services. Corporations must now evaluate vendors on criteria beyond simple hardware specifications, aesthetics, and pricing. Meanwhile, few if any "independent value-added service providers" are positioned to help business and corporations understand differences among vendors. Electricians are called in to bid on installation jobs, not to provide information; rather than acting as impartial advocates, most electricians either partner with a single charging manufacturer or bid on prespecified equipment.

- **EV World Expectation:** "If you contact me, I'm going to do all I can to sell you my chargers and get you into my network."
- **Customer Reality:** "Where can I get independent information comparing all the different chargers on the market? Where can I research the reputations and performance of the companies providing this equipment?"

3.4 Utility Requirements and Rates

Most corporate decision makers for EV services know little to nothing about existing utility rates, rate tiers, or the cost implications of EV charging. Understanding rates, or deciphering time of use and tired payment structures, can be a complex task. Add to that load calculations based on projected EV charging sessions—and setting EV session rates for employees and visitors can be daunting. Utilities, meanwhile, are concerned with the ability of local transformers to handle demand from EV chargers; each installation must therefore be registered with the utility (if only so it can upgrade infrastructure to support customer needs). The utility application/registration process takes time and requires technical knowledge.

- **EV World Expectation:** "The utilities are on top of this; they're structuring rates to incentivize EV charging."
- **Customer Reality:** "I'm not clear on how the utilities charge for rate tiers. When do higher fees kick in? How can I plan for increased fees?"

3.5 Site Selection and ADA Striping and Signage

Where should EV charging sites go? Factors to consider include visibility, ease, and cost of deployment. Power rooms are generally in the back of the workplace, away from highly visible spaces. Corporations and business tend to want to "turn" spaces, rather than have a car sitting for hours with a plug in it. Americans with Disabilities Act requirements may come into play here; accessible spaces require more square footage and may become a gating factor. The addition of signs, bollards, and wheel stops change the aesthetics of the environment and may raise concerns from architectural partners.

- **EV World Expectation:** "Choose the most visible spaces for the EV chargers—it will raise awareness and get more users."
- **Customer Reality:** "Parking lot layout is already challenging. I want to maximize efficiency—but what if I dedicate a space and it isn't used? It costs a lot to get power to that one parking spot. It is worth it?"

3.6 State and Local Laws and Permits

California—like many states—has no standard building codes for EV vehicle charging stations. Many municipalities and government agencies

have created initiatives to draft guidelines; a lot of thought has gone into these, and many are excellent. Meanwhile, each city planning department handles applications for EV charging differently: some treat a station as a simple plug and require little paperwork, while others force applicants to embark on a full-blown planning department adventure complete with plan submission and multiple reviews. The absence of standards, combined with the complexities of regulating both public and private property, suggest that it will take some time for government entities to come to a consensus.

- **EV World Expectation:** "This is a simple device. We want planning departments to streamline the process."
- **Customer Reality:** "Dealing with government is already far too complex. it's a simple installation—are you telling me I need to do all this for a permit for a simple plug?"

3.7 Power and Electrical Infrastructure Review

Not every power room in a corporate environment is at once accessible, labeled, and convenient to potential EV parking spaces. Most often, a house engineer must be consulted on the building's incoming power level and how that power flows between house and tenant metering. Once power is tracked to specific subpanels, EV chargers require significant dedicated space on breaker panels to be available. Understanding power availability is critical. The challenge is not how to put in enough power for two charging stations—it's how to design or upgrade an infrastructure to support 50.

- **EV World Expectation:** "Today, this is a relatively simple installation; all we need is a 40A dedicated circuit. Long term, we'll figure out how to power 50 parking spots in a shopping center."
- **Customer Reality:** "I might have power now, and if I don't, I can see it's a relatively easy upgrade. But how can I maximize the time and money I'm spending now to upgrade my infrastructure? This stuff costs a lot. Can't I do it right once and be done with it?"

3.8 Installation Requirements

Once how to handle power is determined, the next challenge is wiring that power to the location. Often, installers must forge new pathways from power rooms to charging locations, a process that requires installing conduit, drilling through walls, and—in some environments—taking core samples and X rays. Companies may also need to consider trenching to get wiring to the chosen location and concrete pads to attach bollards or chargers. All of these elements require time, money, and the expertise of a professional electrician.

- **EV World Expectation:** "Wiring is simple. It's just a question of distance from the power room to the charging spot."
- **Customer Reality:** "It could be a long way to the location I want—and it's very expensive to run wires, cut concrete, and install chargers. It adds a lot to the overall cost of deployment."

3.9 Government Rebates and Incentives

While some government incentives may still exist, the main federal tax incentive—a 30% rebate on EV charging station installation costs—no longer exists. A bill has been introduced in the House of Representatives to repeal the $7,500 tax credit for the purchase of electric cars. Soon, we'll see a true market-based economy for electric cars.

- **EV World Expectation:** "Federal and state support is critical to early market adoption, and necessary to help the industry get off the ground. You can still get chargers for free."
- **Customer Reality:** "Federal tax credits for installation are going away. Deploying these stations just got more expensive—now I can't write it off."

3.10 EV Network Software Training

Once chargers are installed, who will manage them? Is this person empowered to set corporate policies? To understand, monitor, and present utility costs? Is formal software training and ongoing support available? Who will reconcile utility payments with network software payments to ensure that the corporation is appropriately reimbursed, and to track ROI?

- **EV World Expectation:** "Setup and provisioning is easy. We'll do most of it—just tell us how you want to set up user classes and charging fees."
- **Customer Reality:** "I have no way of knowing about user classes, and I have no idea whether

I'm charging too much or too little. Where do I find the best practices and market information that can help me set expectations?"

Author

John Kalb is a partner in Evolvelectric, where he is responsible for EV charging infrastructure. Before joining Evolvelectric, he consulted for clients in the data storage and multimedia industries. He has a passion for creating revenue from emerging trends. Mr. Kalb attended San Francisco State University.