

Transcript for #81. The Process and Planning Needed for EV Charging
Guest Jenna McDavid, Associate; Electric Vehicles Practice Director, Kimley-Horn
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Introduction (00:01):

You're listening to Fueling the Future of Transport, hosted by Tammy Klein, the founder and CEO of Transport Energy Strategies. We'll talk all about the fuels and energy it takes to keep the world moving forward.

Tammy Klein (00:17):

Welcome to the program everyone. Thanks for joining us today. I am so pleased to have with me Jenna McDavid. Jenna is an Electric Vehicles Practice Director with Kimley-Horn. So we are really going to get into what I like to call the bits and nuggets of electric vehicle charging. And for those of you that have been listening this year, especially in the latter half of this year, we've really done a lot of perspectives and brought in a lot of perspectives on electric vehicle charging, especially in North America. And we're going to continue that for the next few shows. But I'm really excited to have Jenna with us today because we talk more broadly about what the future is going to look like and what the sales are going to be and what are the policies. But to actually have someone come on and talk about what the process is like and what's involved in terms of installing charging is really, really exciting. And I think you're gonna learn a lot today. So, with all that said, Jenna, welcome to the program.

Jenna McDavid (01:26):

Thank you so much, Tammy. I'm so happy to be here.

Tammy Klein (01:28):

I'm happy to have you. So Jenna and I were both on a panel at the conference where I was just talking about what's the future going to look like, what's it gonna be like? And I was really happy to be on the panel with Jenna and I learned so much from her as frankly another panelist. And I'm like, 'Hmm, we have to have Jenna on the program.' So let's get into it. So for the listeners who may not be familiar, can you talk about Kimley-Horn, what it does, it's connection into the EV space and and your role?

Jenna McDavid (02:05):

Sure. So Kimley-Horn is one of the largest engineering planning and design firms in the US. I've been with the firm for about a year and I'm still learning about everything we do. We do transit and transportation planning and urban design and aviation and energy and mechanical, electrical, structural engineering, roadways and bridges and traffic and parking and landscape architecture, more and more. There's 6,500 of us in a hundred offices across the US. In the EV charging space, we've been involved for more than a decade. We've planned, designed and or permitted more than 15,000 chargers in more than 40 states. In the US, we do level two and DC fast charging for major network operators for national private clients across industries. We do fleet electrification for transit agencies and airports and seaports and local and regional governments and a whole host of other public and private clients. So it's a really exciting time to be involved in this space, and it's really exciting to work for a firm that touches it from so many different angles.

Tammy Klein (03:09):

So what is the process of planning and designing for EV charging really look like? What is for someone who really doesn't know a whole lot about this space? What's really involved?

Jenna McDavid (03:25):

I would say the process is a little different depending on the type of client and what their business objectives are and where they are in the process. So we have some clients that have large portfolios of sites across the country or within a specific state or region, and they ask us for help deciding where and when to deploy chargers across all their sites. So they're trying to decide which sites and which order, how many and what types of chargers and that sort of thing. We have other clients who have a specific site in mind and they need help figuring out what types of infrastructure are best suited to that site. Then we have some clients who have the site and the infrastructure selected, and they just need support from that point forward. And then a lot of our fleet clients have some of these same considerations coupled with trying to identify how many chargers do they need, what's the right placement of those chargers, what are the right types of chargers to support their operations?

(04:21):

So across all of those different sort of pieces, once the site has been selected, there's a multi-stage process that we go through. The first step is to assess the site and figure out exactly where to put the chargers. So this has a lot of opportunities and constraints that relate to how the site is used, where the existing infrastructure is placed and so on. The next step is to actually design the charging installation and develop the construction drawings, and then we go to the permitting process. So once the permits are in place, the site moves to construction and installation. And of course, during all of this, there's a lot of work happening behind the scenes. So we need to understand the cost associated with all the stages. We need to understand the available electrical capacity at the site, the utility's ability to serve that load when they can provide the power. And some of our clients also need assistance with things like parking policies or what's the right pricing structure for customers when they're using the EV chargers asset management planning and a whole host of other considerations.

Tammy Klein (05:26):

Wow. So what are the biggest challenges in your view with...you just talked about that whole sphere. So what are the biggest challenges within and around all of that?

Jenna McDavid (05:37):

I think there's maybe four broad groups of challenges. The first relates to cost. The second relates to reliability and the customer experience. The third is around access and accessibility. And the fourth is around power. So starting with cost, EV charging infrastructure can be expensive. DC fast chargers can cost anywhere between \$30,000 to \$150,000 and more depending on their power delivery capabilities. And then you need to consider the cost to bring electricity to the site, the cost for construction and installation, the cost for operations and maintenance. The National EV Infrastructure formula program, the NEI program, which is part of the bipartisan infrastructure law, there's seven and a half billion in funding there to support DC fast charging, but even that's not gonna be enough to build out all the charging infrastructure we need. Not if we're gonna support electrification across all types of vehicles in all different places, and we also need to think about the pricing structures for charging.

(06:35):

It needs to be affordable, or the transition to EVs will be financially untenable for a lot of drivers, so that's the cost piece. Then we have reliability and customer experience. So you know, you just had Kameale Terry from ChargerHelp! on the show. She knows more about this than most and I'm sure that you've heard about the study from UC Berkeley earlier this year, they went to more than 650 EV

chargers in the Bay Area public chargers, and found that like a quarter of them were not operational. Um, that's a problem.

Tammy Klein (07:07):

Its a huge challenge. Yes.

Jenna McDavid (07:08):

And you know, that NEI funding, I mentioned the DC fast charging sites funded with NEI dollars need to maintain 97% uptime. So getting from where we are now to that point is a big hurdle, and we have a lot to do as an industry to make that happen. So performance is a big part of the customer experience, but so is the customer interface at the charger, and there are a lot of fault with the payment system on the chargers that contribute to their downtime, which again, leads to a negative customer experience. And I also wonder about these payment platforms from an equity perspective. So a lot of public chargers require credit cards to use them, and there's somewhere between 15 and 20% of Americans who do not have credit cards. So a lot of the card-based systems might be exclusionary by default.

Tammy Klein (07:54):

Oh God, I never even thought about that before. But that would be a huge issue.

Jenna McDavid (07:59):

And you know, there's some transit operators or EV car share programs that are targeting folks who have credit access issues. So this is a surmountable challenge. There's ways to get around it, but it, it's gonna require a lot of careful planning, I think. The third piece here, in terms of challenges, I think access and accessibility. So we want to share equal access for everyone regardless of geography, of income, of housing type of ability. And then we want to make sure that community members of all ages and abilities can use infrastructure. So is there enough space for me to get out of my vehicle in a walker or a wheelchair or with another assistive device to move comfortably around the chargers, move comfortably around the vehicle to access the charging? We could spend a whole show talking just about access and accessibility issues.

(08:44):

And similarly, we could spend a whole show just talking about power. So we need to think about powering all these chargers. And there's some studies that suggest the electricity utility or the electric utilities can generate enough power to serve all the EVs. But getting that power to a lot of the sites where it's needed is expensive. It can take months or even years especially considering some of the supply chain issues around some of the infrastructure. And we also need to think about how best to manage when the vehicles are charging and try to spread that EV charging load around the clock, rather than having everyone's EV charger come online at the end of the workday, whether they're at home or they're using commercial vehicles. So there's a ton of other challenges here. You know, how do we futureproof these technologies? How do we ensure access to the benefits of EVs to folks who don't want to, or can't afford to own their own vehicle? You know, how do we support transit electrification, access to micro-mobility options? So we're just scratching the surface here. In terms of the types of challenges.

Tammy Klein (09:46):

Just from your perspective, do you see these issues? I mean, I see these are all surmountable issues and I see them being addressed in this decade. Am I wrong? Do you think it'll take a little longer in some

cases? But you know, I think this is the decade of fixing, kind of setting up the system and getting it working.

Jenna McDavid (10:13):

I sure hope so, <laugh>, I think if nothing else, we will make progress. I have tremendous faith in the individuals who are working on this. I think a lot of us are you know, it's a job, but it's a passion project. You know, we care deeply about a lot of the issues that we're talking about. You know, again, access and accessibility, reliability, ensuring a positive customer experience. These are really important components. So I think we'll see headway. I don't know if we'll work everything out in a 10-year period, but like I said, I sure hope

Tammy Klein (10:45):

So, gaps will start to close.

Jenna McDavid (10:47):

Yes. Yeah, Exactly.

Tammy Klein (10:48):

Yeah, I think so too. So from your experience what are the biggest...you were talking about the 15,000 installed chargers, and I don't know if Kimley-Horn is...if that's like the biggest chunk. If Kimley-Horn represents the largest chunk of that kind of activity and installing chargers in the country. I mean, the experiences you all must have must be so profound. So what are the biggest learnings after 15,000 projects? What have you learned about what works and what doesn't work?

Jenna McDavid (11:30):

You know, I think there's an important distinction between what works from a technical perspective and what's joyful to use, I guess. We've all seen the photos and perhaps experienced. The example I always use is the EV charger that's behind the building, near the dumpster and in the dark. Oh, yes. We don't want that.

Tammy Klein (11:55):

You'll never get the women <laugh>

Jenna McDavid (11:59):

Who are thinking about safety and you know just wanting to have a positive user experience. So there's the technical components and then there's the usability or again, it's like, is this going to be a positive experience for me? I think ensuring that positive customer experience, I think that's priority one in some respects. We're not going to see mass adoption of EVs if there's this broad perception that charging is a pain or it's frustrating, or again, like I can't do it unless I put maybe my safety at risk by going into places I don't really feel comfortable being.

(12:44):

I think a lot of the conversation has been focused on the user experience from the perspective of the person pulling their car out to the charger to use it. But there's another user group or another customer group that I think is worth thinking about. And clearly I have a vested interest in this, given what Kimley-Horn does, but a lot of the folks who are deploying the charging infrastructure are our clients. Uh, those folks are customers, they're utility customers. Their customers are charging infrastructure providers, like I said, they're customers of ours. Right. I've touched on how deployment can be expensive. It can be

time-consuming. I think the industry in general has a lot of work to do to improve these experiences across the board.

Tammy Klein (13:26):

So it would be like the fueling chain stations, convenience stores taking the risk, rolling the dice and putting these chargers in. You're right. There are a huge group of folks that are investing, looking to invest in this space for their customers. And I hadn't really thought about it from the customer experience, from their perspective that, oh, this might be really difficult for them in some sense, depending on how, how it all goes down.

Jenna McDavid (14:08):

Yeah. And I think again, the focus has been on the end user, and I think that's an appropriate place for, for us to be focusing again, because we need to make sure that the folks who are using the infrastructure are set up to have an enjoyable, successful experience. But again, I would like to see the process of deployment, there's some kinks there that I think we need to iron out a little bit.

Tammy Klein (14:36):

So Yeah. So the biggest, one of the biggest, learnings from your perspective is considering their experience as well. So that means having a product for them. The customer doesn't go inside the store yelling at the clerk or whatever because the station doesn't work or the reputational issues that may occur when a station isn't quite working, but it's the network operator station and all that. But that's really kind of the thing that you're sort of talking about here.

Jenna McDavid (15:10):

I think so. And I think some of my engineering partners might have a different perspective to bring to the table. My background is in planning and I've done a lot of customer research. And so I always think about how do we make sure that the folks that we want to adopt a technology or to use a technology or to access something can do that. And not that they just...not simply that they can like, muddle through it, but that it can be an experience that delights them. And again, going back to that behind the building, near the dumpster in the dark, that's not a delightful experience. From an engineering perspective, that might be a well-designed station. It might be the best position in terms of access making the shortest conduit run and getting to the electrical room in terms of position, it's the closest parking stalls or something like that. But again kind of taking that other perspective of we want to make sure that this is a delightful experience for folks.

Tammy Klein (16:10):

Right. So, okay. I'm going to ask you a question about authorities having jurisdiction. So when we talk about authorities having jurisdiction, which for the listeners are called AHJs and really talk about states and localities, could be counties, could be cities, could be metropolitan organizations. So from your perspective, what's it like to work with AHJs and how knowledgeable are they outside of California and then maybe the Northeast, which those are the two areas of the country where there's a higher, I guess we should say, a degree of electric vehicle penetration and more charging. So what's it like to work with them and what would make the process of expanding charging easier from the regulatory perspective? You didn't mention that as a barrier, but you know, research that I've done suggests that there some issues there. So can you talk a little bit more about that?

Jenna McDavid (17:20):

Sure. So Kimley-Horn is working with agencies of all sizes in all 50 states. So we're encountering some challenges with like you mentioned, a little bit of a lack of knowledge in some cases or even resistance. But I would say those are the exception rather than the rule. There are a lot of jurisdictions that are really excited about EV charging to them. It represents the new technology, EVs are cleaner and quieter, there's a potential for a new revenue source in EV charging. So there's a lot for them to be excited about in terms of getting EV chargers deployed in their communities. I think one of the challenges is the lack of consistency from jurisdiction to jurisdiction.

Tammy Klein (18:06):
Absolutely, mm-hmm.

Jenna McDavid (18:07):
In terms of the types of permits that are required, sometimes it's electrical, sometimes it's mechanical, sometimes it's both there's a lot of variation there. And then also in the timeframe between permit application and approval you know, that can stretch out to months and months and months, in some cases a year plus depending where you are. And in some cases it's the jurisdictions that are permitting a lot of chargers that tend to have you know, more scrutiny of the permitting process. So there's some movement toward standardization of codes at the state level. Certainly California is making strides there and then nationally. But in some jurisdictions, even if you have an inspector who's really excited about seeing an EV charging project through, if they don't have the details from their code book, they don't know what to do with it.

(19:02):
So that's a challenge. I think making it easier to expand EV charging might require a little bit more flexibility from a regulatory perspective. A lot of the standards right now, as I understand it, assume a new site a new space, a new location. They might not entirely address retrofit situation. Or adding a charger to an existing location and I know some of our clients got on board with EVs early and they already have aging infrastructure that needs to be swapped out, which is like a whole other set of considerations on this. So the zoning and the development restrictions can become a huge, huge time sink too. So sometimes your installations could impact stormwater, they could impact landscaping. So you have to look at all of it.

(19:52):
It requires a lot of time, a lot of negotiation, a lot of renegotiation either with the AHJs, the site host, the landowner there's serious staffing constraints we're seeing in a lot of the agencies. So each time you need to go back to them, the process can really stretch out. And so I mentioned that year you know, again, it's the exception rather than the rule, but we're, we're seeing some extremely lengthy processes. Uh, I did mention development of streamlined processes for permitting in a bunch of different areas.

Tammy Klein (20:29):
And I think that's on the network operator wishlist is expedited, streamlined permitting. And you do see some jurisdictions that are beginning to legislate that, New Jersey being one and there are a couple of others, but you know, this, this issue of harmony, it really is or harmonization, really is a problem. I was talking to one of the convenience store fuel providers and it's a major frustration for them because they in the same metropolitan area they may have little cities or enclaves within that metropolitan area that all have different permitting requirements and to stay on top of that and to make decisions about where you're gonna locate stores and let alone how you're gonna design the charging to accommodate is you

know, it's time-consuming and it's costly for them as well. So it is a big issue where you could go from one part of the area into one set of rules and another into something else.

Jenna McDavid (21:48):

Yeah. And you make a good point, right? So I think a lot of folks think about when they think about permitting challenges, they think, okay, let's talk about national private clients with operations in many, many states. But even if you are operating within, like you said, just a metropolitan area or you know, adjacent properties that happen to be in two different cities or two different counties there's a lot of potential confusion that can enter the process as a result of that.

Tammy Klein (22:15):

Yeah. So I wanna ask you sort of an overarching philosophical question, which I know you like, so how do you see the charging space itself? How do you see it evolving for light, medium, and heavy duty? Because you're not only...Kimley-Horn isn't only working on charging for light duty vehicles, but you're doing projects in the heavy duty space. So I'm really interested to hear how your perspective on where you see charging going and what you think about that space in particular.

Jenna McDavid (22:55):

So Kimmy-Horn has a big transit practice, and I think some of my partners who are involved in transit have been working with some of the transit agencies for a long time and planning for electrification and designing and deploying the charging infrastructure to serve them. And that's an area I think that's gonna continue to grow really rapidly. You know, there's more and more models that are being released in the light and medium and heavy duty vehicle faces. You know, we have increasing battery capacities, we're seeing range increases, and we're seeing the ability to charge even faster. The megawatt charging system officially launched that I think this last summer that's a DC fast charging connector for heavy duty vehicles. We're seeing more and more successful vehicle-to-grid applications. We're seeing billions of dollars in investments from major automakers and commercial vehicle makers. So I think we're just poised for explosive growth. We're just starting to see the beginnings of that. I think this year we saw some acceleration in the market as a result of fuel prices. That sort of EV option became a little bit more attractive. The ROI became a little bit better thinking about that. But I think explosive growth, I think that's where we are right now. We're just on the cusp of that.

Tammy Klein (24:11):

So, last and fun question, what excites you most about the space and your job and why?

Jenna McDavid (24:20):

My number one motivation in my work has always been around improving environmental quality, improving environmental health, improving public health. So EVs produce zero tailpipe emissions. They generate somewhere on the order of half the emissions of a comparable ICE vehicle, even when you include the battery manufacturing process. Right. We have a ton of work to do here. It's more than simply swapping out every single vehicle with an internal combustion engine for a zero-emissions vehicle. We need to reduce reliance on single-occupant vehicles to reduce congestion, to reduce motor vehicle accidents, to reduce pedestrian collisions. We need to make sure everyone has access to safe, affordable, reliable, clean transportation. We need to design and deploy thousands upon thousands of EV chargers in well lit, accessible spaces with accessible payment systems with high up times. These are huge, huge challenges that require experts from a lot of different disciplines to do their very, very best work very quickly. It's very important. It's personally important, and I think it's globally societally important. So if that's not exciting, I don't know what is.

Tammy Klein (25:30):

<laugh>. Well, that's great. Jenna, thank you so much for being on the program today. It was a real pleasure to have you, and to learn a little bit about the bits and nuggets of charging.

Jenna McDavid (25:39):

Well, thanks so much for having me, Tammy. This is a lot of fun.

Outro (25:45):

You've been listening to Fueling the Future of Transport. This show is hosted and edited by Tammy Klein, produced by Carolyn Schnare, and engineered by Aleksander Nicolic. To hear more great episodes of this show, learn more and sign up for a free biweekly newsletter, visit transportenergystrategies.com.