Grid integration will make or break transportation electrification

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From retailers to academics to the media, many stakeholders have started pointing at insufficient infrastructure—namely, our overextended electricity distribution grid—as the main bottleneck to accelerated transportation electrification.

The need for cleaner transportation-fueling infrastructure is undeniable, but the roadmap for how to best roll it out is still fuzzy. I touched on this in my recent blog post Arguing about which clean mobility tech to support is slowing progress. A representative from Portland General Electric (PGE) who spoke at the 2021 Asilomar Conference, hosted by hosted by the UC Davis Institute of Transportation Studies, gave an accurate summary during a session on fleet electrification:

> We don't currently know if a business customer wants to electrify its fleet. So, if you know you want to electrify, call us. We can figure out if you're ready to install electric vehicle charging infrastructure at your site, or if make-ready or grid-side upgrades are needed.

Reading this statement, you might think PGE is behind the eight ball with its transportation electrification planning, but nothing could be further from the truth. As far as utilities go, PGE is one of the most advanced in this kind of planning, and the speaker is an electric vehicle (EV) veteran.

So how do we move from one-at-a-time, reactive planning to something more holistic and proactive? More money—like dollars earmarked in President Biden's Build Back Better plan—will certainly help, but we also need to carefully and strategically plan for transportation electrification infrastructure spending, deployment, and operation. This will require close coordination, resource sharing, and employing the best data science and

technology currently available.

Learning our lessons from past investments

So far, most planning for EV charging infrastructure deployment has been top-down: allocate resources and trust that preferred solution providers will effectively deploy infrastructure in the best interests of the market and society. We've seen similar models on both the public and private sides. We don't yet know exactly how Biden's infrastructure spending will roll out, but we can look to lessons learned from the Obama-era American Recovery and Reinvestment Act (ARRA) of 2009 to understand what might happen and to avoid making the same mistakes.

Don't put all your eggs in one basket. The lead solution provider involved with the EV Project—ARRA's big EV infrastructure push—was ECOtality. That company went belly up before the EV Project was even halfway completed. The reasons for ECOtality's bankruptcy are complicated, but the lesson isn't: don't rely on just one vendor. Create a healthy ecosystem of solution providers and an effective structure through which they can collaborate with other stakeholders. Vendor diversity is important, especially in the near term, to ensure that all vehicle types and drivers are well supported.

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Just because you *can* doesn't mean you *should*. Much of the charging equipment deployed so far is underutilized. Just because a station is relatively easy or inexpensive to install, or because a site host is supportive of EV adoption, doesn't mean installing infrastructure there is a smart investment. Private network operators like Tesla and Electrify America have developed their own processes for identifying and vetting prospective station locations. Collectively, we should be working from the same playbook to make sure that future investments are sound and cost-effective and to avoid land grabs among competing interests vying for the best station locations. For recent details on what the national labs have learned about EV charging infrastructure deployment and utilization, see the National Renewable Energy Laboratory's (NREL's) Electric Vehicle Charging Infrastructure Trends from the Alternative Fueling Station Locator: First Quarter 2021 (PDF).

We need more fleet, workplace, and multifamily charging infrastructure now. There has been a lot of focus on the need for more public DC fast chargers, as well as faster-charging equipment in general, but a more immediate and pressing need is for charging infrastructure located at fleet depots, workplaces, and multifamily residences. The absence of home and workplace charging options will prevent many potential EV adopters from making the transition away from gas-powered vehicles in the near term. NREL's analysis of thousands of networked chargers shows significant recent growth in deployments of workplace and

multifamily charging stations, but more infrastructure is still needed.

We need standards to ensure proper asset management. Inoperable charging stations can leave EV drivers stranded, and refueling an EV that's "on empty" is usually not as fast and simple as filling up a gas can. Poor maintenance practices of the past have left charging stations out of commission, sometimes for extended periods of time. And this leads to low customer satisfaction and an all-around poor EV driving experience. We need standardization around how EV charging stations are managed so consumers can have consistent expectations, no matter where they choose to refuel.

Taking an integrated approach

To successfully address all of the challenges we've experienced in the past with EV charging infrastructure rollouts, we need to take a different approach to infrastructure planning, deployment, and management. Instead of continuing to operate in the Wild West of transportation electrification—where service providers fight over the best locations and utilities are simply expected to serve whatever new load pops up on their distribution grid—we must adopt a more conscientious and collaborative strategy.

As part of our strategic partnership with the California Mobility Center (CMC), E Source is attempting to create just such a structure for stakeholder coordination. We're carefully designing a transportation electrification ecosystem that, unlike other stakeholder processes, doesn't bog down innovation. Our structure will accelerate clean transportation technology deployments into the market. There are several ways the CMC and groups like it can turn such visions into realities.

Align objectives. The CMC's top priorities, objectives, and initiatives are aligned across stakeholders representing all sides of the transportation electrification ecosystem. From utilities and regulators to innovators and incumbent manufacturers, everyone has a seat at the table and a voice in creating and refining the roadmap.

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Evaluate transparently. We know that an open, collaborative environment generates more innovation faster. It also helps establish trust and buy-in among disparate stakeholders. Instead of allowing each group to evaluate emerging technologies independently behind closed doors, we encourage partners to participate in an open technology validation process.

Focus on speed to market. Evaluating new technologies and securing and spending funds may be the means, but they're not the goals. Everything the CMC does is intended to speed up the development of

emerging clean transportation technologies. There are no tech winners and losers, only potential solutions existing at different stages of market maturity and in need of varying degrees of support. The goal is to quickly determine where support is needed and strategically make it available, ensuring that we electrify and decarbonize transportation at a pace dictated by the climate emergency.

Look for "yes and" opportunities. It's relatively easy to focus on the problems or fight for the needs of just one company or interest group. It's a much more difficult challenge to listen carefully to the grievances and needs of others and attempt to support them with "yes and" statements and initiatives, especially when they don't perfectly align with or feel contradictory to your individual interests. This is the hard work or "big W" work that we desperately need, now more than ever, in all infrastructure planning and strategic market interventions taking place to accelerate transportation electrification efforts.

Optimizing infrastructure spending and utilization

We can come to an agreement on where to place resources and how to best support different technologies or consumer groups, but at the end of the day, we also need tools to help us achieve societal goals as we make infrastructure investments. We must continually ask ourselves questions like:

- Are we spending funds equitably?
- Are we making progress toward our climate goals at a sufficient rate?
- Are there critical gaps in infrastructure coverage or performance?
- Are the associated cost burdens reasonable for all stakeholders?

Utilities, cities, and other entities that are crafting and refining their transportation electrification plans and roadmaps are often relying on incomplete, isolated, static, or outdated datasets and other sources of information to inform their business and spending decisions. And in light of the many other pressures on our time and resources, it may be tempting to treat transportation electrification as a compliance-driven activity, making investments reactively and only to meet the minimum requirements of local laws and codes. Compliance is certainly a big part of the overall process, but it shouldn't be the only determining factor. If we ever hope to clear the transportation electrification infrastructure bottleneck, we need to think more proactively, holistically, strategically, and collaboratively.

Plan proactively for transportation electrification infrastructure deployments. Based on what's published in the public domain, most US and Canadian utility transportation electrification plans don't contain detailed information about exactly where they will deploy transportation electrification infrastructure over time and where we'll need upgrades to the distribution grid. Where these analyses do exist, they often only look out 5 or 10 years and rarely consider more than impacts to service-level transformers. Analyses of aggressive electrification scenarios do exist, but they're largely conducted by the national labs and lie outside of the utility planning or regulatory processes. These activities must begin to merge and inform one another. What would it look like to support 100% EV adoption?

Think holistically about EV charging infrastructure needs. No one can be faulted for the inefficiencies of the initial rollout of EV charging stations. We had never done it before, and we based our decisions on limited information. That's not the case today: we have enough data and learned enough from those early deployments to make sound business decisions about where to place new infrastructure, how much is needed, and how best to site and manage it. We need to share the best available data and information and use it to drive sound investments. We're helping utilities and other stakeholders do this now through E Source research and advisory services, consulting, our work with the CMC, and E Source EV4Sight, a collaborative transportation electrification database.

Act strategically *and* collaboratively. Unlike 10 years ago, when EVs were little more than a geeky novelty, there's a lot of movement in the market and genuine excitement about the potential for EVs to help meet our climate and equity goals. Given all the hubbub, there's a tendency to not share information, either to maintain strategic market advantage or to avoid looking foolish in the future (for example, spending money on investments that don't pan out). We don't have time for pure-play competition. We need to work together closely to support collaborative sharing within competitive markets. We can do it, but it won't happen by accident.

Get involved! And if you need help getting started with transportation electrification, contact us.

This post is part two of a three-part mobility blog series. Stay tuned for part three in the coming months!
