

Soft Costs in EV Charging Infrastructure

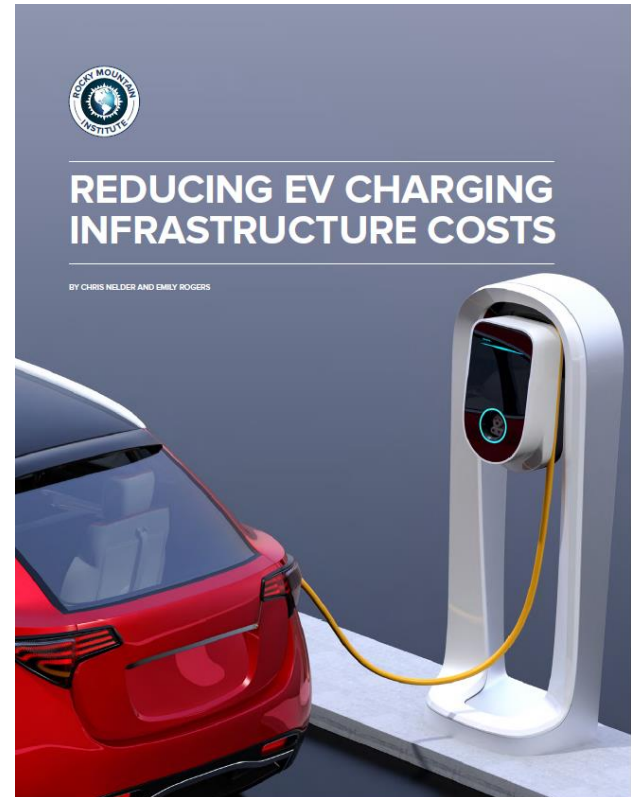
Chris Nelder, Manager, EV-Grid Integration
Rocky Mountain Institute, Boulder, Colorado USA

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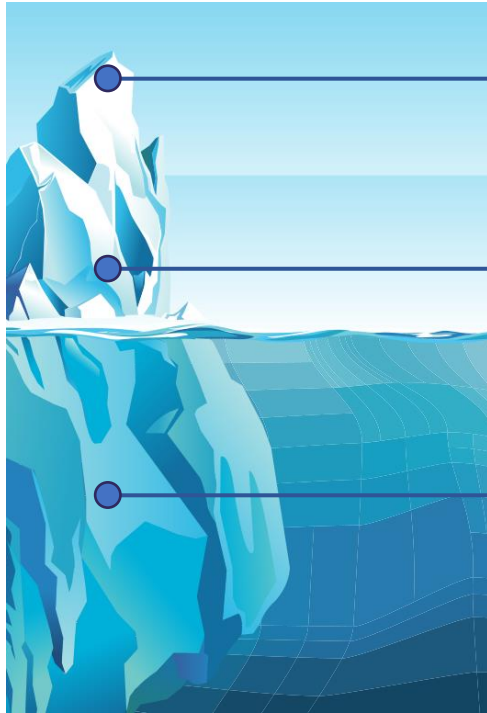


Reducing EV charging infrastructure costs

- Our January 2020 report is the first-ever compilation of EV charging infrastructure costs at the component level.
- Drawn from:
 - Literature
 - Publicly available information on utility procurements
 - 24 original interviews that we conducted under NDA with utilities, hardware providers, software providers, EVSPs, transit agencies, states, laboratories, contractors, and consultancies.
- Found that “soft costs” are some of the largest and most unpredictable costs for EVSPs (electric vehicle service providers).
- **Soft costs are poorly understood, very hard to quantify, and almost entirely undocumented in the literature.**



Procurement costs can be anticipated. It's the unseen soft costs that can sink a project.



Procurement

- Charger Hardware
- Managed Charging Capability
- Contracts

- Software
- Grid Hosting Capacity
- Make-Ready Infrastructure

Requirements

- Payment System
- Measurement Standards Compliance
- ADA Compliance and Parking Requirements

- Dual Plug Types for DCFC
- Open Standards

Soft Costs

- Communication Between Utilities and EVSPs
- Future-Proofing
- Easement Processes
- Complex Codes
- Complex and Inconsistent Permitting Processes

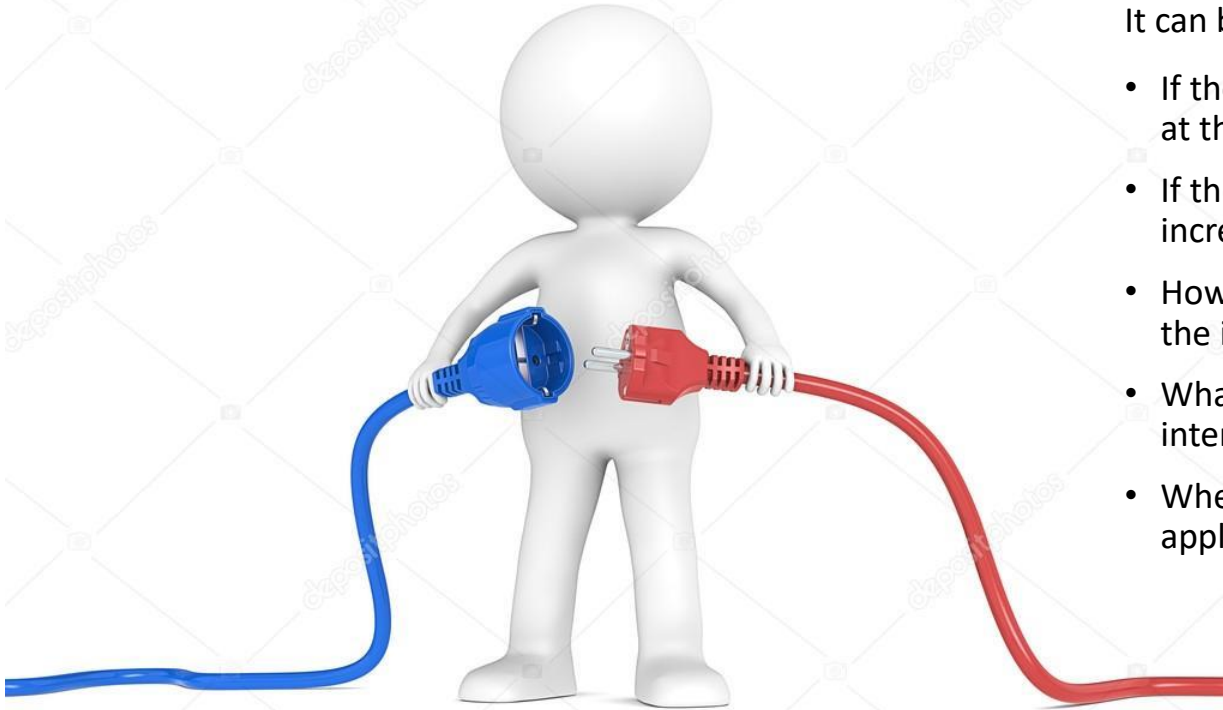
Site selection is often a large operational expense

- For a public DCFC site, EVSPs (EV service providers) often have to evaluate **2.5 – 3** sites before selecting one to complete.
- Site evaluation costs include:
 - utility interconnection options
 - engineering drawings
 - permitting requirements
- Trenching is expensive, at ~\$200 per linear foot. In one CA project, trenching alone was 18% of total project costs, and conduit was another 12%.



Utility interconnection points and conduit runs can make or break a project.

Utility interconnection processes are often opaque to EVSPs

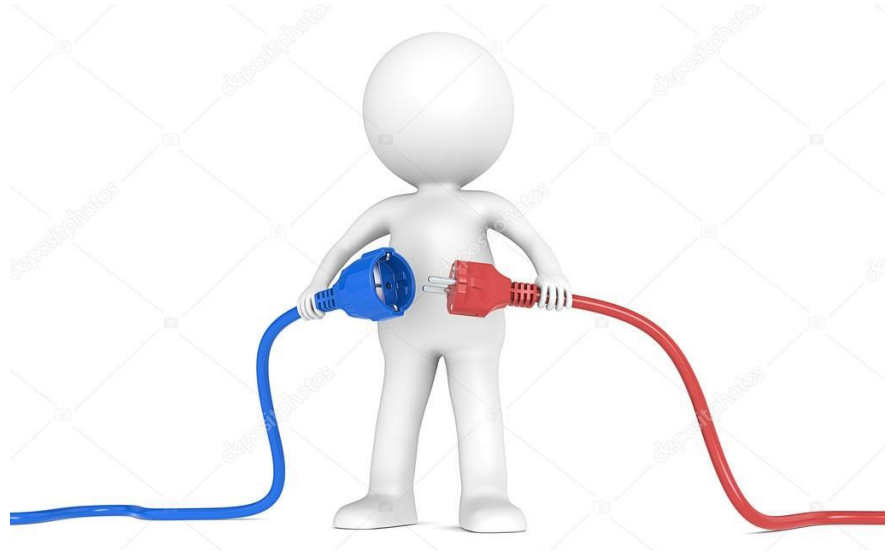


It can be hard to find out:

- If there is sufficient grid capacity at the site
- If there isn't, what it will cost to increase capacity at the site
- How long will it take to approve the interconnection application
- What it will cost to get an interconnection
- Where in the process the application is.

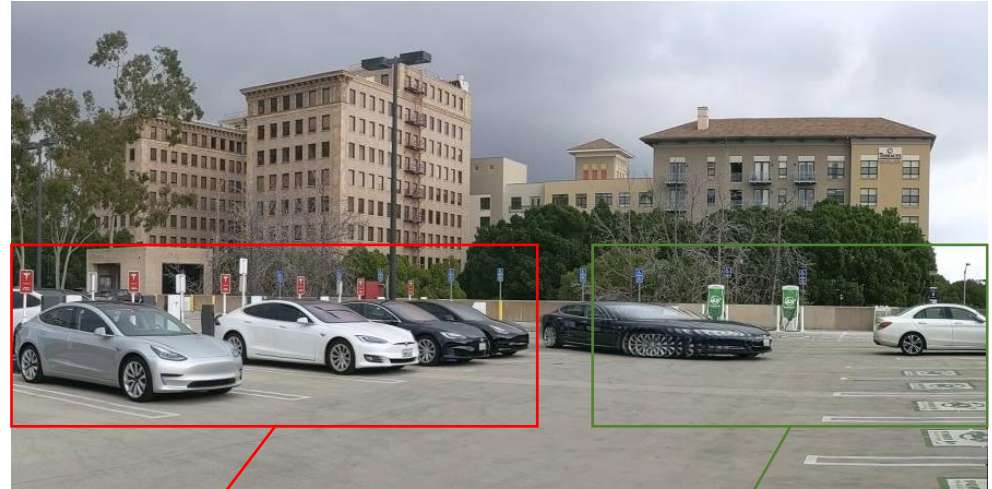
Rural utility co-ops pose particular challenges

- Requiring EVSPs to pay expensive (e.g., \$5000) membership fees just to see the tariffs they will have to operate under.
- If the EVSP discovers that the tariff is uneconomic, they can't get membership fees refunded.
- Many co-ops lack necessary information about hosting capacity and have to roll a truck to discover it.
- Line extension for larger DCFC sites can be expensive.



Duplicative work is expensive

- Multiple EVSPs building at/near a single site often do **duplicative retrenching and distribution system upgrades**.
- Could be avoided by coordinating installation and sharing costs.
- Utilities & EVSPs could future-proof a site by upgrading distribution transformers *once*, and oversizing or installing extra conduit the first time.



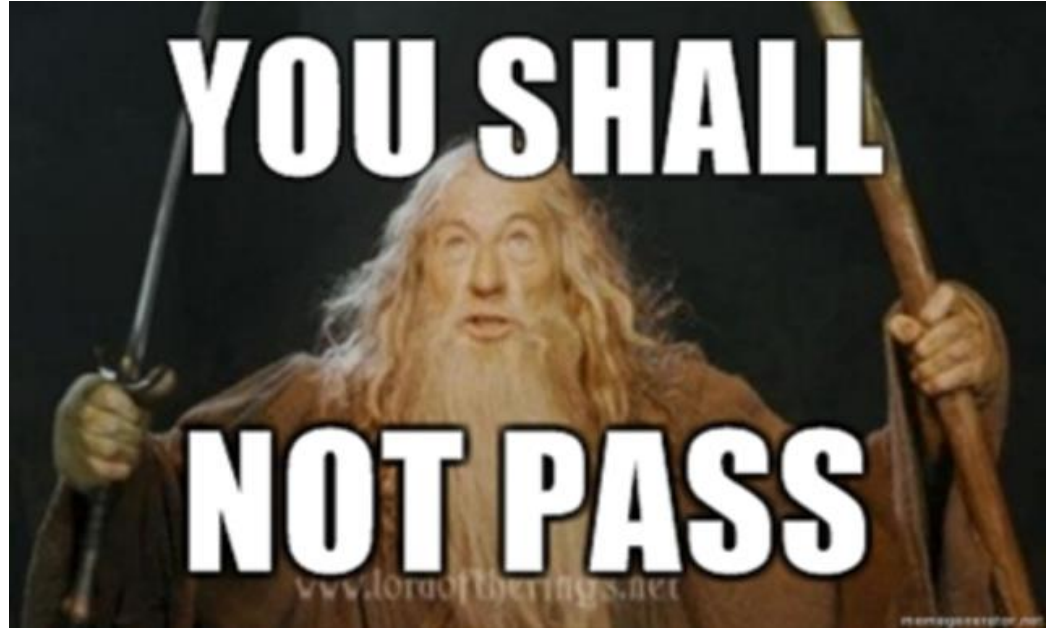
Tesla's chargers

Utility's chargers

Example: Tesla built 24 chargers and paid for the make-ready for 20 chargers that Pasadena Power & Light owns & operates at the same site, saving the utility \$140k in capex.

Utility and building department easement policies are unclear

- On average, obtaining easements takes 59 business days, but some customers have experienced up to 234 business days, causing **expensive construction delays**.
- Utility and building department easement policies can change without warning.
- Need a way to identify and standardize needed easements for conduit runs, parking spaces, equipment pads, ADA path of travel, etc.



Building codes and permitting processes are balkanized



- Building codes and permits vary by local jurisdiction.
- Documentation requirements are hard to determine.
- Permitting processes can be unclear, onerous and expensive.
- Guidance on ADA compliance is often incomplete, vague, or incorrect, forcing EVSPs to rebuild or redesign sites
- ADA requirements for charging station equipment, physical site characteristics, and parking requirements can be incompatible with charging station design & operation.



Thank you!