NARUC Electric Vehicles State Working Group

JUNE MEETING

JUNE 23, 2020

AGENDA (Eastern Time)

3:00 PM	**Welcome and Introductions (5 minutes)** • Agenda review • Roll call, by state
3:05 PM	**Presentation and Q&A: Tesla (25 minutes)** • Francesca Wahl, Senior Associate for Business Development and Policy at Tesla, will provide an overview of the siting and permitting process for public charging stations.
3:30 PM	**Presentation and Q&A: Rocky Mountain Institute (25 minutes)** • Chris Nelder, Manager in RMI's Mobility Practice, will present on a 2019 RMI report, "Reducing EV Charging Infrastructure Costs." He will also discuss rate design principles for DC fast charging.
3:55 PM	**Closed Door Discussion (30 minutes)** • Working group members will discuss their own views and the actions their states have taken to date.
4:25 PM	**Next Steps and Announcements (5 minutes)**
4:30 PM	**Adjourn**

Roll Call – Read from Webinar

Working Group Members

States:

- Arizona
- California
- Colorado
- Connecticut
- D.C.
- Florida
- Georgia
- Hawaii
- Illinois
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Missouri
- Nevada
- New Jersey
- New York
- North Carolina
- Ohio
- Oregon
- Puerto Rico
- South Dakota
- Texas
- Vermont
- Washington
- Wisconsin

National/Federal Partners:

- NARUC
- U.S. DOE
- U.S. EPA

Public Charging: Siting, Permitting, and Demand Charges

Pre-Read Materials

- Rocky Mountain Institute, *Reducing EV Charging Infrastructure Costs*. 2019.
- NARUC, *Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators*, p. 26-27. 2019.


TESLA

OUR MISSION

PRODUCT SUITE

Vehicles Semi Charging Solar Powerwall Powerpack Software

THE TESLA FAMILY

THE TESLA FAMILY – PART 2

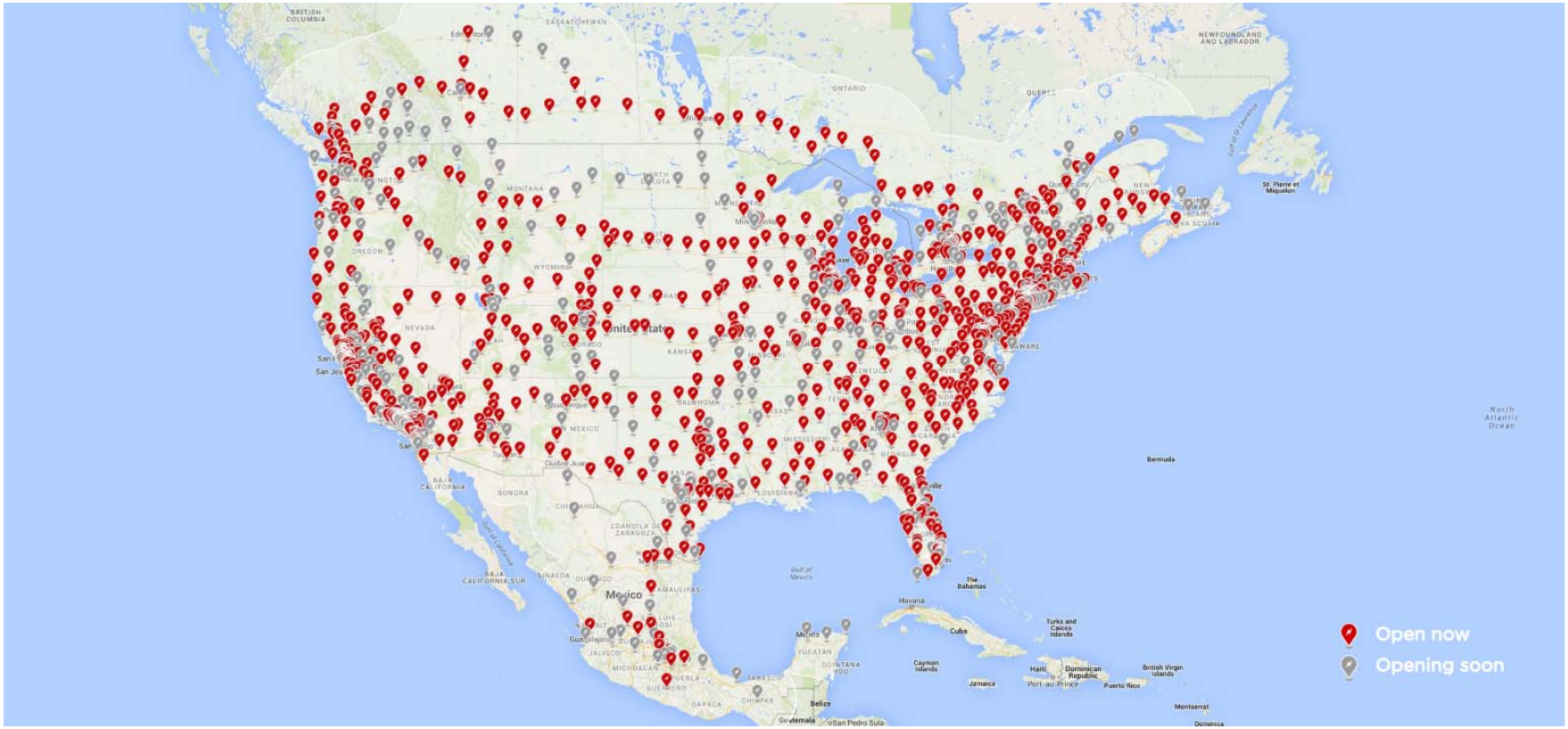
TESLA CHARGING

Supercharging

Destination Charging

Where You Park

S U P E R C H A R G I N G

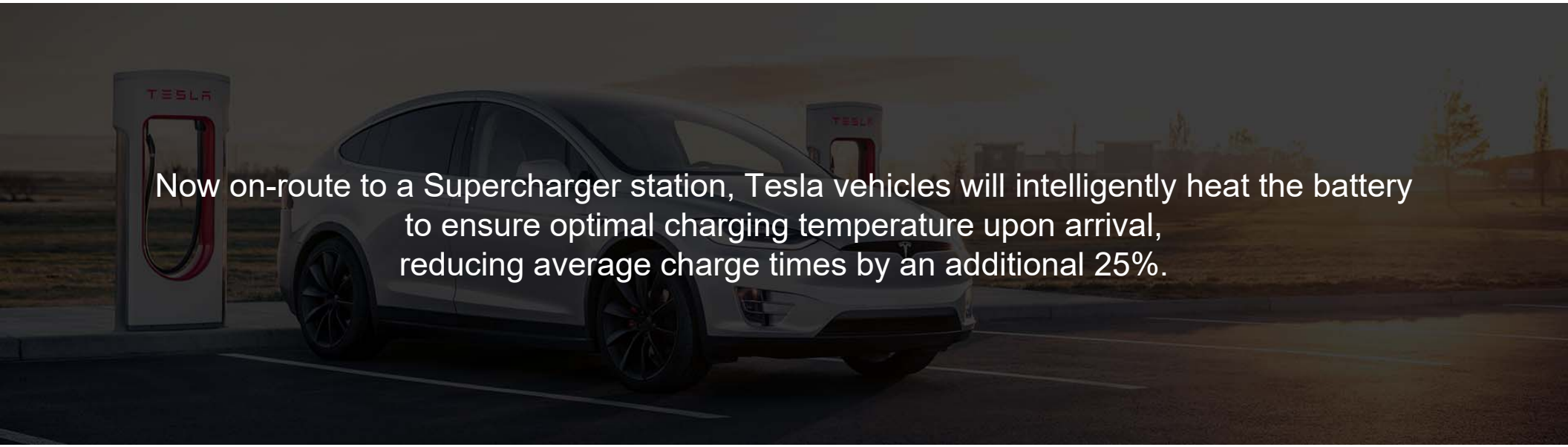


1,870 Supercharger Stations with 16,585 Superchargers Globally

TESLA CHARGING EQUIPMENT

	Supercharger V3 (250 kW)	Supercharger V2 (120kW)	Supercharger (72kW)	Wall Connector
				
Max Output Power	250 kW	150 kW	72 kW	7-17 kW
Typical Charge Time	20-30 minutes	30-40 minutes	50 minutes	4-8 hours
Target Use Case	Long Distance	Long Distance	Urban Fast Charging	Destination Charging (Public + Work + Home)

ON-ROUTE BATTERY WARMUP



Now on-route to a Supercharger station, Tesla vehicles will intelligently heat the battery to ensure optimal charging temperature upon arrival, reducing average charge times by an additional 25%.

TYPICAL CHARGING

Approx. 85% of your charging

Full Charge Every Morning

<10% of your charging

Supercharge on the Way

<10% of your charging

Recharge at Your Destination

Unlike refueling, charging happens mostly at home or at work

OUR STATION LAYOUT

Parking Stalls with Supercharger

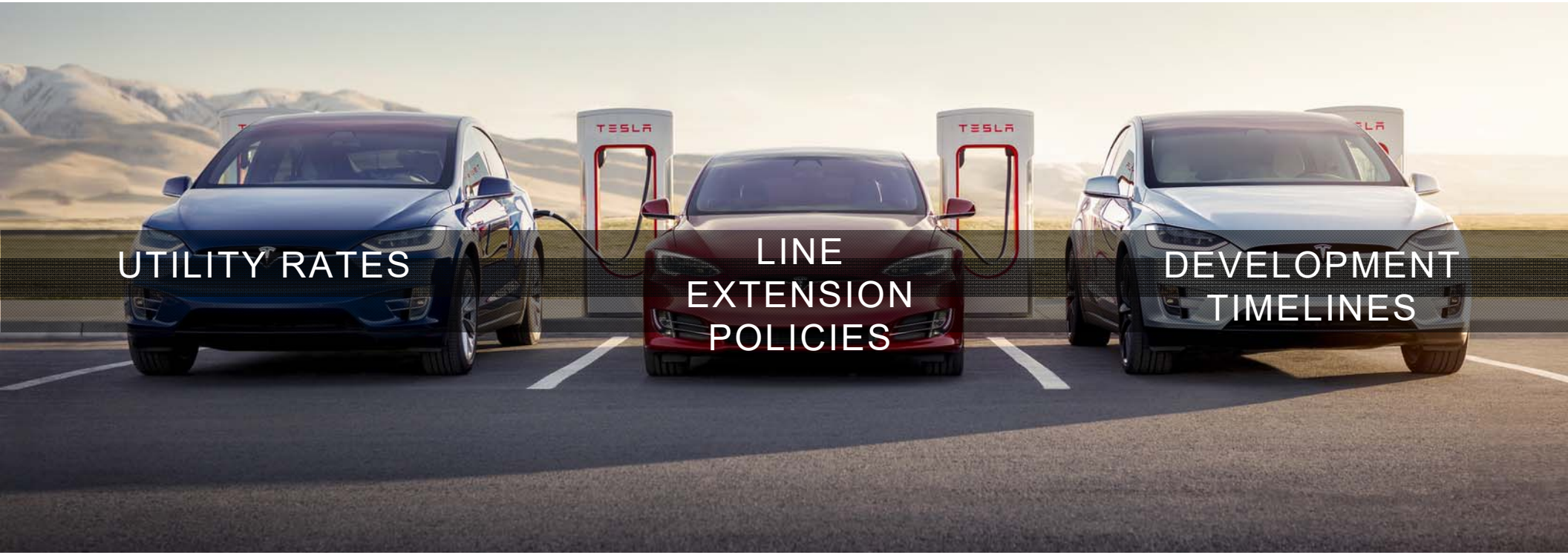
Equipment

New Utility Service

POLICY CONSIDERATIONS FOR CHARGING DEPLOYMENT

- Utility Engagement – rates and timelines
- Education, Awareness and Outreach - charge where you park
- Local Policies - Streamlined permitting and inspection

TRANSPORTATION-ELECTRIC UTILITY NEXUS



RATE DESIGN CONSIDERATIONS

Public Fast Charging

Home Charging

Fleet Charging

RATE DESIGN CONSIDERATIONS

Ex. Utility Rates:

Fixed charge = $100
Demand charge = $8/kW
Energy charge = 10 c/kWh

Shopping Center

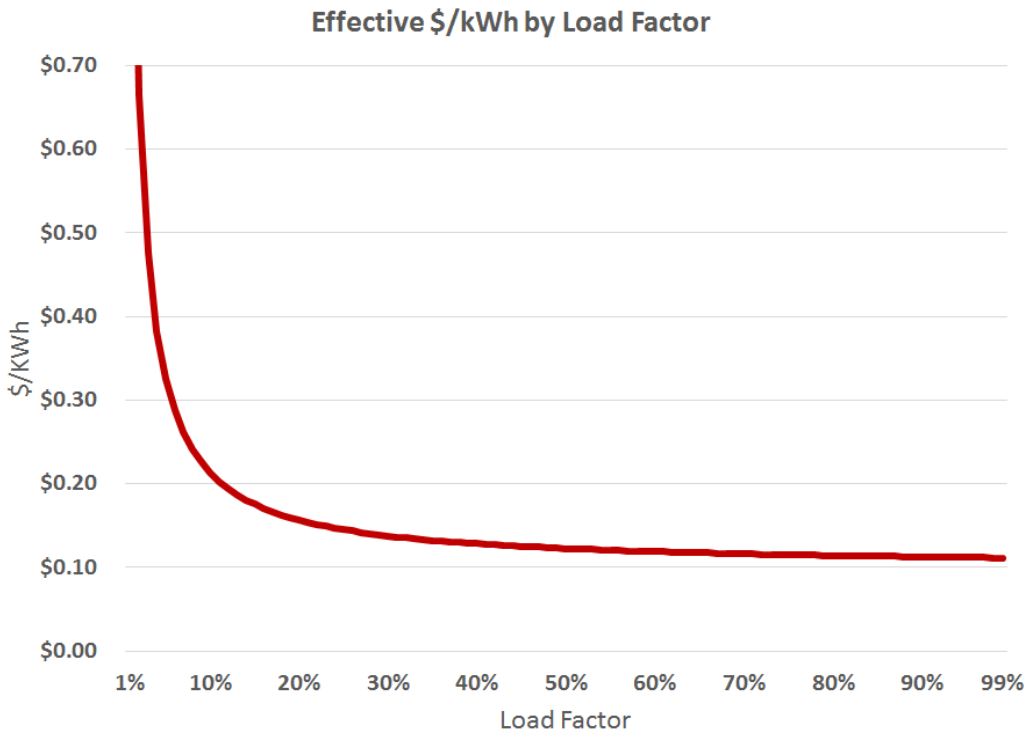
750 kW & 270,000 kWH

- Fixed charge = $100
- Demand charge = $6000
- Energy charge = $27,000
- **Effective Rate = 12.2 c/kWh**

Supercharger

750 kW & 54,000 kWh

- Fixed charge = $100
- Demand charge = $6000
- Energy charge = $5400
- **Effective Rate = 21.2 c/kWh**



CUSTOMER EXPERIENCE

Audience Questions

Does the working group have any questions for the Francesca?

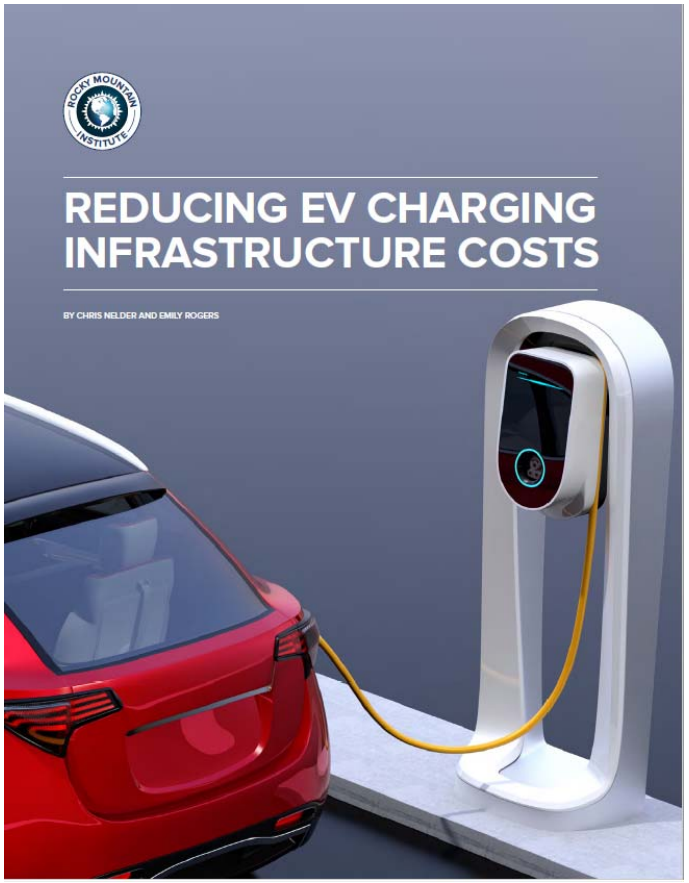
Reducing Soft Costs in EV Charging Infrastructure

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

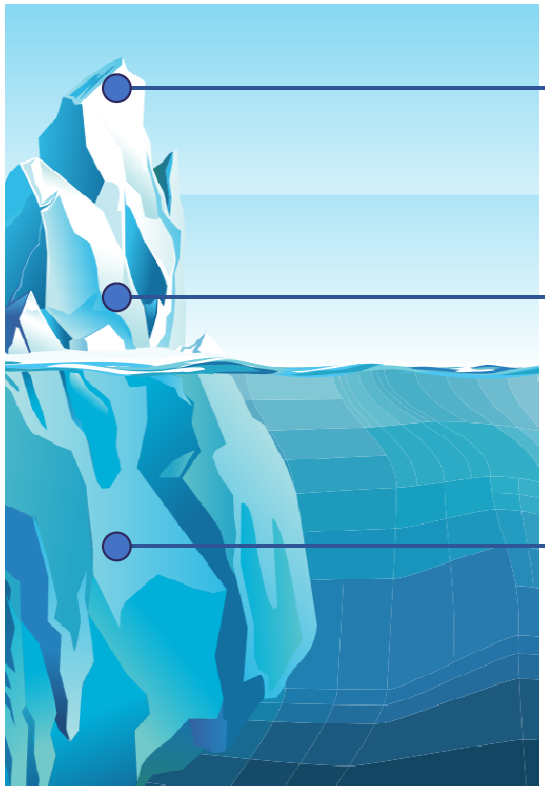
NARUC Electric Vehicles State Working Group – June 23, 2020

Reducing EV charging infrastructure costs

- Our 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

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

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

- Software
- Grid Hosting Capacity
- Make-Ready Infrastructure

- Dual Plug Types for DCFC
- Open Standards

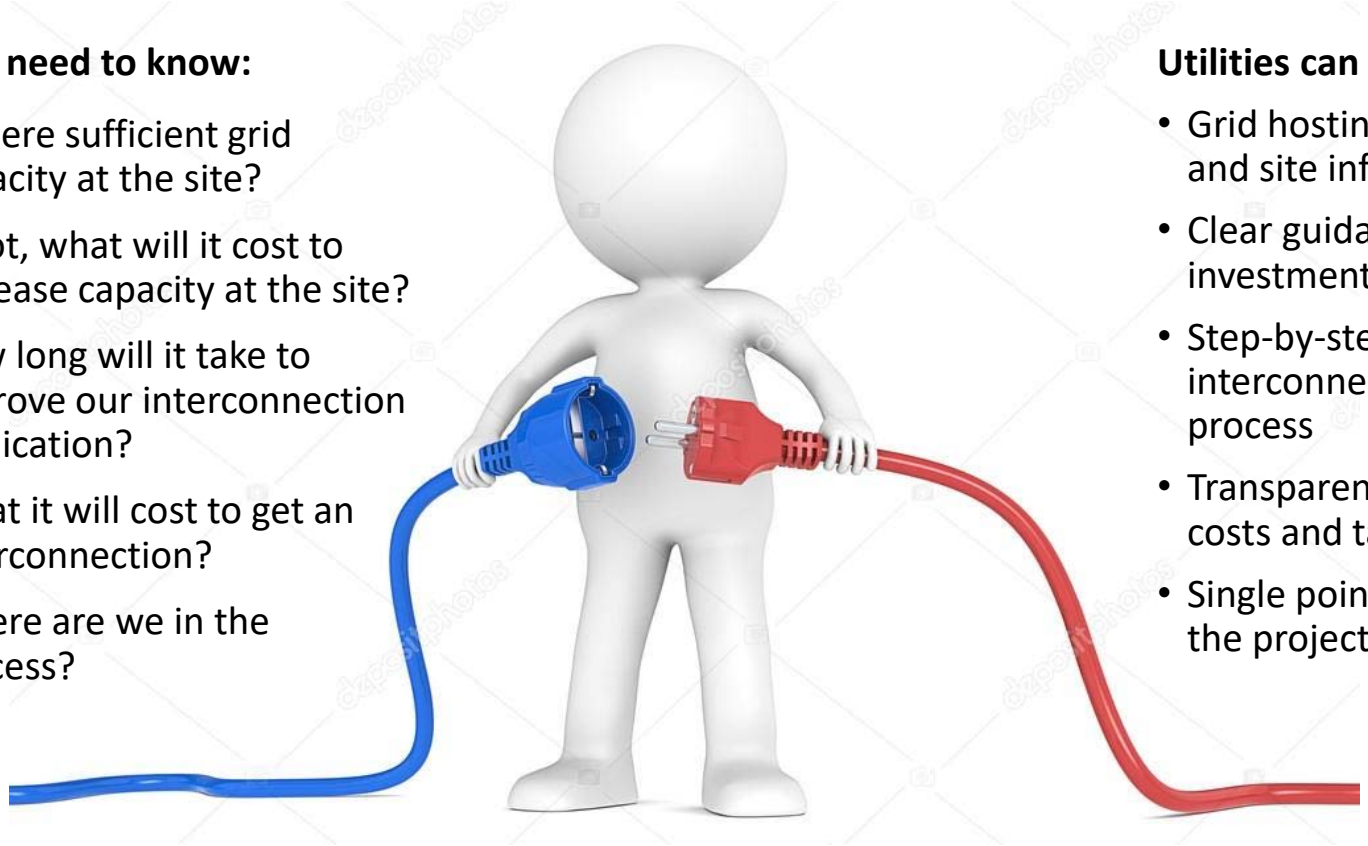
Choose sites and charger siting carefully

- 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
- When locating chargers on a site, think carefully about utility interconnection points and conduit runs.

Improve communication between utilities and EVSPs

EVSPs need to know:

- Is there sufficient grid capacity at the site?
- If not, what will it cost to increase capacity at the site?
- How long will it take to approve our interconnection application?
- What it will cost to get an interconnection?
- Where are we in the process?



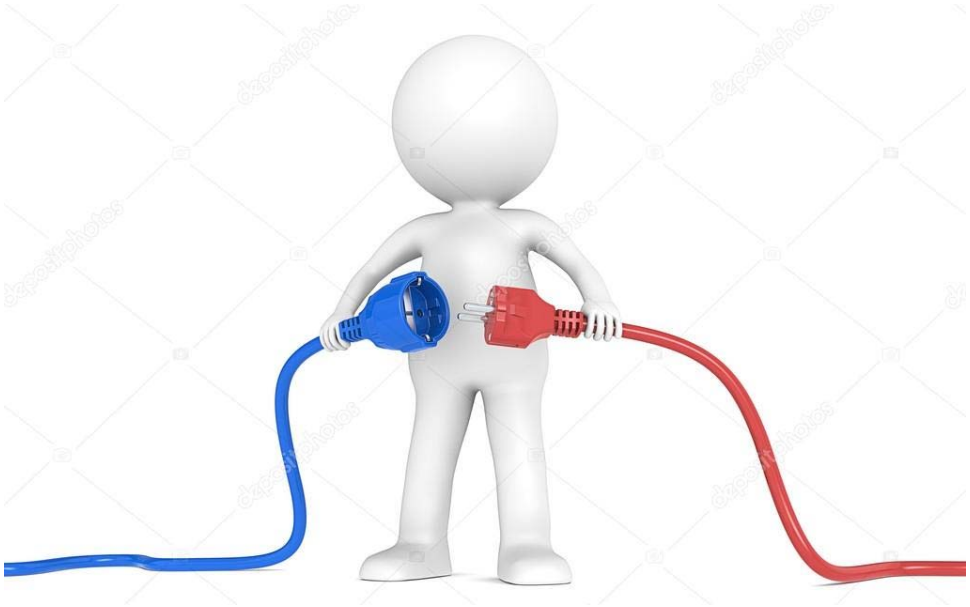
Utilities can provide:

- Grid hosting capacity maps and site information
- Clear guidance on utility co-investment in make-ready
- Step-by-step guides to interconnection application process
- Transparent disclosure of costs and tariff structures
- Single point of contact for the project

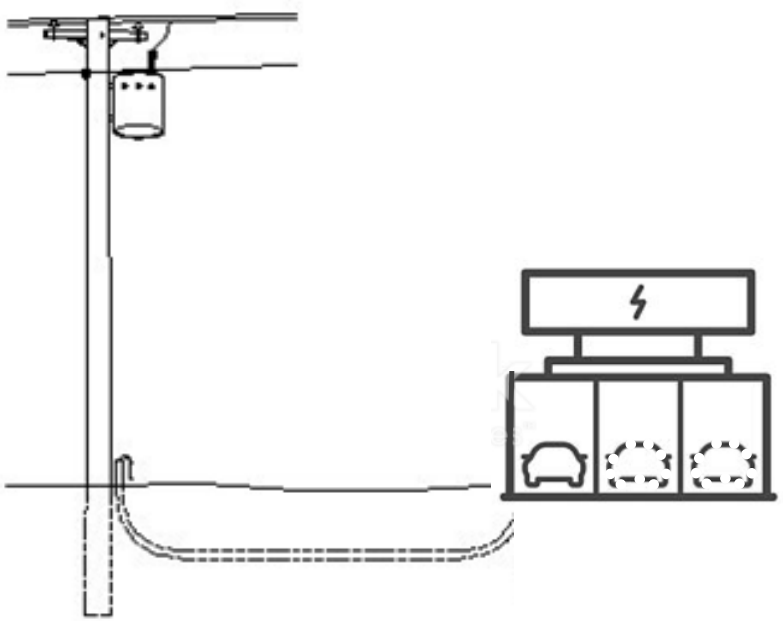
Improve communication between utilities and EVSPs

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.



Think ahead and future-proof sites



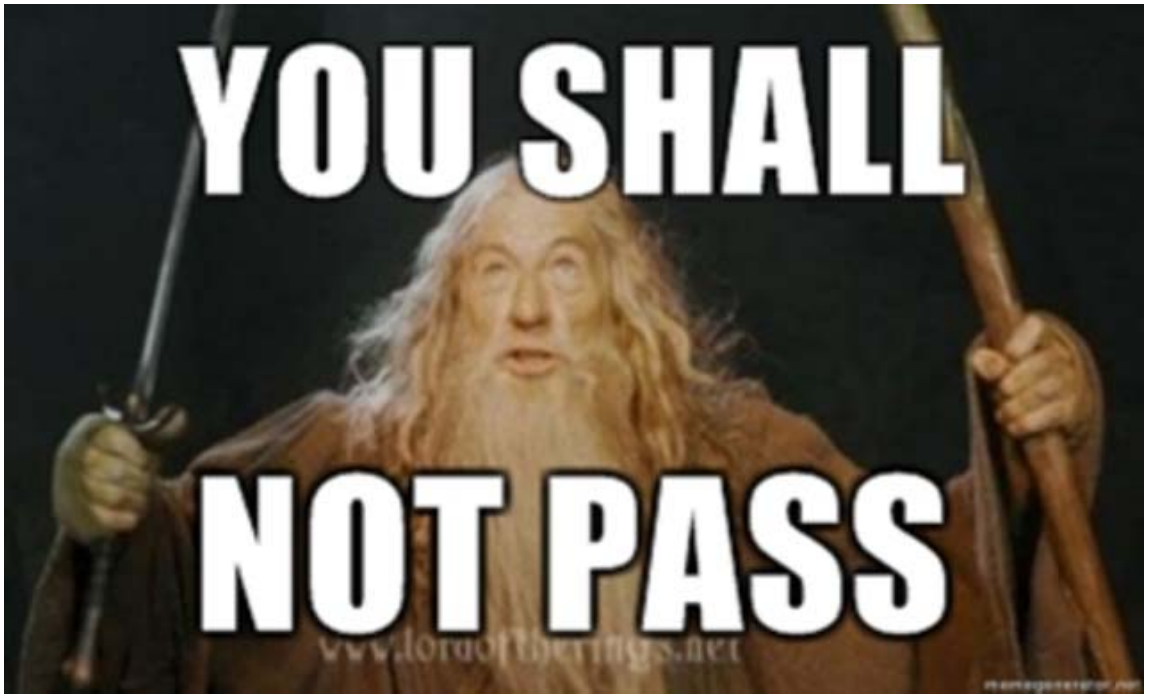
- Try to build enough site electrical capacity to meet future needs.
- Upsizing distribution transformers and digging trenches can be as much as 20% of project costs. Do it *once*.
- Get distribution transformers big enough to serve the site when at full capacity.
- Oversize or install extra conduit for additional wire.
- Obtain easements and planning permission in advance for parking spaces required to add chargers.

Coordinate multi-party site construction

- Multiple EVSPs building at/near a single site should **coordinate efforts to avoid duplicative retrenching and distribution system upgrades**
- Spreads fixed costs such as site preparation and utility interconnection across more chargers
- Reduces the number of sites that maintenance personnel must visit
- Example: Tesla built 24 chargers and paid for the make-ready for 20 chargers that Pasadena Power & Light (a municipal utility) owns & operates at the same site, saving the utility $140k in capex.

Explore needed easements early and thoroughly

- On average, obtaining easements takes 59 business days, but some customers have experienced up to 234 business days, causing **expensive construction delays**. Identify any needed easements (for conduit runs, parking spaces, equipment pads, ADA path of travel, etc.) **early** in the process.
- Examine utility and building department easement policies in detail and be alert for changes in policies. Triple-check for compliance.



Streamline and standardize building codes and permitting processes

Building codes and permits vary by local jurisdiction.

To reduce costs, building & planning departments can:

- Standardize requirements across jurisdictions
- Offer online checklists of required documentation
- Offer online applications for permits
- Prioritize requests from EVSPs
- Share load forecasts with utilities to ensure good distribution system planning

Communicate and standardize ADA compliance requirements

A lack of clarity about ADA compliance causes unnecessary costs:

- Incomplete, vague, or incorrect requirements, forcing EVSPs to rebuild or redesign sites
- Mismatches between ADA requirements and charging station equipment or physical site characteristics
- Conflicting parking requirements for ADA & charging stations

To reduce ADA-related unnecessary costs:

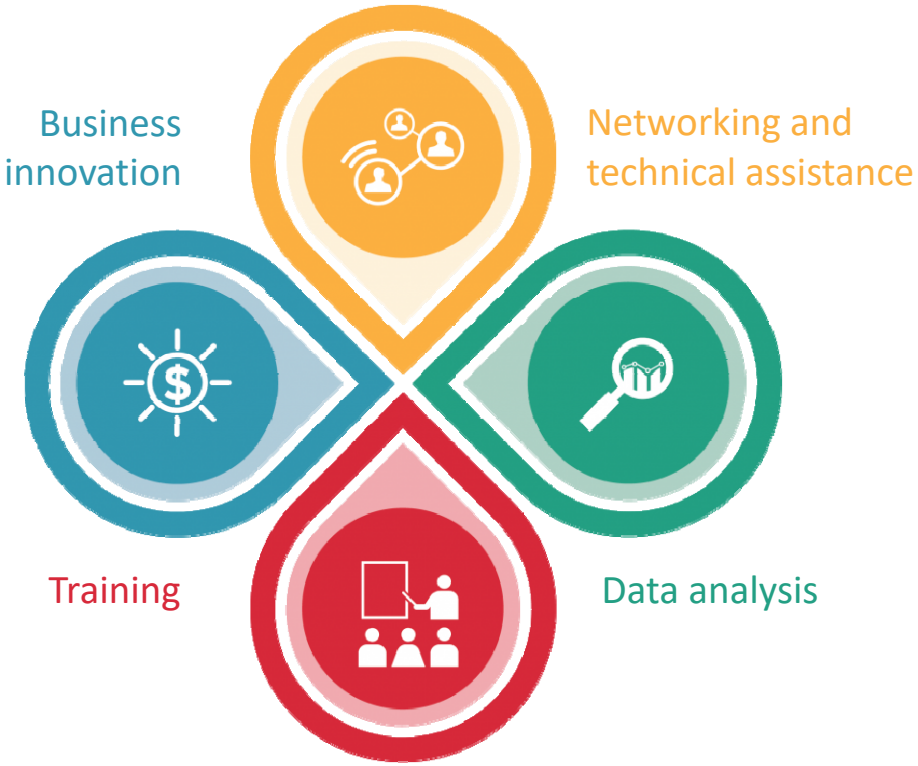
- Replace the balkanized set of state ADA requirements with a common federal standard
- State and municipal officials can offer clearer guidance to EVSPs on ADA compliance
- ADA requirements should be part of early, pre-construction review and signoff at building & planning

Install charging infrastructure during construction

It's much cheaper to install charging infrastructure during building construction.

- Reduces iterative costs for design, engineering, permitting, utility interconnection, etc.
- Reduces costly retrofit trenching (~$200/ft).
- Encourages long-term thinking about needed capacity.

We've seen this movie before



SunShot program elements

- The Department of Energy's SunShot program, launched in 2011, sought to reduce the soft costs of solar installation.
- The soft costs of solar were estimated to account for as much as **64%** of the total cost of a new solar system.
- **These costs are largely the same for charging infrastructure,** owing to largely the same agencies, codes, and requirements.
- DOE research and actions by state legislatures offer useful precedent for reducing charging infrastructure soft costs.

What can EVSPs do?

1. Choose sites and charger siting carefully.
2. Think carefully about utility interconnection points and conduit runs.
3. Future-proof sites.
4. Obtain easements and planning permission in advance for expansion—e.g., parking spaces, conduit runs, equipment pads, ADA access.
5. Examine utility and building department easement policies in detail and be alert for changes in policies.
6. Install charging infrastructure during building construction

What can utilities do?

1. Make grid hosting capacity maps available.
2. Give EVSPs clear, step-by-step guides to interconnection application process.
3. Disclose tariff structures and costs for make-ready without requiring membership or application fees.
4. Offer single point of contact for updates on projects.
5. Coordinate EVSPs at a single site to share costs for hosting capacity analyses, obtaining utility easements, and upgrading grid capacity at the site.

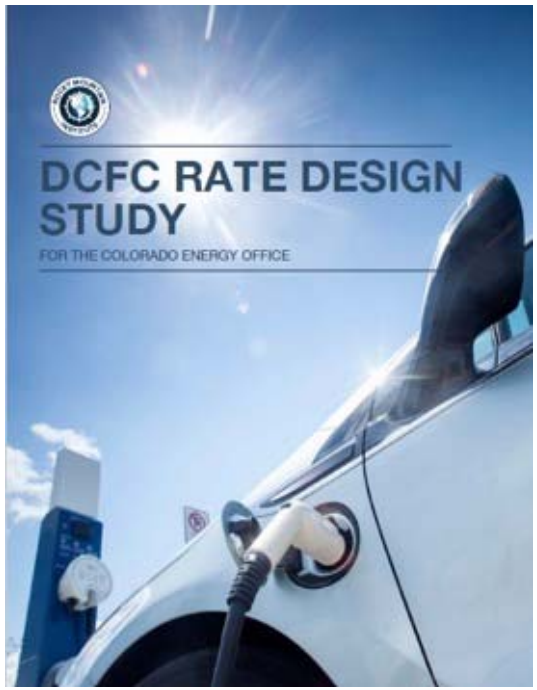
What can government do?

At the **federal** level, requirements for ADA compliance and building permitting can be clarified and standardized.

At the **state** level, permitting & utility interconnection can be streamlined (e.g., CA AB 2188) and ADA compliance can be clarified.

At the **municipal** level, building and planning departments can standardize codes and permitting requirements across jurisdictions, offer simple checklists for required documentation, and offer online permits.

DCFC Rate Designs Compared



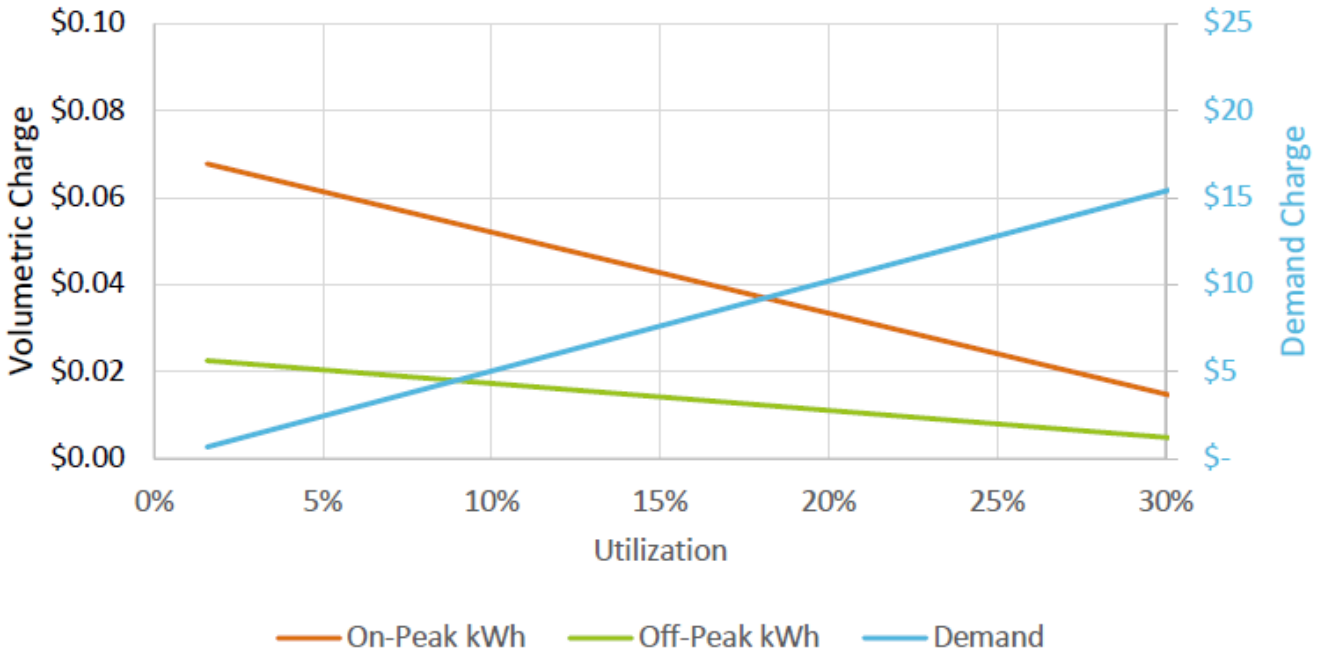
DCFC Rate Design Study **(Sept 2019)**

We compared:

- Three tariffs:
  - Xcel Energy's S-EV
  - PG&E's EV-Large S
  - RMI's DCFC
- Three load profiles:
  - Public DCFC charging depot with two dual-port 50 kW chargers
  - Public DCFC charging depot with two dual-port 150 kW chargers
  - Transit bus depot with 25, 100-kW chargers
- Three utilization rates on public DCFCs: 5%, 10%, and 30%

Goal: Meet or beat gasoline parity at $0.09/mile.

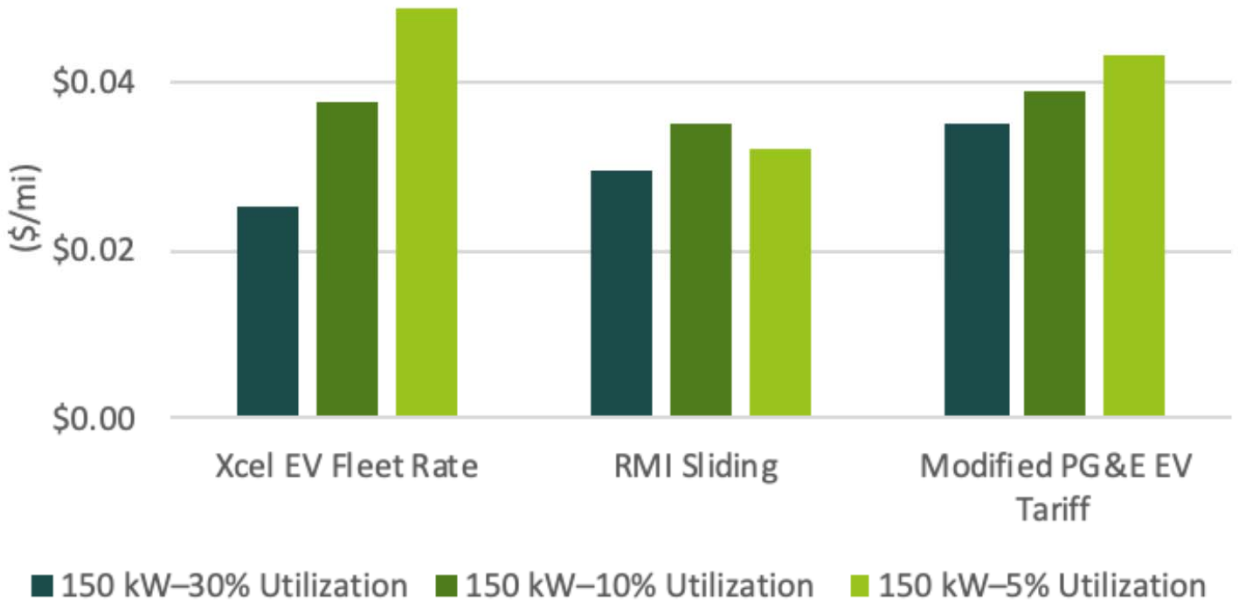
RMI's DCFC Rate Design



- Charges scale *as a function of utilization rates*.
- Fixed monthly charge: $34.40/mo.
- Two-tier ToU rate:
  - On-peak (9 am – 9 pm)
    Decreases from $0.068 to $0.007
  - Off-peak (9 pm – 9 am)
    Decreases from $0.022 to $0.002
- Demand charge: Increases from $0.677 to $17.622/kW

DCFC Rate Designs Compared

RMI's rate design produces the *most consistent cost per mile* and the cheapest cost at 5% and 10% utilizations




Thank you!

Audience Questions

Does the working group have any questions for the Chris?

Peer Discussion – Commissioner Commission Staff Only

Facilitators

- Working Group Chair Maria Bocanegra and Illinois Commerce Commission Staff
- Working Group Vice-chair Jason Stanek and Maryland Public Service Commission Staff

Discussion Questions

1. Has your state taken or considered any actions to streamline the permitting or utility interconnection process for EV charging stations?

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1. Has your state taken or considered any actions to streamline the permitting or utility interconnection process for EV charging stations?
2. Has your state taken or considered any actions to future proof charging infrastructure?
3. Do any utilities in your state offer demand charge mitigation or holidays? If so, what are the details of the program?
4. What are other challenges to installing public and/or fast charging stations? How can commissions address these issues?

Announcements

No July Meeting. Our next webinar will be held in August, led by Danielle.

Instead please attend our session at the **NARUC Summer Policy Summit**, with the Electricity and ERE Committees:

- Session Title: *Data and Transportation Electrification*
- Tuesday, July 21, 4:15 – 5:00 pm EDT

EVSWG Listserv: NARUC-EVSWG@lists.naruc.org

Presentations and recordings of past EVSWG events: www.naruc.org/cpi-1/energy-infrastructure-modernization/electric-vehicles/