EVs2Scale 2030™

A Grid Connection Roadmap for Utilities to Support Small Electric Vehicle (EV) Customers

Streamlining Utility Service Connections and Customer Engagement for Small Fleet and Multi-Family Housing EV Charging (DOE Project EE0010632)

CENTRAL TEXAS CLEAN CITIES CTXCLEANCITIES.ORG

June 2025

Presentation Overview

1. Project Overview
2. EV Charging Infrastructure Service Connections
3. Research Takeaways
4. An Updated EV Service Connection Process
5. Solution Ideas for a Streamlined EV Service Connection Process
6. Examples of Small Fleets and MFH
7. Implementing the Roadmap

Project Overview

Project Overview

Project Objectives:

Accelerate and improve new grid service connections across utilities and various **small commercial electric vehicle (EV) customers** to achieve:

- Improved EV service connection experiences, project time, and process transparency,
- Better supported customers in their overall transportation electrification journey, and
- Increased visibility into fleet electrification and charging infrastructure planning to inform and

KEY PROJECT DELIVERABLES

- Research report: Simplifying Utility Service Connections for Small Fleet and Multi-Family Housing Electric Vehicle Charging
- A Grid Connection Roadmap for Utilities to Support Small Electric Vehicle (EV) Customers
- Framework to adapt GridFAST for small fleets ***Summer 2025***
- Website for small fleet customers ***Summer 2025***

Project Team

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Alliance for Transportation Electrification

EPRI

IREC
INTERSTATE RENEWABLE ENERGY COUNCIL
Independent leadership. Trusted clean energy expertise.

Louisiana cleanfuels

Metropolitan ENERGY CENTER

RMI

Clean Cities and Communities

ADVISORY STRUCTURE

Clean Cities Coalition (CCC) subgroup + Utilities + Ad-hoc feedback from existing industry groups

EV Charging Infrastructure Service Connections

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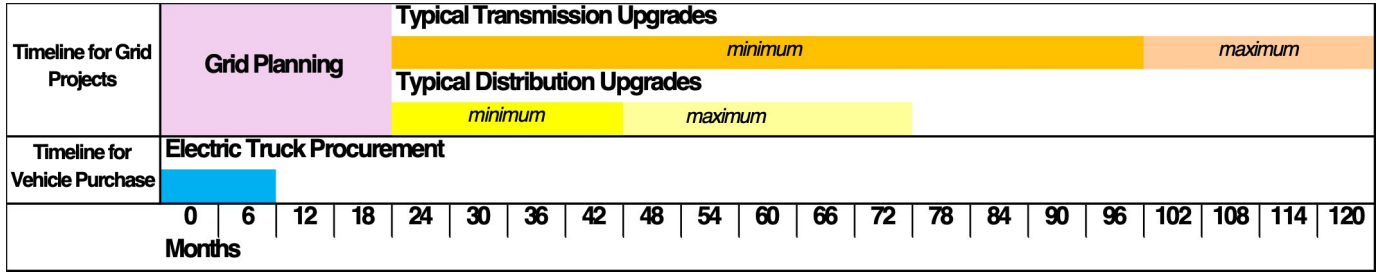
EV Charging Infrastructure Service Connections:
Efficiency Is Important



- EV adoption at scale is coming utilities must be prepared for the increase in service requests for new or upgraded service.
- EV charging infrastructure service requests are different from other service requests:
  - Customers receive vehicles much quicker than other typical service requests (e.g. buildings).
  - Projects may require more discussions with the utility to determine how managed charging and other non-grid build solutions (non-wires alternatives) may apply to the project.
  - **Smaller EV customers have different challenges than larger customers:**
    - EV charging represents a new relationship with the utility for the small customer.
    - Small customers have limited resources compared to national companies.
    - Much of the grid connection conversation has been related to larger customers.
    - Small customers will make up a large portion of service requests at scale.

Project focus is on small customers, so no customer is left behind in the transition to EVs.

EV Charging Infrastructure Service Connections:

Defining a Small Customer

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What is a small customer?

- No specific vehicle class, vehicles can be varied (e.g. pick-up trucks or SUVs or delivery vans or semi-trucks).
- Generally, <10 vehicles in the fleet.
- Vehicles can be parked at home or at a rented/owned office HQ.
- Primary business is varied but usually classified by the type of business carried out: e.g. food service, flower delivery, tool sales, maintenance services.
- Multi-family housing (MFH) developers, owners, and building managers are also small customers in this report. They face similar challenges to those of small fleets.

Small Fleet Customer Examples:

- A plumbing company with 2 pick-up trucks.
- A laundry delivery service with 3 sprinter vans, but expanding to 5.
- A "mom and pop" freight delivery business with five class 8 vehicles

...out the EVSE installed is around 1-10 EVSE.

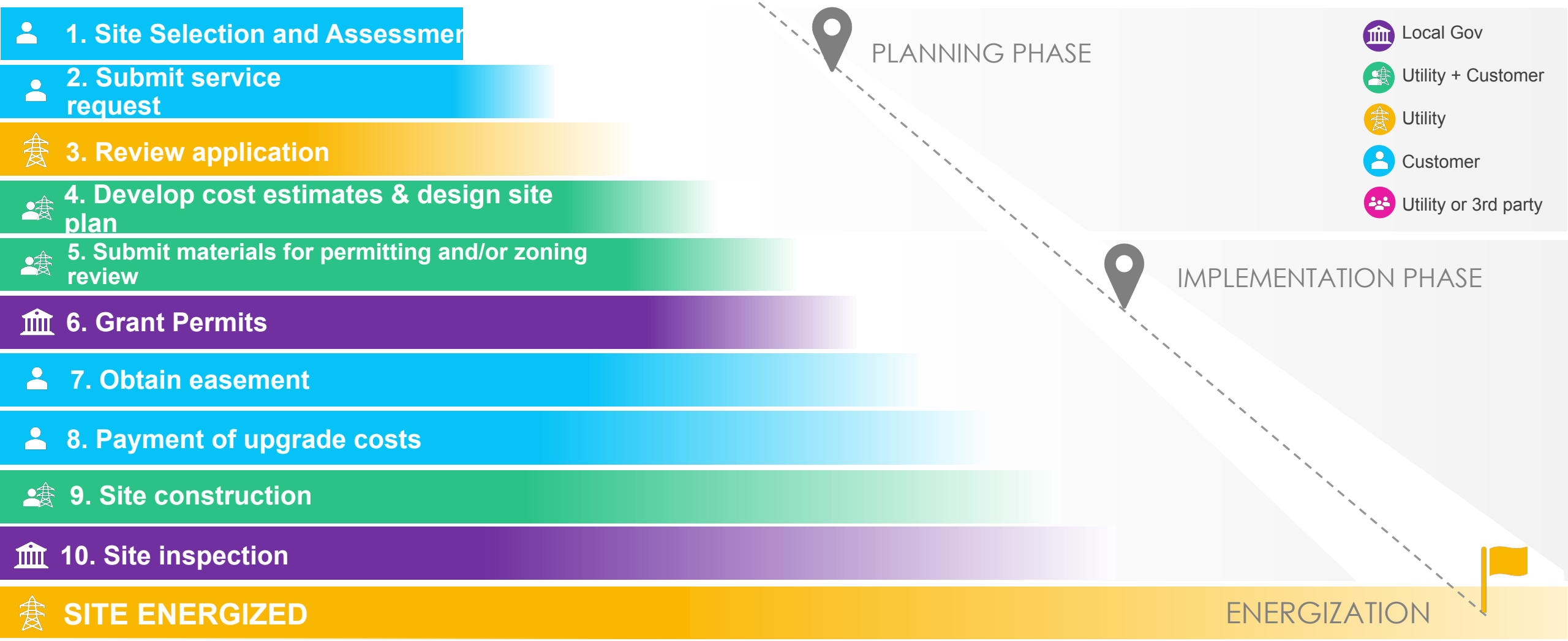
Multi-Family Housing Examples:

- A MFH owner of an 8-unit building installing 8 EVSE
- A property manager of an 80-unit building installing 4 EVSE in an underground garage
- An individual condo owner

EPRI

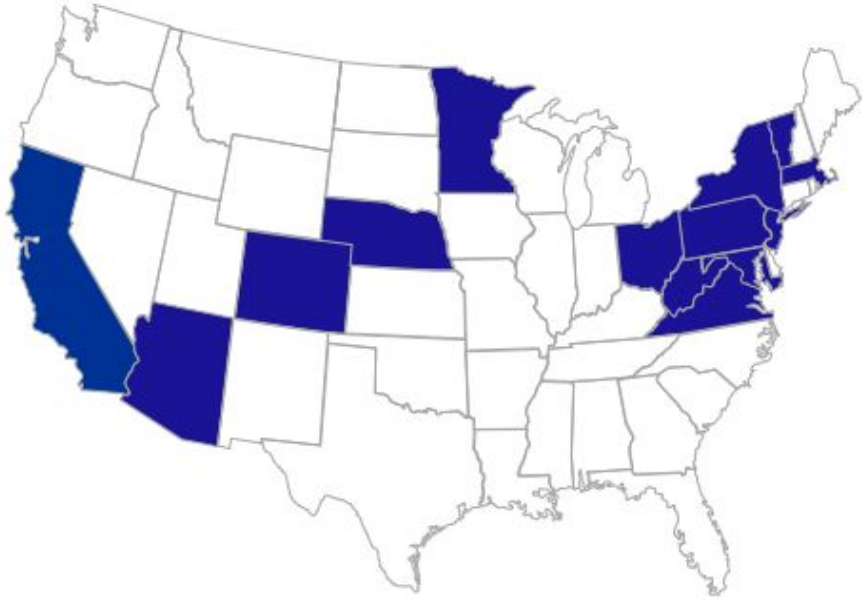
ENERGIZATION JOURNEY

Typical Service Connection Process



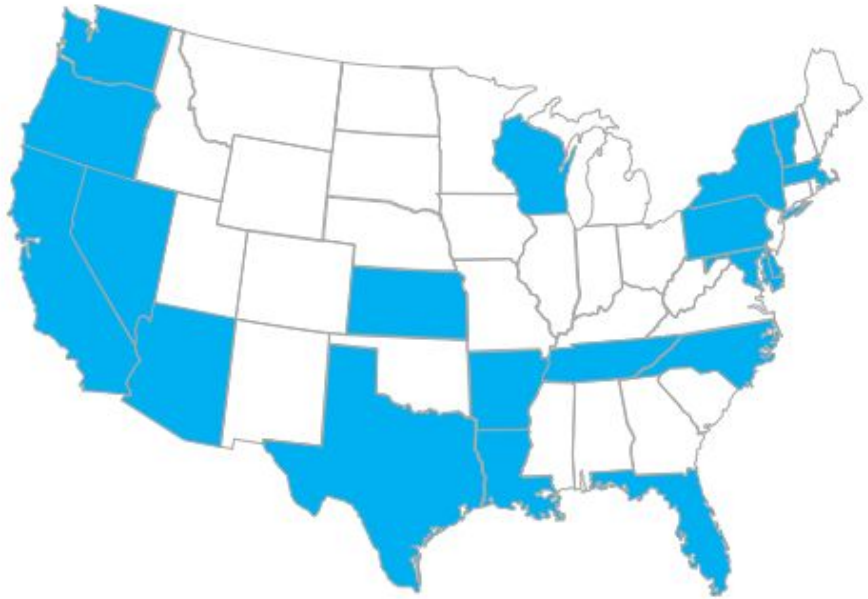
Research Takeaways

Research Takeaways



Utilities Interviewed by State

- 8 IOUs, 4 public power/munis, 2 co-ops
- 30+ utility representatives from various groups (e.g., new service connections, transport electrification, customer programs, customer account reps)



Fleet and MFH Customer (or rep) Interview or Small Group Participants by State

- 15 representing small- or medium-sized fleets (mostly medium- or heavy-duty vehicles)
- 11 representing MFH including 5 with affordable housing
- Plus: 2 online focus groups

Research Takeaways: Customer Feedback

High Project Costs	High upfront costs of installation and equipment, and limited rebate opportunities.
	Unstable and fluctuating cost estimates due to fast-evolving technology and varying market conditions.
	Low potential for cost recovery, especially in low-utilization scenarios.
Insufficient Customer Preparedness	Limited customer knowledge of EV technology and vehicle charging needs may lead to higher cost estimates than required.
	Lack of access to dedicated project managers due to staffing limitations.
	Electrification still perceived as new, complex, and difficult to manage.
Complex Utility Processes	Lack of awareness of utility programs and resources.
	Lack of regular, clear communication between utilities and customers.
	Long processing times for approvals and construction.
Unclear Non-Utility Processes	Permitting delays due to local agency processes.
	Limited local workforce trained in EVSE deployment and maintenance.
Challenging Deployment in Untapped Markets	Often, lower-income neighborhoods may have outdated infrastructure and insufficient grid capacity.
	Low charger utilization in low EV adoption areas makes long-term investment harder.

Full research report: https://www.epri.com/research/products/000000003002031384.

Research Takeaways: Utility Feedback

High Project Costs	Utility infrastructure and site upgrades can be expensive and their need unclear upfront.
	Inefficient site planning can drive unexpected costs (e.g., distance from power source).
	Customers may lack clarity on civil and compliance-related site prep costs.
Insufficient Customer Preparedness	Hard to find qualified EVSE contractors; unclear vetting process.
	Customers often lack clarity on the required application materials.
	Customer unawareness of process timelines leads to misaligned expectations.
Complex Utility Processes	Limited utility staff trained to handle EVSE applications.
	Process delays due to a lack of dedicated support and multiple hand-offs between teams.
Unclear Non-Utility Processes	Permitting and site ownership issues cause delays, especially for fleets and multifamily housing.
	Complex easements and unclear responsibilities may slow down projects.
Challenging Deployment in Untapped Markets	Low EV ownership limits case for utility investment in support resources.
	Existing support (e.g., make-ready programs, EV rates) is available, but utilities may not yet provide tailored help.

Full research report: https://www.epri.com/research/products/000000003002031384.

An Updated EV Service Connection Process

An Updated EV Service Connection Process

Research showed the need to update the typical service connection process at many utilities:

- Add in a “pre-step” and “post-step” in the energization journey.
- Factor in whether the customer owns the space or land where the EV charging infrastructure will be installed.
- Factor in which steps can be completed in parallel.
- Determine which small customers may not need a service upgrade compared to those who do.

ENERGIZATION JOURNEY

Typical Service Connection Process

0. INFORMATIONAL PHASE: VISION, PLAN, FUNDING

1. Site Selection and Assessmer

2. Submit service request

3. Review application

4. Develop cost estimates & design site plan

5. Submit materials for permitting and/or zoning review

6. Grant Permits

7. Obtain easement

8. Payment of upgrade costs

9. Site construction

10. Site inspection

SITE ENERGIZED

11. Post-Energization

PLANNING PHASE

IMPLEMENTATION PHASE

ENERGIZATION

- Local Gov
- Utility + Customer
- Utility
- Customer
- Utility or 3rd party

0. INFORMATIONAL PHASE: VISION, PLAN, FUNDING

1. Site Selection and Assessment

CUSTOMER OWNS THE SPACE OR LAND.

PROJECT SIZE <400 A*,
AND THERE IS PANEL SPACE

No service upgrade needed, customer/electrician notifies utility of new EVSE installed based on terms and conditions of current electric service contract (via email, telephone, or form (if applicable), etc.).

**The 400 amp limit is not a uniform threshold across utilities and is used as an example here. Customers can contact their utility to confirm whether or not a service upgrade is required.*

PROJECT SIZE >400 A

- 2. Submit service request
- 3. Review application
- 4a. Develop cost estimates and design site plan;
  4b customer reviews design with utility
- 5. Submit materials for permitting and/or zoning review
- 6. Grant Permits
- 7. Obtain easement
- 8. Payment of upgrade costs
- 9. Site Construction
- 10. Site Inspection
- SITE ENERGIZED
- 11. Post-energization

CUSTOMER LEASES / RENTS THE SPACE OR LAND.

- 2. Submit service request
- 3. Review application
- 4a. Develop cost estimates and design site plan;
  4b customer reviews design with utility
  4c Customer talks with site host on design plan, obtains approval to make changes at site
- 5. Submit materials for permitting and/or zoning review
- 6. Grant Permits
- 7. Site host / landowner work together to obtain easement rights.
- 8. Payment of upgrade costs
- 9. Site Construction
- 10. Site Inspection
- SITE ENERGIZED
- 11. Post-energization

Local Gov
Utility + Customer
Utility
Customer
Utility or 3rd party

Note: These process steps may vary based on the utility.

Solution Ideas for a Streamlined EV Service Connection Process

Solution Ideas for a Streamlined EV Service Connection Process

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1

- Take challenges
- Identify opportunities and solutions
- Categorize the solutions into the energization journey steps.

2

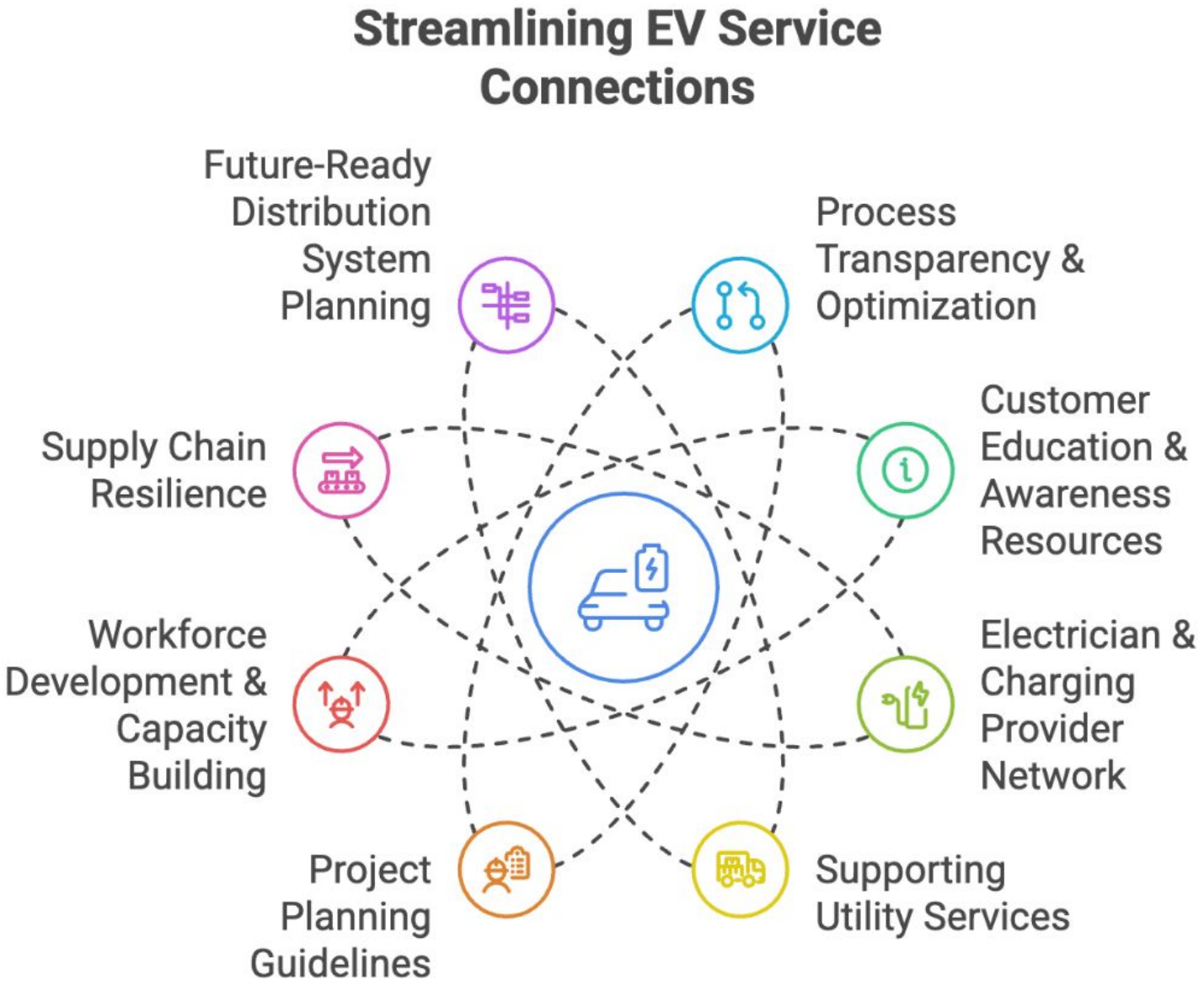
- Rank the opportunities at each step based on easiest to implement (lowest hanging fruit), compared to harder to implement and could even require regulatory approval.

3

- Mark solutions with the biggest impact in streamlining the process or improving customer engagement and education efforts with a lightning bolt.

44 total solutions!

Solution Ideas for a Streamlined EV Service Connection Process



Solution Ideas for a Streamlined EV Service Connection Process

Step 1: Identify the Site.

1. Ensure customer is aware of low-cost solutions such as smart plugs, smart meter panels and other related solutions that maximize panel space.
2. Point to or maintain a list of public charging depots and share it with fleet customers.
3. Provide a list of qualified consultants / contractors to support the site design, engineering and the remainder of the energization journey.
4. Publish load hosting capacity maps.

Solution Ideas	Rank
Step 1: Identify the Site	
Ensure customer is aware of lower cost solutions such as smart plugs, smart meter panels and other related solutions that maximize panel space. In places with panel constraints, smart meter panels can manage and control when some devices are in use and when others are not (e.g. if the a/c is on, the EVSE is off). Smart plugs are similar. Other related solutions include installing smart EVSEs that allow for a customer, such as a MFH customer, to be able to charge their tenants without more meters. While these technologies are more commonly in use on the residential side, their adoption is growing for commercial customers. Utilities should explore further how they can serve some types of EVSE installations as separate customer accounts, rather than treating them as a load under an existing customer account. These are designs that can reduce charging site complexity if it is assumed that EVSEs that contain metering and protection are allowed to be directly connected as utility customers. This can work for some shared MFH housing, and some public parking applications that have overhead service. With the MFH project, the EVSE is added as an additional customer on existing shared secondaries; there is no new meter needed, nor a breaker panel, which saves money and time. For the small fleet parking in a public parking lot, the overhead service drop is directly to the EVSE, and eliminates the need for any separate utility meter, trenching, conduit or breaker panel. More information and considerations are available in EPRI's report, "Shared EV Charging Sites: Cost Components and Cost Reduction Strategies."	1
Point to or maintain a list of public charging depots and share it with small fleet customers. While some small fleet customer may desire to have their own EVSE, others may find value in accessing public charging or public charging depots. The utility could point to websites where public charging stations are listed (e.g. PlugShare, DOE Alt Fuels Database), or the utility could maintain a list of the currently locally available (not planned, as this may be sensitive and confidential information) public charging depots that the small fleet customer could access and share this with customers. Other organizations, such as Clean Cities groups, may also maintain their own lists, and utilities can refer customers to their websites. This shows customers the variety of charging options available. Even if customers ultimately install their own charging infrastructure, this list can become a part of their resilience plan (e.g., for when their chargers are down/require maintenance).	2
Provide a list of qualified consultants/contractors to support the site design, engineering and the remainder of the energization journey. For some small fleet and MFH customers, it may be desirable to hire a qualified consultant and/or contractor to assist with the site design, preliminary engineering, if applicable, and the remainder of the energization journey. Of course, not all customers will have the budget to be able to work with a consultant. Utilities can assist in this step by partnering with local Clean Cities organizations, municipalities, and/or local nonprofits to develop a list of consultants and/or contractors for these kinds of projects. Consultants/contractors will also be able to assist with ADA requirements potentially needed at the site for access to EV charging stations.	3
Publish load hosting capacity maps. While not all small fleet and MFH customers might utilize a load hosting capacity map, they can be very helpful for customers who would utilize the maps to identify site or depot locations with capacity. A load hosting capacity map is an indicator of the amount of new load that can be added to the distribution system without triggering grid upgrades. Utilities could update these maps monthly, biweekly, or even daily; some utilities have or are developing online maps that can be directly accessed by customers. Utilities could also include information on how to read and interpret the maps. NARUC offers some resources on the grid data sharing conversations to have in advance with the appropriate stakeholders (e.g., regulators, governing boards). It should be noted, however, that a hosting capacity map does not necessarily show interconnection requests that are in the queue and where locations with spare capacity are already being considered by other customers. Example: Pacific Gas & Electric's hosting capacity map, referred to as the Grid Resource Integration Portal.	4

Solution Ideas for a Streamlined EV Service Connection Process

Step 2: Review Application

1. Assign a single point of contact for the small fleet and MFH customer to guide the customer through the remainder of the energization journey.
2. Create a clear internal process for EVSE service connections with the ability to track internal inefficiencies.
3. Develop an online system for customers to track application status, receive updates and plan for any delays.

Solution Ideas	Rank
Step 3: Review Application	
Assign a single point of contact for the small fleet and MFH customer to guide the customer through the remainder of the energization journey. Consistent feedback from the small fleet and MFH customers was the desire for a single point of contact at the utility. Even as the project passes into other departments at a utility (e.g., the engineering team or construction team), the single point of contact should remain connected to the project and provide regular updates back to the customer. The benefit of this single point of contact on the utility side is that relationships can be formed between the customer and the utility advisor that can be leveraged in the future as additional programs may be offered; for example, as the utility offers additional managed charging programs, the single point of contacts can easily reach back out to customers and inform about these new utility offerings. However, it should also be noted that once the project gets into the construction phase, the single point of contact at the utility does not necessarily need to be a middle-man between the construction team and the customer, which could lead to some bottlenecks and delays. Example: At Salt River Project in Arizona, all customers are assigned a Strategic Account Manager after application submission, who connects them to appropriate departments and resources within Salt River Project and functions as their prime point of contact.	1
Create a clear internal process for EVSE service connections with the ability to track internal inefficiencies. Most utilities have the opportunity to get ahead of the EV adoption curve and develop streamlined internal processes for EVSE service connections. Utilities can take advantage of this and work across departments and develop a flow chart for the service connection process for EVSE in general, not just for small fleet and MFH customers. Utilities can also identify goals and metrics for each stage of the internal energization journey for a customer, set internal goals to achieve them, and communicate these timeframes to the customer. This can be a way to better understand where improvements may be needed as well as provide a baseline against which to measure and communicate progress with additional external stakeholders (e.g., with regulators and governing boards). One utility noted that sharing end-to-end process timelines may encourage greater efficiencies than timelines for each process step. They asserted that stage-specific targets can lead to a focus on compliance rather than on innovation and time-saving strategies that could reduce the overall energization process.	2
Develop an online system for customers to track application status, receive updates and plan for any delays. While a single point of contact is desired for small fleet and MFH customers, having a central portal or online system for customers to track their project status, receive updates, and plan accordingly for any delays can eliminate some of the unnecessary email traffic between the customer and the single point of contact.	3

Examples of Small Fleets and MFH

Examples of Small Fleets + MFH

- Examples of small customers and their energization journeys are in the Appendix.
- Shows the steps and responsibilities for each stage of the process, incorporates the roadmap solutions into the examples.
- All examples will be on EPRI's small fleet website- coming summer 2025.

Small Fleet Project Considerations | Options + Impact*

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CONSIDERATION:	OPTIONS:	PROJECT IMPACT:
PARKING + BUILDING SPACE OWNER	Own the Space:	No extra easement or approval needed.
	Lease the Space:	Approval and easement required from building owner.
SIZE OF FLEET	1–2 Vehicles:	May have panel space and fewer EVSE needed. Might not need utility service upgrade.
	3–10 Vehicles:	Likely need more EVSE and therefore might not have panel capacity.
PLANNED CHARGING MODEL	At HQ / Home / Depot:	Need to install EVSE.
	En Route:	Rely on public charging, could install a few EVSE at a depot as back-up.
NUMBER OF EVSE, POWER LEVEL	1–3 L2:	Could keep overall load below, e.g., 400 amps and do overhead service connection; fewer upgrades needed.
	4+ L2	Depending on capacity, more upgrades likely needed.
PROXIMITY TO ELECTRICAL UNIT	Close to electrical room or panel:	Lower cost on the customer side due to proximity.
	Far from electrical room or panel:	Extra cost on the customer side to put in network extenders and complete civil work.
TYPE OF TARIFF	Commercial:	Access to commercial utility programs for EVs, EVSE if applicable.
	Residential:	May have access to residential utility programs.
FINANCING	Utility make-ready program or local rebate program available:	Project cost relief available.
	No local incentive available:	Project funded solely by private capital.

*For illustration purposes only. Always talk to a qualified electrician and/or your electric utility.

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Multi-Family Housing Project Considerations | Options + Impact

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CONSIDERATION:	OPTIONS:	PROJECT IMPACT*:
PROJECT OWNER	Resident:	Approval and easement required from building owner.
	Building Owner/Manager:	No extra easement or approvals required.
HOUSING SIZE	Compact *(e.g., quadplex)*	Lower project cost, potentially more panel space and capacity available.
	Large building or complex:	Higher project costs, potentially less panel space and capacity available.
HOUSING TYPE	Affordable housing unit:	Potential state funding available.
	Luxury housing:	Capital funding from real estate company to cover project costs.
SIZE OF PROJECT	1-2 L2 (7 kW):	Likely sufficient panel space and capacity available on site.
	6 L2 (19 kW):	Panel and upgrade likely required, adding to costs and time.
PROXIMITY TO ELECTRICAL UNIT	Close to electrical room or panel:	Lower cost on the customer side due to proximity.
	Far from electrical room or panel:	Extra cost on the customer side to put in network extenders and complete civil work.
CHARGER LOCATION	Underground garage with unassigned parking spaces:	Extra cost to put in network extenders and complete civil work underground.
	Guest space in surface lot with assigned parking:	Lower costs due to more accessible charging location.
FINANCING	Utility make-ready program or local rebate program available:	Project cost relief available.
	No local incentive available:	Project funded solely by private capital.

For illustration purposes only. Always talk to a qualified electrician and/or your electric utility.

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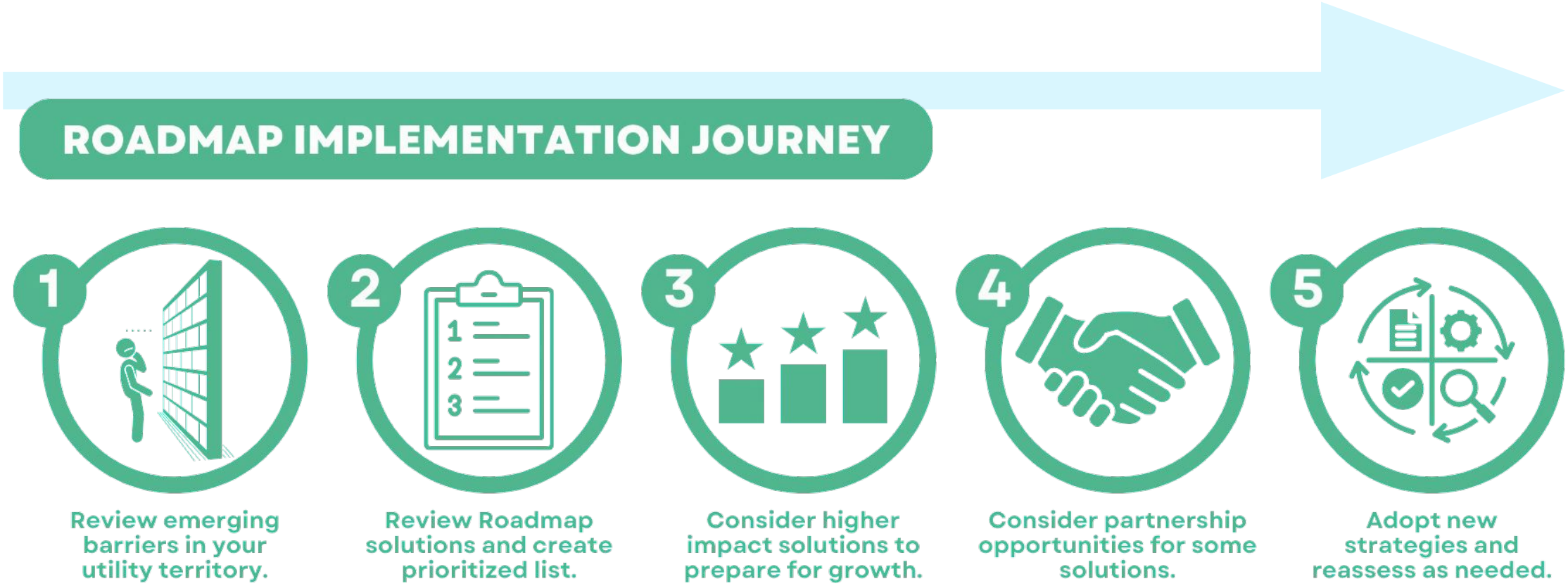
Implementing the Roadmap

Implementing the Roadmap



FAQs

FAQs

Q: What is a small customer?

A: A small customer in this report is a small fleet with less than 10 vehicles, or a multi-family housing unit.

Q: Does the report include actual timelines for each step of the service connection / energization process?

A: No. This report does not propose quantitative detail on the time it takes for the overall energization journey (e.g., 3 months, or 6 months or longer) or suggest a concrete amount of time that each solution would eliminate (e.g., saves 2 weeks or several months). There are too many variations amongst utilities and jurisdictions to suggest meaningful and accurate timelines.

Q Is more research needed on utility service connections and EVs?

A: Yes. As the EV market continues to develop and grow, there will likely be a need for continued streamlining and optimization of the energization journey. In addition, EV charging stations that are paired with solar and/or storage, or those that send power back to the grid (vehicle to grid, V2G) could require different process steps.

Thank you!

For Questions or Additional Information, Please Contact:

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APPENDIX

Advisory: Clean Cities Coalition Group

Clean Cities and Communities

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- ett Hunnicutt
- Central Texas Clean Cities: Elizabeth Munger
- East Bay Clean Cities: Richard Battersby
- Louisiana Clean Fuels:* Elizabeth Linehan
- Metro Energy Center:* Taylor Corn, Djessicka Santil
- Nebraska Clean Cities: Madison Schimdt, Leah Urbank, Nathan Huhnh
- North Dakota Clean Cities: Heather Betts
- Piedmont and Coastal North Carolina Clean Communities: Alrik Lunsford
- Vermont Clean Cities: Peggy O'Neill-Vivanco
- Wisconsin Clean Cities: Fred Schnook

CIISR team member, CCC coordinator

Experiences with Utilities | What Works Well

- Municipal fleets (including transit agencies) whose utility is also municipally-owned often cited collaborative experiences.

- Having a single point of contact at the utility for the customer was generally appreciated, and these were often viewed as a partner for longer-term project evolution.

- Many acknowledged that some projects in disadvantaged neighborhoods wouldn't be cost-effective without external funding support (e.g. utility, state, federal).

- Utility funding can be seen as more viable than state or federal funding.

- Incentive programs for chargers were valued, and rebate payments for chargers were often cited as simple, quick, and easy.