Rev up your mobility strategy

Rachel Reiss Buckley, Vice President,
Enterprise Strategy and Product Development

E Source
POWERING WHAT'S NEXT

Agenda

- Introductions
- Why “mobility”?
- The utility mobility journey
  - Establishing the utility strategy
  - Helping your customers get access to clean transportation
  - Integrating vehicles with the grid
- How E Source can help along your mobility journey
- Next steps
- Q&A

E Source speakers

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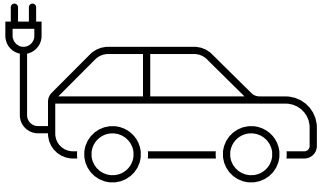
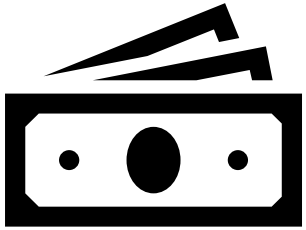
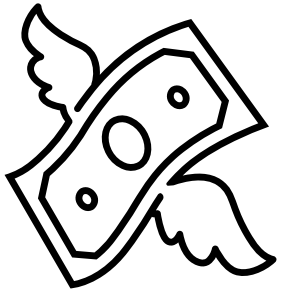
Why mobility and why now?



E Source uses “mobility” to refer to transportation electrification (TE), clean transportation, EVs, and anything else about the movement of people and goods



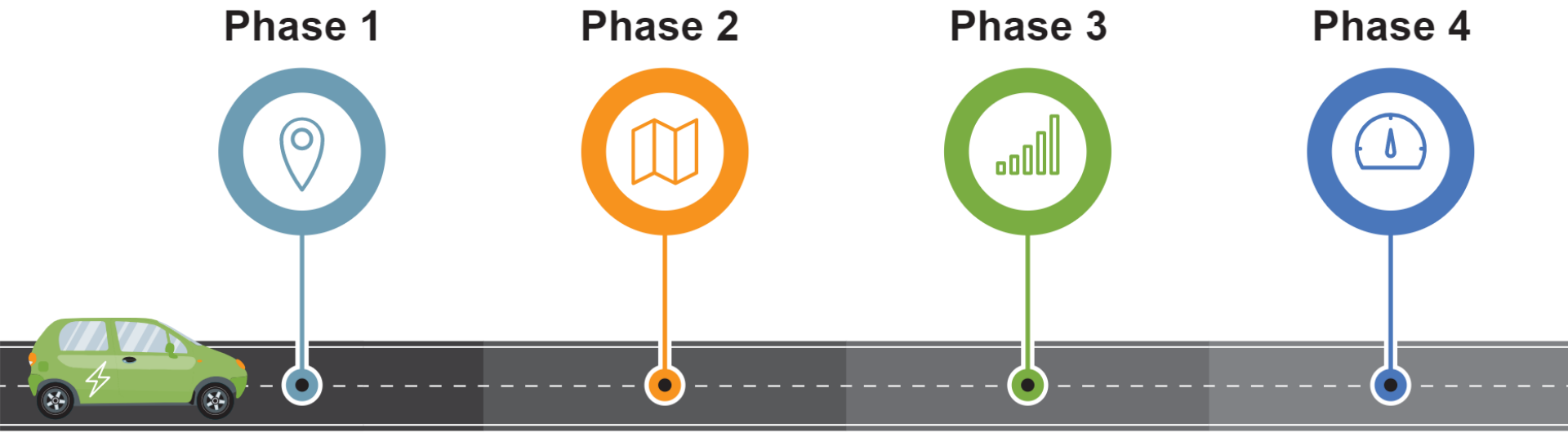
$100 billion in new revenue annually



Mismanaged EV charging is costly

The E Source Mobility practice provides utilities with the **insights and resources** they need to transition from solely serving stationary loads and customers to becoming **transportation fuel providers for the clean energy economy**.

Utilities in all phases of a mobility journey



Thinking about TE plan, strategy, or portfolio

Writing TE plan and needing inputs

Helping customers access clean transportation

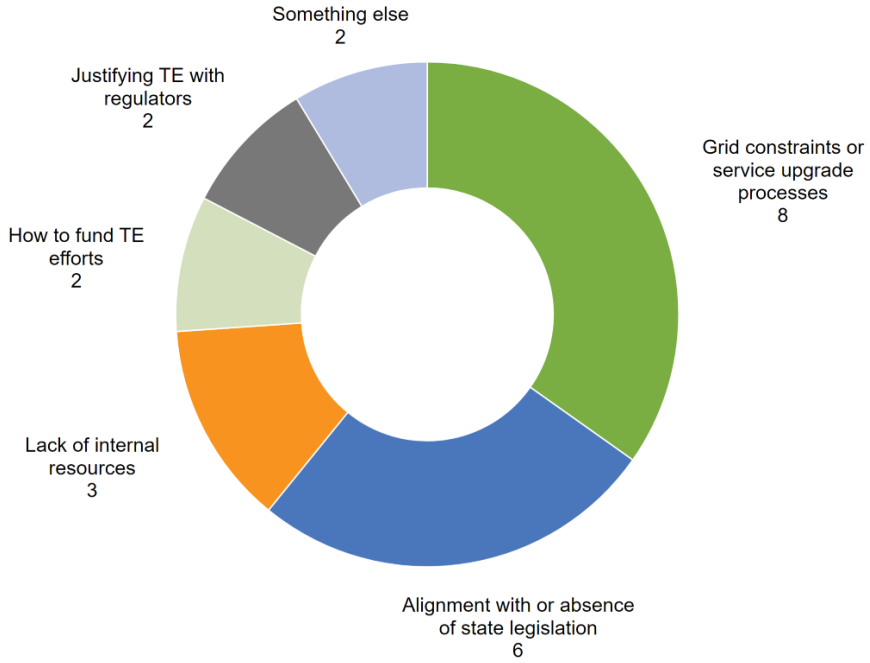
Managing grid assets

E Source

Writing and refining a TE plan

Utilities face major challenges with TE planning

- Grid capacity constraints, line extensions, and service upgrade processes
- State or provincial alignment
- Resources and funding
- Regulator or board buy-in

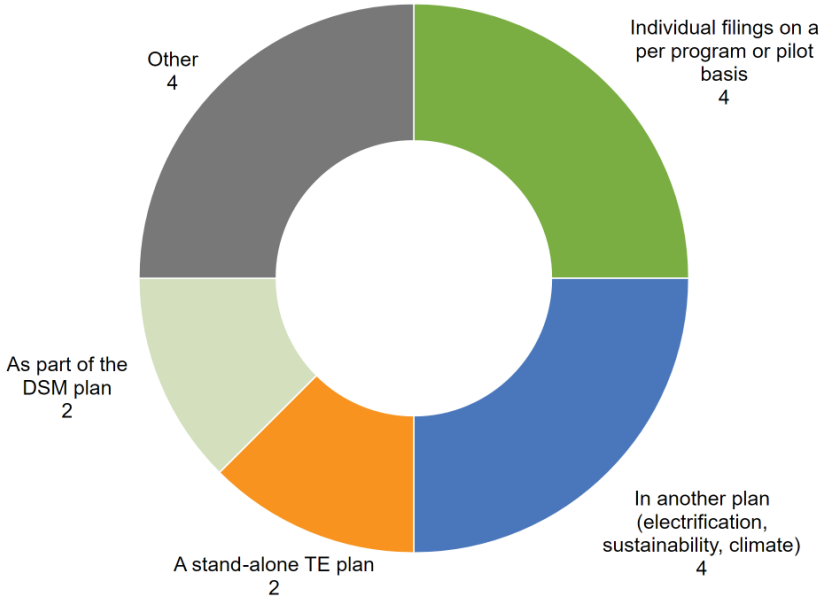


© E Source. **Base:** Event attendees (n = 23). **Question:** What's your biggest challenge in TE planning?
Notes: TE = transportation electrification. Use caution when sample size falls below 30.

An effective TE plan is within reach for utilities, E Source (2023)

TE information is not being consistently reported

- Our utility members indicate that planning for their TE programs exists in myriad documents
  - Demand-side management (DSM) plans
  - Individual regulatory filings
  - Sustainability plans
  - Integrated resource plans
  - Climate or carbon plans
- Relatively few have full TE plans

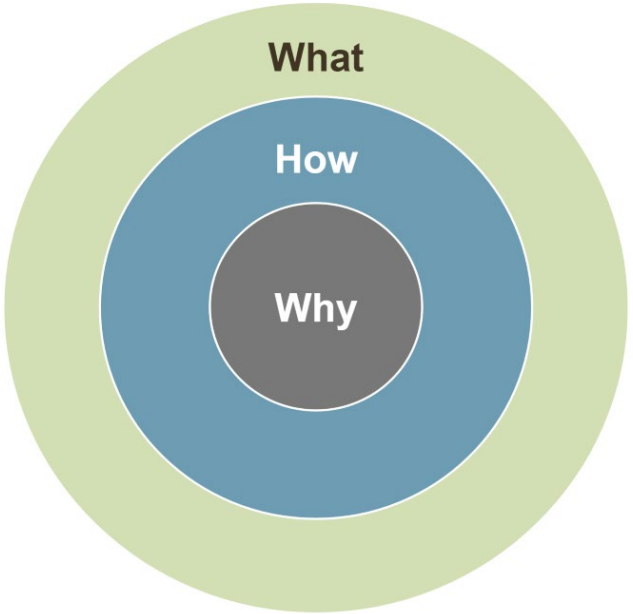


© E Source. **Base:** Event attendees (n = 16). **Question:** What's your biggest challenge in TE planning? **Notes:** DSM = demand-side management; TE = transportation electrification. Use caution when sample size falls below 30.

An effective TE plan is within reach for utilities, E Source (2023)

Comprehensive TE planning and reporting

- Utility EV programs have evolved over many years
- Organic growth can lead to disorganization and inefficiencies
- Pulling data and information into one easy-to-find location is helpful for all stakeholders



© E Source; adapted from Simon Sinek

Creating a blueprint for comprehensive transportation electrification planning, E Source (2023)

What makes a good TE plan?

Strengths	Weaknesses
Communicates with broad audiences	Lacks specificity and granularity of data
Sets goals and includes forecasts	Has no clarity on progress tracking and data collection
Has diverse and robust stakeholder processes	Makes excuses for inaction and is unwilling to take risks
Offers thorough policy analysis	Sets incentives that are unspecified or vague
Assesses air quality and carbon dioxide impacts	Contains unspecified or vague performance metrics
Draws from multiple funding sources, braids funds, seeks budget flexibility	Is slow to push electrification or meet state goals
Exceeds minimum requirements	Claims that minimum requirements are unrealistic
Encompasses a wide range of TE activities	Fails to incorporate all TE activities or details
Aligns with resource and distribution planning and documents	Doesn't tie TE planning and goals to other utility planning and documents
Establishes cost-effectiveness testing	Explains TE barriers but proposes no solutions
Includes robust cost-benefit analysis	Vaguely discusses customer or utility benefits
Rightsizes plans to resources, anticipates current and future portfolio spending	Is unrealistic relative to utility resources and capabilities

As an industry, we're all new to the process of creating and implementing TE plans, and best practices don't exist.

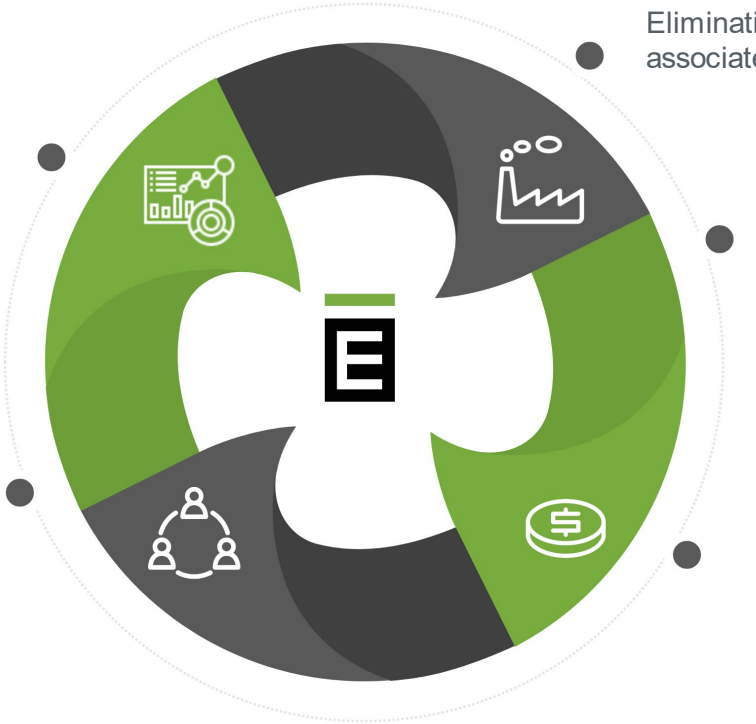
Still, features and content for TE plans are emerging that are more and less helpful.

As they say in relationship counseling, there's no such thing as overcommunicating!

Most of the weaknesses we see with TE plans so far are due to lack of info.

Decarbonization
Eliminating greenhouse gas emissions associated with our energy system

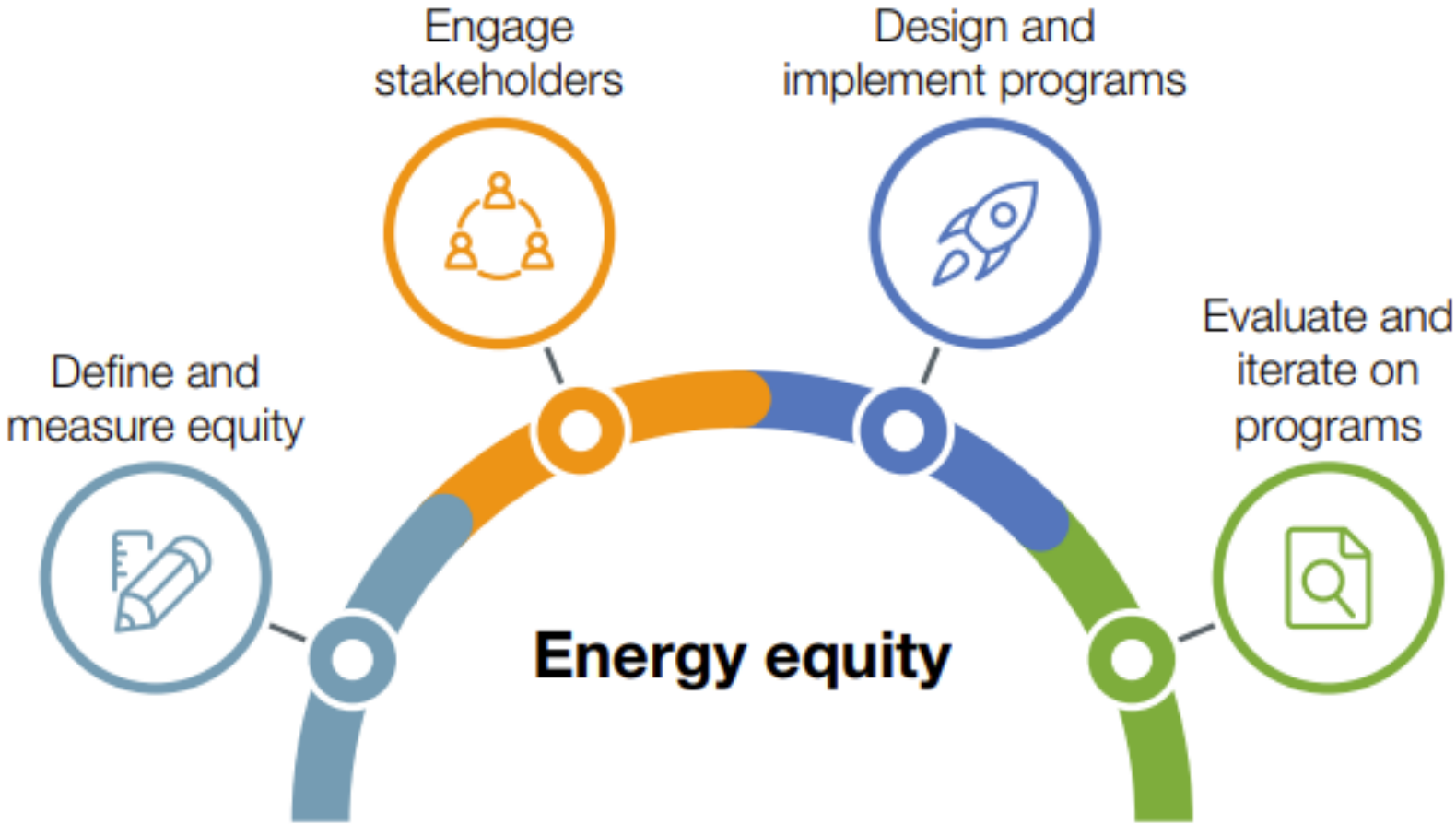
Data-driven paradigm shift
Evolving practices for the collection, storage, sharing, use, and analysis of data



Safety, reliability, and resilience
Furthering the industry legacy of delivering safe and reliable power and improving grid resilience

Customer equity
Making sure disadvantaged and historically underserved communities enjoy more benefits and face fewer burdens

Downward cost pressure
Keeping operating costs down for the utility and energy prices low for customers, especially vulnerable communities



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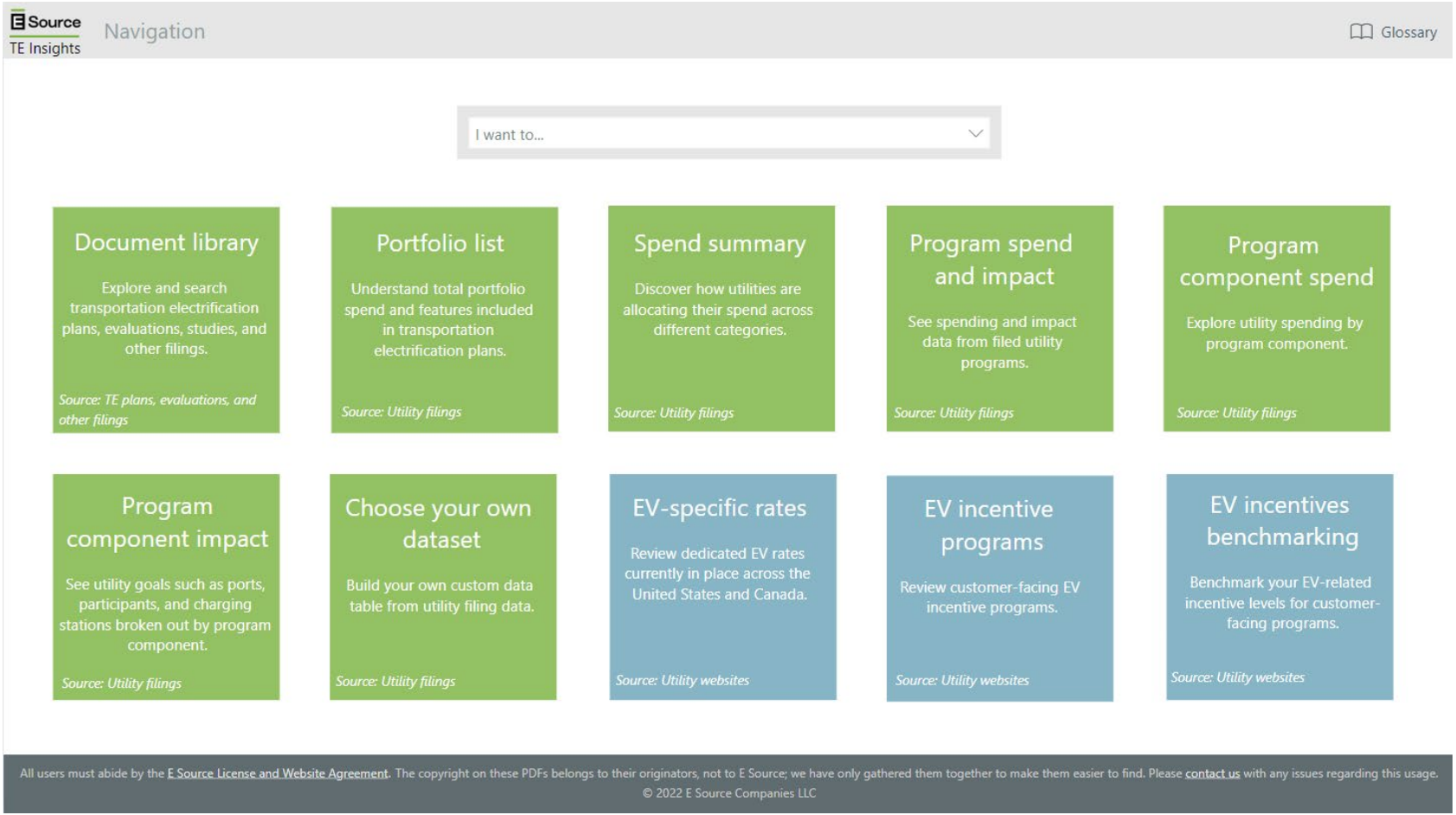
TE Insights

Benchmark utility TE spending and strategy

E Source TE Insights organizes the data from utility transportation electrification (TE) plans, EV-specific rates, and customer rebates into one easy-to-navigate platform. With this tool, you can understand how peer utilities are allocating their TE budgets, track goals and results, find transportation plan language that can support your own filings, and compare EV-specific rates and incentives. Make informed decisions about your TE strategy with this view of the industry landscape.

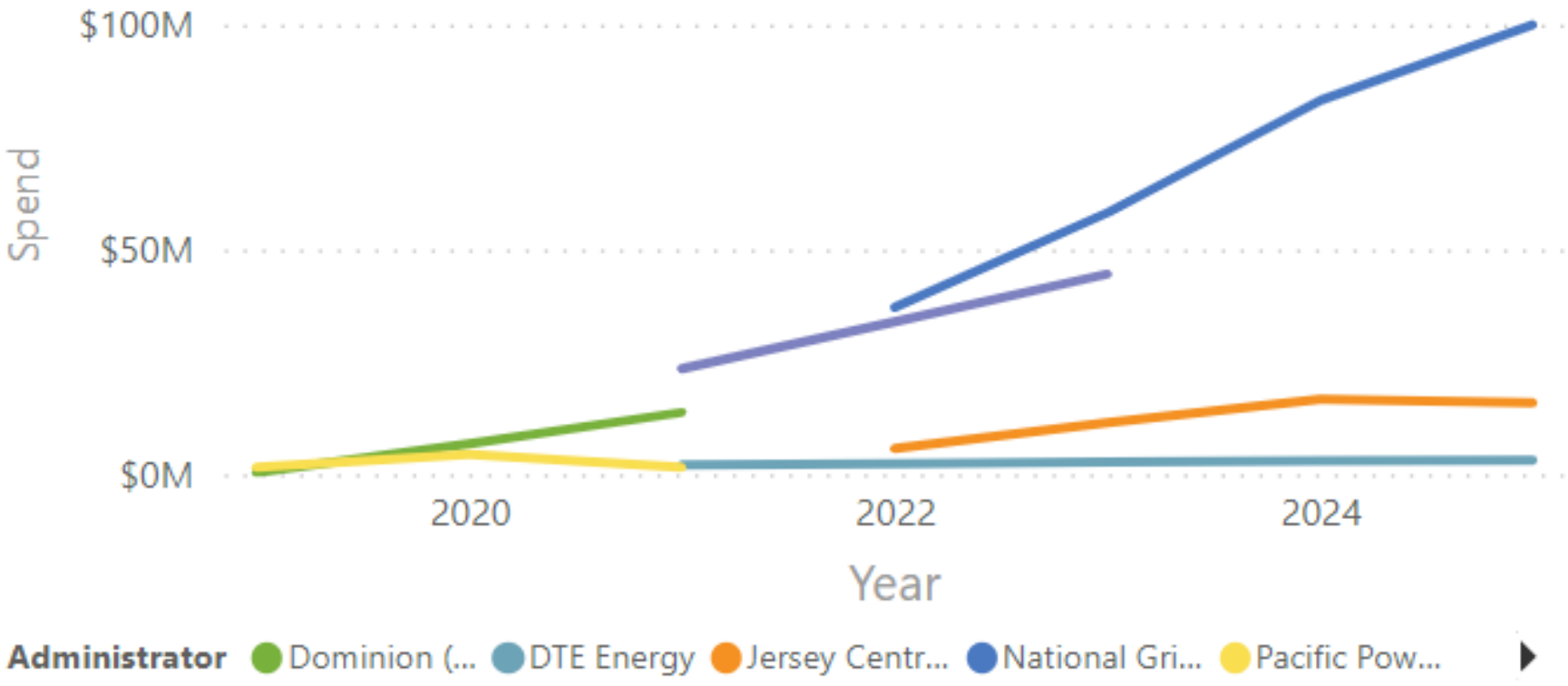
TE Insights helps you design a strategy with confidence by providing:

- Information on utility TE spending, goals, rates, and incentives
- The ability to perform a keyword search within TE plans and evaluations
- Built-in visuals to help you understand trends
- Original source documentation
- Powerful filters so you see only the most pertinent data



Spend by Year and Administrator

Note: Excludes administrators where most data has been annualized from multi-year figures



Helping customers access clean transportation

Competitive grant programs now open

Who is eligible to apply for US Charging and Fueling Infrastructure (CFI) Discretionary Grant Program?

- States or political subdivision of states
- Metropolitan planning organizations
- Unit of local governments
- Special purpose districts or public authorities with a transportation function, including port authorities
- Indian tribes
- US territories
- Authorities, agencies, or instrumentalities or entities owned by one or more entities listed above
- Group of entities listed above
- State or local authorities with ownership of publicly accessible transportation facilities (applies to community program only)

Two programs:

- Community program
- Corridor program

$2.5 billion budget over 5 years

Up to $700 million in 2023

Electrification assistance for customers

Table 1. HOMES Rebates Based on Modeled Energy Savings for Single-Family Homes

	Rebate	Rebate Cap
at least 20% energy savings, but less than 35%		
if LMI household	80% of cost	$4,000
all other households	50% of cost	$2,000
at least 35% energy savings		
if LMI household	80% of cost	$8,000
all other households	50% of cost	$4,000

Source: §50121(c) of Inflation Reduction Act of 2022 (P.L. 117-169).
Notes: IRA defines LMI households to have income below 80% of the area median income for purposes of HOMES rebates.

Source: The Inflation Reduction Act: Financial Incentives for Residential Energy Efficiency and Electrification Projects, Congressional Research Service (2023)

Funding made available through the Inflation Reduction Act to:

- Upgrade electric service panels
- Upgrade wiring
- Fund performance-based energy efficiency rebates

Funds flow through state energy offices (SEOs) and native tribes

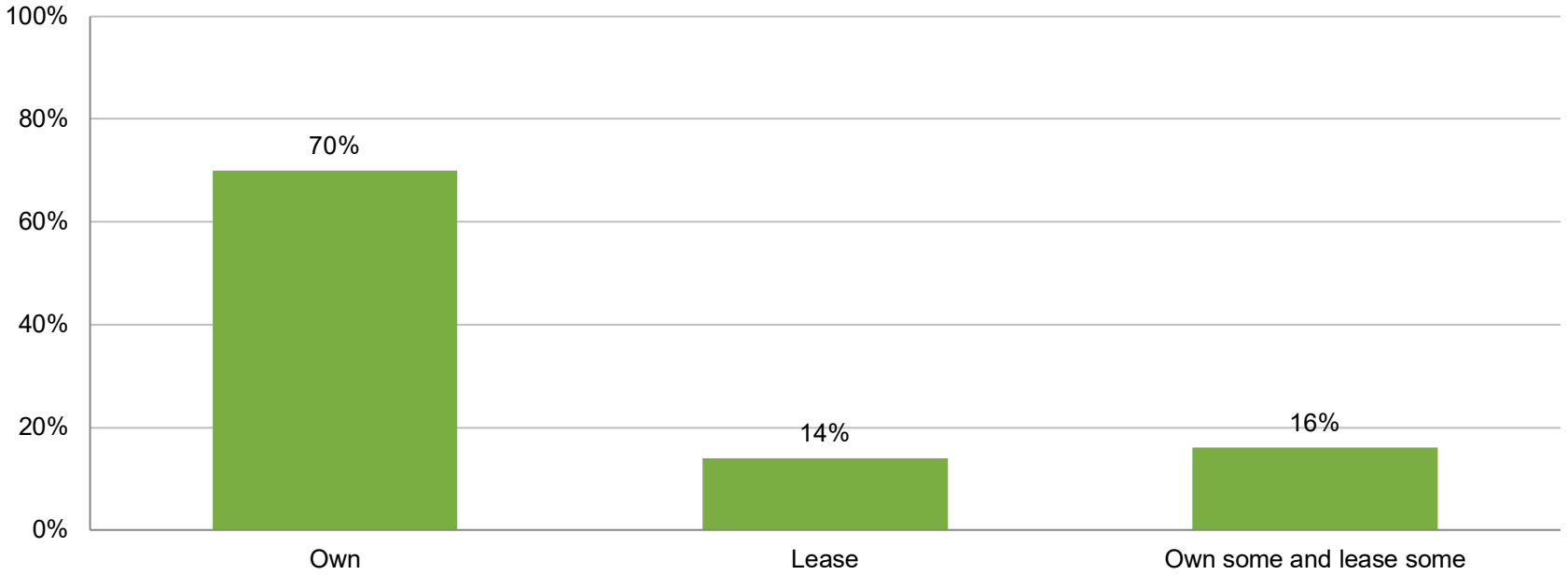
Helping fleets

E Source Nonresidential Fleet Electrification study: Background

Purpose: Get a better understanding of actionable strategies utilities and state agencies can adopt to support commercial customers and their fleet needs

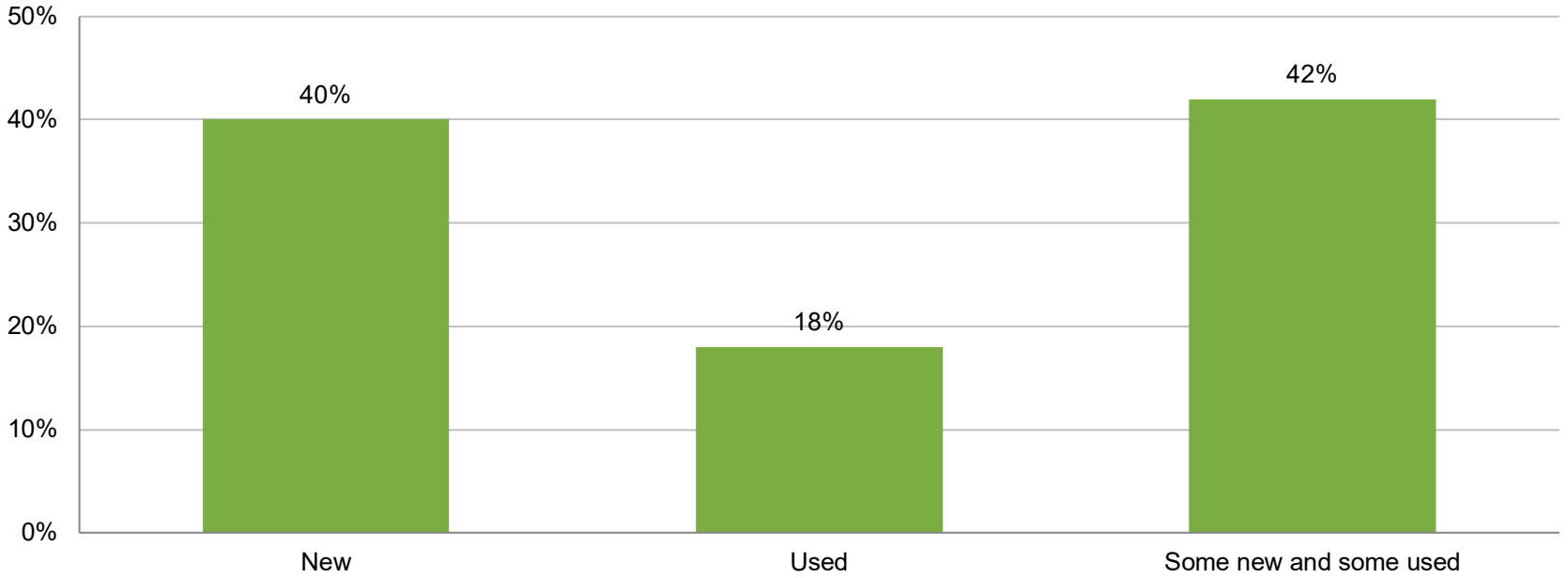
- Online survey of fleet operators, managers, or companies that operate fleets
- September 2022
- 50 respondents
  - 32 fleet operators or managers
  - 18 represent companies that operate fleets
- Small and midsize businesses and fleets
  - Fewer than 500 employees
  - Most have fewer than 50 vehicles
- US only
  - 8 West
  - 19 Midwest
  - 13 South
  - 10 Northeast

Fleet ownership



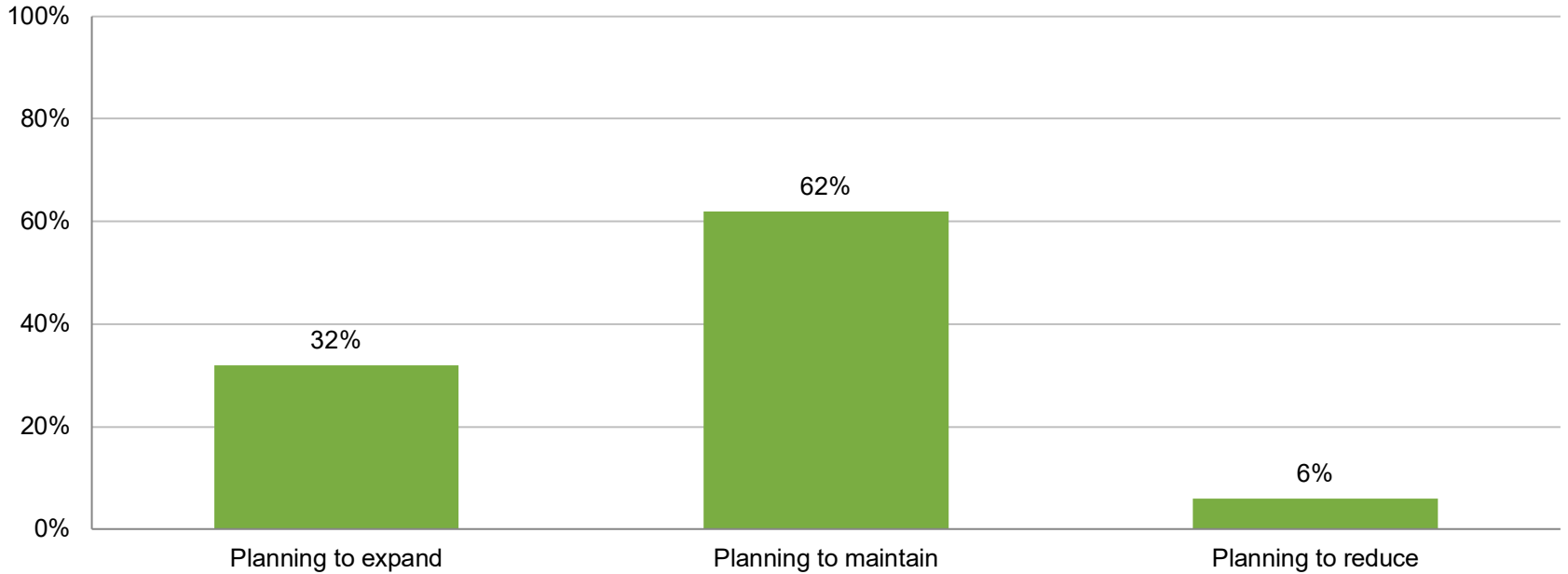
© E Source (Nonresidential Fleet Electrification study). **Base:** n = 50. **Question S1_6:** Which of the following best describes the ownership of the fleet you represent?

Vehicle purchase behavior



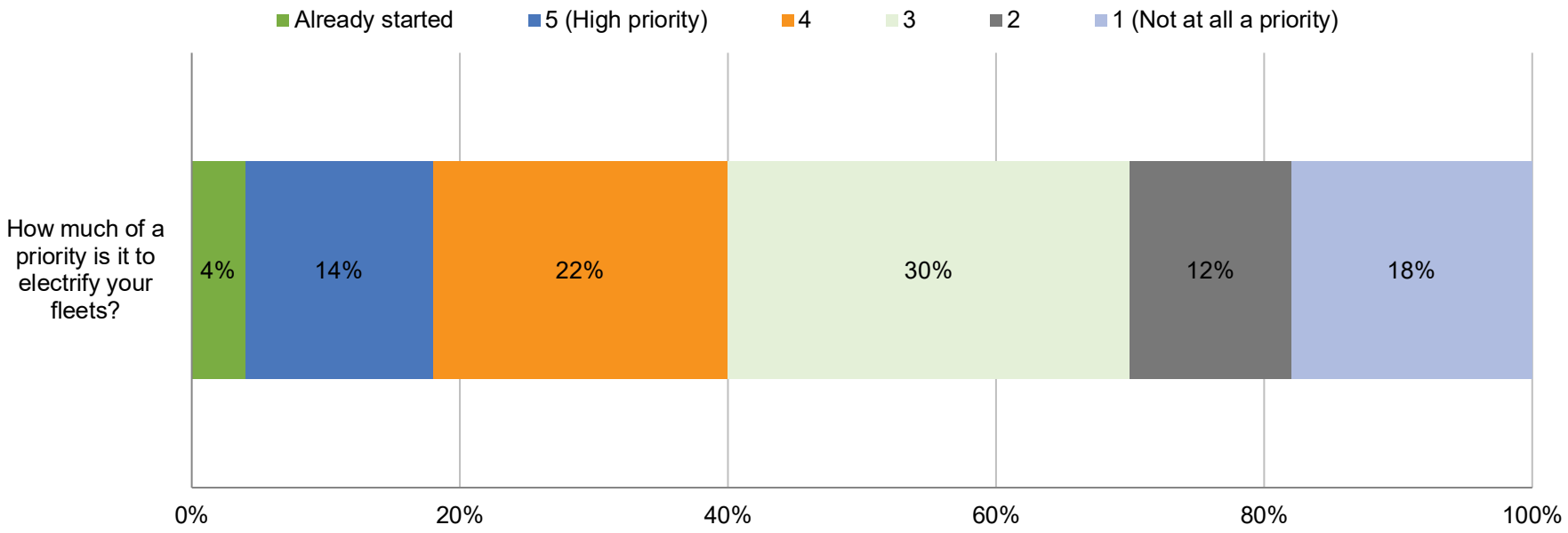
© E Source (Nonresidential Fleet Electrification study). **Base:** n = 50. **Question S1_7:** Which of the following best describes the types of vehicles you get for the fleet you represent?

Fleet plans for the next three years



© E Source (Nonresidential Fleet Electrification study). **Base:** n = 50. **Question S1_8:** Which of the following best describes your vehicle fleet plan for the next three years?

How much of a priority is it to electrify your fleet?



© E Source (Nonresidential Fleet Electrification study). **Base:** n = 50. **Question S1_10:** On a scale of 1–5, where 1 is not at all a priority and 5 is a high priority, how much of a priority is it to electrify your fleet?

Why isn’t it a priority to convert your fleet vehicles to electric?

- Vehicles cost is too expensive (7)
- Electrification is a one-sided political agenda (5)
- Price of fueling or recharging is too expensive (4)
- Reliability and uptime (4)
- Don’t see the benefit of doing so (3)
- Infrastructure is too expensive (3)
- Unfamiliar with charging or refueling needs or process (3)
- Project timeline is too lengthy (2)
- Too busy or have higher priorities (2)
- Unsure of the process for conversion (2)
- Utility permitting process too complex or bureaucratic for line extensions (1)
- Payback term is too long (1)
- Vehicle availability (1)

© E Source (Nonresidential Fleet Electrification study). **Base:** n = 9. **Question S1_11:** Why isn’t it a priority to convert your fleet vehicles to electric? Select all that apply.

What programs or incentives would be most helpful in supporting the conversion?

- Charger incentives (4)
- Vehicle incentives (4)
- Technical assistance (1)
- Special rates or tariffs (1)
- Managed or smart charging, where vehicles are charged in a way that supports the grid (1)
- Other (1)
- None of the above (3)

© E Source (Nonresidential Fleet Electrification study). **Base:** n = 9. **Question S1_13:** Should electrifying your fleet become a priority, what kind of utility-led programs or incentives would be most helpful in supporting the conversion? Select all that apply.

E Source Market Research

Nonresidential Fleet Electrification study

Mobility

About

We'll investigate how commercial fleet managers are planning for electrification and how utilities can best serve them based on customer feedback. Learn more at Nonresidential Fleet Electrification.

Participation

This study is included with membership in the E Source Mobility Service. Nonmembers who participate may access an executive summary of results, or full results may be purchased for a fee.

Results

All participants in the voice-of-the-utility survey will have access to executive summary–level results. We'll publish other reports and webinars to share more results and insights, and members of the E Source Mobility or Distributed Energy Resource Strategy Service can access all of them.

E Source Market Research

Electric Vehicle Residential Customer Survey

Mobility

VOC

About

The largest survey on US and Canadian customer readiness for EVs, we describe residential customers' readiness for EVs to inform utility program design and marketing outreach. Learn more at Electric Vehicle Residential Customer Survey.

Participation

Based on the services they subscribe to, members receive access to reports and webinars featuring insights from the survey. Nonmembers may purchase access to the results for a fee.

Results

Members of all services get content about overall survey findings, including access to industry and best-practice reports, webinars, and networking events for relevant content areas. Nonmembers may purchase access to the results for a fee.

Forecasting the EV market to accelerate fleet electrification

Case study

Using E Source's projections, a utility successfully assessed fleets in its service area based on the types of vehicles in operation. The utility ranked the commercial fleets' likelihood of electrifying their trucks, saving the utility time and money.

The challenge

A Texas-based utility wanted to proactively electrify its commercial fleet customers to increase load and revenue. To accomplish this, the utility needed to identify which fleets—roughly 25,000—would most likely electrify.

But the effort was challenging, expensive, and time-consuming. It was clear that the utility needed high-quality data on how the EV market would evolve over the next 10 years to help it navigate the process.

The approach

The utility partnered with E Source and used the E Source EV Forecast Database to prioritize the fleets in its service area. The database provided insights on how the electric truck market would develop over the next 10 years.

The sales forecast from E Source covered several types of electric trucks, including:

- Electric pickups
- Delivery vans
- Panel trucks
- Straight-line trucks
- Interstate highway trucks
- Refuse trucks

The impact

E Source helped the utility assess the range of fleets in its service area. It reviewed each fleet based on the types of vehicles and ranked the fleets' likelihood of electrification.

Using E Source data, the utility can:

- Confidently direct its resources
- Proactively engage with fleets
- Determine future infrastructure needs
- Potentially offer beneficial incentives

The utility has jump-started its strategy and saved valuable time and budget.

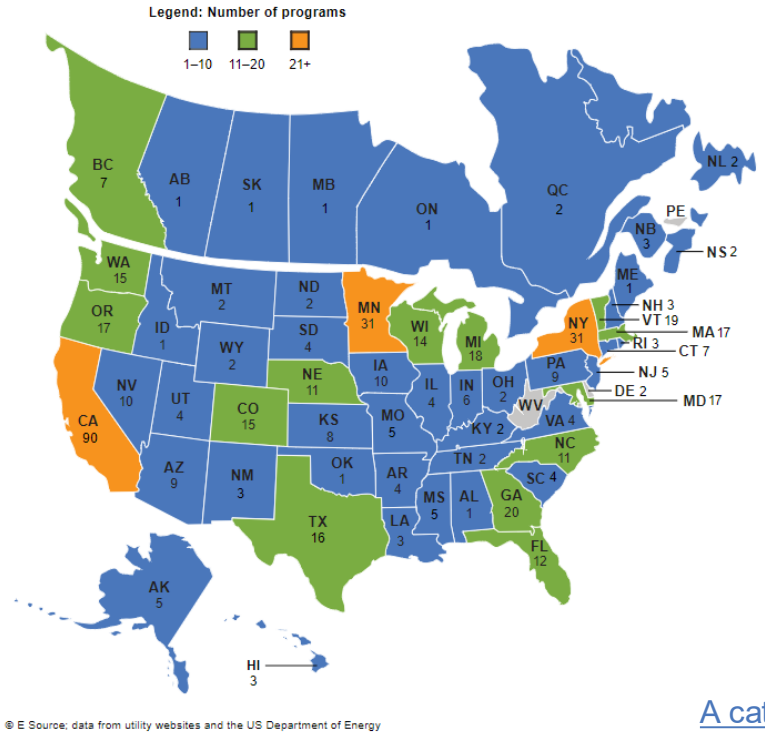
What's next

In addition to the forecasting work, E Source Battery Next can support fleet electrification efforts by scanning, screening, and vetting emerging vehicle and charging technologies.

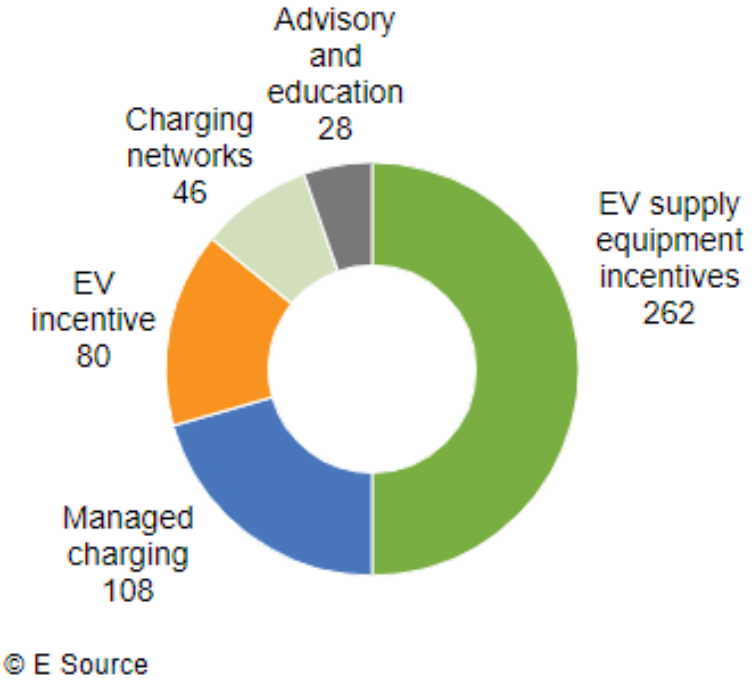
Our experts can evaluate the strategies, programs, and incentives that have worked for other utilities and benchmark that data to improve programs and offerings.

Managed charging

EV pilots and programs

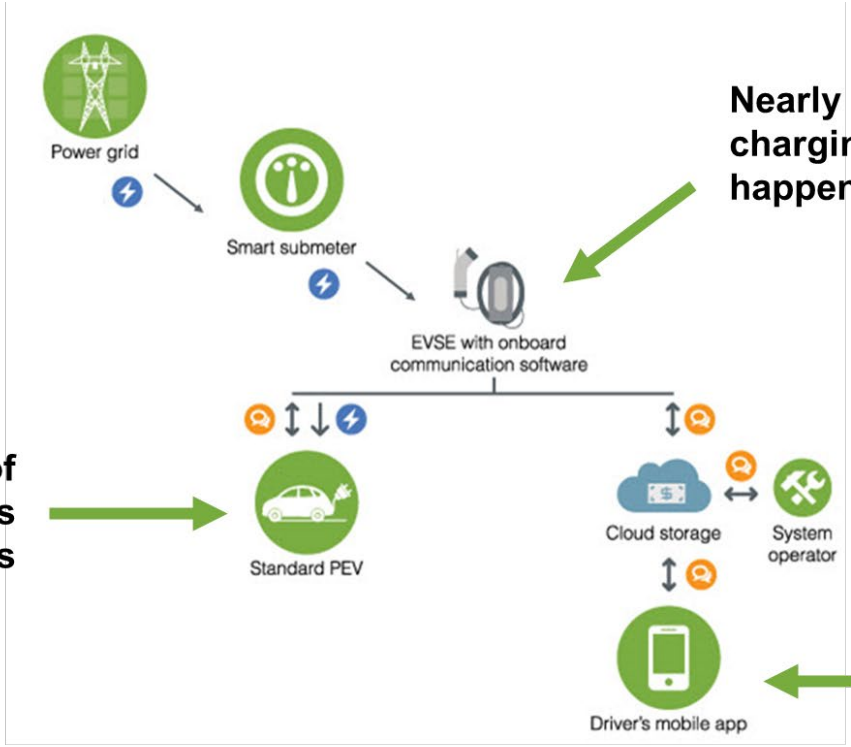


® E Source; data from utility websites and the US Department of Energy



A catalog of utility EV pilots and programs, E Source (updated November 2022)

Where charging is managed



Nearly all managed charging is happening here

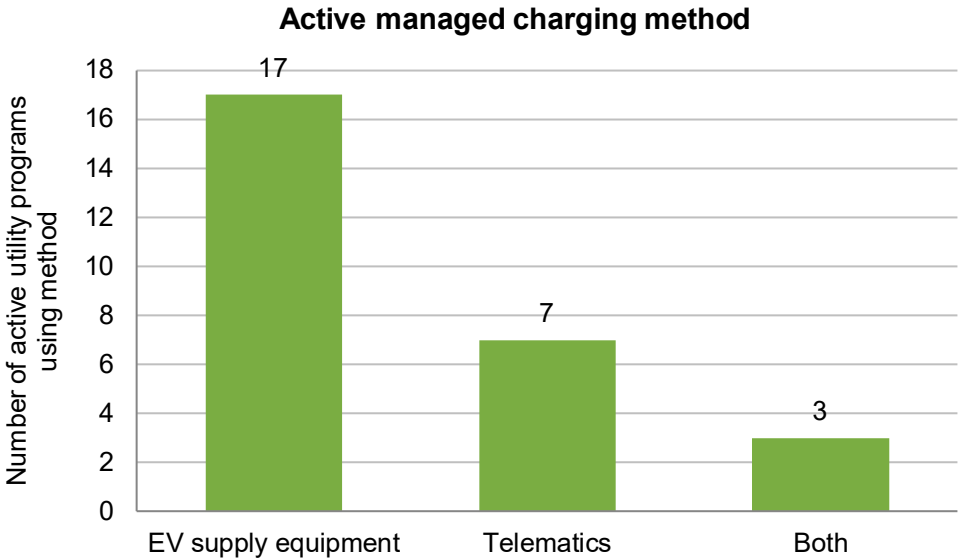
A few examples of vehicle telematics pilots

Also, several behavioral programs

Note: EV = electric vehicle supply equipment; PEV = plug-in electric vehicle. © E Source

Active managed charging approaches

- Our updated A catalog of utility EV pilots and programs tracks the various approaches
- Managed charging allows the utility to take control of the charging load
- Charging can be turned on or off during designated events, or continuously in response to daily peak, electricity mix, or other grid demands.
- Using the EV supply equipment is the most common method of managed charging, but telematics is emerging as an option



© E Source

Asset availability

- Evaluations so far reveal a common challenge: vehicles aren't available to be managed
- Seems to be a trend; customers are aware an event is being called related to their EV, so they simply don't plug it in
  - Good news: The vehicles aren't charging during the event
  - Bad news: The utility can't take credit for it
- Telematics claims to alleviate some of these issues by allowing customers to participate anywhere in the service area and using different marketing language

Evaluations

"Results from the evaluation of the EVCS pilot indicate there is minimal impact to System peak, in terms of additional load/potential DR savings, even as the kilowatt (kW) savings are project across the estimated existing population of EVs in Colorado."

—Electric Vehicle Charging Station: Pilot Evaluation Report (PDF), Xcel Energy Colorado (2015)

"Almost no customers were charging during demand response events which shows that just planning a DR event incentivizes customers not to charge during that time, or that customers were not plugged in at that time anyway."

—Pepco Demand Management Pilot for Plug-In Vehicle Charging in Maryland: Final Report (2016)

"The implementation costs remain highly uncertain due to lack of scale, and many questions remain about the ability for managed charging to produce reliable cost benefit analyses."

—Assessing the value of electric vehicle managed charging: A review of methodologies and results, National Renewable Energy Laboratory (2022)

"Early EVSE DR pilots have shown promising potential, but **challenges related to equipment connectivity and asset availability** will need to be addressed before these programs can achieve the scale and dispatchability that utilities may ultimately want."

—Electric Vehicle Supply Equipment Direct Load Control Demonstration (PDF), Eversource (2019)

Tracking new evaluations

- 2022 PG&E Electric Vehicle Automated Demand Response Study Report (PDF)
  - Engaging customers who already own Level 2 chargers will be more cost-efficient than trying to incentivize hardware upgrades
  - $50 enrollment incentive can capture 50% of customers with Level 2 chargers, but a $300 incentive would be required to garner similar participation with a hardware upgrade
- 2022 National Grid EV and PHEV Demand Response Evaluation (PDF)
  - Technical issues or opt-outs accounted for 29% of all plugged-in participation statuses

> “Continue to monitor the effects of the program on participants’ charging behavior on all days (not just event days) through surveys and other methods, as possible. Evaluate this type of behavioral effect to enable National Grid to claim the savings associated with participants choosing to charge during off-peak hours as a result of their participation in the program.”
>
> *—National Grid EV and PHEV Demand Response Evaluation (July 2022)*

Telematics vendors

EV.energy provided EV charging software for the Silicon Valley Clean Energy's GridShift Pilot. The company also completed a study with AEP Ohio.

FlexCharging works directly with vehicle owners and utilities to manage charging. The company has launched pilots with Efficiency Maine and in Australia with AGL Energy.

EV telematics vendor FleetCarma, which was acquired by Geotab in 2018, has been the leader in developing behavioral managed-charging programs for utilities. Acquiring FleetCarma—Expanding Our EV Offering discusses the acquisition and company vision. And the SmartCharge Rewards page gives details on smart charging pilots and programs.

Rolling Energy Resources connects directly to cars through its native APIs, which control charging and monitor battery state-of-charge, regardless of where customers plug in. Earlier this year, the company announced a managed charging pilot with Duke Energy and Itron and EV Companion an EV-education tool in partnership with ComEd.

WeaveGrid offers smart charging services that use telematics. See the articles WeaveGrid expands work with Xcel Energy and Baltimore Gas & Electric's Telematics-Based EV Smart Program wins the PLMA Program Pacesetter Award for more details on the company's utility pilots.

Vehicle-to-grid (or managed discharging)

Tracking the state of utility and industry vehicle-to-grid (V2G) efforts as they unfold

- The California Public Utilities Commission approved three V2G integration pilot programs for PG&E in May 2022:
  - Residential
  - Commercial
  - Vehicle-to-microgrid public power safety pilot
- Oncor and Toyota announced a V2G partnership in December 2022
- Four TE plans in TE Insights discuss future plans related to V2G

What are some recent pilots and programs related to vehicle-to-grid technology? E Source (2023)

Considerations for managed charging

An appropriate rate tariff

Regulatory approval/incentive

Networked charging stations

Goals, plans, roadmaps

Locational valuation

Customer segmentation

E Source
Mobility Service

E Source Mobility practice

We want you to feel clear-eyed and empowered on your mobility journey

Discover how the E Source Mobility practice can help you **deliver more value** to your customers in **less time**, while **meeting regulatory requirements** and utility priorities.

Learn how access to our:

- Thought leaders and utility peer network
- Benchmarks and voice-of-the-customer market research
- World-class program and technology assessments

We can help you build and optimize your portfolio—from ad-hoc programs to a customer-centric approach

www.esource.com/electric-vehicles

How the Mobility practice will help you

- Meet regulatory requirements and utility priorities
- Address fleet and consumer market demand proactively
- Save time and prioritize your efforts
- Learn from what others have already tried
- Stay on top of trends
- Deliver more value to the right customers in less time
- Move from ad-hoc programs to a customer-centric portfolio

You're not alone

Network with your peers

Annual in-person **Mobility Leadership Council**

Ongoing online **peer exchanges**

Ask us for connections

Our experts are on your team

Authored dozens of mobility reports and invited to **speak** at many conferences

Frontline **consulting** with mobility vendors, agencies, and utilities

Deep **industry relationships** and context for mobility solutions

Analyzed all available TE plans, evaluation studies, and pilot results

E Source Mobility Service membership components

Market research

Proprietary customer and utility market research to enhance your TE portfolio strategy

Research reports and databases

Access to our entire TE research and database library

Ask E Source

On-demand research inquires across TE planning, portfolio design, charging technology, customer engagement, and marketing efforts

E Source TE Insights

Access existing utility TE portfolio budgets, rates, incentives, goals, and results

Dedicated TE advisory team

TE experts that advise and work with you throughout your TE plan

Events

Closed-door utility working groups, leadership councils, webinars, and topical presentations

We can help you develop a customized strategy and implement your plan.

Research and Advisory

Using market research data, expert analysis, and industry experience, we help utilities put their customers first and meet their business objectives

Data Science

Applying predictive data science to help electric and gas utilities make data-driven decisions that improve their bottom line and increase customer satisfaction

Solution Services

Advancing business and technology solutions that strategically enhance operations for utilities

E Source

Optimizing Con Edison's electric vehicle messaging through ethnographic research

Consulting case study

Key highlights

- Con Edison planned to install 38 curbside electric vehicle (EV) charging sites to increase EV adoption and wanted to understand how residents would feel about the addition of the chargers to their already busy streets.
- E Source Management Consulting conducted ethnographic research to gather residents' perceptions of EVs and curbside charging to help Con Edison craft a messaging, communications, and engagement strategy.
- Based on those ethnographic findings and the outcomes of an E Source–hosted design-thinking workshop, Con Edison developed a hyperlocal launch that highlighted EV owners in the community, spread awareness of EVs, and addressed community concerns.

Read more: Optimizing Con Edison's electric vehicle messaging through ethnographic research

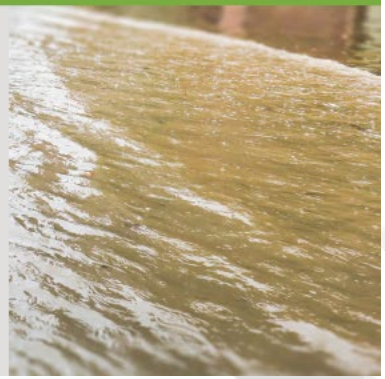
E Source

Strategies for EV charging resiliency during natural disasters

Consulting case study

Key highlights

A large northwestern utility hired E Source to investigate mobile and deployable electric vehicle (EV) charging options to enhance charging resiliency during natural disasters. We investigated the feasibility of several products currently on the market that are designed to be deployed to provide sufficient energy to stranded EV drivers in a natural disaster or other emergency.



Read more: [Strategies for EV charging resiliency during natural disasters]

www.esource.com/electric-vehicles

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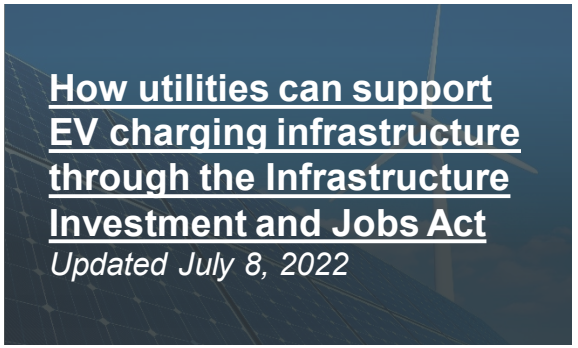

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With a high-touchpoint model, the E Source Mobility Service provides custom engagement and advising on your mobility initiatives.

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We'll schedule recurring advisory calls between E Source TE experts and your TE team, based on your utility's needs

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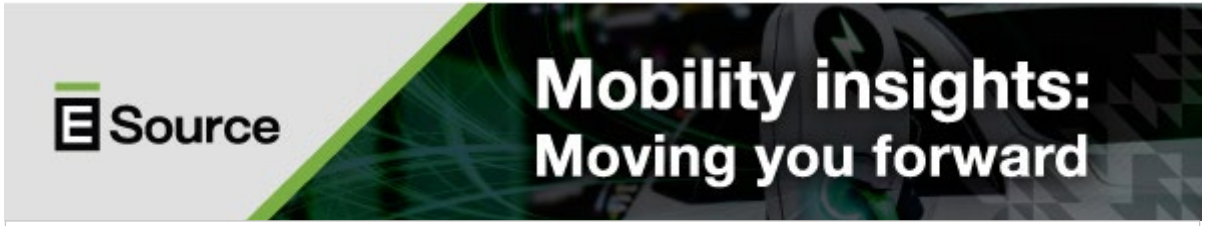
- Optimizing Con Edison's electric vehicle messaging through ethnographic research
- Strategies for EV charging resiliency during natural disasters
- Forecasting the EV market to accelerate fleet electrification

Don’t miss the monthly newsletter



Three insights about mobility planning

Utility transportation electrification (TE) efforts. Our team has been searching for and scouring through TE plans to advise our customers on utility TE efforts. Our analysis shows that most utilities aren’t yet filing stand-alone TE plans, but we do expect this to start happening. This follows the trends we witnessed with the rise of demand-side management planning 20 years ago.

Are you ready to get ahead of market or regulatory requirements with more-comprehensive and robust planning? Check out E Source TE Insights, our tool that can help you track TE plans, programs, and spending.

Roadblocks to TE planning. Based on our research, the three major roadblocks to robust TE planning are:

- Grid capacity constraints

Contact us

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TE tech validation

Ask E Source

"How can we compare different EV solutions for business customer fleets?"

"What are the evaluated impacts, costs, and benefits leading utilities are seeing for EV telematics as a load management resource?"

"Can you help us establish EV supply equipment specifications for our program's qualified products list?"

TE tech validation

Reports

[Transportation electrification and energy funding in the 2021 Infrastructure Investment and Jobs Act]
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