

THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Aradhana Gahlaut, Senior Associate, Rocky Mountain Institute

Nicole LaChapelle, Mayor, Easthampton, MA

Fátima Luna, Climate and Sustainability Policy Advisor, Tucson, AZ

Eileen Cipriani, City Business Administrator, Scranton, PA

Moderator: Chasity Wells-Armstrong, Former Mayor, Kankakee, IL

SUMMER
2023

THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Aradhana Gahlaut, Senior Associate, RMI

SUMMER
2023

Municipal Fleet Electrification

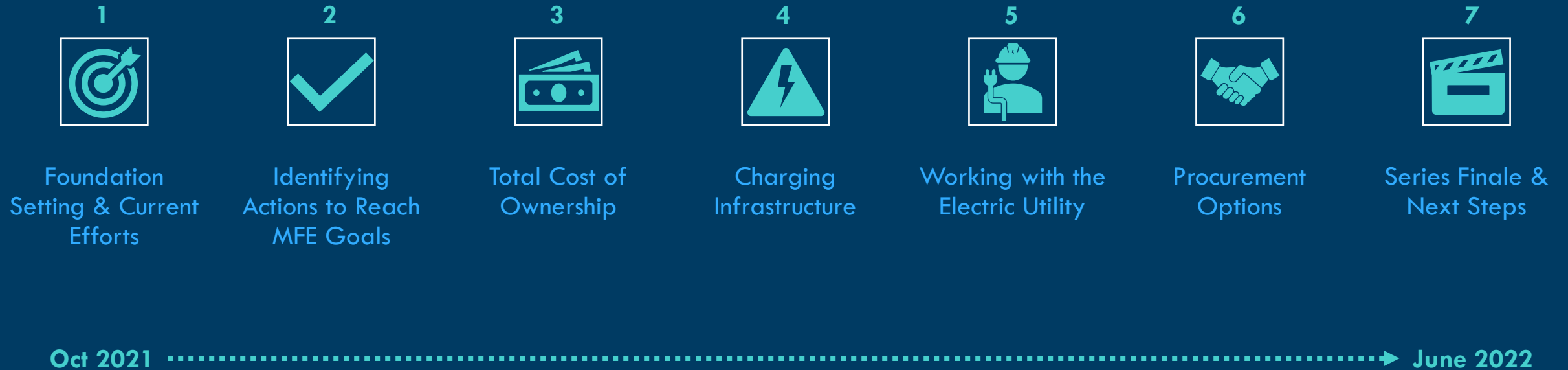
Creating a pathway for cities and counties to electrify their fleets

Aradhana Gahlaut, RMI

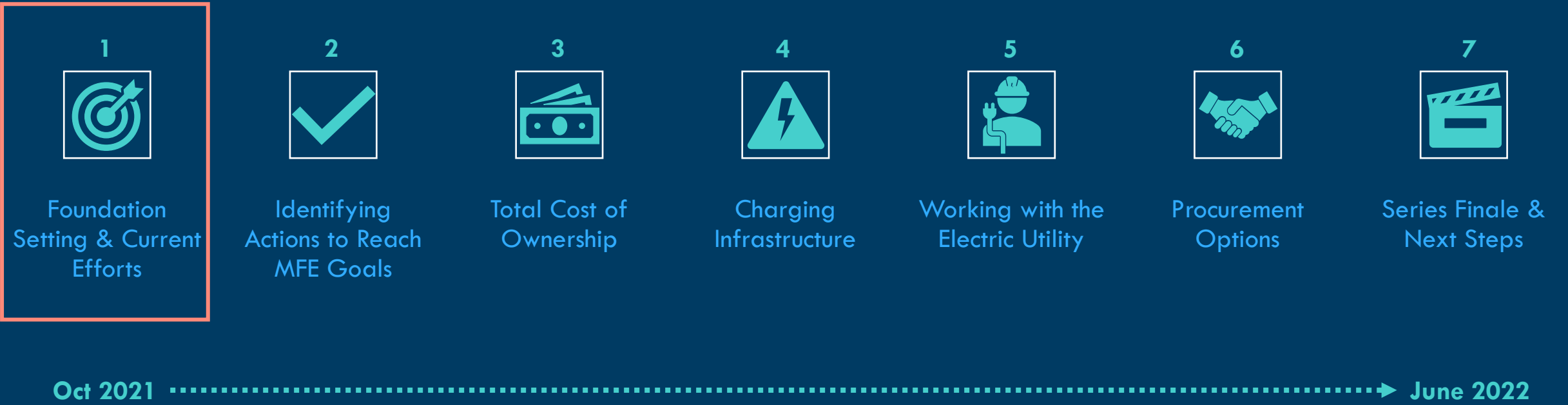
August 10th, 2023



Through six workshops, RMI covered a wide range of topics and best practices



Foundation Setting & Current Efforts



Why electrify municipal fleets?

Several compelling reasons, among others



**Cost Savings
Opportunities**



**Reduced Reliance
on Foreign Oil**

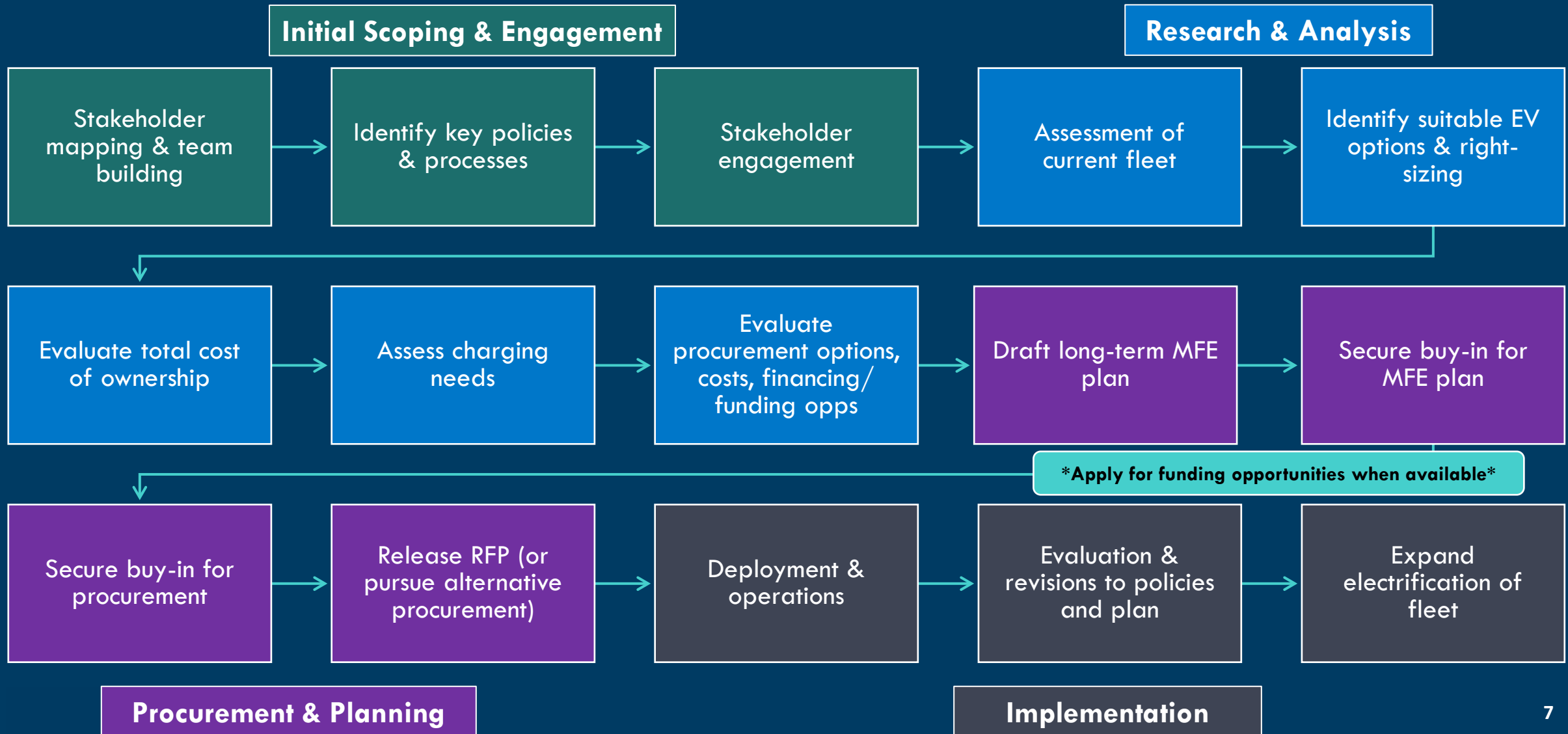


**Emissions
Reduction**

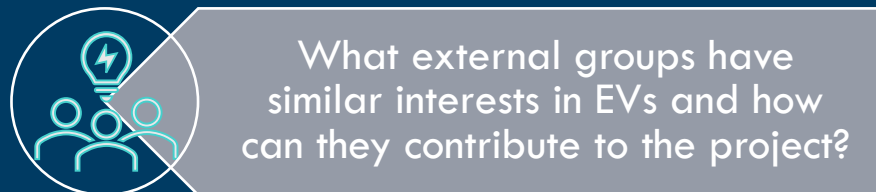
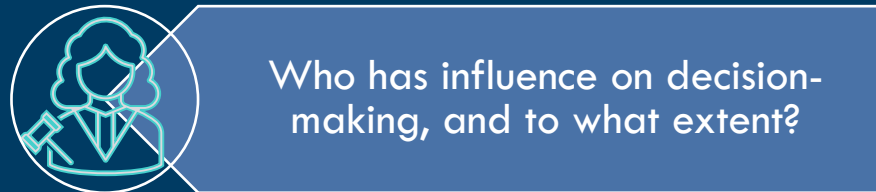
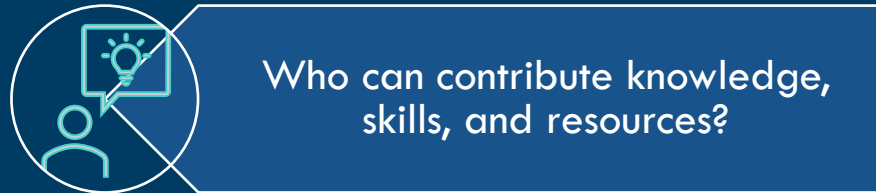


**Public Health
Benefits**

Key steps to municipal fleet electrification (MFE)



Identifying key stakeholders



Potential Stakeholders

- Fleet/Facilities manager
- Finance department
- Legal/Procurement office
- Office of Sustainability
- City Planning
- Mayor's office
- Council of Government
- Elected officials / City Council
- Fleet drivers & other personnel
- Electric utility
- Community-based organizations

Key Takeaways



Understanding the **end-to-end MFE process** enables **strategic planning**

Who must do **what**, **how**, and by **when**?



Establishing **goals and targets** provides a 'north star' to guide efforts

What specific problems are we trying to solve?
What does **success** look like?



Identifying and engaging key stakeholders and processes **early** is critical to the success of MFE efforts

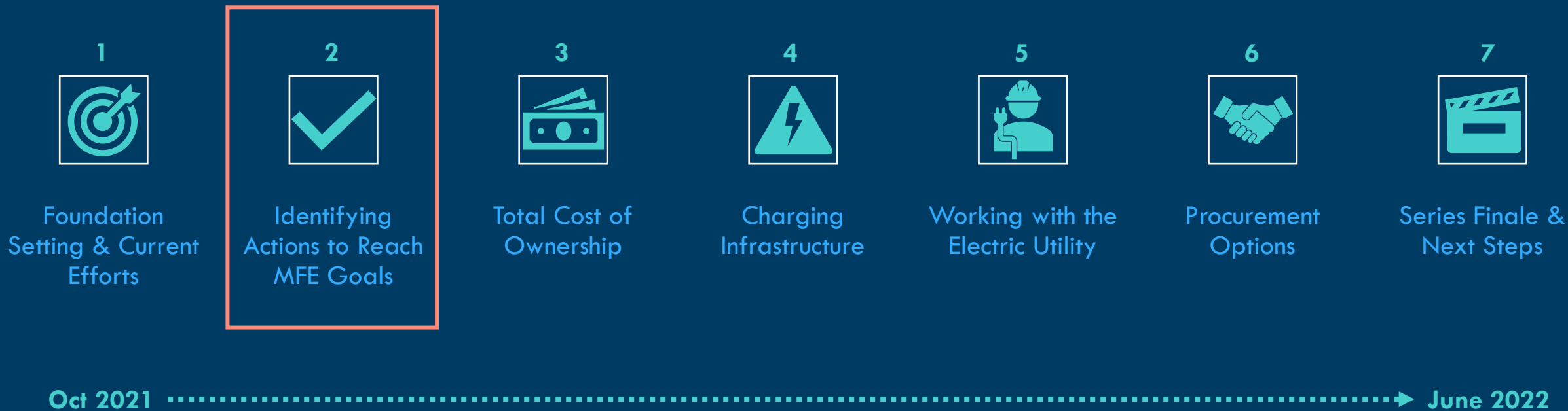
Internal: city leadership, fleet dept., facilities, etc.
External: electric utility(ies)



External funding opportunities exist, and can be critical for project economics

State grants
Federal programs

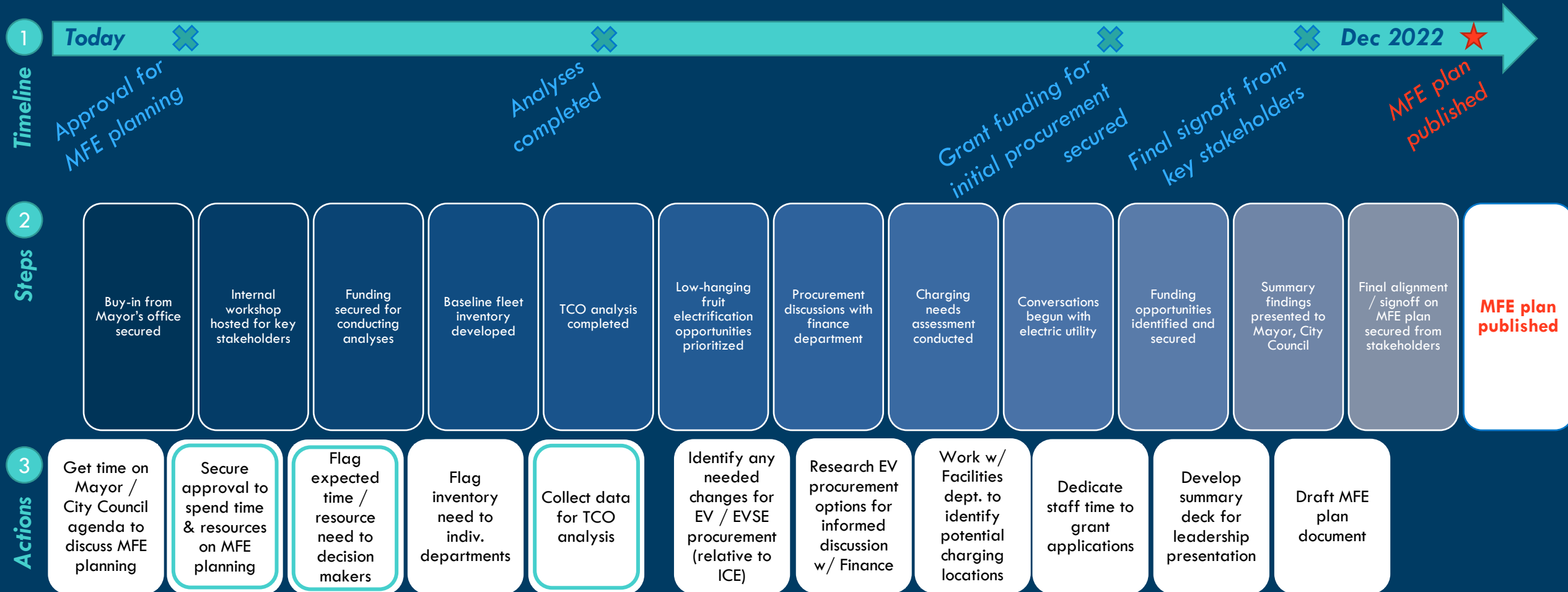
Identifying Actions to Reach MFE Goals



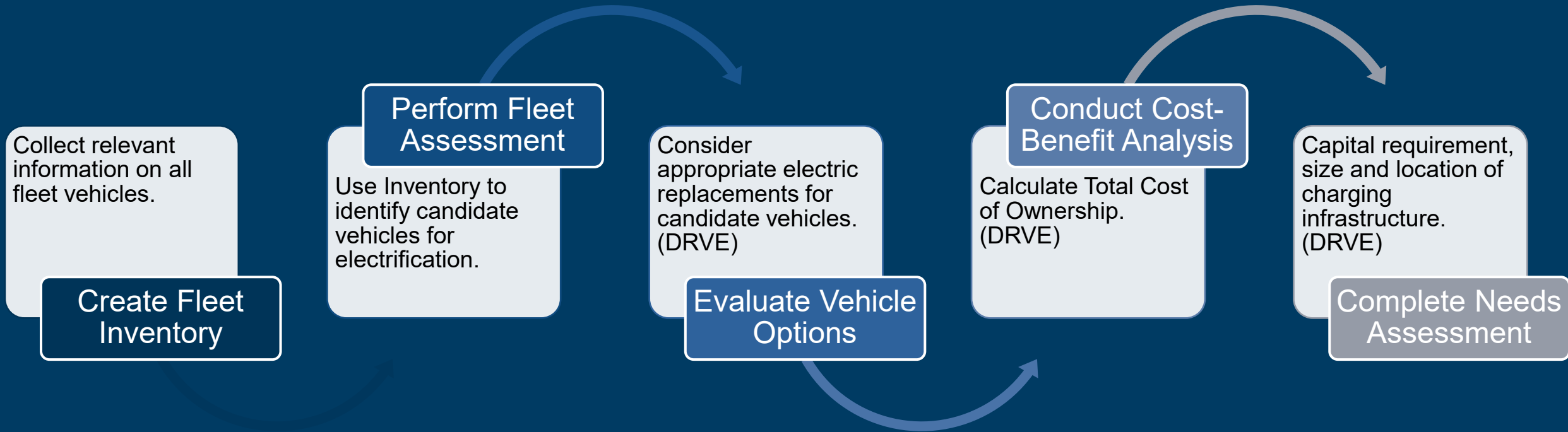
Backcasting Example

Goal: Develop and Publish MFE Plan by EOY '22

- 1) Create a timeline with key milestones
- 2) Identify key steps to reach end goal
- 3) Identify specific actions to connect steps
- 4) Prioritize actions



Fleet Inventory & Assessment



Key Takeaways



Experienced cities highlight **common themes**

Stakeholder engagement and buy-in is **critical**, esp. from city leadership

Infrastructure planning takes time; start early



Conducting a comprehensive fleet inventory is a **key early step**, enabling cost estimates and other subsequent analyses

How many vehicles of **different types**?

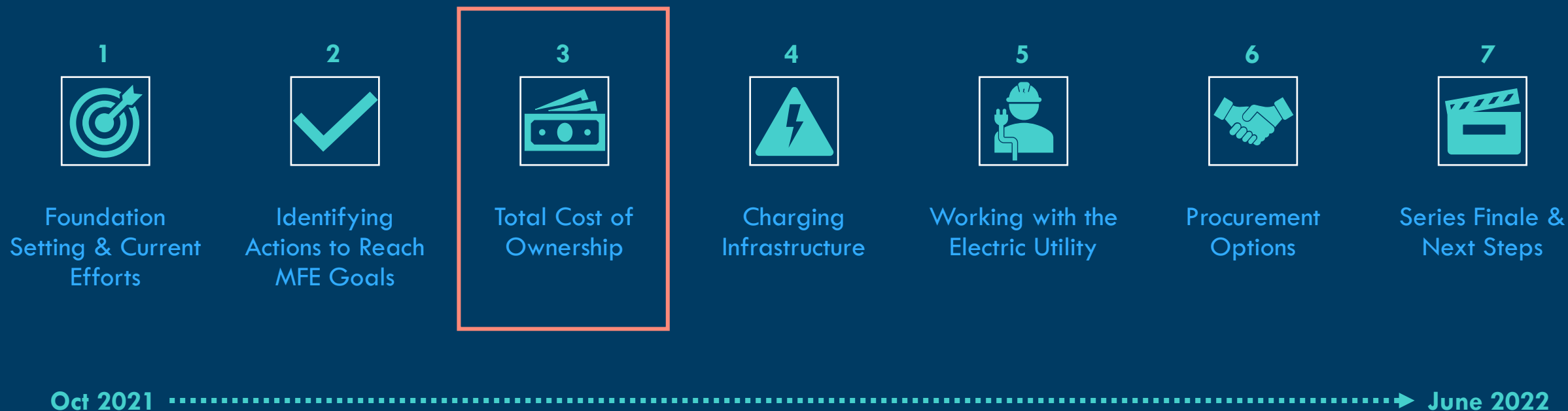
How are they **driven**? Where are they **parked**?



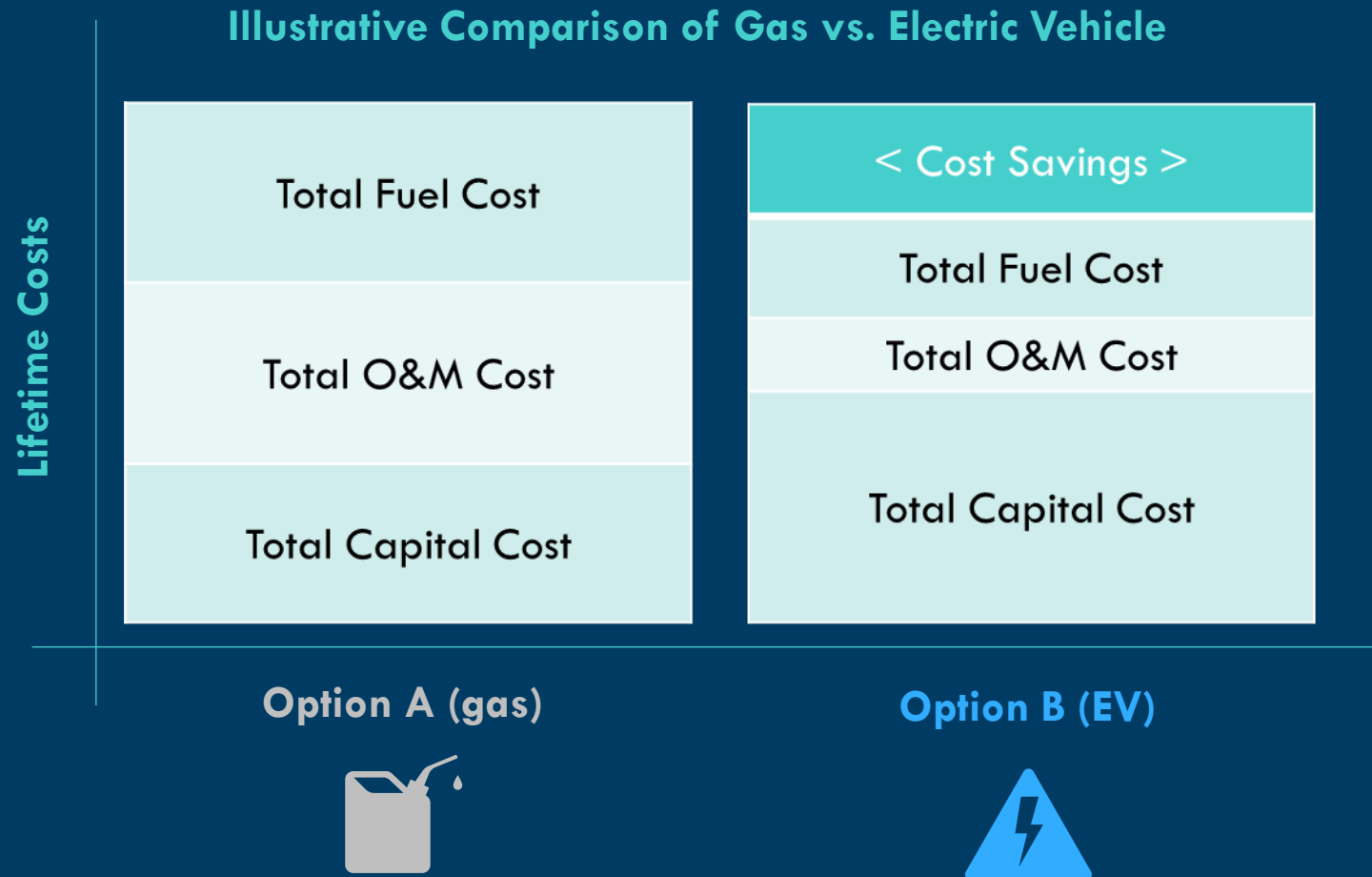
Working backwards from key goals helps to identify concrete steps required

Moving from general goals to **specific actions** – for **specific stakeholders** – is essential to fleet transition

Total Cost of Ownership



Total cost of ownership (TCO) provides a holistic way of comparing lifetime vehicle costs

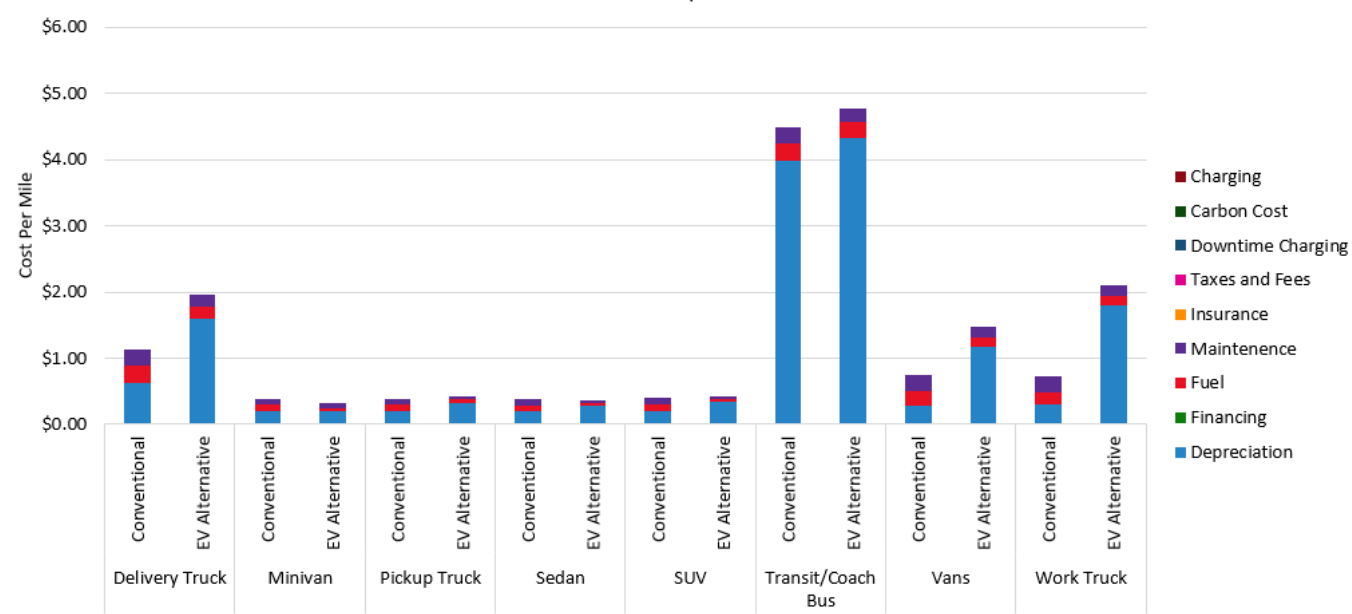


DRVE Tool: Results Dashboard

DRVE Results Dashboard

This dashboard allows you to explore the results of your analysis by drilling down on the various setting that were input into the tool. Save your results and explore them later by clicking "Save Results".

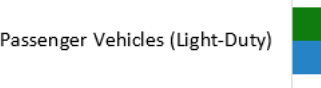
Nominal Cost Per Mile per Vehicle Use Case



Fleet Vehicles by Use Case



TCO for EVs by Electricity Cost Scenarios



Save Results		
Row Labels	Average TCO per Mile	Average TCO
Conventional		
Delivery Truck	\$1.12	\$94,359.88
Minivan	\$0.39	\$32,735.58
Pickup Truck	\$0.39	\$32,719.11
Sedan	\$0.38	\$32,038.94
SUV	\$0.40	\$33,506.62
Transit/Coach Bus	\$4.48	\$376,234.14
Vans	\$0.75	\$62,781.72
Work Truck	\$0.72	\$60,490.53
EV Alternative		
Delivery Truck	\$1.95	\$164,055.03
Minivan	\$0.33	\$27,549.76
Pickup Truck	\$0.42	\$35,653.30
Sedan	\$0.37	\$30,864.69
SUV	\$0.42	\$35,520.49
Transit/Coach Bus	\$4.77	\$400,687.46
Vans	\$1.47	\$123,794.89
Work Truck	\$2.10	\$176,364.01
Grand Total	\$0.78	\$65,382.43

Vehicle Scenario

Conventional

EV Alternative

Vehicle Class

Heavy-Duty Vehicles (...)

Medium Duty Vehicles ...

Passenger Vehicles (Li...

Vehicle Make

BYD

Chevrolet

Chrysler

Dodge

Ford

Freightliner

Gillig

International

Vehicle Model

Bolt EV

C8M 35' All-Electric ...

Colorado 2WD

Corolla

E-450

E450 Cab & Chassis

eM2

Express AMP

VIN

15GGD3013C1181123

15GGD3015C1181155

1FAFP53U05A267100

1FAFP53U05A267101

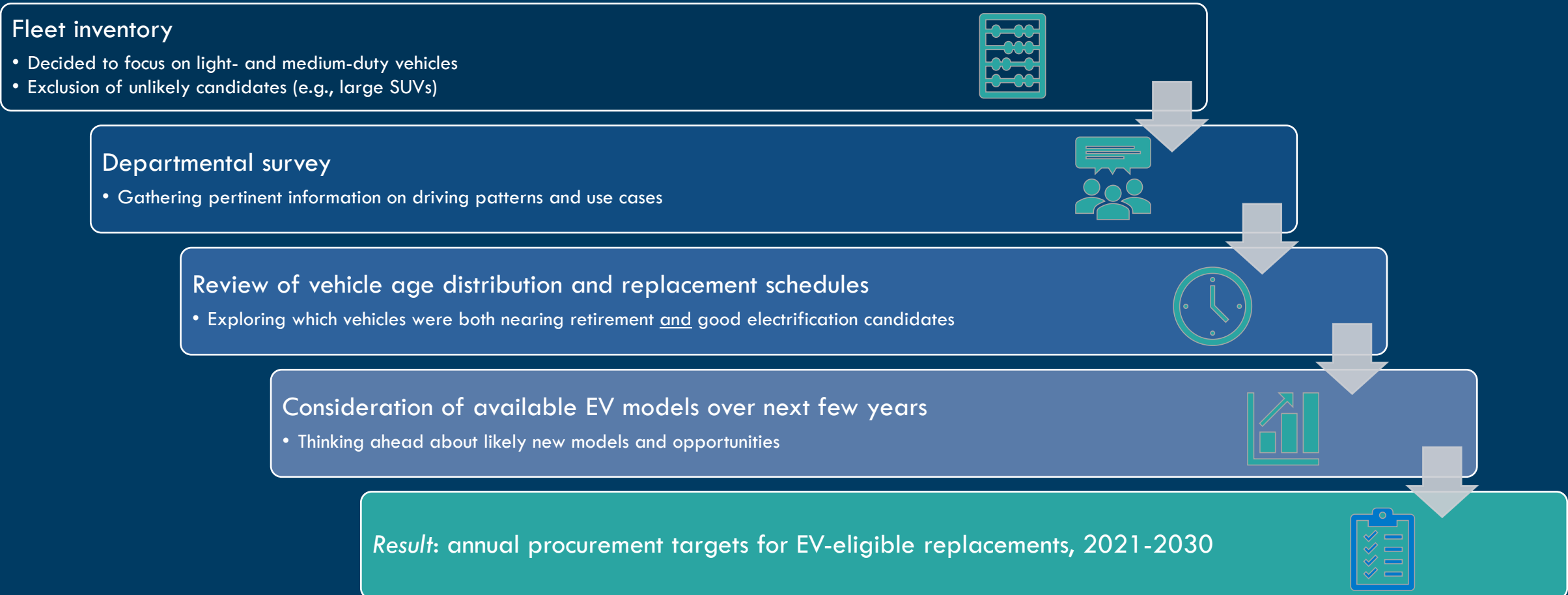
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Forecast Scenario

Business-as-usual

Example: Philadelphia developed annual EV procurement targets through a structured process



Key Takeaways



TCO forms the **basis for economic comparison** of vehicles and is essential for fleet electrification

EVs can **save costs over time**, despite higher upfront price

There is often **tension between capital and operating budgets**



Fleet assessments and TCO analysis **directly inform procurement** roadmaps

Which vehicles can **technically** be electrified?

Which can **cost-effectively** be electrified?

In what **order**?

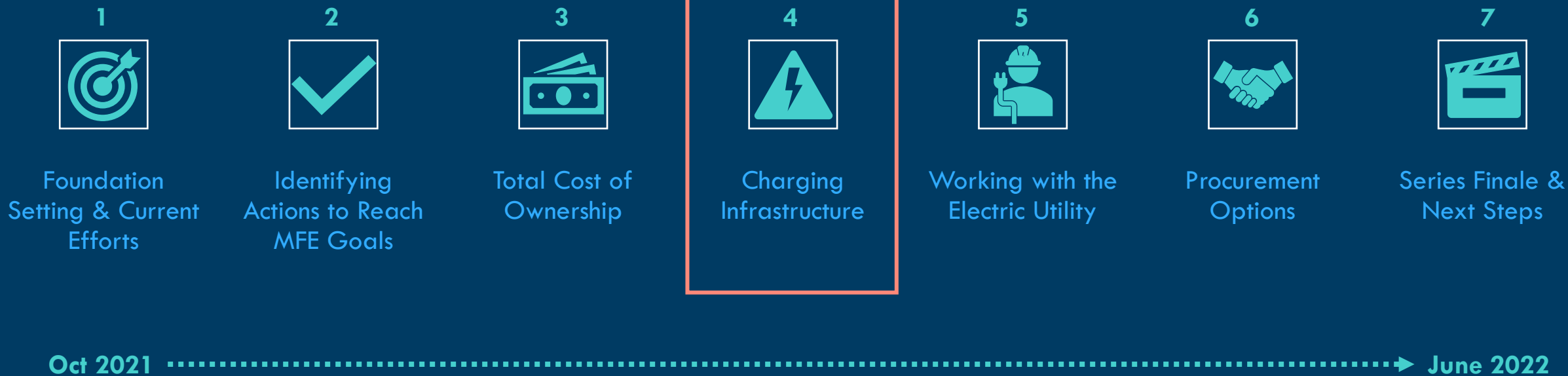


Pairing analyses with **outreach to individual departments** helps identify low-hanging fruit

Can vehicles be “**right-sized**” and still meet needs?

Which department’s operations are best-suited to electrification?

Charging Infrastructure



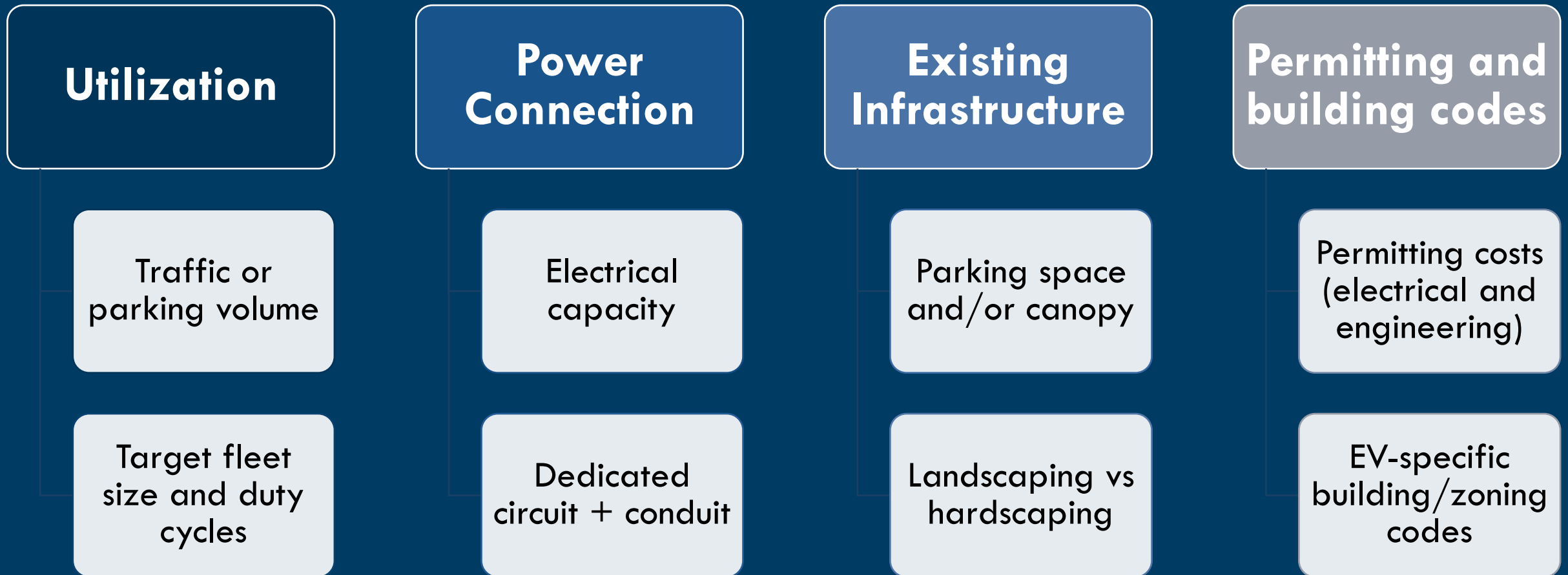
Charger costs vary significantly by power level

	Level 1	Level 2	Level 3 DCFC
<u>Hardware</u>	\$300 – 1,500	\$400 – 6,500	\$20,000 – 50,000
<u>Installation</u>	\$0 – \$3,000	\$600 – \$13,000	\$4,000 – \$51,000

Fleet charger installation costs can be lower than workplace and public sites due to:

- Limited public access
- Lower permitting costs
- Optimized siting choices

What to consider when selecting sites for charging station installation



Key questions help to navigate available EVSE options

1) Who **owns** the EVSE?



2) Who **installs** the EVSE?



3) Who **operates** and **maintains** the EVSE?



4) Who **tracks data** and thinks about **charging optimization**?



Key Takeaways



EV charging infrastructure can be one of the **longest-lead time** parts of fleet electrification

Start **planning early**

Identify and understand **site-specific issues**



Various ownership and operating models exist, from fully in-house to fully turnkey; **best option depends on needs**

Think about who **owns, installs, operates,** and **maintains** the EVSE

Balance between **control** and **risk**

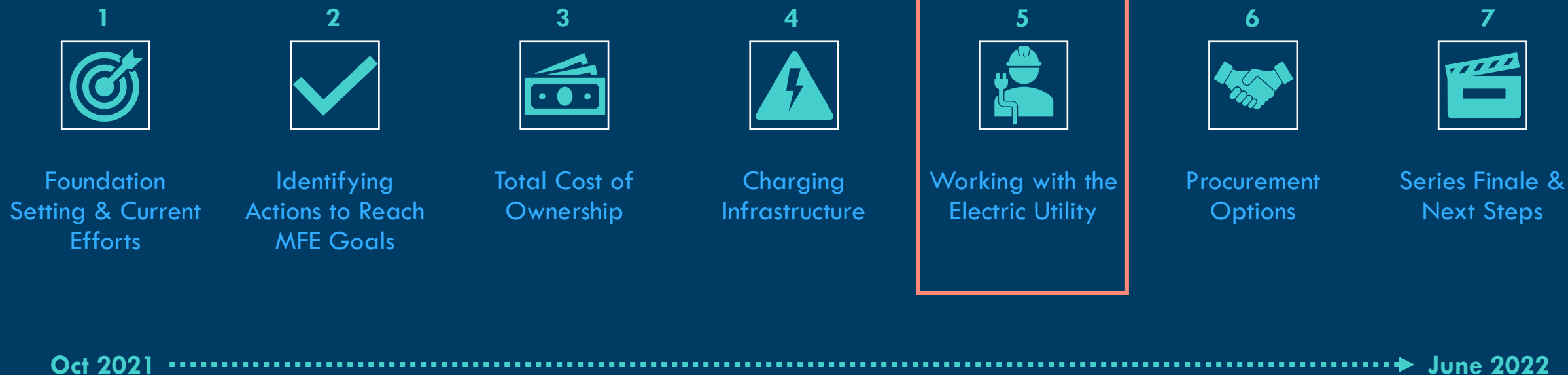


Avoid getting “locked in” to hardware or networks without sufficient interoperability

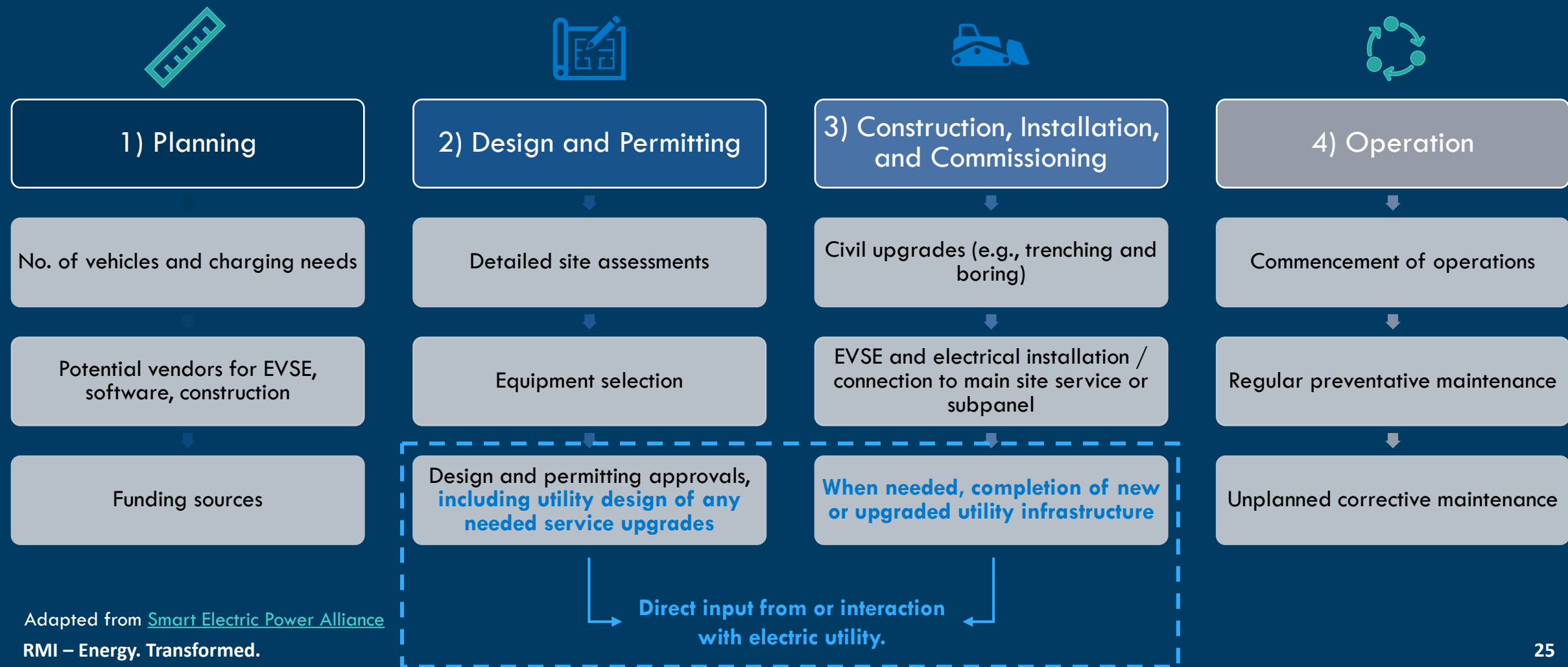
Preserve flexibility for future technology and/or updates

Structure RFPs to **enable changing vendors** as-needed

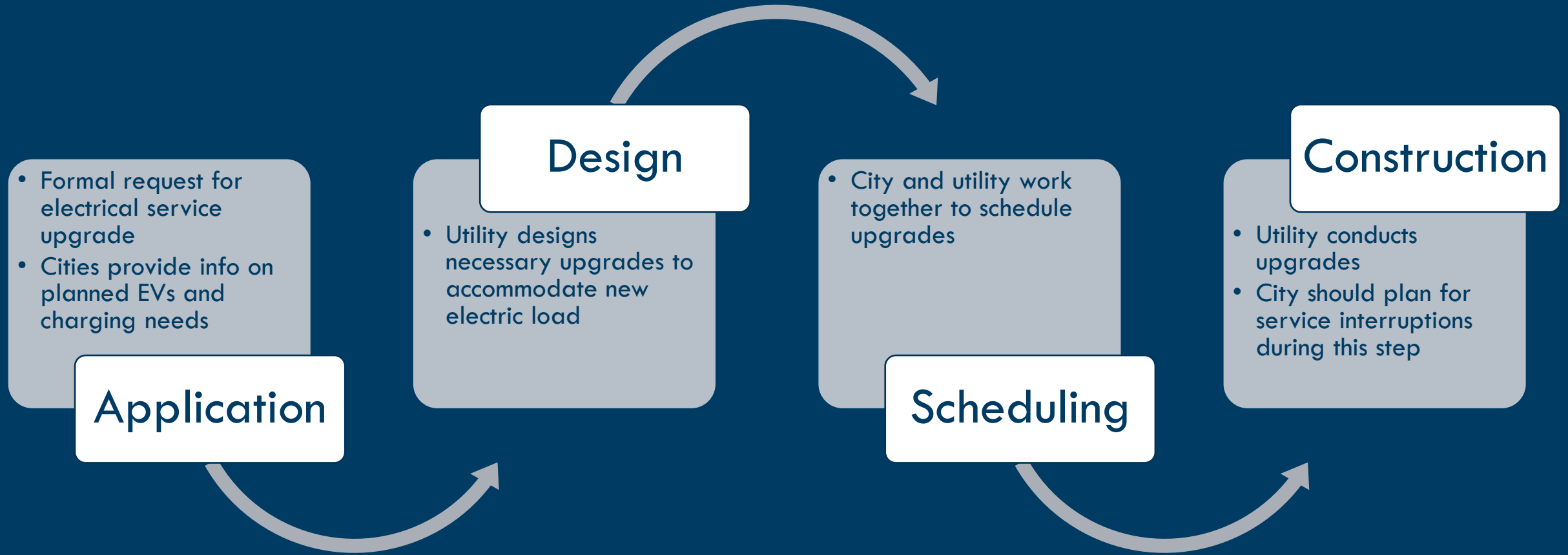
Working with the Electric Utility



There are four primary phases of EV infrastructure development, two of which may require utility involvement



When upgraded electrical service is required, utility processes generally follow four steps



Several best practices are useful to keep in mind as you continue your EV infrastructure planning

Engage with utility early and often in planning

- Infrastructure dev. takes time
- Understand process and requirements
- Early conversations head off potential issues

Identify cost-effective electricity rates

- Utilities are the experts in electricity costs
 - What savings may exist?
 - Are there opportunities for EV-specific rates?

Involve facilities management team early

- Existing expertise in working w/ electric utility
- Necessary partner for updating facilities w/ charging infrastructure

Plan ahead (future-proofing)

- What will charging and associated electrical capacity needs likely be in medium-term (not just near-term)?

Key Takeaways



City utility partnerships can deepen relationships and allow for prioritizing shared goals

It may be worth exploring this option with your local electric utility



Utility **service upgrades** and **interconnection** can **take a long time**

Connect with utility **early** and **often**
Identify **electric grid constraints** upfront



Involve your Facilities department early in the process

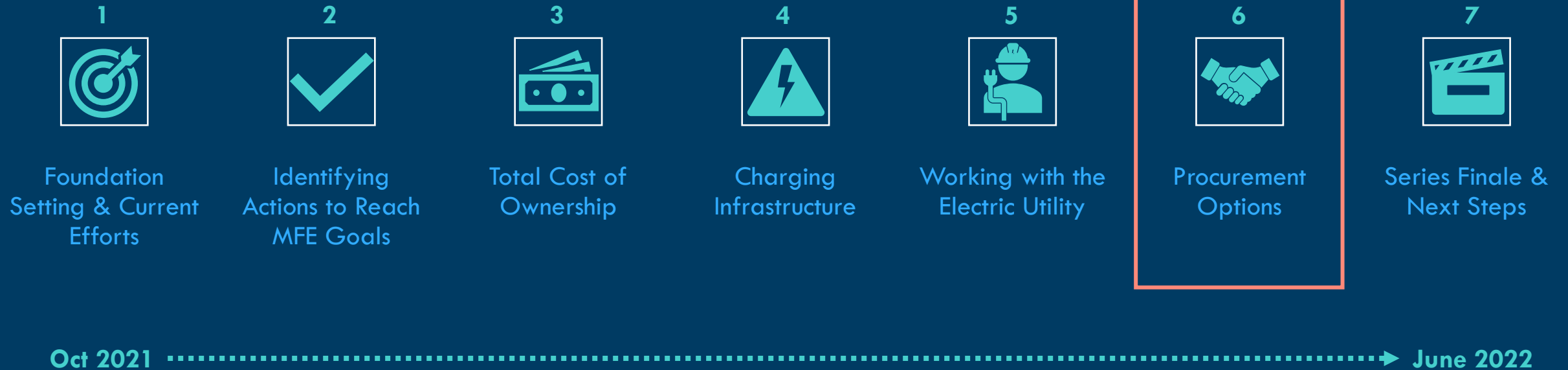
What **constraints** exist on our side of the meter?
Any **planned upgrades**?
Information for utility service requests



Identify electricity rates that **maximize savings**

How to **avoid high demand charges**?
Are **EV-specific rates** available?

Procurement Options



Conventional procurement processes are largely ICE-specific and warrant revision.

Municipal fleet procurement process caters to ICEs due to:

- Focus on upfront cost rather than TCO to make the economic decision.
- Fuel cost-savings benefits often overlooked due to lack of process to recognize savings to different departmental budgets.
- Charging infrastructure tied to individual vehicle procurements and not treated as a long-term infrastructure investment.
- Limited offering of EVs from pre-existing state or cooperative approved dealers.

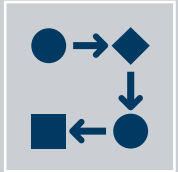
How can the current process be modified to support procuring more EVs?

- Include desired vehicle specifications relevant to EVs in bid solicitation.
- Incorporate lifetime cost savings as economic decision variable instead of only upfront costs.
- Streamline process of recognizing fuel cost-savings to relevant departments and budgets.
- Assess EVSE procurement as a long-term investment.
- Explore EV purchasing cooperatives.
- Update city procurement guidelines to require justification for non-electric purchase.

Green fleet policies have helped cities establish EV purchase requirements

- [City of Seattle 2019 Green Fleet Action Plan](#) includes a decision-hierarchy chart to prioritize fossil-fuel-free vehicles.
- [City of Minneapolis Green Fleet Policy](#) requires passenger vehicles and light duty trucks to be replaced by electric models.
- [City of Charlotte Sustainable & Resilient Fleet Policy](#) directs departments to procure the lowest emitting vehicle that meets operational needs, utilizing a TCO model.
- [City of Denver's EO 123](#) requires the purchase of hybrids and the most fuel-efficient vehicles available for the light duty fleet wherever cost and reliability are similar.

Key Takeaways



Procurement **process changes** are often required to recognize value of EVs

Lifetime vs. upfront costs
Alignment of CapEx and OpEx budgets
EVSE treated as **separate capital project**



EV purchasing cooperatives can be a winning strategy

Additional models
Bulk procurement **pricing discount**



Green fleet policies can be used to establish EV purchase requirements

EVs as **default option**

Thank you!

Aradhana Gahlaut,

Sr. Associate, Carbon-Free Mobility

RMI

agahlaut@rmi.org



THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Nicole LaChapelle, Mayor, Easthampton, MA

SUMMER
2023

Easthampton's road to decarbonization with electric vehicles. A community approach for widespread electric vehicle adoption.

Prepared by: Mayor Nicole LaChapelle

For: MIP Conference Scranton, PA

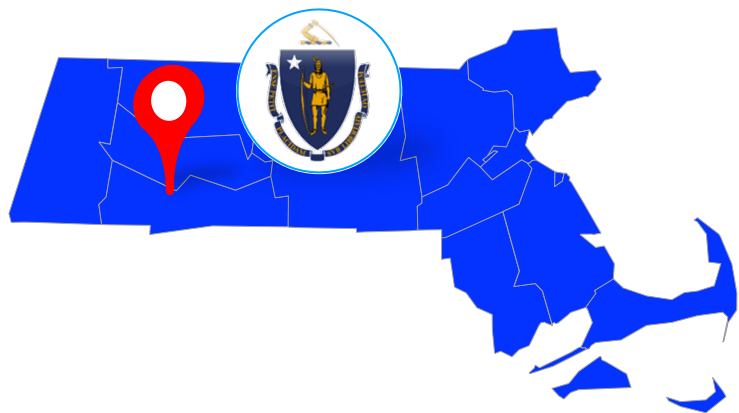
Date: August 2023



In the next 12-minutes

1. About Easthampton, MA
2. Our approach – Municipal action inspired community action – continuous authentic public engagement
3. Act now – 3 things each Mayor can do

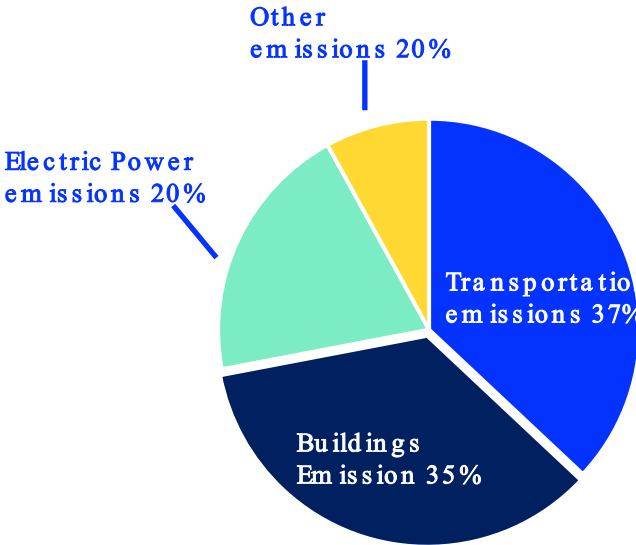
About Easthampton



17,000
Residents

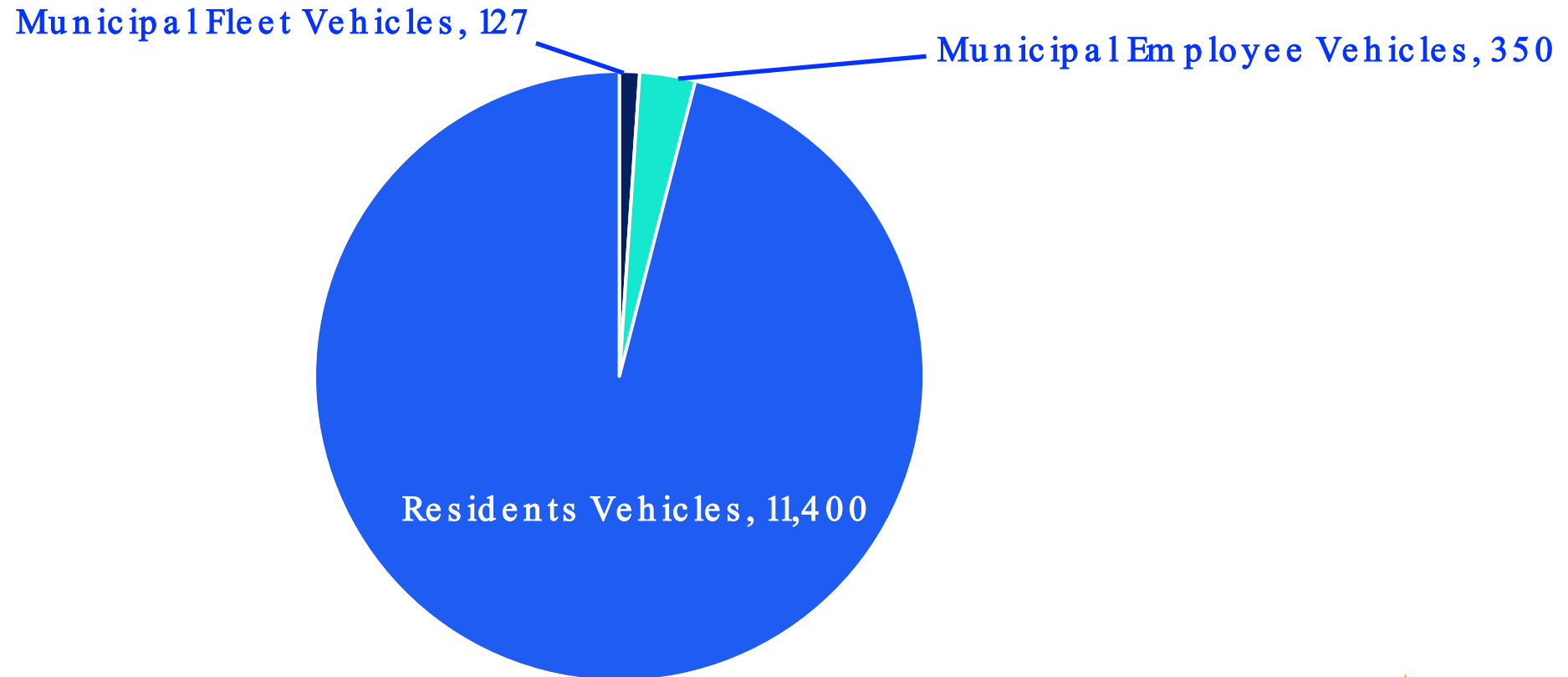


\$56,000.00
Average Income



37%
Transportation Emissions

The majority of vehicles in Easthampton are owned by residents.



Easthampton has a history of taking a community-wide approach with innovation.

EV adoption is no different. Look at key indicators to build a plan that kicks off change now and builds momentum for tomorrow.

Our commitment

Easthampton is committed to reducing our carbon footprint as fast as possible.

While we build out our long-term climate plan, we can make immediate impact on reducing the climate footprint in our city with electric vehicles.



Municipal EV demo day with MoveEV - May 2023 – Easthampton, MA

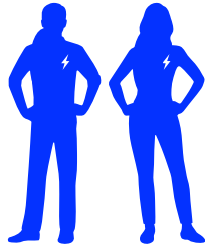
Why electric vehicles are good for your city now

1. **Connect with sustainable local economy efforts** - act today for next generation; EVs free up monthly cash flow in the form of fuel savings - important given % of income goes to rent/mortgage
2. **Federal & state governments are reducing financial barriers** - funds are available today & are stackable for vehicles and chargers – allows for thousands off sticker price at point of sale
3. **New financing tools available** – that aren't available for gas fleets allowing for further reduction in total cost of vehicle ownership and operations
4. **Understand what will work for your community** - Easthampton's average commute is 24 miles - does not demand long charge every day - gives us time to add more public chargers (level 2 and 3), home units
5. **Reduce emissions in a meaningful way** – each car you move to EV reduces emissions in your community by 5-10 metric tons of CO₂ every year

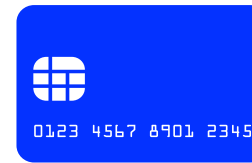
Easthampton's fleet overview



122
vehicles



5 municipal
groups & leaders

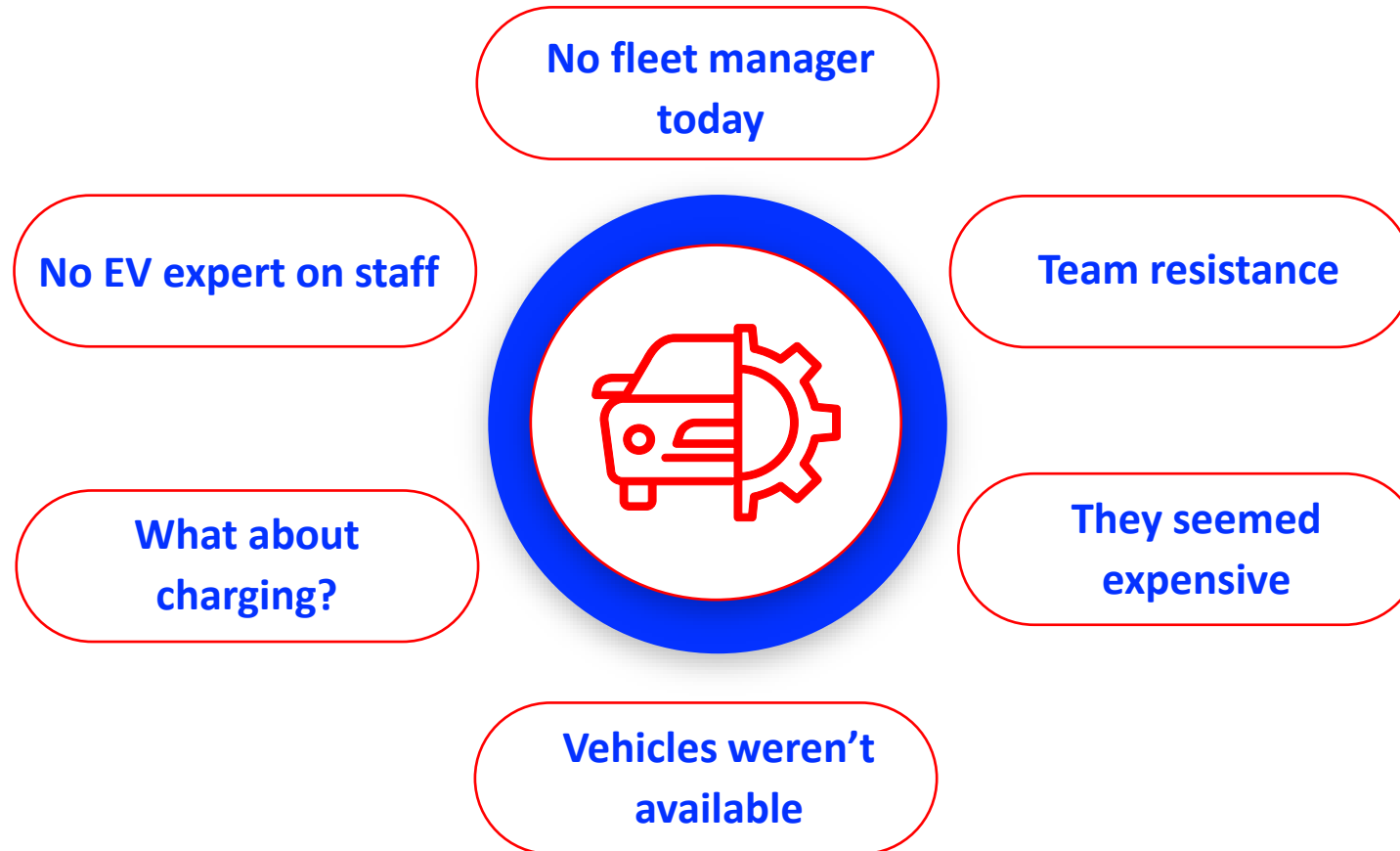


\$270,000
fuel spend

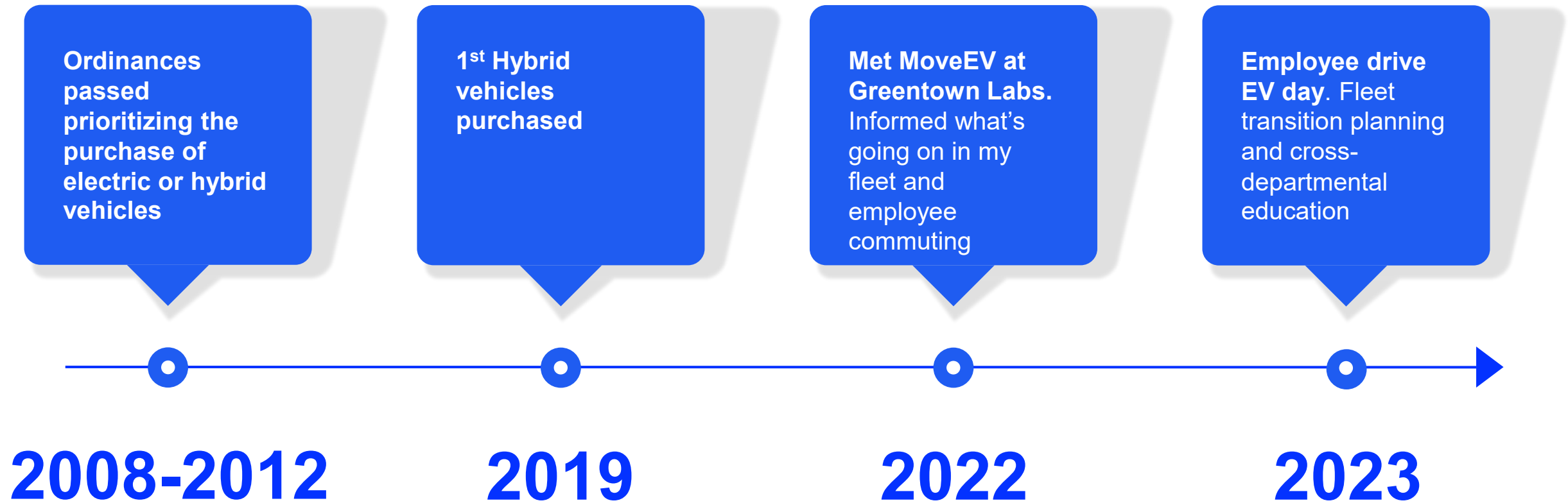


1,200 m t CO₂
emissions

Challenges we have had to overcome in our EV journey



Challenges we have had to overcome in our EV journey



Work we have done with our private partner, MoveEV, to get stakeholder buy-in for fleet electrification

- ✓ Where we are today reviewed and analyzed all available fleet & census data for city of Easthampton
- ✓ What we are doing well and where we can improve (cost, operations, emissions, available incentives and funding)
- ✓ Spend savings & decarbonization strategy for Easthampton fleet vehicles
- ✓ Projected impact of program for fleet and city employees
- ✓ Projected impact of program across all residents of Easthampton

Act now – 3 things each Mayor can do

1. **Public private partnerships are key** – find a great consultant to help you out. Make sure they are experts in gas fleet as well as electric vehicles to optimize your transition
2. **Purchase an EV in your next buying cycle** – this is a slow transition and need to start (we only buy a handful of vehicles each year)
3. **Get your municipal employees involved** – a demo day is a low cost / low risk way to start to building stakeholder buy-in across your community

Thank you!



THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Fátima Luna, Climate and Sustainability Policy Advisor,
Tucson, AZ

SUMMER
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CITY OF
TUCSON

ELECTRIC VEHICLE READINESS

Fátima Luna (she, her / on Tohono O'odham & Yoeme territory)
Climate and Sustainability Policy Advisor
Office of City of Tucson Mayor, Regina Romero



CITY OF
TUCSON

Regina Romero

MAYOR REGINA ROMERO



MAYOR

Regina Romero

CITY OF TUCSON

CLIMATE EMERGENCY DECLARATION

#TUCSONCLIMATEACTION

Climate Emergency Declaration

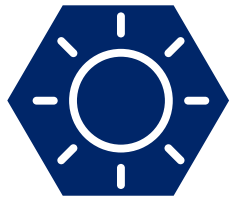


Carbon neutrality by
2030

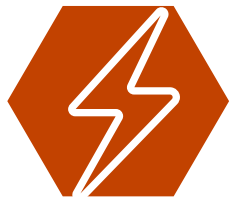


TUCSON
Resilient Together

Climate Action Plan



Clean and renewable energy



Electrification & fossil fuel
phase-out



Carbon sequestration &
massive tree planting



Transportation, mobility &
connectivity



Resource conservation & 50%
waste diversion by 2030



Green infrastructure &
restorative ecology



Climate adaptation & resilience





ELECTRIC VEHICLE READINESS ROADMAP

2022



Prepared by The Office Of Tucson Mayor



MAYOR

Regina Romero

Guiding Principles



EV-Readiness
Roadmap



Promote clean air

Clean air that protects public health, our natural environment and sustainable economic growth.



Accelerate clean energy

Energy that is affordable, reliable and carbon neutral.



Prove effective

Solutions that are integrated, durable, credible, and actionable.



Benefit economy wide

Innovation in how we move, where we live and work, and how we power our economy while limiting adverse impacts in our communities.



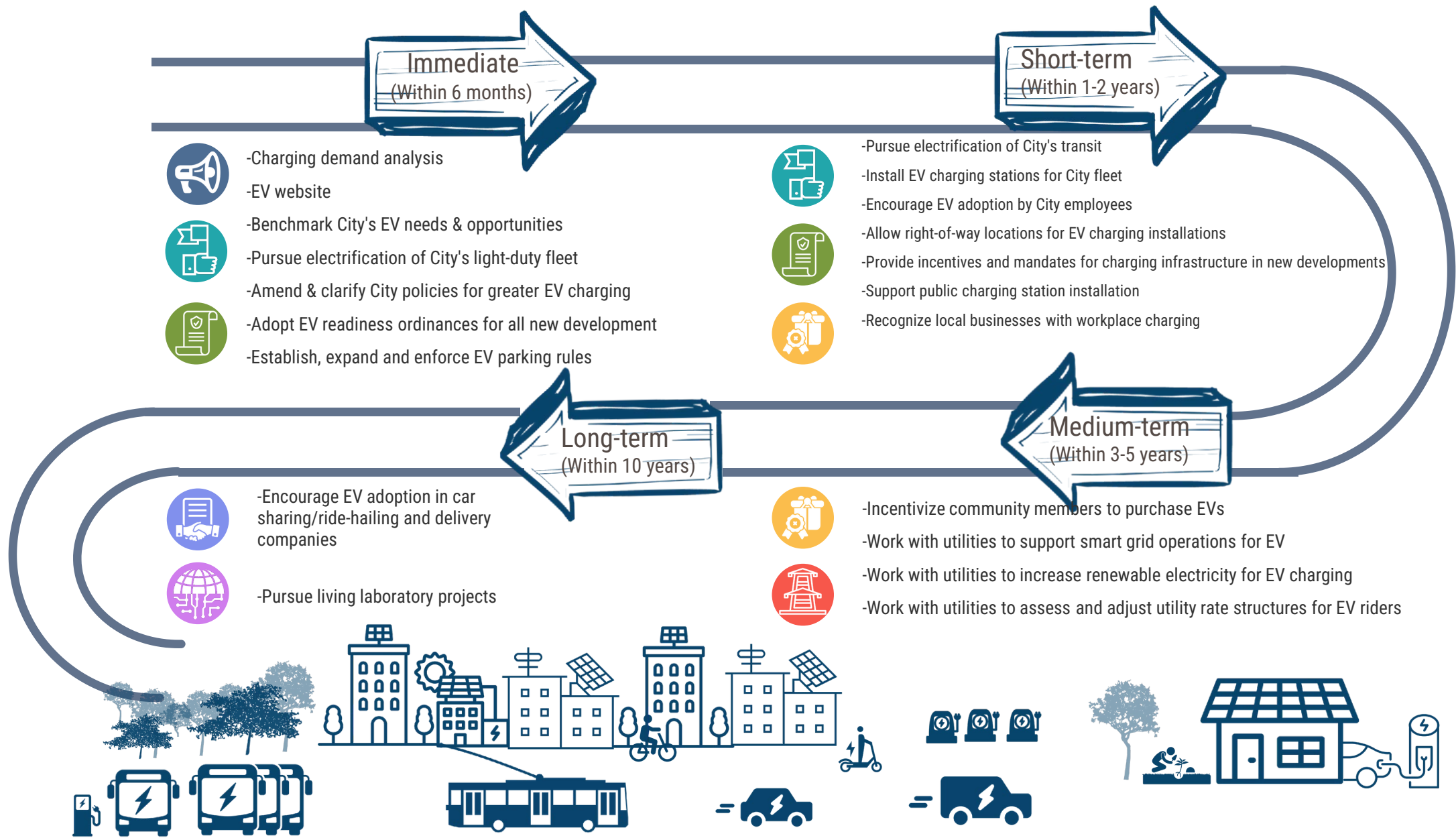
Ensure a healthier future

A process that values equity, access, and healthier communities and environment.



Arizona Forward 2023 Environmental
Excellence Award for
Climate Action Solutions

City of Tucson Electric Vehicle Readiness Strategies



★ Ongoing



Outreach & Education



Leading by Example



Policies



Incentives



Utilities



City Planning & Regional Coordination



Emerging Technologies

EV Ready New Buildings

Amendment to the Unified Development Code to ensure new buildings are EV ready.

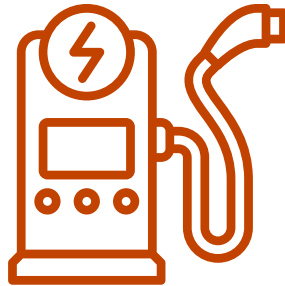
Residential
homes

Commercial
Buildings

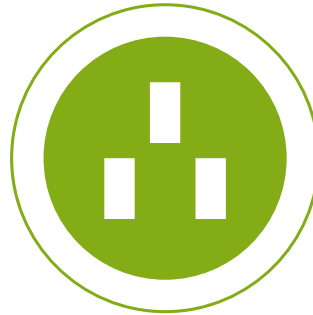
Multi-family
buildings

Office buildings

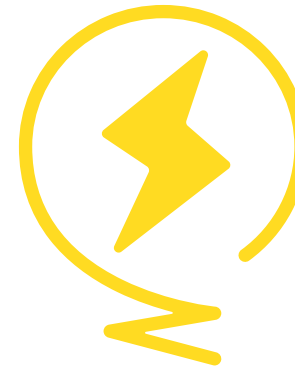
Retail spaces



Stations



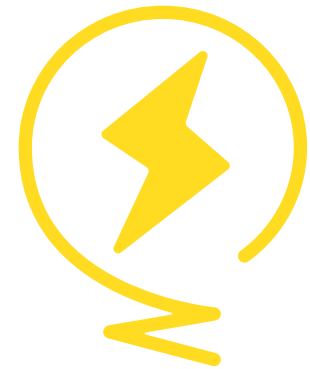
Outlets



Conduit

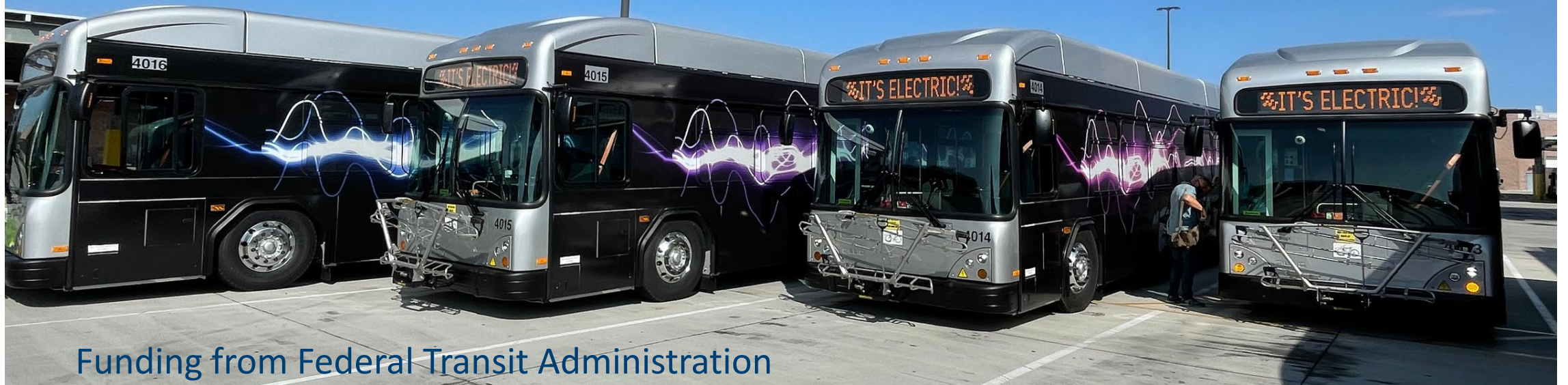
The City of Tucson is EV-Ready

The City's 14 Megawatts of solar at 60+ locations are EV charger ready



Conduit

The City of Tucson is on its way to have the
largest electric bus fleet in the southwest



Funding from Federal Transit Administration

Green Fleet Policy for light-duty vehicle fleet



Green Fleet Transition Plan

January 2023

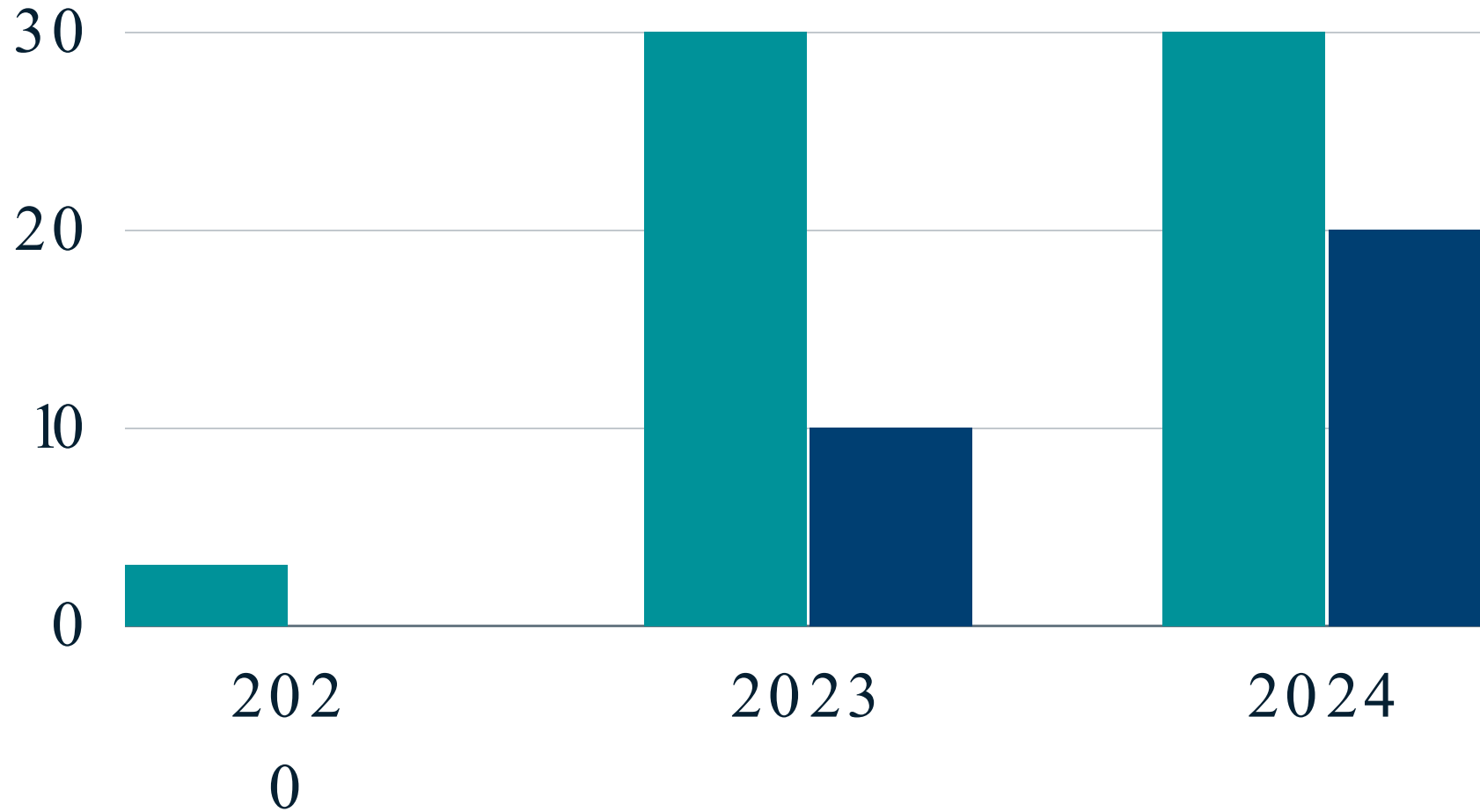
Goal

Advance the EV Readiness Roadmap to transition 100% of the City's light-duty vehicle fleet to electric by 2030

Objectives

- Rightsizing
- Reduce VMT and idle times
- Replace vehicles with battery powered or hybrid vehicles or other green vehicles when commercially available which will meet operational requirements
- Deploy EV charging stations
- Educate City staff in eco-driving best practices
- Measure and evaluate progress

Electric vehicles and bus fleet



EVs



E-Buses

Electric vehicle chargers

- 80+ locations with multiple charging stations around the city
- Park Tucson has 11 blink charging stations at 4 locations
- Sun Tran has 11 fast charging stations for city's bus fleet
- City has more than a dozen public and fleet charging sites identified
- The City will utilize mobile solar EV chargers



Challenges

- EVs and E-buses cost
- Battery technology and costs
- Manufacturing and recycling
- Charging Infrastructure - North American Charging Standard (NACS) recently changed
- EVs and E-buses availability (supply)

Opportunities

- Unprecedented federal investments
- Bidirectional charging to increase resilience
- Renewable energy integration
- Innovation and technological advances
- Improved public transport
- Job creation

Thank you



Fátima Luna

Climate and Sustainability Advisor

Office of the Mayor | City of Tucson

fatima.luna@tucsonaz.gov

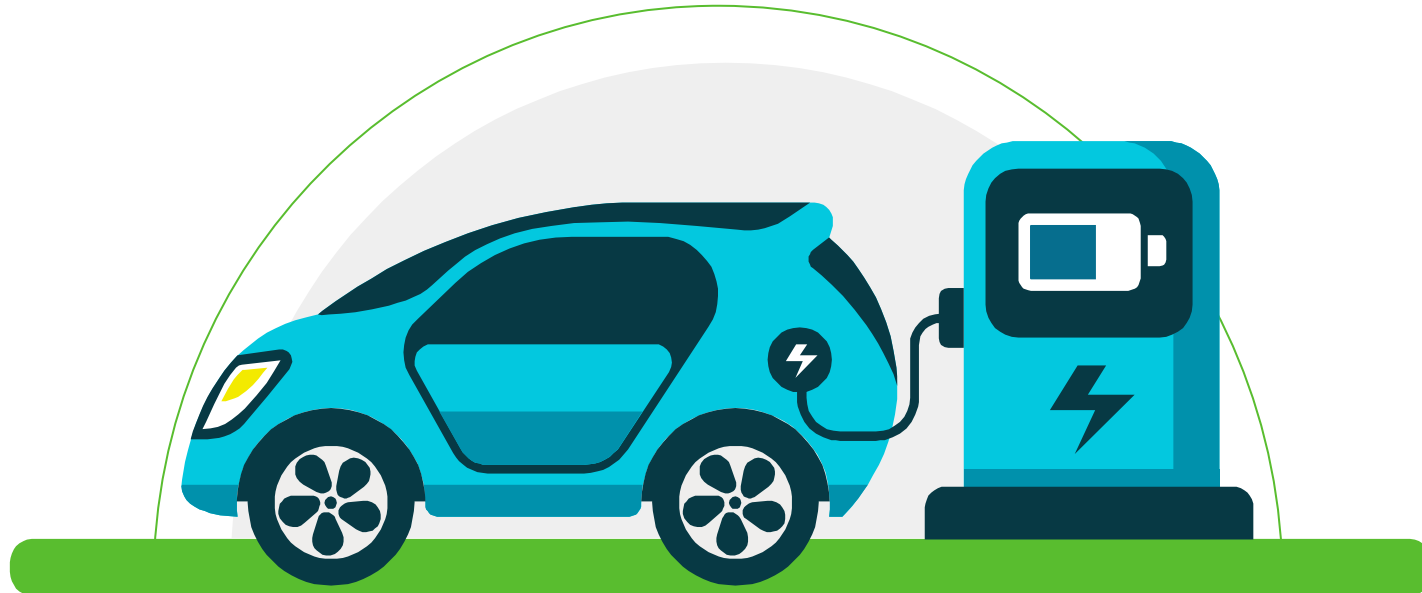
main 520.791.4201 | **mobile** 520.903.7141

THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Eileen Cipriani, City Business Administrator, Scranton, PA

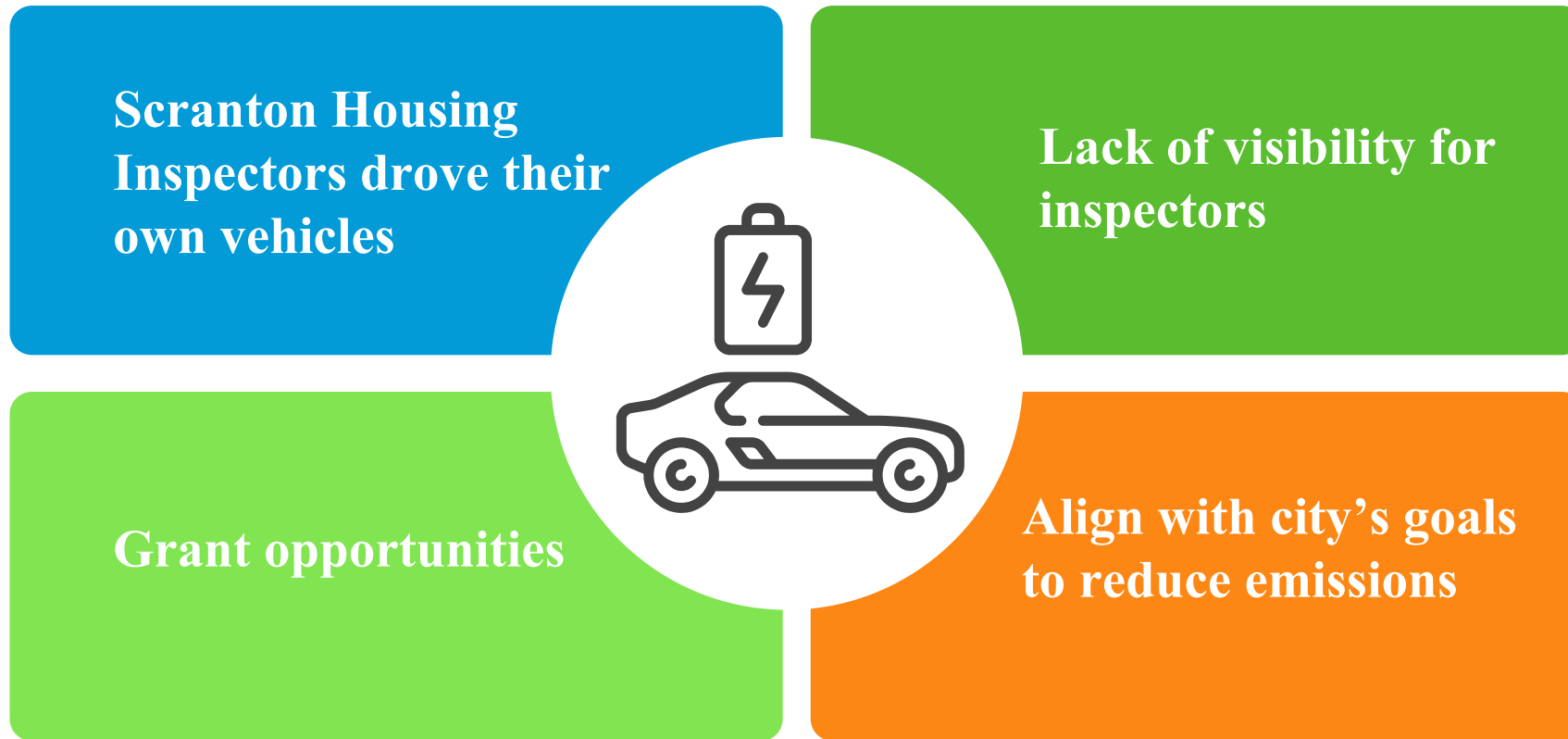
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The Electric City: Transitioning to an EV Fleet



Credit to [Slidesgo](#) and [Freepik](#) for slide template and graphics

Why Electric Vehicles for Scranton?



Why Not?



Limited Range – will run out of charge



Few available chargers



Too expensive



Batteries catch fire

Pennsylvania Department of Environmental Protection Grant

American Rescue Plan

- ▶ In April 2022, then-Pennsylvania Gov. Tom Wolf announced the City's receipt of \$75,000 for its electric vehicle fleet and \$45,642 for vehicle charging stations from DEP's Alternative Fuels Incentive Grant program.
- ▶ Scranton allotted \$225,052 ARPA funding for EV's and \$45,000 for charging stations

Scranton Unveiled Fleet of Electric Vehicles



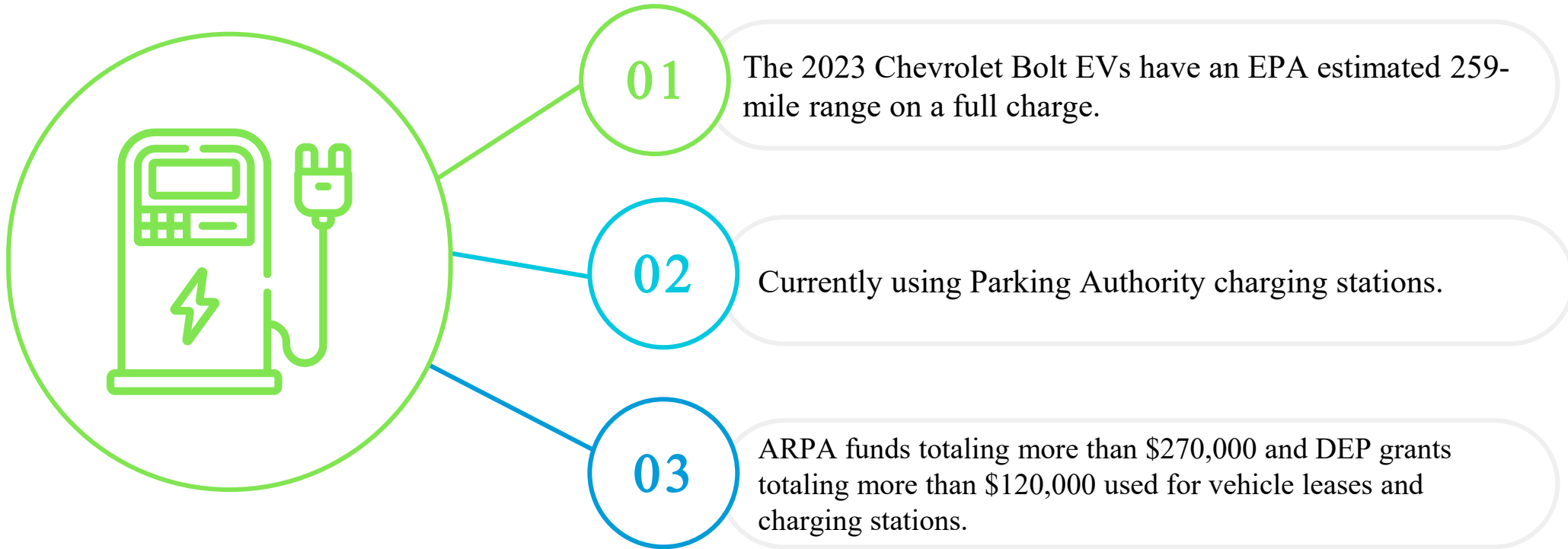
- & Vehicles are on lease and will be used exclusively by the Code Enforcement Office.
- & The five-year leases for the ten 2023 Chevrolet Bolt EVs.

Scranton Unveiled Fleet of Electric Vehicles

Pennsylvania Department of Environmental Protection joined Scranton officials as they unveiled the City's new electric vehicle fleet on

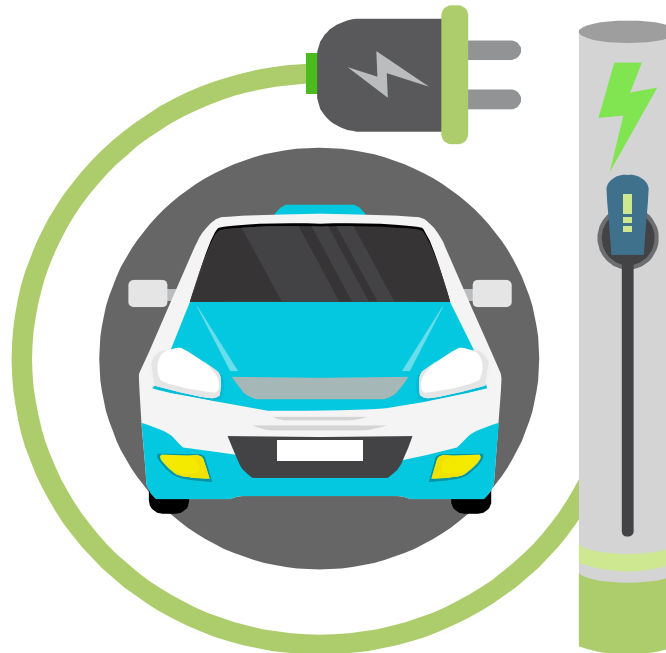


Important Details



Charging Stations

- City Council allocated \$45,000 in ARPA funds to support the charging stations.
- City in conjunction with multiple municipalities in northeast Pennsylvania applied for a CFI grant



Benefits



01

Reduced emissions

Produces zero tailpipe emissions

02

Efficient

2023 Chevrolet Bolt EVs can travel an estimated 259 miles on a single charge

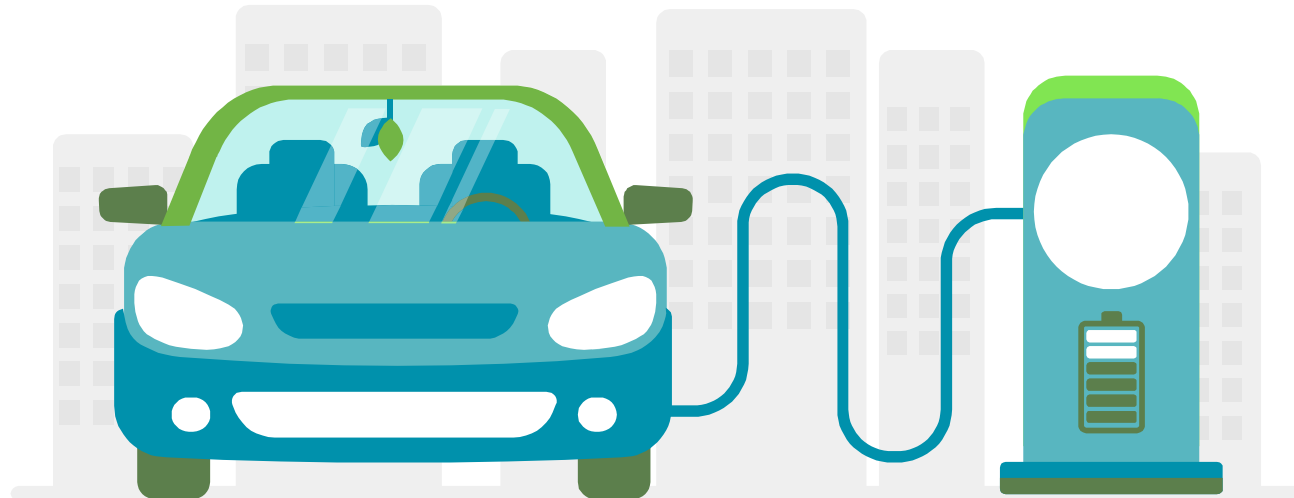
03

Easy to charge

Pending addition of 10 new charging stations

Take Aways

- Look for funding opportunities
- Share EV success stories
- Encourage EV charging infrastructure



THE ELECTRIC CITY: TRANSITIONING TO AN EV FLEET

Aradhana Gahlaut, Senior Associate, Rocky Mountain Institute

Nicole LaChapelle, Mayor, Easthampton, MA

Fátima Luna, Climate and Sustainability Policy Advisor, Tucson, AZ

Eileen Cipriani, City Business Administrator, Scranton, PA

Moderator: Chasity Wells-Armstrong, Former Mayor, Kankakee, IL

SUMMER
2023