Salt Lake City
Electrified Fleet Infrastructure Study

Utah AEE Annual Conference| September 17, 2024

Kimley»Horn

SALT LAKE CITY 1847

SAWATCH

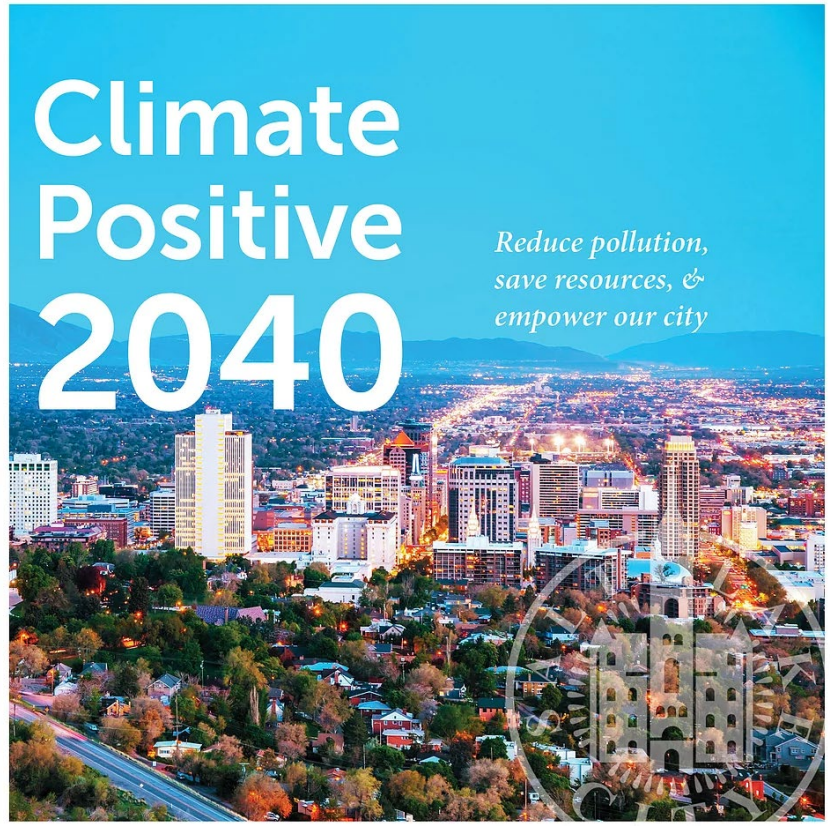
Agenda

SLC Goals and Priorities	*Sustainability goals* *Actions and Policies to support electrified transportation*
Electrified Fleet Charging Infrastructure Study	*Study goals, process, findings*
Challenges and Next Steps	*Challenges identified* *What we are doing next*
Q&A	*Questions?*

SLC Sustainability Goals and Priorities

Climate Positive 2040

*"Salt Lake City is committed to protecting the public health and safety of its residents, including ensuring access to **clean air**, clean water and a **livable environment**."*



Climate Goals | Joint Resolution (2016 & 2019)

- **100 x 2030**: 100% Renewable Energy for Community Electricity Supply by 2030
  - Includes 50% Municipal renewable electricity
- **80 X 2040**: 80% Reduction in Community Greenhouse Gas Emissions by 2040

2020 Electrified Transportation Resolution

FLEET

New purchases

2023: Sedans

2025: SUVs

2027: Pickups

Heavy/Medium: evaluate

Charging infrastructure

TRANSIT

Encourage UTA to transition to electric buses

Collaborate with UTA on other efforts

SMART MOBILITY

Rideshare

Car share

Equitable access to affordable and clean transportation

PERSONAL

Accelerate uptake to rates above national average

Support programs and policies to encourage purchase of EVs

Encourage development of charging infrastructure

Salt Lake City's Electric Fleet

66 Electric Vehicles

18 Charging Stations

FLEET ELECTRIC VEHICLE CHARGING INFRASTRUCTURE STUDY

August 2024

Objectives of the Study

- Meet the commitments of Salt Lake City's **2020 Electrified Transportation Joint Resolution**
- Assess the **charging infrastructure needed** to support an electrified fleet
- Estimate the **cost** to install infrastructure
- Provide information to support a **strategic deployment plan**

Fleet Electric Vehicle Charging INFRASTRUCTURE PLAN

TELEMATICS ANALYSIS

- ✓ EV Suitability Assessment
- ✓ Vehicle Infrastructure Needs
- ✓ **1,335** light- and heavy-duty vehicles

CHARGING INFRASTRUCTURE DESIGN

- ✓ Site plans and cost estimates for charging infrastructure
- ✓ **42** City facilities

EMERGENCY PREPARDNESS AND RESILIENCY

- ✓ Available technologies
- ✓ Feasibility

Telematics Analysis

EV Suitability Assessment (ezEV)

- Identify and assess operational needs
- Compare available EV models
- Vehicles were scored based on:

Confidence

- Vehicle operational data

Energy

- % of days EV meets operational needs on a single charge

Economics

- Lifetime financial impact of replacement

Parking

- Parking time and consistency

EV Suitability Assessment (ezEV)

Recommended Replacement:
2023 Ford eTransit Cargo Van

Select Vehicle To Compare:

2023 Ford eTransit Cargo Van

100	100	100	100+	100
Overall	Confidence	Energy	Economics	Parking

Economics & Environment | Parking & Charging | Assumptions | Scoring Metrics

Estimated Operational Metrics in a 2023 Ford eTransit Cargo Van

These metrics estimate what the usage numbers would be if the miles driven by your 2020 Ford Transit had been driven in a 2023 Ford eTransit Cargo Van .

Annual Vehicle Miles Traveled	GHG Reduction (%)	GHG Reduction (lbs)	Operational Cost Difference*	TCO* (Lifetime)	TCO** (%)	Average Daily Idling Hours
7,880	81%	127,080	▼ -$27,000-30,000	▼ -$15,000-18,000	▼ -20%	1.6

* Total Cost of Ownership (TCO) Change and Operational Savings reflect the financial savings over the lifetime of the vehicle.

** TCO Change takes into account the purchase price of the recommended vehicle, Operational Savings does not.

EV Suitability Assessment (ezEV)

Economics & Environment | Parking & Charging | Assumptions | Scoring Metrics

Parking & Projected Charging Locations

Observed parking locations

These are the locations where your vehicle parked for an extended period of time. These *extended dwell periods* are any parking event that exceeds 9 hours. We observed **198** extended dwell periods for this vehicle.

Location	Dwell Time (Avg Hrs)	Frequency
Fire Station #2*	15	99%
Fire Station #2	15	1%

Parking Locations Map

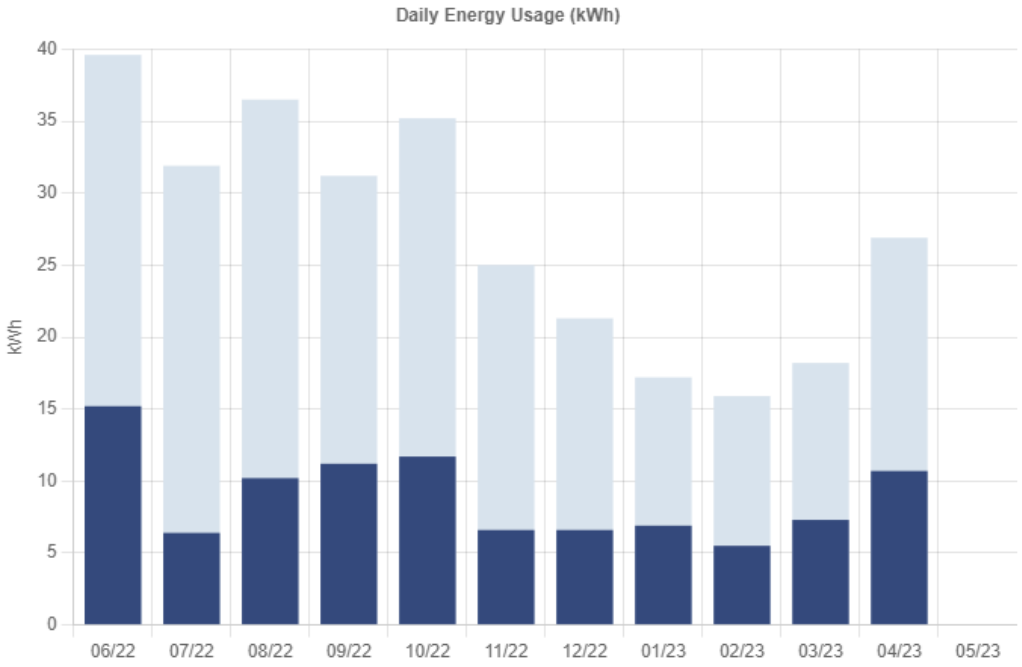
*This location has been identified as the vehicle's current homebase parking

Charge Time & Cost

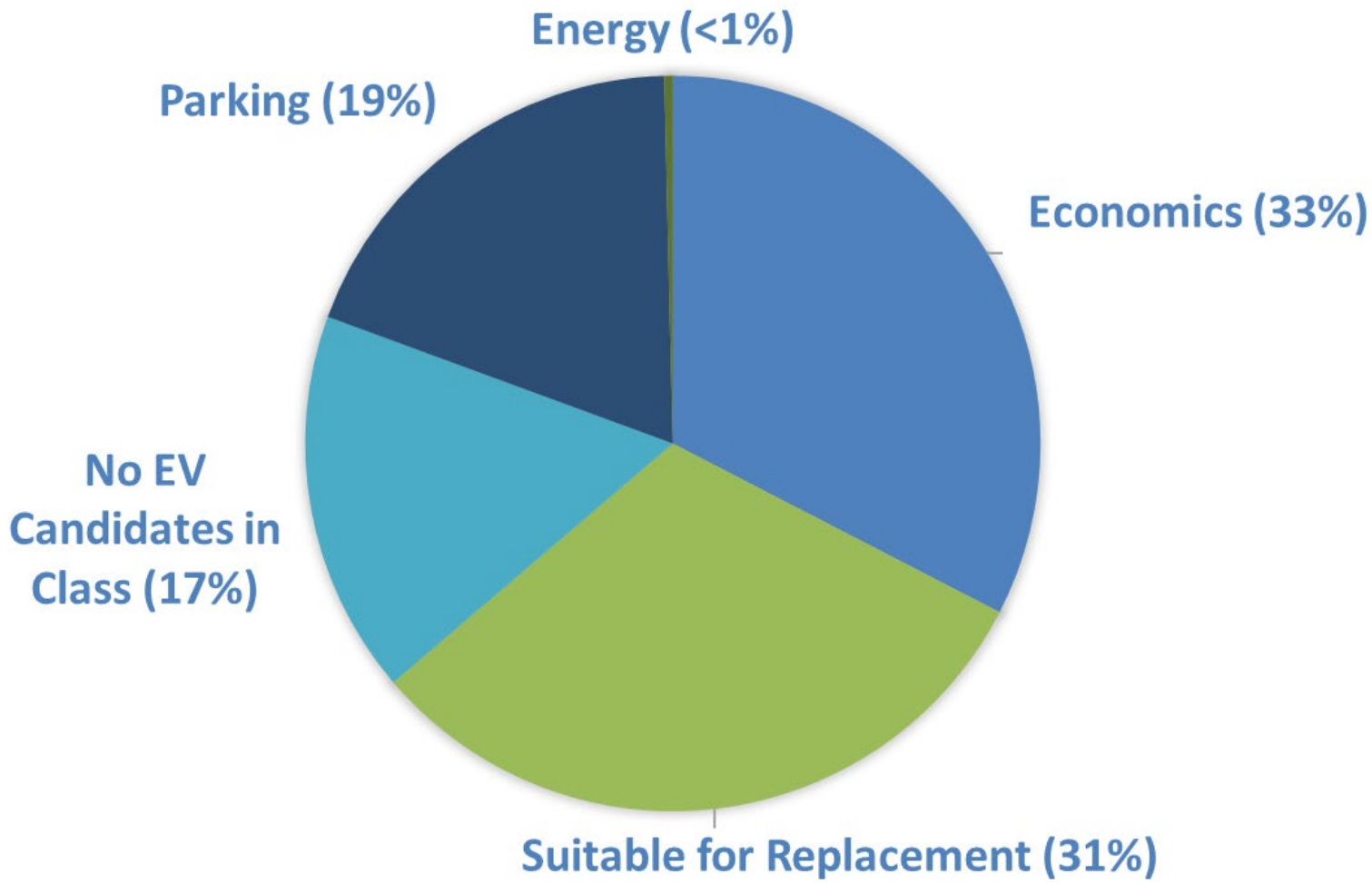
Average on days used

These metrics estimate what the charging needs and cost would be if the miles driven by your 2020 Ford Transit had been driven in a 2023 Ford eTransit Cargo Van . The Effective Usable Battery Capacity takes into account the usable battery capacity of the vehicle and the charge to/discharge to settings provided by your fleet.

Average Daily Energy Use (kWh)	Max Daily Energy Use (kWh)	Effective Usable Battery Capacity (kWh)	Level 1 Hrs	Level 2 Hrs	DCFC Hrs	Daily Cost
15	39.6	68	11.5	1.5	0.3	$1.65



EV Suitability Assessment (ezEV)

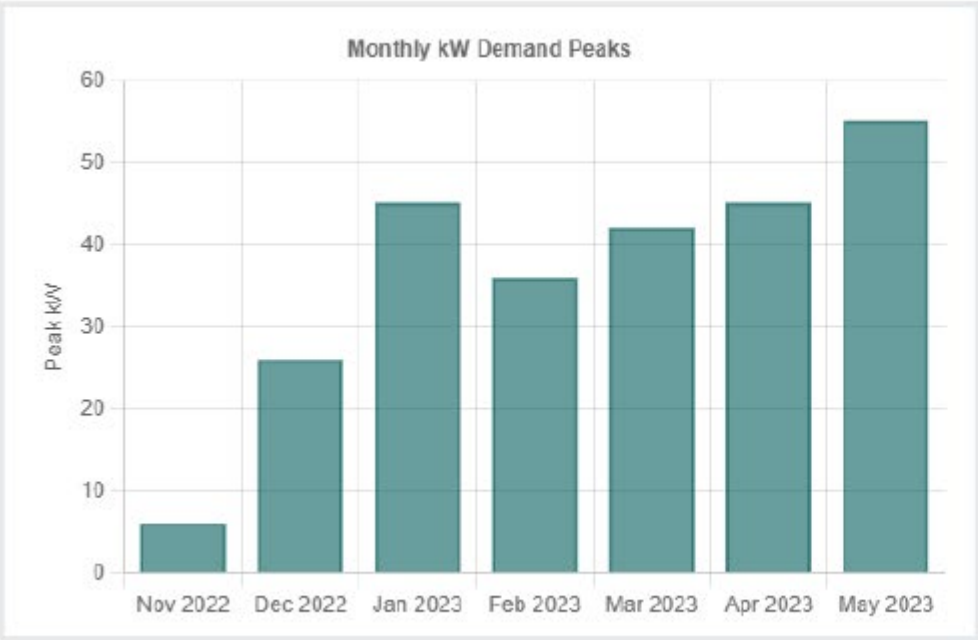


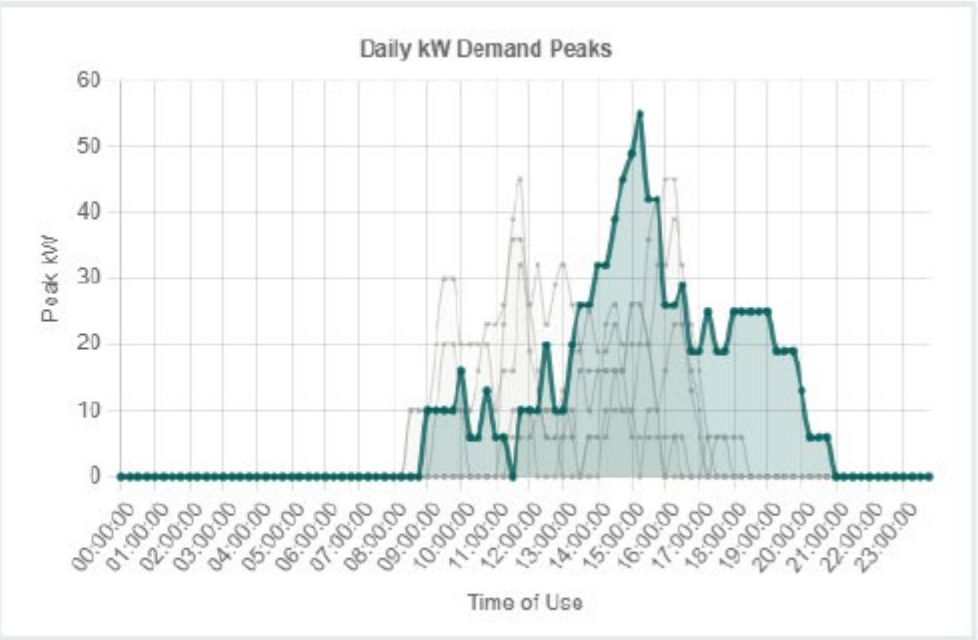
Infrastructure Planning Tool (ezIO)

- **Aggregates vehicle data** at a facility level
- **Charging demand curves**
  - Daily, monthly, and annual
  - 15-minute peak demand
- **Common charging levels**: 7 kW, 10 kW, 18, kW, 47 kW, and 50 kW+
- Different fleet electrification **scenarios** (10% increments)

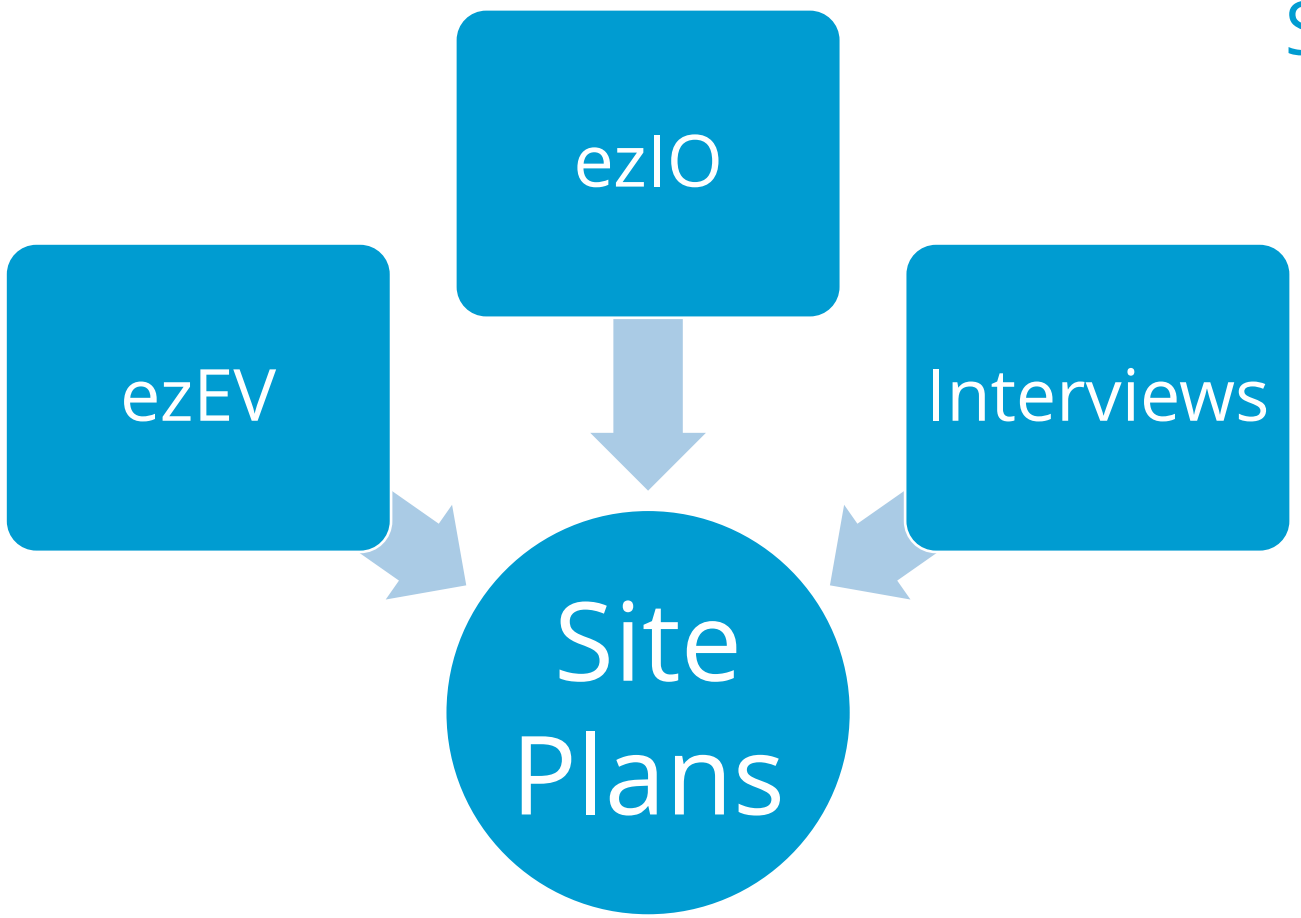
Infrastructure Planning Tool (ezIO)

17/550 Vehicles Projected to Charge/Total Vehicles in Fleet*	**5** Vehicles Recommended for Replacement with an EV	**55 kW** Highest Peak Demand at Same Time
6/3/0 L2 Ports Needed (7kW/11kW/20kW)	**0/0** DCFC Ports Needed (50kW/100kW)	**100 %** Charging Projected at This Location**





Infrastructure Plans



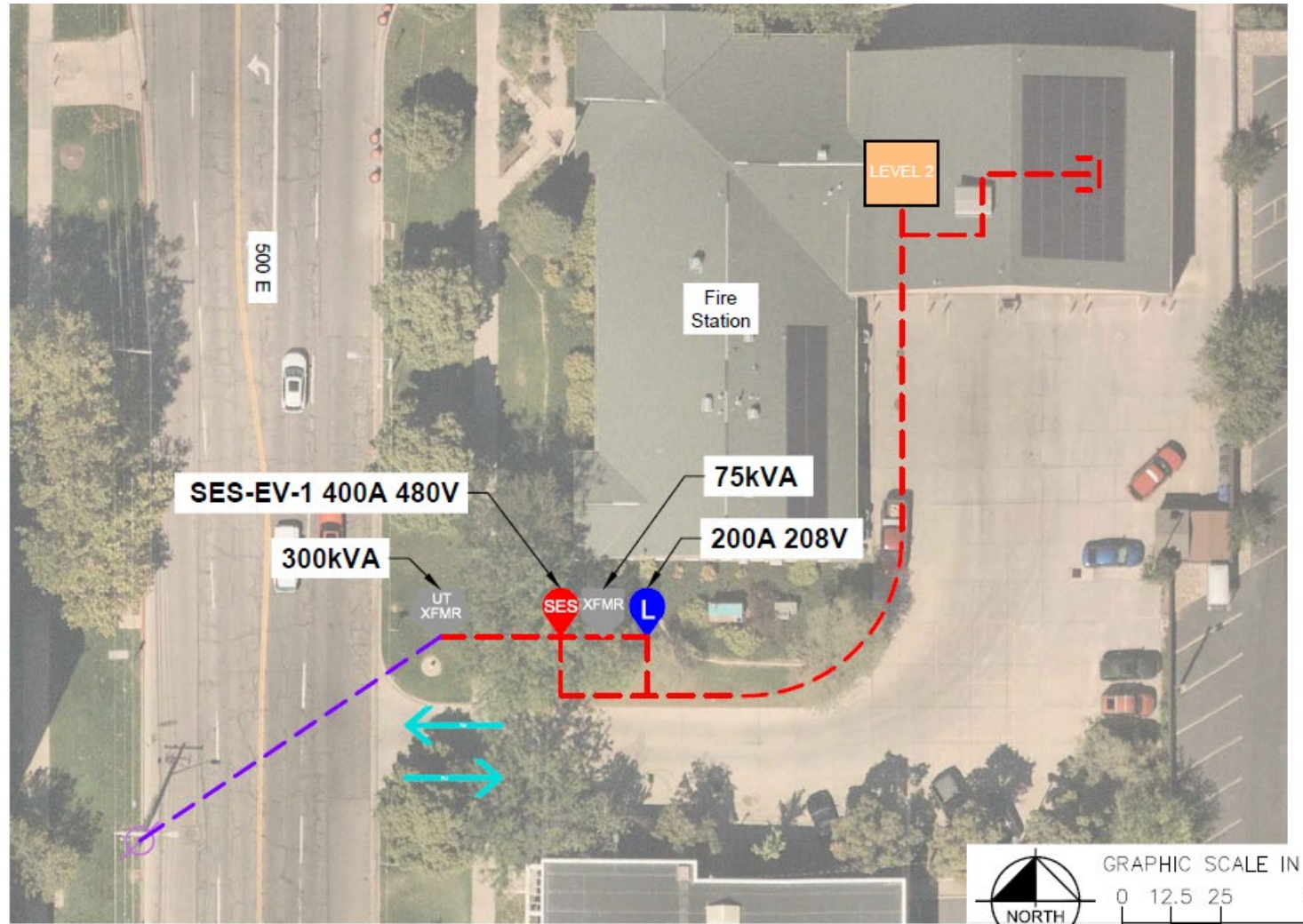
Site Plan per Facility

- Site summary
- 30% charging infrastructure design
- Cost estimate
  - Infrastructure and energy costs
- Phased Construction Approach
  - Phase 1 – Main infrastructure to support chargers
  - Subsequent phases –wiring and charger installation

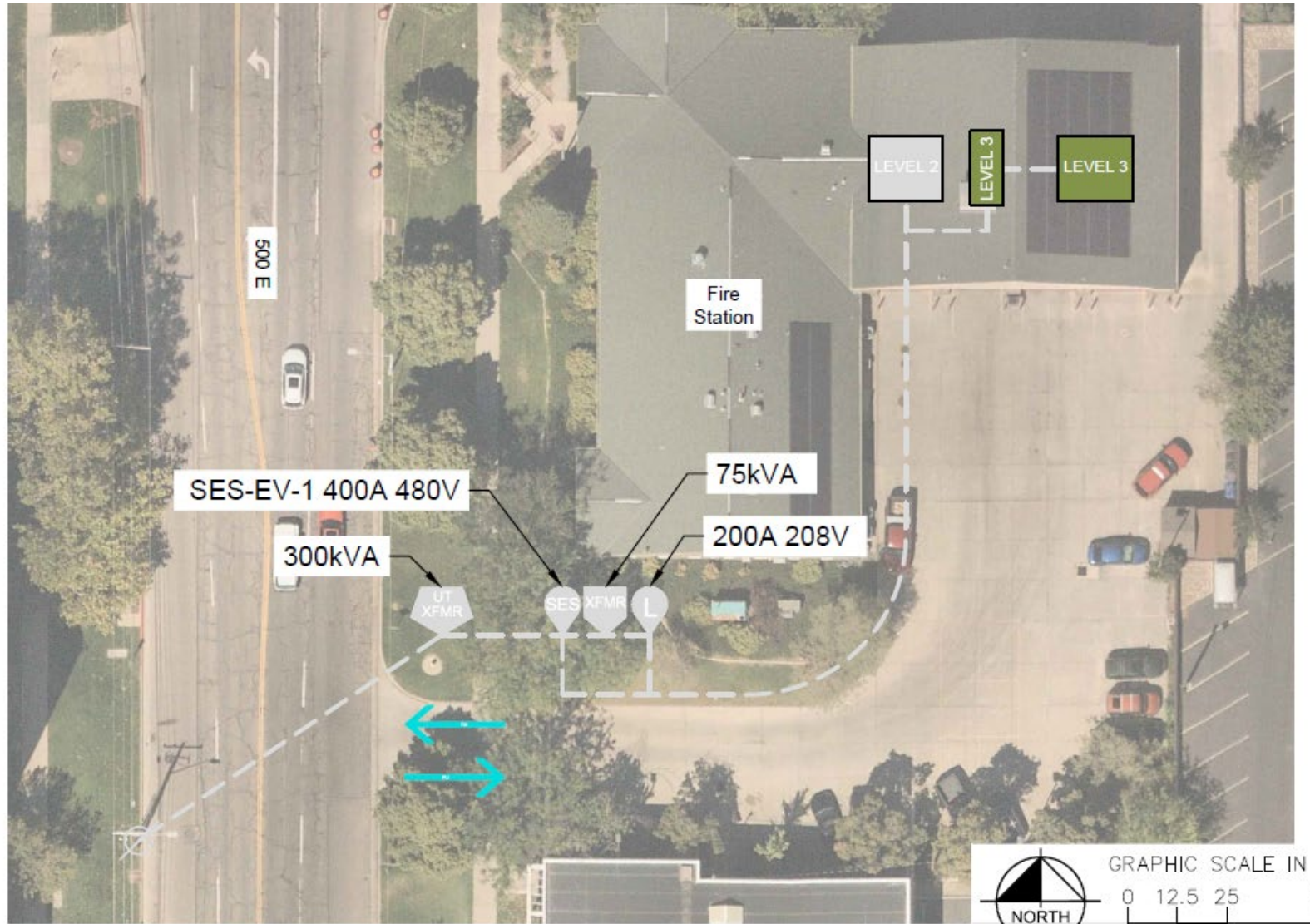
Infrastructure Plans

- Tier System
  - Tier 1 – Minor to no electrical upgrades needed, <$150,000
  - Tier 2 – Moderate electrical upgrades needed, $150,000 - $1M
  - Tier 3 – Significant upgrades needed, >$1M

Site Use	Tier 1	Tier 2	Tier 3	Cost
Police	2	2	1	$2,438,189
Fire	1	12	2	$8,353,914
Public Services	3	2	2	$15,312,506
Public Utilities	4	1	2	$8,269,979
Parks and Public Lands	5	2	1	$6,441,094
Total	**15**	**19**	**8**	**$40,815,681**



- Proposed Conduit Routing
- Proposed Utility Extension
- Public Access
- Private Access Gate
- Proposed Utility Transformer
- Proposed XFMR
- Proposed SES
- Proposed Utility Extension
- Proposed Low Panel
- Phase 1 Dual Port L2 Charger
- Proposed Conduit Stub Up
- Existing Utility Pole



Proposed Conduit Routing
Public Access
Proposed SES
Private Access Gate
Proposed Utility Transformer
Proposed XFMR
Existing Utility Pole
Proposed Low Panel
Phase 1 Dual Port L2 Charger
Phase 2 L3 Chargers

Utility Coordination

- Meetings with RMP
  - Permitting process, timelines
  - EV Programs
    - RMP Owned and Installed Chargers
    - EV Rebates and Make Ready funding
- Potential Next Steps
  - Initiate capacity studies for larger sites
    - No funding
    - Timing
  - RMP Owned and Installed Chargers
    - Priority on sites with DC Fast chargers

Emergency Preparedness and Resiliency

- Battery Energy Storage Systems
  - 72 hour back up power
  - Large footprint and cost

- Mobile Solar Chargers
  - Potential option for specific use cases
- Standby Generators
  - Already in place to support buildings, add chargers

Emergency Preparedness and Resiliency

- Vehicle-to-Grid
  - Option for sites with a lot of heavy-duty vehicles
- Next steps
  - Update the City's Emergency Management Plan

CHALLENGES AND NEXT STEPS

Facilities Management

- Older City = Older buildings
- Buildings Assessments
  - **Facility Condition Assessment** – what the current conditions of our buildings
  - **Facility Needs Assessment** – what departments need now and in the future
- Uncertainties in charging infrastructure investments

Dedicated Service Meters for EV Chargers

- Budgetary Reason
  - Different **funding sources** for buildings and fleet
  - Rate structure
- Demand Management
  - **EV-charger specific** demand management
- Implementation timelines

Take-Home Vehicles

- **+500** take-home vehicles
- Excluded from site plans, but included in **telematics analysis**
- **Policy** needs to be updated to incorporate **electricity as fuel** and other considerations specific to charging take-home EVs

Next Steps

Funding

- Re-commitment from City to prioritize this effort and dedicate funding
- Grants and other funding opportunities

Implementation

- Prioritize locations and vehicles
- Contracting and Procurement
    - Design and Installation

Next Steps

Internal Policies

- Education and training in other Department to address common issues, such as range anxiety, charging etiquette, and vehicle performance concerns
- Update take home vehicles and fuel policies to include EVs and charging
- Fire suppression training
- EV charger maintenance and workforce training
- Employee charging

THANK YOU!

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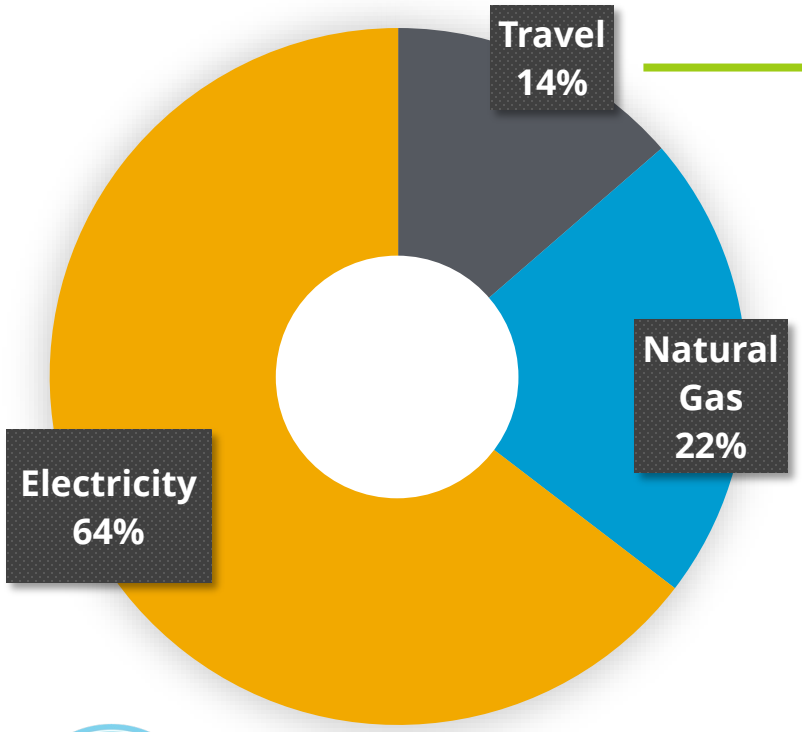
Transportation and Carbon Emissions

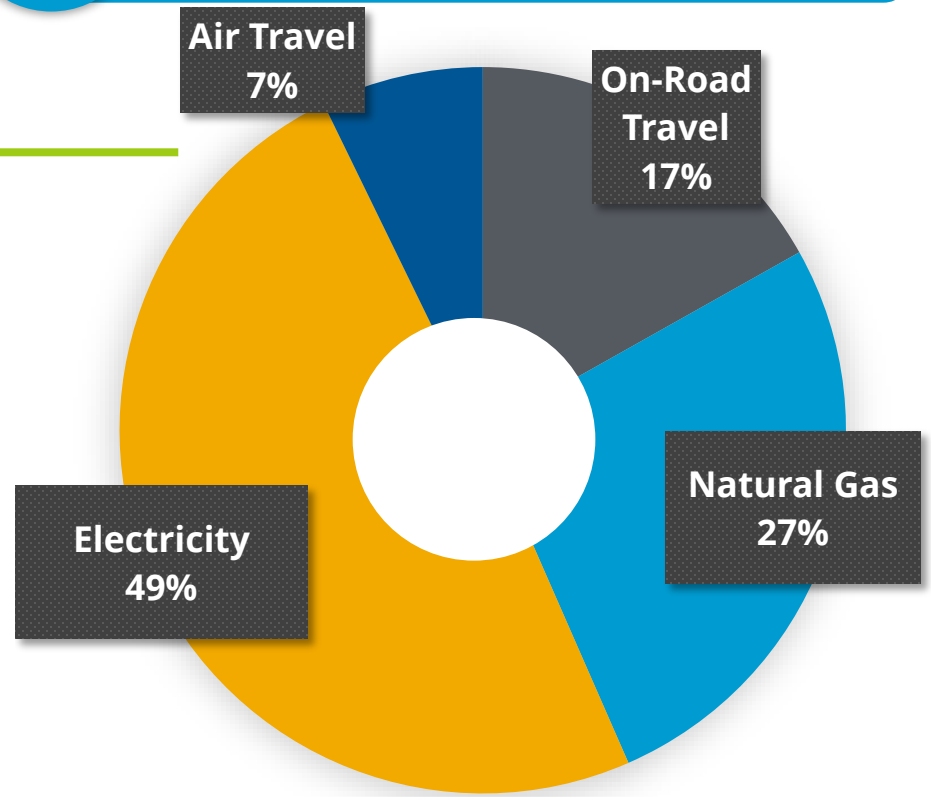
SLC Govt (2019 est.)
% of CO2e metric tons



~14%

~17%

Community (2019 est.)
% of CO2e metric tons

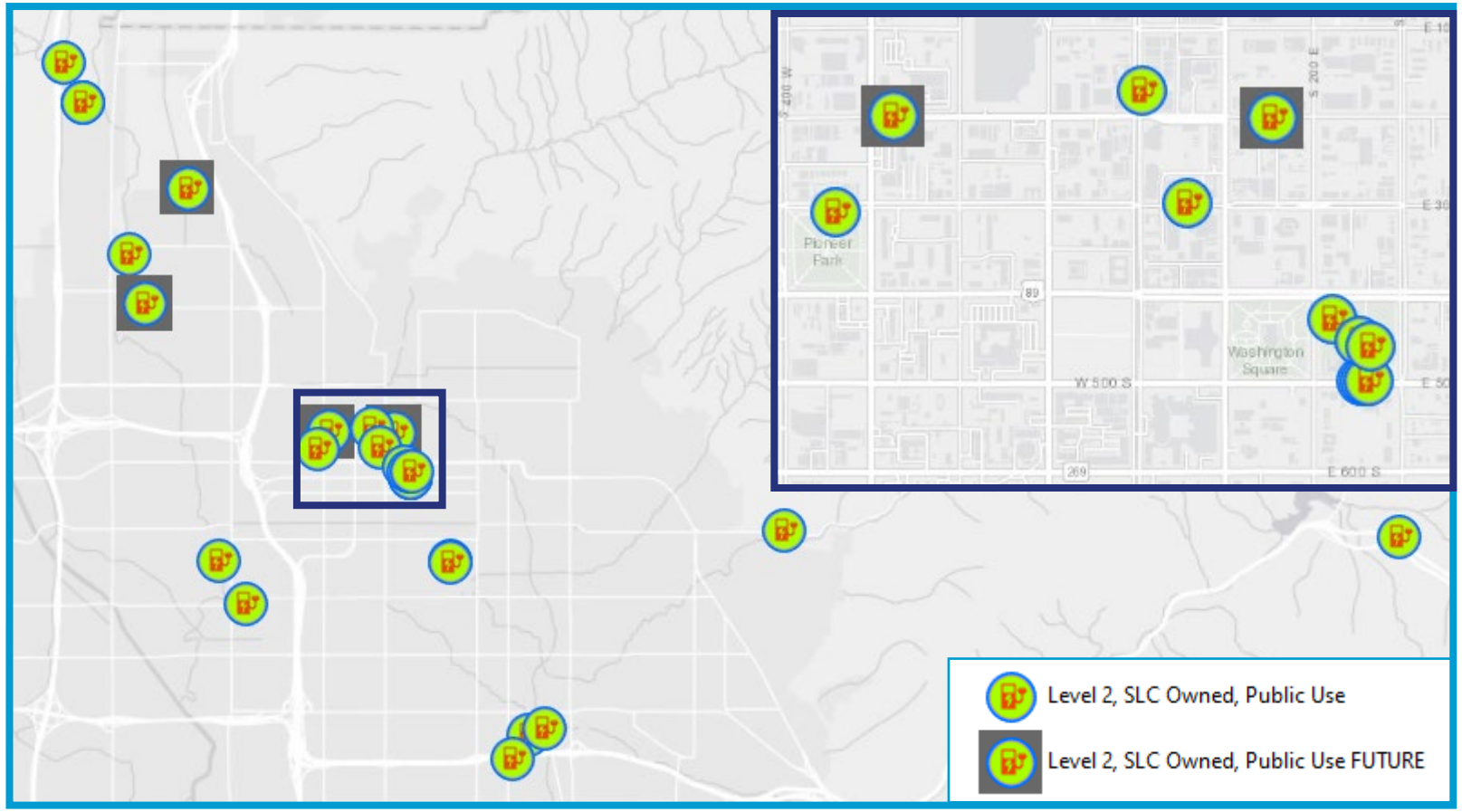


SLC-Owned Public Chargers

23 Public Level 2 Chargers

4 New stations coming in 2024

$ Free!



EV Charger Readiness Ordinance

New multi-family

1 EV charger per 25 required parking spaces

20% EV-ready parking spaces installed

Charging Demand

Table 3: Top Ten Charging Salt Lake City Locations (100% Electrification)				
Location	**Number of Vehicles Charging**	**L2 Port Count**	**L3 Port Count**	**Peak kW Demand**
Fleet/Streets Complex	196	46	78	3618
Public Utilities Jefferson Street	166	84	28	1890
Public Lands Complex	97	53	16	1250
Public Safety Building	33	20	0	122
Plaza 349 Complex	39	16	0	91
Public Utilities Water Rec	32	13	6	381
Facilities/CBD/Grey Glass	24	15	3	245
City Library Parking Structure	19	10	0	90
Compliance Building	14	2	0	57
Salt Lake City PD Pioneer Station	7	4	2	76