

# How to Electrify Your Medium- and Heavy-Duty Fleet

Thank you for joining us.  
The webinar will begin shortly.



**Larry Brasfield, Regional Sales Manager, Lion Electric Co.** – Larry's role with Lion Electric Co leverages his customer-focused approach and 30 years of experience in the trucking industry. For Lion Electric, the emerging leader in pure electric medium and heavy-duty trucks, Larry specs and sells fleet specific, right sized solutions that meet customers' needs with zero-emission battery electric solutions. Larry grew up with trucking in the family as the third generation in the business and has worked in many different roles in the industry including full-service leasing, vocational truck sales and natural gas prior to the last 3½ years in EV trucks. The Brasfield legacy is now 4 generations strong as two of his three children are in the industry and he has been blessed with 5 grandchildren.



**Julie Dietrich, Evergy** – As a Program Manager on the new Electrification team at Evergy, Julie is responsible for developing and implementing the strategic vision for transit and fleet across Evergy's Kansas and Missouri jurisdictions. This includes building partnerships with fleet managers and their affiliates and offering solutions and support related to fleet electrification.



**Andy Fry, Topeka Metro** – Andy is the Special Projects Engineer for the Topeka Metropolitan Transit Authority. He is the primary staff member in researching and understanding the implications of electrification of Topeka Metro's electric bus pilot scheduled to go live in 2023. Andy has a Mechanical Engineering degree from Kansas State University and has worked in the area of utility regulation with Kansas utility providers and consumers in the Kansas Corporation Commission's Utilities Division. Electric vehicle implementation continues to be a favorite focus of Andy's career, across the various sectors of his work.



**Kurt Neutgens, President & CTO, Orange EV** – Kurt is the co-founder of Orange EV and leads engineering, production, sales, service, and technical support for the company. He has 30+ years of OEM product development and manufacturing experience. Kurt was VP of Engineering & Assembly for Harlan Global's line of airport tractors and launched their all-electric line-up. He launched Electric Vehicle International's first electric truck model. Kurt co-led Ford's \$2B Eco-Boost program strategy and definition and served as Engineering Manager of the Ford F-150.

# How to Electrify Your Medium- and Heavy-Duty Fleet

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



  
U.S. Department of Energy



## Metropolitan Energy Center and Clean Cities Program Overview

December 8, 2020

Tami Alexander, Program Coordinator

Metropolitan Energy Center  
Central Kansas Clean Cities

# Metropolitan Energy Center

Our Mission: To create resource efficiency,  
environmental health and economic vitality in mid-  
America



**Metropolitan**  
ENERGY CENTER

## Kansas City area nonprofit since 1983

- Over 35 years of energy efficiency

## Energy Efficiency in the Built Environment

- Small Commercial Buildings
- Multi-Unit Dwellings
- *Project Living Proof* demonstration home

## Reducing Petroleum Use in Transportation

- Kansas City Regional Clean Cities - 1998
- Central Kansas Clean Cities – 2013

# What is Clean Cities?

## Clean Cities

advances the energy,  
economic, and  
environmental security of  
the United States by  
supporting *local* actions  
to cut petroleum use in  
transportation.

Reduced petroleum consumption  
for transportation

Reduced greenhouse gas  
(GHG) emissions

Reduced dependence  
on imported petroleum

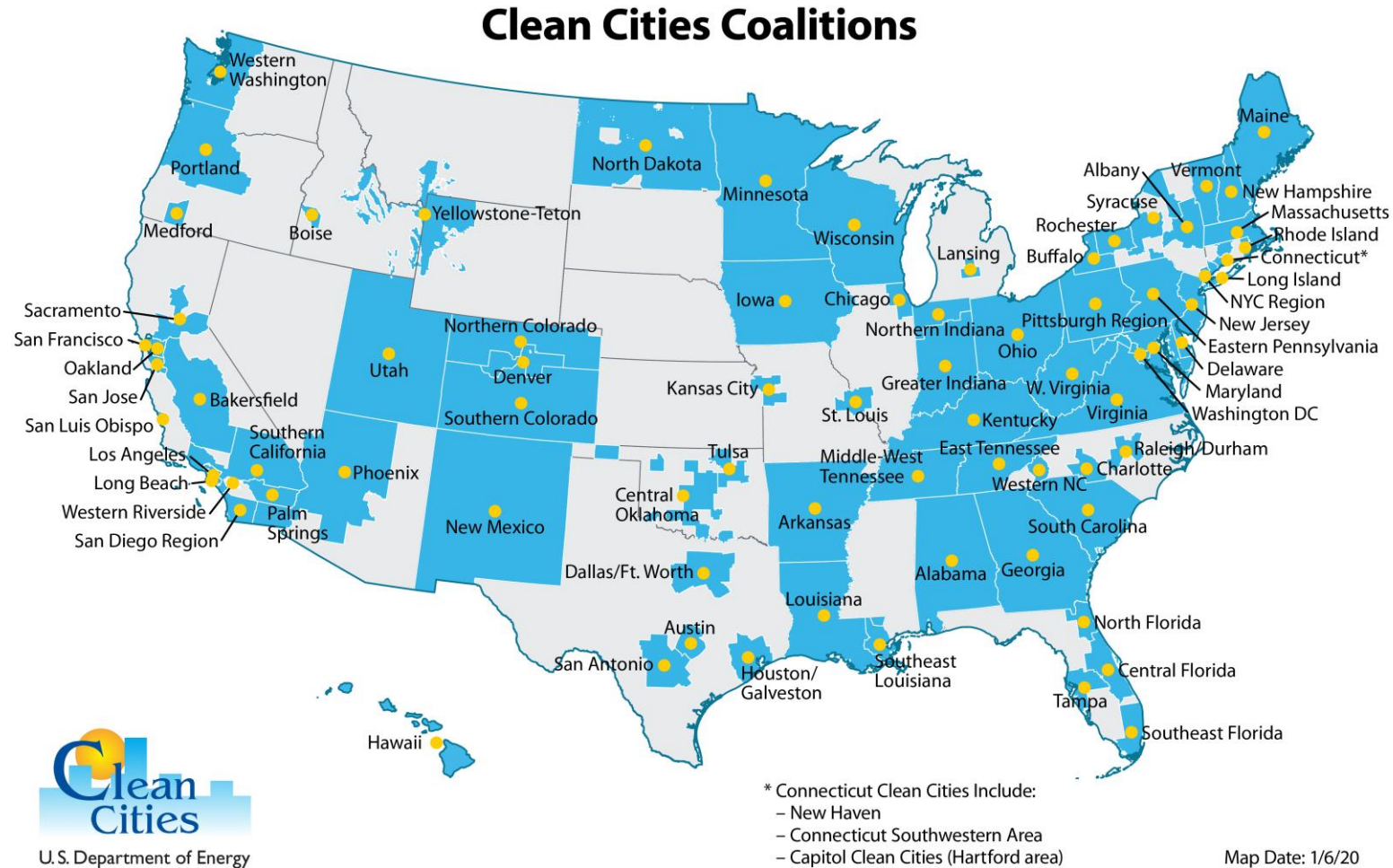


# Complementary Framework



**Clean Cities coalitions are locally based with the ability to tap national resources.**

# Local Partnerships: Clean Cities Coalitions



- National network of nearly **100 local coalitions**
- **82% of the total U.S. population** lives inside coalition boundaries

# Local Partnerships: Build Relationships & Strengthen Markets



- Connecting fleets with fuel providers and industry partners
- Offering training and information
- Supplying access to technical assistance
- Identifying funding
- Providing public recognition
- Collecting data and tracking progress



# Contact Information & Questions

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# We build better terminal trucks

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100% electric.

Safer. More reliable. Lower cost.

Proven and preferred by drivers and management alike.

OrangeEV.com



Fleets choose Orange EV to reduce downtime, avoid costly and problematic diesel emissions controls, increase safety, improve the driver experience, and to:

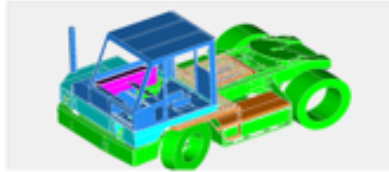
- Dramatically reduce total cost of ownership (TCO)
- Save up to \$60k+ per truck annually on fuel, maintenance, and emissions control

*Save up to 90% on fuel*

*Save up to 75% on maintenance and repair*

*Save 100% on emissions control*

- Save more when adding health, safety, and operational benefits
- Completely eliminate diesel-related costs and emissions



**2012**

Orange EV founded by Kurt Neutgens and Wayne Mathisen. 2,000 sq ft and a plan.



**2014**

Demonstrations with major operators prove truck capabilities.



**2016**

New truck offering available. Move to 12,000 sq ft facility. 22 trucks in operation.



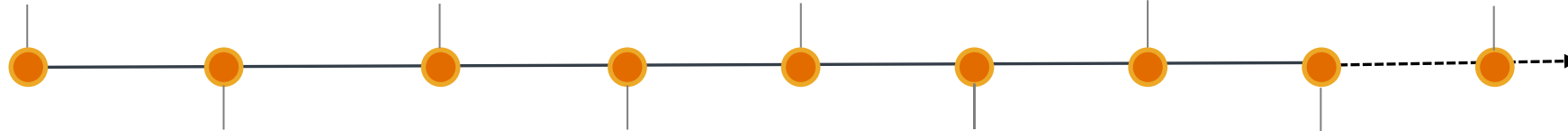
**2018**

80 trucks in service. Autonomous partnership.



**2020P**

230+ trucks in service. 86% revenue growth. Tandem and Digital Truck. Over 80 employees.



**2013**

Design completed and demo truck operational.

**2015**

Initial orders of four trucks. 16 employees, first delivery to DHL, mobile service capable – factory service.

**2017**

First fast charge truck introduced. 39 trucks in operation and 29 employees.

**2019**

140 trucks in service. Relocated to 52k sq ft facility. 69% revenue growth.





## Terminal Trucks

*aka hostlers, spotters, yard trucks, yard dogs, shunt trucks, tractors, etc.*

- Class 8
- GCWR 81,000 lbs
- Up to 25 mph
- Supporting 24x7 operations
- Used in container/trailer facilities: Rail, manufacturing, distribution, agriculture, etc.
- On-road (DOT-compliant) and non-road (in-yard)
- Managed by hours, not miles



## Orange EV T-Series Terminal Trucks



6x2

4x2



- No diesel engine, trans., cooling, or emission control
- Operate up to 24+ hours on a single charge
- Telematics provide real time operating data
- Safer, cooler, smoother, quieter, & cleaner

- Lower total cost of ownership
- Regenerative braking
- 50% shorter stopping distance
- Zero emission



## Better terminal trucks

### Built to meet site specifications and duty cycles



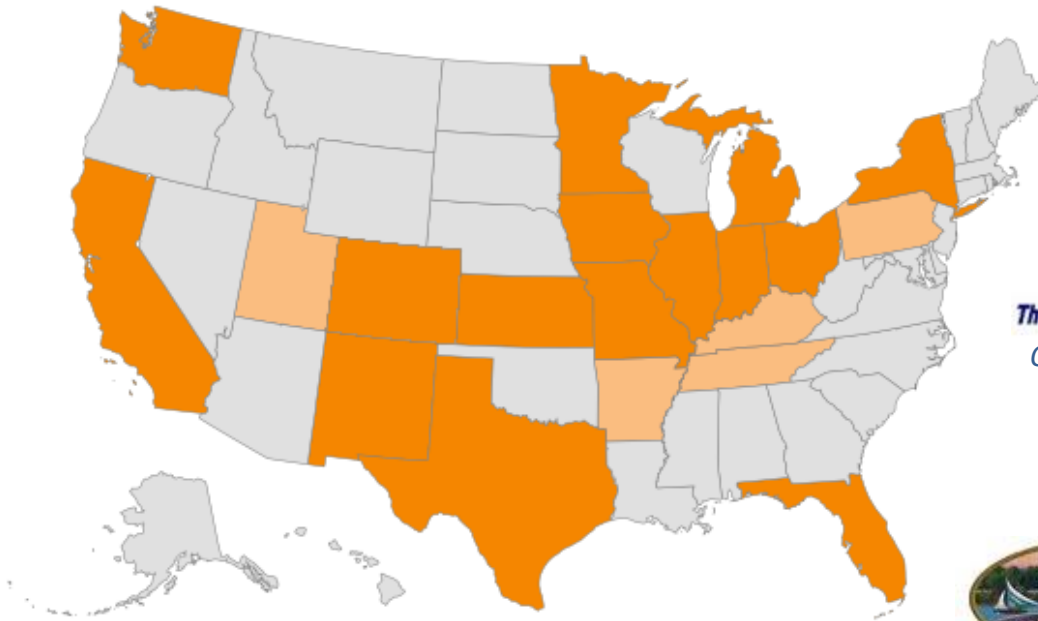
- Battery: 80 kWh / 160 kWh
- Charging: Standard (13kW-22kW) / Fast (70kW)
- Gatorhyde floor + high-wear surfaces
- Galvanized frame
- 4x2 or 6x2
- Custom colors
- 12V power ports in cab
- A/C, instant-on electric heaters



# T-Series: Proven and Preferred

## Orange EV Commercial Truck Deployments

■ Current ■ YE 2020



- Deployed nationally since 2015 initial production, across weather and duty cycles
- Over 200 trucks in service, chosen by more than 75 fleets in 15 states and Canada
- Commercially deployed fleet has surpassed 615,000 hours and 1.81 million miles
- We come to you: Factory-direct mobile service



## Questions

- Overall: What's real? I can't tell with all the hype about new tech.
- Trucks: How long can trucks work on a single charge? Do I need more EV's than diesels to make up for charging time?
- Charging: How long does it take to charge? Can I use the charging stations at work for these trucks?
- Weather: What are the impacts on cold weather?
- Cost: Cost is higher than my diesels? How can justify it?
- Maintenance: Can my techs maintain, or do we need special training/service from the OEM?
- Data: How do I know if being used, and if correctly?



## Simple Steps

- **Site & Truck Operating Data** - diesel trucks being replaced
- **Spec & Quote** - designed to site-specific requirements
- **Develop Business Case** - total cost of ownership
- **Educate your Team** - socialize across functional areas, 1 week demo: Emily Wolfe
- **Purchase, Install, Deploy** - in a managed project
- **Train Your Team** - operators, mechanics, management
- **Plan Continued Deployments** – based on operational experience and telematics data

# Kraft Heinz Deploys All Electric Trucks in Ohio, Eliminating Diesel Emissions with Firefly Transportation Services and Orange EV

*Global food and beverage leader replaces Class 8 diesel terminal trucks with pure electric at its Ohio distribution center*

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**Kraft***Heinz*





***“Firefly will operate three (3) **Orange EV** pure electric terminal trucks to do the work formerly accomplished by five (5) diesels.... With this deployment, Kraft Heinz plans to virtually eliminate diesel terminal truck emissions at their Groveport distribution center.”***

*~ Press Release (May 8, 2019)  
The Kraft Heinz Company  
and Firefly Transportation Services*

# Ability Tri-Modal Deploys Five Orange EV Electric Yard Trucks to Carson, California Distribution Operations

*Delivering a return on investment while reducing carbon footprint*

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***“For the last 12 years or more,  
we’ve had two or three  
diesels down at any one time.  
We needed a solution, and  
until **Orange EV**, no one had  
answers.”***

*~ Press Release (June 20, 2018)  
Ability Tri-Modal*

# With **Orange EV**, OMSS becomes first to commercially deploy 100% electric Class 8 truck to Port of Oakland

*Meeting the needs of truckers while reducing impacts on local community*

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# OMSS

Oakland Maritime Support Service, Inc.



***“The yard hostler is critical to our operations, so we naturally wanted to go with the industry leader. That’s **Orange EV**. They specialize in electric hostlers and it shows.”***

*~ Press Release (June 26, 2018)*  
**OMSS**

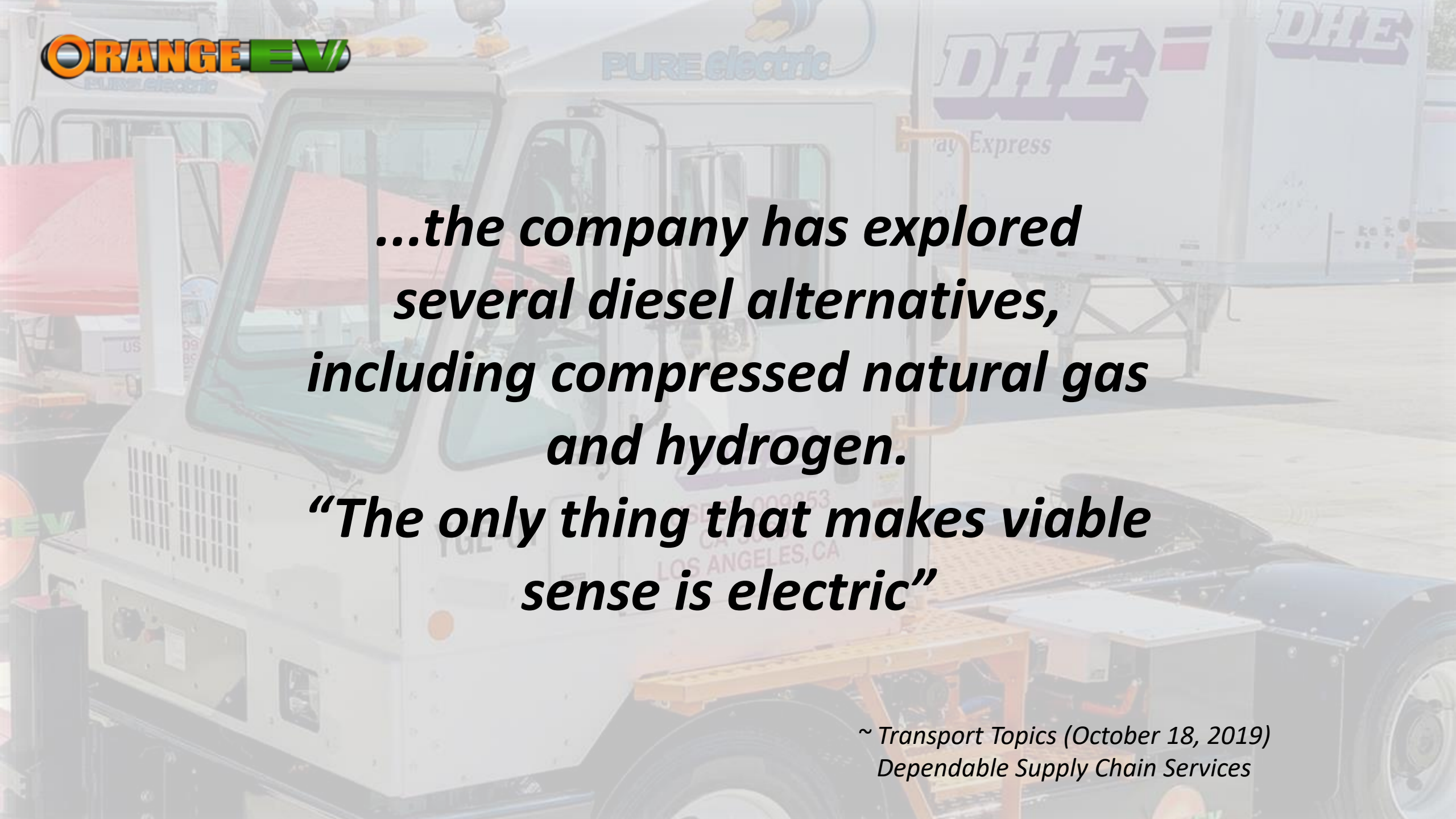
# Dependable Supply Chain Services Deploys Orange EV Electric Trucks as First Step Towards Zero-Emission Freight Facility

*Eliminating diesel emissions creates safer, healthier environment for site personnel and surrounding Ontario, California community*

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**DEPENDABLE**  
Supply Chain Services





**ORANGE EV**  
PURE electric

***...the company has explored  
several diesel alternatives,  
including compressed natural gas  
and hydrogen.***

***“The only thing that makes viable  
sense is electric”***

~ Transport Topics (October 18, 2019)  
Dependable Supply Chain Services

# Dimension Fabricators Deploys Orange EV Electric Yard Truck Powered by Onsite Solar Array

*Schenectady, NY area manufacturer advances customer sustainability goals while improving employee health and safety*

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***“Happy and safe operators stick with you for the long term, and the guys just love the new **Orange EV** truck. They can’t stop raving about it...”***

*~ Press Release (March 21, 2018)  
Dimension Fabricators*

# BIGGE EXPANDS GREEN INITIATIVE BY INTRODUCING ELECTRIC YARD TRUCKS AT BAY AREA HEADQUARTERS

Jun 17 2019

Headline & photo:  
Bigge Crane and Rigging  
Website News Post  
June 17, 2019



***“We’re getting a full 12 hours of work, per charge, which keeps our **Orange EV** trucks running all day long. The trucks are quiet, efficient, and very reliable.”***

*~ Bigge Website News Post (June 17, 2019)  
Bigge Crane and Rigging*

# EXECUTIVE INTERVIEW: Bolthouse Farms Is Achieving Significant Emissions Reductions with Electric Terminal Tractors

June 25, 2020



Headline:  
ACT News  
Website Post  
June 25, 2020



***“The **[Orange EV]** electric terminal tractors had a 75% decrease in downtime over the two-year period as compared to their diesel counterparts. The diesel vehicles needed about 522 hours in the shop, while the electric vehicles only needed 134 hours.”***

***There was an 80% reduction in maintenance costs compared to the diesel counterparts: The diesel vehicles cost \$3.93 per hour to maintain, while the **[Orange EV]** electric vehicles only cost 78 cents per hour to maintain.***

*~ ACT News Interview (June 25, 2020)  
Nick Chase, Bolthouse Farms*



# We build better terminal trucks

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100% electric.

Safer. More reliable. Lower cost.

Proven and preferred by drivers and management alike.

Contact: **Skye Carapetyan**, National Sales Director

916-500-1666, [SkyeC@OrangeEV.com](mailto:SkyeC@OrangeEV.com)

# Lion Electric Overview



An all-electric commercial  
vehicle manufacturer

DEC 2020

# Lion Electric

## Overview

<https://youtu.be/rsOuM1G2yho>



An all-electric commercial  
vehicle manufacturer

# Lion Today



## Experience Centers

- Sacramento, California
- Los Angeles, California
- Albany, New York
- Seattle, Washington



**400+ employees / 2,000 indirect jobs**



**2,500 electric vehicles per year manufacturing capacity**



**300+ electric vehicles in operation**



**More than 6 million zero-emission miles driven**



# Product Line Evolution

2008



Lion was  
founded

2011



LION360  
Diesel C-Type

2016



LIONC  
C-Type 100% Electric

2019



LionM, Lion8, LionA  
Minibus Shuttle / Paratransit  
Class 8 Urban Truck  
Mini Schoolbus  
100% Electric

2020



Lion8 - Refuse  
100% Electric

# Product Roadmap

2020



LionD, Lion8 - Aerial

Type D School Bus

Aerial Truck

100% Electric

Q4 - 2020



LION8 – Tractor,  
Lion6

Class 8 Tractor

Class 6 Urban Truck

100% Electric

2021



Lion5, Lion7, Lion8 – Boom, Ambulance

Class 6 & 7 Urban Trucks

Boom Truck

Ambulance

100% Electric

# Why go electric?

Affordability  
& Sustainability

**Calculating TCO - Electric will always  
be cheaper than diesel no matter what**

- Zero-emission solution
- Low maintenance
- No noise pollution
- Health Impact
- GHG reduction
- Proven safety record

# Transport is the largest source of pollution on the planet

even though...



92%

Believe that electric vehicles are a great energy-efficient alternative to gas-powered vehicles

Only

7%

Of them know that electric vehicles are already available

Less than

1%

Buy electric vehicles

# Savings electric vs diesel

80%

Energy Costs  
Reduction

60%

Maintenance  
Costs Reduction



# Purpose-Built to be Electric

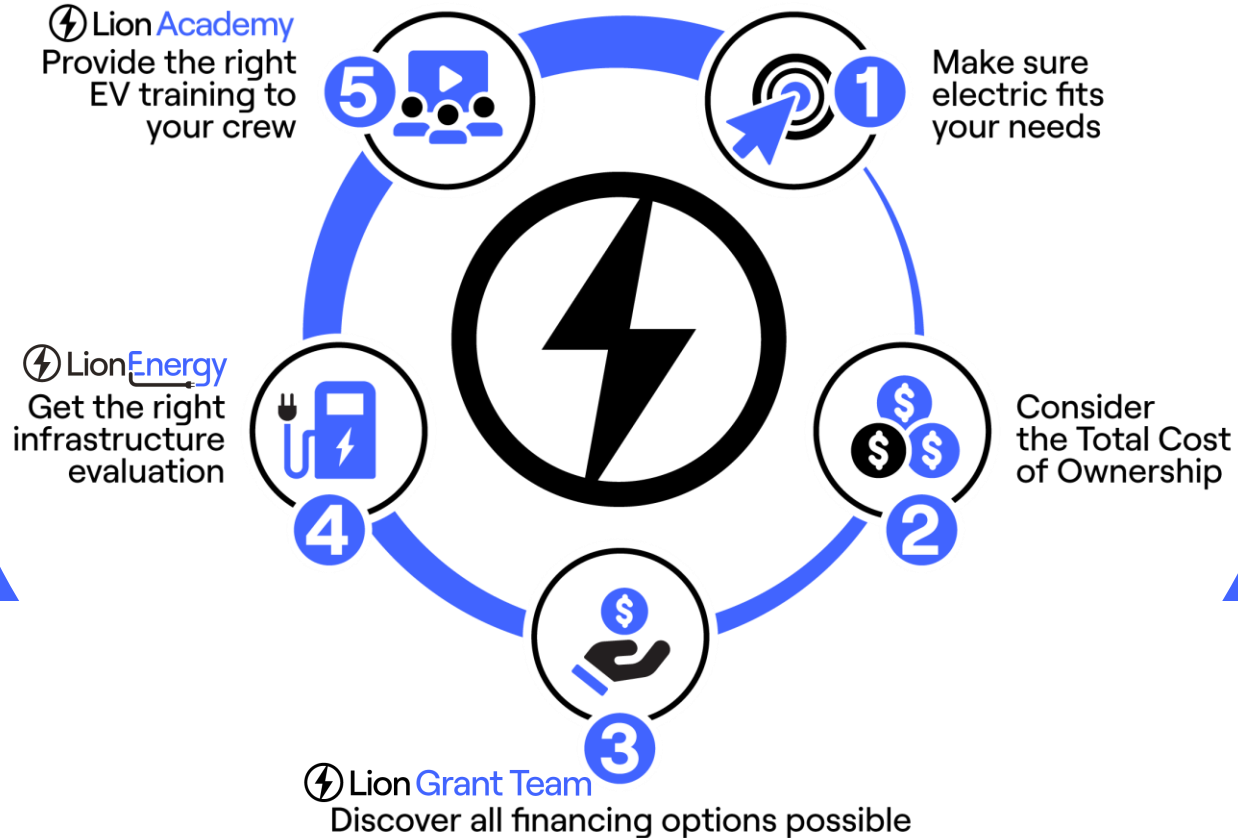
## PARTS

Electric motor : 20 parts vs. Diesel engine : 2,000 parts

**Total body parts** – Electric parts: 7,000 vs. Diesel parts: 30,000

- We build our own chassis and body
- We assemble our own battery packs
- More kWh available than any other OEM on the market
- Composite body - no rust, no corrosion, no paint, less down time
- Regenerative braking system – decrease braking distance and increase brake life (up to 3x longer)
- Our vehicles are not retrofitted diesel, they are born to be 100% electric
- Custom-built driver information center & clusters

# 5 steps to electrify your fleet.



# Operating in extreme climates since 2016

Lion Electric vehicles have been tested and proven in all types of warm and cold weather conditions





- Grant writing
- Leverage funding opportunities in your region
- Full support during the entire process

**Contact [grant.lion@thelionelectric.com](mailto:grant.lion@thelionelectric.com) to  
discover funding opportunities in your region!**

# Truck Line



# The Lion chassis: a versatile platform with huge potential



Lion vocational trucks are the only heavy electric specialty vehicles perfectly integrated to date. Our chassis and electric powertrain will serve as a platform to accommodate the various applications available.



**Lion Crane**



**Lion Stake Bed**



**Lion Refrigerated**



**Lion Utility**

# All-Electric Urban Trucks



1 LION TRUCK =  
ELIMINATING

100 tons  
of GHG

\*EPA calculator

MODULAR  
BATTERY  
APPROACH

## LION6

### All-Electric Class 6 Truck

26,000 lb GVWR  
Up to 180 miles  
Up to 252 kWh



## LION8

### All-Electric Class 8 Truck

Up to 60,000 lb GVWR  
Up to 150 miles  
Up to 336 kWh



# All-electric refuse truck



## SAVINGS

Electric vs Hydraulic

50%

Reduction of energy consumption of an electric vs hydraulic on an electric chassis

## ADVANTAGES

- 1,000 - 1,200 homes per day
- Integrated solution means less energy used so the truck can complete its route
- No hydraulic fluid or pumps
- All compaction and arm movements are powered by the Lion8 HV batteries that drives the electric motor
- Less weight than a hydraulic body

## PROMOTIONAL VIDEO



[SEE THE TRUCK IN ACTION](#)

# All-Electric Bucket Truck



## Lion8 – Bucket Truck

All-electric Class 8 Bucket truck

### MAXIMUM POWER

Up to 350 kW / 470 HP

### BATTERY CAPACITY

Up to 336 kWh

### CHARGING TYPE

Standard : Level III (DC) – CCS-COMBO

Optional : Level II (AC) – J1772

## FACTORS THAT IMPACT RANGE

With an integrated solution on the Lion8 bucket trucks, there are factors that will impact the range:

- ✓ AC (3 kW) per hour of operation
- ✓ Heat (4 kW) per hour of operation
- ✓ Bucket operation: up to 27 kW per day
- ✓ 24 V auxiliary items

Our approach will be different with each customer due to a variety of duty cycles. Lion offers several kWh battery packs to meet the needs of each customers and their route profile.

# All-Electric Tractor Truck



## Lion8 – Tractor

All-electric Class 8 Tractor truck

### MAXIMUM POWER

Up to 536 kW

### MAXIMUM TORQUE

5,300 ft-lb

### RANGE

Up to 210 miles

### BATTERY CAPACITY

Up to 588 kWh

### CHARGING TYPE

Standard : Level III (DC) – CCS-COMBO

Optional : Level II (AC) – J1772



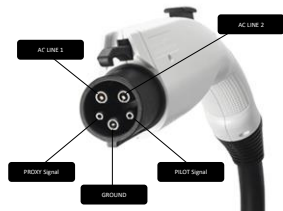
## Why do you need purpose-built EV telematics?

- ✓ Measure your Electric Truck & Bus Performance
- ✓ Measure your energy use / average mi. / kWh
- ✓ Measure your maintenance savings
- ✓ Measure your driver performance

Reduce Total Cost of Ownership and ROI timeline



# Charging & Infrastructure



## LEVEL II (J1772)

- Embedded 19.2 kW charger



## LEVEL III (CCS-Combo)

- DC fast charging
- Reduce the overall charging time

All Lion's products  
are V2G ready!



Lion will take care of everything

- 1 Project management
- 2 Relationship with utility
- 3 Design & review

# What makes Lion the leader?



- Global experience in the deployment of electric vehicles
- Constant support from the Lion Academy
- Purpose-built to be 100% electric
- Infrastructure support with Lion Energy
- Ability to leverage incentives

# The bright move

## CONTACT

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(630) 208-7984



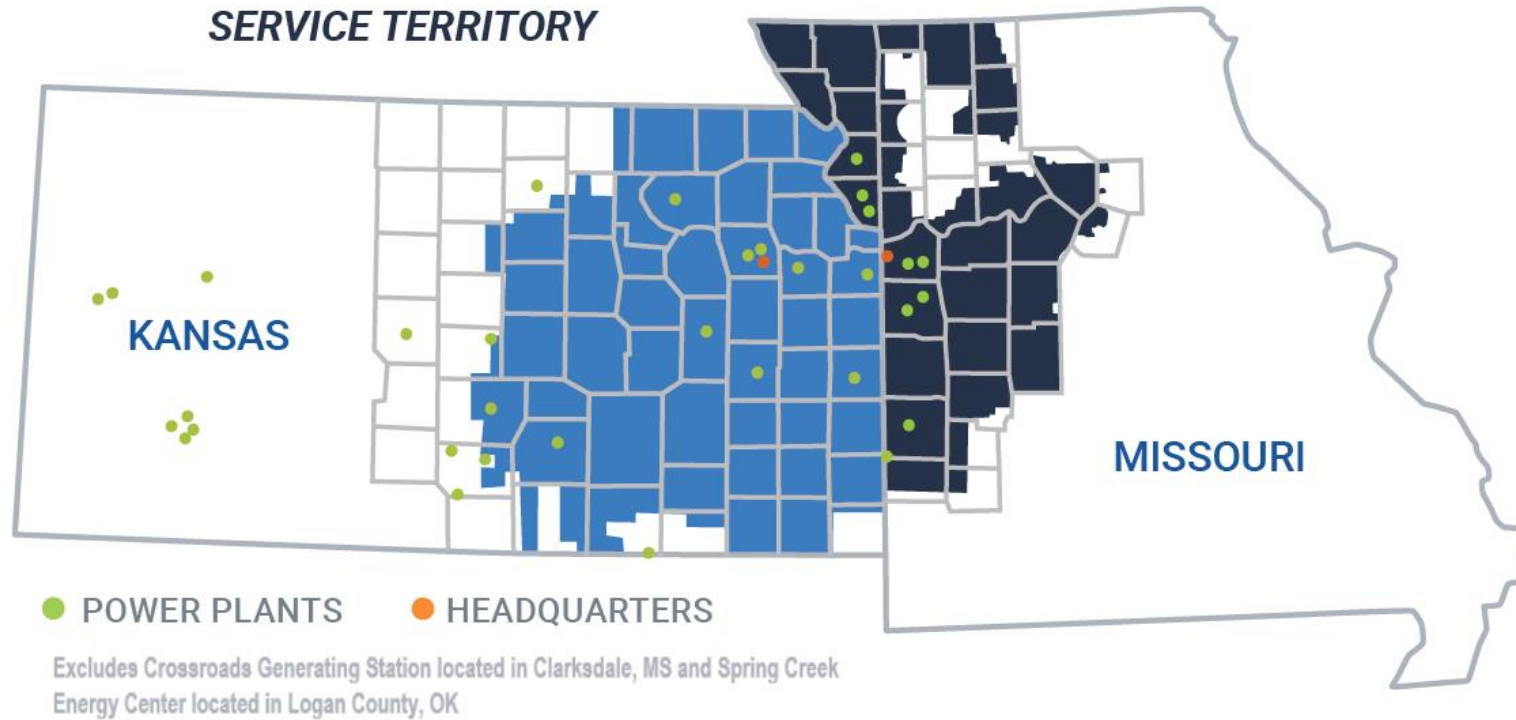
# Best Practices for Partnering with Utilities on Your Transportation Electrification Initiatives

*December 8 2020*





# Vertically Integrated Regulated Electric Utilities



1. Statistics as of 12/31/18.
2. Market cap as of 10/31/19.
3. Estimated rate base based on ordered and settled rate cases.
4. Renewables include both owned and purchase power agreements as of 12/31/18. Additionally, we expect total renewables will be over 3,800MW by 2020.

## *Evergy Statistics<sup>1</sup>*

~\$15B market cap<sup>2</sup>

~\$14.2B of rate base<sup>3</sup>

1.6M electric customers

11,566 MW of owned generation

3,517 MW of renewables<sup>4</sup>

13,700 miles of transmission

52,200 miles of distribution



# Our electrification vision

## VISION

To unlock the value of electrification through **innovative initiatives** that complement our industry-leading portfolio of **sustainable, customer-centric energy solutions**.

## MISSION

We empower Evergy customers with electrification solutions that leverage our carbon free resources to **improve the environment, lower customer costs, and enhance grid operation.**



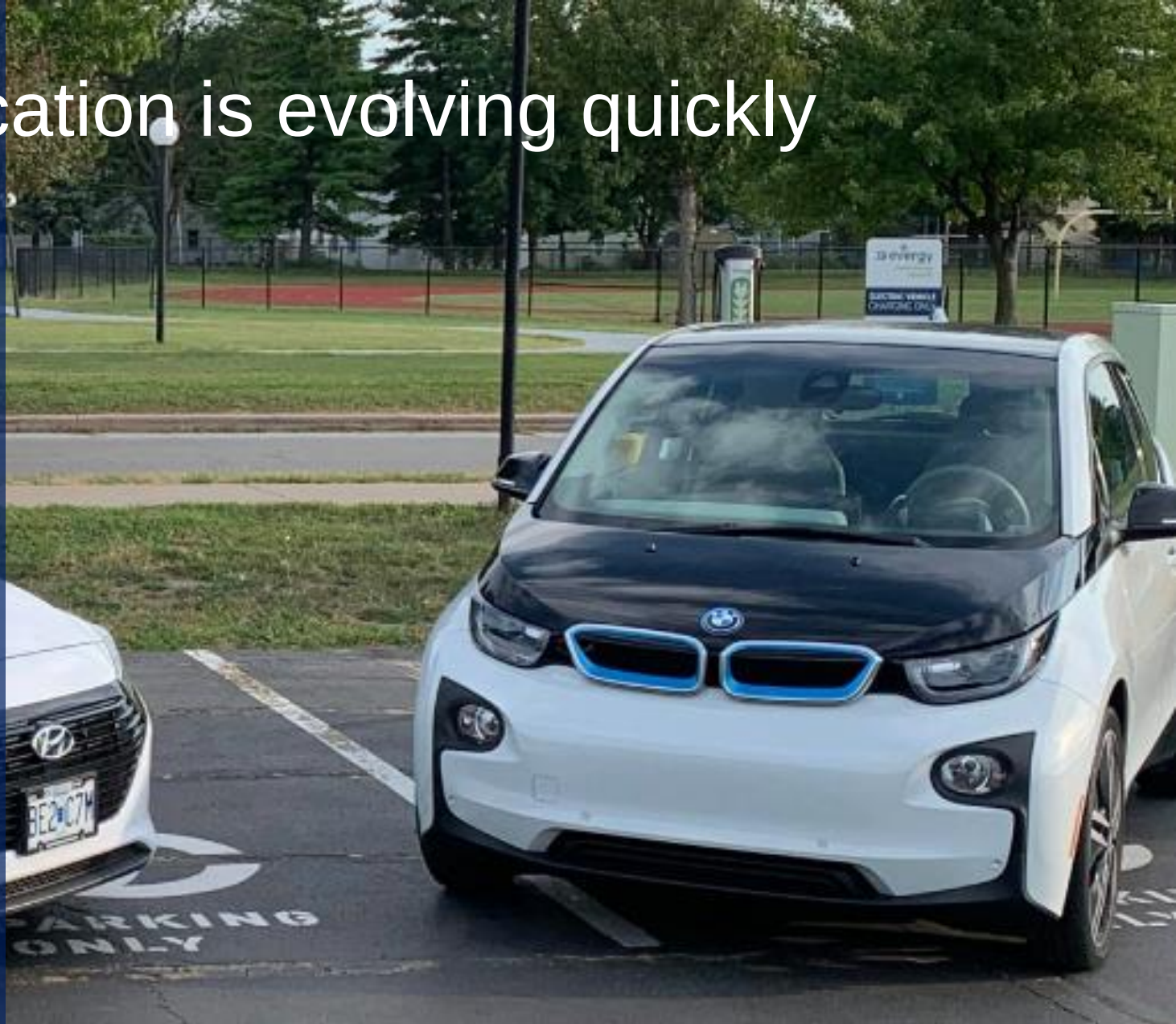
### GUIDING PRINCIPLES:

- Clean community benefits
- Proactive engagement
- Customer empowerment
- Cost effective solutions & reliable service

# Transportation electrification is evolving quickly

## Why now?

- Electric vehicle technology is increasingly viable and cost-effective for cars, buses, and commercial vehicles
- Cleaner grid makes transportation sector decarbonization more potent
- Automakers are making the switch
- Mainstream market awareness is high
- State and federal policies and incentives are driving consumer action



# Engage Early with the Utility TE Team

## Leverage Utility TE Specialists



- Provides advisory support dedicated to TE projects
- Serves as project advocate for internal coordination
- Engages all utility stakeholders involved in TE project lifecycle
- Project planning support for grant applications
- Pursuing fleet rates/incentives

## Engage Early



- Early coordination supports alignment between project delivery and fleet transition timeline
- TE fleet projects can range from months to years depending on project size and utility infrastructure needs
- Allows time for capacity assessments and utility upgrade planning if needed

## Fleet Information is Key



- Understanding your fleet operational needs
- Vehicle Class(es) and number of vehicles
- Type and number of chargers, if determined
- Understanding of your short-term and long-term TE plans

# TE Infrastructure Planning Impactors – The Basics

## Capacity and Demand Support



- Work closely with the TE team to review TE fleet implementation timelines
- Evaluation of existing capacity
- Calculate anticipated load demand based on vehicles, selected chargers and operational needs

## Load Management



- Leverage utility experience for load management and charger requirements discussions
- What is your purpose for load management: reducing infrastructure needs, managing electric rates or both?
- How are you planning on implementing load management?

## Large Load Studies



- Project size often determines project workflow for service planning
- Distribution planning studies may be triggered with loads as low as 0.5 MW (equal to ten 50 kW chargers)
- Utility planning studies analyze existing capacities and needs for new infrastructure



# Collaboration is Key with TE Projects

## Communication and Partnering Is Key With TE Projects

- Utilities and customers are often learning and implementing at the same time
- Get to know your points of contact within the Utility TE team and leverage advisory support
- Ask questions for project planning and delivery to level-set expectations both internally and externally
- Include both customer and utility stakeholders early on during the planning process

## Leverage The Depth of the TE Community

- Engage the TE community for best practices and planning for implementation
- Leverage industry specialists, early adopters and non-profits for key learnings
- Reach out to those who have completed or in process of various TE projects stages
- See first-hand what has been done by visiting constructed sites and/or locations

Thank you

Julie Dietrich

Electrification Program Manager - Transit and Fleet

816-309-7555

[evergy.com](http://evergy.com)



# Transit Electrification in Topeka

Topeka Metro's efforts to date in investigating  
and preparing for electric buses

Metropolitan Energy Center

Andy Fry

December 8, 2020



# What has been done

- Electric Relief cars
- Added RFP language for future procurements
- Transit Specific Electric Rate
- Hands-on demonstrations and in-person inspections
  - Modeling/ Analysis validating data
- Charging options and Infrastructure Need on-site
- Awarded for FTA Low-No Emissions grant
- Long term modeling and case study of further implementation.

# Electric Relief Cars

- What is a relief car?
- How often are they used?
- Does anyone see these vehicles?



# Added RFP language for future procurements

- Considering electric vehicles for future procurements
- Transit service vehicles fit well with electric vehicle applications



RFB TO-19-03  
Service Vehicles

October 22, 2018

**Request for Bids TO-19-03**  
Service Vehicles

Topeka Metropolitan Transit Authority (Metro) is requesting bids from qualified firms to provide two (2) vehicles of standard manufacture that are of crossover type. This is a one-time vehicle purchase; Metro will issue a purchase order for the vehicles upon contract award.

**Background**

Metro currently has a fleet of service vehicles that are in use. We are planning to purchase (2) two standard manufacture crossover type vehicles to replace some of our current vehicles and add them to our service fleet.

**Specifications**

All vehicles must meet or have the following specifications or features

Basics

- Model Year ----- 2018 or newer
- Mileage ----- 0

Technical

- Drivetrain ----- AWD
- Transmission ----- Automatic
- Fuel ----- Unleaded regular, hybrid or electric

Body Exterior Features

- Door Handles ----- Black in color
- # of Doors ----- (4) four
- Color of Vehicle ----- White
- Door Mirrors ----- Power operated

Seats & Trim

- Seating Capacity ----- (5) five
- Front Seats ----- Power operated
- Windows ----- Power operated
- Floors ----- No carpet, only mat flooring
- Cargo Storage ----- Concealed, or covered option

Security & Safety

- Security System ----- Standard
- Door Locks ----- Power operated
- Traction Control ----- Standard
- Windows ----- Light-tinted
- Back-up Camera ----- Standard
- Additions ----- Emergency strobe lighting in the front and rear of the vehicle (See Appendix 1 for examples)

Convenience Features

- HVAC System ----- Standard
- Windows ----- Power operated

Service VehiclesPage 1

# Transit Specific Electric Rate

- For all transit agencies in Westar area
- Uses night surplus energy
- No demand charges
- ¼ of the energy costs

No supplement or separate understanding shall modify the tariff as shown hereon.

Sheet 1 of 3 Sheets

ELECTRIC TRANSIT SERVICE

AVAILABLE

Electric service is available under this schedule at points on Company's existing distribution facilities.

APPLICABLE

To any non-residential customer using electric service for the exclusive use of charging electric public transit vehicles, supplied at one point of delivery for which no specific schedule is provided. This schedule is not applicable to backup, breakdown, standby, supplemental, short term, resale or shared electric service.

NET MONTHLY BILL

BASIC SERVICE FEE

\$29.00

ENERGY CHARGE

Off-Peak Period

2.0847¢ per kWh

On-Peak Period

14.2257¢ per kWh

Plus all applicable adjustments and surcharges.

MINIMUM MONTHLY BILL

The greater of the Basic Service Fee or the minimum amount specified in the Electric Service Agreement, plus applicable adjustments and surcharges.

# Transit Specific Electric Rate

- On-peak, off-peak rate design

No supplement or separate understanding shall modify the tariff as shown hereon.

Sheet 2 of 3 Sheets

ELECTRIC TRANSIT SERVICE

ADJUSTMENTS AND SURCHARGES

Other Adjustments and Surcharges

The rates hereunder are subject to adjustment as provided in the following schedules:

1. Retail Energy Cost Adjustment
2. Property Tax Surcharge
3. Transmission Delivery Charge
4. Environmental Cost Recovery Rider
5. Renewable Energy Program Rider
6. Energy Efficiency Rider
7. Tax Adjustment

Plus all applicable adjustments and surcharges.

DEFINITIONS AND CONDITIONS

1. The above rates shall apply as follows:
  - a. On-Peak Period shall include energy consumed Monday through Friday, from 6:00 a.m. through 6:00 p.m. excluding the holidays included in the Off-Peak Period.
  - b. Off-Peak Period shall include all other times of the year, including New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.
2. Facilities subject to this rate shall be separately metered.

# Hands-on demonstrations and in-person inspections

- Have had demos from
  - Proterra
  - BYD
  - CCW
  - New Flyer
  - Gillig
- Modeling/ Analysis validating data from current Low-No Grant partner
- Visiting existing transit properties currently running electric buses: Louisville, KY and Columbia, MO



PROTERRA



NEW FLYER OF AMERICA



*Build Your Dreams*

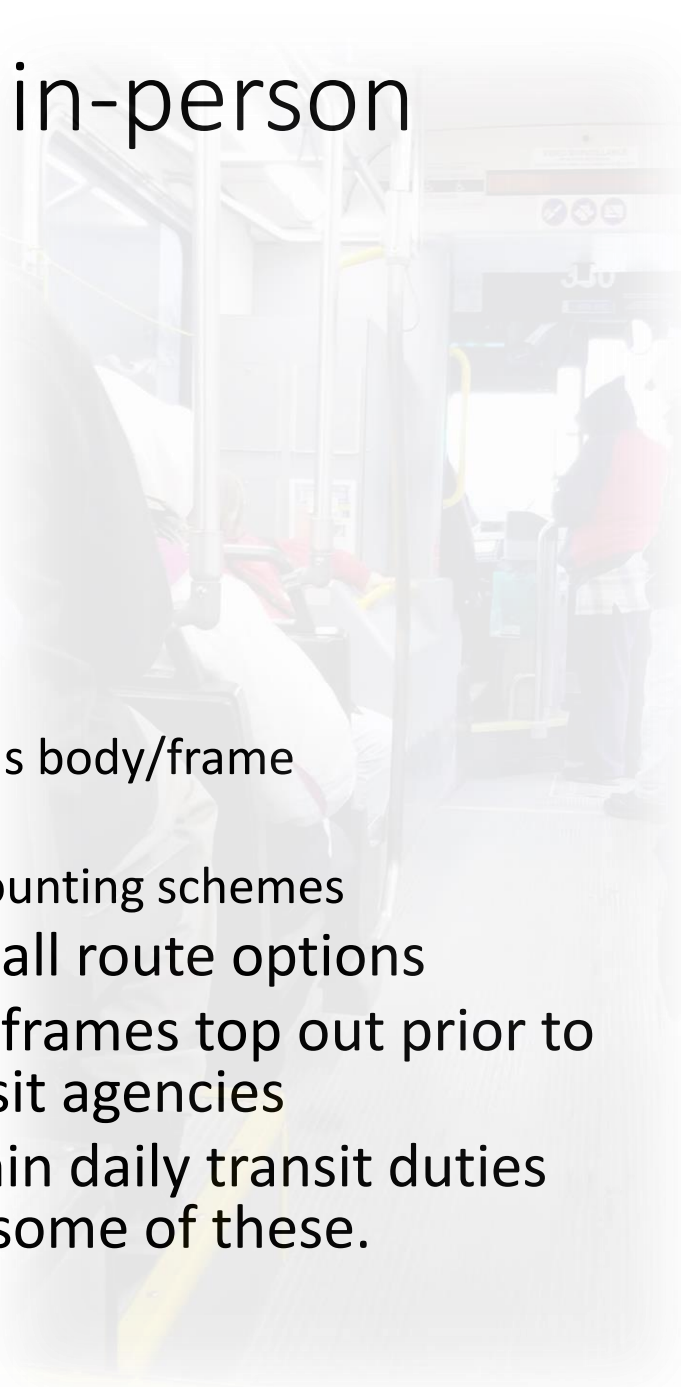


COMPLETE COACH WORKS



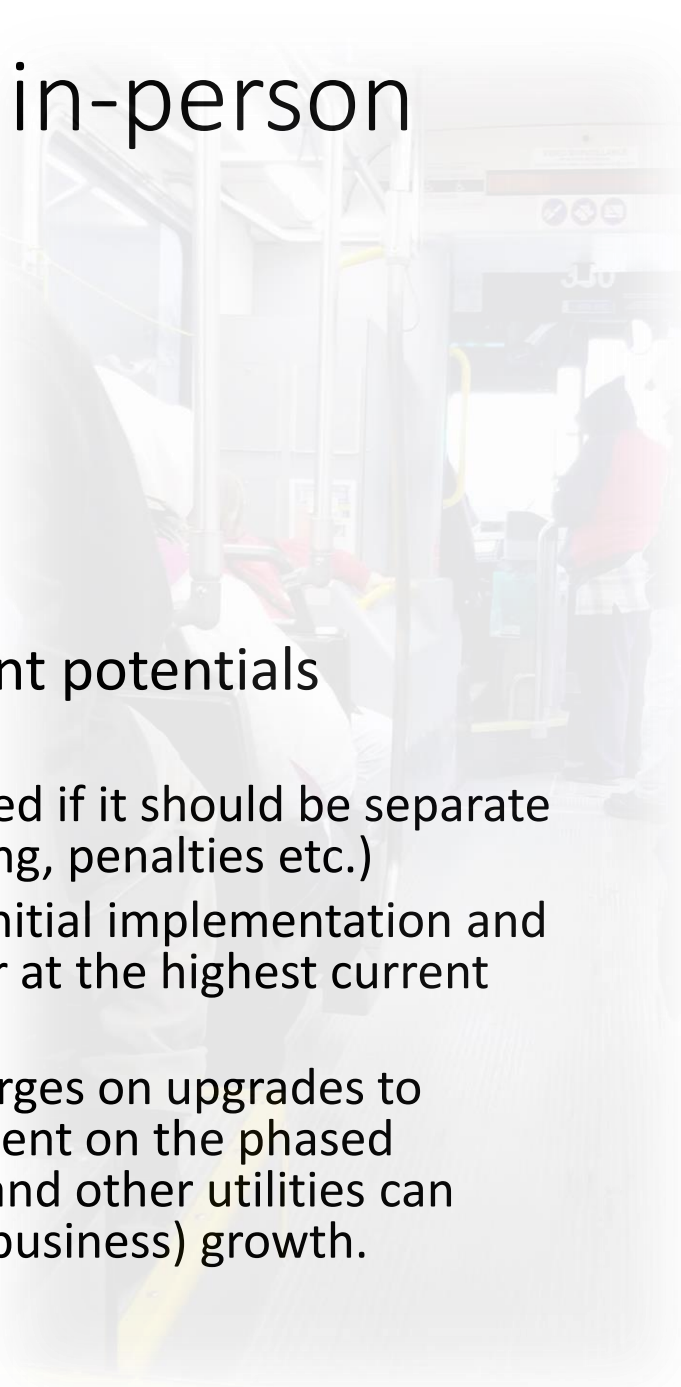
# Hands-on demonstrations and in-person inspections

- What are we finding?
  - Not all brands are created equal.
  - Many startups
  - Different approaches
    - Innovative materials
    - Rebuilt existing buses
    - Same build of existing diesel/CNG bus body/frame
    - New players from related industries
    - Different battery chemistries and mounting schemes
  - Range limitations for “entirety” of all route options
  - Weight capacity limitations of bus frames top out prior to existing range needs of many transit agencies
  - Specific applications and runs within daily transit duties fit electric buses well. Topeka has some of these.



# Hands-on demonstrations and in-person inspections

- Charging options
  - On Route
  - At passenger depot
  - In bus barn, during day
  - In bus barn, overnight
- Identifying needs and validating current potentials
  - Worked with Evergy system planners
  - Met on site, walked connections, discussed if it should be separate service to eliminate rate challenges (timing, penalties etc.)
  - Had them run several scenarios (partial initial implementation and then worst case, every bus with a charger at the highest current power rating within reason.
  - Be prepared to coordinate for partial charges on upgrades to transformers or system upgrades dependent on the phased implementation of a larger fleet. Evergy and other utilities can sometimes justify certain costs for load (business) growth.



# Awarded 2019 FTA Low-No Emissions grant for (3) 35' buses

- The next step beyond testing, analyzing and improving the fuel costs is the initial procurement
- Utilizing FTA funding, common transit practice
- Offered annually
- Highly competitive
- Favoring small urbans like Topeka recently
- Typically one per state gets award

# Long term modeling and case study of further implementation

- Initial study and modeling has given high level certainty that electric buses can be implemented, AS-IS, with current technologies in certain applications
- Now Metro is looking to do further long-term study to identify what needs to be done operationally and to the larger facility wise to implement larger numbers of buses
- In addition, we need to run potential futures seeing how scheduling and charging needs to change with larger numbers of buses in play
- Metro needs to be identifying for future plans, grants and strategic changes/plans

# Thank you!

- Questions? Follow up inquiries:

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