NC STATE UNIVERSITY

SUSTAINABLE FLEET TECHNOLOGY CONFERENCE & EXPO 2021

Session #11: Future Proofing Electric Charging Infrastructure

October 19, 2021

NC CLEAN ENERGY TECHNOLOGY CENTER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUSTAINABLE FLEET TECHNOLOGY
WEBINAR SERIES 2021

Sessions through December 09, 2021

SUSTAINABLE FLEET TECHNOLOGY
CONFERENCE & EXPO 2021

Sessions September 09, 2021 – October 19, 2021

https://www.sustainablefleetexpo.com/

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SFT Conference Series Upcoming Sessions

- 10/21: Best Practices of the Top Green Fleet Winners 2021
- 11/04: Product Feature--Sustainability Starts Here: XL Fleet Electrified Drivetrains
- 11/09: Electric Vehicle Use Case Deployment Examples
- 12/02: EPA SmartWay Technologies and Success Stories
- 12/09: Green Garage Winners Announcement 2021

2021 SFT Conference Series Sponsors


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Format

- Q&A at the end
- Submit questions and comments to “Panelists”
- Scheduled for 2:00p-3:30p
- Handout
- Recording

https://awards.nafa.org/

Accepting applications through October 29th.

NC CLEAN ENERGY TECHNOLOGY CENTER

Future Proofing Electric Charging Infrastructure
October 19, 2021

2:00-2:07 **Rick Sapienza NCCETC**--Introduction & Welcome

2:07-2:19 **Rick Azer, Black & Veatch**—8 Steps to Fleet Electrification

2:19-2:31 **Ian Beil, Portland General Electric**—Electric Island

2:31-2:38 **Allen Goetz, Gilbarco Veeder-Root**—e-Mobility Solutions

2:38-2:45 **Warren Williams, Fuel Force**—The Challenges Integrating EV Charging into Fleet Fuel Management

2:45-2:57 **Jared Walker, The Electrification Coalition**—Future-Proofing EVSE

2:57-3:10 **Jeff Benavides, Orange County Government FL**—Passport to Sustainability & Resilience

3:10-3:30 Q&A

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Driving Clean Air & Renewable Energy
CleanTransportation.org
Supported by the NC Clean Energy Technology Center with funding from the North Carolina Department of Transportation

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Clean Transportation Program
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twitter.com/nccleantech

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Rick Azer
AzerRE@bv.com

- Associate Vice President of Strategy and Innovation at Black & Veatch
- Founding Member of Growth Accelerator – a team that champions cultural innovation and technological disruption
- Works to commercialize new technologies and service offerings that extend the company's position as a leader in critical human infrastructure, with a focus on resilient, sustainable technologies
- Led advanced transportation initiatives, including a nationwide network of high power EV Charging stations along with projects related to the implementation of connected, autonomous vehicle and smart city mobility infrastructure
- Prevoius time at Qualcom and served as Chair of the Board of Directors at Cleantech San Diego
- Bachelor of Science in Environmental Design from ASU and a MBA from Washington University, Saint Louis

8 Steps to Fleet Electrification

Rick Azer

Black & Veatch

Black & Veatch Today – 105 Years of Innovation

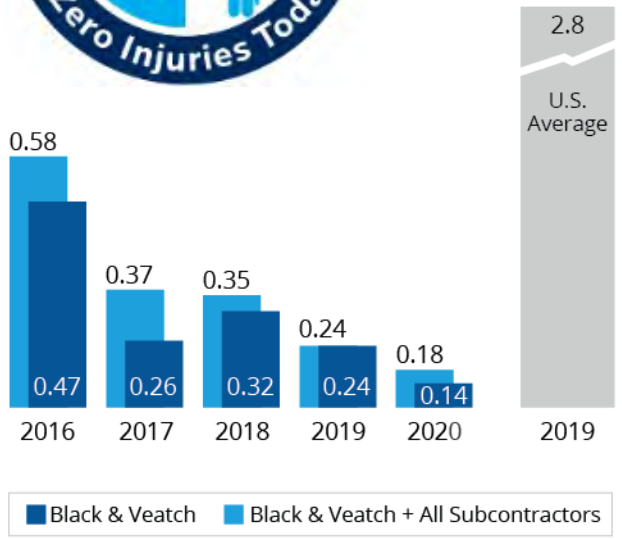
HUMAN RIGHTS CAMPAIGN FOUNDATION
BEST PLACES TO WORK
2021 for LGBTQ Equality
100% CORPORATE EQUALITY INDEX

EDISON AWARDS
GOLD
2016 WINNER

CEO ACTION FOR DIVERSITY & INCLUSION

- 8,300+ professionals
- $3.0 billion in 2020 revenue
- Work in 100+ countries on six continents
- Consistently high industry rankings in Power, Telecom, Water and more

Think · Plan · Act
Zero Injuries Today



Everybody returns home safely each day

Black & Veatch: Innovating for Over 100 Years

Our work in Transportation Decarbonization

Renewable Energy

Battery Energy Storage

Hydrogen Refueling

High-Powered Charging

- Strategy, planning, design, engineering, permitting through construction of **EV charging and H2 fueling at scale**
- Communications, renewables, energy storage integration and resilient microgrids
- Clients: Public & Private Fleets, Utilities, Vehicle OEMs, Charging Networks, Developers
- **Focus on safety, speed, and quality**

1400+
EV Charging Sites Deployed

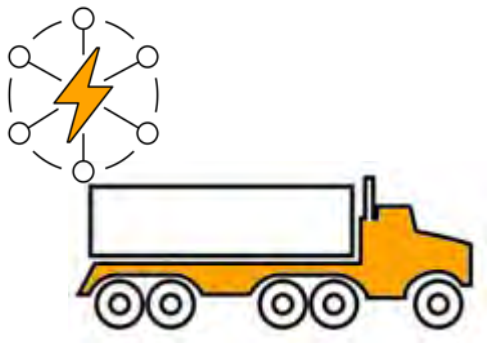
120+ MW
Transit & Fleet Charging Engaged

150+ MWh
Behind-the-Meter Battery Installations

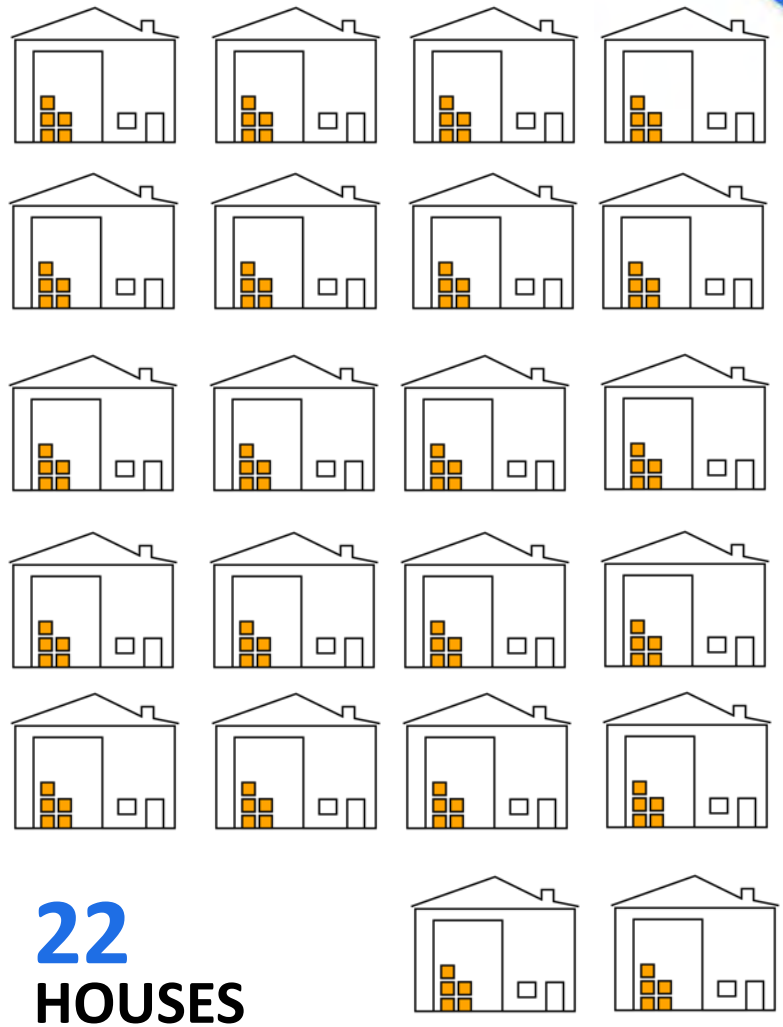
25,000 MW
Solar Capacity Installed

Electricity Usage Comparison

Long Haul 220,000 kWh per Year



1
LONG HAUL TRUCK

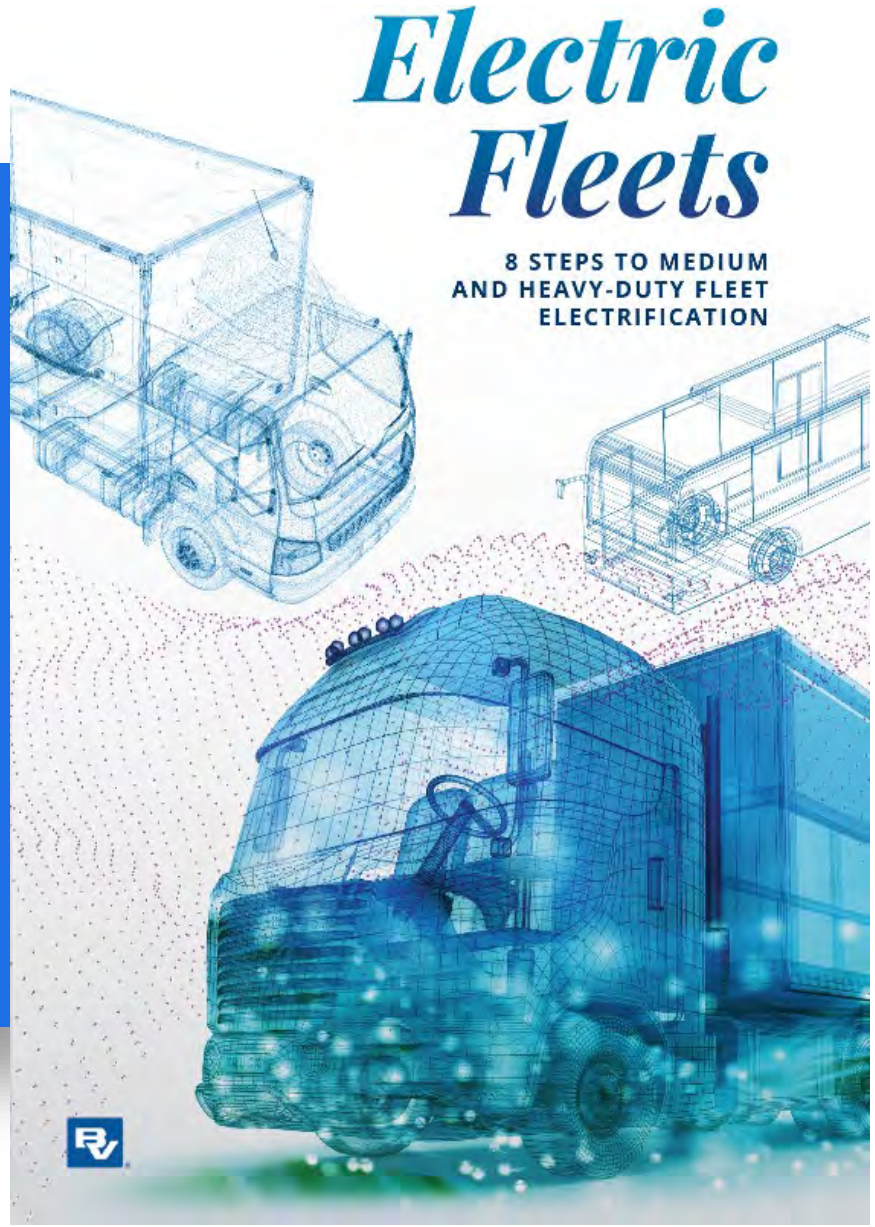


22
HOUSES

8 Steps To Fleet Electrification

1. Define Drive Cycles, Duty Cycles and Operational Considerations
2. Review and Select Technology Options
3. Understand Charging Loads and Power Delivery
4. Site Planning & Future Consideration
5. Conduct Utility Coordination, Engineering and Design
6. Apply for Permit and Approvals
7. Distribution Grid Upgrades
8. Obtain Equipment, Construct and Commission

Download the eBook: bv.com/ElectricFleets



Electric Vehicle Infrastructure Lessons Learned

MANAGE PROCESS, PERMISSIONS & BUY-IN

- Start early on EVERYTHING
- Interagency agreements and approvals
- Consider grants, incentives and funding
- State environmental impact filings
- Sort applicable terms and conditions
- Differences between vehicles, infrastructure and deployment services
- Consider future needs in initial design
- Utility load letters right of way, and service agreements
- DOT and city approvals, special permits
- Building and electrical permits (can expire!)
- Facility & Energy Managers

Public and Private Fleets have different sets of stakeholders

Electric Vehicle Infrastructure – Controlling Project Costs

Change and risk are expensive

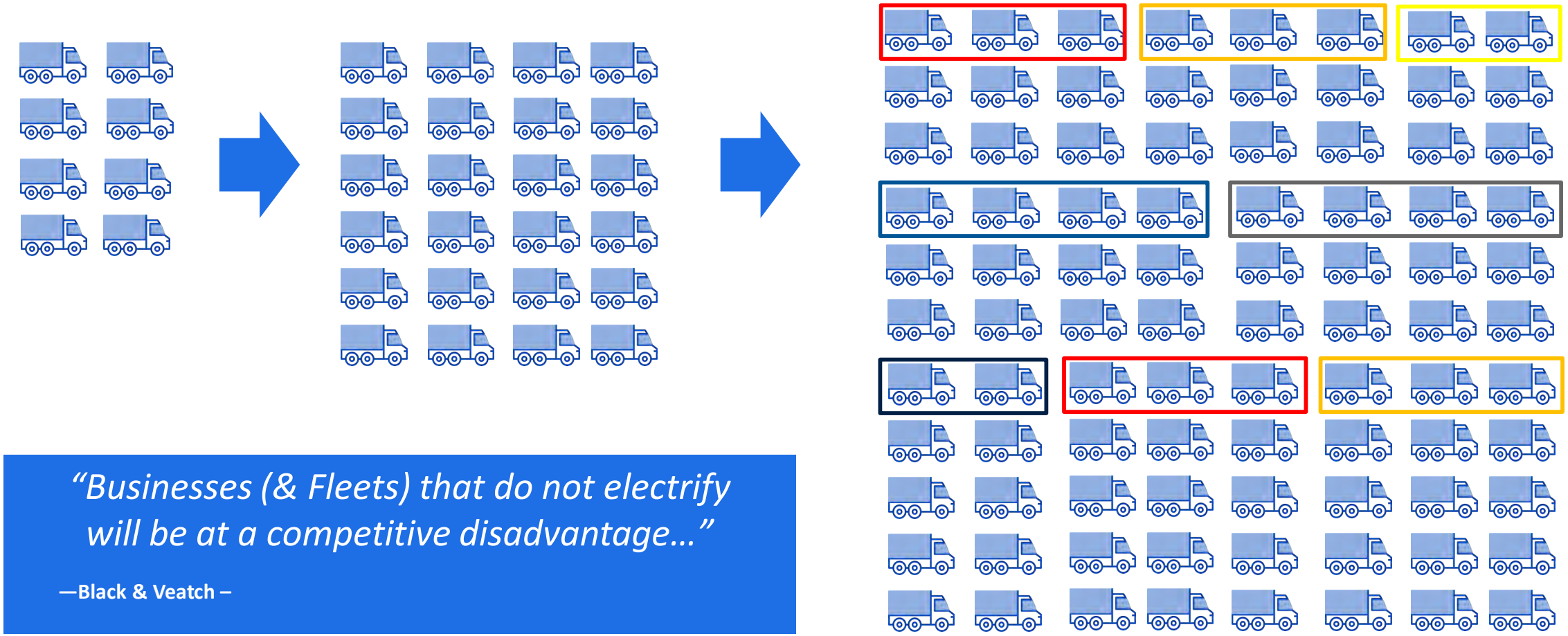
- Quality information drives design certainty
- Design certainty drives deployment cost certainty
- Develop execution strategies to reduce risk
- Plan for unknowns

Project delays are expensive, vehicles that can't charge and expedited construction are more expensive!

- Power delivery per facility
- Understand and manage entire supply chain
- Understand all required approvals (internal/external)
- Understand and plan for contracts and legal process

Site feasibility, power delivery, equipment lead times, design approvals

Pilot While Planning for Scale



"Businesses (& Fleets) that do not electrify will be at a competitive disadvantage…"

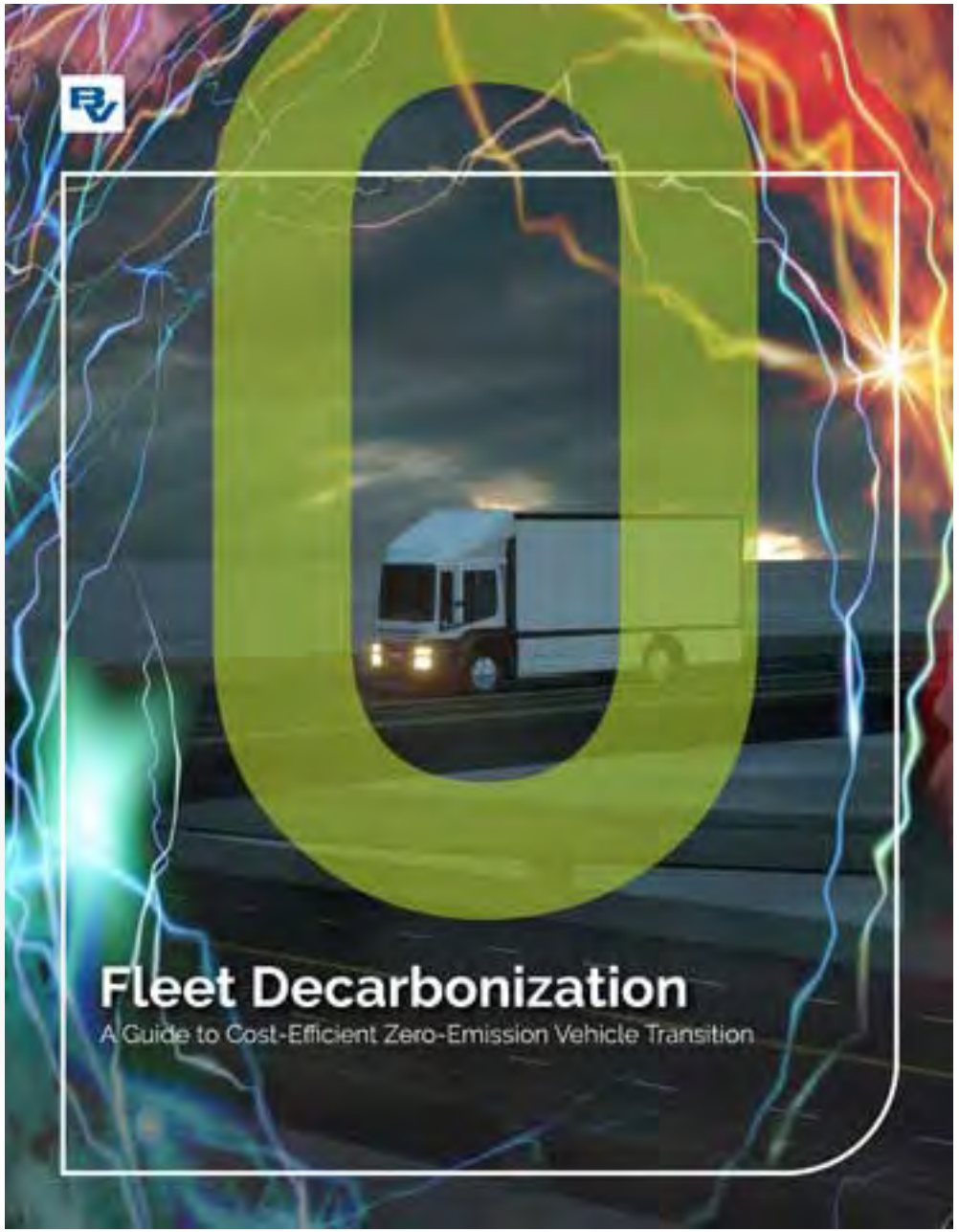
—Black & Veatch –

Modular, least regret infrastructure investment program (Fleets & Facilities)

Learn more in our latest Black & Veatch eBook

Available at:

bv.com/eBooks



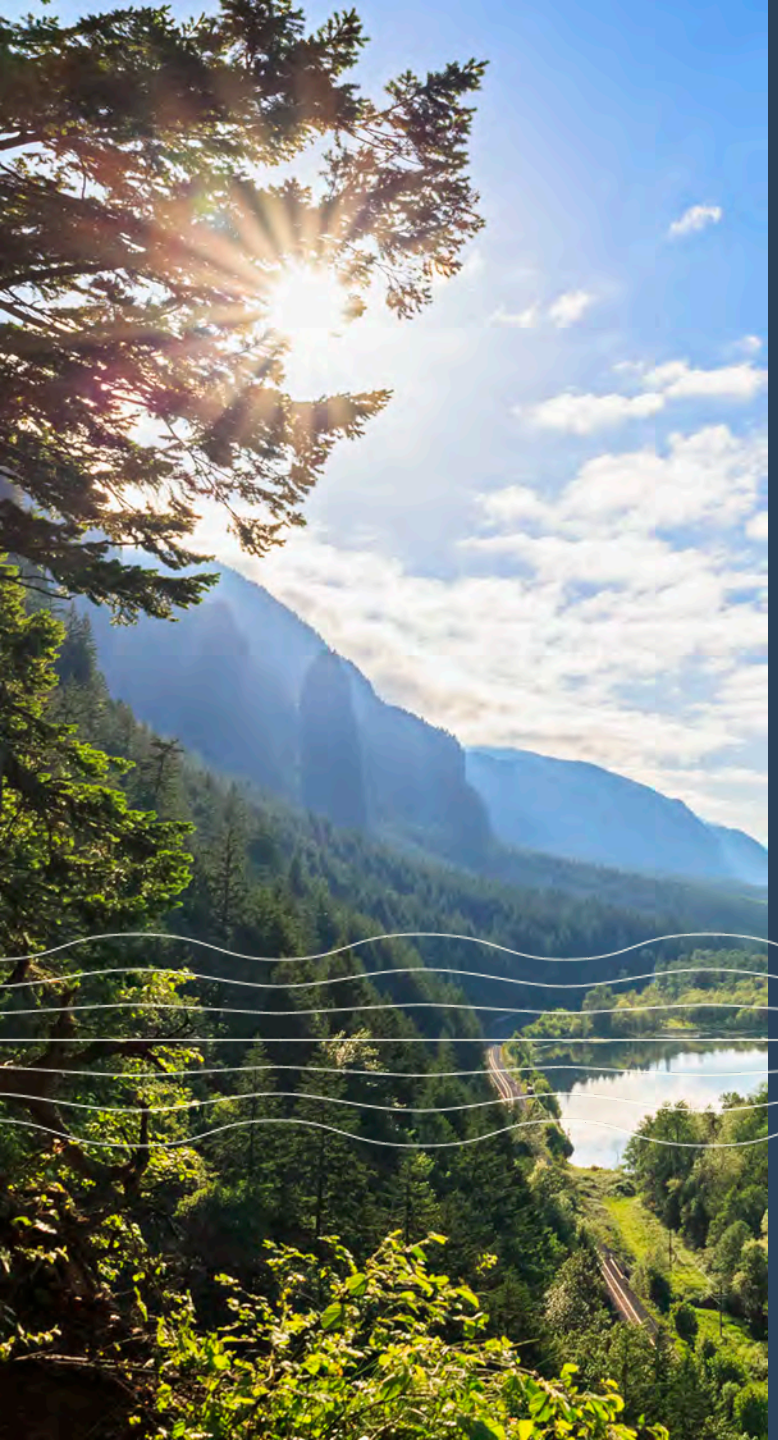
Building a World of Difference.®

Rick Azer, Black & Veatch
AVP Strategy & Innovation
AzerRE@BV.com

Electric Island Video

Ian Beil
Ian.Beil@pgn.com

- Grid Edge Engineer for Portland General Electric
- Work focuses on incorporating energy storage and electric vehicle technologies into the power system
- Adjunct faculty member of PSU's Maseeh College of Engineering
- Licensed Professional Engineer, a member of the the IEEE Power & Energy Society, and a sub-group lead for the NERC System Planning Impacts from Distributed Energy Resources working group
- BS in electrical engineering from Washington University, St. Louis and an MS and PhD in electric engineering from the University of Michigan, Ann Arbor



Sustainable Fleet Technology Conference & Expo 2021:

EVSE Future Proofing

October 19, 2021

Ian Beil, PhD, PE
Grid Edge Engineer
Portland General Electric

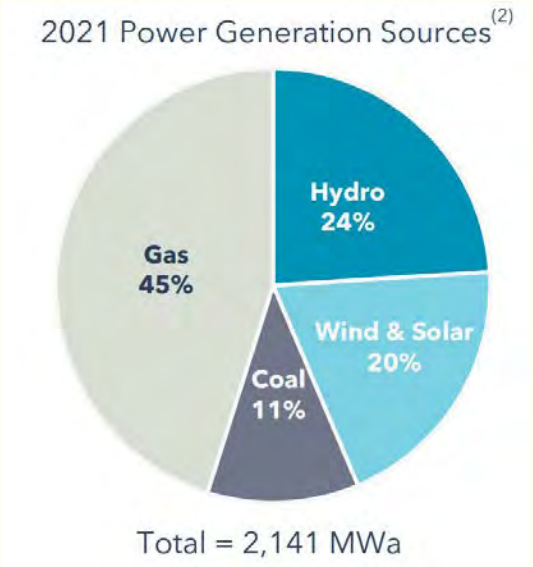
PGE at a glance

Quick facts

- Vertically integrated electric utility encompassing generation, transmission and distribution
- 900,000 retail customers within a service area of 2 million residents
- 46 percent of Oregon's population lives within PGE service area, encompassing 51 incorporated cities entirely within the State of Oregon
- 75 percent of Oregon's commercial and industrial activity occurs in PGE service area

Leading the way to a clean energy future for Oregon

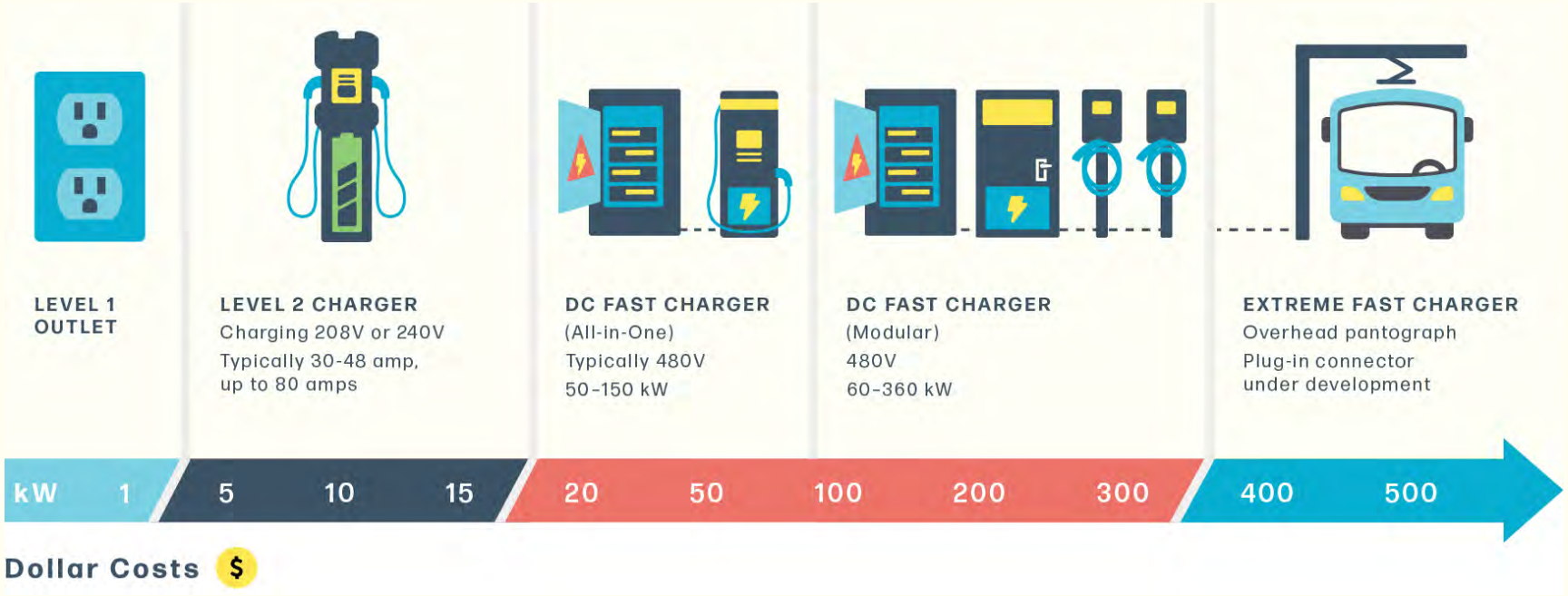
- Committed to 80% reduction in greenhouse gas emissions associated with electricity we serve our customers by 2030
- With PGE support, Oregon legislature recently approved HB2021, requiring utilities to provide 100% carbon free emissions by 2040.
- Continued commitment to advancing a sustainable future by joining The Climate Pledge



How to charge your fleet

Slow, overnight charging is the most cost-effective way to charge an EV:

- A lower charge rate means less expensive equipment and infrastructure.
- Customers benefit from lower demand and off-peak electricity pricing.
- By using charge management software, customers can optimize charging and further reduce costs.



Electric Island

PGE


CASCADIA
eM2


WERNER


AVAILABLE
AVAILABLE
PROTERRA
NAKADATE
PGE
DAIMLER


106739 1000
JCB

West Coast Clean Transit Corridor

- Initial study called for 27 charging sites spaced ~50 miles apart along I-5
- Additional sites proposed along major east-west highways
- WCCTC group is being reconvened for additional coordination efforts

https://westcoastcleantransit.com/

Let's Meet the Future Together

Allen Goetz
allen.goetz@gilbarco.com

- Market Development Manager at Gilbarco e-Mobility
- 14+ years of fleet/transportation industry experience
- Focused on bringing solutions to the vehicle electrification space
- Previous positions with major fuel card companies, software providers, and leaders in manufacturing

TRITIUM EVerse Amps2Go

Fueling the future, today.

GILBARCO VEEDER-ROOT

2021

e-Mobility Solutions

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Fueling the future, today.

GILBARCO VEEDER-ROOT

Gilbarco Veeder-Root | The Global Leader of Fueling Control

e-Mobility & ICE Fueling

We keep the world moving with the best fueling technology and services

GILBARCO VEEDER-ROOT

Fleet Markets Served

Mining

Construction

Rental

Aviation

Distribution

Defense

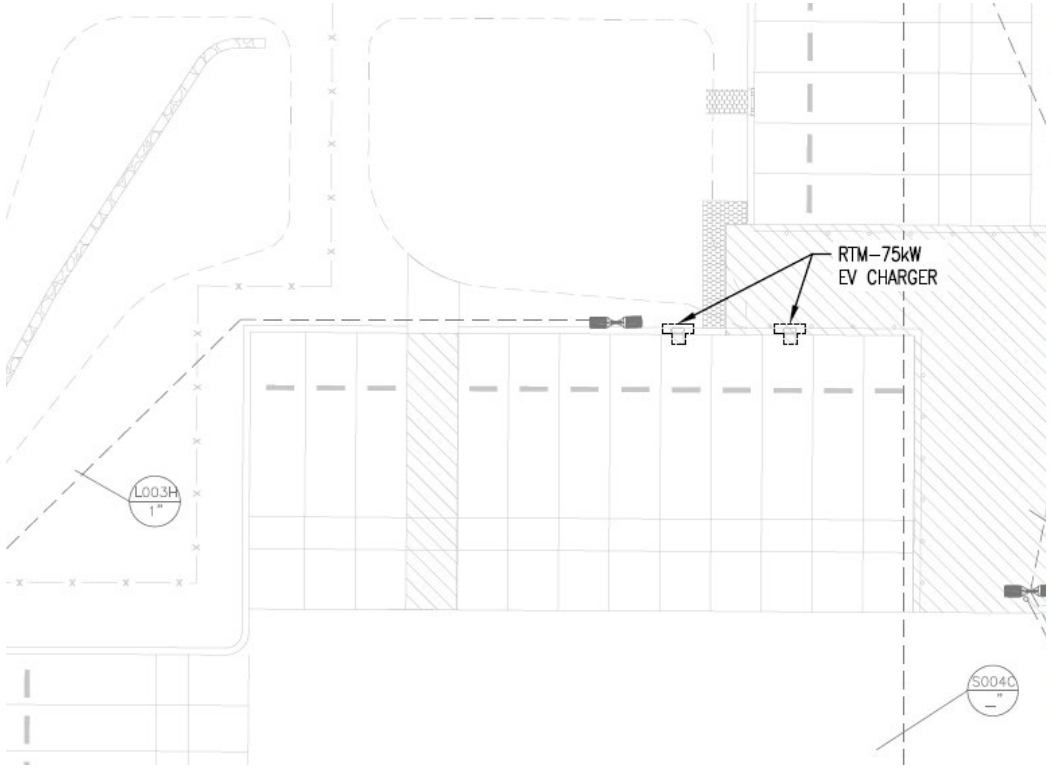
Marine & Ports

Transportation

Government

US: > 5,000 sites / 300k vehicles Globally: >10,000 sites / 2.5M vehicles

Fleet Markets Served



Gilbarco e-Mobility Charger located at Manhattan Beer Distributors

Gilbarco Veeder-Root e-Mobility Timeline

TRITIUM

October 2018

February 2020

driivz

Amps2Go

July 2020

Q2 2021

EVerse

GILBARCO VEEDER-ROOT

Gilbarco Veeder-Root is a total e-Mobility solutions provider

FLEXIBLE, SCLABLE TECHNOLOGIES

Software Solutions

GILBARCO VEEDER-ROOT

Why EV charging software?

When it comes to managing a fleet of electric vehicles, what's important?

EV charging software helps address the following important fleet needs…

1

Completing the Mission

- Vehicle Readiness
- Charger Uptime
- Scheduling
- Diagnostics
- Authentication
- NOC Support

2

Reducing OpEx

- Energy Management
- Consumption Reports
- LCFS Reporting

3

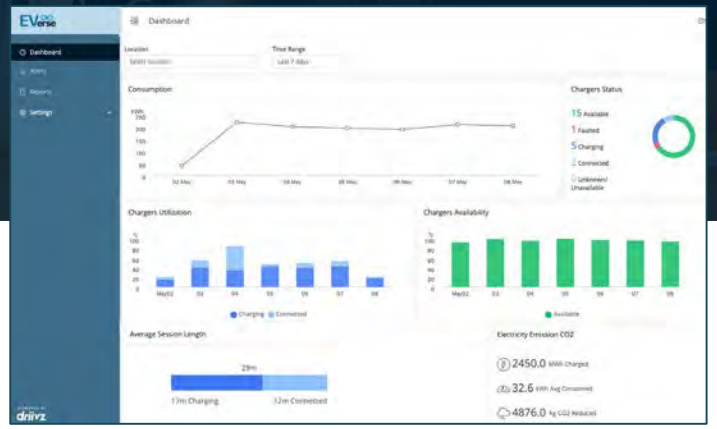
Management, Tracking, & Reporting

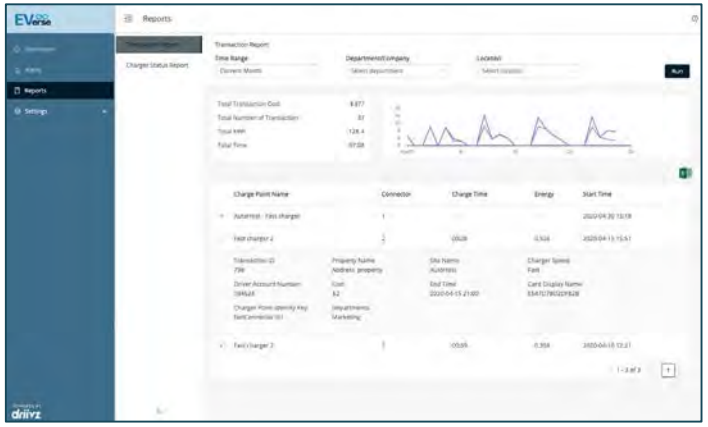
- Driver Management
- Analytics & Reports

GILBARCO VEEDER-ROOT

ENGAGE FLEET

Off-the-shelf EV charging solution for fleets





Software Tools/Features

Fleet manager dashboard to…

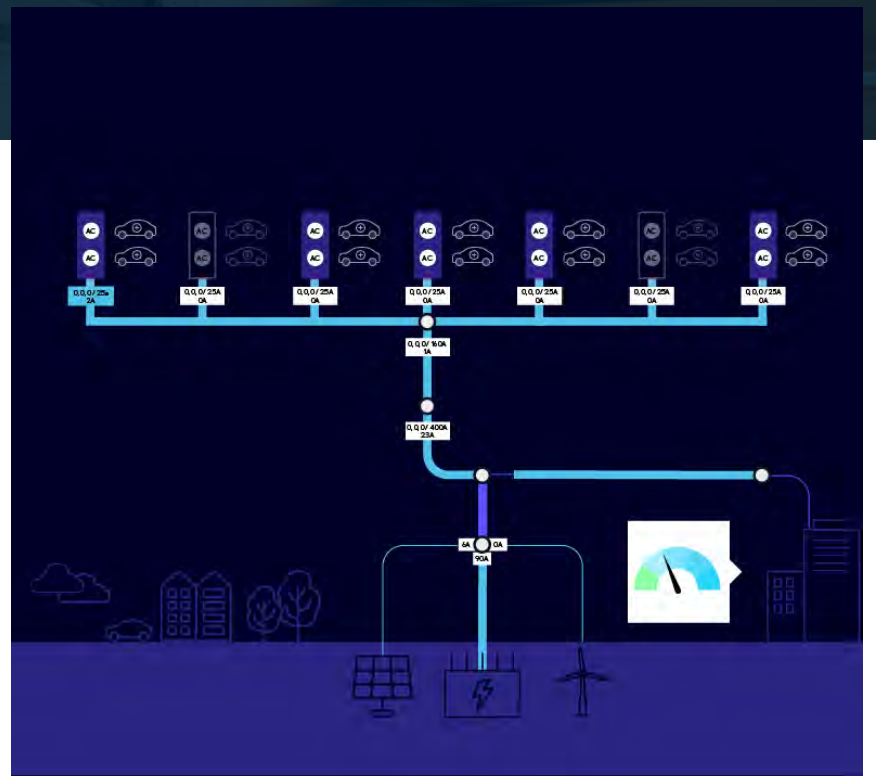
- ✓ Schedule charging sessions
- ✓ Real-time analytics & reporting:
  - Charger utilization/availability
  - Energy usage
  - CO2 emissions reduction
- ✓ Self-healing to automatically resolve issues without human intervention
- ✓ Alerts GVR if assistance is required
- ✓ *Supports any OCPP-compliant EV charger*

EVerse ENGAGE FLEET

Optional Energy Management Module

Energy Management Module

- ✓ Improves fleet charging efficiency and potentially reduces OpEx
- ✓ Monitor, manage, & adjust energy consumption
- ✓ Near real-time load balancing for single chargers, sites with multiple chargers, & sites with locally supplied electricity (renewables, microgrid, etc.)
- ✓ Smart demand response algorithm to lower consumption when grid is congested or prices too high
- ✓ Supports OpenADR demand management



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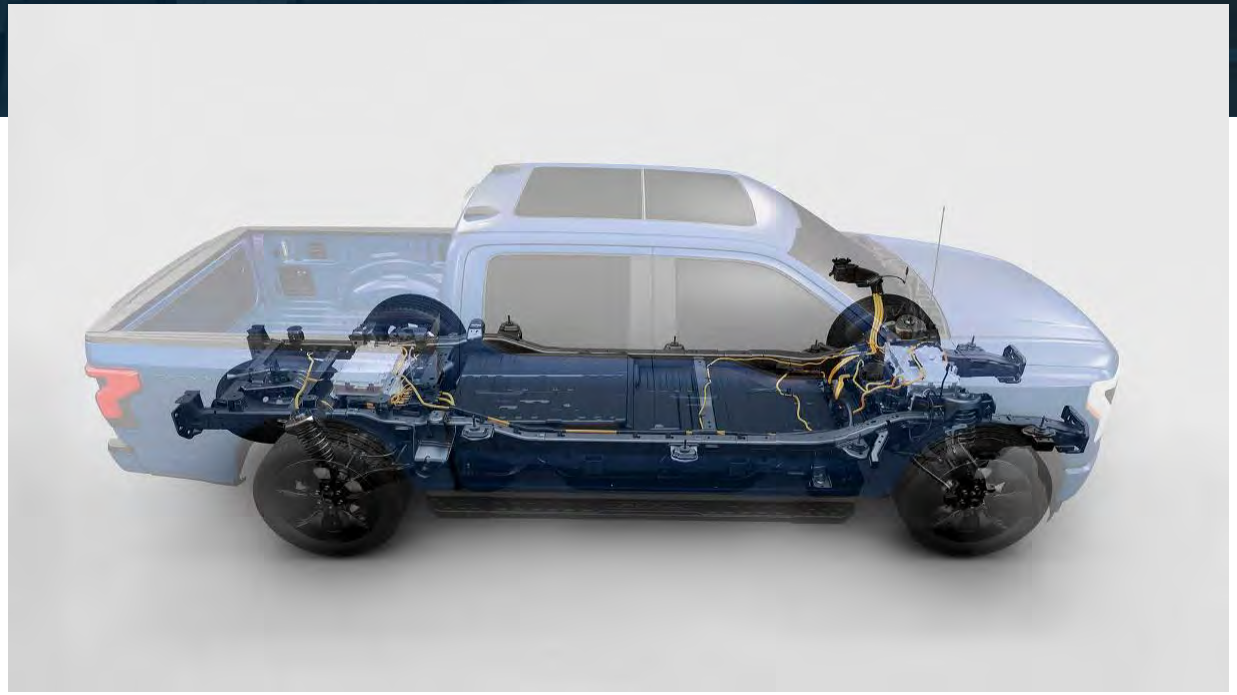
Amps2Go

Fleet EV Trends

Batteries are getting bigger & onboard chargers are too

Vehicle	Battery Size	Onboard Charger Max
Nissan Leaf (standard)	40kWh	6.6kW
Nissan Leaf (extended range)	62kWh	6.6kW
Ford e-Transit	64kWh	11.3kW
Lordstown Endurance	109kWh	11kW
Fort F150 Lightning (standard)	125kWh	19.2kW
Ford F150 Lightning (extended range)	155kWh	19.2kW



Amps2Go

Series F19

A rugged 19.2 kW Level 2 charger for behind-the-fence fleet charging – **ideal for light-medium duty electric trucks and electric school buses**

Series F19 has the same form factor as the Series F7, with a slightly larger head unit, and larger/ thicker cables

- ✓ Standard dual port configuration
- ✓ Compact form factor
- ✓ Commercial grade aluminum body
- ✓ Key FOB authentication
- ✓ Rugged, outdoor rated enclosure
- ✓ Full warranty replacement policy
- ✓ Multiple configuration options
- ✓ Smart charger, compatible with network SW for:

1. Fleet charging support: scheduling, load management, etc.
2. Energy management

GILBARCO VEEDER-ROOT

FLEXIBLE , SCALABLE TECHNOLOGIES

DC CHARGING SOLUTIONS

Universal | Liquid Cooled | Industry-best IP Rating (IP65)

50kW

Available Today

20-40 minute average charge time

50/75kW

Coming Soon!

Simultaneous charging

Modular from 50-75kW

175kW

Ultrafast Charge

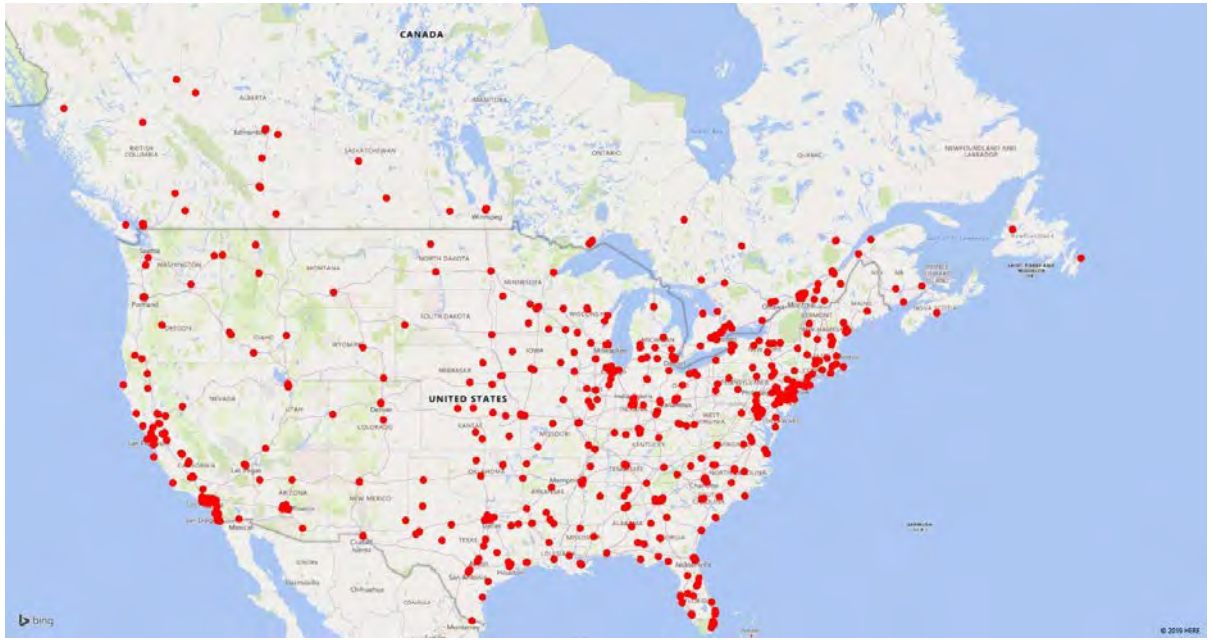
Fleet Markets Served

Gilbarco e-Mobility works with a variety of OEMs

Service Providers & Technicians

Gilbarco Veeder-Root's industry leading service and support team

- 600+ Gilbarco Service Contractors in North America
- Certified Technician Base
  - 2375+ Certified Techs



Site assessment & Installation

Gilbarco Veeder-Root's industry leading service and support team

- In-person site walk performed by authorized ASC to determine best location for siting charging to meet operational needs & reduce cost.
- Project Management process includes elements of permitting, site design, and coordination with local utilities for infrastructure upgrades (if needed).
- Construction scope covers an agreed upon schedule to meet customer needs.

Thank you

Fueling the future, today.

GILBARCO VEEDER-ROOT

FUELFORCE® EV
Integrated Management of EV Charging Systems

Warren Williams
warrenw@fuelforce.com

- Director of Marketing for Multiforce Systems and is a senior executive with a passion for making electric transportation an effective alternative for fleets
- Over 30 years of proven experience leading teams, building and delivering business results
- In-depth knowledge of the EV infrastructure space and a proven ability to evaluate, implement, and integrate complex technologies into a business environment and to communicate the value that such technologies can bring to a market
- Bachelor's Degree in International Relations, Minor in Economics from Brigham Young University and a Master's in Business Administration from San Francisco State University

FUELFORCE® EV
Integrated Management of EV Charging Systems

The Challenges Integrating EV Charging into Fleet Fuel Management

The Challenge of Multi-Fuel Management

- More and more, fleet managers are adding alternative fuel vehicles to their fleets: bio-fuels, CNG, LNG, hydrogen…

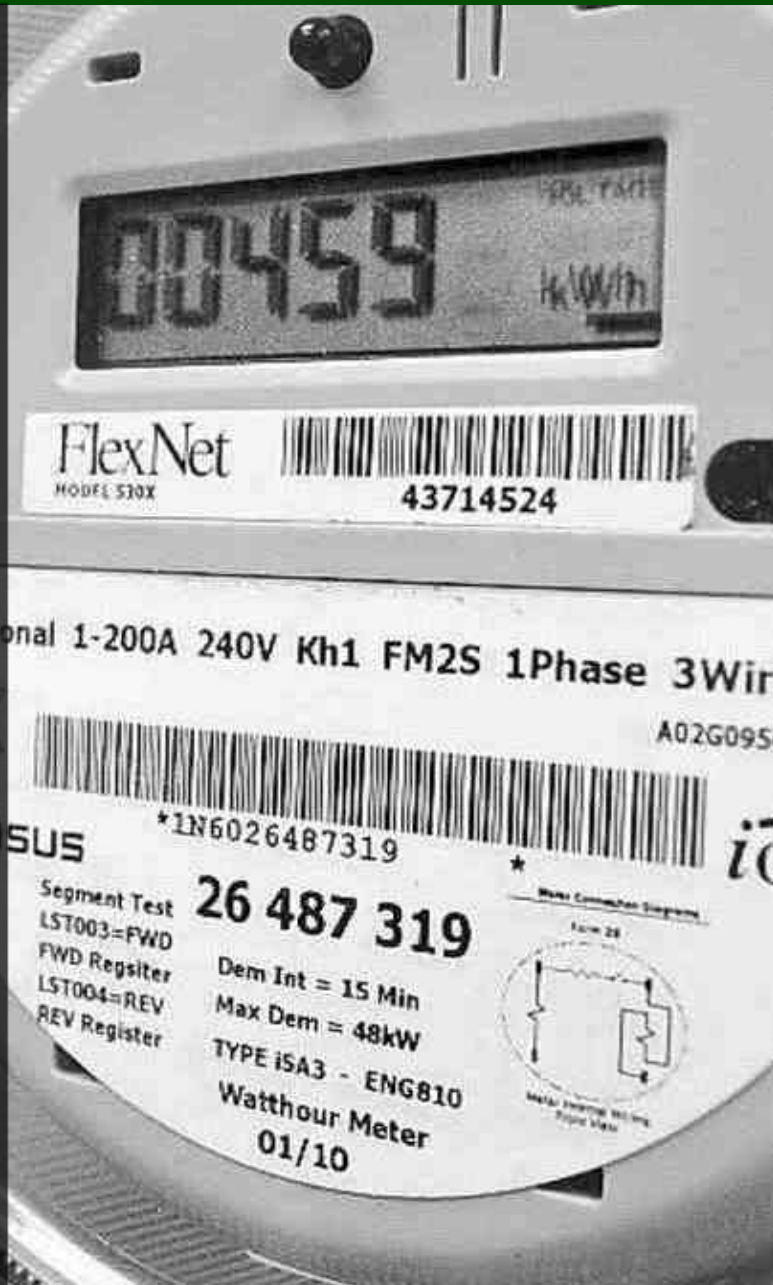
  … and now electricity.

- Each of these fuels bring unique value resulting in fleets using the right fuel for the right job.

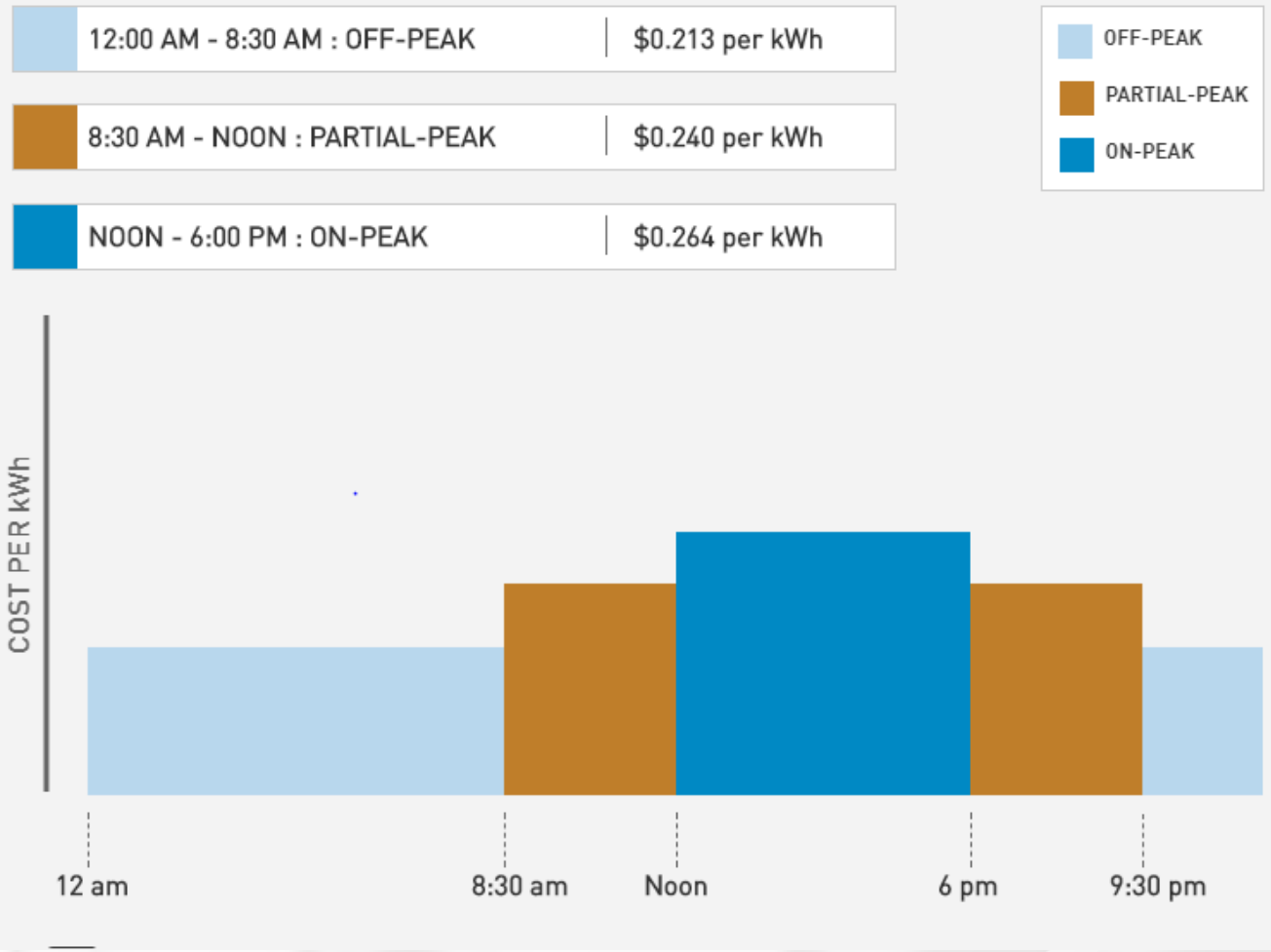
- However, this creates the need to effectively manage fuels of all types.

The Challenge of Managing EV Charging

- Electricity already has a delivery infrastructure
- KWh use buried in the electric bill, likely only seen by facility manager
- No transaction details
- No authorization rules
- Need the ability to manage electricity like “any other fuel”



Time of Use Billing

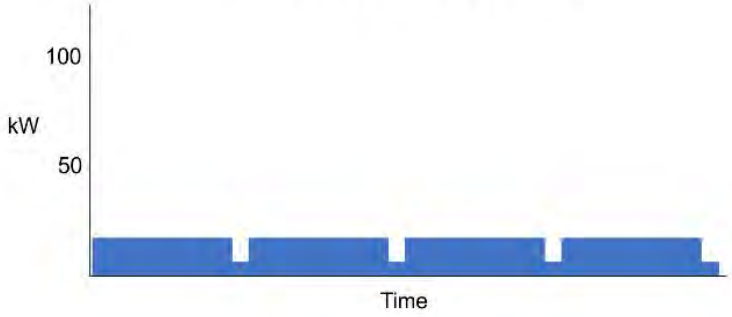


- A key challenge for fleet managers is that depending on the time of day, electricity costs can very dramatically.
- Most utilities have Time of Use billing tiers, with On-Peak, Partial-Peak, and Off-Peak pricing.

The Demand Charge Mystery

Company A

Monthly Energy Usage



Utility Bill

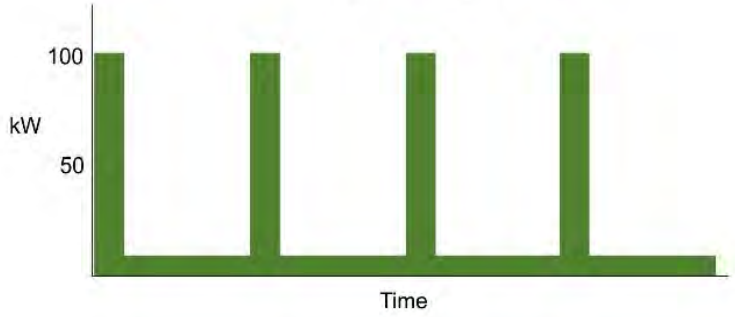
		Rate	Charge
Energy Consumption:	20,000 kWh	$0.10	$2,000
Peak Power Demand:	20 kWh	$16.00	$320
		TOTAL	$2,320

Demand Charges = 14%

of Company A's monthly electricity costs

Company B

Monthly Energy Usage



Utility Bill

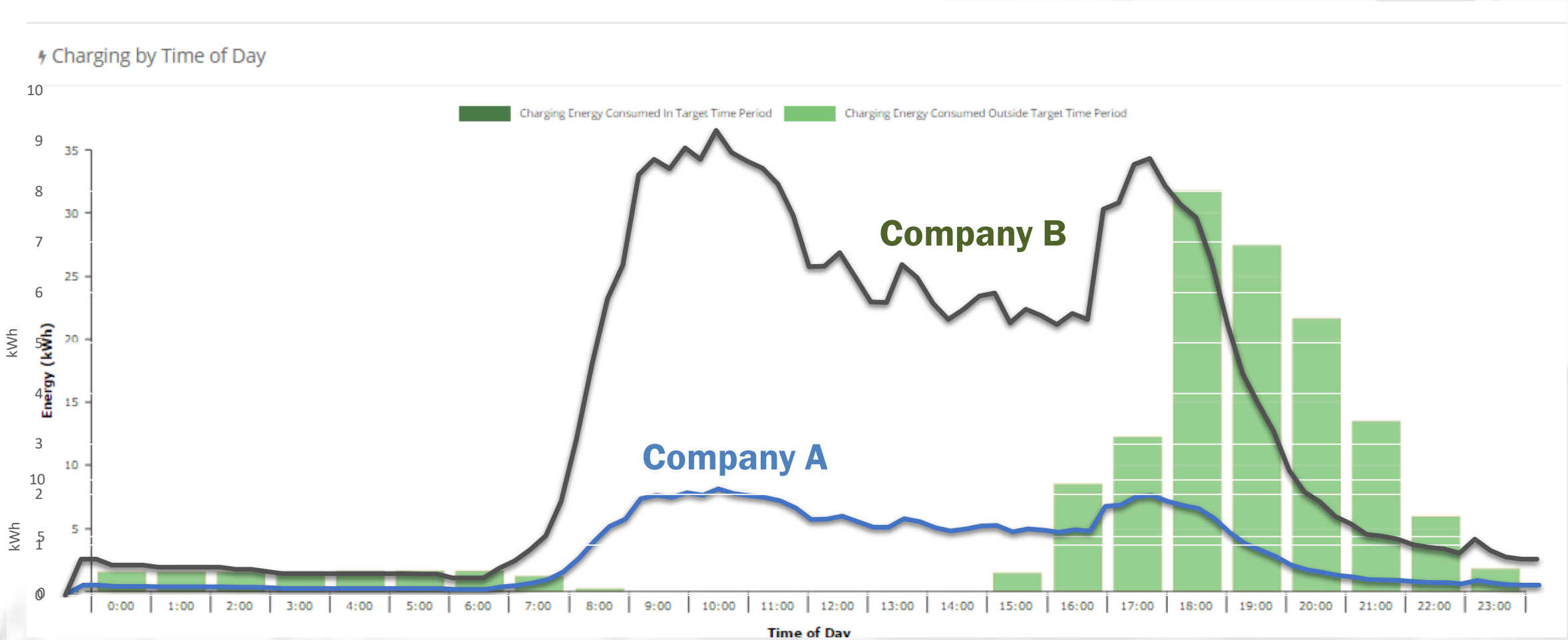
		Rate	Charge
Energy Consumption:	20,000 kWh	$0.10	$2,000
Peak Power Demand:	100 kWh	$16.00	$1,600
		TOTAL	$3,600

Demand Charges = 44%

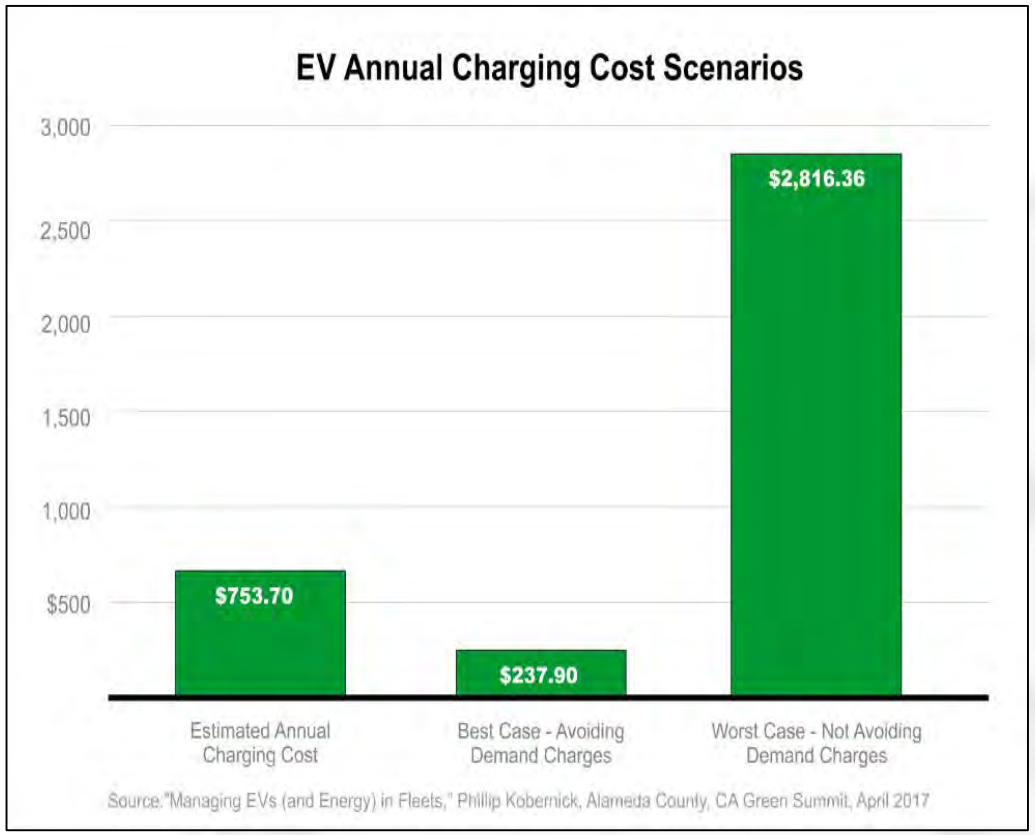
of Company B's monthly electricity costs

- These two companies have the same total electricity use, but vastly different usage patterns.
- The "pipe size" for the amount of peak power used is found in the demand charge portion of the bill.

EV Charging Impact on Demand Charges



EV Charging and Demand Charges

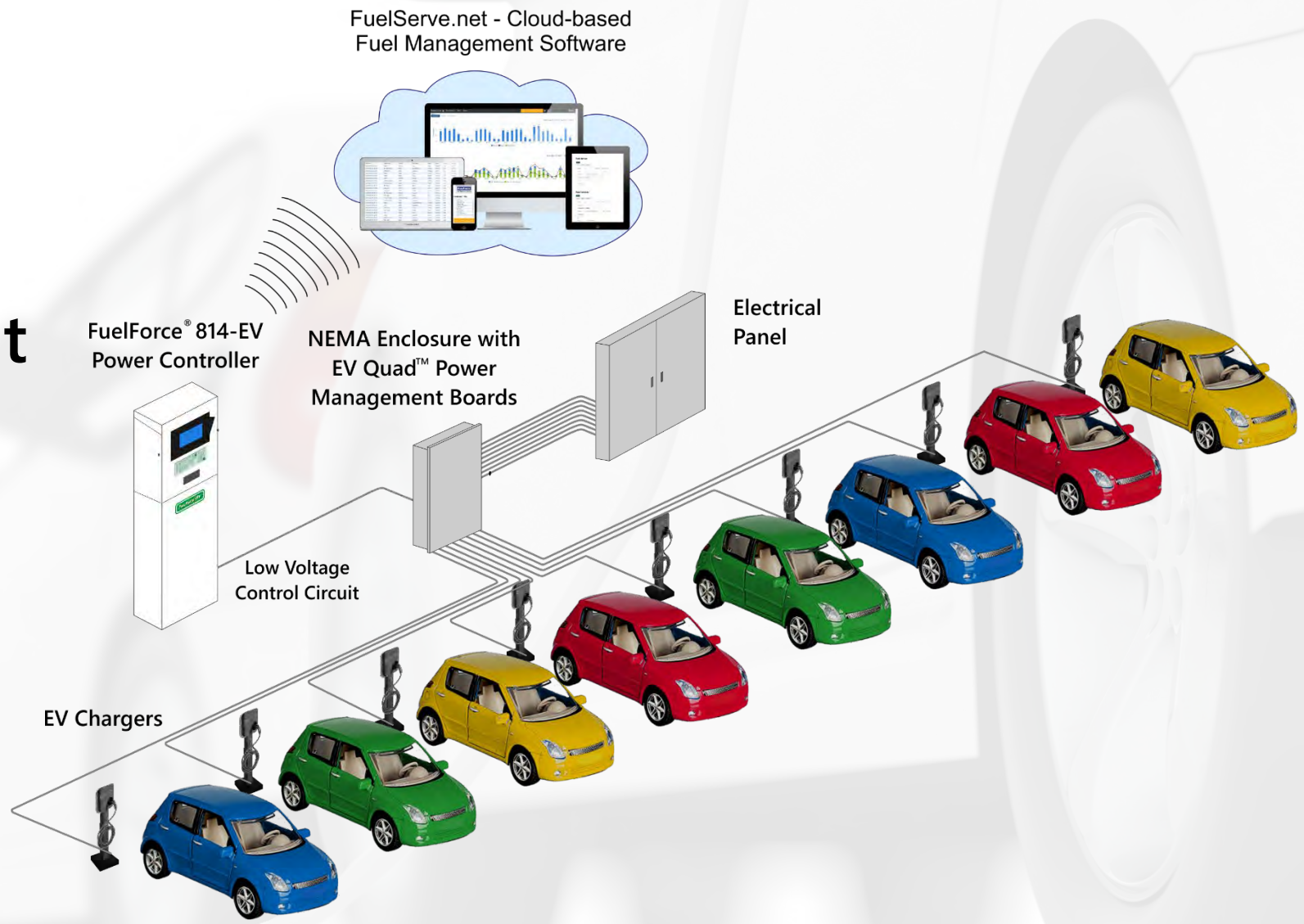


- Time of charging has a dramatic impact.
- Concentrated power demand can add to the peak assessment.
- Peak billing period lockout capabilities are needed to avoid excessive fees.

- Emphasizing the need to integrate fuel management system with advanced electrical power management.

Components of an Integrated Solution

- EV Chargers
- Power Controller
- Power Management Modules
- Electrical Panel
- Fuel Management Platform



The Goal - Integrated Reporting

FUELFORCE EV

Fuelissues

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« 1 2 3 4 ... 10 11 »

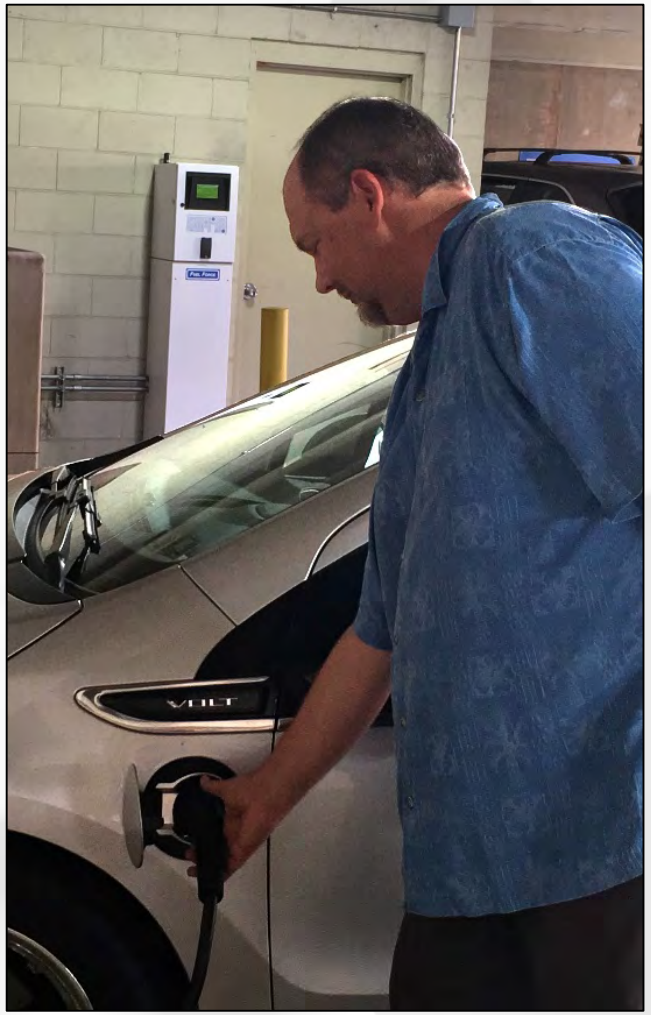
EV Charging Data
Integrated with Gasoline Fueling

Occurred	Department	Vehicle	Vehicle desc	Meter	Product	Quantity	Controller	Hose	Sequence
2017-09-19 15:00:11	60158	867		35849	UNL	18.56000	001	1	101432
2017-09-19 14:56:23	60158	867		35849	UNL	0.00000	001	2	101431
2017-09-19 14:46:43	(None)	EVCHARGER		0	KWH	1.83200	002	1	30
2017-09-19 14:19:45	60125	1315	FORD F250 PICKUP	15541	UNL	21.49000	001	1	101430
2017-09-19 14:02:28	(None)	EVCHARGER		0	KWH	0.26500	002	1	29
2017-09-19 13:58:33	60125	1159	REFUSE SCOOTER	3515	UNL	4.19000	001	1	101429
2017-09-19 13:56:59	60125	1159	REFUSE SCOOTER	3515	UNL	0.00000	001	2	101428
2017-09-19 12:56:09	60145	1077		44544	UNL	25.22000	001	1	101427
2017-09-19 12:55:14	(None)	EVCHARGER		0	KWH	0.00100	002	5	28
2017-09-19 12:53:26	(None)	EVCHARGER		0	KWH	0.00100	002	4	27
2017-09-19 12:51:29	(None)	EVCHARGER		0	KWH	0.00200	002	3	26
2017-09-19 12:49:28	(None)	EVCHARGER		0	KWH	0.00100	002	2	25
2017-09-19 12:48:13	(None)	EVCHARGER		0	KWH	0.00100	002	1	24

Case Study – Princeton University

Shifting Constituency Demands: Workplace vs. Fleet Needs

- Requests to provide the charging of employee-owned Electric Vehicles at work
- Budgetary restraints slowed the progress
- Found they could expand to existing FuelForce® Fuel Management System
- EV power management up and running within 60 days
- Integrated and reporting with both University fleet and Employee Vehicles



Princeton University Parking Garage

FUELFORCE EV

Princeton University Parking Garage

Princeton University Parking Garage

FUELFORCE EV

Jared Walker
jwalker@electrificationcoalition.org
678-938-4918

- Technical Lead of Fleet Electrification for the Electrification Coalition
- Previous experience with an international fleet consulting firm
- Experience with the development of creative financing mechanisms and unique fleet management services
- Passionate EV advocate

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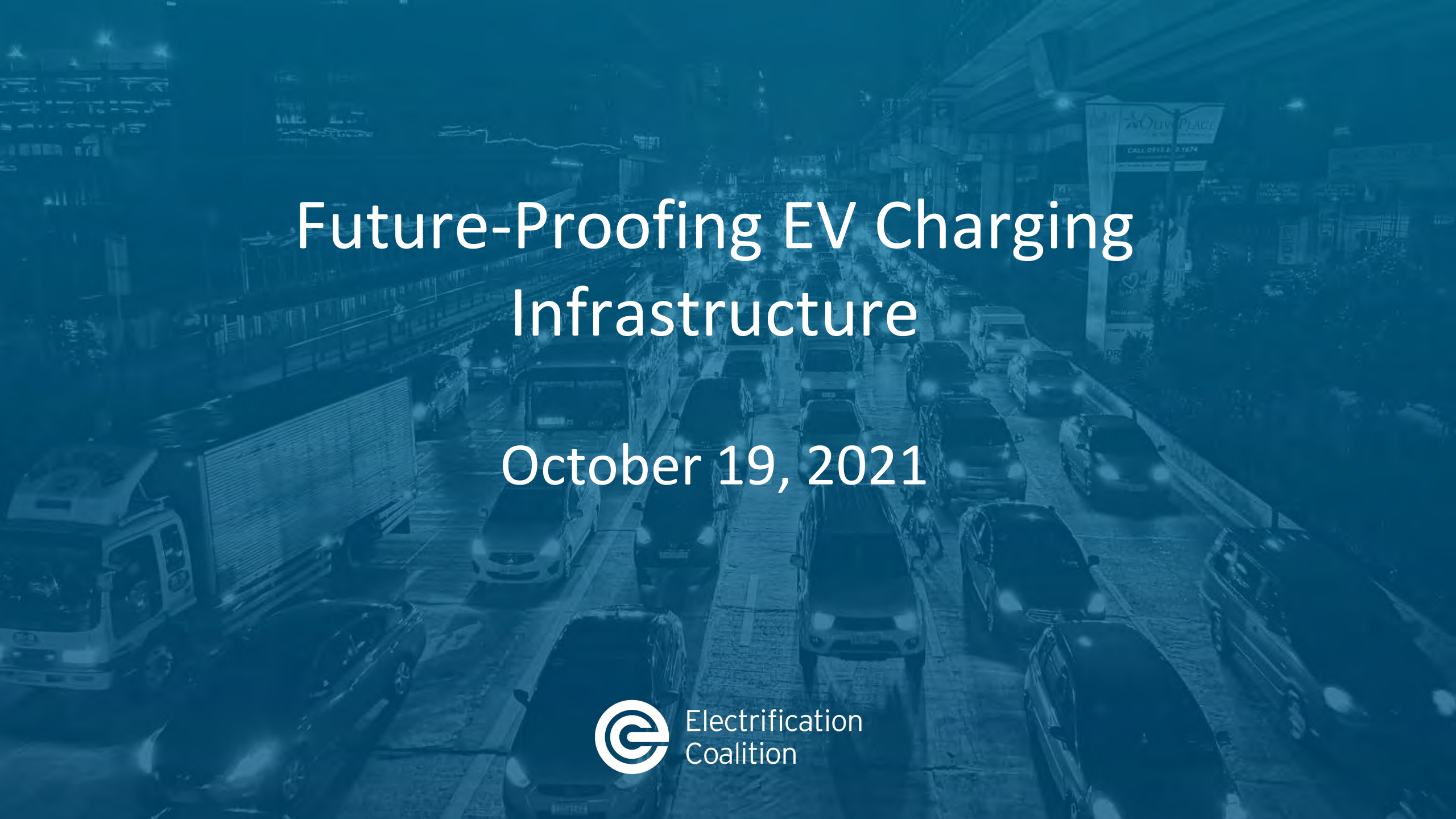


Future-Proofing EV Charging Infrastructure

October 19, 2021

Electrification Coalition

EV Adoption Programs Around the U.S.

The **Electrification Coalition** is a nonpartisan, not-for-profit group of business leaders committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale.

Technical Lead
Climate Mayors EV Purchasing Collaborative

State EV Policy Accelerator
NV, MI, PA, VA, NC

Electrification Advisor
Bloomberg American Cities Climate Challenge

Lead Electrification Partner
Smart Columbus

Project Lead
Drive Electric Northern Colorado

Pilot Program Leader
Freight and Goods Delivery Electrification

Electrification Coalition

EC City Policy Toolkit

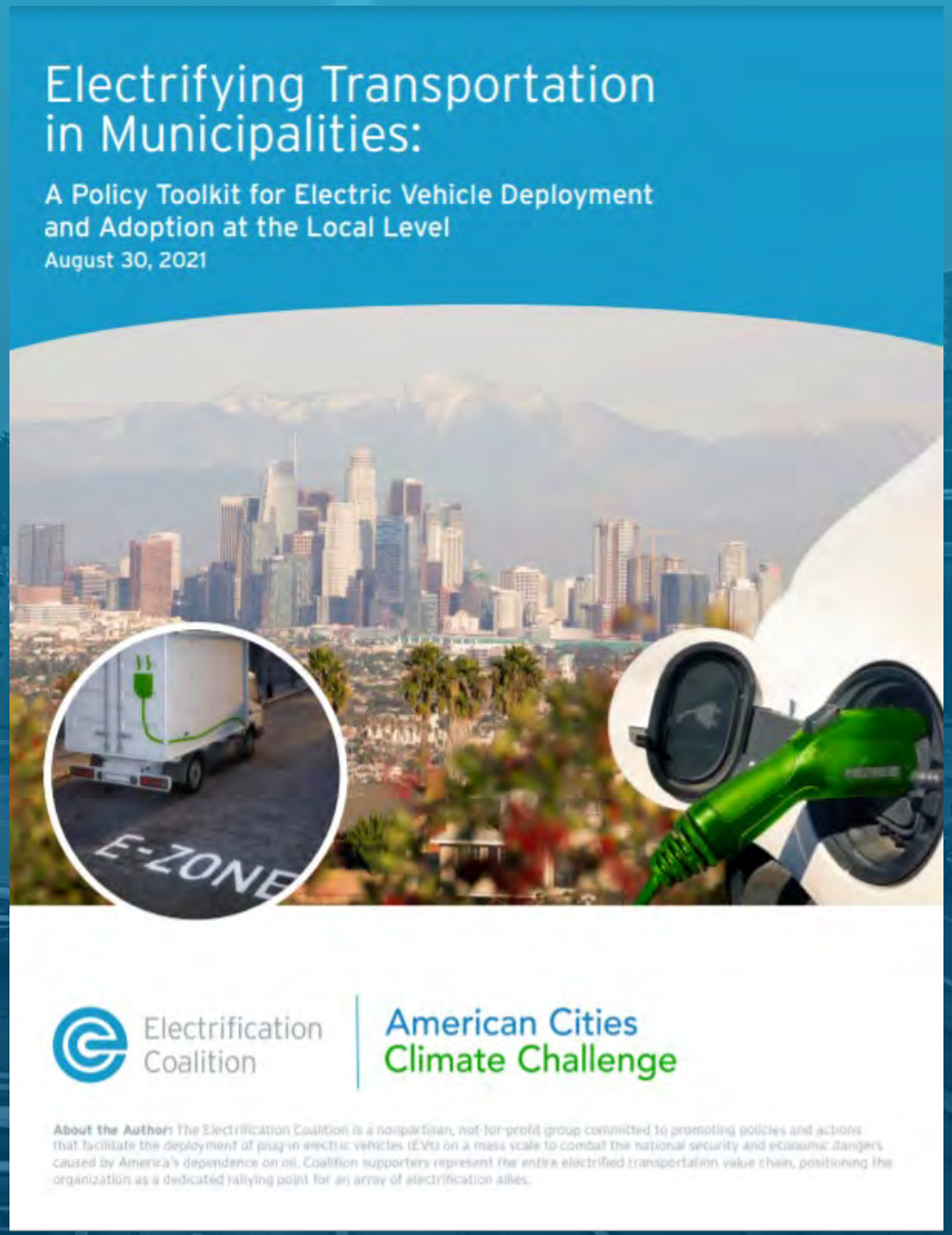
Build policy framework for ongoing success

Electrification Coalition

City Policy Toolkit

The EV Policy Toolkit outlines key policies within five categories:

- Multi-sector
- Freight
- Fleets
- Charging infrastructure
- Consumer adoption



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Evaluation of the potential difficulty to pass each policy and the cost to implement it

Summary of key city policies Benefits & impact key: High Medium Potential Negative Dificulty & cost key: Low Medium High		Benefits & impact					Difficulty to pass	Current cost to implement
		Direct GHG reduction	Health	Equity benefits	Jobs	Market impact		
Charging infrastructure	1. Infrastructure deployment							
	2. EV-ready buildings & businesses							
	3. Equitable charging							
	4. Streamlined charging approval (permits)							
Multi-sector	5. Zero emission (ZE) areas, diesel bans, or similar							
	6. Road tolls and CO_2-focused congestion pricing							
	7. Funding for electric vehicles and charging							
Freight	8. Zero emission freight/delivery zones/curb access							
	9. Zero emission ports and inland hubs/ warehouse districts							
Fleets (buses, light-duty)	10. Zero emission bus requirements & rollout							
	11. Fleet EV funding and business models							
	12. Light-duty city fleet requirements							
	13. EV procurement and use policies (all classes)							
Consumer	14. ZE mobility service provider/taxi deployment							
	15. City programs for faster uptake (bulk purchase agreements & dealer & education campaigns) (action)							

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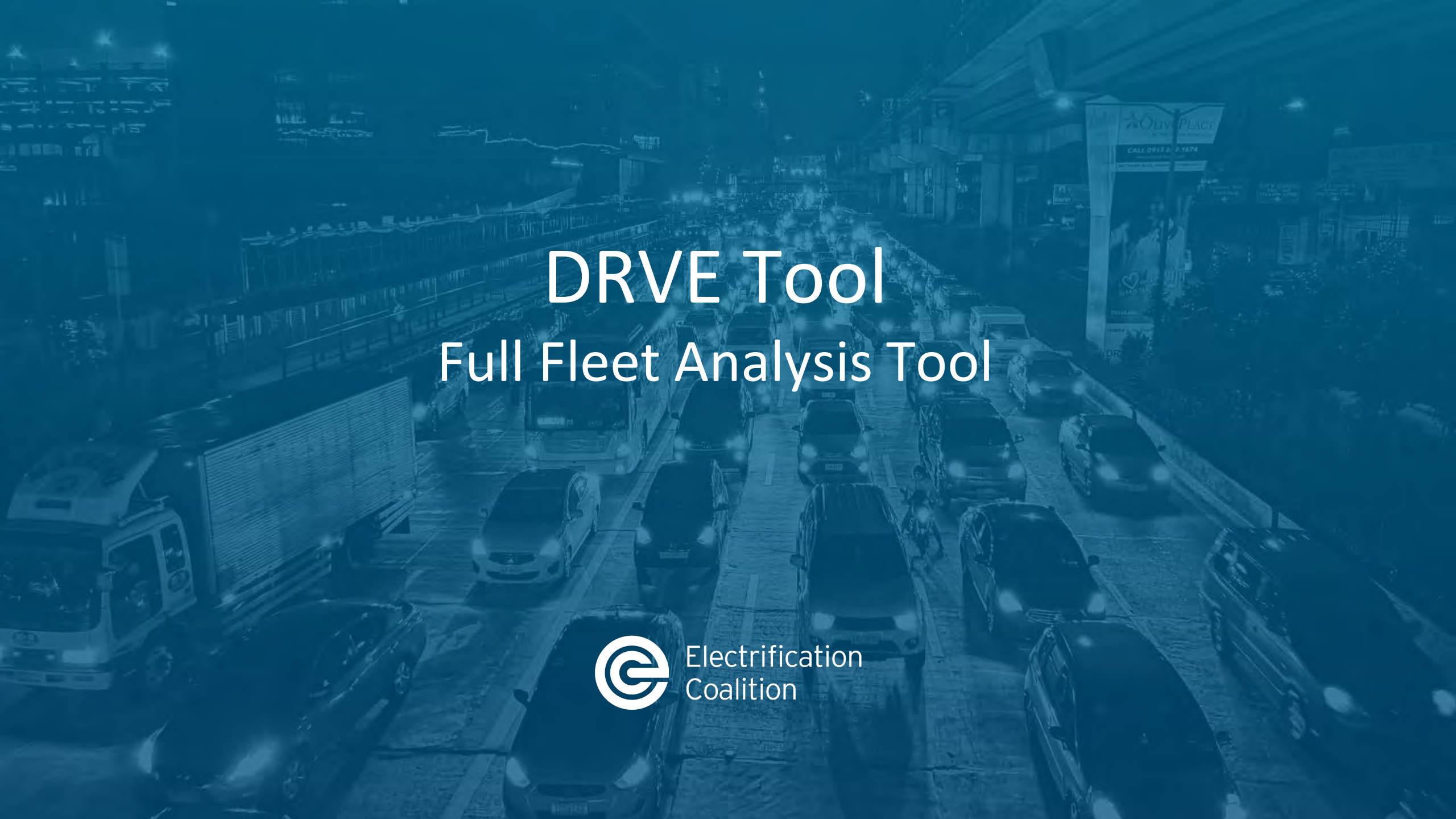
Charging Infrastructure Policy Examples

1. Charging Infrastructure Plans and Rollout- The EV Spot Network in **Minneapolis and Saint Paul, Minnesota**: created about 70 charging hubs for carshare and public charging. It is the largest Midwest charging network

2. EV-ready Buildings & Businesses- **Atlanta, GA** adopted an ordinance in 2017 requiring all new single-family homes to be EV-ready, as well as 20% of new commercial and 20% of new multi-family residential parking to be EV-ready

3. Equitable Charging- **Mountlake Terrace in Washington** adopted a city ordinance requiring a minimum percent of parking dedicated to charging stations for multi-family residential, commercial, office, and industrial development.

4. Streamlined Charging Approval (Permits)- in **Houston, TX**, there is a 24-hr permitting process whereby inspections scheduled by noon of a business day will be conducted that day.



DRVE Tool

Full Fleet Analysis Tool

Electrification Coalition

DRVE Tool Analysis

Dashboard for Rapid Vehicle Electrification

1) VIN

2) Annual VMT

3) Vehicle Service Life

Electrification Coalition

DRVE Tool Analysis

Dashboard for Rapid Vehicle Electrification

Figure 6: Average Cost-Per-Mile by Use Case

Average TCO Per Mile	Conventional	EV Alternative
Delivery Truck	$1.03	$1.66
Pickup Truck	$0.38	$0.37
SUV	$0.34	$0.31
Vans	$0.60	$0.51
Grand Total	**$0.47**	**$0.44**

Figure 7: Top 5 Passenger Vehicles to Procure

Vehicle Model	Average of Percent Savings from EVs	Vehicles
2022 Ford eTransit - Cargo Van BEV	23.31%	1
2022 Ford eTransit - Passenger Van BEV	15.74%	15
2020 Ford Escape FWD PHEV PHEV	9.28%	3
2022 Ford F-150 Lightning (Standard Range) BEV	3.03%	26
Grand Total	**8.13%**	**45**

Figure 9: Top 100 Vehicles

VIN	Conventional Vehicle	EV Alternative	Average of Percent Savings from EVs
3N63M0YN6FK727109	CHEVROLET City Express	2022 Ford eTransit - Cargo Van BEV	23.31%
1GNSGCF48E1117639	CHEVROLET Express	2022 Ford eTransit - Passenger Van BEV	18.74%

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Identifying near term, mid term and long term opportunities

VIN	Conventional Vehicle	EV Alternative	Average of Percent Savings from EVs	Domicile
3N63M0YN6FK727109	CHEVROLET City Express	2022 Ford eTransit - Cargo Van BEV	30.95%	1
1GCSGAFX3E1174662	CHEVROLET Express	2022 Ford eTransit - Passenger Van BEV	27.09%	1
1GCZGGFF4H1101961	CHEVROLET Express	2022 Ford eTransit - Passenger Van BEV	27.09%	1
1GNSGCF48E1117639	CHEVROLET Express	2022 Ford eTransit - Passenger Van BEV	27.09%	1
1GNSKFEC2GR433065	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	1
1GNLCDEC1GR328152	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	1
1GNLC2E07ER200280	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	1
1GNSCEEC8JR329484	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	1
1GNSCEEC2LR293617	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	1
1GNSCEEC4HR219171	CHEVROLET Tahoe	2020 Ford Escape FWD PHEV PHEV	26.21%	2
1FBZX2ZM2HKA76604	FORD Transit	2022 Ford eTransit - Cargo Van BEV	24.67%	2
1FBZX2ZMXKKB76411	FORD Transit	2022 Ford eTransit - Cargo Van BEV	24.67%	2
1FMZK1ZMXKKB67420	FORD Transit	2022 Ford eTransit - Cargo Van BEV	24.67%	2
1FBVU4XM3HKA22962	FORD Transit	2022 Ford eTransit - Cargo Van BEV	24.67%	3
1FBZX2ZM1JKB37107	FORD Transit	2022 Ford eTransit - Cargo Van BEV	24.67%	3

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Identifying near term, mid term and long term opportunities

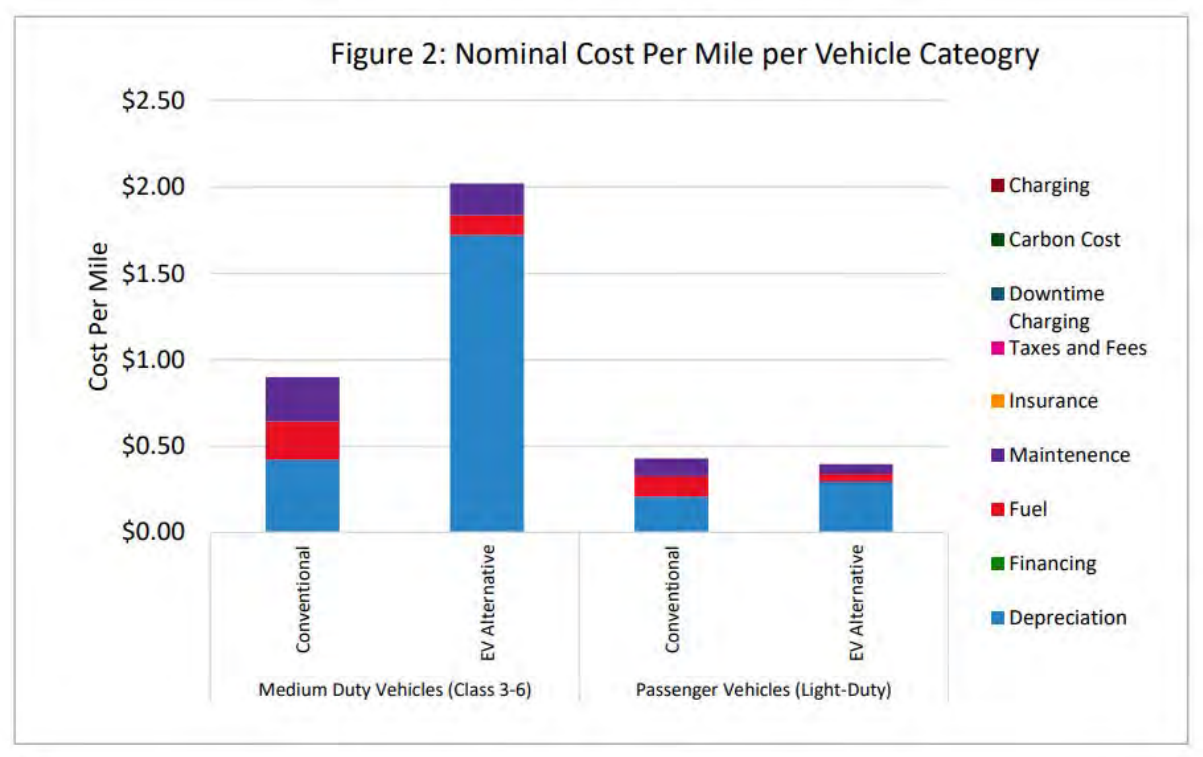

Figure 8: Top 5 Medium- and Heavy-Duty Vehicles to Procure

Vehicle Model	Average of Percent Savings from EVs	Vehicles
2020 Freightliner eM2 BEV	-63.16%	4
2019 Phoenix Motorcars Z400 - Work Truck BEV	-135.11%	21
Grand Total	**-123.60%**	**25**

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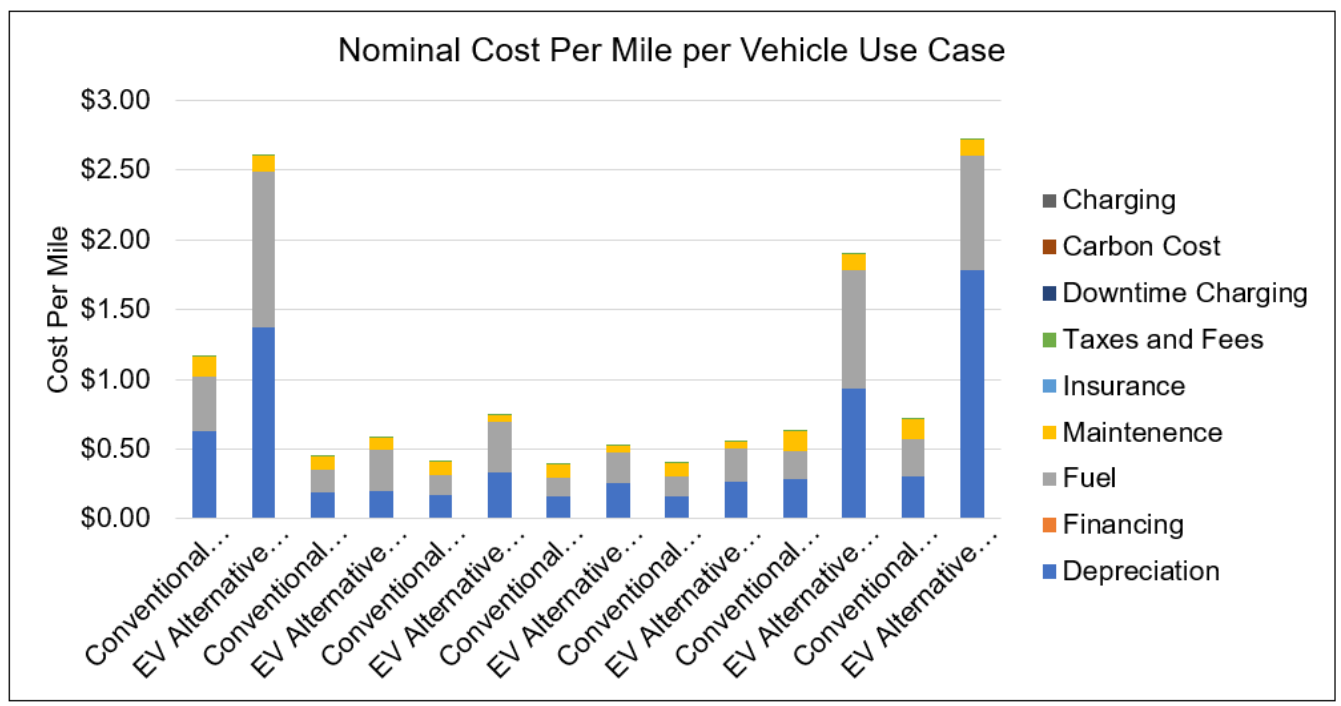
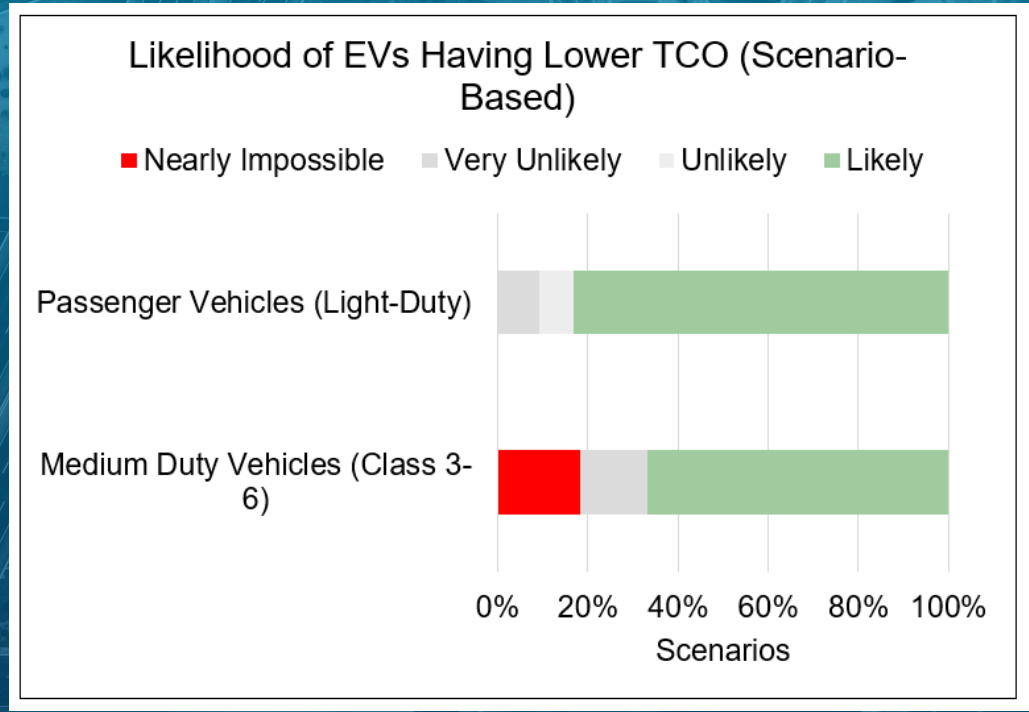
DRVE Tool Analysis

Market forecasting MD/HD TCO





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EVSE Vendors with available contracts

www.DriveEVFleets.org

- ChargePoint, Inc.
- FLO Services USA, Inc.
- EVBox Group
- FreeWire Technologies
- Blink Network LLC
- EV Connect, Inc.
- SemaConnect
- Wireless Advanced Vehicle Electrification, Inc.
- Livingston Energy Group, LLC
- Siemens Industry, Inc.
- Nuvve Holding Corporations

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Next Steps:

- Asses near, mid and long term EVSE installations
- Evaluate electrical capacity requirements
- Streamline EVSE installation policies & procedures
- Explore procurement methods

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Electrification Coalition

Changing the Future of Transportation.

Jared Walker
Senior Fleet Specialist
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Electrification Coalition

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WASHINGTON, DC 20036

TEL: 202-461-2360
FAX: 202-318-8934
ELECTRIFICATIONCOALITION.ORG

Jeff Benavides
Jeff.Benavides@ocfl.net

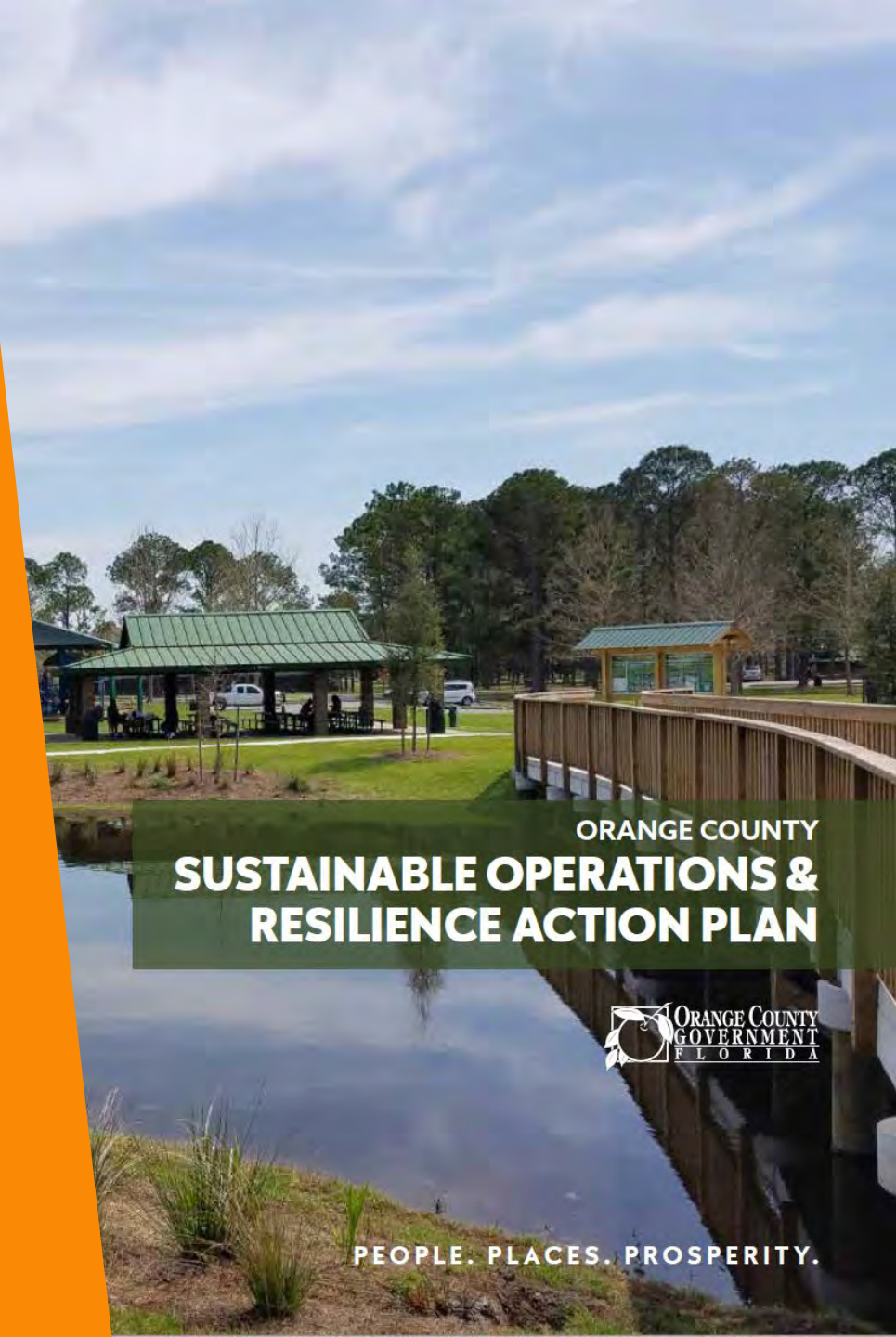
- Chief Sustainability and Resilience Officer for Orange County FL
- Works county-wide across 17 internal departments with 8,000 employees across to develop a vision for community resilience and sustainability
- Coordinates social services projects, grants, and funding with 13 cities and towns, public and private agencies
- Adjunct professor at Valencia College's Energy Management Controls Technology Program and serves on the board for the U.S. Green Building Council Central Florida, ASHRAE Central Florida and the National Solar Workforce Development Committee
- Extensive experience launching award winning energy, water, and waste reduction projects with Wyndham Resorts, Bank of America, and the City of Orlando that have sustained more than $5 million savings in annual expenses

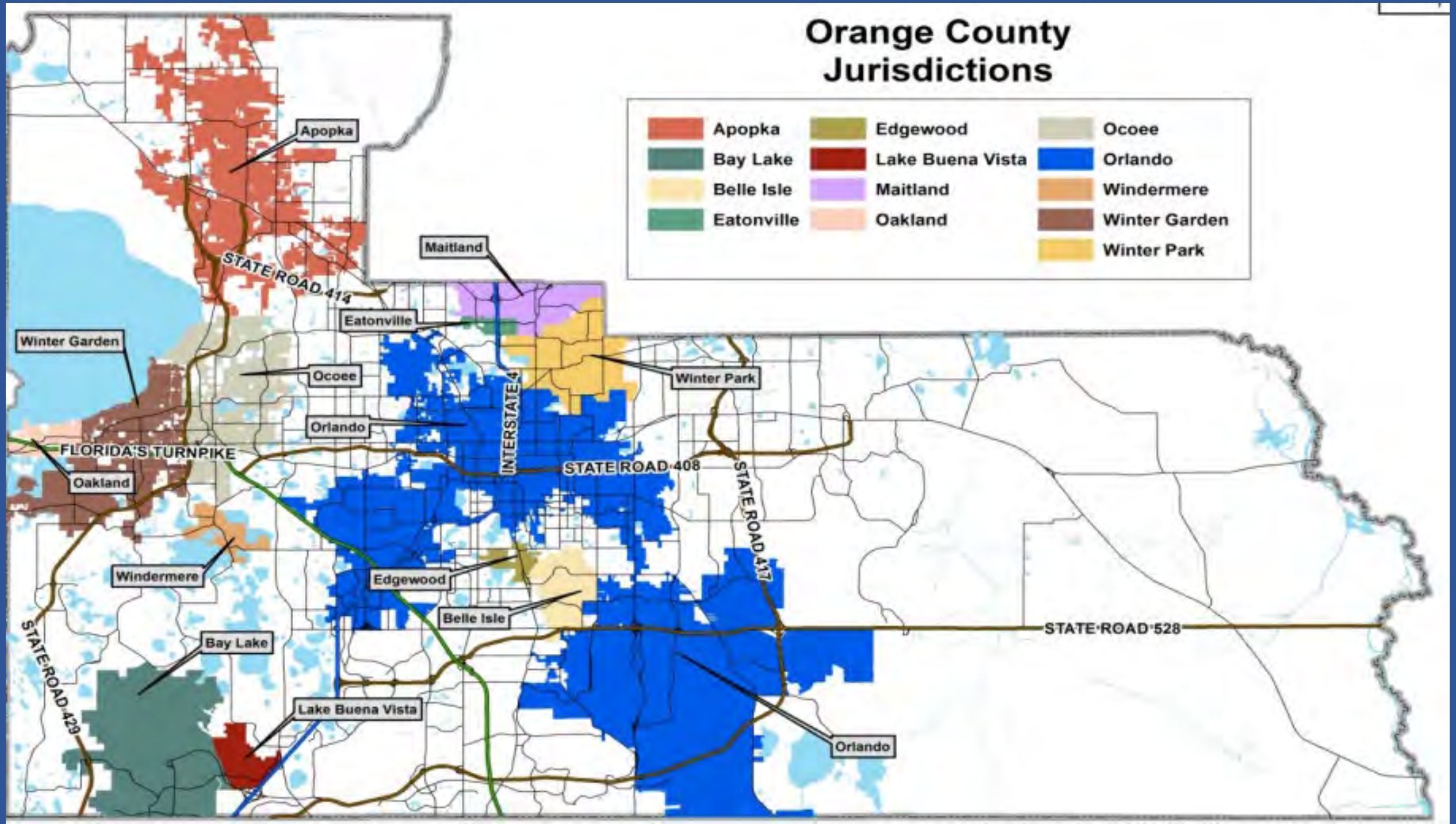
Passport to...

SUSTAINABILITY & RESILIENCE

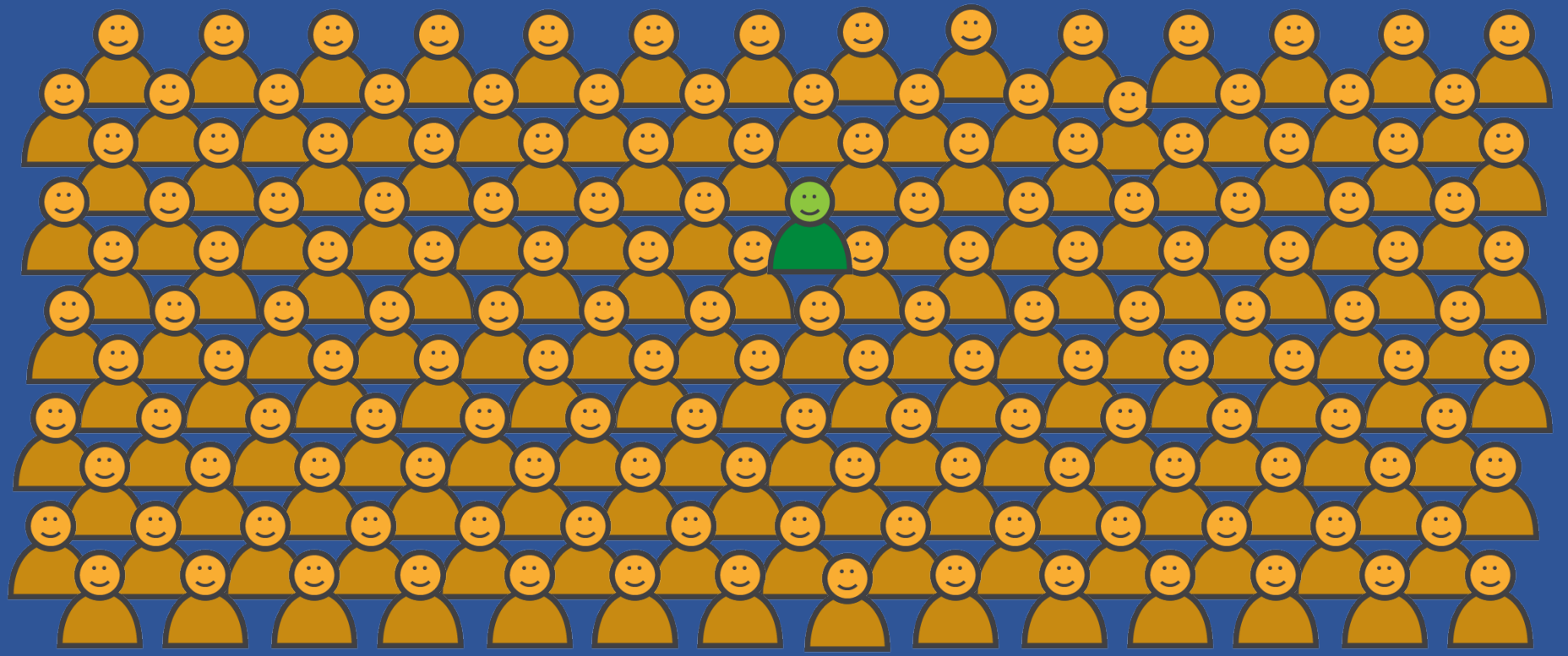
People. Places. Prosperity.

ORANGE COUNTY GOVERNMENT FLORIDA

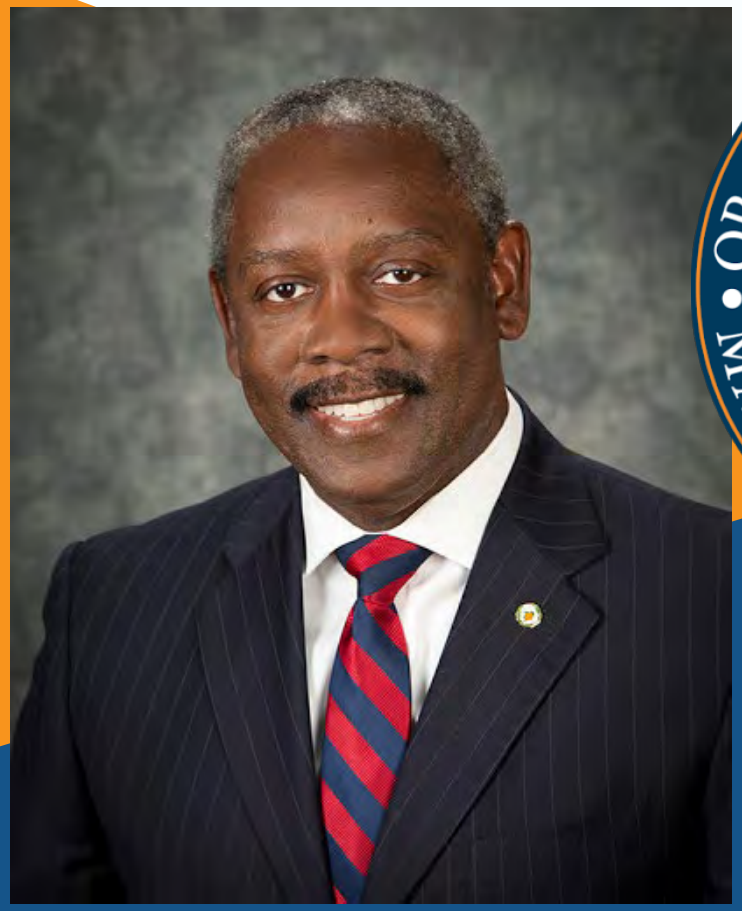



Orange County Jurisdictions
Apopka
Bay Lake
Belle Isle
Eatonville
Edgewood
Lake Buena Vista
Maitland
Oakland
Ocoee
Orlando
Windermere
Winter Garden
Winter Park
Apopka
Maitland
STATE ROAD 414
Eatonville
Winter Garden
Ocoee
Winter Park
Orlando
INTERSTATE 4
FLORIDA'S TURNPIKE
Oakland
STATE ROAD 408
STATE ROAD 417
Windermere
Edgewood
Belle Isle
STATE ROAD 528
STATE ROAD 429
Bay Lake
Lake Buena Vista
Orlando

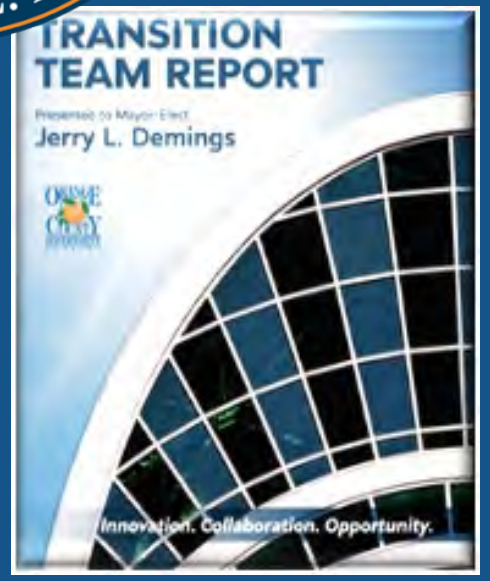
1 Resident to 62 Tourists each year



LEADERSHIP



MAYOR JERRY L. DEMINGS,
Orange County



MAYOR BUDDY DYER
City of Orlando

INNOVATION COLLABORATION INCLUSION

Fleet Electrification Commitments & Goals

Over 13 years in the making:

1. Advocacy
2. Education
3. Incentives
4. Policy

"Top 10 Most EV-ready Cities" in the nation.

"Top Tier" performer in the League of Women Voters of Florida Summer 2020 EV Report Card

Future Ready Infrastructure

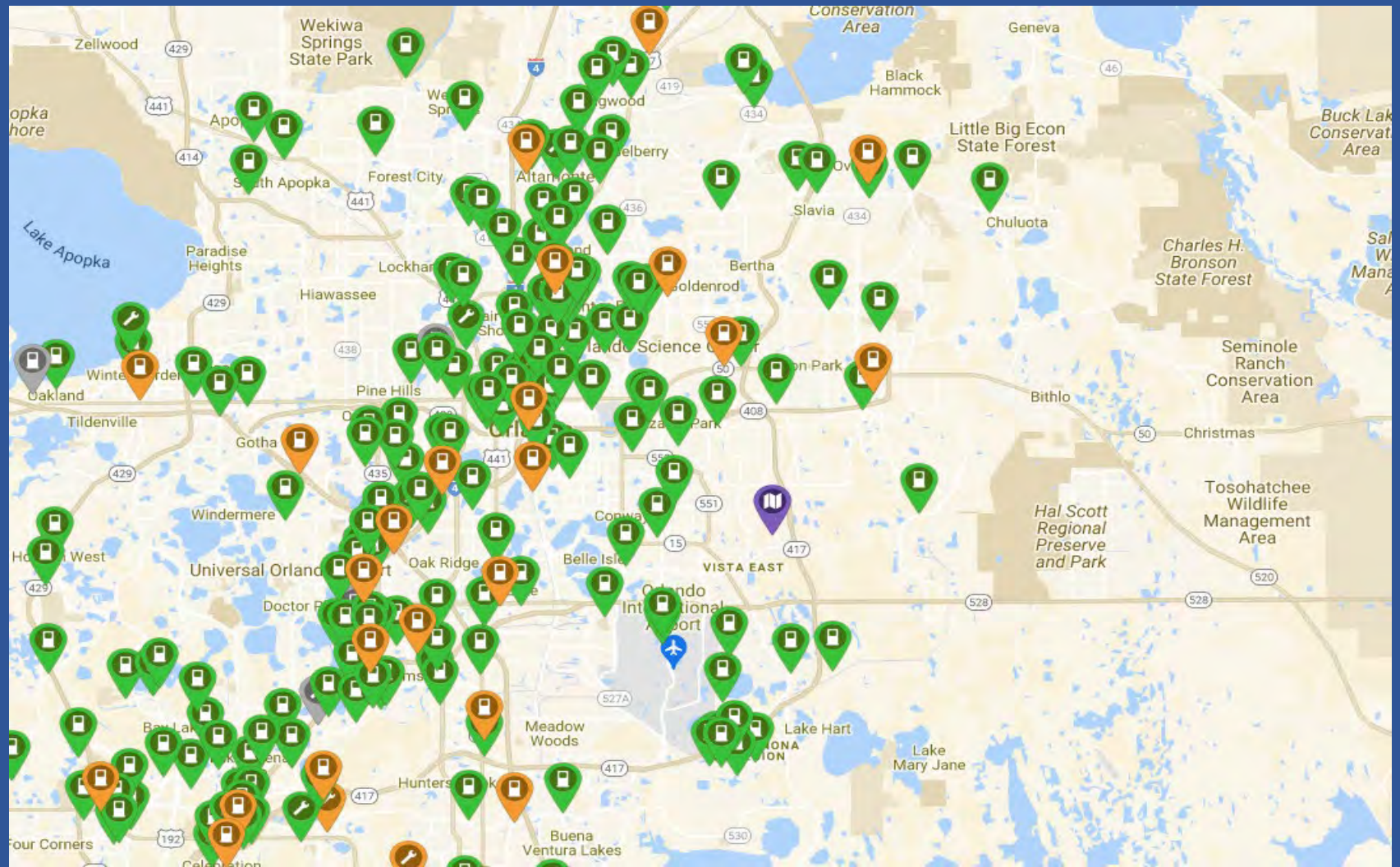
LEED FOR CITIES

U.S. GREEN BUILDING COUNCIL

# Orange County Residents	Level 2	Level 3
1,450,000	450	49

Exceeding LEED for Cities and Communities Criteria

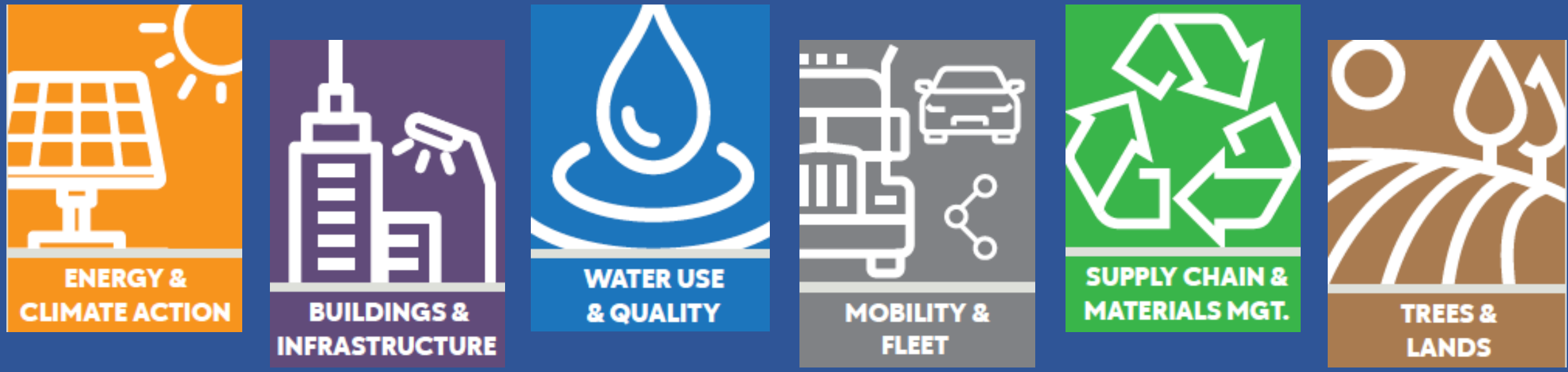
Future Ready Infrastructure



EV Fleet

High Speed Orlando to Miami

6 Focus Areas



MOBILITY & FLEET

GOAL 10:

OPTIMIZE VEHICLE FLEET PERFORMANCE THROUGH ONBOARD TECHNOLOGY AND A 50% REDUCTION OF PETROLEUM-BASED FUEL BY 2030

GOAL 11:

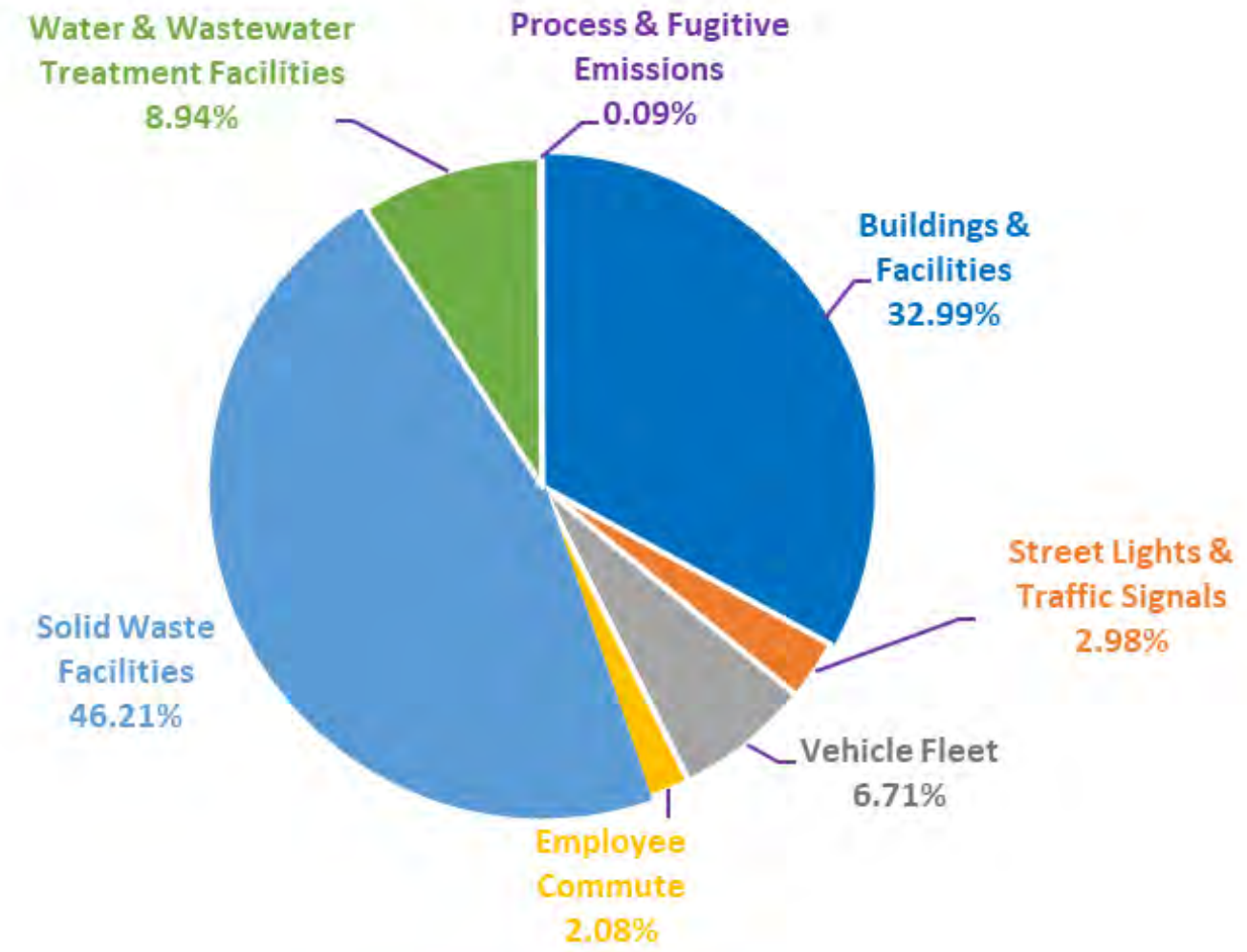
DEPLOY EV-READY INFRASTRUCTURE AND CONVERT 100% OF LIGHT-DUTY COUNTY FLEET TO ELECTRIC OR ALTERNATIVE BY 2030

SUB GOAL: DEPLOY ELECTRIC VEHICLE CHARGING INFRASTRUCTURE AT 25 COUNTY FACILITIES BY 2025

GOAL 12:

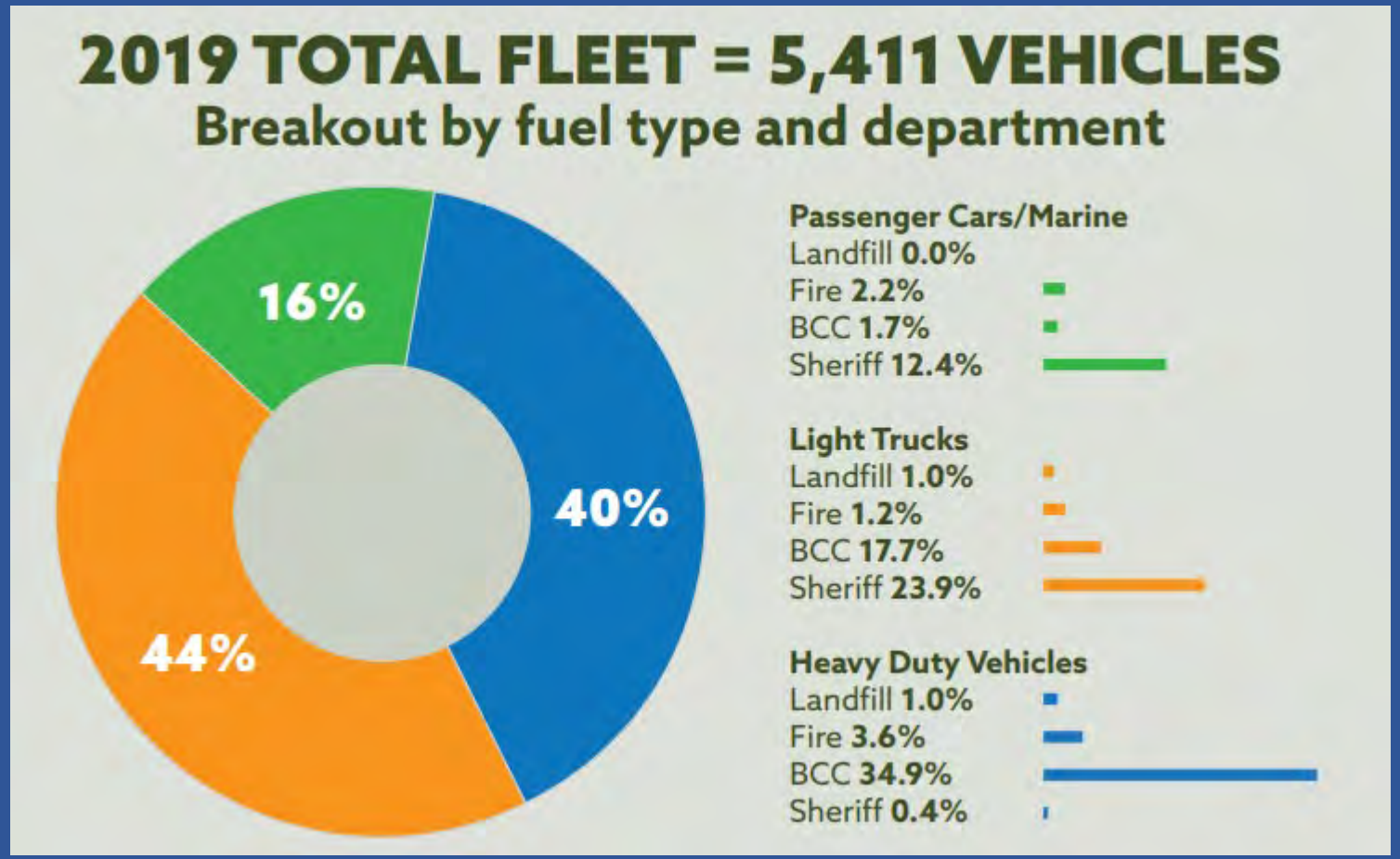
IMPROVE VEHICLE, BICYCLE, AND PEDESTRIAN ROADWAY SAFETY, RESILIENCE, AND INTEROPERABILITY THROUGH TRAFFIC TECHNOLOGY RETROFITS AT 300 INTERSECTIONS BY 2025

2015 GHG Emissions Breakout by Sector



MOBILITY & FLEET

Mobility & Fleet



MOBILITY & FLEET

2019 TOTAL FUEL= 3,634,964 GALLONS, $7.3 M

Breakout by Fuel Type

GASOLINE

1,759,220 48%

DIESEL

1,875,744 52%

**Includes Fire, Sheriff, Landfill and all BCC-owned Fleet*

MOBILITY & FLEET

Spotlight:

EV / Mobility Hubs

Location of Project: Orange County

Description: Transportation and Planning

Benefits:

- Access & Equity
- Last mile from mass transit
- Co-Locate facilities with fleet needs
- Future ready

MOBILITY & FLEET

Strategy:

- Orlando Roadmap
- Development Services
- Current Adoption & Projects
- EV / Mobility Fleet Study

Thank you!

@OrangeCoFL

@OCFL

@_jeffbenavides

ocfl.net/sustainability

ORANGE COUNTY GOVERNMENT

SUSTAINABLE FLEET TECHNOLOGY
WEBINAR SERIES 2021

Sessions through December 09, 2021

SUSTAINABLE FLEET TECHNOLOGY
CONFERENCE & EXPO 2021

Sessions September 09, 2021 – October 19, 2021

https://www.sustainablefleetexpo.com/

NC CLEAN ENERGY TECHNOLOGY CENTER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION