How to save time and money using inductive charging for electric port vehicles

INDUCTEV™

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INDUCTEV

Presenters

Greg White
Chief Revenue Officer
Ports, Intermodal, Freight

Tim DeMoss
Director of Port
and Intermodal Strategies

InductEV Commercial Presentation

About InductEV

2 Office Locations

King of Prussia, PA
Long Beach, CA

60+ Employees

Engineering
Hardware
Software
ML/AI

2017

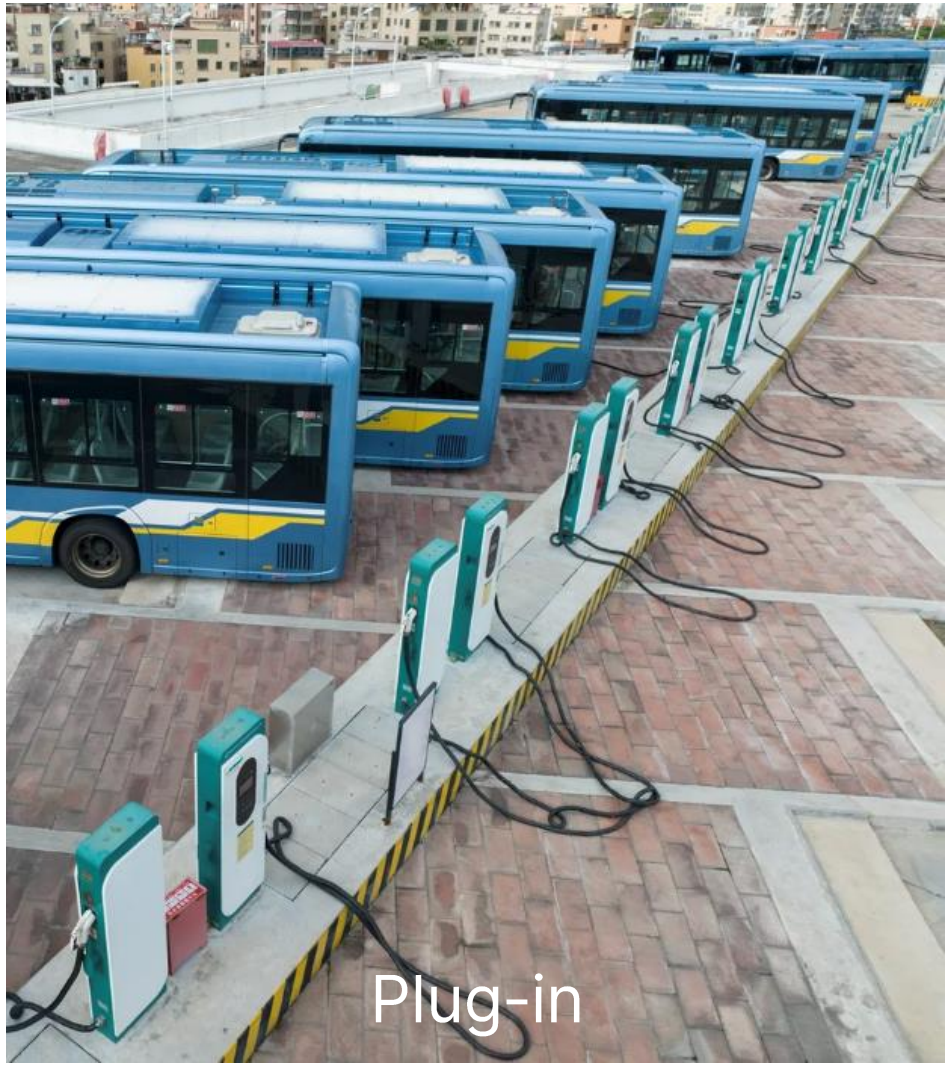
First commercial deployment

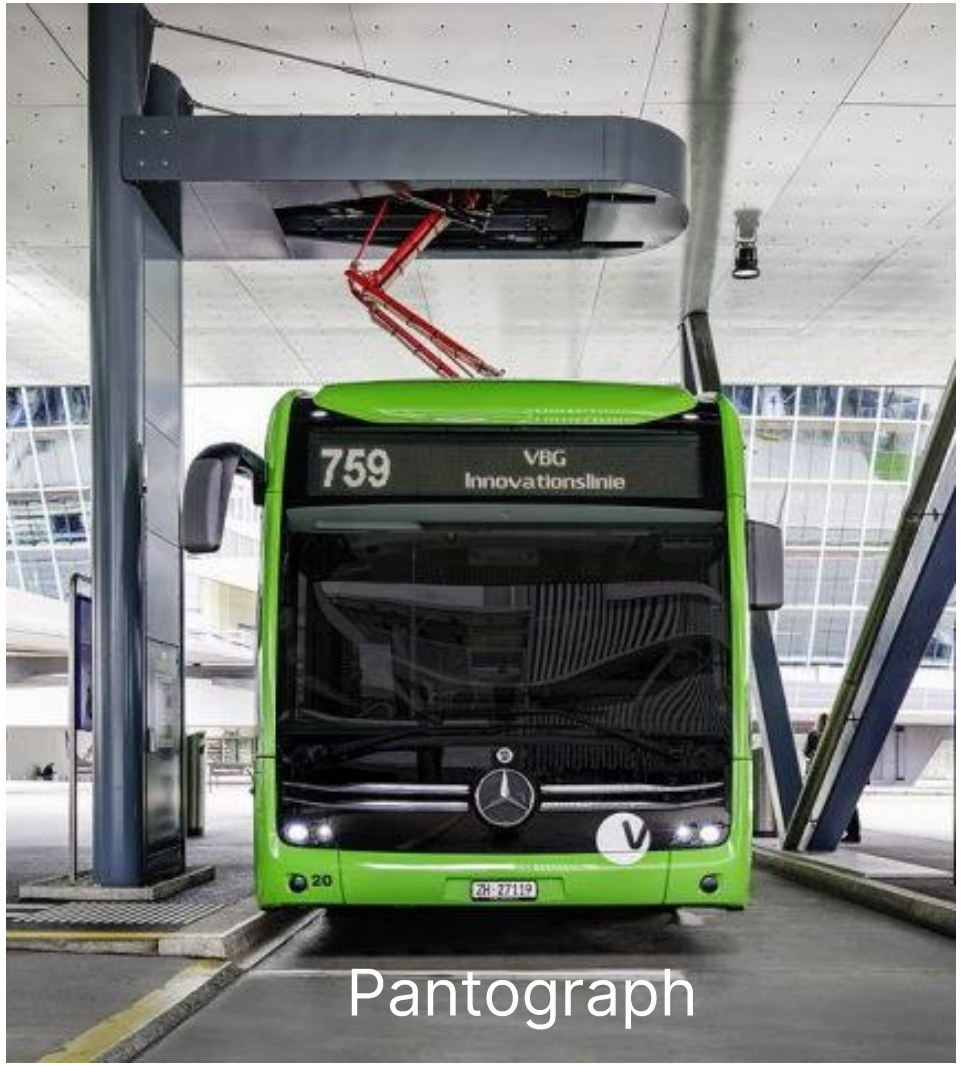
Unique & Proven Solution

Wireless Inductive Charging

- Hardware (VA & GA)
- Subscription Software
- Energy Management
- Professional Services
- Grant Writing

Breaking Wired Dependency for Hands-Free Efficiency



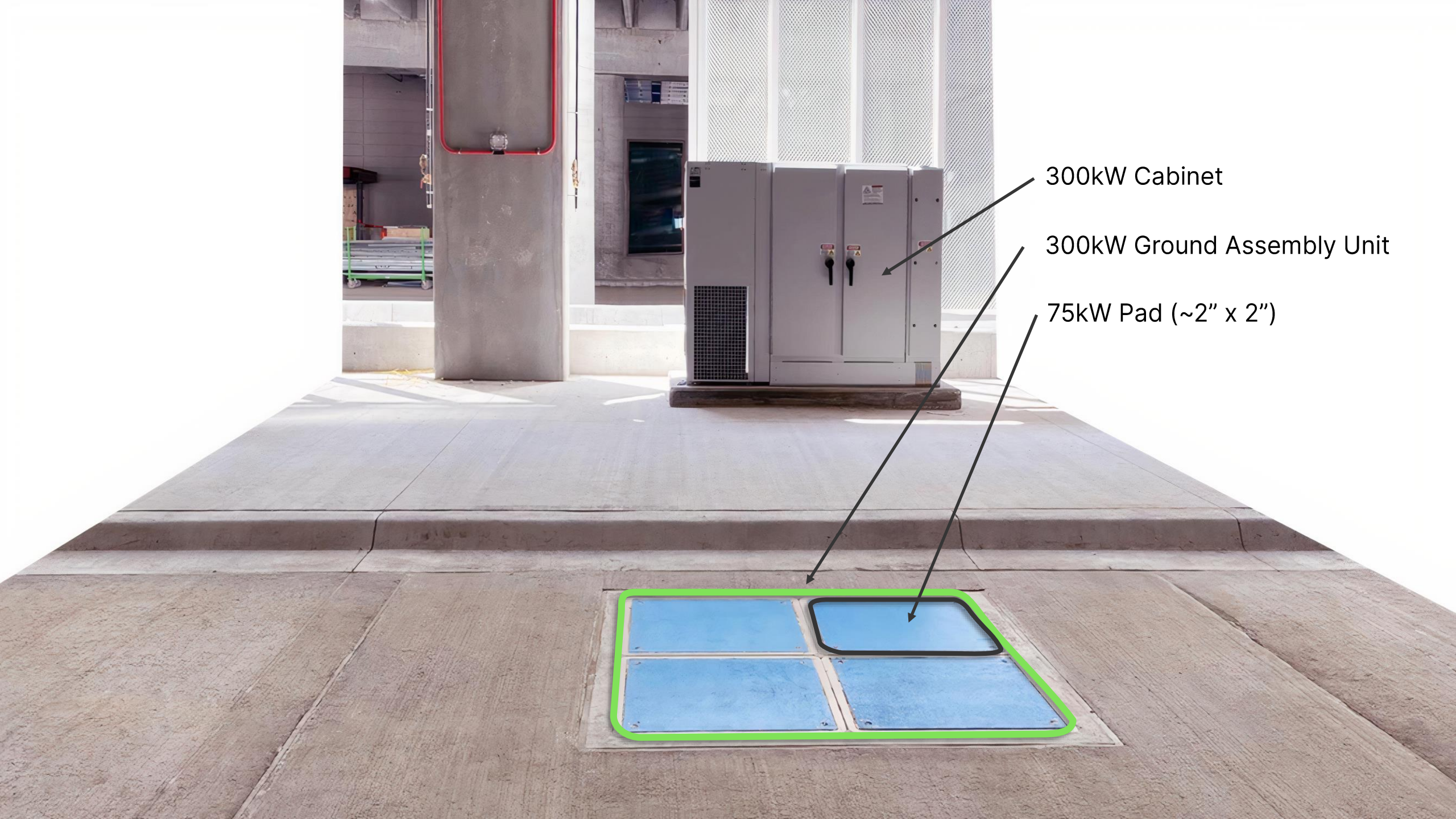


Time inefficiency, increased staff and vehicle demands

Work rules and safety concerns

Congested footprint and workflow

Fleet availability and operational constraint

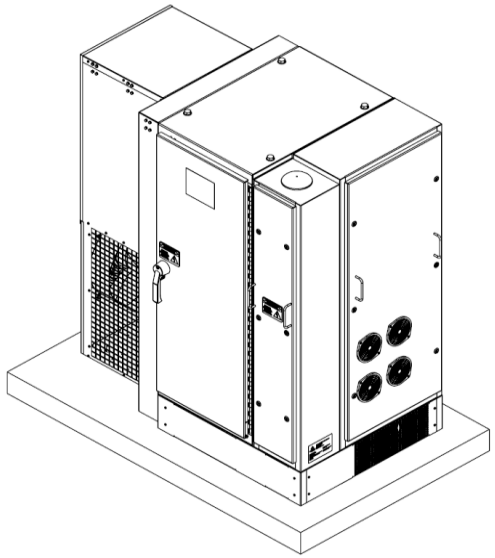

300kW Cabinet
300kW Ground Assembly Unit
75kW Pad (~2” x 2”)

300kW Vehicle Assembly

4 x 75kW Pads

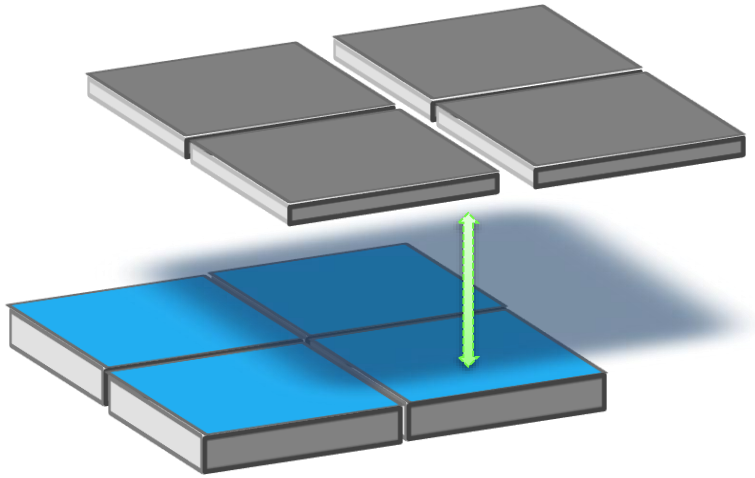
Our Hardware is Designed for Seamless, Safe, Scalable Integration

Ground Assembly (GA) Components



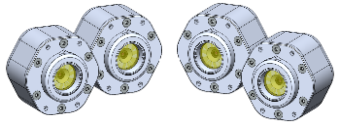
480V 3-Phase Cabinet
- 150kW
- 300kW

VA Pads - Charging Receiver
75kW/pad
- Each vehicle unit wirelessly receives electricity for the battery



GA Coils - Charging Transmitter
75kW/coil
- Each ground unit wirelessly transmits electricity

Vehicle Assembly (VA) Components



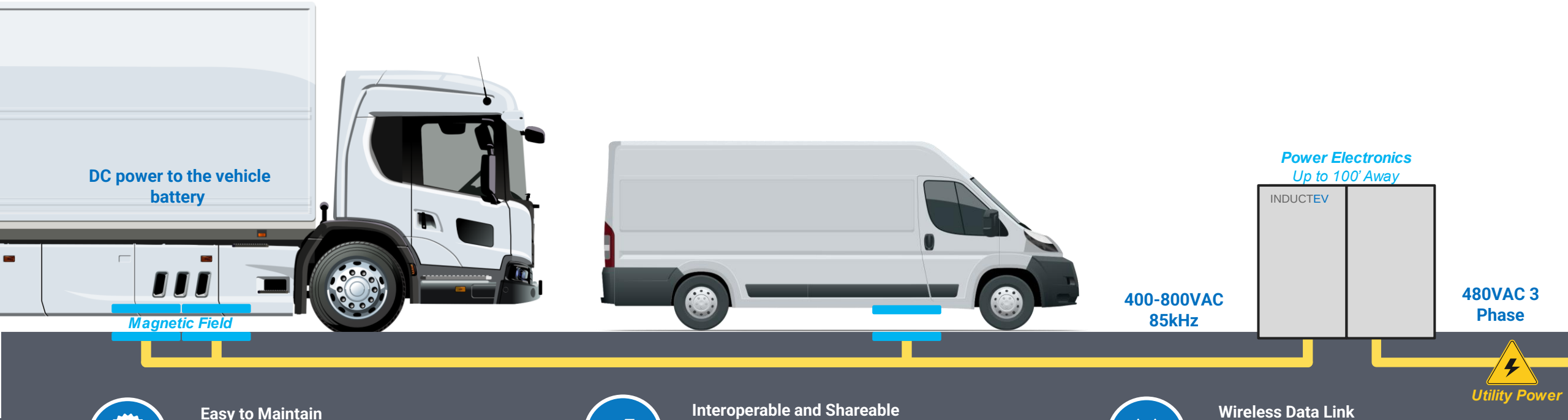
Foreign Object Detection (FOD) Cameras (x4)

HMI “Opus Display” (x1)

Tomorrow is Here: High Power Wireless Charging

Electrification ⟷ **AI, Cloud, Data**

A contactless, safe magnetic field transfers energy from the grid, to a Ground Transmitter to the Vehicle Receiver, which charges the battery in the vehicle.



Easy to Maintain
No moving parts, very little maintenance

Interoperable and Shareable
Multiple vehicle types and power levels use the same pads

Wireless Data Link
Patented, secure, ultra high speed, near-field communication for control, data, and billing

Modular and Scalable
Modularity allows for scalability from 50kW to 450kW+ (1-6 pads)

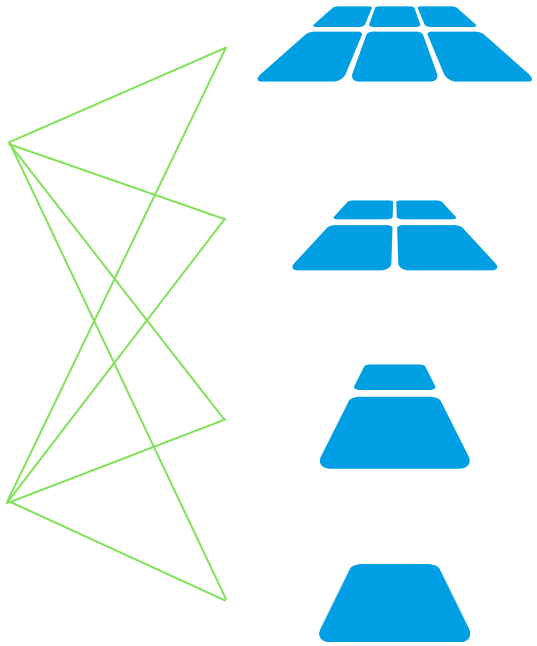
All-weather
Operates through rain, ice, snow, leaves, mud, and even underwater with no loss of efficiency

Meets key standards
Operates under guidelines of FCC, IEEE, UL, ICNIRP, and CE safety standards across power levels

Our Versatile Charging Solutions Supports Mixed Fleet Operations

Light Van / Truck | Yard Truck | Medium Truck | Heavy Truck

Passenger (Taxi, Fleet) | Shuttle and Para-Transit | Bus



6+ Pads 450kW+

Large trucks, Industrial equipment, Rail and Ferry Applications

4 Pad 300kW

Buses, medium and heavy-duty trucks

2 Pad 150kW

Mid-size buses, large shuttles, medium duty truck, terminal tractors

1 Pad 50kW to 75kW

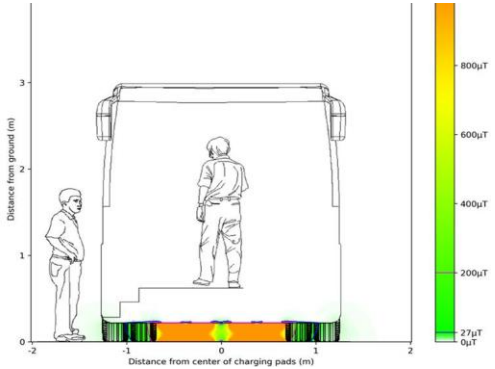
Cars, delivery vans, shuttles, utility vehicles

Flexible EV operations with interoperable, automatic, scalable charging solution

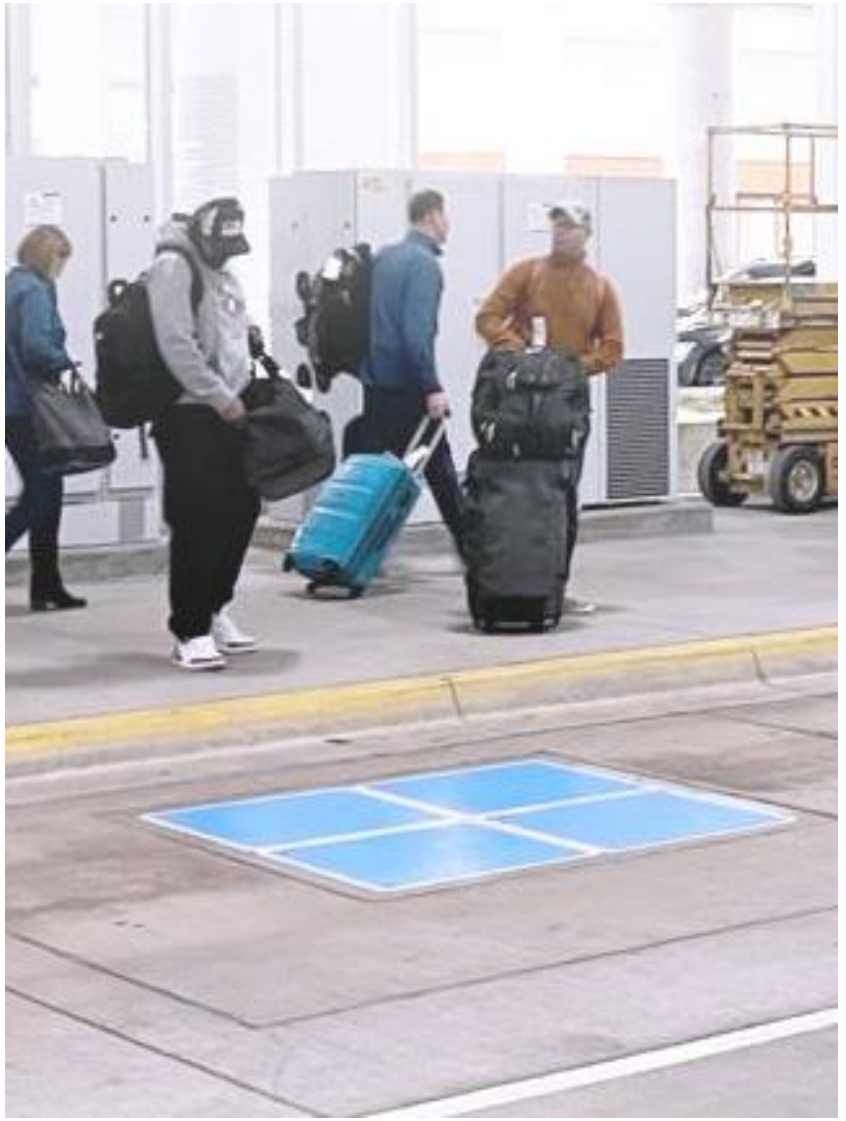
Any vehicle on the left can charge using any InductEV Chargers on the right.

Proven Safe

Safe to operate around people, does not interfere with other electronics, and is interoperable with the grid



- Highly localized magnetic field
- Ultra-fast auto shutdown
- Field levels around vehicle meet global electromagnetic exposure standards

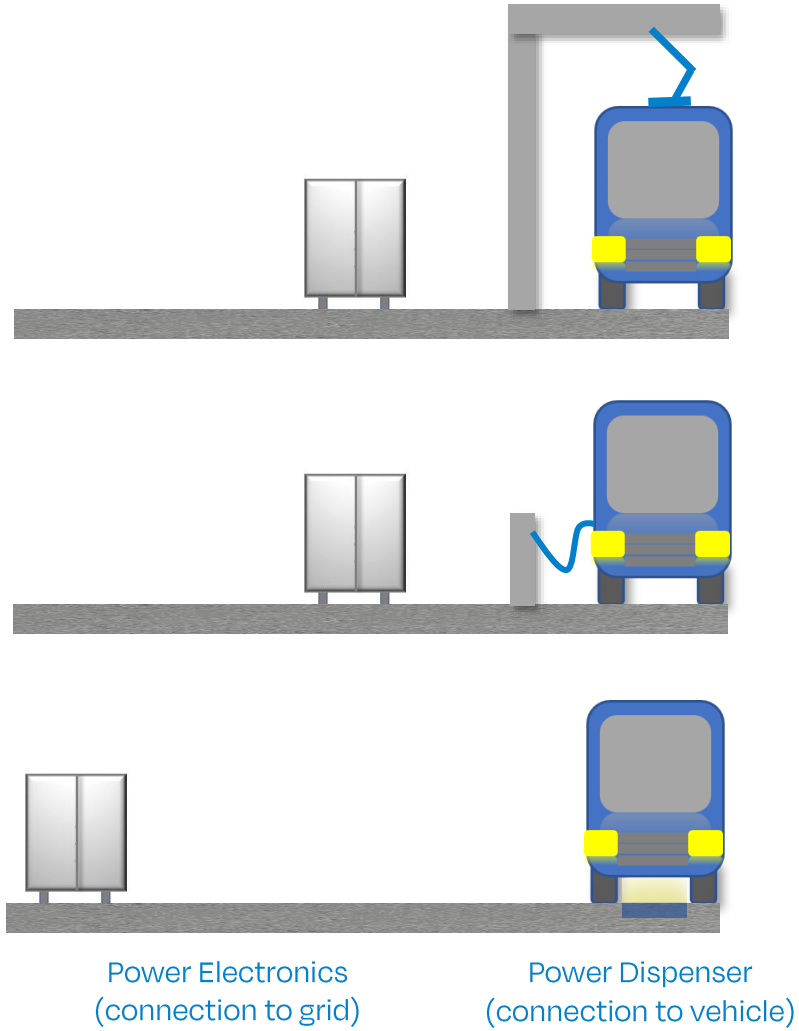


DC Fast Chargers Operate at ~90-92% Efficiency

Pantograph

Plug-in

Wireless



Inductive systems are as or more efficient than conductive systems

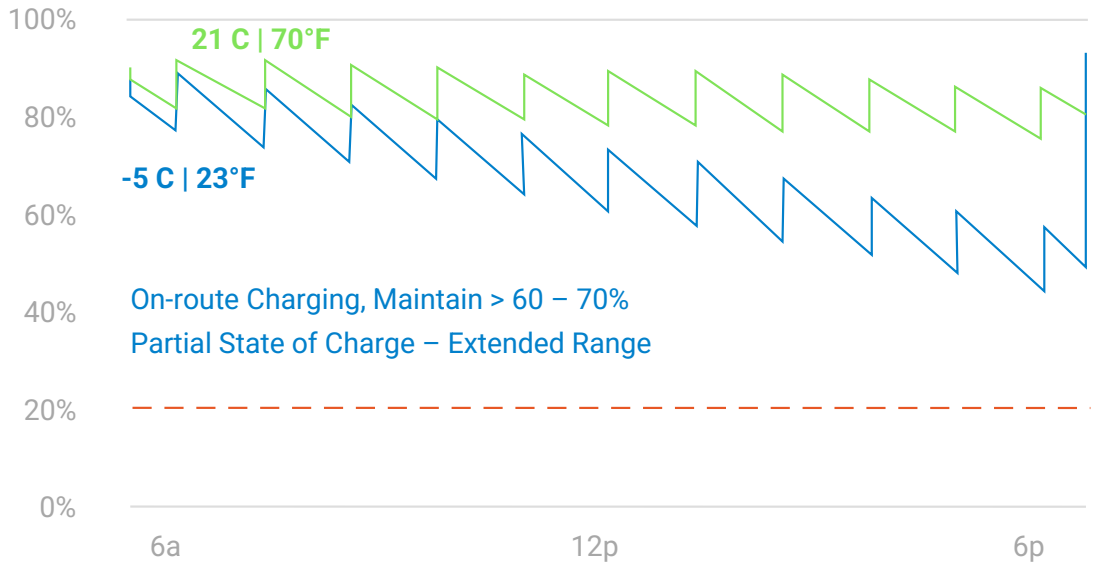
Inductive systems have high transmission efficiency - the air gap in inductive systems is NOT a source of loss (99.99% transmission efficiency)

Contact based chargers have an additional power transfer step in the power electronics that is not required in inductive systems, i.e., a galvanic isolation transformer for safety

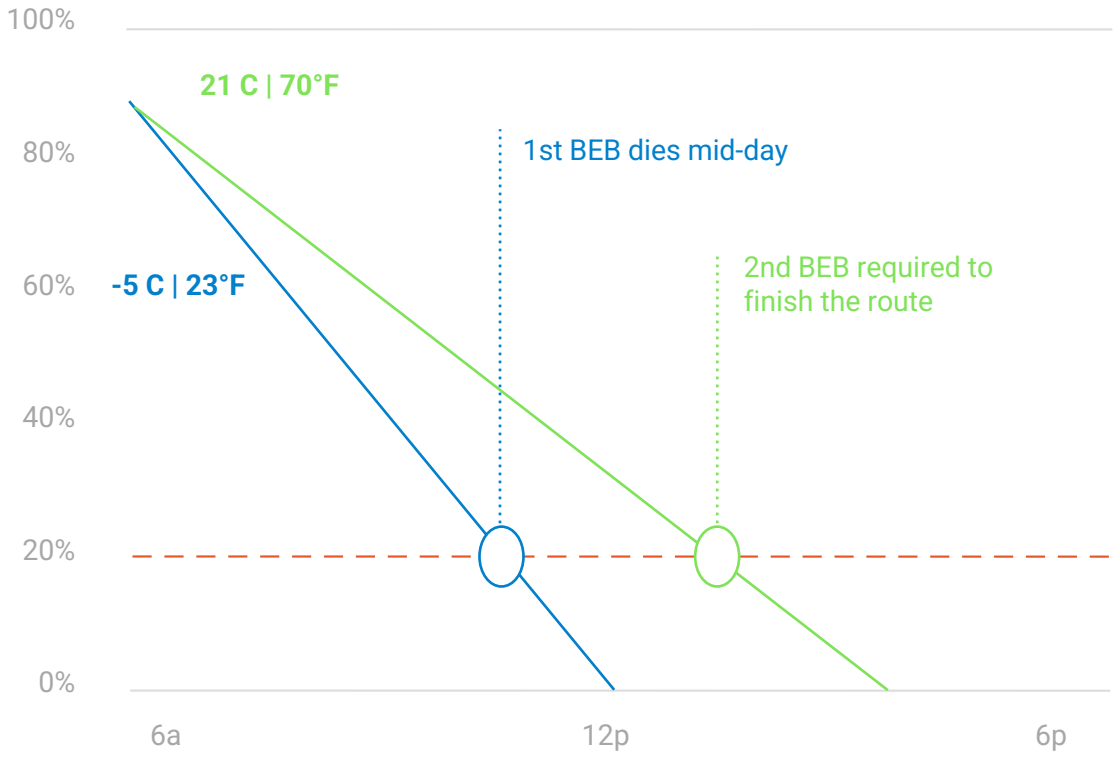
Inductive systems have less copper resistance.

Maximize efficiency with fewer vehicles, fewer chargers, and lighter batteries

OPPORTUNITY CHARGING PROVIDES A PERPETUAL RANGE

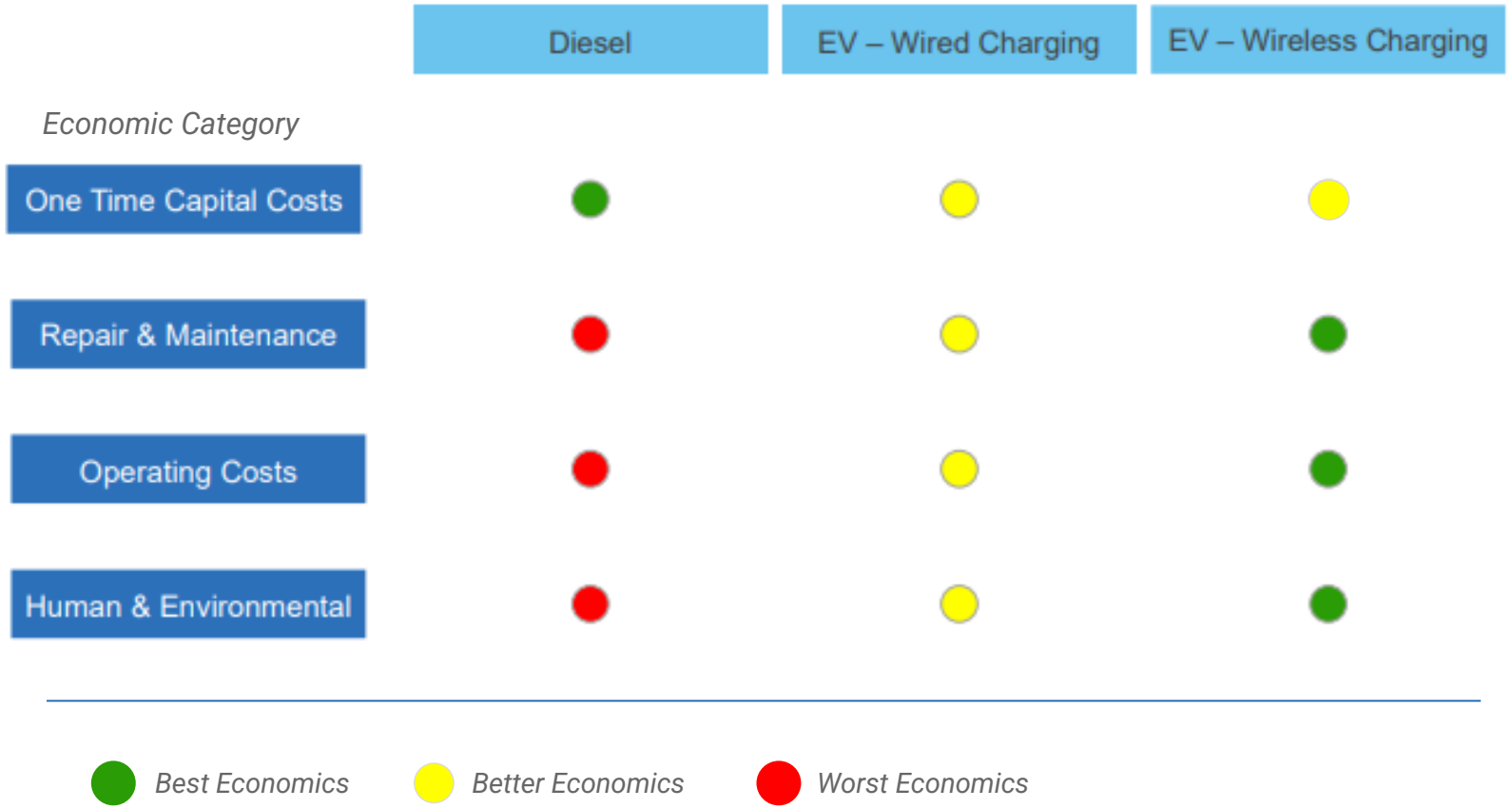


IF DEPOT ONLY CHARGING…



Total Cost of Ownership

One-time capital investment, ongoing operating costs, human & environmental costs are considered



Savings with EV Wireless Charging*

Annual OpEx + R&M

- 54%

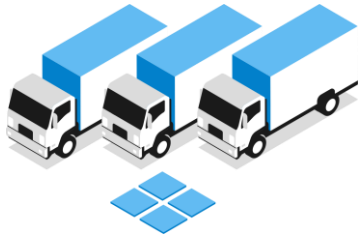
Total Cost of Ownership (TCO)

- 33%

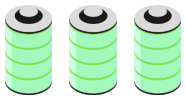
*** Savings Compared to Wired Chargers**

Wireless technology helps to keep things simple!

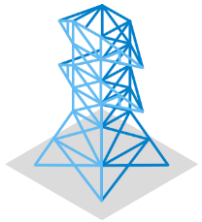
InductEV (Wireless and Inductive Charging)



One Charger,
Many Vehicles



Smaller batteries



Optimized usage,
less expensive

Hands Free

Lower TCO

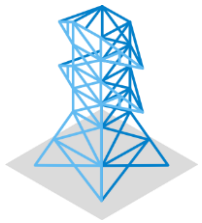
No moving
Parts

Existing
real estate

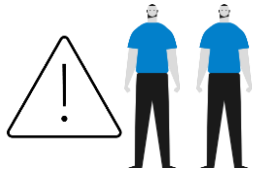
Wired Charging

One Charger.
One Vehicle

Large batteries



Grid pressure,
more costly



Humans required,
safety worries

Higher TCO

Parts to break
& maintain

Lots of new
real estate

InductEV Is Focused On Moving Both Freight and People

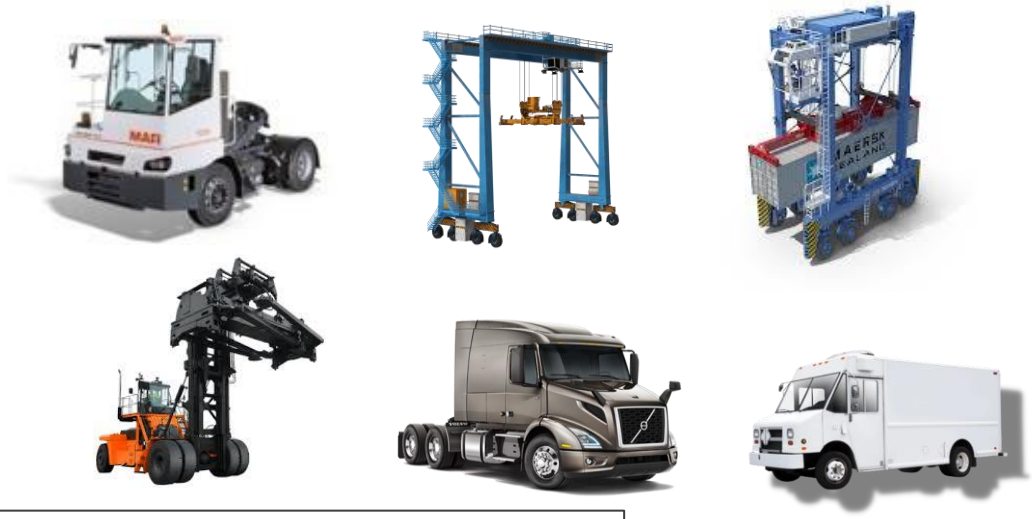
Goods & Industrial Markets

Freight

Port / Terminal / Yard

First Mile & Middle Mile

Last Mile



High-power charging for high-utilization and high-value vehicles

Transit Markets

People

Municipal Transit

Shuttle

Taxi / Ride Hailing

Expanding Vehicles Using InductEV

Orange EV Huskie™ Terminal Truck

Integration Q2 2023

SOP: 2024

Volvo Construction POC

Integration Q3/Q4 2023

SOP: 2024

Mack LR

Integration Q3/Q4 2023

SOP: 2024

Volvo VNR

Integration Q3/Q4 2023

SOP: 2024

MAFI Terminal Tractor

Integration Q3/Q4 2023

SOP: 2024

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

JAGUAR – In production 2022

VOLVO – In production 2022

GILLIG – In production 2022

BYD – In production 2017 + Retrofits

Scania Bus POC

POC Q2 2023

SOP: 2024 - 2025

S-Series Truck SDX 300 Concrete Mixer

Integration Q1/Q2 2023

SOP: 2025 - 2026

Fire & Emergency Pierce Volterra Electric Custom Pumper

Integration Q1/Q2 2023

SOP: 2024

ENC El Dorado

Integration Q3/Q4 2023

SOP: 2024

12 Integrations with New OEM's in progress

Numerous Cargo Handling Equipment OEM Integrations In Place...And Growing

In Place Now

Expected In 2024

DAIMLER TRUCK

Focus on Performance and High-Powered Growth
Latest Partnerships for Turnkey Solutions

INDUCTEV

DETROIT MANUFACTURING SYSTEMS

Contract Manufacturing and supply chain management

WB Engineers+ Consultants

Streamlines pre-construction and site engineering/design services.

MILLER EVSOLUTIONS

Installs, commissions, and maintains InductEV's (GA) charging systems

ROUSH CLEANTECH

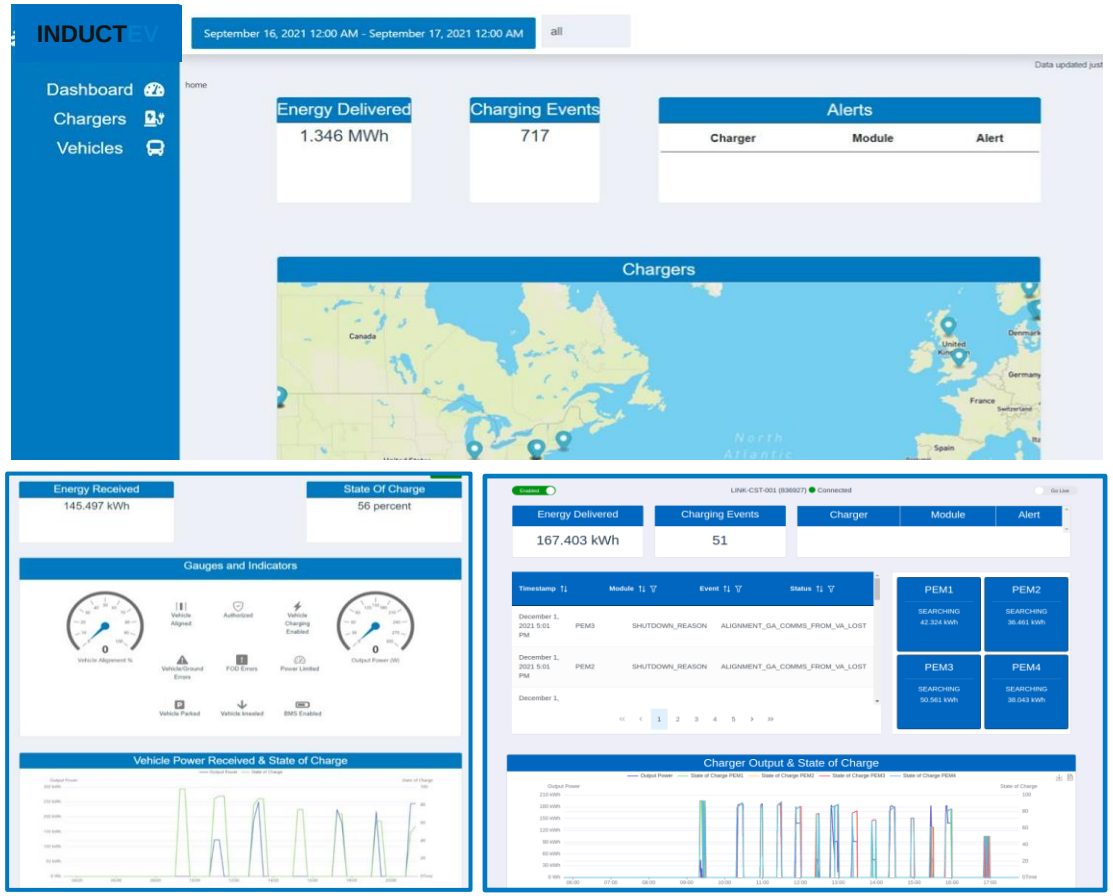
Engineering integration design and post-deployment servicing for vehicle assemblies (VA)

DANLAW

Integration Engineering and Program management Services

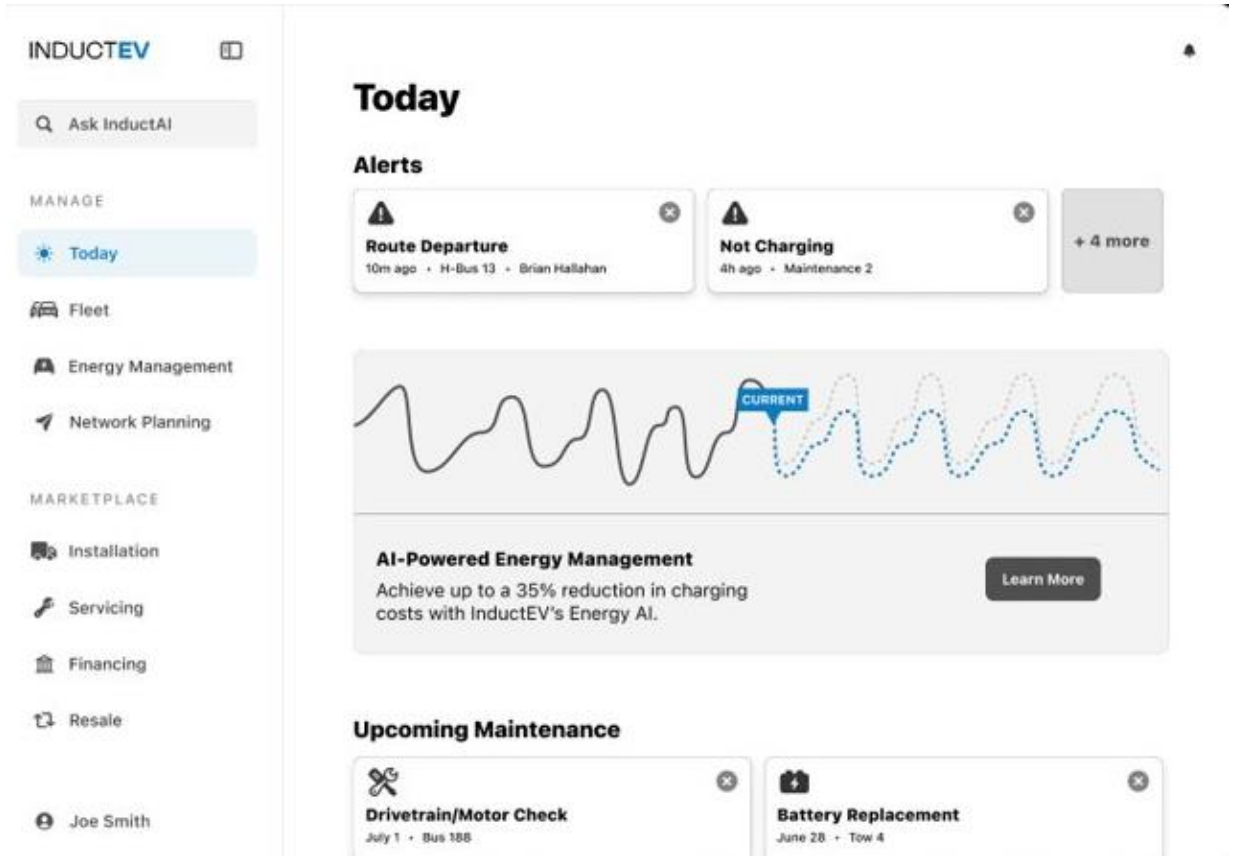
The INDUCTEV team is focused on enhanced organizational performance through strategic partnerships for faster and more scalable operations

Our Software Provides Diagnostic Insights, Telematics, Analysis, And Resilience



Vehicle Level Data

Charger & Component Data



AI-Driven Value Add Recommendations

InductEV live now in NY/NJ and set to deploy on the West Coast

Seven (7) MAFI T230e yard tractors deployed with InductEV wireless charging in Port Elizabeth, New Jersey

The case study has already been done: Our initial Deployment 2017: Link Transit, WA

History & Scope:

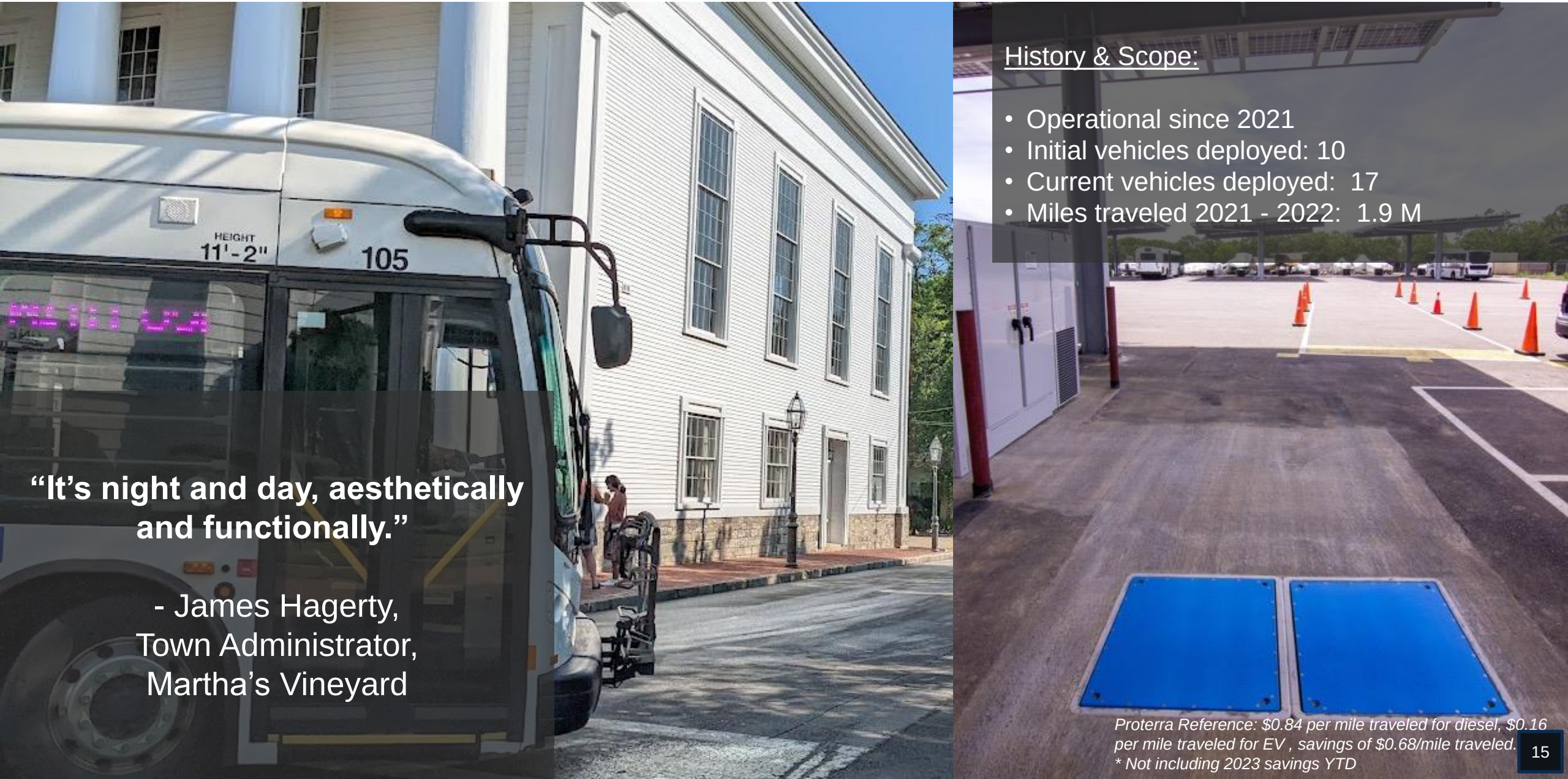
- Operational since 2017
- Deployed: 1 (2017) → 23
- 300kW Chargers: 4
- Sub -20°C with Substantial Snowfall
- +17 hr 370 Miles / +440 km Continuous Hwy Duty
- Return to Depot with 60-70% SOC
- **1:1 Diesel bus replacement**

"InductEV's wireless chargers have been a game-changer for us."

- Richard DeRock, GM, Link Transit

Diesel vs. EV savings: Proterra Reference: $0.84 per mile traveled for diesel, $0.16 per mile traveled for EV , savings of $0.68/mile traveled.
** Not including 2023 savings YTD*

Current Customer Deployments: Martha's Vineyard Transit, MA



"It's night and day, aesthetically and functionally."

- James Hagerty,
Town Administrator,
Martha's Vineyard

History & Scope:

- Operational since 2021
- Initial vehicles deployed: 10
- Current vehicles deployed: 17
- Miles traveled 2021 - 2022: 1.9 M

Proterra Reference: $0.84 per mile traveled for diesel, $0.16 per mile traveled for EV , savings of $0.68/mile traveled.
** Not including 2023 savings YTD*

First airport with wireless e-bus charging in the world
US: Kansas Airport turns to InductEV

KANSAS CITY International Airport

Opportunistic Charge Opportunity:

- Two (2) 300 kilowatt (kW) Chargers per 28 bus total fleet
- At New Terminal's shuttle bus stops near baggage claim
- Extended range without above-ground charging infrastructure
- 2023 ACT Expo Fleet Award Winner

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Current Customer Deployments: Gothenburg Taxi, Sweden

"The charging starts automatically, allowing drivers to conveniently charge without getting out of their car."

- Robert Eriksson, Senior Technical Leader at Volvo Cars

History & Scope:

- Operational since 2022
- Initial vehicles deployed: 22
- Current vehicles deployed: 22
- Miles traveled in 2022: 1.3M

$0.72 per mile traveled for gasoline vs $0.31 per mile for EV, savings of $0.41 per mile)
** Not including 2023 savings YTD*

InductEV Grant Program

InductEV Grant Support

InductEV provides dedicated end-to-end grant assistance with in-house and contracted experts.

In-house Team

InductEV has an in-house team dedicated to grant program identification and project matching, proposal development, and award management.

$175M+ Secured

InductEV's Grants Team has a history of success in preparing winning grant proposals for vehicle electrification projects at the local, state, and federal level.

Government Experts

InductEV leverages in-house experts and third-party consultants to engage with government officials pre- and post-application to galvanize key support and advocate for critical project funding.

InductEV Grant Consultant Support

Partnership facilitation, project development, and grant writing support

Grant services and federal advocacy

Public affairs and public relations, West Coast grant services and government advocacy

Grant services and Canadian federal and provincial government advocacy

BABA

Build America Buy America

INDUCTEV™ Fully BABA Compliant

Billions Available to Accelerate the Zero-emission Transition

United States

- EPA Clean Ports Program (CPP)
- Reduction of Truck Emissions at Port Facilities (RTEPF)
- Port Infrastructure Development Program (PIDP)
- Charging and Fueling Infrastructure Program (CFI)
- EPA Clean Heavy-Duty Vehicle Program (CHDV)
- Diesel Emissions Reduction Act (DERA)
- Communities Taking Charge
- Climate Pollution Reduction Grants (CPRG)
- Rebuilding American Infrastructure with Sustainability and Equity (RAISE)
- Infrastructure for Rebuilding America (INFRA)
- *...and many more at the regional, state, and federal level!*

Canada

- Green Municipal Fund
- Canada Growth Fund (CGF)
- Strategic Innovation Fund (SIF): Net-Zero Accelerator
- Zero Emission Vehicle Infrastructure Program (ZEVIP)
- Low-Carbon Economy Fund (LCEF)
- Rural Transit Solutions Fund

Funding is Available for Wireless Solutions

- Include wireless inductive charging in initial applications to grant making agencies
- RFPs can be designed to consider TCO of charging solutions in scoring criteria
- Emphasis placed on low- to no-human contact enhanced safety

Current InductEV Grant Projects

Clean Ports Program
- Collaborating with several terminal operators and their associated port authorities throughout the US

Diesel Emissions Reduction Act (DERA)
- Active port project with seven (7) MAFI yard tractors equipped with Vehicle Assembly pads and one (1) 150kW Ground Assembly unit

Low or No Emission Grant Program (Low No)
- Collaboration with **3 transit agencies** throughout the US on submission of grant proposals for battery electric bus transit system expansion
- Qualification statements and technical capability descriptions, partnership descriptions, and letters of support

Innovative Charging Solutions for Medium- and Heavy-Duty Vehicles
- Collaborated with ITS Terminal at Port of Long Beach as a Subrecipient to receive a **$3.3 million grant award** for hands free charging for battery electric cargo handling equipment.

InductEV's Current Port/Intermodal Efforts

- Reaching out to Ports and Intermodal Facilities nationally and around the globe to deploy wireless charging solutions
    - In discussion with large container terminal and railyard operators to choose InductEV as their charging solution
- Working with several OEMs to integrate the InductEV product into their commercial vehicles
- Working with governmental policy makers to shape wireless charging legislation and to provide grant funding opportunities to interested parties
- Researching and pursuing grant funding to assist in wireless charging projects

Thank You

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