

Brandy Henson



Head of Federal Government Business, Siemens SI

- Transformation Leader in Digitalization of Energy for the largest customer within Siemens USA
- 18 years in the Energy & Infrastructure Business
- Decarbonization, Resilience and Renewables have my heart
- Bipartisan Infrastructure Law Lead – Public Sector
- President Society Women Engineers Nashville
- Director SAME Post
- Horses are my passion, I love the Gypsy breed!



Agenda:

EV Market Overview

EV 101

Federal Funding IIJA – BIL

Federal Government Sustainability

Federal Fleet Electrification

Innovation

Industry Co-Creation

Q&A

| EV Market Overview

Today's biggest global challenges require transformative change

We will need to ...

Reduce emissions



Lower emissions
by 50%
in this decade
and reach
net 0 by 2050¹

Increase renewables



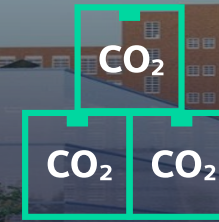
Install
8x more
solar panels and **5x more**
wind turbines
by 2030²

Electrify mobility



Grow use of
EV passenger vehicles
by ~25% per year
until 2030³

Capture carbon



Capture, use, and/or store CO₂³

Find net zero alternatives

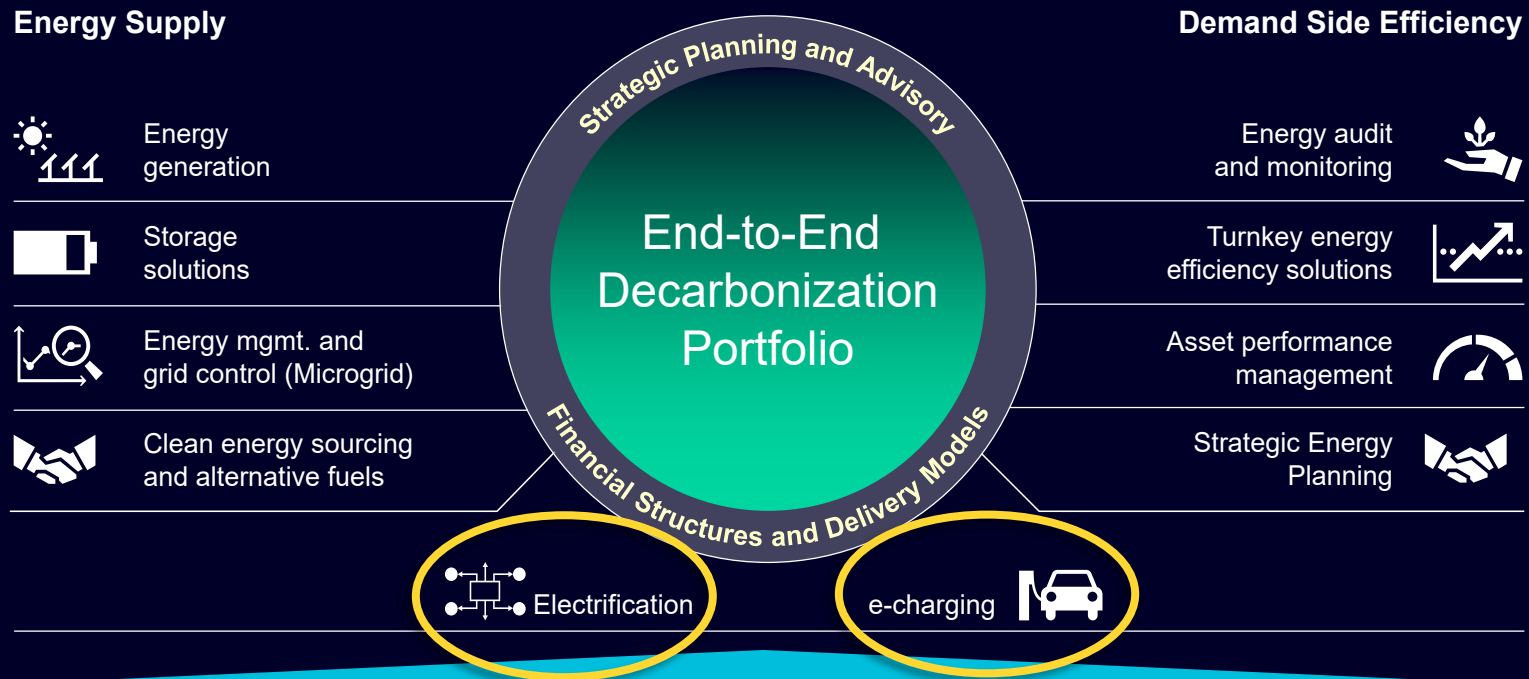


Shift to **zero-emission alternatives**
such as
electrification³

Source: 1 "Net-zero Challenge." Boston Consulting Group <https://www.bcg.com/about/about-bcg/net-zero> | 2 McKinsey and Company. Scenario A – "The 1.5-degree challenge." <https://www.mckinsey.com/business-functions/sustainability/our-insights/interactive-the-1-point-5-degree-challenge> | 3 McKinsey and Company <https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-math-what-a-1-point-5-degree-pathway-would-take>

Decarbonization Portfolio

Integrating Supply, Demand and Sustainability



Innovative Financial Structures and Options

Digitalization: Connecting and Monitoring

Monitoring, Reporting, Prioritization



Transportation Electrification Market - The EV wave is here!

Across all sectors of transportation



Auto Market Announcements:

- Ford Mach-E and eF150, Tesla, VW, Toyota, Kia, Nissan, Hummer EV SUV...

Delivery / Work Vehicles:

- Rivian-Amazon, Ford Transit, Penske, Volvo

School buses & Electric Semi Trucks are going mainstream

..Just to name a few!

The eMobility Market in the US is at an Inflection Point.....

The global EV market spend in 2019 was **\$39 billion**, by 2030 its expected to grow to over

720 billion

EV vehicles in the U.S. surpassed 400,000 units in 2021, increasing

83%

In 2020, the battery market expanded to **11GWh**. Compared to 2019, that's an increase of

41.3%

From 2021 to 2030, the E-Mobility CAGR is projected to grow

22%

By 2025, the expected number of EV's on the road in the U.S. is expected to surge to over

25 million

In terms of market share, by 2030 EV's will increase from around 3% today to more than

30%

... the passed Infrastructure (IIJA) bill will accelerate this growth



Ultium Cells LLC, a joint venture of LG Energy Solution and General Motors



TENNESSEE

Tennessee Gets a New Charge with \$2.3 Billion Battery Plant

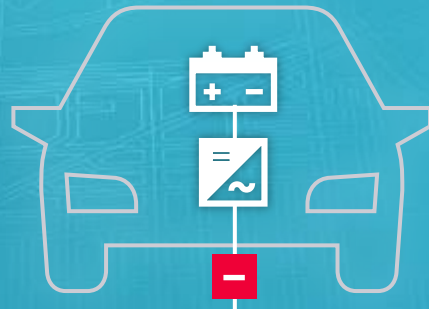
The new \$2.3 billion Ultium Cells LLC battery plant will create 1,300 new jobs and supply Ultium battery cells to GM's Spring Hill Manufacturing assembly plant, which will build the **Cadillac LYRIQ**.

| EV 101

Electric Vehicles 101 ...

Battery Charging Methods | AC vs. DC

Perfect For Long Term
Parking Locations



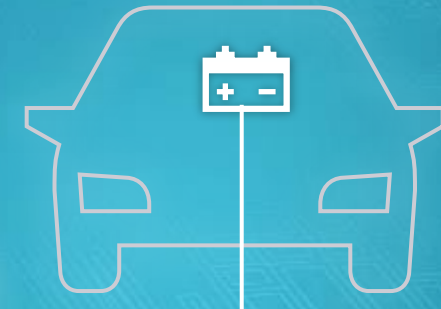
AC



DC



Perfect For Fast Charging &
Large Capacity Battery Vehicles



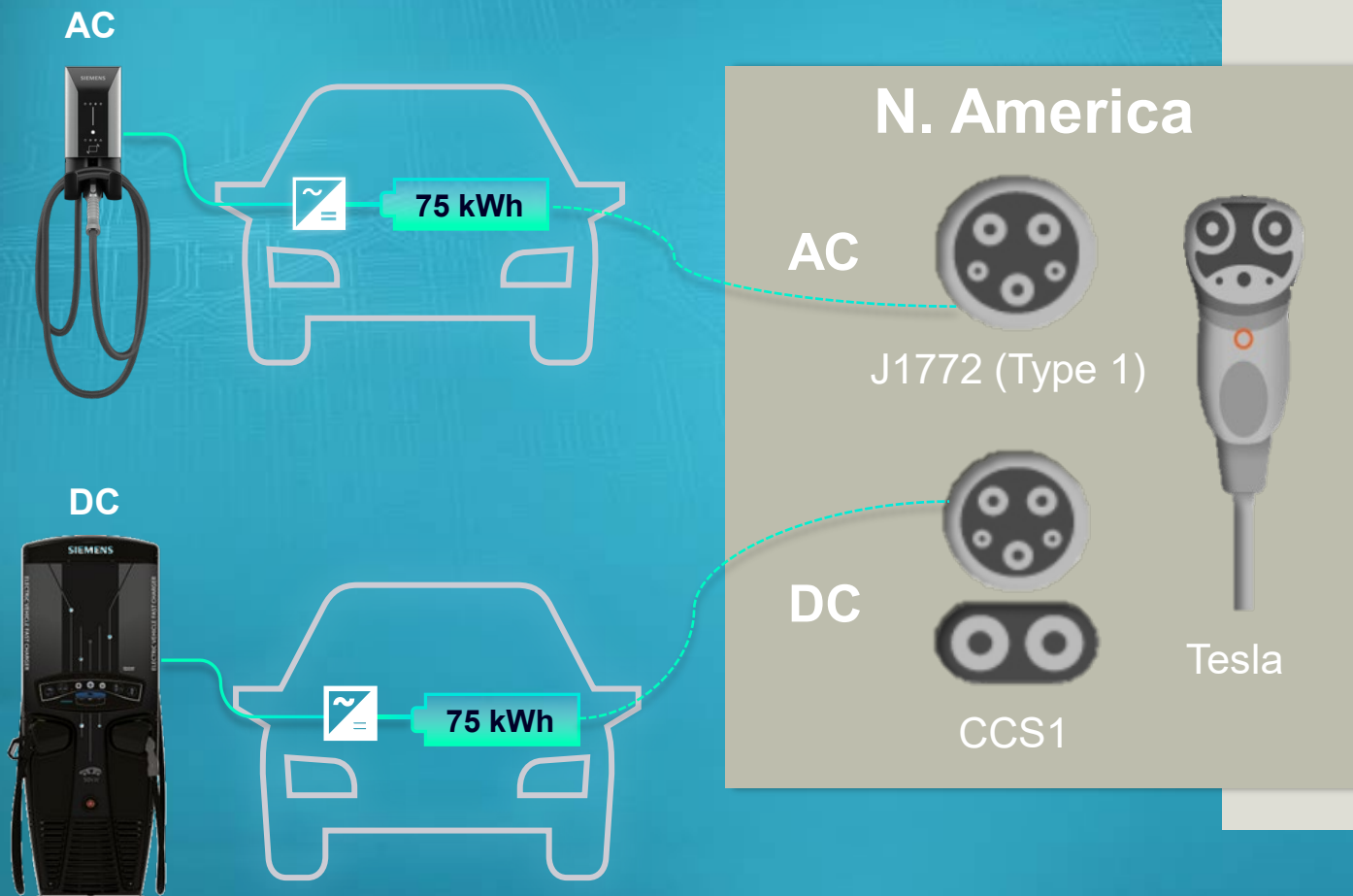
Siemens Offers Both Product Types

- Onboard inverter inside the EV
- Charging infrastructure has a small footprint and low investment cost
- Charging power rates depend on car inverter and electrical supply
- **Slower charge**

- **Inverter in the charging infrastructure**
- Lower investment cost in vehicle and larger footprint and investment in charging infrastructure
- **Higher Power charging allows faster charge**

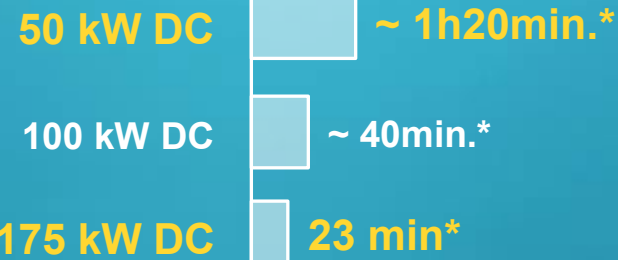
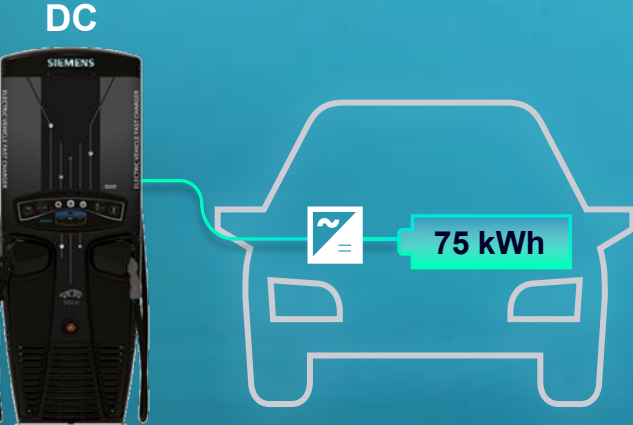
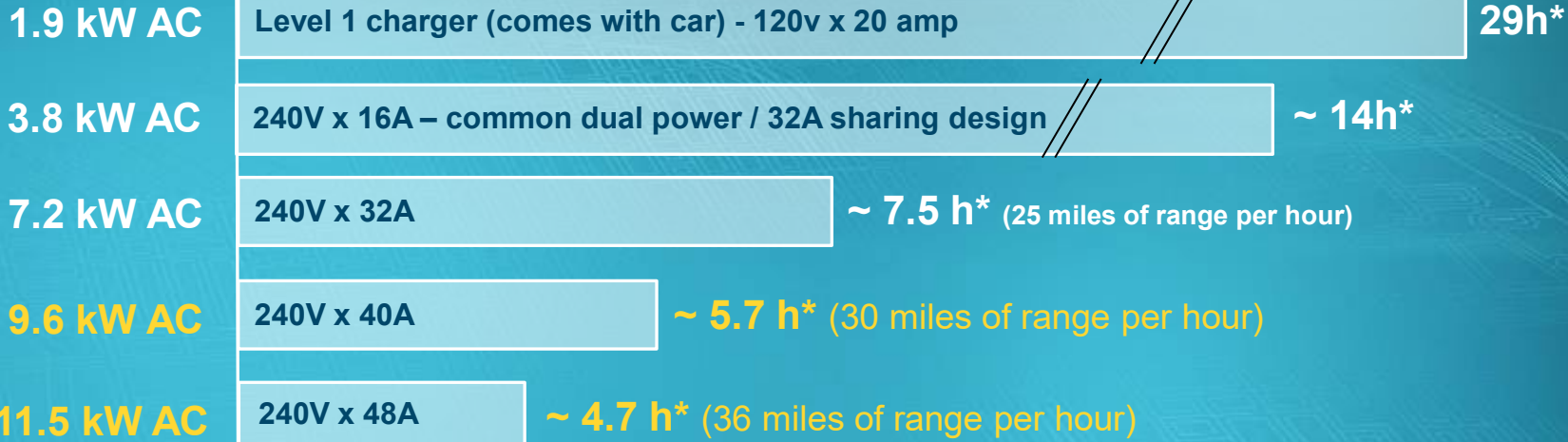
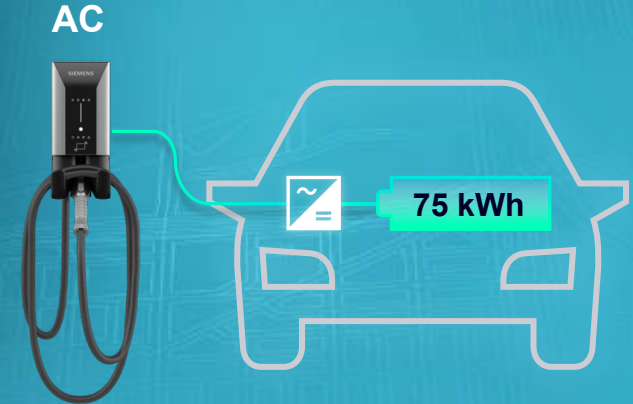
Electric Vehicles 101 ...

Plug Types



- In North America all vehicle manufacturer (except Tesla) use SAE J1772 connectors
- Tesla provides an adapter to enable use with J1772 connector charging stations
- Every EV sold in North America can use any charging station with J1772 connector.
- The CCS1 connector uses the J1772 charging inlet and adds two more pins below
- Tesla uses the same connector for level 1, level 2 and DC fast charge
- Only Tesla vehicles can use their DC fast chargers, called Superchargers.

Common “*Re-fuel* Charging” Times of an Average Electric Vehicle



- AC vs DC Considerations**
- Cost
 - Lead time
 - Impact on Battery Life
 - Power Requirements

Example: Tesla Model S or X, based on 75 kWh battery charging from 15% to 80%

Fleet Electrification is about more than electrifying a single place



| IIJA – BIL

Federal Stimulus

Bipartisan Infrastructure Bill – \$1.2T (includes \$550B Incremental funding)



The Association of Electrical Equipment and Medical Imaging Manufacturers



Infrastructure Investment and Jobs Act (\$400B+ indirect to NEMA members)

Utility Systems			Transportation		
\$13.1B grid upgrades	\$3B DER projects	\$2B energy storage projects	\$7.5B EV charging at DOT	\$400M EVs at maritime ports	\$1.4B resilient transportation systems
\$500M grid cybersecurity	\$10M transformer rebates	expedited transmission line construction	\$7.5B EV buses and ferries	\$2.275B maritime port electrification	\$20B airport electrification
Buildings Systems			Industrial Products		
\$250M energy efficient buildings	\$225M building code adoption		\$750M manufacturing facility modernization	\$10M motor and drive system rebates	
\$550M energy efficiency upgrades	\$250M energy efficiency in federal buildings		\$500M industrial facility emission reductions	\$225M energy efficiency in water facilities	

IIJA – BIL Customer Segments

Federal

SIEMENS



Federal investments for modernizing infrastructure and addressing climate are on their way.

New funding will be available for modernizing America's aging infrastructure, including the electrical grid.

Navigating the process of securing funding to manage the energy transition can seem daunting.

At Siemens, we're ready to help you hit the ground running.

[Speak with an expert](#)

Airports

SIEMENS



Federal investments for modernizing infrastructure and addressing climate are on their way.

New funding will be available for modernizing America's aging infrastructure, including airports.

At Siemens, we're ready to help you hit the ground running.

[Contact us today to get started!](#)

Utilities

SIEMENS



Federal investments for modernizing infrastructure and addressing climate are on their way.


New funding will be available for modernizing America's aging infrastructure.

At Siemens, we're ready to help you hit the ground running.

[Contact us today to get started!](#)

Education

SIEMENS



Federal investments for modernizing infrastructure and addressing climate are on their way.

Infrastructure and clean energy initiatives are a cornerstone of this important new funding.

[Contact us today to get started!](#)

State & Local

SIEMENS



Federal investments for modernizing infrastructure and addressing climate are on their way.

New funding will be available for modernizing America's aging infrastructure.

At Siemens, we're ready to help you hit the ground running.

[Contact us today to get started!](#)

Electrification Programs of Bipartisan Infrastructure Law **\$12.5B**

Grants for Buses and Bus Facilities

\$211M/Year (add funding to program)

covers at least 80% of cost for eBus and charging

Clean School Bus Program

\$5B (over 5 years)

covers up to 100% of cost for eBus and charging

National Electric Vehicle Formula Program

\$5B (over 5 years)

covers adding DCFC every 50 miles on highways

Grants for Charging & Fueling Infrastructure

\$2.5B (over 5 years)

National Fleet Company

175kW depot installation

DC Fast Charger

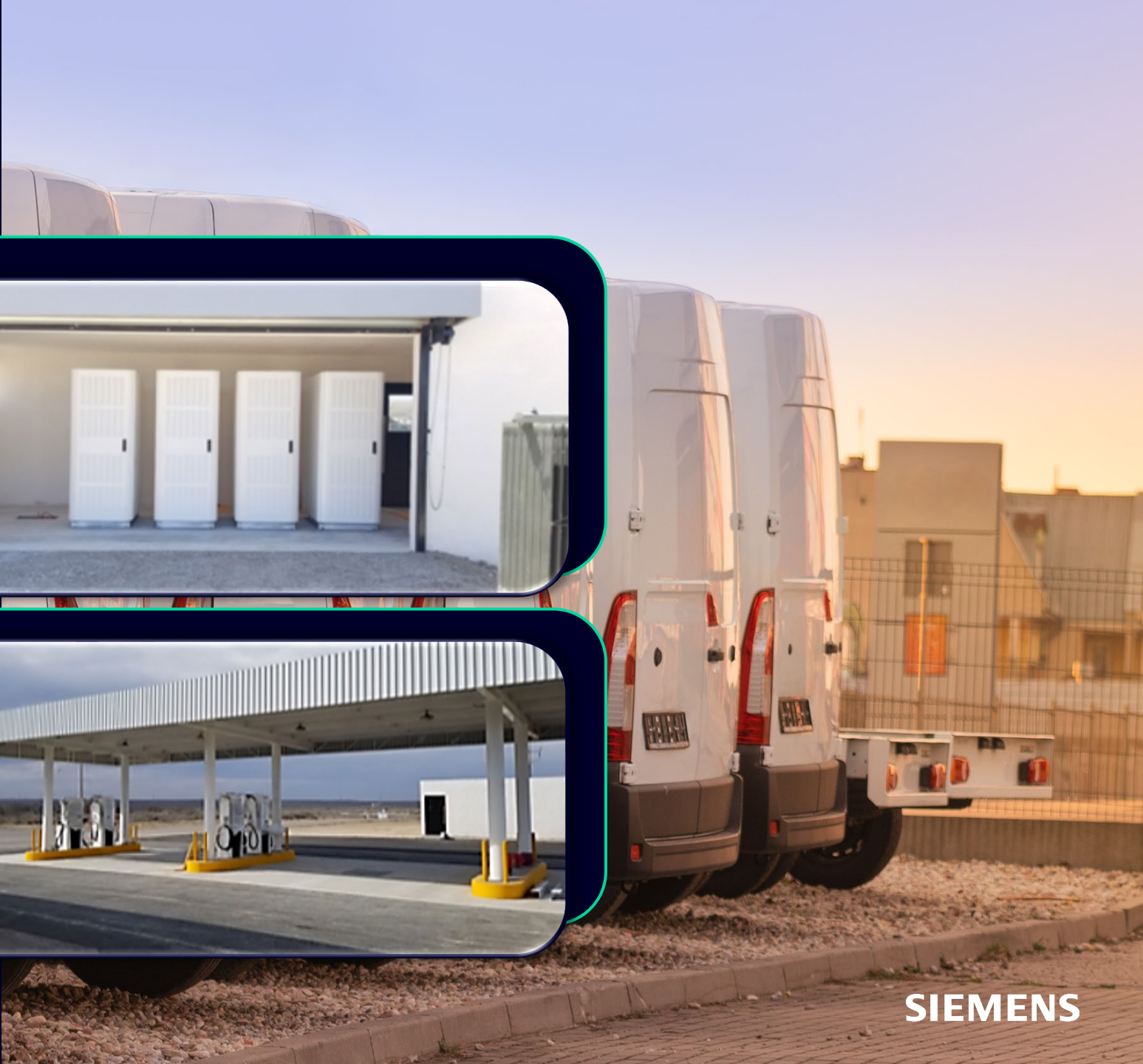
Gas station concept – EV depot

Power Control cabinets (top pic)

Last mile trucks

Siemens Ultra175 units

IIJA – \$5B over 4 years for on-highway DC Fast Chargers
Must be over 150 kW



Siemens eMobility Product Offering

The industries most comprehensive Electric Vehicle offering – **MADE IN AMERICA**

Commercial AC Chargers “Level 2”



VersiCharge

Home, Workplace,
Parking areas, longer-
term stop locations

- * **9.6kW & 11.5kW**
- Cell, Wi-Fi, OCPP,
Modbus, I/O,
FID / QR Code

DC Fast Charger “Level 3”



Ultra50 / Ultra175

Short term stop locations

- **50kW / 175kW**
- Wi-Fi, Cell, RFID,
- Credit Card,
- OCPP coms
- 30 min to charge

DC Heavy Duty Plug-In Charger



SICHARGE UC Plug-In

- Fleet, eBus &
Depots
- **150kW,**
- 200-950V
- Up to “4” remote
dispensers

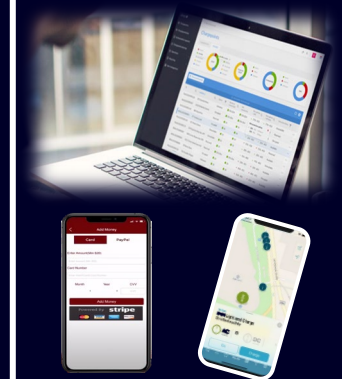
Overhead Bus Charger



SICHARGE UC Pantograph

- eBus & Fleet
charging
- On-route or
Depot charging
- **150kW - 450kW**

Cloud Service Offerings



Care, Charge and Control

- IoT cloud
Reporting,
trending, control,
alarming and billing
- Open connectivity
to any OCPP
charger



Made in America
Coming F22 Q4



Federal Government Sustainability



Federal Government Sustainability

Climate Resilient Infrastructure and Operations

There is little the Department does to defend the American People that is not affected by Climate Change.

-Lloyd J. Austin III, Secretary of Defense

Climate Change is THE context for all future National Security Planning.

-Deputy Secretary of Defense Kathleen H. Hicks

New Federal Goals and Requirements

Energy Act 2020:

- Requirements related to implementation of lifecycle cost effective (LCE) energy and water conservation measures identified in facility audits (use of performance contracting to address at least 50% of LCE measures identified)

EO 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability

- Net-zero emissions from overall federal operations by 2050
- 100% carbon pollution-free electricity (CFE) by 2030, including 50 percent 24/7 CFE
- 100% zero-emission vehicle (ZEV) acquisitions by 2035, including 100% zero-emission light-duty vehicle acquisitions by 2027;
- A net-zero emissions building portfolio by 2045, including a 50% emissions reduction by 2032; and
- A 65% reduction in scope 1 and 2 GHG emissions by 2030 from 2008 levels;

EO 14008: Tackling the Climate Crisis at Home and Abroad

- Use the power of procurement to increase the energy and water efficiency of installations, buildings, and facilities and ensure they are climate-ready



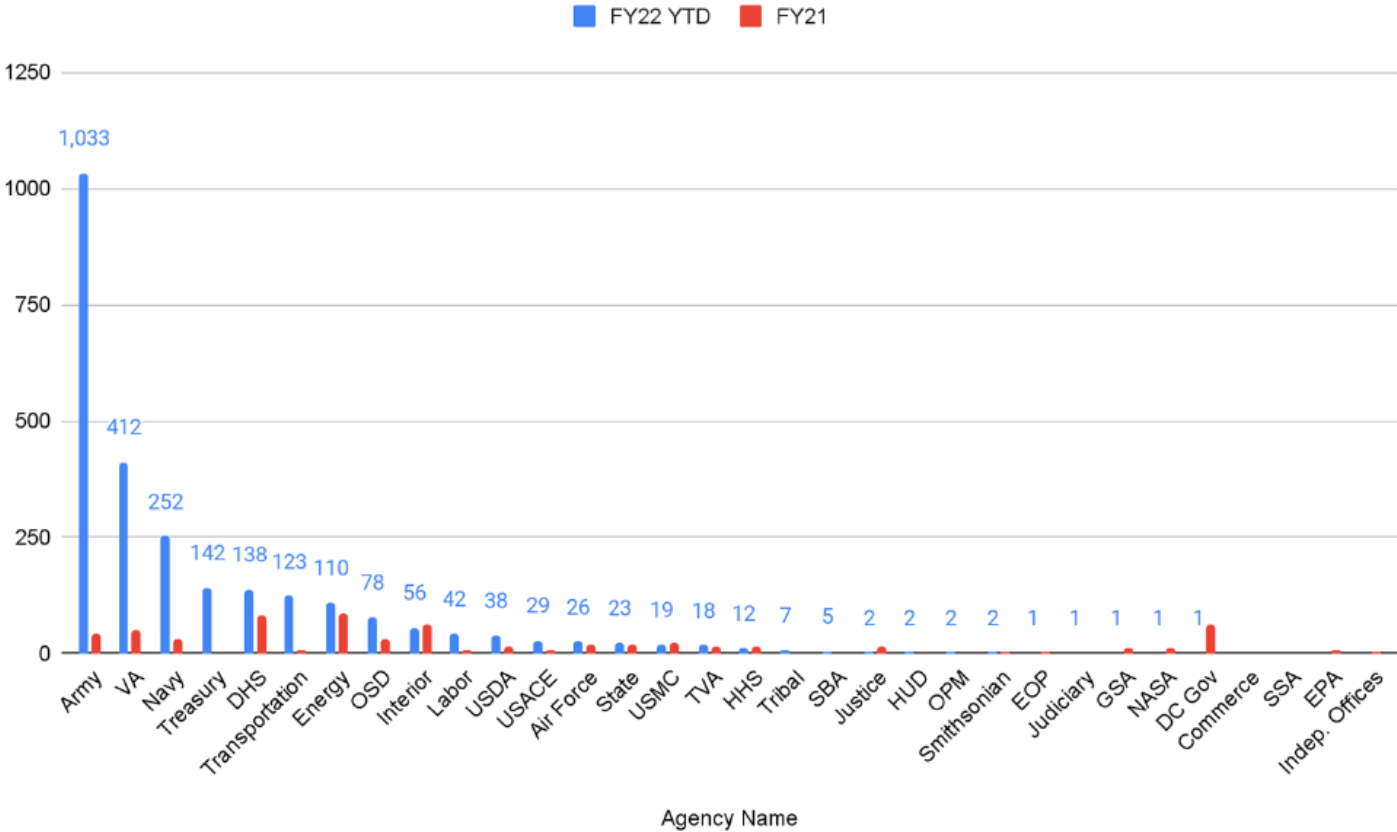
Federal Fleet Electrification

Federal Government ELECTRIFICATION

.5% of Fleet is EV today



FY21 & FY22 Electric Orders by Agency



Federal Government ELECTRIFICATION

GOAL:

100% Zero Emissions Vehicle Acquisition by 2035

100% Zero Emission light-duty acquisition by **2027**

CUSTOMER CHALLENGE:

Streamline procurement to Electrify Federal Government Fleet

0.5% of 650,000 are EV today

OPPORUNTY:

1. EVSE Infrastructure Hardware approval
2. Design Build - Feasibility Study, Design Assist
3. Upgrades/Modernization, Installation/Commissioning
4. Charging As A Service, Ancillary Services, O&M

Customer:

Federal Government
General Service Administration
Office of Fleet Management



SI Portfolio:

- Electrical Vehicle Chargers
- LV Infrastructure
- Services

Customer Procurement:

- Hardware approval awards - April 2022
- Design Build awards - expected July 2022

Deployment Timeline: 5 Year APPROVAL

- Design Build: starting Q1 2023
- Hardware: Q4 2022



Federal Government ELECTRIFICATION

2022 EVSE Blanket Purchase Agreements

BPA Number	BPA Holder (Value-Added Reseller)	Business Size	Brands	Platforms Undergoing NIST 171 or FedRAMP Process
47QMCA22A0001	ABM FACILITY SUPPORT SERVICES, LLC	LB	Atom Power, ABB, Blink Charging, ChargePoint, Efacec USA, EvoCharge, EVConnect, Heliiox, JuiceBar, Nuvve, Rhombus, SemaConnect, Tritium	Atom Power, ABB, Blink, ChargePoint, EVConnect, Nuvve, Rhombus, SemaConnect, Tritium
47QMCA22A0002	AMERESCO FEDERAL SOLUTIONS, INC.	LB	BTC and EVConnect	EVConnect
47QMCA22A0003	APOLLO SUNGUARD SYSTEMS, INC.	SB, SDVOSB	ChargePoint	ChargePoint
47QMCA22A0004	BEAM GLOBAL	SB	Beam Global	Beam Global
47QMCA22A0005	CARAHSOFT TECHNOLOGY CORPORATION	LB	ChargePoint	ChargePoint
47QMCA22A0006	DISTRICT FLEET, LLC	SB, SDB, HUBZone	ABB, BTC Power, EVConnect, EVoCharge, Freewire, Garage Juicebar, PowerCharge and Tritium	ABB, EVConnect, Freewire, Tritium
47QMCA22A0007	EATON CORPORATION	LB	Eaton	
47QMCA22A0008	ENERGY SYSTEMS GROUP, LLC	LB		
47QMCA22A0009	GLOBAL ENTERPRISE, INC.	SB	Livingston Energy, Terra Wallbox	Livingston Energy
47QMCA22A0010	LIOCE GROUP INC., THE	SB	SemaConnect	SemaConnect
47QMCA22A0011	OSC SOLUTIONS, INC.	SB, VOSB		
47QMCA22A0012	PACIFIC LIGHTING MANAGEMENT, INC	SB, HUBZone	EVConnect, Clipper Creek, EVLoop, EVSE LLC	EVConnect, EVLoop, EVSE LLC
47QMCA22A000A	PCS ENERGY, LLC	SB	EvoCharge	
47QMCA22A000X	SIEMENS INDUSTRY, INC.	LB	Siemens	EVC3 (the network)
47QMCA22A000Y	VERDEK, LLC	SB	ABB E-Mobility, AeroVironment, AMPLY Power, ChargePoint, Efacec, EVConnect, EVoCharge, Freewire	ABB E-Mobility, AMPLY Power, ChargePoint, EVConnect, Freewire
47QMCA22A000Z	WSP USA SOLUTIONS INC.	LB		

2022 EVSE Blanket Purchase Agreements

16 BPAs awarded to MAS contractors:

- 9 small businesses (5 small, 1 HubZone, 1 SDB - HubZone, 1 SDVOSB, 1 VOSB)
- 7 other than small businesses

CLIN	Description
CLIN 0001	Level 1 Charging Stations
CLIN 0002	Level 2 Charging Stations
CLIN 0003	DC Fast Charging Stations
CLIN 0004	Solar/Off-grid Charging Stations
CLIN 0005	Portable Charging Stations
CLIN 0006	Site Planning/validation and prep; consulting; procurement support; utility coordination; design; basic install (when no construction is needed), project management and more
CLIN 0007	Power Management and Metering
CLIN 0008	Network Data Plans and Packages
CLIN 0009	Operation, Repair and Maintenance Plans
CLIN 0010	Non-Conventional Solutions
CLIN 0011	Accessories and Components
CLINs 002, 003 & 010	Charging as a Service

Federal Government ELECTRIFICATION

General Construction with Design/Build Capabilities to Support EVSE Installation

Design/Build IDIQ Scope

General Construction Services

Design/Build Services

Feasibility Study and/or Site Assessment

Utility Coordination

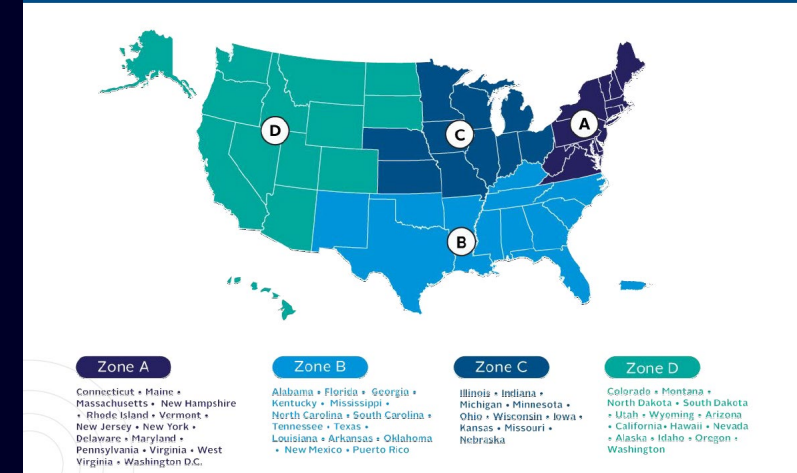
Electrical Infrastructure Upgrades
(e.g., conduit, switchgear)

EVSE Installation

Other site work
(e.g., trenching, bollards)

Testing, Commissioning

Four (4) Small Business Geographic Zones



Benefits include:

Full solution for electric vehicle infrastructure in lieu of providing EVSE as government-furnished property

EVSE meets cybersecurity and supply chain risk management (SCRM) requirements

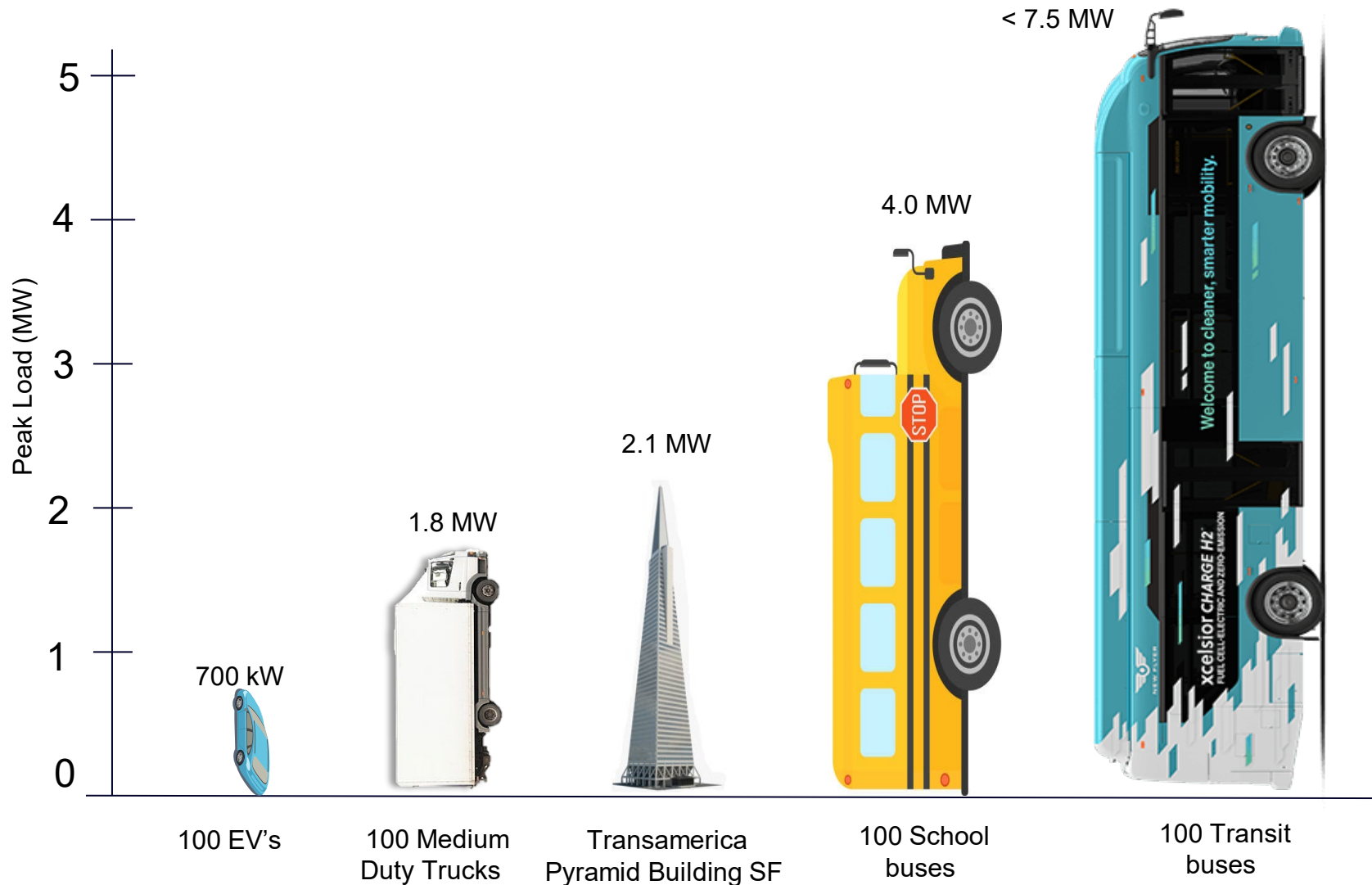
Previously established EVSE pricing at a discounted rate

Solicitation Number: 47PL0122R022

SIEMENS

| Innovation

PlugtoGrid™ Scale Up

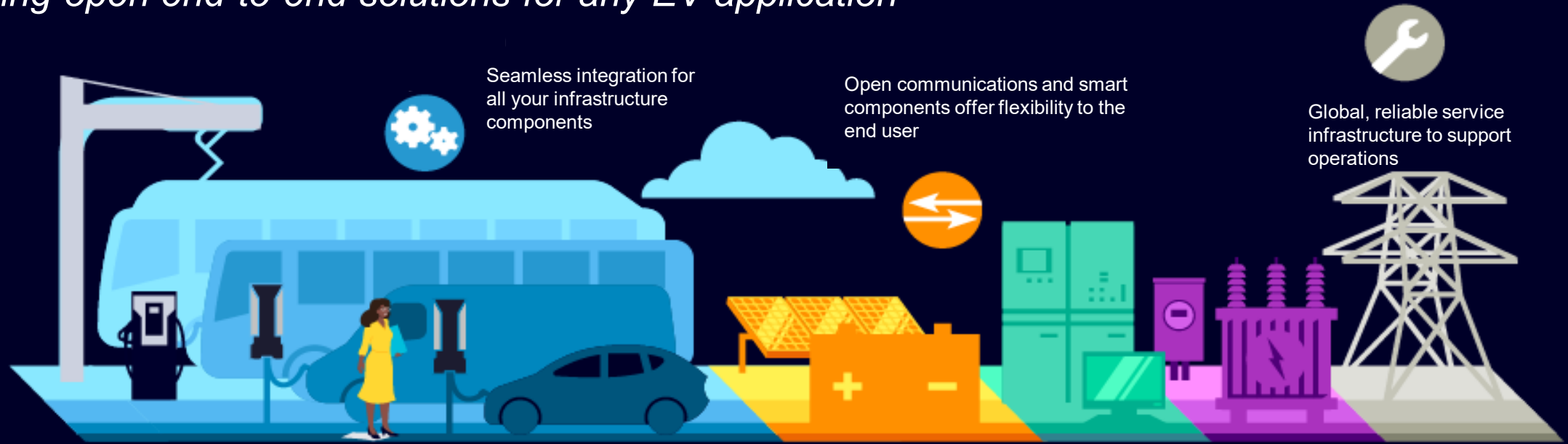


Highlights

- Load Management is a critical enabler for scale up
- New build planning for scaled up charging infrastructure deployments, up front consulting
- Microgrids and Renewables integration will address choke points for deployment in existing facilities and new build facilities.

Siemens PlugToGrid™

Supplying open end-to-end solutions for any EV application



Charging solutions of all power levels available



Design and build consulting available



Comprehensive charging as a service offering managing charging infrastructure



Global presence to incorporate advancements from all over the world



Design & build

- Large LD infrastructure deployment
- MD/HD depot
- Microgrid
- Greenfield/Brownfield projects
- Infrastructure expansions
- 3rd party chargers

EV chargers

- DC heavy-duty plug-in (SICHARGE UC)
- High powered pantographs
- AC level 2 (VersiCharge)
- DCFC level 3 (Ultra)

Make-ready equipment

- Power distribution equipment
- Simplifying installations with one vendor

Digital services

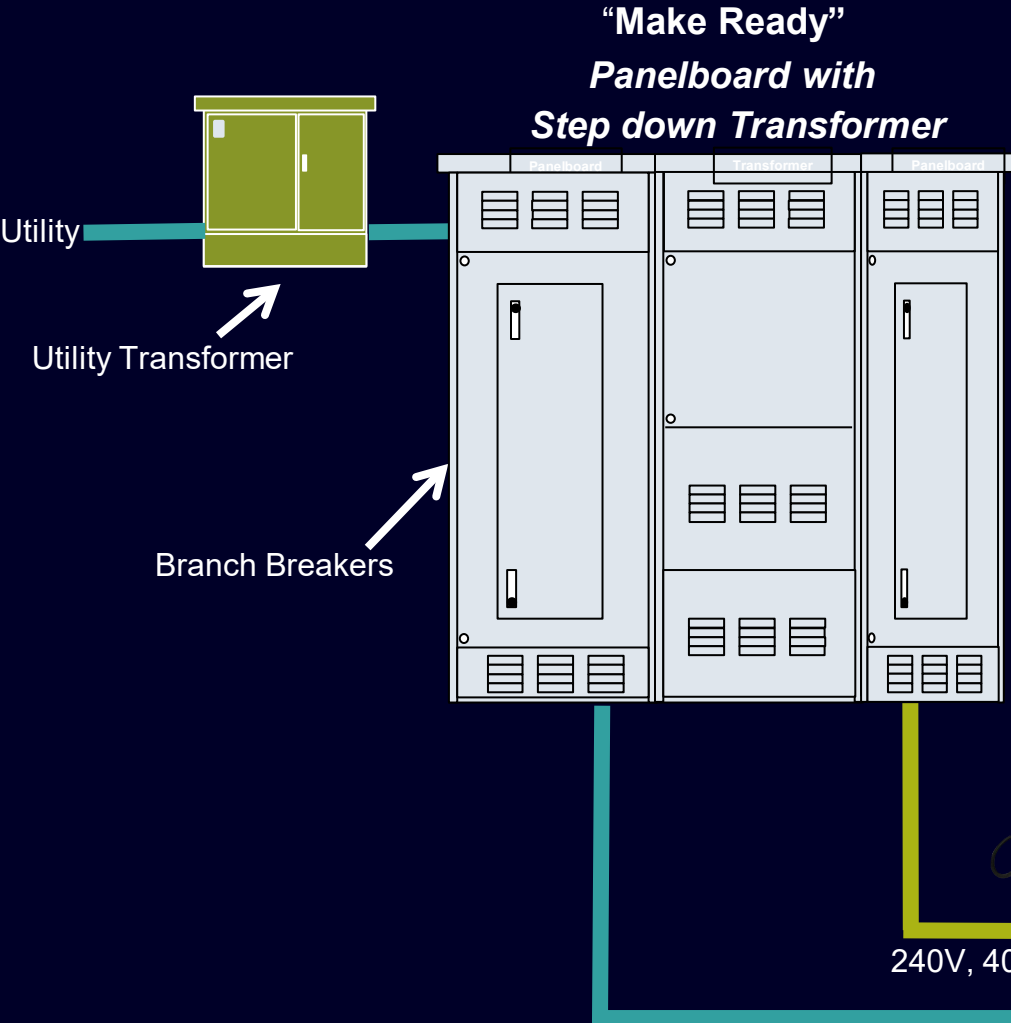
- Charger management / billing
- Building management systems
- Load management
- Scheduled charging
- Energy optimization

Asset services

- Onboarding
- Project Financing
- O&M management
- Maintenance and service contracts
- Warranty

Example - PlugToGrid™ Offering

Combined DC / AC Example



Applications:

- Parking lots
- Rest Stops
- Fleet Depo's
- Chain stores
- And more



Power cable in conduit / 480V 3P with dedicated 100A breaker per DC Fast charger



Electric Vehicle Charging Prototype to Enable Faster EV Infrastructure Deployment

LEGO Application for Busway, Power, EVSE



Challenge

- Electrify thousands of vehicles quickly
- Scale up across multiple locations
- Utilize existing parking locations

Solution

- Prefabricated charging infrastructure
- Quick installation.
- reduce ground installation work
- modular for easy future expansion

Result

- AC and DC charging stations Faster install, lower cost



SIEMENS

| Industry Co-creation

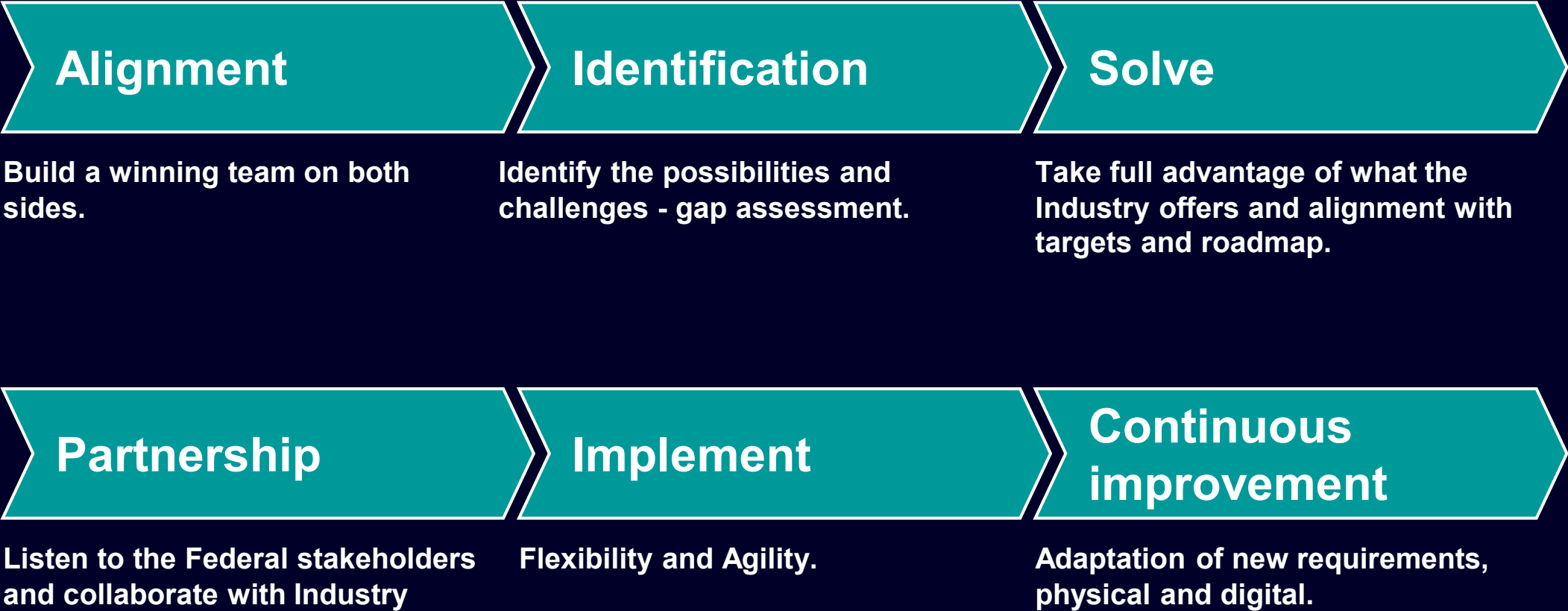


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Industry Co-Creation

- Alignment with multiple stakeholders to understand the mission (ZEV)
- Bringing innovative ideas to modernize the Infrastructure (Plug to Grid)
- Leverage agnostic solutions approach (OCPP)
- Integration of disparate existing systems (Navy AMI, Army MDMS)
- Inclusive of the broader Federal ecosystem, industry and emerging technologies (WEX Federal Fleet)
- Cybersecurity integration (FedRAMP)
- Sustainability - Climate Resilient Infrastructure & Operations (ZEV)

Industry Co-Creation Process



Contact Information

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| Backup Slides



Fleet Application - Penske Truck Expands Heavy-Duty EV Charging in U.S

DC fast charging and cloud-management

150 kW DC fast chargers at Ontario, CA location
Cloud-services to manage fleet

More than chargers,

Service includes battery storage

Penske ramps up EV charging stations

- 6 locations in Southern California
- Recent ruling that all new trucks sold in California should be zero-emissions by 2045

Photo credited by Penske – <https://www.gopenske.com/blog/lease/penske-truck-leasing-continues-to-expand-heavy-duty-electric-vehicle-charging-network>

eMobility Product Offering

The industries most comprehensive Electric Vehicle offering

Commercial & Residential AC Chargers “Level 2”	DC Fast Charger “Level 3”	DC Heavy Duty Plug-In Charger	Overhead Bus Charger	Cloud Service Offerings
				
<h2 data-bbox="71 878 445 935">VersiCharge™</h2> <ul data-bbox="38 1013 471 1213" style="list-style-type: none"> • Home, Workplace, Longer-term stop locations *9.6kW & 11.5kW • Cell, Wi-Fi, OCPP, Modbus, I/O, RFID / QR Code 	<h2 data-bbox="547 878 1006 935">Ultra50™ / Ultra175</h2> <ul data-bbox="547 1013 955 1249" style="list-style-type: none"> • Short term stop locations *50kW / 175kW • Wi-Fi, Cell, RFID, Credit Card, • OCPP coms • 30 min to charge 	<h2 data-bbox="1095 863 1490 978">SICHARGE UC™ Plug-In</h2> <ul data-bbox="1070 1013 1516 1170" style="list-style-type: none"> • Fleet, eBus & Depots *150 - 450kW • Up to “4” remote dispensers or pantograph 	<h2 data-bbox="1592 863 1987 978">SICHARGE UC™ Pantograph</h2> <ul data-bbox="1567 1013 2012 1170" style="list-style-type: none"> • On-route or Depot charging for Fleet & eBus *450kW • OCPP Coms 	<h2 data-bbox="2089 863 2497 978">Care, Charge and Control</h2> <ul data-bbox="2063 1013 2497 1213" style="list-style-type: none"> • IoT cloud Reporting, trending, control, alarming and billing • Open connectivity to any OCPP charger

Siemens eMobility Americas (NAM) Coverage, Support and Experience

100,000+

Charging points (2010-2021)

≈12 Years

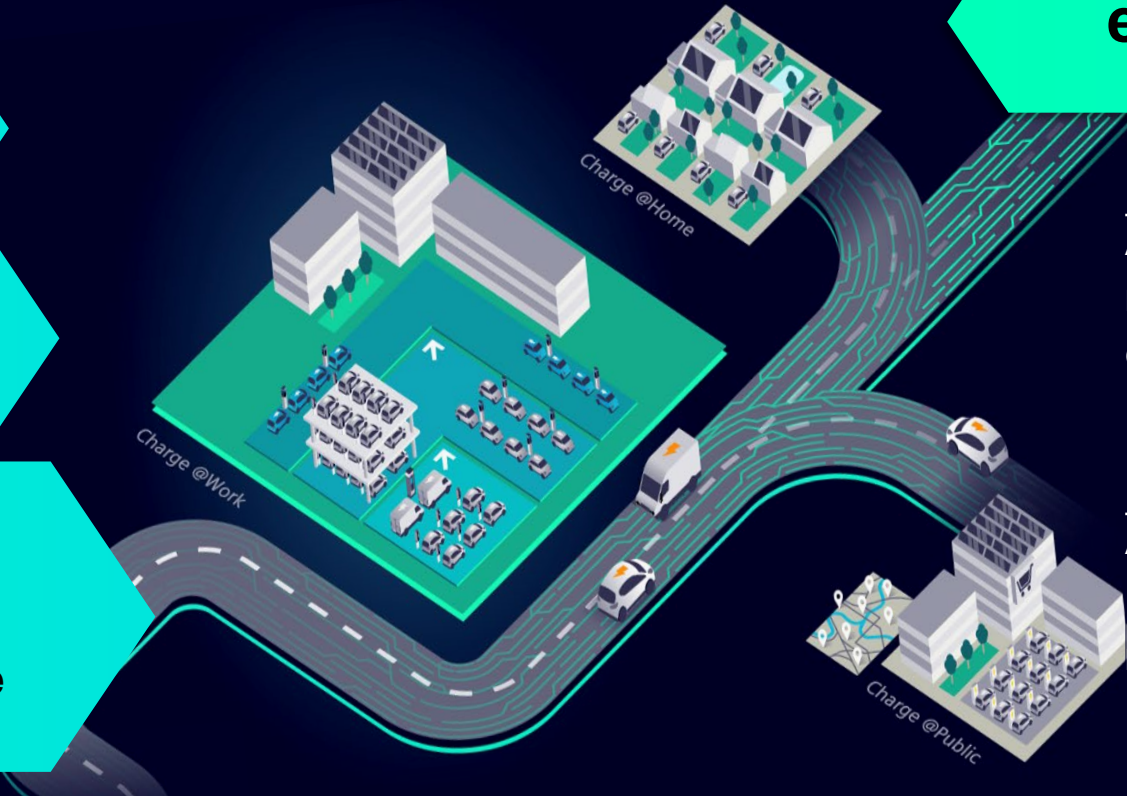
EV Experience

NAM Support

2,800 Channel Partners
1,000+ Siemens Sales
1,000's of Siemens service support personnel

Global Focus

EV Products for UL / IEC / CE / GB/T



eMobility NAM Footprint

R&D / Corporate Office

AC Charging	Atlanta, GA / Germany
DC Bus Charging, Charging Software	Atlanta, GA / Germany Atlanta, GA / Germany

US Factory Footprint

AC Charging	International California (Buy America)
DC Charging	Wendell, NC Alpharetta, GA Nashville, TN (Q4 F22)
Make-ready Panels	Wendell, NC Spartanburg, SC Grand Prairie, TX Pomona, CA

VersiCharge™ G3 Commercial Network Connectivity

Siemens Cloud (OCPP) Billing & Control Solutions

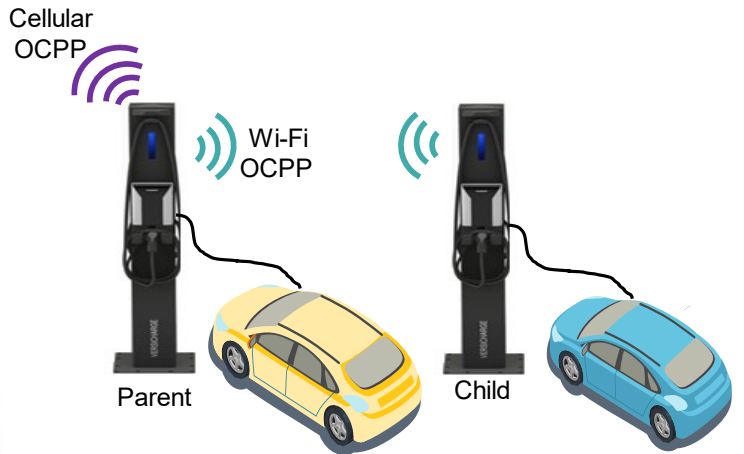
Siemens Cloud Services
or other OCPP Cloud provider



Option 1:

Child Wi-Fi* to Parent with Ethernet, to buildings LAN network with open connection to the cloud

* Consult with Siemens for Wi-Fi distance limitations between Parent and Child.



Option 2:

Child Wi-Fi* to Parent with Cellular connection to the cloud

VersiCharge AC Series | UL Highlights

Rugged housing for indoor/outdoor use (NEMA 4)

Metering (+/- 1% standard accuracy)

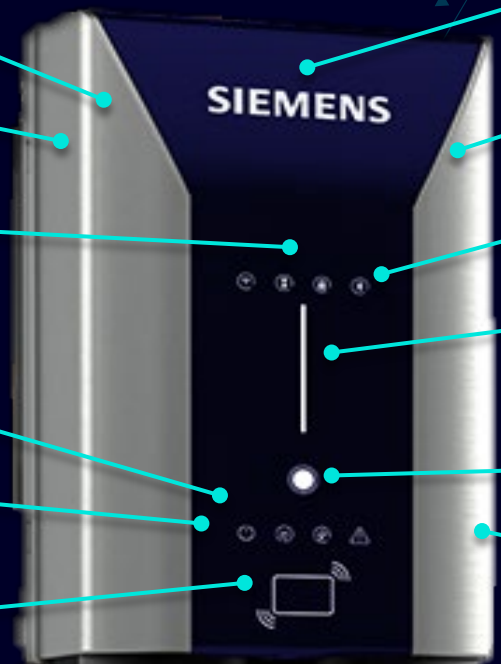
Status LEDs for vehicle connection, charger status and panel locked

Adjustment dial for current limitation

Integrated ground fault detection and automatic reset functionality

User authentication via an RFID reader (Mifare standard)

240V, 50A and 60A breakers required



High performance dual band Wi-Fi

UMTS / LTE /4G (Parent units)

RS485 Modbus RTU to BMS

Status bar for extended user interface options

Touch-sensitive button for delay of charge and fast charge

UL certification

21ft cable with plug

Siemens EV Charging Portfolio for Enterprise Accounts AC Chargers



Up to 11.5kW



Workplace & Residential Charging

- Charges all EV cars up to 11.5kW
- Supports standard plug design – SAEJ1772
- Billing or On/Off control with RFID or QR code
- Wi-Fi, Ethernet, and 4G capable
- Support key communications such as OCPP 1.6

Flexible Installation Options

- Wall Mountable, Post Mount, Cable Retraction Systems, Integration Partners

Services

- Brand Label Opportunities
- EVSP Onboarding Services
- Driver Cell Phone App
- Owner Management Software Tools

VersiCharge Ultra™

Automotive / Fleet Focused Product

One of the fastest growing charging lines

Features

- Dual cord design can accommodate one CCS1 plug and one CHAdeMo plug for maximum flexibility
- Communication via 4G wireless or ethernet wired
- Options include built-in credit card reader and RFID capability
- 175 kW model has an external module to support the power electronics
- Liquid cooled power electronics
- 50kW & 175 kW units are proven and widely used in North America, 480V, 3 phase, 100A and 250A breaker requirements

The charger can be custom-wrapped to reflect the customer branding

50 kW



175 kW



SIEMENS

SICHARGE UC™ Modular System

Fleet Charging Solutions for City / Government and Private Sector

- The SICHARGE UC 150 provides a modular 150kW solution that can be expanded to 450kW.
- Connections can include external dispensers and/or pantograph applications.
- Each SICHARGE UC 150 lineup will support up to four remote dispensers.
- Siemens has high power plug-in and mast pantograph installations all over the world.



DAIMLER



RENAULT



NEW FLYER



PROTERRA

Siemens EV Charging Portfolio for Enterprise Accounts

DC Fast Charging



Up to 450kW



Up to 175kW

Mid Mile & Last Mile Heavy Duty Fleet

- DC Fast Charging for Automobile/Trucks
- DC Heavy Duty Vehicle Charging

Public or Private Installation Options

- Public facing DC Fast Chargers with Credit Card readers for day
- Depot Style configuration for a reduced electrical footprint and cost savings

Services

- Custom Branding for public facing chargers
- Owner Management Software Tools
- Fleet Management Tools