

Drive Clean. Drive Electric

Electric Vehicle Charging Stations - 101



APEC Meeting– Nov 20, 2020

Agenda

- **Why go Electric?**
 - Why now?
- **Electric Vehicles**
 - Past, Present, and Future
- **EV Terminology**
- **EVSE (Supply Equipment)**
- **EV Charging Infrastructure**
- **EV Considerations**
 - Cost Factors
 - Location
 - User Management
- **Charge Ahead Programs**
 - Corridor Charging Program
 - Local Incentive Program



Electric Vehicles

Why Now?

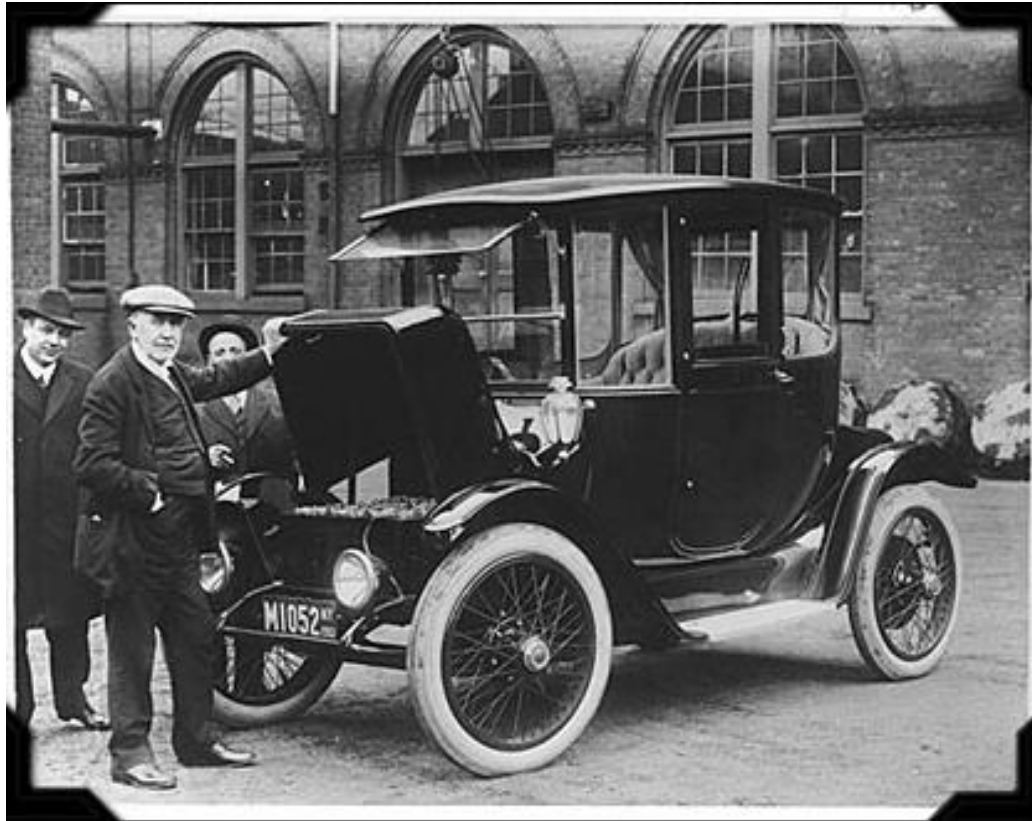
- Environmentally friendly sustainable technology
 - Less emissions
- Economics
 - Less maintenance
 - Lower fuel costs (\$1.00/gallon!)
 - Lower total cost of ownership
- Rapidly changing technology
 - Battery technology is developing rapidly
 - 300 mile + range and price will continue to fall
 - Major automakers promise as many as 50 new models by 2025!



www.AmerenMissouri.com/EV

Electric Vehicles

Early Models



Electric Vehicles

2010-2012

- Major auto manufacturers start selling in US
- GM rebounds with the Chevy Volt extended range EV
- Ameren purchased and still operates several of these models



Electric Vehicles

Today's EVs



Electric Vehicles

Tomorrow's EVs



More electric crossovers, SUVs, and trucks are coming in 2020-2022

2020 Ford Escape PHEV



2021 Jeep Wrangler PHEV



2021 Rivian R1S BEV



2021 Ford Mustang Mach-E BEV



2021 Rivian R1T BEV



2020 Toyota RAV4 Prime PHEV



2021 Nissan Ariya BEV



2021 VW ID4 BEV



2021 Lincoln Corsair PHEV



Future Electric Pickups:

- Ford F150
- GMC Hummer EV SUT
- Rivian R1T
- Tesla Cybertruck
- Bollinger B2
- Lordstown Endurance
- Nikola Badger

Also look for GMC Hummer EV SUV, Cadillac Lyriq BEV, and ~5 BMW PHEVs

Electric Vehicles

Terminology

- ICE Internal Combustion Engine
- EV Electric Vehicle – normally implies “with plug” but there are various:
 - HEV Hybrid electric vehicle (Prius – NO plug)
 - PHEV Plug in HEV (Prius prime, Honda Clarity)
 - EREV Extended range EV (Chevy Volt)
 - BEV Battery EV (full plug in)

Electric Vehicle Charging

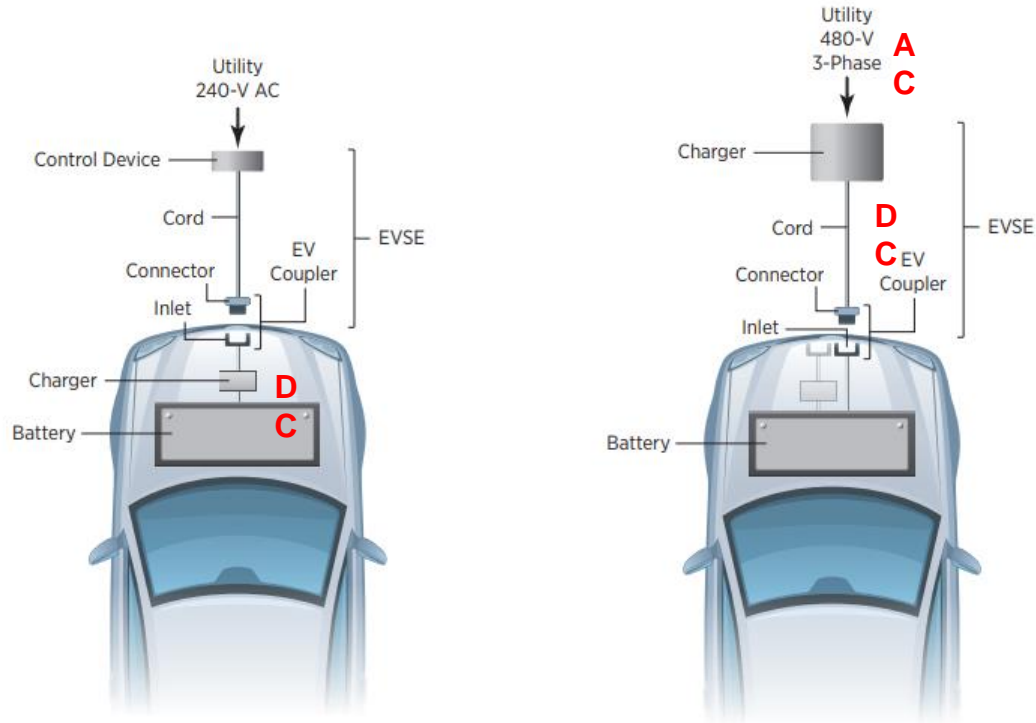
Various charging options

- Level 1 (120V)
 - 4-5 miles per hour of charging (15-20A)
 - Included with car purchase or available at work/around town
- Level 2 (240V)
 - 12-25 miles per hour of charging (16-80A)
 - Commercial and residential grade available
- Level 3 (DC Fast Charging)
 - 50kW – 75+ miles in 30 mins
 - Tesla Supercharger – 130 miles in 20 mins



EV Chargers

AC vs DC



**Note that charger is in the car for L1 & L2*

EVSE Connector Types

North America



Type	J1772	CCS Combo	CHAdeMO	Tesla
Level 1 AC	✓			✓
Level 2 AC	✓			✓
Level 3 DC		✓	✓	✓

EV Charging Installation Guide for Business



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Welcome 1

Introduction 2

Charging Overview 3

- Defining EVSE (Electric Vehicle Supply Equipment) 3
- Types of Charging Equipment 3
- Connectors and Plugs 4
- Recommendations 6
- 'Smart' or Basic Charging? 10

Payment Options 11

Monitoring and Reporting 12

Considerations 12

- Location 12
- Convenience 12
- Driver Safety 13
- Mounting Type 13
- Internet Connection 14
- Protecting Chargers 14
- Aesthetics 15
- Signage and Marking 15
- Accessibility 16
- Potential for Growth 16
- Cable Management 16
- Benefits of Offering Charging 17

Associated Costs 18

- Equipment 18
- Installation 19
- Internet Connection 19
- Maintenance 20
- Energy Use 20
- Incentives 20

Checklist 21

- Goals and Scope 21
- Internal Buy-In 21
- Budget and Timeline 21
- Incentives 21
- Installation Contractor 21
- Project Design 22

Conclusion 23

- Additional Resources 23



Important Questions

Compromise will be necessary

- What is the goal or reason you are considering EV charging?
 - Sustainability
 - Economics
 - Employee Engagement
 - Customer Amenity
- Access – public, limited, or private (dedicated)?
- Price – free to all, free to some, never free?
- Payments – what forms do you accept?
- Dwell time - how long will vehicles park?
- Visibility – do you want it?
- Power – do you have it?

Cost Factors - Equipment

- Equipment
 - Level and quantity
 - Vendor/Software
 - Networking
 - Install Type



Examples – wall mount vs. pedestal



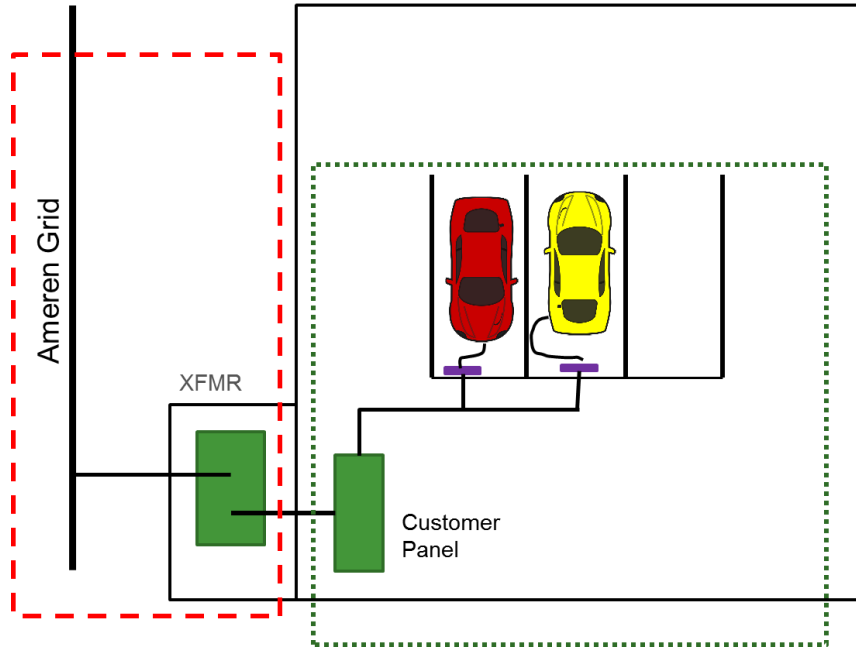
Image courtesy of City of Richmond Heights

Cost Factors – Signage and Maintenance



Cost Factors – Electric panel capacity

- Available Power/Future Expansion
- Timing is everything!



Location Matters!

- Equipment and Power Access
- Easily visible
- Prime parking?



Location – ease of access



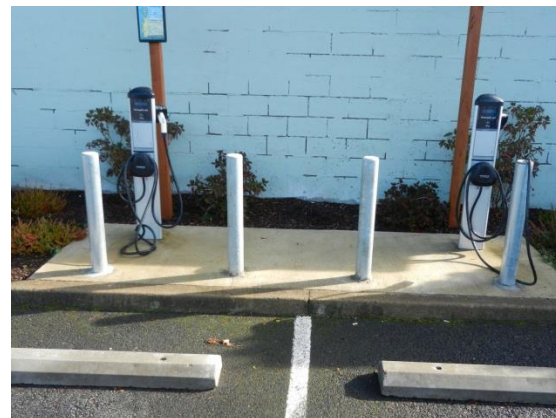
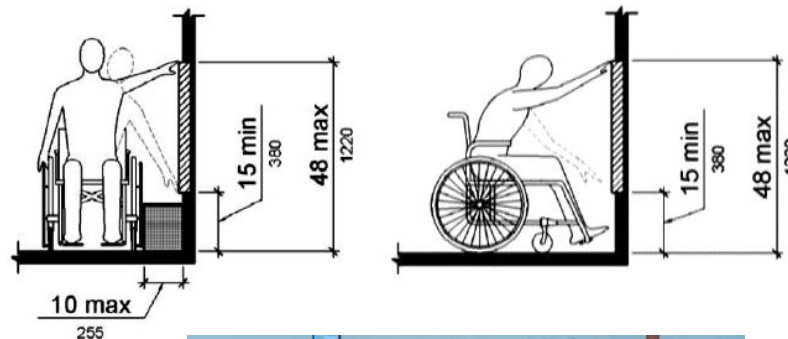
Location – User Safety



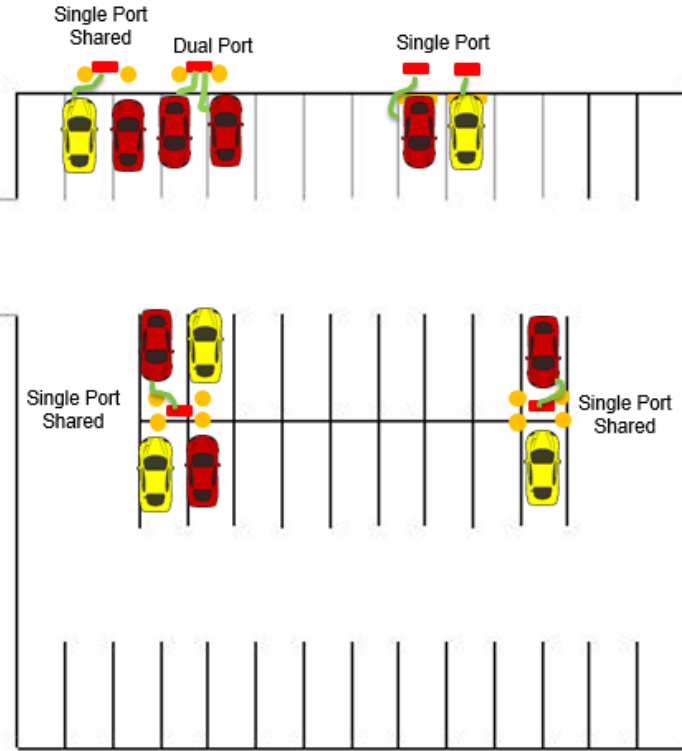
Location

- Accessibility/ADA

- Aisle for wheelchair
- Reach to charger
- Adequate room to move to car's port
- Ramp to destinations



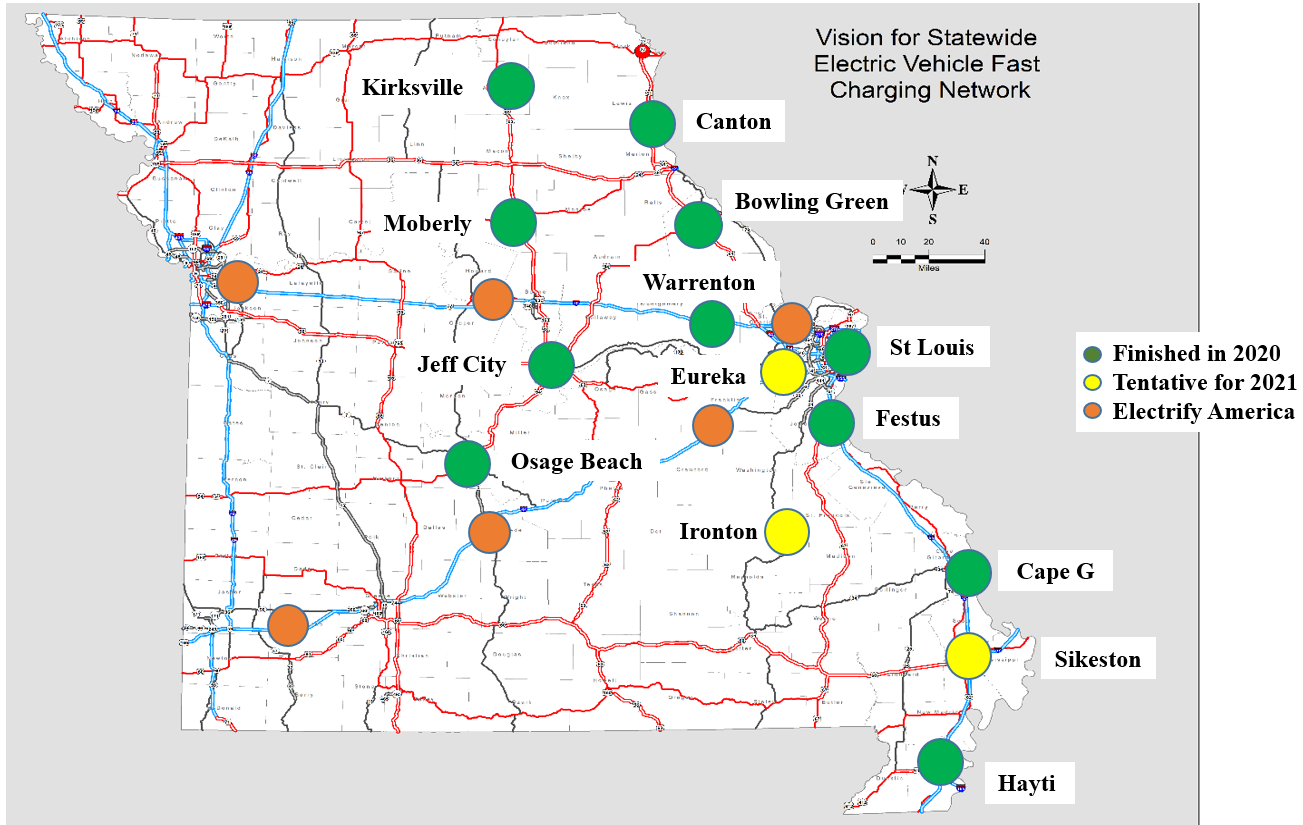
Some examples



Some examples



Corridors Progress Map



Festus Schnucks



Incentives for Business

Charge Ahead – Local Charging

- 3 year, \$6 million program
 - \$5,000 per Level 2 port
 - \$20,000 per DC fast charger (50kW max)
 - Up to 50% total project cost
- | | |
|----------------|---------------------|
| • Public | 6 L2 ports, 2 DCFC |
| • Workplace | 10 L2 ports, 2 DCFC |
| • Multifamily* | 10 L2 ports |



Charge Ahead – Local Incentive Program



Applying for Incentives

AmerenMissouri.com/EV - choose **Business**

Electric Vehicles for Business

Ameren Missouri is your workplace EV charging resource. EVs are increasingly showing up at workplace parking lots throughout our region. Ameren Missouri will help ensure you are prepared for employees asking to charge their cars at work.

[Overview](#) [Incentives](#) [Find an EV](#) [Charging](#) [Resources](#)

Charging Station Incentives

[Find Out More](#)

How do I charge?
Charging at home or on the road is

[Learn More](#)

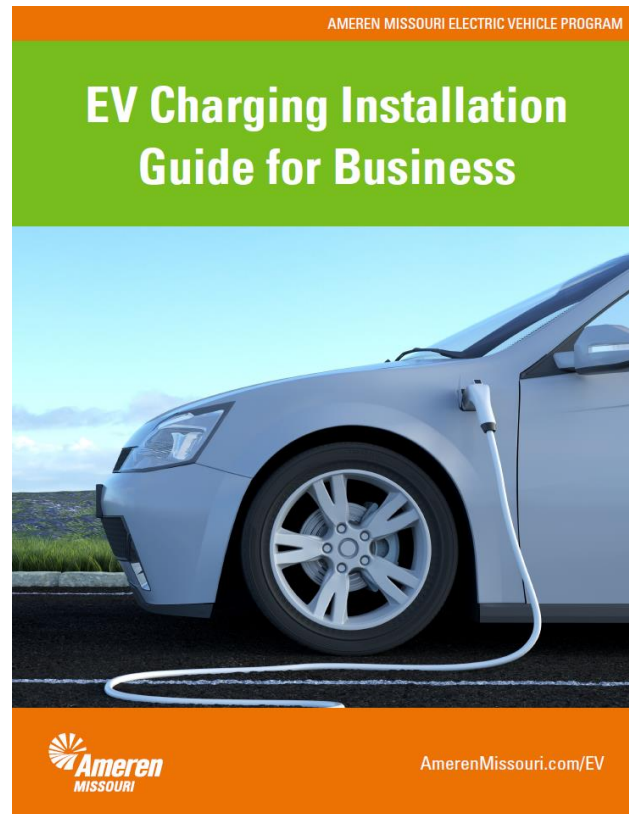
Providing employees EV charging at work can boost their satisfaction, and is a worthwhile investment that pays for itself in many ways:

- Establishes your organization as a leader in sustainability
- Is an incentive to attract and retain high-quality employees

Incentives are available for your fleet's transition to electric.



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Thank You!

