ENERGY STAR® Certified Electric Vehicle Charging Stations

Peter Banwell, U.S. EPA

October 8, 2019

Best Practices for EV Charging in Commercial Buildings

Electric Vehicle & Charging Basics

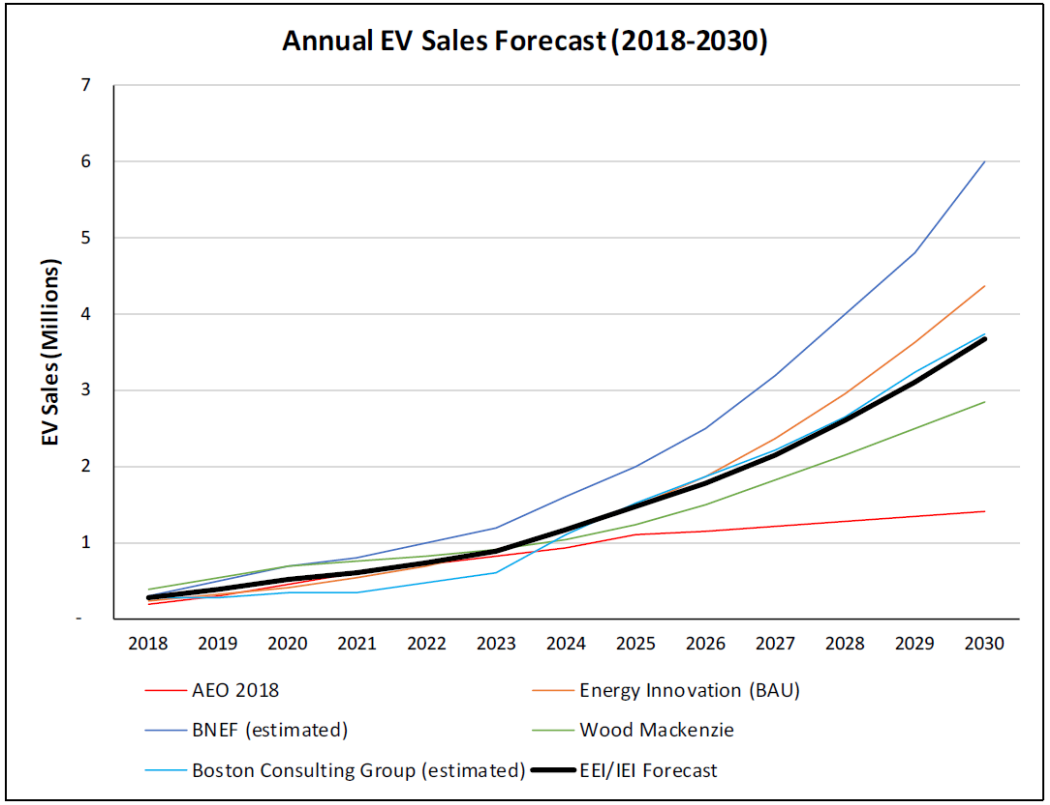
	Power Source	All-Electric Range*	Examples
Plug-in hybrid electric vehicle (PHEV)		10-50+ miles	Chevy Volt BMW i8 Prius Prime
All-electric or battery electric vehicle (BEV)		Up to 300+ miles	Tesla models Nissan Leaf BMW i3

*as of September 2019

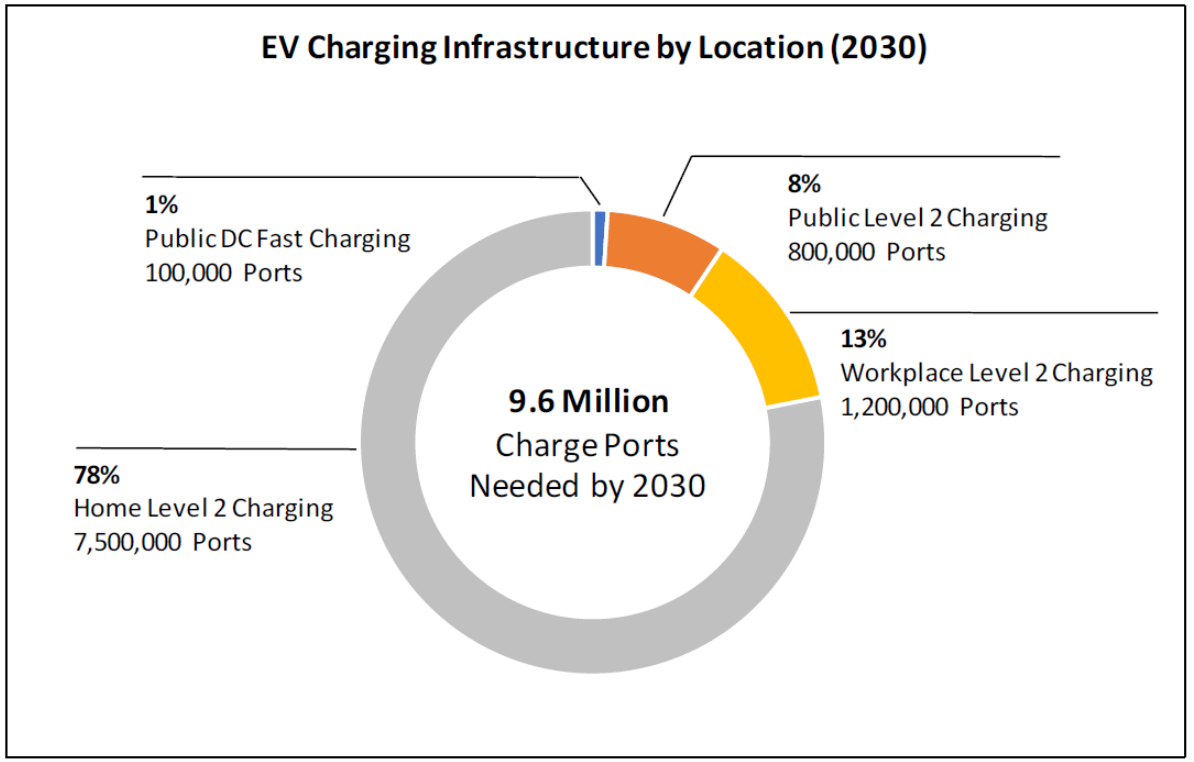
Electric Vehicle & Charging Basics

	Electric Current	Charging Rate	Connector(s)
Level 1	Alternating current (AC) 120 volt (V), 20 amp (A)	2 to 5 miles of range per hour of charging	J1772 
Level 2	AC 208/240V, 30A	10 to 20 miles of range per hour of charging	J1772 
DC Fast	Direct current (DC) 208/480V, 80-200A (and higher)	60 to 80 miles of range per 20 minutes of charging (for 50kW)	J1772 Combo (CCS)  CHAdeMO  Tesla 

Electric Vehicle Market Indicators



EEI and IEI say nearly 19 million EVs on the road by 2030…



…and more than 9.5 million charge ports needed to support them.

Source: EEI and IEI, *Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030, November 2018*

Efficiency Opportunities in AC Charging

Level 2 EV chargers are 98%+ efficient during steady state charge

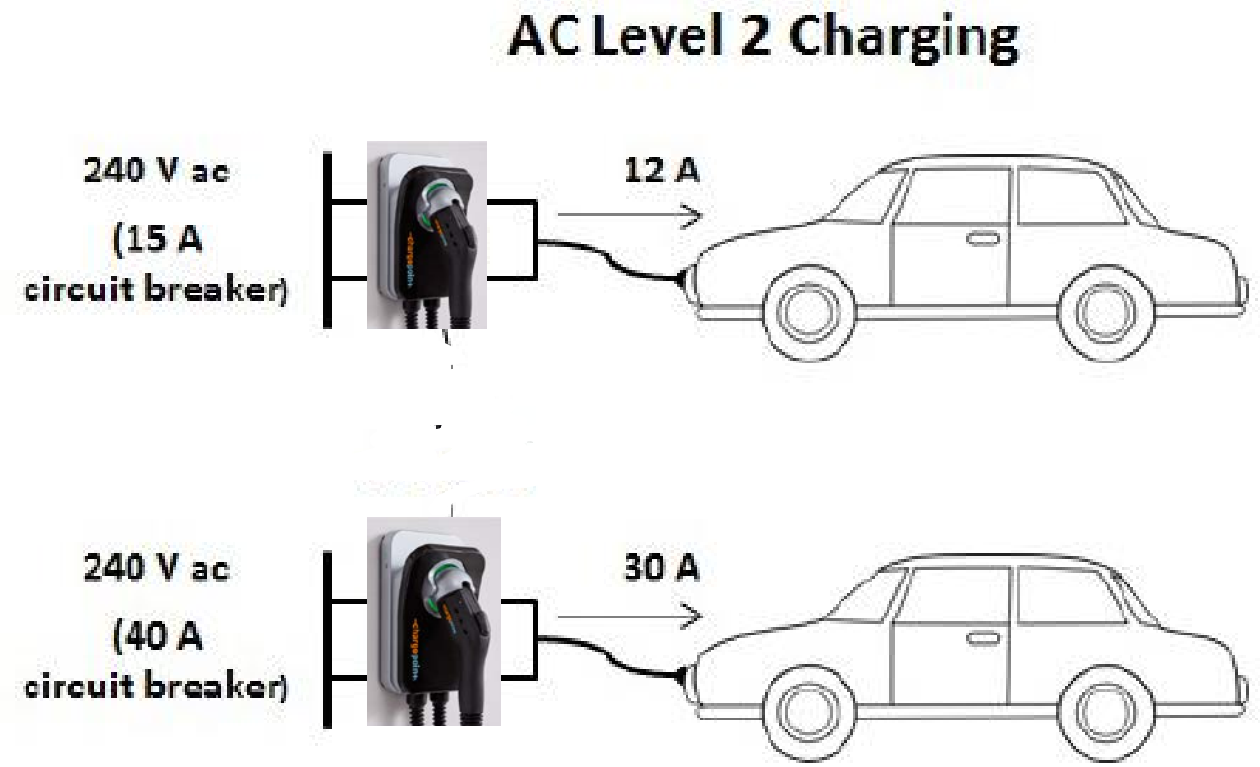
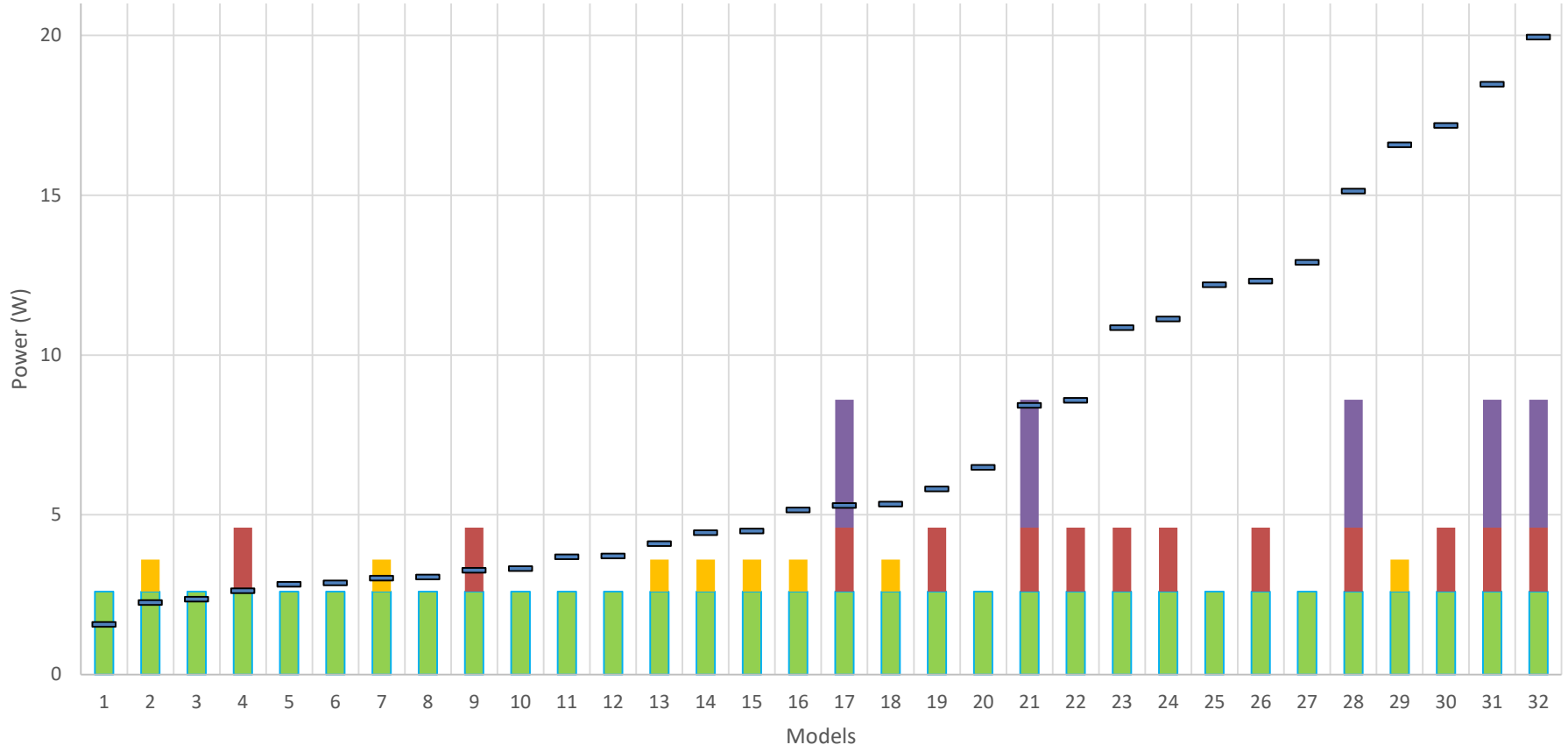


Image Source: National Research Council, *Overcoming Barriers to Deployment of Plug-in Electric Vehicles*, 2015

Efficiency Opportunities in AC Charging

Opportunity for energy savings in standby mode, when the vehicle is not actively charging



ENERGY STAR Version 1.0 Specification Today

Scope:

- ✓ AC Level 1
- ✓ AC Level 2
- ✓ AC Dual Input L1/L2

Key Features:

1. Energy Savings, 40% in Standby Modes
2. Safety
3. Open Communications

Communications Details:

- Grid Communications
- Open Access
- Consumer Override

Photo by Dennis Schroeder, NREL 39251

ENERGY STAR Charging Partners

blink

LiquidSky Technologies

SemaConnect

chargepoint

ClipperCreek, Inc.

solaredge

EVBOX

eMotorWerks

Webasto

as of September 2019

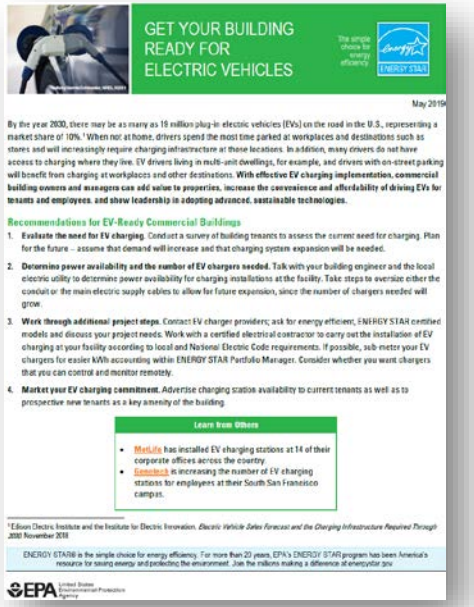
Marketing Efforts

Guaranteed efficiency

Charging stations require energy — so at least make sure they're using it effectively. Every ENERGY STAR certified charging station promises to reduce energy waste during at least 50% of its lifetime. That means, when an eVBox station is not in use, neither is your energy.

Increasing Brand Awareness + Visibility

- Label use by partners (e.g., Blink, ChargePoint, EVBox)
- Industry media (e.g., CHARGED Magazine)
- Conference, webinar participation (e.g., Roadmap, EPA State & Local)
- Materials development (e.g., EV-ready commercial buildings)



Partnerships & Collaborations

California Energy Commission (CEC)

- California Electric Vehicle Infrastructure Project (CALeVIP)

New York State Energy Research & Development Authority (NYSERDA)

- Charge Ready NY Program

Partnerships & Collaborations

- **State Agencies** (additional examples)

- **Utilities** (examples)

ENERGY STAR Version 1.1 Specification

- Key topics that will be addressed in the specification:
  - **Criteria to recognize energy efficiency in DC EV charging stations:**
    - ✓ Active charging % efficiency
    - ✓ Minimizing heating and cooling
    - ✓ Standby losses – display, lighting, network

- Progress to date:
  - Final Draft Test Method released Sept 2019


Source: Cnet

Incorporate ENERGY STAR EV Chargers

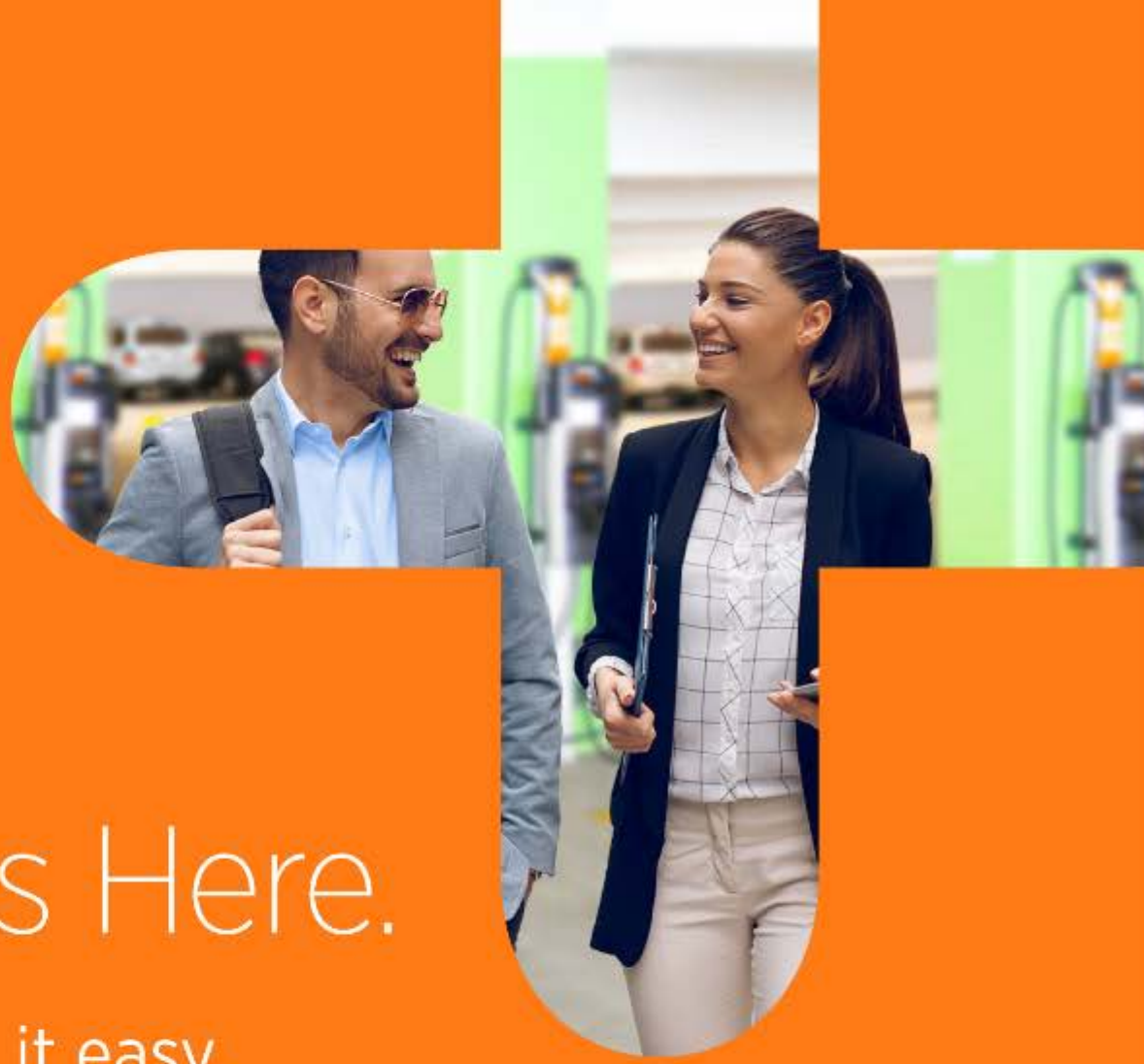
- Learn more
  - Visit the ENERGY STAR EV Chargers webpage, https://www.energystar.gov/products/other/evse
- Select ENERGY STAR qualified products for workplace, fleet charging
  - Use the Product Finder, https://www.energystar.gov/productfinder/product/certified-evse/results
  - Incorporate into procurement language, policies

Contact the ENERGY STAR Team with Questions

- Existing Partners: Reach out to your buildings account manager

- Questions related to ENERGY STAR EV charger efforts:
  - Peter Banwell: Banwell.Peter@epa.gov
  - Stacy Noblet: Stacy.Noblet@icf.com


Photo by Kendall Septon, NREL 45635



The Electric Revolution Is Here.

Our obsession? Making it easy.

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EV Charging for Commercial Buildings

Mike Fogerty

Sr. Director, National Accounts

EV Charging Innovation | April 18, 2018

ChargePoint Teams with ENERGY STAR® on Efficient EV Charging Solutions

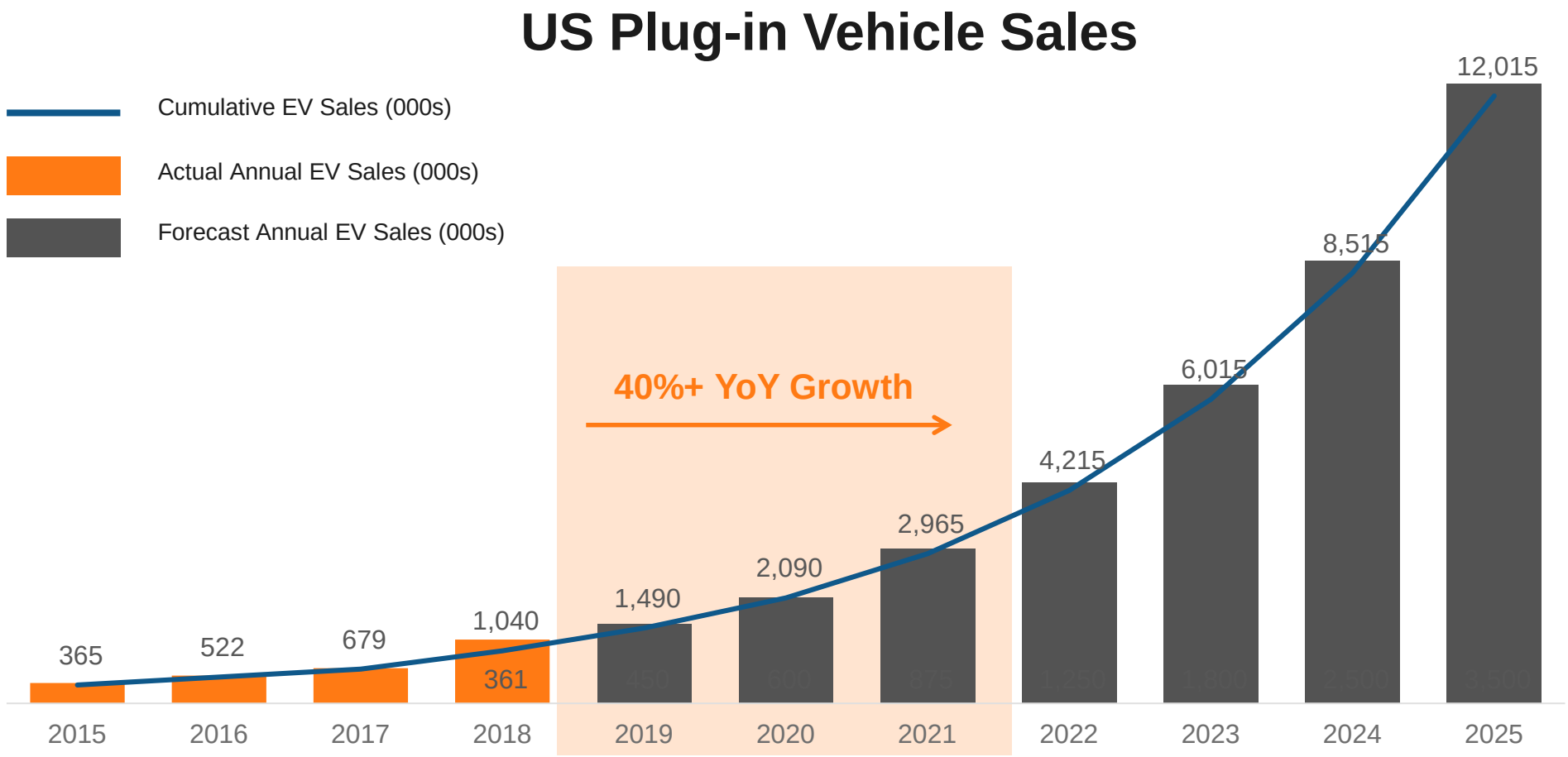
Anne Smart
Vice President, Public Policy

Share This:

The automotive industry is moving to electric

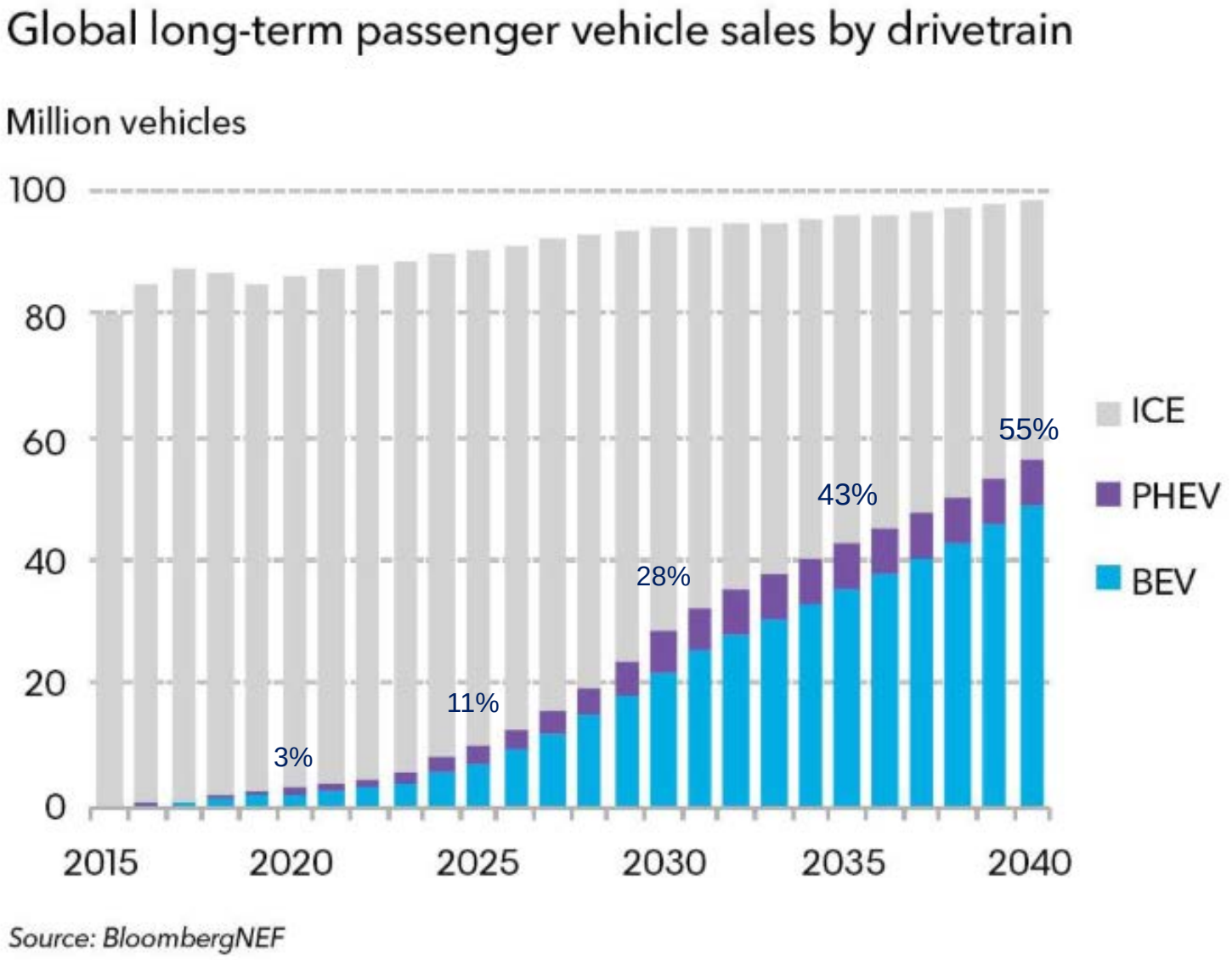
- Double Model 3 production and reveal the Model Y this year
- 20 all-electric cars by 2023
- 30 BEV and PHEV models by 2025
- 10+ new all-electric vehicles by 2022 and plans to electrify entire Mercedes-Benz portfolio
- 44 electrified Hyundai/Kia/Genesis models by 2025
- 16 fully electric vehicles and 40 electrified vehicles through 2022
- First all-electric compact SUV (Macan) and third EV after Taycan and Cross Turimo (planned for 2019, 2020)
- Every Jaguar and Land Rover launched from 2020 will be electrified
- Almost 70 new electric models by 2028
- 50% of Volvo Cars' sales volume to be fully electric by 2025 and plans a hybrid or full-electric powertrain for all models

More drivers are choosing electric



Source: EVvolumes.com

Global Passenger to EV Projections



Commercial charging is big and growing

Employees want to charge at work

Workplace Charging:

- + 2nd most frequently used charging location
- + 32-39% of employees use workplace charging in addition to home (INL study)
- + Doubles the electric range for most drivers
- + Primary charging source for many drivers

Contributing to your sustainability initiative

- Each EV driver contributes .5 to .75 MT of CO_2e reduction per year
- At scale, EV charging can reduce a company's global commute emissions by as much as 3%
- ChargePoint charging stations are designed to be energy efficient and reduce energy consumption **ENERGY STAR**
- Networked stations offer advanced Power Management capabilities
- Adding EV charging to commercial building contributes to LEED points

3 Considerations and Best Practices

1. Plan ahead

1. Plan ahead

Reduce Expenses

Cost difference between New Construction and Retrofit

Location location location

+ Cost of Civil work- Trench length, asphalt and concrete repair
+ Price per foot

Compliance Regulation – ADA, Building Codes

+ Adds considerations such as parking count, path of travel, etc.
+ Such adjustments in a retrofit can be very costly – see Civil Work calculations
+ Many municipalities are adding building codes such as make-ready

Utility Coordination (if needed)

+ Easier to include EV load or potential load into initial Utility calculations
+ Utilities are usually not allowed to upsize services unless there's stated demand

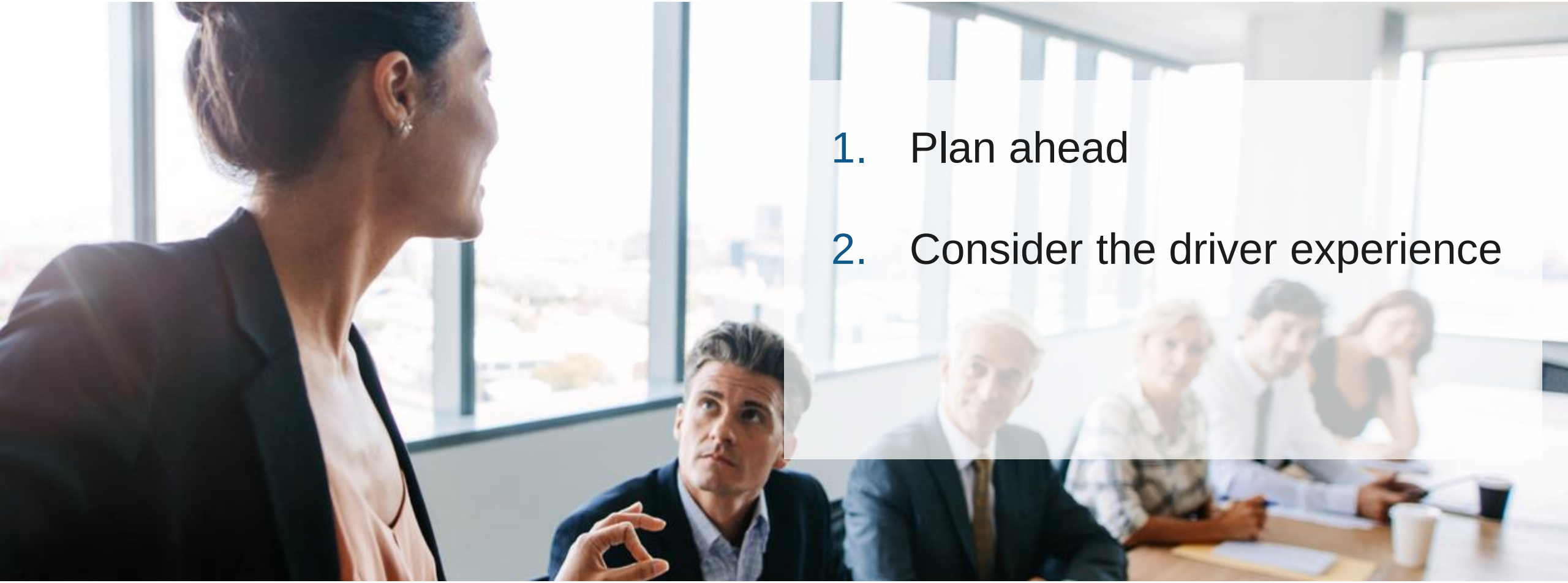
Electrical Distribution

+ The location of the electrical panel should be located as close as possible to reduce costs
+ Plan ahead with your EC & EVSE for potential service panel upgrades
+ Choose switchgear that allows for expansion

Permitting

+ Permitting fees easily wrapped into original project with new construction
+ Permitting can range from a few hundred to thousands just for a **single** EV charger
+ As part of a large project, the EV component will not be as scrutinized – 1 electrical single line diagram, signage, structural, planning etc. - **Saves Time and Money**

3 Considerations and Best Practices



1. Plan ahead
2. Consider the driver experience

2. Consider the driver experience

Know your audience and plan a solution that will **scale with you**

Define your users

+ Employees, VIP, Guests, Customers, Contractors, etc.
+ Internal fleets (if appropriate)

Tailor the Experience

+ Access rights
+ Pricing policies
+ Waitlist
+ Valet services

Understand User Requirements

+ Access and availability
+ Cost and convenience
+ Predictability and consistency

2. Consider the driver experience

Is faster always better?

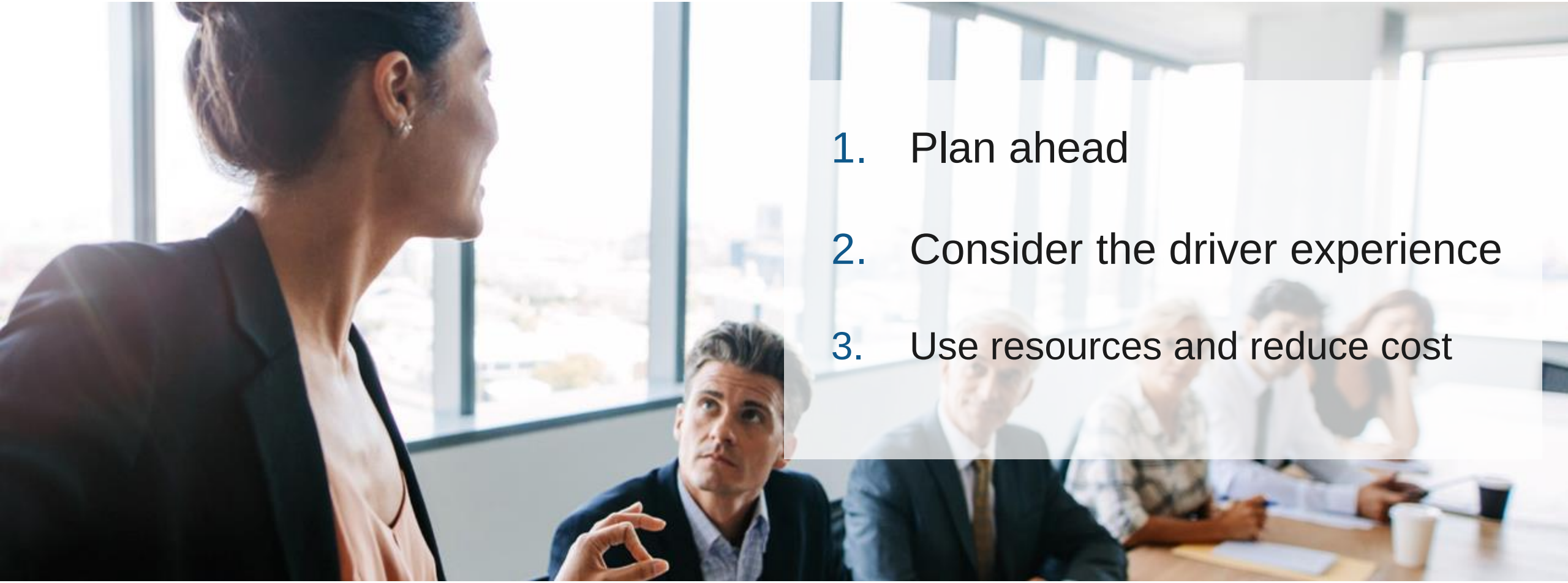
Level 2
AC Charging
7 kW
25 mile RPH

+ Ideal for workplace charging (2-3 hours of charging)
+ Used in 90+% of workplace environments today
+ Most efficient for cost and power output

Level 3
DC Charging
62 kW
250 mile RPH

+ Accommodates need for rapid charging
+ Ideal for unplanned driver scenarios
+ Pairs well with valet services
+ Used as a bridge to longer term expansion
+ Self-service requires policies to drive higher turnover

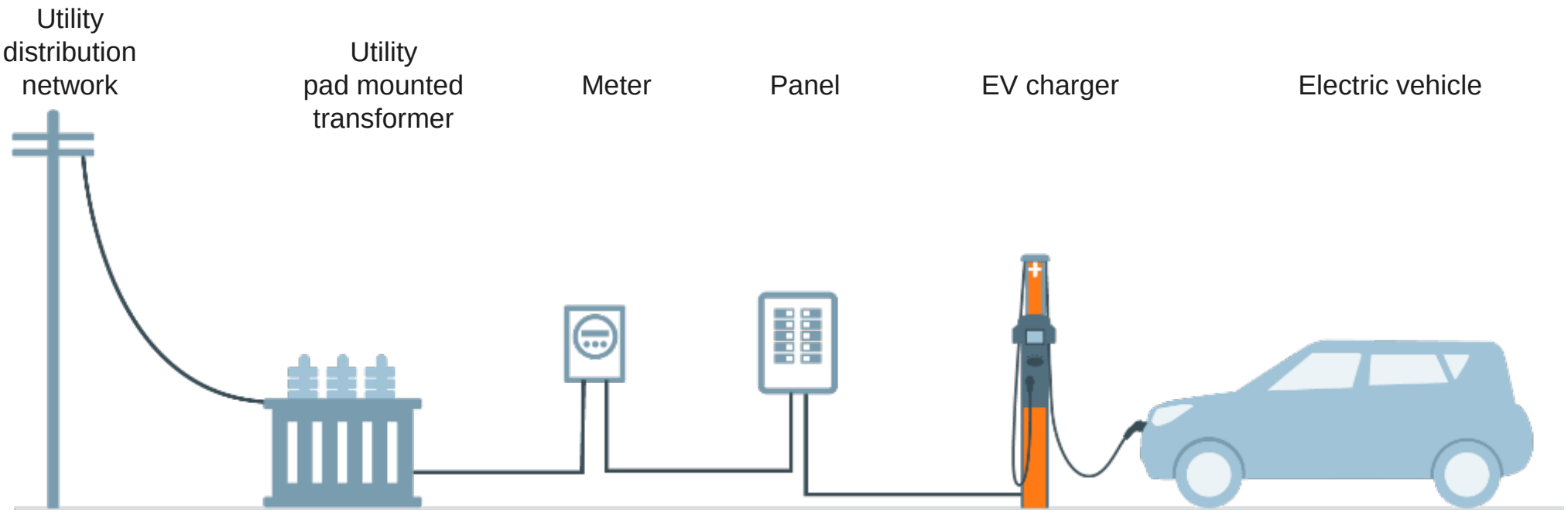
3 Considerations and Best Practices



1. Plan ahead
2. Consider the driver experience
3. Use resources and reduce cost

3. Use resources and reduce cost

Most sites require prep (make-ready) before installing EV chargers



3. Use resources and reduce cost

Make-ready expense is lowest during new construction

New Construction

- $500 to $900 per parking space
- 1/5 the cost of post construction (or less)

Post Construction

- $2,500 to $4,500 per parking space
- 5X the cost of pre-construction (or more)

3. Use resources and reduce cost

Make-ready expense is lowest during new construction

New Construction

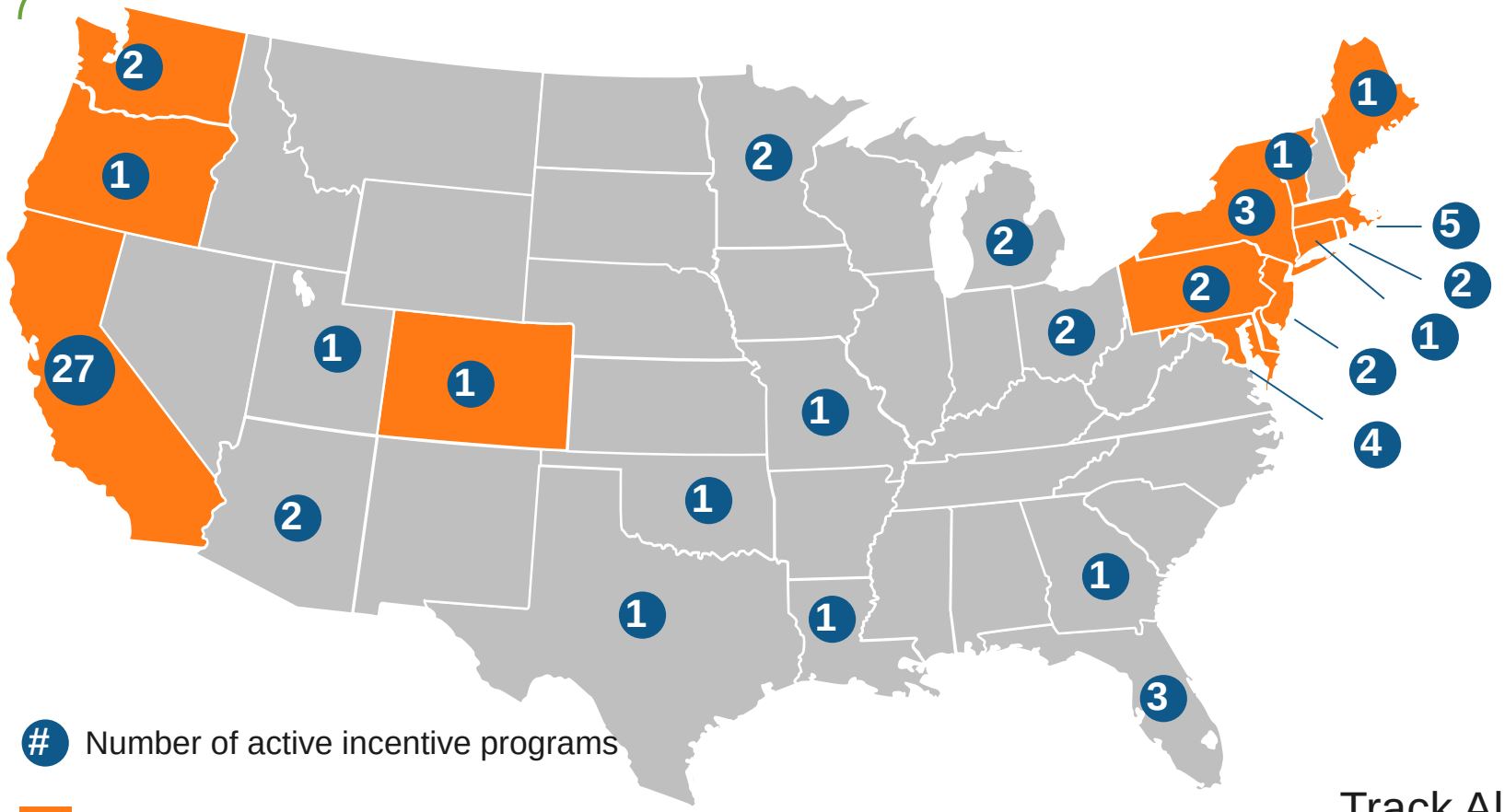
- Establish standards to prepare 10% of parking spaces for EVs
- Build for future

Post Construction

- Consider EVSE incentive programs if available
- Build for future

3. Use resources and reduce cost

Number of EVSE incentive programs by State



Today
69 Active EVSE Programs
(State or Utility sponsored)

Track All Grants & Utility Incentives:
https://www.chargepoint.com/incentives/home/

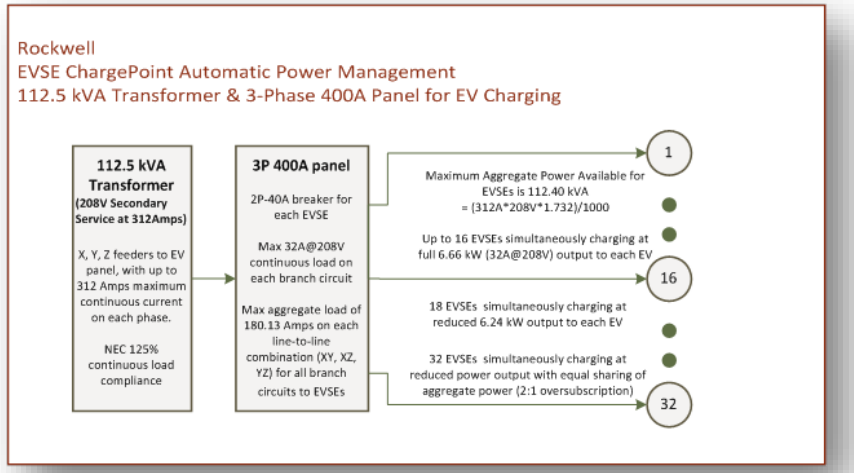
3. Use resources and reduce cost

Engage ChargePoint Early

- Will help with site planning for this feature
- Will configure power management post station activation
- Will help with electrical contractors

Resources

- NEC and CEC code changes
- UL Listing
- Site Specific Cut Sheets
- Solutions engineering support



ChargePoint Solutions Engineering team will work with you to create a site specific cut sheet

Class A+ Residential

Private Resident Library with Terrace
Spa-Quality Fitness Center & Studio
Two Rooftop Lounges w/ Spectacular Views
360-degree Skytrack Perimeter Rooftop Walking

Landscaped Rooftop w/Pool
7 x 24 Valet Service
Concierge, Pet Services, Event Planning
Chef Service, Observation Deck, etc.

Lessons Learned- the tactical story

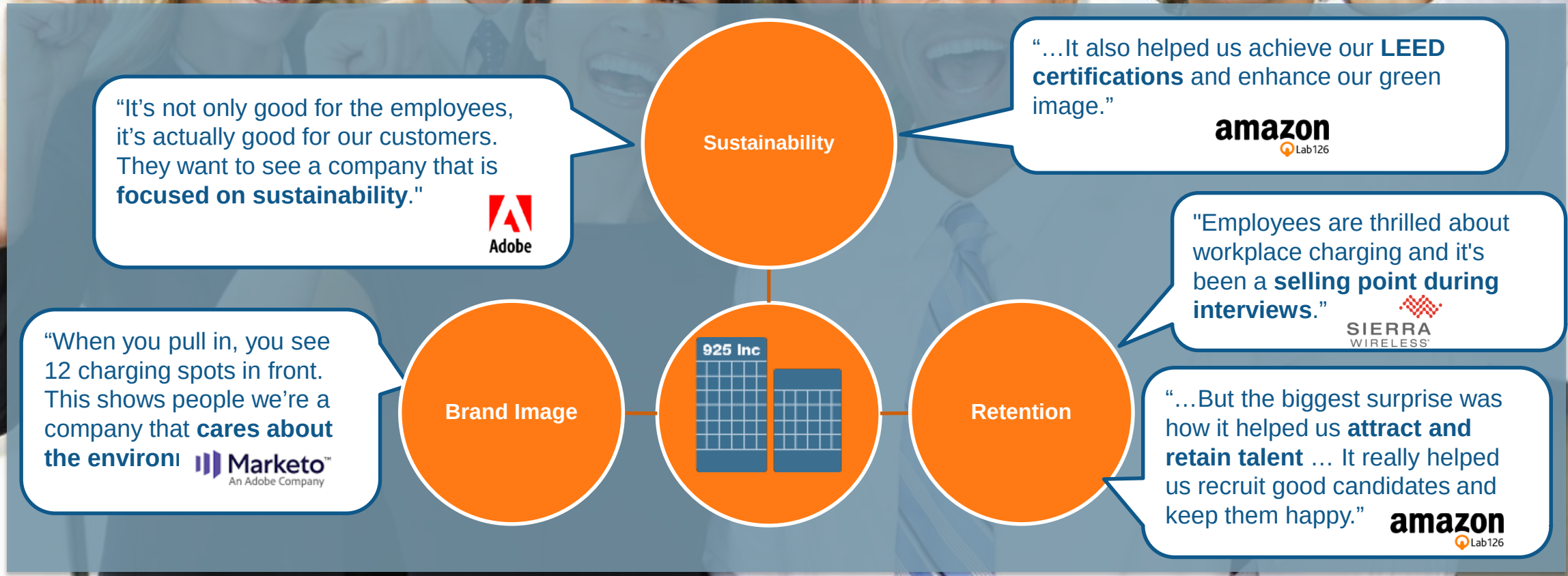
+ 373 Luxury Units Parked 1:1 7x24 valet service
+ (3) Floors of underground parking (75,000 SF)
+ (6) charging stations spec'd by the architect…?!
+ CP has now quoted (6) CT 4Ks

Issues:

+ Charger ratio 1:62- Way Low based on likely expectations
+ Locations random- over (3) floors. No additional make-ready
+ Power (not enough)- wired for only 20 amps. Will impact user experience
+ Post-deployment operational plans/policy??

Lesson- Lack of pre development planning impacting $$/time/expectations

Why companies are investing in EV charging



EV Charging at Verizon

Best practices and lessons learned

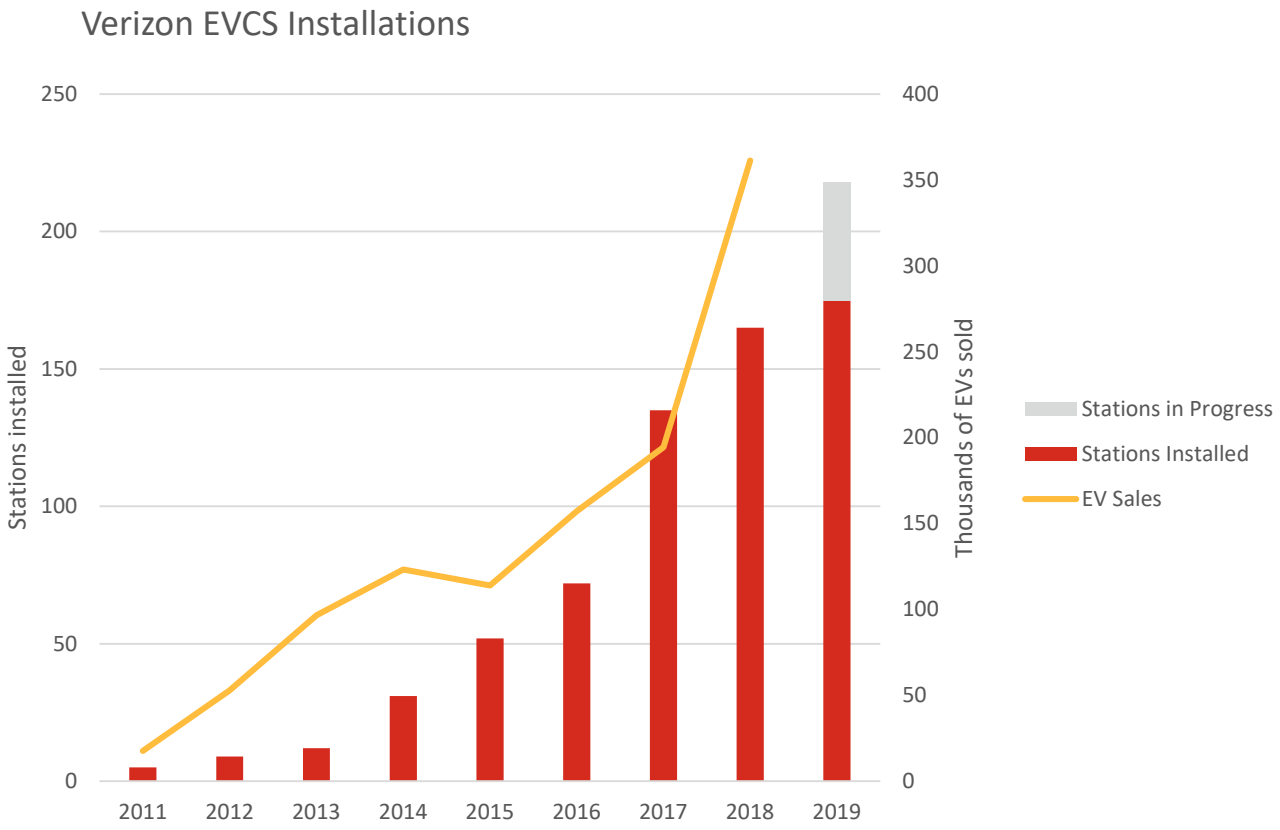
Michael Sandford, Verizon Global Real Estate

10/2019

Verizon has a long history of promoting EVs

Program history:

- **2011:** Verizon installs first stations with early focus on fleet vehicle charging
- **2013:** Verizon joins the "Workplace Charging Challenge"
- **2017:** Sets public goal of installing stations at 75 locations company-wide by 2020
- **2019:** Total of 65 sites with charging infrastructure in place, 176 total stations as of 10/19



EV Charging program ownership

verizon

Sustainability

- BAU program management
- Internal communications
- Employee onboarding

Real Estate (Energy team)

- New site selection
- Funding new stations
- Coordinating technical support

Real Estate (Operations)

- Day-to-day technical support
- Installation support and project management

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Account Management, Driver Helpdesk

- Strategic vendor, technical support, platform and payment management

Verizon’s process of installing new stations

Site Selection:

- Predict demand across company-wide portfolio based on employee population and geography.
- Assess needs of buildings upon request.
- Compare to Verizon GRE standards.
- Determine feasibility
  - Landlord approval
  - Physical parking layout
  - Electrical capacity
  - Local zoning compliance

Installation:

- Provide Scope of Work Template to site project manager
- Solicit multiple bids for electrical work
- Ensure proper signage and ADA compliance
- Complete ChargePoint “Site Readiness Certificate”
- ChargePoint performs final installation

Expansion:

- Monitor utilization data to assess need for expansion

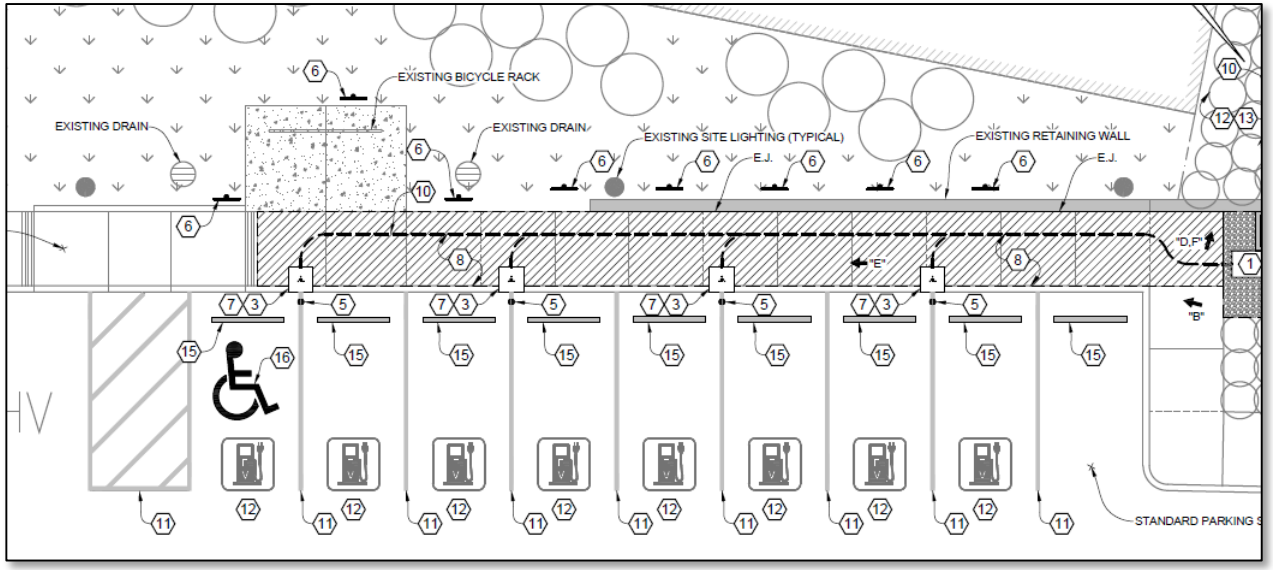
Site selection lessons learned

- Take advantage of all available state, local, and utility rebate programs. Most need applications prior to starting work
- Check with landlord prior to any work
- For large installations, check with utility for feeder capacity
- Predict demand based on local EV penetration rate
- Add to solar installations where available

Locations of Verizon's installed EVCS infrastructure

Installation lessons learned

- Oversize all conduits to allow for future expansion
- Utilize dual-port stations
- Ensure proper electrical due diligence
- Verify contractors follow all local codes/apply for all necessary permits
- Put new EVCS adjacent to existing HC parking
- Install bollards for station protection
- Minimize distance to electrical infrastructure
- Check for local ADA req.



Example EVCS plan at Verizon location

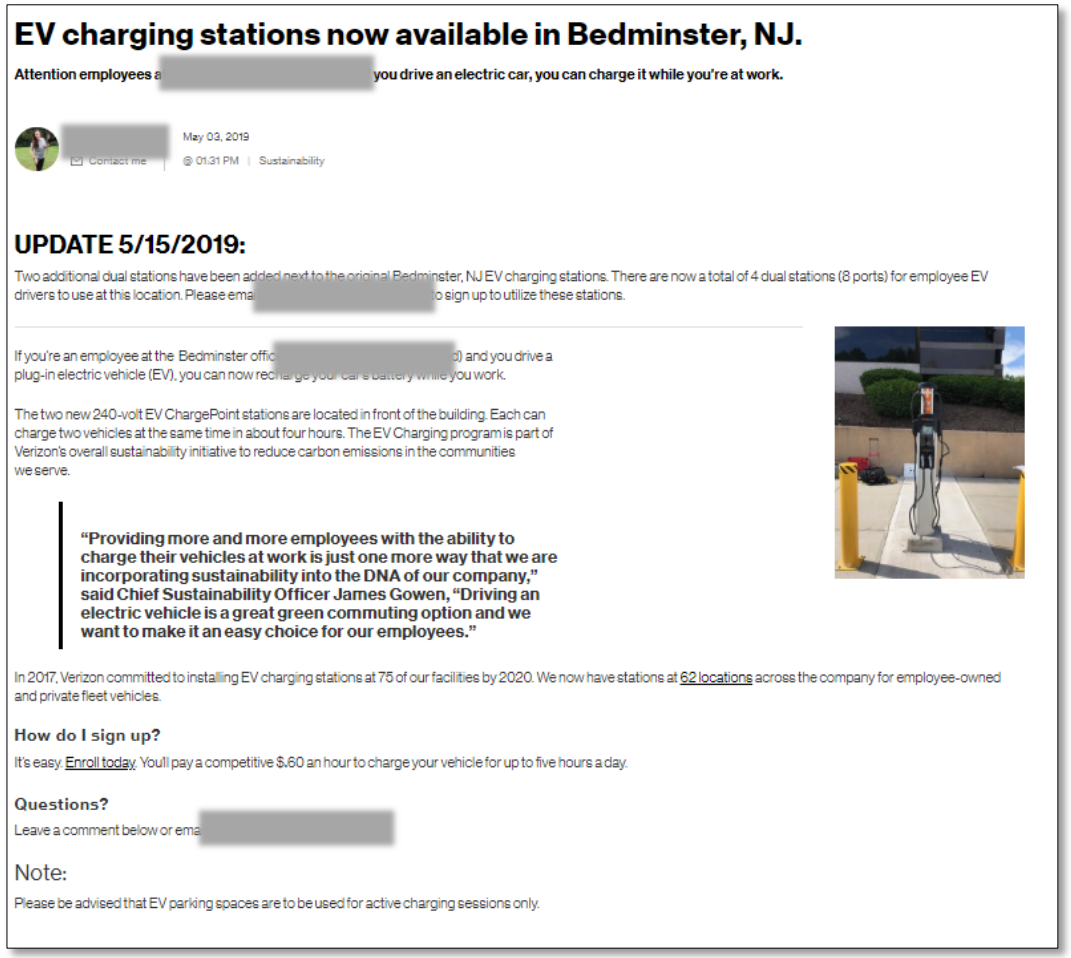
Expansion lessons learned

- Increase existing asset utilization by permitting only active charging
- Set nominal fee when plugged in to encourage only active charging (increase utilization)
- Develop process for enforcement of non-compliance
- Expand on existing infrastructure when utilization is maximized

Several non-compliant vehicles at a Verizon location

Program Management lessons learned

- Generate excitement through routine communications/new station announcements
- Establish clear rules for the program and get buy-in prior to signing drivers up
- Work with security to establish process for enforcement
- Promote EV charging along with other “Green Commuting” options
- Be thoughtful with incentives (free charging, “VIP parking”, etc)



EV charging stations now available in Bedminster, NJ.

Attention employees a [redacted] you drive an electric car, you can charge it while you're at work.

[redacted] May 03, 2019
Contact me | @ 01:31 PM | Sustainability

UPDATE 5/15/2019:

Two additional dual stations have been added next to the original Bedminster, NJ EV charging stations. There are now a total of 4 dual stations (8 ports) for employee EV drivers to use at this location. Please ema[redacted]o sign up to utilize these stations.

If you're an employee at the Bedminster offic[redacted]d) and you drive a plug-in electric vehicle (EV), you can now rec[redacted] you work.

The two new 240-volt EV ChargePoint stations are located in front of the building. Each can charge two vehicles at the same time in about four hours. The EV Charging program is part of Verizon's overall sustainability initiative to reduce carbon emissions in the communities we serve.

“Providing more and more employees with the ability to charge their vehicles at work is just one more way that we are incorporating sustainability into the DNA of our company,” said Chief Sustainability Officer James Gowen, “Driving an electric vehicle is a great green commuting option and we want to make it an easy choice for our employees.”

In 2017, Verizon committed to installing EV charging stations at 75 of our facilities by 2020. We now have stations at 62 locations across the company for employee-owned and private fleet vehicles.

How do I sign up?

It's easy. Enroll today. You'll pay a competitive $.60 an hour to charge your vehicle for up to five hours a day.

Questions?

Leave a comment below or ema[redacted]

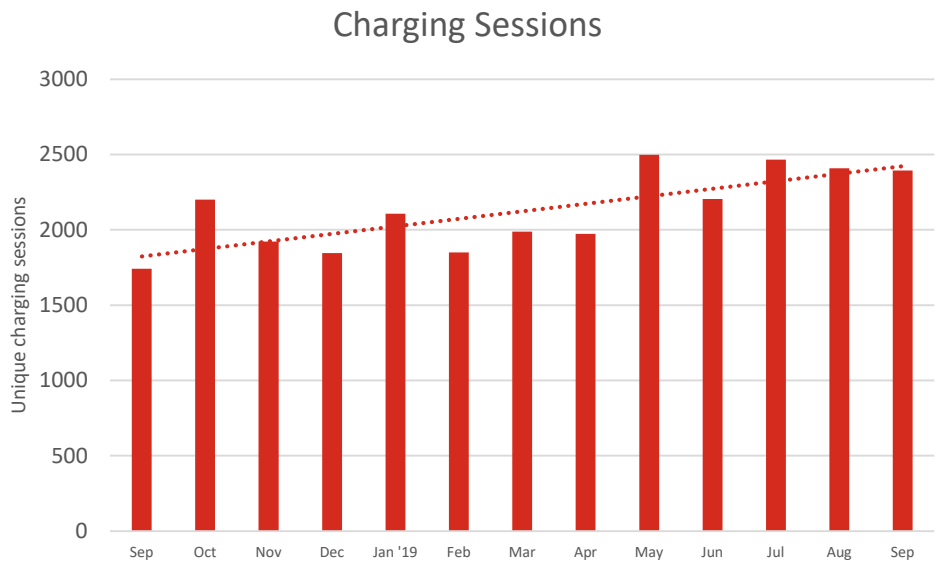
Note:

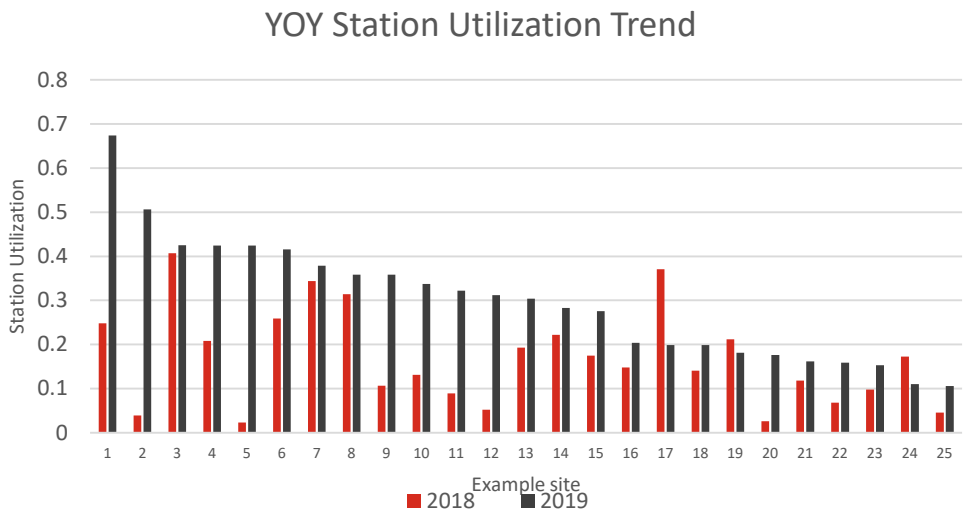
Please be advised that EV parking spaces are to be used for active charging sessions only.

Announcement of new stations on internal news feed

Trends

- More requests for stations at smaller locations (Pull vs. Push)
- 37% growth in number of unique charging sessions
- 20% growth in charging station utilization
- Increased employee demand for enforcement of program rules
- Wider variety of EV models and price points available
- Avg. session length increased 16 min. YOY (3:45 vs. 3:29)





Summary of lessons learned

- Determine a mission for the program
- Think long term
- Leave room for expansion
- Involve multiple organizations
- Leverage partnerships
- Set public goals
- Communicate!

Verizon's newest EV stations in El Paso, TX, turned up 10/2/19

Q&A