

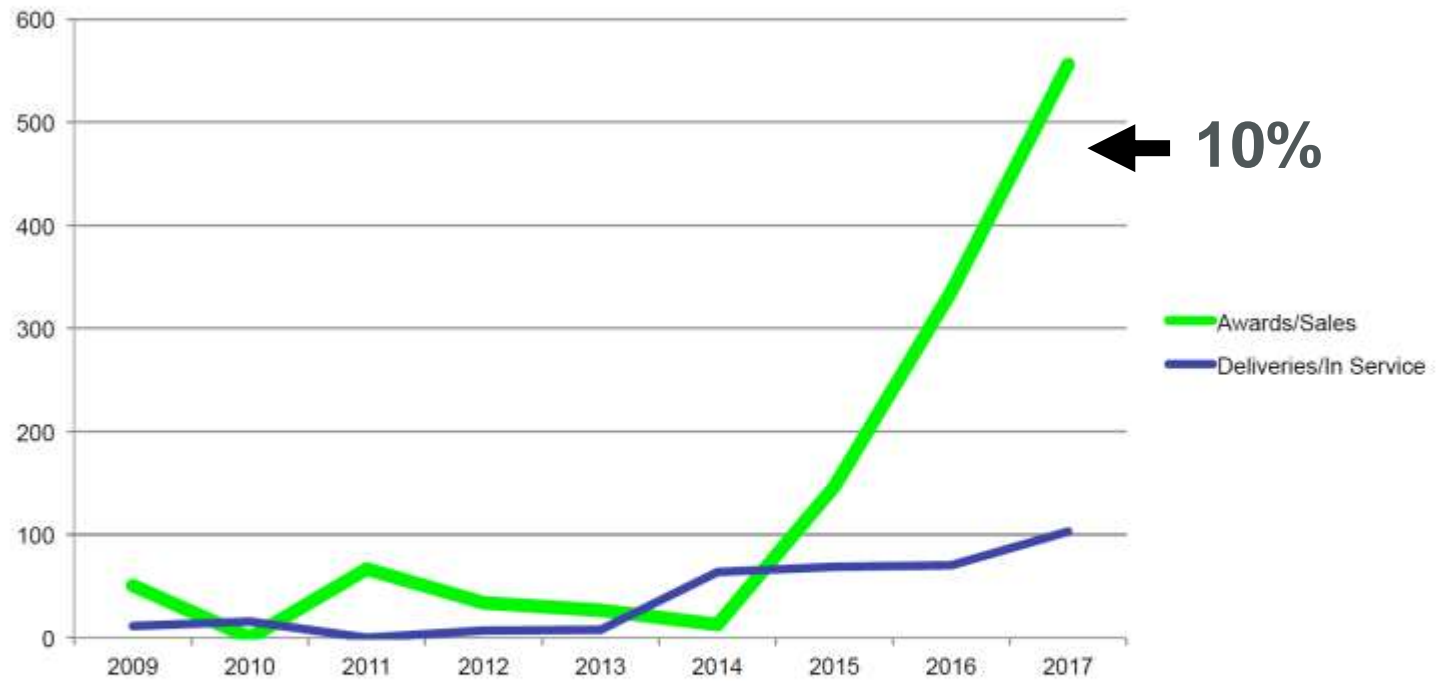
# CURRENT STATE OF BATTERY ELECTRIC BUS MARKET

**Matt Horton**  
Chief Commercial Officer  
Proterra



**PROTERRA**

## ZEB U.S. Annual Sales & Deliveries



- **> 140 Agencies**
- **> 1200 cumulative awards/sales**
- **> 340 cumulative deliveries/in service**



# Diversity of Customer Profiles Demonstrates Value Proposition



**Note:**  
Map excludes  
2017 FTA Low-  
No!

Proterra alone has deployments or orders representing over 60 U.S. transit fleets.



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# 28 Successful 2017 Low-no Partnerships

## 2017 Proterra Low-No Partners

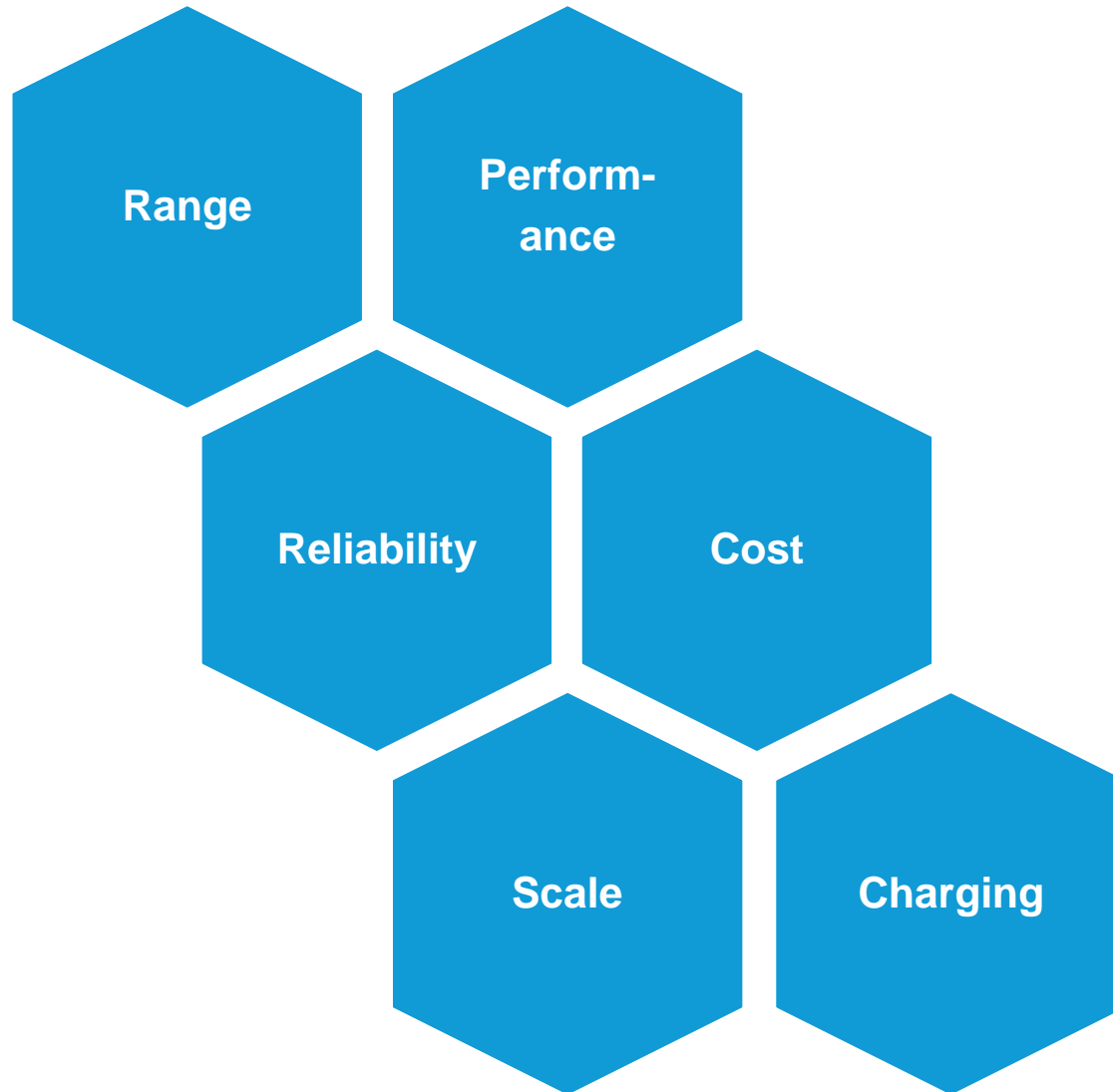
- LADOT, CA
- Tallahassee, FL
- Lexington, KY
- Montgomery County, MD
- Des Moines, IA
- NJ Transit, NJ
- Greenville, SC
- Park City, UT
- Connecticut DOT
- Delaware Transit Authority, DE
- Asheville, NC
- Wilsonville, OR
- Hampton Roads, VA
- Fairfield, CA
- Baton Rouge, LA
- Lafayette, LA
- Madison, WI
- Flint, MI
- Alabama A&M, AL
- Bloomington, IL
- Seneca, SC
- Lubbock, TX
- Juneau, AK
- Redding, CA
- Missoula, MT
- Nashville, TN
- Kitsap County, WA
- Lake Tahoe, NV



**Legend:**  
Dots on map represent Proterra partners

FTA's Low-No Program continues to be over-subscribed with demand growing. 2017 Low-No program spread smaller amounts of funding over many agencies.

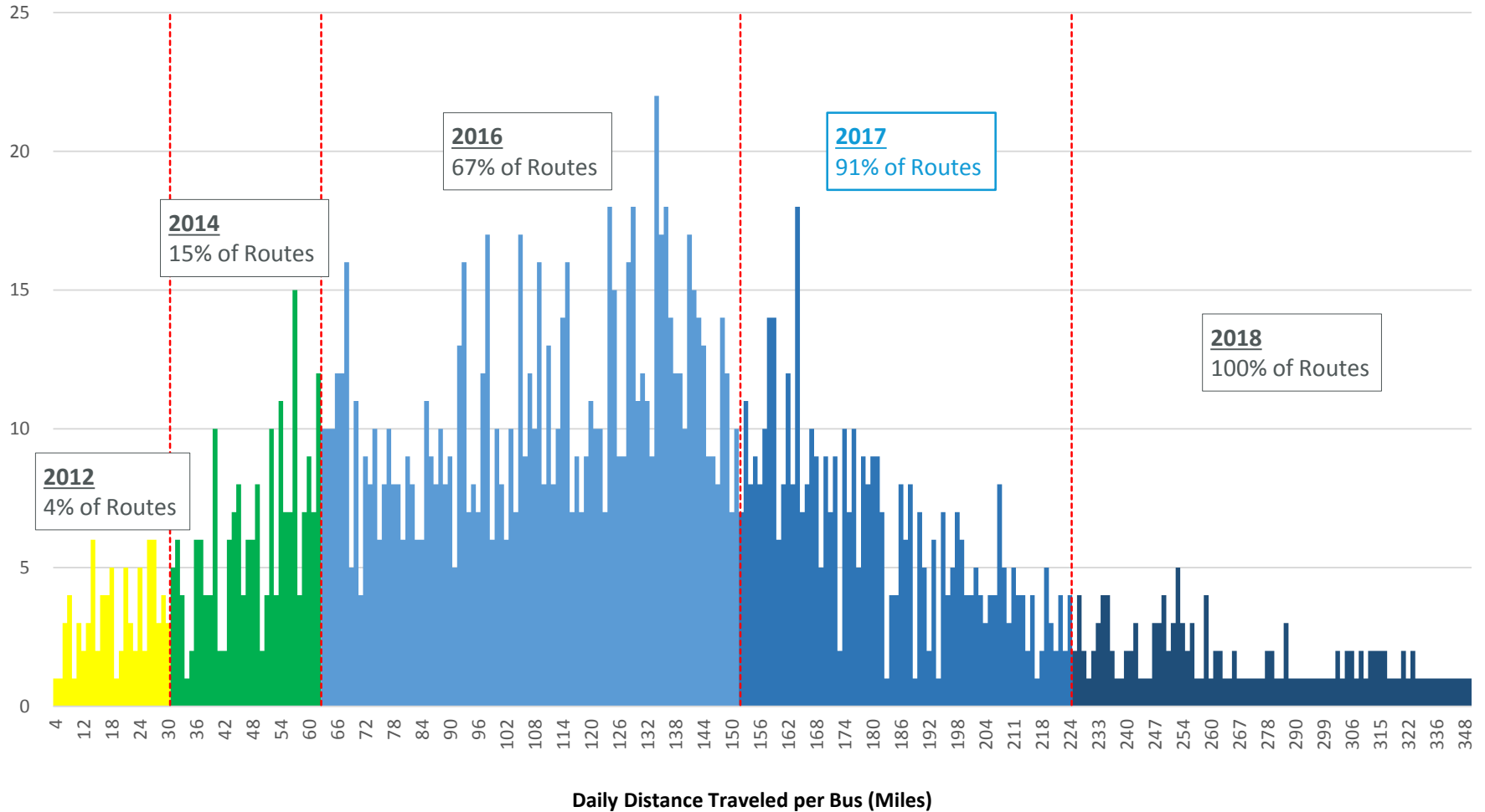
# Falling Barriers to Adoption



# Vehicle Range has Tripled in Less than 5 Years



Number of Routes



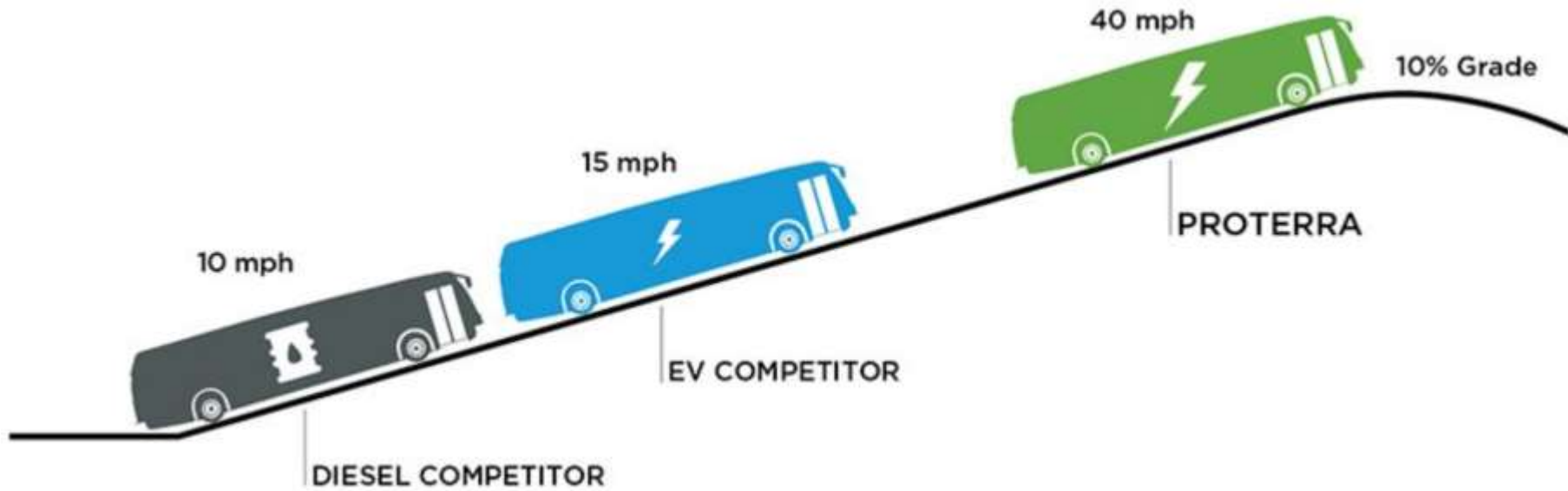


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# EV Performance Leading the Pack

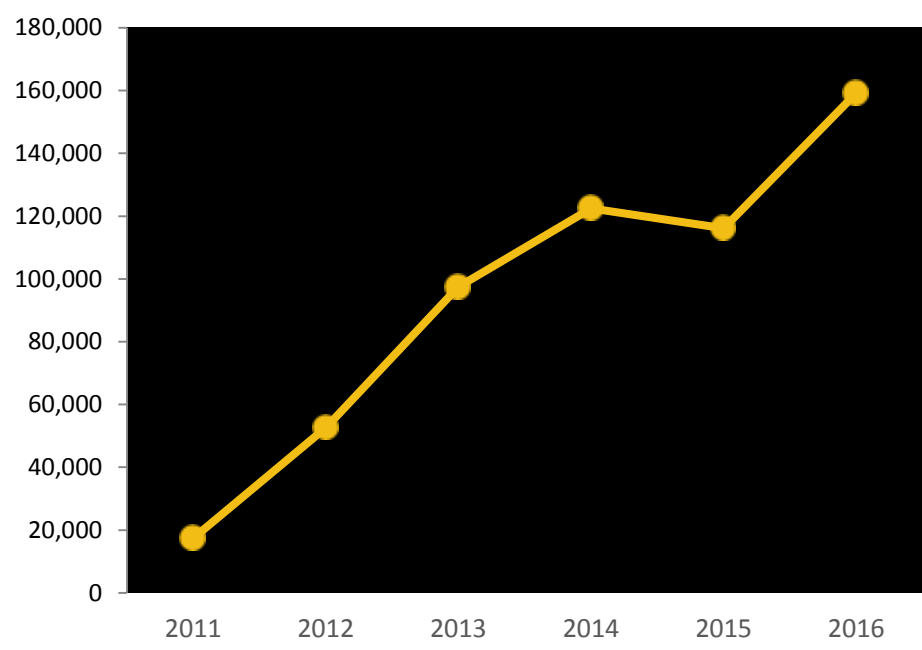
## HILL CLIMB

PERFORMANCE COMPARISON	Diesel Competitor	Electric Competitor	Proterra Catalyst® E2 with DuoPower™ Drivetrain
<b>TOP SPEED ON HILLS</b>			
5%	35 mph	33 mph	59 mph
10%	10 mph	15 mph	40 mph
15%	n/a	1 mph	27 mph
<b>MAX HILL CLIMB</b>	12.4%	15.1%	26.0%

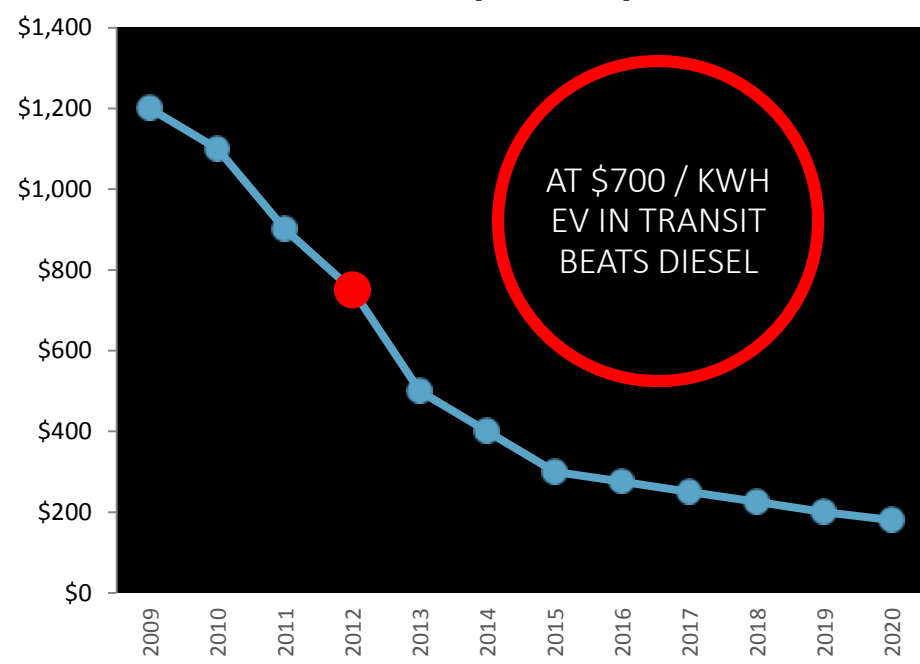


# Battery Technology Improvement is Primary Cost Driver

## U.S. EV SALES



## BATTERY COST (\$/kWh)



With Batteries at \$140/kWh, Diesel Would Have to be FREE to Compete with EV Based on Maintenance Savings Alone

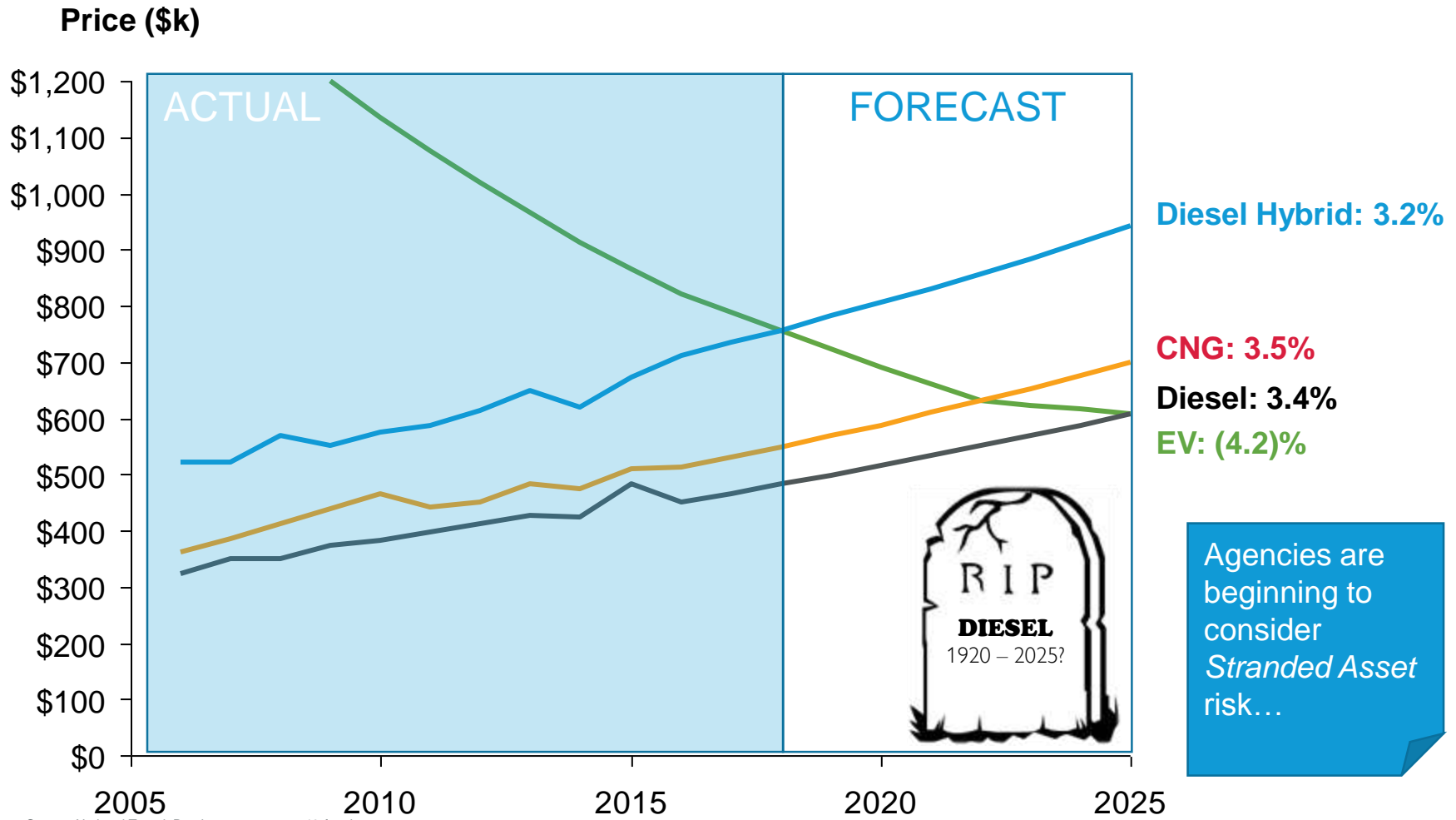
Sources: Navigant Research, green.autoblog.com, Electric Drive Transportation Association. xEV = PHEV, HEV, EREV and BEV.





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# Current Trends Favor EV Technology



EV Has *Decreased* In Price 4.2% Per Year Since 2010  
 Diesel Has *Increased* In Price > 3.4% SINCE 2005  
 By 2025, We See Little Transit Demand For New Diesel/CNG Buses

# The Future of Charging Infrastructure



- Standards-based charging will become the norm in procurements
- Most North American transit OEMs are moving toward a DC standard compatible with medium/light duty vehicles: **SAE J1772-CCS**
- CCS Charging will offer low cost, high reliability; vendors already shipping 100KW systems, 300KW systems in development
- Emerging on-route charging standards under development: **SAE J3105**
- As vehicle range increases, the prevailing model will be **“plug-in at night, drive all day, fast-charge if necessary”**

**SMARTER CHARGING**  
Configuring for “Smart Range” with the most efficient charging options  
Compatible with industry-standard charging systems

**OVERHEAD CHARGERS**  
Catalyst® vehicles can be configured to charge with Proterra® overhead fast-chargers, as well as other standard overhead chargers

**PROTERRA ON-ROUTE CHARGE STATIONS**

- Enable 24/7 circulator operations
- Provide opportunity charge boost for longer routes
- Are simple and safe, with highly accurate, assisted automatic docking

## PLUG-IN CHARGERS

Charging your Catalyst vehicle at the depot is easy. Simply plug in a standard J1772 CCS charger.



- Industry-standard SAE J1772 CCS chargers are offered by several suppliers with easy plug-in functionality
- Enables interchangeable charging of buses, cars and utility vehicles
- Catalyst vehicles can be configured with two charge ports, for faster charging of high-energy batteries
- This charging standard is adopted by many major OEMs, including:



Proterra is a Core Member of CHAdeMO, helping to drive heavy-duty electric vehicle charging standards

SAE Compliant with SAE standards

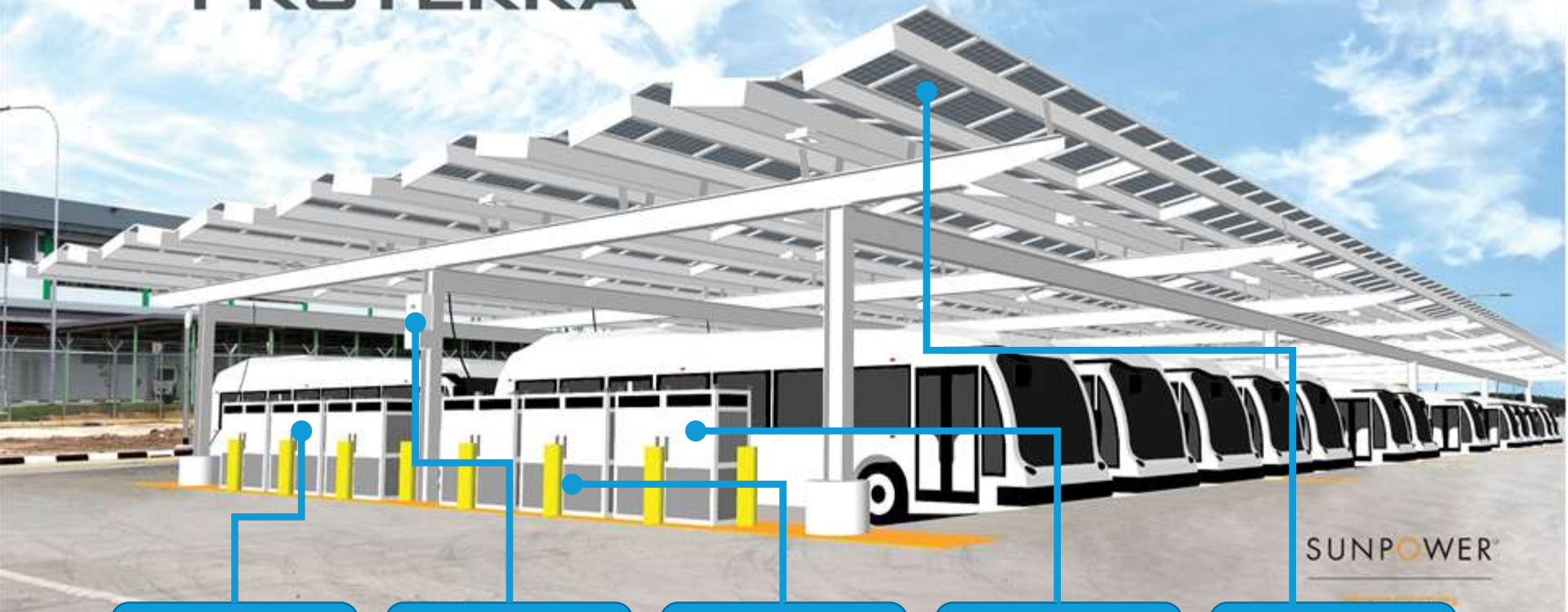


# CHARGING AT SCALE



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Proterra works closely with customers to recommend the appropriate charging solution for fleets and facilities planning for scale as the demand for charging increases.



SUNPOWER

V2G  
Resiliency

Low Profile  
Chargers

Stationary  
Batteries

Fuel Cell  
Back-Up

Solar  
Generation



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