AFTER A BRIEF PERIOD OF SUBURBANIZATION, THE U.S. IS RETURNING TO ITS CITIES
Total fuel consumed by buses per year:
- **Diesel fuel**: 389,600,000 gallons
- **CNG fuel**: 150,000,000 gallons

Total GHG per year:
- **From diesel buses**: 12,500,000,000 lbs.
- **From Natural Gas buses**: 4,600,000,000 lbs.
Proterra’s Mission
Advancing electric vehicle technology to deliver the world’s best-performing transit vehicles

- Founded in 2004
- Offices and manufacturing in CA and SC
- 330+ employees, strong executive management team
- Backed by industry-leading VC and corporate investors
- 40 customers; >400 vehicles sold
- >110 vehicles delivered; >3,500,000 service miles
- >1,400,000 pounds of CO2 emissions avoided

Strong Executive Team

Solid Financial Backing
300 announced orders from 32 customers
100+ orders not yet announced
28 New Awards under LoNo
NEW CUSTOMERS
2017 LOW-NO WINS (ANNOUNCED SEPTEMBER)

- Alabama
  - Alabama A&M University*
- Alaska
  - City and Borough of Juneau*
- California
  - City of Fairfield - Fairfield
  - and Suisun Transit (FAST)*
  - Redding Area Bus Authority (RABA)*
  - City of Los Angeles Department of Transportation (LADOT)*
- Connecticut
  - CTTransit - Hartford Division*
  - Greater Bridgeport Transit Authority*
- Delaware
  - Delaware Transit Corporation (DTC)
- Florida
  - City of Tallahassee
  - (StarMetro)
- Iowa
  - Des Moines Area Regional Transit Authority (DART)*
- Illinois
  - Bloomington-Normal PTS (Connect Transit)
- Kentucky
  - Lexington Transit Authority (Lextran)
- Louisiana
  - Capital Area Transit System (CATS)*
  - Lafayette Transit System (LTS)*
- Maryland
  - Ride-On Montgomery County Transit*
- Michigan
  - Flint Mass Transit Authority (MTA)
- Montana
  - Missoula Urban Transportation District
  - (Mountain Line)*
- New Jersey
  - New Jersey Transit*
- Nevada
  - Tahoe Transportation District*
- North Carolina
  - Asheville Redefines Transit (ART)*
- Oregon
  - SMART*
- South Carolina
  - Greenville Transit Authority (GTA)*
  - City of Seneca
- Tennessee
  - Nashville Metropolitan Transit Authority (MTA)
- Texas
  - Lubbock CitiBus*
- Utah
  - Park City Transit
- Virginia
  - Hampton Roads Transit*
- Washington
  - Kitsap Transit
- Wisconsin
  - Metro Transit System
  - (Metro)*

*New Proterra Customers
At Proterra, we believe that zero-emission electric vehicles are the smart choice for heavy-duty transit operations. We hope you’ll agree. Together, we can eliminate the need for fossil fuels in transit.
ELECTRIC TRANSIT VEHICLES OUTPERFORM FOSSIL-FUELED VEHICLES

CLEAN
Tailpipe Emissions
Annual lbs CO₂ (000's)

QUIET
Noise
dB

EFFICIENT
Fuel Economy
MPGe

AFFORDABLE
Lifetime Fuel Costs
000s

D=Diesel, DH=Diesel Hybrid, CNG= Compressed Natural Gas, Pro=Proterra EV
Advanced battery technology cost has declined to the point of replacing fossil fuels in the transit market.

Sources: Navigant Research, green.autoblog.com, Electric Drive Transportation Association. xEV = PHEV, HEV, EREV and BEV.
Objective:
• Build the world’s cleanest, most efficient, most cost-effective urban transit vehicle

Approach:
• Selected battery-electric drivetrain for maximum performance in all areas
• Clean-sheet design incorporating most advanced materials and technology
• Developing core innovations in EV drivetrain and charging technologies
• Partnering with world’s best technology providers to leverage scale

Outcome:
• 3 generations of vehicle development integrated into the Proterra Catalyst®
• Strongest intellectual property portfolio in the industry
• Record-breaking performance in FTA-required Altoona testing
• 350 miles nominal range between charges (E2); >700 miles per day (FC)

Purpose-built for EV Performance
Recently conducted most thorough EV test in U.S. that proved Proterra EV transit vehicles meet rigors of strenuous continuous usage.
THE PROTERRA CATALYST’S RANGE

*Depending on model. Nominal range = total energy/ projected Altoona efficiency. Actual range will vary with route conditions, battery configuration and driver behavior.
Proterra Catalyst® vehicles can be configured for overhead and/or plug-in charging at a variety of rates, to maximize available charging opportunities.

Configuring for “Smart Range” – the Most Efficient Combination of Energy Storage and Charging Options
Proterra can help you find the right combination of financing tools that map to your procurement plans

Municipal Capital Lease
A generally low-cost financing tool for local governments with investment-grade credits. Can be paid for with FTA funds. Offers structured ownership that enables you to own a Proterra bus at the end of the lease term.

Operating Lease
Operating leases allow you to pay for the use of a bus over time, with the option to permanently transition the bus into your fleet. No upfront capital costs.

Bus Rental Program
For fleet operators looking to “test drive” a Catalyst® bus before making a long-term commitment, Proterra offers the option to rent a bus for up to 12 months before making a long-term purchasing decision.

Battery Lease
A battery lease enables you to buy a Catalyst vehicle for roughly the same price as a diesel bus, putting the operating savings toward the battery lease. Proterra is responsible for the performance of the batteries through the life of the lease, removing operator risk.
SECOND LIFE

- Batteries will retain significant energy storage capability long after their first life in a transit bus
- Stackable design, retaining interface and safety features
- Hardware designed to exist >12 years in outdoor environmental conditions
SECOND LIFE

- Batteries will retain significant energy storage capability long after their first life in a transit bus.
- Stackable design, retaining interface and safety features.
- Hardware designed to exist >12 years in outdoor environmental conditions.
- Capable of serving multiple storage requirements for renewable energy, grid services, demand management and emergency backup.

~4 MWh shown
DEPOT CHARGING SOLUTIONS: PARKING DENSITY (75-85%)

- North American Plug Standard
  - J1772 CCS Type 1 (widely adopted for both heavy and light duty)

- One port on each side of the bus
  - Enables charging infrastructure in every other row rather than every row.
  - Increases customers' degrees of freedom
Local Charger, Slim Profile
50kW (7hr)
Double Plug
Uni-directional

Remote Charger + Local Dispenser
60kW (6hr) or 120kW (3hr)
Single plug
Bi-Directional (V2G)

- Wall Mountable
- Overhead Mountable
- Ground Pedestal

- Local Dispenser can be positioned 150m from Remote Charger
- CCS Type 1 Connector length up to 10m
Main Parts
1. Charger
2. Docking Control Box (DCB)
3. Charge Head Assembly
4. Canopy
DEPOT OVERHEAD CHARGING: Highest Parking density (>95%)

Remote Chargers with Local Dispensers

Pantograph w/ Automated connection
### NHTSA Levels of Vehicle Automation

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>Warning-only or absence of driver-assist</td>
<td>Forward Collision Warning (FCW) Lane Departure Warning (LDW) Blind Spot / Side Object Detect (SOD) *Alert-Only Assistance Systems</td>
</tr>
<tr>
<td>1</td>
<td>Function-Specific Automation</td>
<td>Singular control assistance Driver disengaged from steering or pedal</td>
<td>Automatic Emergency Brake (AEB) Lane Keep Assist (LKA) Electronic Stability Control (ESC) *Generally Lateral or Longitudinal</td>
</tr>
<tr>
<td>2</td>
<td>Combined Function Automation</td>
<td>Cooperative system assistance Driver disengaged from steering and pedal</td>
<td>Traffic Jam Assist (TJA) Highway Auto-Pilot Fully Autonomous Park Assist (AutoPA) *Generally Lateral and Longitudinal</td>
</tr>
<tr>
<td>3</td>
<td>Limited Self-Driving Automation</td>
<td>Semi-automated cooperative vehicle control systems Vehicle as primary controller of multiple functions</td>
<td>DRIVER SELECTIVELY IN THE LOOP</td>
</tr>
<tr>
<td>4</td>
<td>Full Self-Driving Automation</td>
<td>Fully-automated cooperative vehicle control systems Vehicle as primary controller—occupied or unoccupied</td>
<td>DRIVER OUT OF THE LOOP</td>
</tr>
</tbody>
</table>
Building Blocks of Automated Driving

Processing & Decision Making
- Software
  - Decision Making
  - Driver Interface
  - Driver-Car Handoff
- Significant interest, research, innovation, expansion
  Increasingly important for Level 1 → 4

Sensing
- Fusion
  - Sensor Data
  - Applications
  - Central Computing
- Ongoing integration, refinement, expansion
  Crucial component for Level 1 → 4

Vehicle Dynamics & Control
- Suspension
- Transmission
- Braking
- Steering
- Acceleration
- Underlying control systems