



Foothill Transit

ELECTRIC BUS

Program History

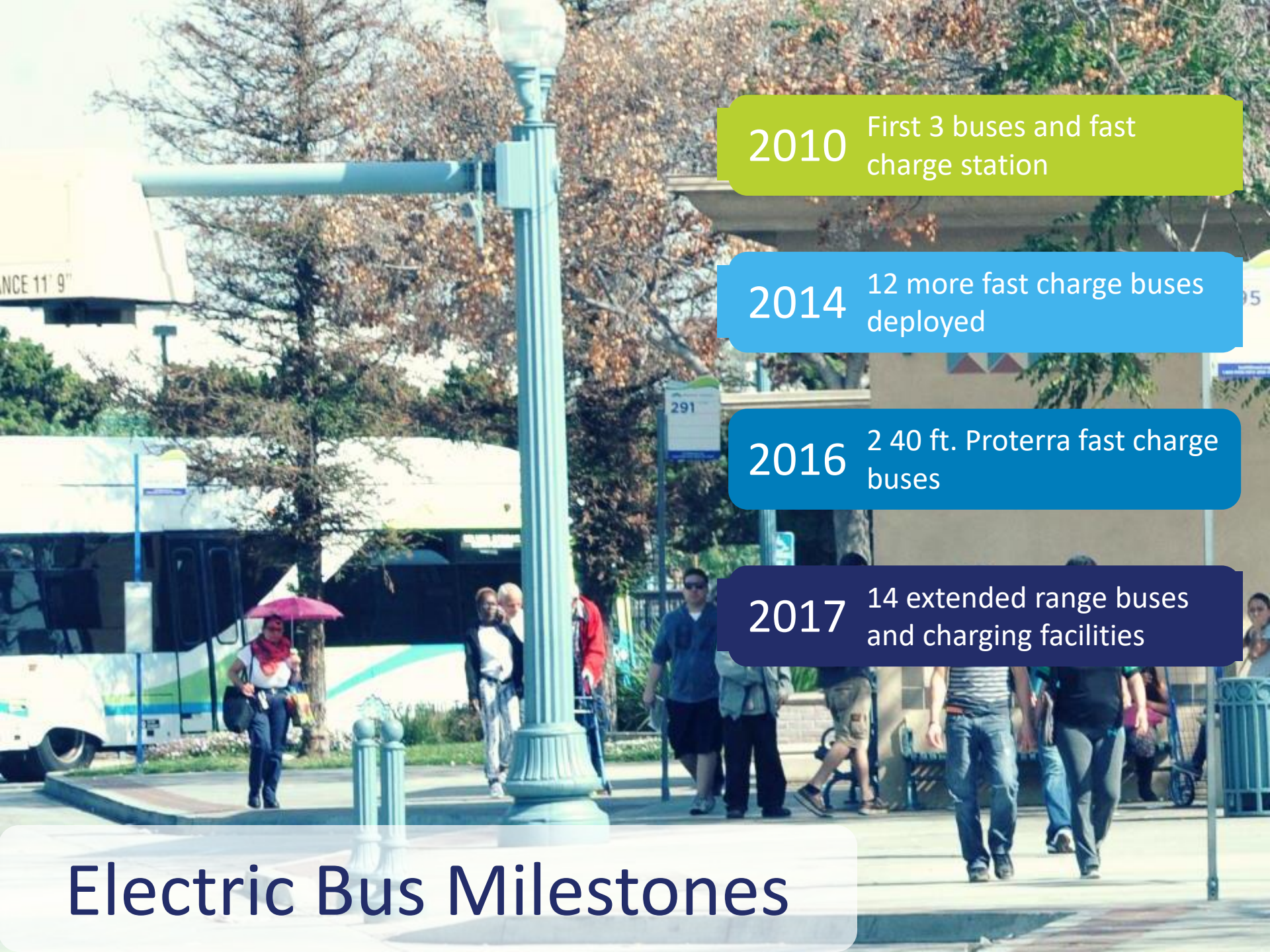
Lesson Learned and Future
Plans



Key Facts about Foothill Transit

Fast Facts

- 327 sq. mi service area, 1.5m service pop.
- 14.6 Million boardings per year, 40,000/day.
- 36 local and express routes.
- 354 CNG buses, 17 electric buses.
- Innovation is part of our core mission.



2010 First 3 buses and fast charge station

2014 12 more fast charge buses deployed

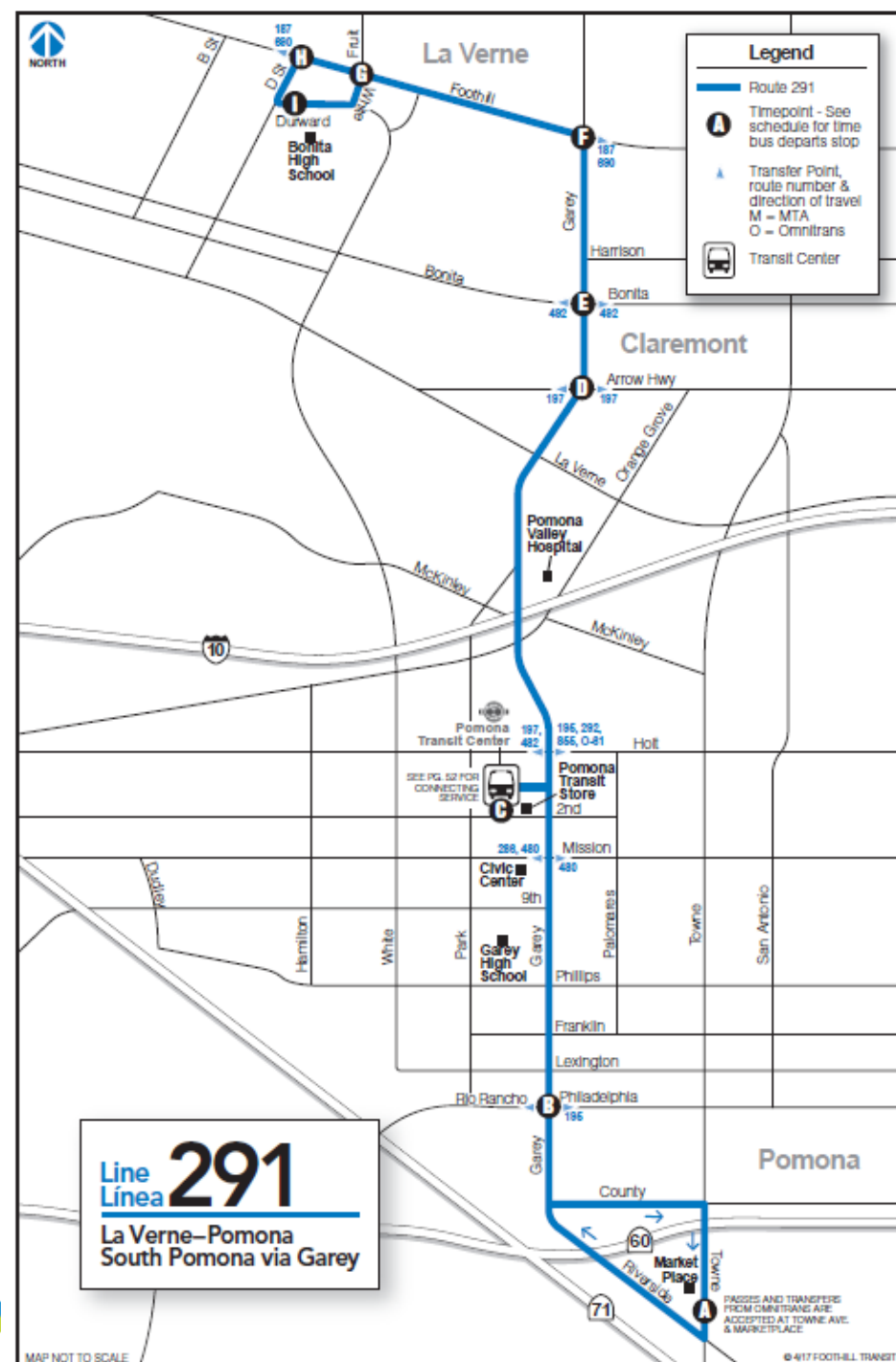
2016 2 40 ft. Proterra fast charge buses

2017 14 extended range buses and charging facilities

Electric Bus Milestones

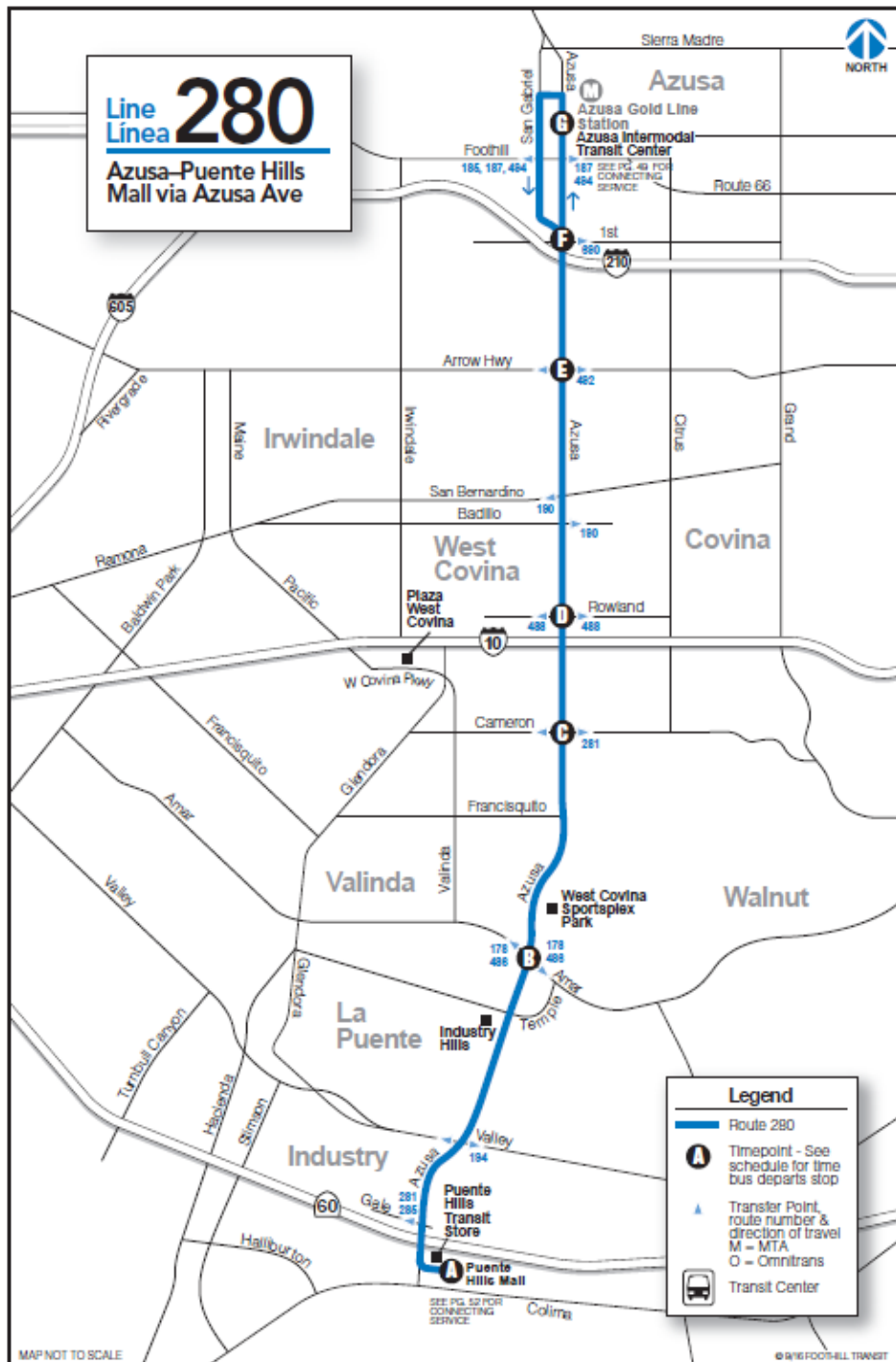
Current Service

- 16 FAST CHARGE electric buses
- Line 291 – La Verne – Claremont – Pomona
- 7-min charge at Pomona Transit Center
- 8 buses at peak service
- In operation since 2010



New Electric Service

- 14 EXTENDED RANGE electric buses
- Line 280: Azusa – Covina – West Covina – La Puente – Industry – Puente Hills Mall
- 251 miles nominal range
- Overnight charging at Arcadia Maintenance and Operations Facility
- On-route charging available at Azusa Intermodal Transit Center (near Gold Line Station)



ABOUT OUR CHARGING STATION



- One high power fast-charge station with two overhead chargers, sufficient to serve all buses
- 150,000 charge cycles to-date, and 1.5 million electric bus miles
- Located at Pomona Transit Center, a central hub with off-street flexibility, safety and security



ABOUT OUR CHARGING STATIONS



- AITC fast-charge station with two overhead chargers
- 14 new 40ft. extended-range buses on line 280
- Installed adjacent to Gold Line tracks





Bus Tests to Measure Range Capability



Four tests on local routes
Average 159 mile range (100%→10%
battery discharge). Results varied from
149 to 168 miles.

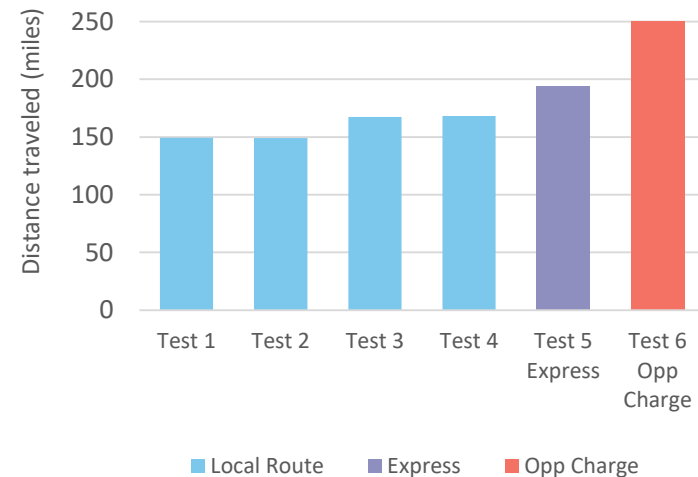


Express line test, 194 miles (100%→10%)



Opportunity charge, 250 miles (100%→
>10%)

Electric Bus Range Test Results





Current Challenge: Installing Depot Chargers



Foothill Transit Arcadia Yard



In-Depot Charging



Working with Proterra for 14 plug-in chargers



RFP for In-Depot Charging Design

Operating Electric Buses

- Not an easy task, can be complex and complicated depending on agency size.
- Operating a small fleet of EBs, 20 or less is easier compared to larger fleet sizes.
- Have OEMs provide a demo bus over a month period operating buses in actual service to get an idea of how EBs will perform in your service area.
- Bus operator driving habits, traffic, frequency of traffic lights and bus stops, weather, route topography
- AC units and heaters can use a substantial amount of battery energy.
- Range Anxiety



Energy Management

- Utility rates can be expensive and can sometimes be provided by multiple utility companies.
- Demand charges can cost as much as 25% of the utility bill.
- By having more buses operate on a specific route, you can lower the impact of demand charge.
- Demand charge is based on highest energy used.
- Spread charging of buses during the day.



Lessons learned

- In-route charged buses are inflexible.
- In-route charging stations require off-street installations.
- In-route charging stations are costly. Requires working with local city planners for plan review and permitting and with contractors and local utility.
- When installing in-route charging stations you need to have two.
- It also requires a maintenance contract with the charger station provider.
- Foothill Transit's approach now is to have extended range buses and charge them in the bus maintenance facility with in-depot chargers.
- To save space, our preferred approach is to have overhead in-depot rather than pedestal mounted plug-in chargers.





Foothill Transit

Electric Double-Deck Buses



First to use technology



Increase rider capacity



Improve Transit



Reduce Greenhouse Gas Emissions



Foothill Transit

**THANK
YOU**