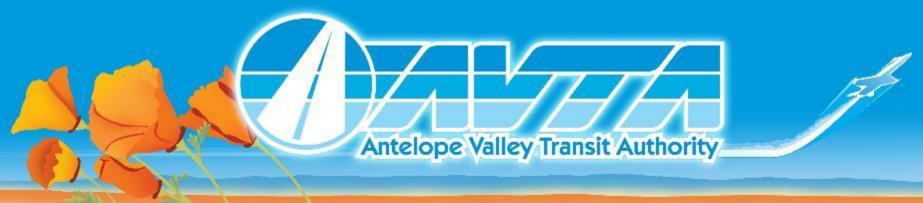
# Adapting and Creating "Change"

Norm Hickling Director of Strategic Planning and Development

> California Transit Association Fall Conference & Expo



### Change the Game by Going Green Began November 2014

Pilot Program......Procure 2 BYD 40' Battery Electric Buses Data Data Data.....Collect incredible amounts of data What will our fleet look like past 2019......50 Local & 35 Commuter How will we run them in route all day?....Charging Infrastructure Training.....Operators and Technicians Technicians vs. mechanics!!!



### **Results Were Favorable**



- Two BYD 40' battery electric buses
- 90% availability for service
- Average range 150 miles @ 2.2kw/mile
- 15,000 Miles between service interruptions
- Average operating cost:

Maintenance + Electricity <u>\$.55/mile</u>



#### Hold On, Here We Go!! February 2016 Board of Directors meeting

- AVTA awarded a contract for 85 Battery Electric Buses to BYD
  - 35 45' Commuter Coaches
  - 13 60' Articulated Buses
  - *37 40' Local Transit Buses*
- \$5 Million infrastructure project for 89 Depot Charging Stations at main facility
- \$10 Million infrastructure project for High Power Wireless Inductive Charging Systems







## Mitigating the "CHANGE" Factor

- Infrastructure
- Route Planning and Execution
- Operations
- Organizational Change



# Infrastructure

- Four inductive chargers at main transit centers
  - Owen Memorial Park
  - Palmdale Transportation Center
- Additional chargers will be installed at strategic locations in support of regional service routes structure
  - Metrolink Station
  - Healthcare Facility







Infrastructure Inductive/Enroute Charging
AVTA's 1200 square miles of service area provides CHALLENGES to cover
our local transit routes
Inductive chargers extend mileage ranges sufficient to cover all routes
50kWh Chargers...one located at each transit center
10 min charge times = 4 miles of added range
4 miles X 10 = 40 miles range extension
180+40=220 potential miles of range

250kWh Chargers...3 located at each transit center 10 min charge times = 15-18 miles of added range 20 mile X 10 = 150 to 180 miles of daily range extension 180+150 = 330 potential miles of range



#### **Infrastructure Depot** Charging

- 89 Depot Chargers
  - 43 200kWh
  - 40) 100kWh
- Energy Required Daily...40,500kW
- Peak Available...NTE 10,000A
- Emergency standby power...1.5MW
  - 25 buses

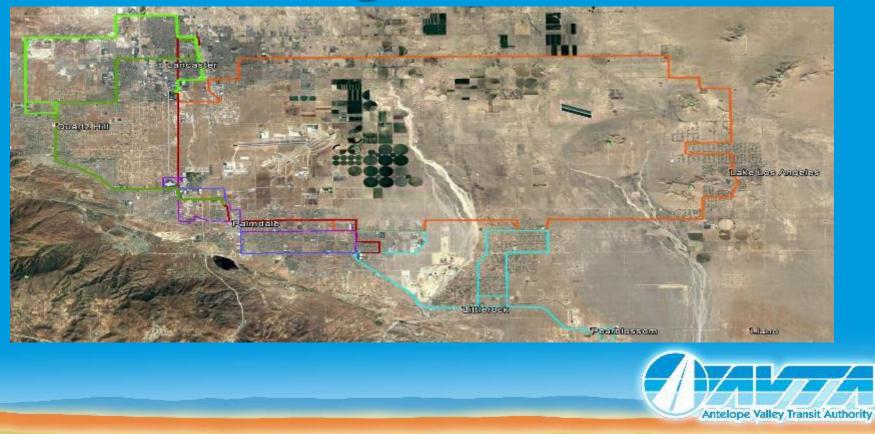








# **Route Planning**



### **Route Planning**

- Planning principles become critical
  - Long-term view
  - Charging facilities must be carefully located for support of routes today and into the future
- Must incorporate careful timing of schedule
  - Allow for appropriate time in service schedule for charging process
  - Minimize wasted deadhead miles, excessive dwell time, etc.
- Plan for growth patterns within the region



# Operations

- Battery Electric Buses need to be driven differently
  - Acceleration & Braking
  - Driving technique
  - "Anxiety" @ 25% Charge
- Operations Procedures
- Training for Success
- Technicians vs. Mechanics
- Recognize performance





## Organization

- Organizations must have a clear vision for operating electric buses in their fleet
- Change the mindset of every person within the organization
  - Transit Agency
  - Contractor, Consultants, Vendors, etc.
  - Work in progress
- Do it for the right reasons
  - Environmental stewardship and a sustainable future
  - Healthier environment for operators and technicians
  - Enhanced customer experience



### Summary

- "Change" is a part of the process. Well worth it!
- Bus procurement is the "easy" part of the process
- Plan the infrastructure
- Adjust route planning
- Align the organization to a new "Customer Experience Mindset"
- Reach out to those agencies that have taken the leap...





Come visit the Antelope Valley Our doors are always open to our friends!!

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