



# Resilience ZEB Design & Off Grid Charging

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# OVERVIEW



**7 Elected Board Members**  
**1.5M people in service area**  
**364 square miles**  
**128 lines (18 transbay)**  
**16.7M annual service miles**  
**2,200+ FTE's**  
**7 facilities (4 bus-3 support)**  
**637 buses (58 ZEBs)**

Bus Division  
Battery Electric  
H2 Fuel Cell  
Administrative



# ZEB HYDROGEN



# ZEB BATTERY



- **Hydrogen delivered by truck**
- **Limited storage onsite**
- **Limited fuel suppliers**

- **Distribution by utility grid**
- **Power outages "PSPS"**
- **Planned & unplanned**

# ZEB BATTERY



# ZEB HYDROGEN



- **Alternative power source**
- **On-site electricity production**
- **On-site electricity storage**
- **Power distribution & storage management**
- **Clean green renewable power**

- **Emergency genset to power station**
- **On-site liquid storage**
- **On-site fuel production**
- **Multiple fuel suppliers**
- **Force Majeure language**

# OTHER CONSIDERATIONS



- ✓ **Plan for various scenarios: earthquake, flood, extreme weather, fires, planned & unplanned power loss, equipment incident, short term (hours) vs long term (days, weeks, months)**
- ✓ **Be realistic: 100% vs 65% emergency service levels**
- ✓ **Consider operating only critical routes**
- ✓ **Consider mixed ZEB fleet if feasible**
- ✓ **Capitalize on multiple bus divisions**
- ✓ **Think outside the box**

# THOUGHTS?



# THANK YOU!

