

**Work Session:  
Clean Energy Meets Green Transportation  
Panel B  
March 16, 2021**

# **SMART CITIES, SMART FLEETS, AND GREEN COMMUNITY MOBILITY:**

- FLEET ELECTRIFICATION AND EVSE DESIGN
- NEIGHBORHOOD E-MOBILITY HUBS
- TRANSIT ELECTRIFICATION AND PARK AND RIDE OPTIMIZATION

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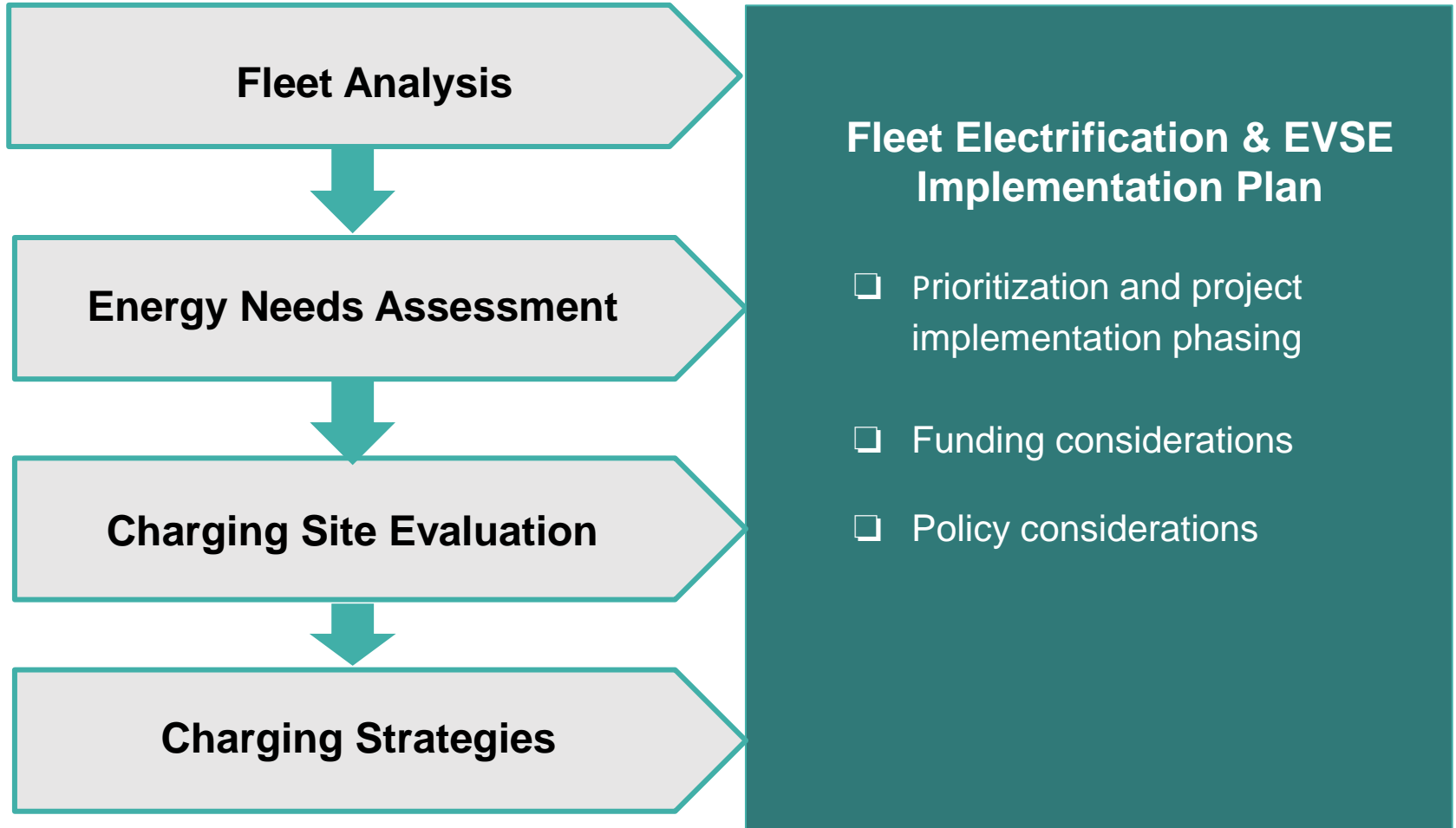




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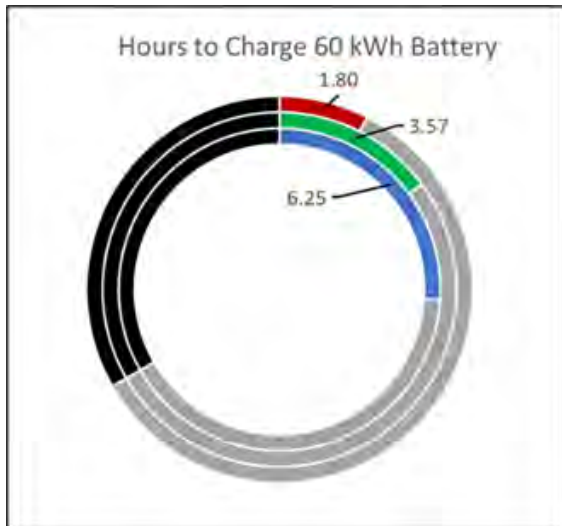
**FLEET  
ELECTRIFICATION AND  
EVSE DESIGN**

# FLEET INFRASTRUCTURE PLANNING PROCESS



# FLEET CHARGING OPPORTUNITIES

## Planning Charging infrastructure



Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0		⚡				⚡	
1					⚡		
2				⚡			
3			⚡				
4		⚡				⚡	
5					⚡		

■ 9.6 kVA Charger   
 ■ 16.8 kVA Charger   
 ■ 33.36 kVA Charger   
 ■ Unused Charging time   
 ■ Vehicles in Use

# FLEET CHARGING STRATEGIES

	Dedicated L1 & L2 chargers	Dedicated L2 chargers with load management	Shared L2 chargers	Shared DCFC	Mobile charging
Convenience and simplicity					
Capacity for future fleet expansion					
Reduces peak demand and resulting service upgrades					N/A
Costs for hardware purchase, installation, and load upgrades					
Requires active parking/charging management					N/A
Risk of vehicles not being charged					
Flexibility for different vehicles and users					

Charging strategy ranking from excellent to poor for fleet applications -

# FLEET CHARGING TECHNOLOGIES

## Today's chargers



## Tomorrow's chargers



Inductive charging



Automated charging



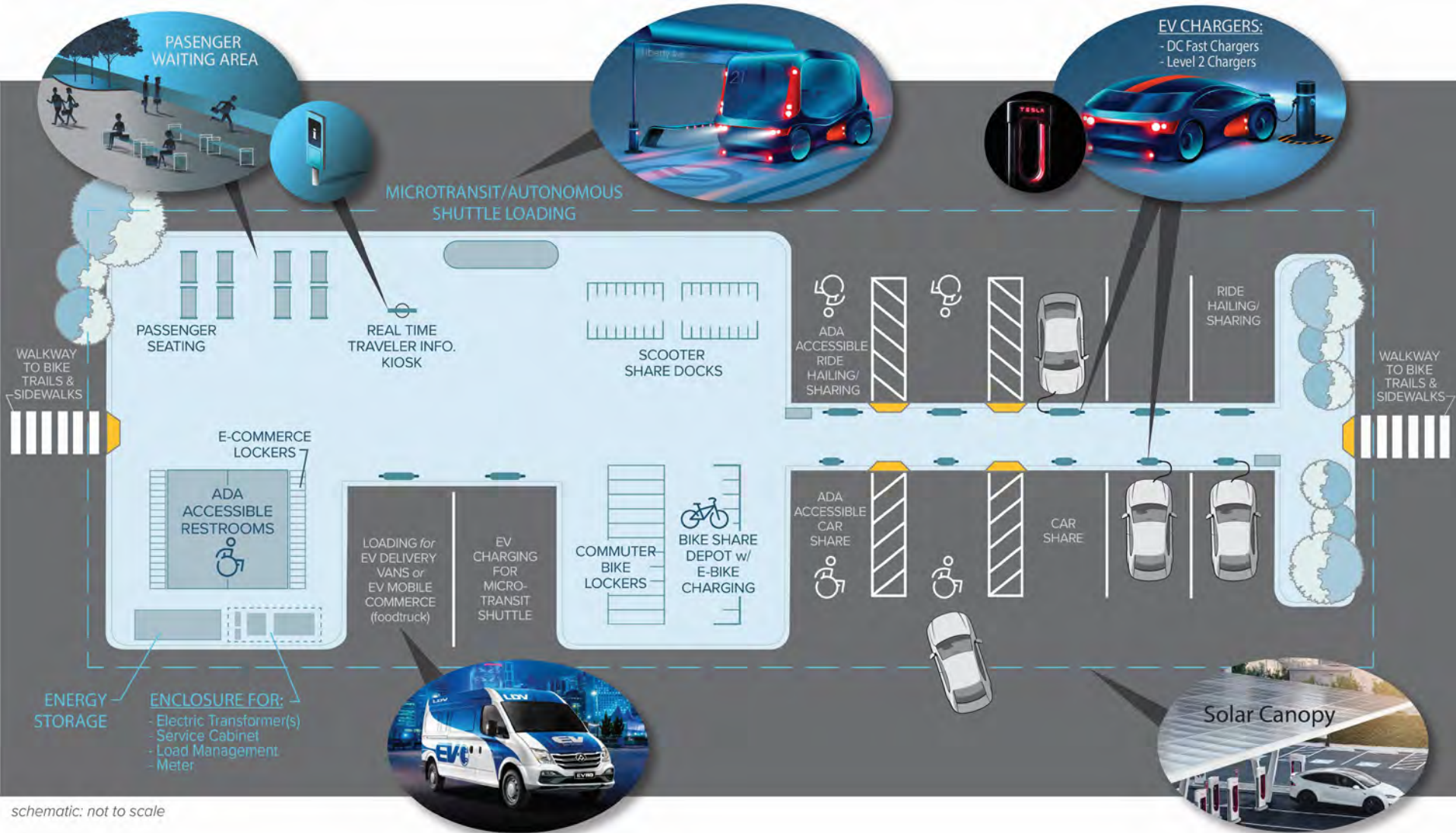
Robotic charging



## NEIGHBORHOOD E-MOBILITY HUBS



# ANATOMY OF AN E-MOBILITY HUB





# E-MOBILITY HUB COMPONENTS

## EV Charging:

- 1. High power chargers** for microtransit, ride hail vehicles and possibly electric buses
- 2. Level 2 chargers** for car share and possibly private EVs
- 3. Level 1 charging docks** for micromobility: e-bikes and scooters



SOURCE: SWIFTMILE & EVGO



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**TRANSIT  
ELECTRIFICATION  
AND  
PARK AND RIDE  
OPTIMIZATION**

# TRANSIT ELECTRIFICATION

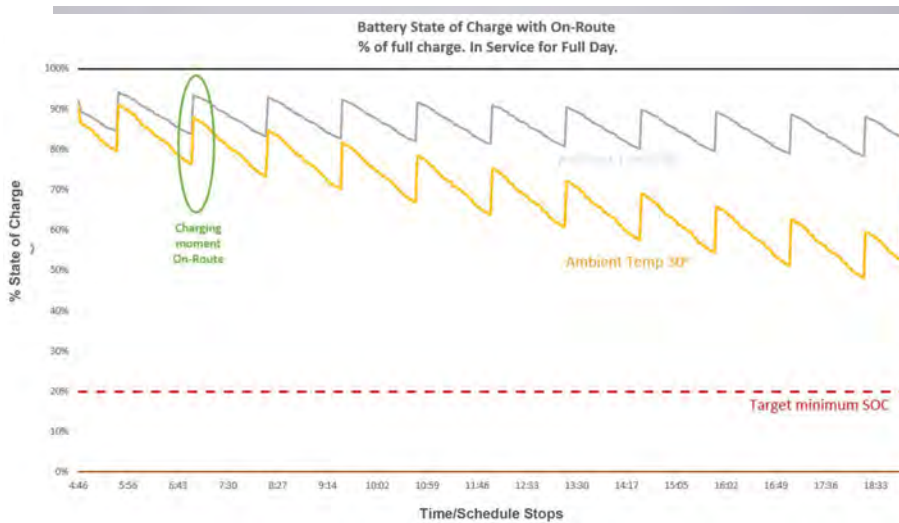
## On-route/Opportunity Charging

### Benefits:

- Less electrical infrastructure at bus depots
- Lighter, less expensive buses
- Fewer chargers shared by more buses



Inductive charging



Automated Pantograph

SOURCES: MASS TRANSIT & NGT NEWS

# PARK AND RIDE OPTIMIZATION

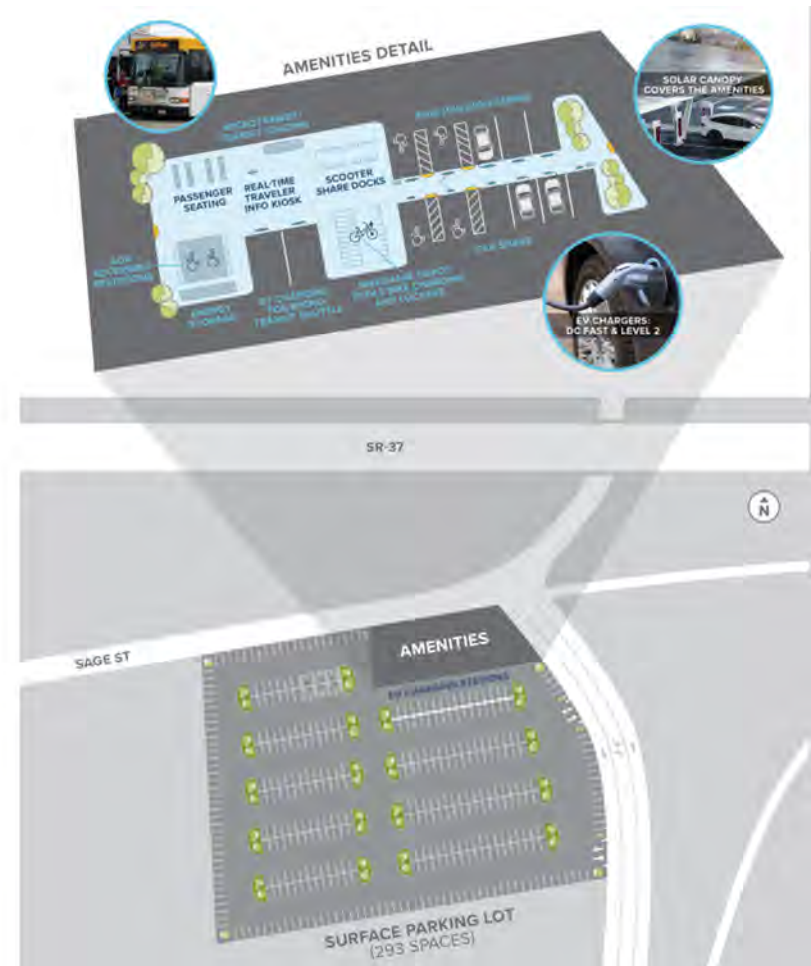
## Scenario 1 Surface Parking Lot

### Parking Spaces

Total Number of Spaces	305
# of EV Charging Stations	19

### Cost Breakdown

Surface Parking Lot	\$ 2,497,000.00
Amenities	\$ 704,000.00
Additional Cost To Upgrade to Electric Bus Charging Infrastructure	\$ 475,000.00
Traffic Control and Mobilization (20%)	\$ 735,200.00
Contingency (25%)	\$ 919,000.00
<b>Total</b>	<b>\$ 5,330,200.00</b>



# THANK YOU

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