VISALIA
A BETTER WAY OF LIVING

Solid Waste Electric Truck Pilot

Why electrify?

- The State of California and the California Air Resources Board have mandated that State and local agencies begin converting their heavy-duty fleets to zero emission starting 2024.

- CNG does not qualify as meeting the regulations. This leaves electric as the only alternative, as hydrogen fuel cell trucks are still not available.

- A pilot electric vehicle will assist staff in getting real world data on the new technology, specific to the City of Visalia over an extended period of time.

- There are now enough users of electric trucks to obtain good references and information.

Research Process and Information Gathering Overview

- Staff researched and demo'ed viable solid waste trucks from various manufacturers and configurations. This included ensuring the Transit charging station was compatible, and also included the Fleet Department for servicing and maintenance questions.

- After selecting a preferred manufacturer for viability and experience, staff collected testimonials and researched current operators of the selected truck within, and outside, California.

- After ensuring that the truck was a operationally viable alternative for a current CNG truck, staff compiled data and cost figures, including initial quotes, to determine the lifetime cost of an electric truck versus the City's current CNG platform.

Trucks Considered

- Trucks that Staff considered and their general operating specifications:




	Mack LR Electric	Peterbilt 520EV	Battle Motors	McNeilus Volterra	CNG Comparable
Electric Battery Capacity	334 kWh	400 kWh	400kWh	498 kWh	N/A
Battery Type	Lithium-Ion	Lithium-Iron Phosphate	Lithium-Iron Phosphate	Lithium-Ion	N/A
Range	100 miles	150 miles	210 miles	150 miles	150 miles
GVWR (Gross Vehicle Weight Rating)	72,000 lbs	77,020 lbs	66,000 lbs	66,000 lbs	60,000 lbs
Maximum Legal Weight (CA)	59,500 lbs	59,500 lbs	57,500 lbs	59,500 lbs	51,500 lbs
Payload	16,500 lbs	17,060 lbs	17,340 lbs	19,280 lbs	14,400 lbs
Charging (@150kW)	2 hours	3-4 hours	3 hours	4 hours	N/A
Capacity	28 cubic yards	28 cubic yards	28 and 31 yard options	31 cubic yards	28 cubic yards

- **extra legal weight capacity capable on electric trucks due to tag axle (except Battle Motors)*

Staff Selection Criteria

- **Mack LR Electric** – Battery capacity and range was not desirable.
- **Peterbilt 520EV** – Was a viable truck, but seemed to perform with less battery efficiency compared to alternative. Was able to complete route as needed. Not many on the road or sold.
- **Battle Motors** – Not enough experience (sales in CA) outside of demo that warranted comparison.
- **McNeilus Volterra** – Was a viable truck that seemed to check off all operational needs, with the best range and turning radius. Was able to complete route as needed. Many operators throughout California for references.

Staff Selection – McNeilus Volterra

- Local McNeilus dealer is located in Tulare, CA.
  - Able to service and provide warranty work locally.

- Two options available:
  - New truck, ordered through the Sourcewell Cooperative
  - Demo Truck, also available through the Sourcewell Cooperative (due to mileage being less than 3,500. (Current mileage is 1,721)

**Demo Truck is also still grant eligible as verified through the Air Resources Board.*

McNeilus Volterra Considerations

- **Knowing the cost of an electric alternative to CNG would have a higher up-front cost, staff considered what grant options were available to bridge the cost gap.**
  - In addition, staff considered the lifetime cost of owning an electric truck versus a CNG model to determine if any cost savings are anticipated due to the difference in fuel and maintenance needs.

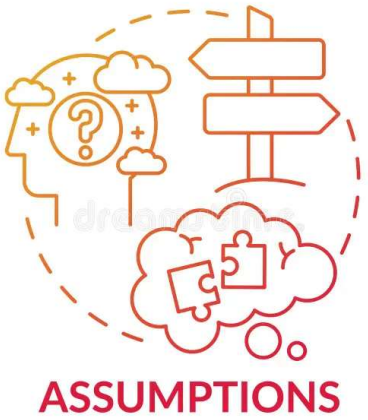
Lifetime Cost Comparison: Electric vs. CNG

- **Electric Advantages**
  - Lower estimated repairs
  - Lower estimated maintenance
  - Lower estimated cost of fuel (charge)

- **Electric Drawbacks**
  - Higher up-front capital cost
  - Possible unknowns due to experience
  - Possible repair delays

General Assumptions for Comparison

- **CNG Truck**
  - 210 working days per year
  - 10-year life
  - 90 miles average per day, per route
  - No Air Board Incentives



- **Electric Truck**
  - 210 working days per year
  - 10-year life
  - 90 miles average per day, per route
  - Air Board Incentives (HVIP, Truck Replacement Program)

Assumptions for Comparison

- **CNG Truck**
  - CNG fuel - $1.61/gal (current price)
  - CNG Fuel Use – 45 DGE per day (60% of max 75 DGE)
  - Repairs and Maintenance based on 10-year actual averages

- **Electric Truck**
  - Electricity - $0.22/kWh (off-peak)
  - 50% battery use per day (249 kWh)
  - Repairs at a factor of 73.11% of CNG
  - Maintenance at a factor of 50% of CNG *

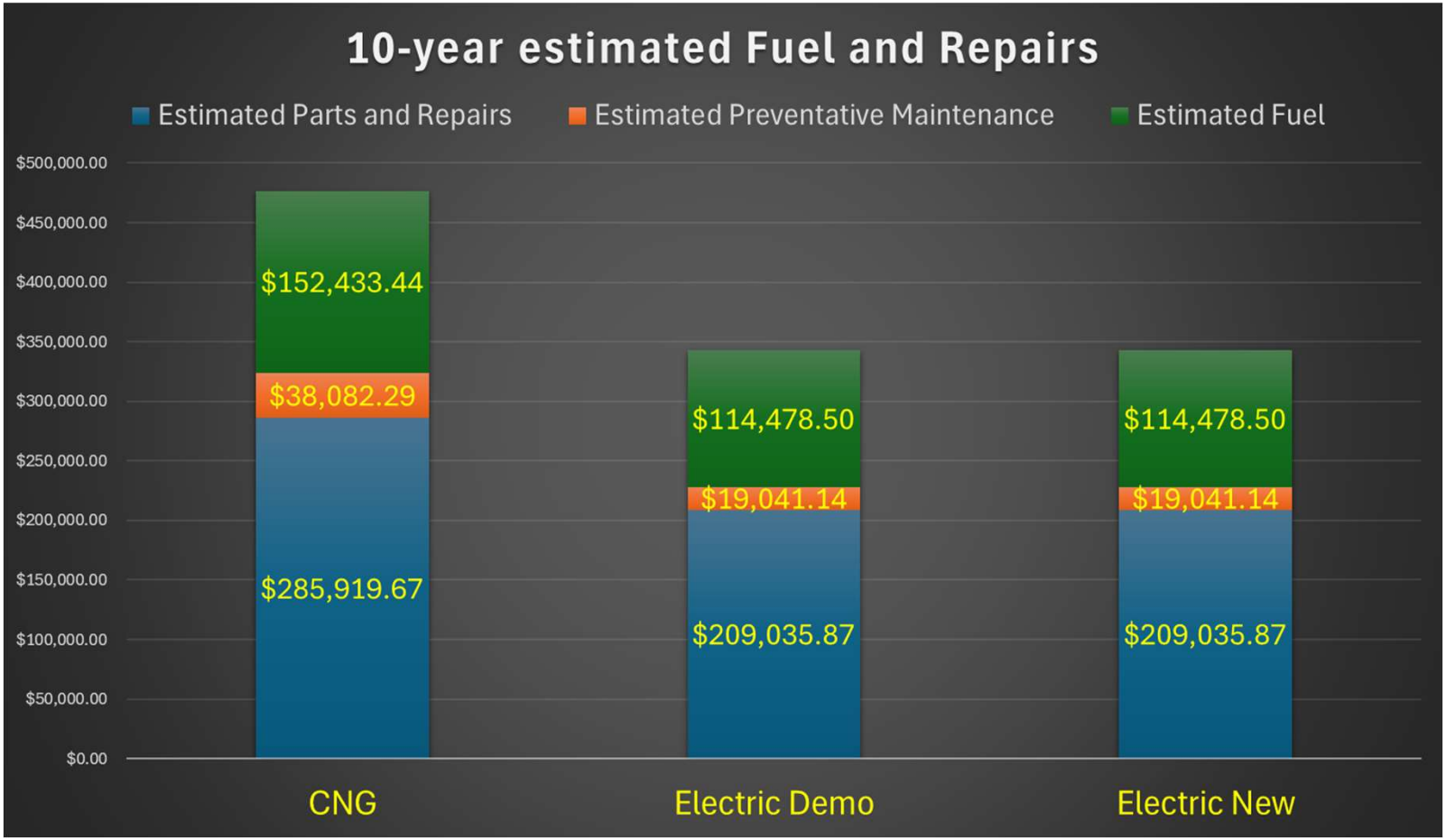
**based on operator 2-year actuals*

10-year Total Cost Comparison versus CNG

10-year Electric VS CNG Comparison			
	CNG	**Electric Demo**	**Electric New**
Purchase Price	$527,371.08	$848,035.38	$931,171.35
Initial Charger	$0.00	$28,333.20	$28,333.20
Grant Dollars HVIP	$0.00	($150,000.00)	($150,000.00)
Total Purchase Price (including tax)	**$527,371.08**	**$726,368.58**	**$809,504.55**
Estimated Repairs (related to Parts & Labor)	$285,919.67	$209,035.87	$209,035.87
Estimated Preventative Maintenance	$38,082.29	$19,041.14	$19,041.14
Estimated Fuel	$152,433.44	$114,478.50	$114,478.50
Total Cost of Ownership (Annual)	**$1,003,806.48**	**$1,068,924.09**	**$1,152,060.06**

**** Potential to stack an additional $120,832 Air Board Grant, if qualified after purchase.***

10-year Total Repair and Mtc Cost Comparison vs CNG



Additional Purchase Requirements

- **Maintenance Requirements**
  - PPE required for servicing electric vehicles
  - General safety equipment for the Fleet department related to high electric current (barricades, etc.)
  - Additional specialized high voltage training (included in purchase)

- **Charging Backup Solutions/Opportunities**
  - Initial Charger (Backup)
  - Future Solar Consideration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