TOTAL COST OF OWNERSHIP FOR ESBS IN MICHIGAN
WHY TOTAL COSTS MATTER

- Budgeting
- Savings potential
- New revenues streams
- Alternative business models
KEY COMPONENTS

Total Cost of Ownership Components

- Expected Vehicle Lifetime
- Annual Mileage
- Average Fuel Economy
- MSRP
- Maintenance and Repair Cost
- Charging Infrastructure Cost
- Fuel and Energy Costs
- Potential V2G Revenues
## ELECTRIC VS. DIESEL BUS MODEL INPUTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Electric</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Vehicle Lifetime (Years)</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>Annual Vehicle Mileage (VMT/Year)</td>
<td>14,084</td>
<td></td>
</tr>
<tr>
<td>Bus MSRP</td>
<td>$352,000</td>
<td>$103,000</td>
</tr>
<tr>
<td>Energy infrastructure &amp; installation</td>
<td>L2 19.2 kW charger $10,475</td>
<td>n/a</td>
</tr>
<tr>
<td>Average Fuel Economy (weighted 55% city/45% highway)</td>
<td>22.1</td>
<td>6.59</td>
</tr>
<tr>
<td>Full Coverage Annual Cost to Insure ($/yr)</td>
<td>$6,800</td>
<td>$6,800</td>
</tr>
<tr>
<td>Fuel prices</td>
<td>$0.11-0.13/kWh</td>
<td>$3.98/gallon</td>
</tr>
<tr>
<td>Overall Average Maintenance &amp; Repair Cost ($/Mile)</td>
<td>$0.30</td>
<td>$0.60</td>
</tr>
<tr>
<td>Discount Rate for NPV Calculations (%)</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Pricing Approach</td>
<td>MSRP Less Tax Credits (45W &amp; 30C)</td>
<td></td>
</tr>
</tbody>
</table>

Source: TCO Technical Note
MICHIGAN PROGRAMS

Utility Programs

Volkswagen Settlement Funds
ILLUSTRATIVE TOTAL COST OF OWNERSHIP

SCHOOL BUS TOTAL COST OF OWNERSHIP

- **DIESEL**: TCO $434k
  - $121,000 (Bus Capital Costs)
  - $116,000 (Maintenance & Repair (includes EVSE))
  - $94,000 (EVSE Capital Costs (after 30C))
  - $103,000 (Remaining Upfront Capital Gap)

- **OPTIMIZED TOU**: TCO $525k
  - $40,000 (Bus Capital Costs)
  - $29,000 (Maintenance & Repair (includes EVSE))
  - $83,000 (EVSE Capital Costs (after 30C))
  - $7,000 (Remaining Upfront Capital Gap)

- **TOU + DTE E-FLEET BATTERY SUPPORT**: TCO $409k
  - $40,000 (Bus Capital Costs)
  - $100,000 (Maintenance & Repair (includes EVSE))
  - $83,000 (EVSE Capital Costs (after 30C))
  - $29,000 (Remaining Upfront Capital Gap)

- **TOU + NGRID V2G**: TCO $433k
  - $40,000 (Bus Capital Costs)
  - $81,000 (Operations (insurance, fees, V2G revenues))
  - $49,000 (eBus Tariff Incentive)

- **TOU + DTE + NGRID V2G**: TCO $384k
  - $40,000 (Bus Capital Costs)
  - $200,000 (Remaining Upfront Capital Gap)

*Source: WRI Illustrative calculations*
POTENTIAL TCO PARITY BY LATE 2020s

Source: WRI Illustrative calculations
RESOURCES

https://atlaspolicy.com/electric-school-bus-calculator

https://electricschoolbusinitiative.org/clearinghouse-electric-school-bus-funding-and-financing-opportunities