REPOWERING DIESEL SCHOOL BUSES TO ELECTRIC!

A repower, or retrofit, involves removing a vehicle's internal combustion engine (ICE) which runs on fossil fuels and replacing it with an electric drive system.

The Steps of a Repower

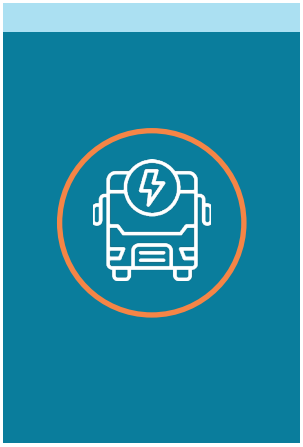
1. Assess if funding is available for electric repowering.
2. Identify the best pathway to acquire a bus for repowering (see pathway options on the right).
3. Publish a Request for Proposals (RFP) and select a repower vendor. During this process, assess what refurbishment work, if any, is needed.
4. Repower and refurbish the bus.
5. Certify the vehicle with your local city or state agencies. Your bus is ready to roll!

There are three potential pathways to acquire a repowered school bus:

1. Choose an internal combustion engine (ICE) bus from the district's fleet to be repowered.
   - Newer to mid-life buses with less wear and tear on the body and chassis are best for a repower.
   - As of 2023, most repowers have been completed on Type A and C school buses.
2. Purchase a used ICE bus to be repowered.
   - Government surplus auction sites offer opportunities for used buses.
   - Listings can range from $2,000 for an older bus with a degraded engine to $40,000[1] for a newer bus in great condition.
3. Purchase a repowered bus from a dealer.

[1] Forth research on bus auction sites during 2023
[2] Ly & Werthmann, WRI 2023
[3] Lee & Chard, CALSTART, 2022 pg.32

Benefits of Repowers



Less expensive than purchasing a new electric school bus.

- Repowering a Type C school bus costs about $175k[2] which is roughly half the cost of a new Type C electric school bus.

Repowers increase equitable access to electric school buses.

- Converting an existing ICE bus has a lower upfront cost which makes the environmental benefits of electric school buses more accessible.

Shorter lead time on fleet electrification.

- As of 2022, school districts in California waited an average of 23 months[3] to receive a new electric school bus. Repowers show promise to be delivered in a shorter time frame.

Limits the need to manufacture a new school bus.

- Roughly 9 tons of steel[4] are needed to build a new Type C school bus. 1.85 metric tons[5] of carbon dioxide are emitted by manufacturing that steel alone.

Expected Lifetime

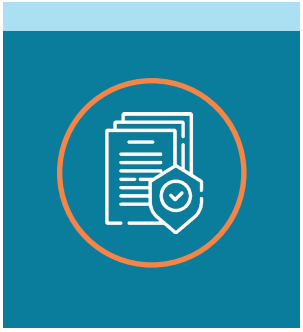
Repowered Bus Lifetime

The lifetime of a repowered electric school bus will depend on:

- The age of the bus before it is repowered. The younger the bus, the longer the bus body and chassis can continue to operate with its new electric powertrain.
- The environmental conditions where the bus runs (e.g. weather, corrosion from salt on the road, etc.).
- The quality of maintenance and upkeep provided over the life of the vehicle.

Logan Bus Company operates five repowered school buses in New York. At the time of the conversion to electric, the buses were 10 years old. Logan Bus estimates that their buses will be on the road at least 10-12 years[6].

Best Practices



- Consider the distance of the bus routes and available charging infrastructure.
- Be specific about your needs and budget in your RFP to find the right contractors and compatible project partners.
- Get familiar with the warranty policy of your repower vendor. A service-level agreement could be used to ensure that you're on the same page about your repowered school bus.
- Seek out advice! Whether it be from a repower vendor, a charging infrastructure manufacturer, a school district that has electric school buses, or a team that has completed a repower.

[4] Forth interviews with repower companies, bus manufactures, dealers, and school districts
[5] World Steel Association. (2021). Climate change and the production of iron and steel
[6] Repowering the Transition to Electric in New York and Lowering Total Cost of Ownership, WRI 2023