

Scope of work to convert 2016 Ford Transit gasoline 350 HD cutaway bus to full electric.

Vehicle for conversion

2016 Ford Transit 350HD

3.5l gasoline engine, automatic transmission

Vin# 1FBVU4XG9GKA56624

Pictures will be provided, and any questions answered via email tkuykendall@swtransit.org

EV Powertrain

Remove factory Ford 3.5l engine and automatic transmission. Install fully electric powertrain, motor, and transmission with regenerative braking, hybrid options will not be accepted. Remove any original factory wiring, belts and hoses not used with EV powertrain. Engine compartment should look clean and professional, with wiring and hoses routed in a way as not to allow kinking or rubbing. All wiring harnesses must be sheathed to protect wires from elements, all electrical connectors used must be of a positive locking style with seals to protect terminals from moisture.

Accessories

All factory installed systems including but not limited to horn, wipers, power steering, brakes and lighting must operate as factory specified at time of conversion completion. These items cannot be altered in any way that could affect their safe operation.

HVAC

The bus must be equipped with both a heating and air conditioning system that allows the bus to be comfortably operated year-round in Minnesota with summer temps as high as 100 degrees Fahrenheit and winter temps as low as -30 degrees Fahrenheit. It is acceptable to tie into the existing HVAC systems or to install an after-market system to achieve these requirements. The use of a non-electric heaters such as a diesel heater is not permitted.

Removed Parts

Parts no longer needed following the conversion including but not limited to the gas tank, fuel lines, exhaust system, exhaust brackets and hangers, belts, hoses, and electrical cables are to be removed

from the vehicle. Any parts removed from the vehicle that will sold from the conversion should be shown as a credit on the proposal submitted to SouthWest Transit.

Batteries

The battery pack, electrical connectors and all wiring must be sealed to not allow water, salt, or corrosion to penetrate the batteries, electrical wiring, or connectors. The battery pack must be mounted in a way that is stable and quiet during operation. The battery pack and electrical cables must allow adequate ground clearance to be operated in all normal conditions without causing damage to batteries or bus, including but not limited to speed bumps, potholes and up to 6 inches of snow.

Battery Charging

The proposal must include both a wall outlet plug in style a/c 240-volt charger and a DC fast charger capable of charging 80 kwh batteries from 10 percent to 100 percent in 3 hours or less.

Battery monitoring system

The bus must be equipped with a battery monitoring system. The system must be easily readable by the operator while operating the bus. The system must show battery charge state while bus is being operated and while being charged. The battery monitor must show the battery state as both a percent and as an estimated range remaining. The system must also monitor and alert the driver of all unsafe conditions including but not limited to overheated or damaged battery cells, shorted or damaged wiring.

Battery degradation

The proposal must list the acceptable amount of battery degradation over a 5-year period. The proposal must state and what level of degradation the batteries will be warranted in years one through five.

Warranty

The EV powertrain motor, transmission and all electrical harnesses and connectors must be fully warrantied for a minimum of 5 years or 60,000 miles.

The battery pack, connectors and harnesses must be fully warrantied for 5 years or 60,000 miles. This warranty must include free replacement of batteries that degrade faster than acceptable with in years one through five.

Battery chargers must be fully warranted for a minimum of 2 years. The charger must be repaired or replaced free of charge for any failures in the first 24 months of operation.

Minimum Specs (these specs must be met or exceeded)

EV drive motor 160 KW

Battery pack 80 KWH

Top speed 65 MPH

Range 120 miles

Charge time from 10%-100% in three hours or less with DC fast charger

Extra options

Please include pricing for battery options offered that extended driving range beyond the 120-mile minimum range required to submit a proposal. Please include pricing for DC fast charge battery chargers capable of charging batteries from 10 percent to 100 percent in less than three hours. Please include estimated delivery time for completed conversion if bus were available for conversion in mid-September 2021. Please include options and pricing for telematic diagnostics and monitoring services if offered.

How will the proposal be graded?

Several criteria will determine which conversion proposal is recommended to the SouthWest Transit commission for approval.

1. Ability to meet all requirements of proposal.
2. Price of conversion including battery charger.
3. Total range on a single charge.
4. Warranty of complete EV power train, batteries, chargers and all electrical.
5. Completion date.