

Questions for bus vendors:

- 1) What configurations are you currently offering on the FI Bus Bid in the Electric bus, type and capacity. Do you have other electric units meeting FI specs that are not currently on the bid? The electric bus is currently available: as a Special Needs wheelchair bus with a 217" wb, 26' 08" body, flat floor and lift. There is also a route bus with a 276" wb, 34' 02" body conventional floor, no lift. Additional body sizes are being released during 2021 for the 276, 34' 11", 33' 05", and 32' 08".
- 2) Based on these configurations, please identify with a fully loaded bus based on capacity of ridership, A/C application, the effective range for each ~~application bus~~ before recharge. - This is still being finalized in testing which is anticipated in January 2021. With A/C we recommend either the 2 or 3 battery pack with kWh of 210 and 315 respectively, we would look for 1.35 to 1.70/kWh.

2)

3) Identify the requirements of percent of charge that the bus must have prior to operation. - The bus can operate at any state of charge but performance will de-rate below a 20% SOC.

~~3)~~

4) Identify all charging options and time requirements that each carry to provide a fully charged bus ready for use. - NEXT The vehicle is standard with both AC and DC charging. The vehicle can charge at the maximum AC charging rate of 19.2kW and up to 125kW on a DC fast charger.

~~4)~~

5) What level of expertise will be required for Districts to provide internal service of these units? Must technicians have specific certifications? Is training available? – Training will be available for technicians. Both diagnostic and maintenance, at this time it is my understanding any HV component work will be dealer only.

6) What specialty equipment/tools will be required to be purchased from the district to provide routine maintenance of these units. -

tbd

7) Please identify all PM maintenance schedules required along with time expectations to perform. - Cooling system flush will be on an

annual basis. Visual inspections for cable integrity/chafing.

Chassis maintenance as current. There is no transmission on the IC

EV.

8) Please identify all associated warranties with the units being

purchased. - Drive Battery – 8 yrs./175,000 miles, Drive Motor -

5 yrs./100,000 miles, Drive Charger, Inverters, HV Cables – 5

yrs./100,000 miles.

9) Please identify anticipated costs with battery maintenance,

inclusive of replacement costs and disposal costs. - It is expected

the battery will last the life of the vehicle, currently estimated at

14-15 years. Replacement costs, multiple years in the future are

not estimated at this time. IC/NEXT will recycle batteries.

10) Please provide an anticipated build time of these units from time of order to delivery, can you identify a premium time for order based on your factory build schedules. – Currently order to delivery is estimated at 360 days from PO/Order entry.

11) Please identify the provisions your company has made to ensure warranty service and other service can be performed on these units once purchased by the districts. – IC/Navistar Service will have online and hands-on training for our dealers as a requirement for their market participation. These courses are in various stages of completion at this time.

12) Has there been a determination of life expectancy of the electric bus based on all required and recommended services performed?
–The bus is expected to meet or exceed the life of a normal internal combustion bus. If the battery degrades below an acceptable range the NEXT team will have options for remanufactured batteries and/or extended battery warranties.

12)

13) What is the anticipated annual maintenance costs for these units

and any milestone major services and are they based on time,

hours or mileage? – There are no major milestones in maintenance

events. The maintenance is essentially time based, with coolant

changes and inspections.

14) What level of interaction will the dealer provide in working with

power companies in providing the appropriate hook up platforms

for the connection between bus and charging station. – In-

Charge/DealerOur infrastructure partner – In Charge, will work with the

dealer and the local utility to ensure that the proper power requirements

are met / will be met. In-Charge will work with the client and utility to

implement any grants/rebates and incentives associated with the

infrastructure costs. In-Charge has worked with dozens of utilities across

the nation to ensure that the proper power requirements (both immediate

and future) needs. In-Charge will be part of the initial design process as

well as managing all power installations and charger installations. In-Charge

will provide all charger installations and commission the systems to ensure

functionality and connectivity to the vehicle/bus. In-Charge will provide on-site training for all client personnel associated with charging the vehicles.

15) What provisions has your company taken to create an upgradable bus as new technologies emerge to enhance this generation of buses being purchased. - NEXT The NEXT team are always exploring new technologies. The new technologies will be available as upgrade kits in the future.

15)

School Bus Fleet Electrification General Considerations and Questions

Buses:

1. What is the maximum battery system kWh capacity? 2-string 210 kWh; 3-string 315 kWh
 - a. Is usable capacity different? About 89% is usable. The IP SOC reading will indicate useable SOC, not absolute SOC.
2. What is the maximum kW input the battery system will accept for recharging? 125 kW via DC fast charging.
3. What is the estimated recharge time based on charging equipment outputs (in kW)? Charging power = EVSE power minus 1 to 5 kW (to condition the battery based on ambient temp). Charging time = kWh to be charged / charging power + roughly 15 min.
4. What is the rating for miles-per-charge (or kWh-per-mile) under normal bus operation? 1.4 to 1.6 kWh per mile without HVAC
 - a. With air-conditioning? We haven't tested. Need 1 more month for simulation.
 - b. With heating? We haven't tested. Need 1 more month for simulation.
5. What is the idle time included in the miles-per-kWh rating? Minimum idle time. We use the Jerry cycle for simulation. It doesn't have idle time.
 - a. With air-conditioning? We haven't tested. Need 1 more month for simulation.
 - b. With heating? We haven't tested. Need 1 more month for simulation.
 - c. How does this compare to actual idle time for the fleet? Unknown
6. Where is the charge port located?
 - a. Front, rear, option for both? Front, pass. Side near entrance door is standard. Pass. side aft of wheels is optional rear location.
 - b. May influence where buses can park for recharging

Charging Equipment (often referred to as Electric Vehicle Supply Equipment or EVSE):

1. What is the maximum kW output? There are a multitude of options in regards to the charging systems. Both AC and DC are available with the IC bus. But below are the standard (Max) output for each:
 - a. AC = 19.2 kW
 - b. DC = 180 kW
2. What footprint is required per unit?
 - a. Bollards, wheel stops, both?
 - i. The smaller (19 – 25 kW) AC or DC units can fit on a pedestal and would take up less than a 2' x 2' space.
 - ii. The larger DC fast charge units will be on a pad that is about 3' x 5'.
3. Is each unit stand-alone or is it 'mother-daughter' system that is easier to expand?
 - a. Each unit is stand alone. They run in series and can easily be expanded to other charging systems as long as there is enough power available from the main power.
4. What are the capabilities for data collection and reporting?
 - a. Charge duration?
 - b. kWh dispensed?
 - c. Etc.

- i. All above and additional information is available through our fleet management software system. The system can provide an extensive amount of information from both the bus and the charger.
- 5. What are the capabilities for managed charging?
 - a. Scheduling?
 - b. kW Ramp-up/ramp-down?
 - i. Our fleet management software provides all necessary charging schedules and charging management. The software is designed to charge at optimal cost saving schedules, but can also easily be changed to charge based on emergency schedules, changes in schedules, etc.

Site Location for bus parking/charging:

1. Identify the location(s) where the buses will park to charge
 - a. Utility service to an existing facility may not be adequate and may require a new service
 - b. Additional time for design, permitting, and construction of utility service may be needed
 - c. Bus/charger specs, and charging schedules will influence power requirements
 - d. Weigh option to use more than one location based on current power availability and potential for expansion at each location

We have a detailed and organized process to evaluate and design the charging infrastructure for our clients. Below is our typical plan for site evaluation. There may be some additional steps/procedures based on specific site challenges, the process itself has proven to be a success.

1. Contact In-Charge to begin process
 2. Gather Site Information Utility Bills Site Plan One-Line Electrical Drawings
 3. In-Charge Performs Site Walk Understand existing site parking / layout Verify property limits / utility right of ways Begin prelim layout Web Based Remote Survey Tool
 4. Overall Evaluation
 - a. Bus Routes / Distance, etc.
 - b. Current Parking / fueling
 - c. Determine Current power usage
 - d. Determine Current capacity for EV fueling
 - e. Calculate costs based on existing rate tariffs
 - f. Develop future capacity needs analysis short term / long term
 - g. Develop Energy Management control plan
 - h. Determine any / all utility rebate / incentive / grants
 5. In-Charge develops Preliminary Plan 6. Review of Prelim Plan with Client
 6. Development and Presentation of Final Plan / Estimates 8. Identify Financial Solutions to meet clients needs
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7. What are the expansion considerations?
 - a. Lead times on buses, EVSE, and utility service may warrant expansion considerations in the initial project scope

- i. The largest / longest lead time will be any upgrades that are necessary for the utility services. This could be 6-12 months depending on the utility. Upfront and early planning is the key to getting these permits / applications in early.
- b. How many additional buses can EVSE control panel(s) support?
 - i. Many variables associated with this question – size of charger, how many chargers, etc. But each charger will be on its own circuit. This is a main step in our preliminary site evaluation as described in question above.
- c. Can additional equipment be avoided using managed charging or based on route schedules?
 - i. Yes. Charging efficiency will be a big part of the discussion for your site evaluation. Depending on length of routes, frequency, etc chargers can be used for multiple buses and having a charger for each but may not be necessary.