**General note:** This checklist can be used for bus contractors as well. Any reference to school district can be assumed to apply for the bus contractor in this case.

**Things to Look For**

* Proper grammar
* Ensure the correct district is being referenced throughout the document
* Flag confusing or misleading language
* Technical Accuracy
* Numbers in budget snippet match actual budget document

**Introduction**

* Identify the Applicant (Consultant/School District/BOCES/Bus Contractor)
* Identify the Customer (School District/BOCES/Bus Contractor)
* Identify the Priority status of the district and the NYSERDA cost-share percentage
* If applicable, mention any subcontractors involved in this study

**District/Fleet/Facility Description**

* Brief description of the school district (town/county information, number of schools, annual budget, number of students, total staff, and priority status (DAC, NYSBIP Priority, etc.)
* Fleet information
  + Number of buses
  + Number of other vehicles used for pupil transportation
  + # of buses owned by the district, # of buses contracted, and # of buses leased (even if one of these values is 0)
  + # of vehicles owned by the district, # of vehicles contracted, and # of vehicles leased (even if one of these values is 0)
  + General use of buses (route buses, spare buses, activity buses, etc.) as available
  + General use of other vehicles (route vehicles, spare vehicles, activity vehicles, etc.) as available
  + Types of buses (A, B, C, D) as available
  + Types of other vehicles, as available
  + Fuel type of current fleet as available
* Depot Address/Location
  + Address/location of site, number of vehicles stored there, and the name of the utility provider
  + If multiple depot locations are used, please include a table that lists each building or location to be analyzed through the study and all relevant information about that site

**Task 1: Project Kickoff and Client Meetings**

* Kickoff Meeting
  + Indicate whether this will be on-site or virtual
    - If on-site, will it occur at the same time as the site survey?
  + Ensure the utility and NYSERDA are invited to this meeting as optional participants
* Site Survey
  + Specify that this site survey will be in-person
  + Specify that an in-person site visit will be scheduled
  + Will it be the same date as the kickoff?
* Client Meetings
  + Indicate whether client meetings (meetings between the district and the consultant) will occur after specific tasks or on a recurring basis
  + Indicate whether client meetings will be in-person or virtual
  + Indicate whether presentations to the School Board will be in-person or virtual
  + NYSERDA should be listed as an optional attendee for these meetings

**Task 2: Data Collection**

This section should mention coordinating with the district/utility to collect the following:

* Bus/other vehicle fleet information
  + Number of buses/other vehicles, including spares (current and projected)
  + Bus type/size
  + Other vehicles type/size
  + Replacement schedule
  + Ownership (district-owned, contracted, or leased)
* Bus schedules and routing data
  + Standard daily routes
  + Extracurricular trips (sports, field trips, BOCES runs, etc.)
  + Route distances
* Bus parking/ storage arrangements
  + Ownership of the land the buses are stored on
* Fueling- current operational requirements
* Utility data- name, existing service size, voltage, and contact
* Existing distribution data – capacity, condition, expansion capability, as-built electrical one-lines
* Existing site plan(s)
* Other data as needed

**Task 3: Route Analysis and Bus Technology Assessment**

* Analyze available route data for time and distance to understand range and energy requirements by route
  + Include information on sports routes, field trips, and maximum number of buses on extracurricular trips at any point
* Factor in climate, topography, and driving conditions to determine the energy needs of each route. Report the temperature, battery efficiency, and all other assumptions used in the route energy analysis.
* Identify minimum battery requirements for all routes (even those that cannot be met with today’s technology)
* Compare at least 2 different bus manufacturers
* Recommend bus types and battery sizes for all feasible routes. Identify routes that cannot be met with today’s technology.
* Show the feasibility of electrifying each route using the recommended bus type under 2 temperature scenarios (shown as a yes/no condition)
  + Cold: Winter ESB battery efficiency (average winter low of last 5 years)
  + Temperate: Fall/Spring ESB battery efficiency (average temp between March 1 and November 1)
  + [OPTIONAL] Extreme Cold: Most extreme conditions (lowest temp of last 5 years)
* Include the frequency, or % of days in the year the fall within each temperature scenario

Optional:

* Analyze additional bus manufacturer/types of buses to show a wider range of performance
* For cold climates, assess the need for auxiliary heating (short-term fuel-fired heaters, long-term heat pumps, or fuel-cell heaters)
* Include analysis of sports routes and/or other activity routes that the buses would be completing to see if they would be feasible with today’s technology
* Additional tasks as discussed with the client

**Task 4: Conceptual Charging Strategy**

* Create a charging strategy based on the routing requirements, energy needs, and recommended battery sizes from Task 3
* Identify peak demand using 2 potential charging scenarios
  + Unmanaged charging (includes pre-conditioning and maximum SOC at departure)
  + Managed charging (includes reduced pre-conditioning, and matches SOC to route needs)
* Identify the potential peak demand reduction possible when using a charge management software (CMS)
* Recommend a charging strategy including charger types, quantities, and charging times
* Identify and outline a charge management strategy for the district to optimize efficiency and reduce demand charges
* Identify routes that are able to complete their afternoon runs without midday charging, and routes that have additional charge remaining after all of their scheduled runs
  + This will inform a discussion and high-level analysis of which buses/routes could support early dismissal and extracurricular activities
* Describe benefits of CMS in long-term operations
* Submit the necessary inputs for a rate analysis to the utility provider for 2 scenarios, or use their online tool to complete a rate analysis (as available)
  + Number of buses
  + Number of ports
  + kW rating of ports
  + 24hr load profile in kW (peak demand, time of peak demand, total kWh for full day)
    - One for each of 6 scenarios (2 scenarios with 3 different fleet %s)
* Include qualitative description of the range in rates, and how they can vary with charge management

**Task 5: Electric Utility Analysis**

* Conduct initial outreach with school district’s utility provider
* Summarize the findings of the utility rate analysis (as available)
  + Include each adoption milestone as defined by the Joint Utilities (25%, 50%, 100%)
* If District is planning an imminent capital project (with design work within the next 6 months) submit a work request for the full energy fleet needs required in 2035
* Request a capacity analysis from the district’s utility provider
* Hold a meeting with the utility, school district, NYSERDA, and the consultant to discuss expected peak loads
* Update or create the fleet assessment questionnaire with the utility provider on behalf of the district based on Task 3 and 4 results
* Work with utility to determine the overall equipment needs and costs, as well as the breakdown of costs (utility side vs customer side)
* Discuss possible mitigation measures if power cannot be supplied to the site, and possible obstacles for the district meeting the timelines required by New York State law (ie. Alternative connection options, battery storage, mobile chargers, easements, component lead times, etc.)

Optional:

* Description of how multiple sites will be handled, if applicable
* Vehicle-to-Grid (V2G) charging analysis
* Backup power analysis
* Microgrid analysis
* Distributed Energy Resources (DER) analysis

**Task 6: Concept Development and Phasing Plan**

* Provide a brief paragraph about the purpose of this task
* Select preferred utility connection option and work with the utility to identify locations for any onsite utility interface equipment
* Develop concept-level site plan and one-line diagram that includes locations of utility interconnections, conduit, chargers, bus parking, and other necessary site changes or infrastructure elements to support a zero-emission bus fleet
* Identify capital works needed to install chargers
* Develop a vehicle replacement schedule
* Develop a charger purchasing and installation schedule
* Provide a consolidated timeline for how the school district could meet the 2035 transition schedule either in phases, or year-by-year

**Task 7: Transition Plan Cost Estimates and Cost Comparisons**

* Brief paragraph describing the purpose of this task
* Total anticipated infrastructure costs
* District share of infrastructure costs
* Current pricing for each recommended bus type, along with amount of available incentives that could be applied to each bus type, and a comparison to the comparable diesel/gasoline bus cost
* Include potential/estimated cost of Charge Management Software
* Summary of state transportation aid changes and how they impact TCO
* Comparison to “business-as-usual" bus purchasing costs
* Identify cost reduction potential of possible incentives
* Incorporate the rate analysis conducted by the utility (as available)

**Task 8: Final Report and Presentation**

* Prepare a final report including all tasks from the SOW and based on the NYSERDA Final Report Guidelines and Checklist
* Address comments from NYSERDA personnel as needed
* Prepare a final presentation for the client to use as needed that includes easy-to-understand descriptions of main takeaways timelines, costs, and analyses conducted
* Final draft revisions will be made until NYSERDA deems the Final Report satisfactorily complete
* Optional: Present to the school board (specify if this presentation will be in-person or virtual

**Schedule and Site Visits:**

* Provide an anticipated schedule for completing tasks in a “weeks from purchase order (PO)” format
* NYSERDA must be notified as soon as possible if the deliverable dates in the schedule change

**Budget**

* Provide an itemized budget breakdown using the NYSERDA budget template, or equivalent format, that includes all the information identified in the budget template
* Include cost share information
  + Total study cost
  + $ amount contributed by client (include % of total study cost)
  + $ amount contributed by NYSERDA (include % of total study cost)