ESB Consultant Office Hours: FEP SOW Requirement Updates

December 3rd & 6th, 2024

NEW YORK STATE | NYSERDA

Agenda

- **Welcome** - already done!
- **Big Picture**
- **Specific Updates**
  - **The change**
  - **Why we made the change**
  - **Example of what it could look like**
- **Checklists, Templates & Website Materials**
- **Next Steps & Important Dates**
- **Side Note: CGSI → FlexTech**
- **Q&A**

Big Picture

- **Past updates to SOW & Final Report requirements from NYSERDA have been ad hoc**
- **The program has grown rapidly:**
  - 350+ districts currently engaged in an FEP (>50%)
  - >20 consulting firms completing FEPs
  - ~30 completed FEPs (and many more in our queue to be reviewed…)
- **As we scale up, we are working to be more predictable, while also looking for more consistency so we can collect data, maintain timelines, and coordinate between stakeholders**

Updates – Quick Notes

- **Updates seek to formalize best practices that we have seen**
- **Updates are not intended to add costs or time – please reach out to us if you anticipate significant changes to your workflow**
- **Updates are reflective of discussions we have had with school districts, utility providers, BOCES, and yourselves**
- **This presentation will only cover major changes, please review documents for details**
- **You are free to deviate from any examples or templates as long as the requirements are met**

Update 1: Vehicle & Land Ownership

Change:

As part of the application, specify in the submitted SOW the number of vehicles owned by the district, leased by the district, or contracted out. The same should be done for land where buses are stored.

Why:

This impacts the type of analysis done (and therefore project cost), which stakeholders to include, and who the project applicant should be (and therefore who pays & gets paid).

Example:

Bus Type	Owned	Leased	Contracted
Type A	8	0	2
Type B	0	0	0
Type C	15	0	4
Type D	2	0	0
Van/Other	0	5	0

Update 2: Existing Service Capacity

Change:

When conducting the site visit, identify any additional capacity on the existing service and assess the number of ESBs that could be supported without site upgrades.

Why:

Many school districts are looking to purchase their first couple buses & chargers. It is important to know what can be supported without doing significant upgrades to energy infrastructure.

Example:

Total Fleet Size	22	
Existing Service Capacity	XX kVa	
Buses That Can be Supported on Existing Service	2	
Recommendations		
Route Number	**Bus Type/Size**	**Charger Size**
XX	Type A XX kWh	19.2 kW
XX	Typa A XX kWh	19.2 kW

Update 3: Feasibility Under Varying Temps

Change:

The feasibility of the bus routes will be assessed for 2 different temperature scenarios as specified by NYSERDA:

- **Cold**: Winter ESB battery efficiency (average winter low of last 5 years)
- **Temperate**: Fall/Spring ESB battery efficiency (average temp pre-November 1 and post-March 1)
- **[OPTIONAL] Extreme Cold**: Most extreme conditions (lowest temp of last 5 years)

Bus and charger recommendations should be based on the "Cold" temperature scenario. This change is not asking for varying bus sizes based on different temperatures, merely an indication of how buses may run differently in different temperatures.

Why:

To increase the consistency of results between different consultants and ensure the district understands how feasibility can change with different weather conditions.

Update 3: Feasibility Under Varying Temps

Example:

Recommended Buses by Route

Bus or Route #	Bus Type	Max Energy Usage on route (kWh)	Minimum Battery Size Required (kWh)	Proposed Bus Size/Manufacturer
23	*Type C*	*110.52*	*153*	*155 kWh Bluebird*

Route Feasibility Under Different Conditions

	Scenario 1: Cold (XX °F)	Scenario 2: Temperate (XX °F)	[OPTIONAL] Scenario 3: Extreme Cold (XX °F)
155 kWh Bluebird	*Yes/No*	*Yes/No*	*Yes/No*

Update 4: Two Charging Scenarios

Change:

Identify peak demand based on 2 different charging scenarios as specified by NYSERDA:

- **Unmanaged**: Includes maximum pre-conditioning and maximum SOC at departure
- **Managed**: Includes reduced pre-conditioning and matches SOC to route needs

Identify the feasibility of routes being completed with and without midday charging.

Why:

These two scenarios will exemplify the difference in peak demand between a fleet with managed charging and a fleet without. This data will also be used later in the utility rate analysis to compare utility rates/costs to the district with and without managed charging. Midday charging feasibility will show which routes could support early dismissal.

Example:

Peak Demand Reduction with Charge Management	
Peak Demand without Managed Charging	
Peak Demand with Managed Charging	
% Reduction in Peak Demand with Charge Management	

Update 4: Two Charging Scenarios cont.

Example:

Midday Charging Feasibility		
Route	**Recommended Charger**	**Can it Complete it's PM Route without Midday Charging**
X	19.2 kW	Yes
Y	19.2 kW	No

Update 5: Utility Rate Analysis

Change:

Consultants will submit standardized inputs to Utility Provider, or use their online tool as available, to receive a rate analysis. This will include 2 scenarios, with 3 electrification adoption scenarios:

- Cold Weather/Unmanaged Charging @ 25%, 50%, and 100% adoption
- Temperate Weather/Managed Charging @ 25%, 50%, and 100% adoption

Why:

School districts who have begun implementing ESBs are not familiar with the intricacies of utility rates. Districts and contractors would benefit from understanding the implications of charge management on rates, as well as how rates may change as their fleets electrify.

Utility providers are hoping to provide clarity on rates to begin this conversation early and avoid or reduce sticker shock from utility bills.

Update 5: Utility Rate Analysis cont.

Scenario Definitions

Charging Behavior

Minimum Charging: Minimal pre-conditioning & cycling; SOC matched to routes (min. kWh / day)

Aux. Charging: Includes pre-conditioning & max. SOC @ departure (max. kWh / day)

Bus Efficiency

Cold: Winter E-Bus efficiency (high kWh / mile)

Temperate: Spring / Fall E-Bus efficiency (low kWh / mile)

Scenario 3: Higher kWh, moderate peak kW Load	**Scenario 4:** Highest kWh, highest peak kW Load
Scenario 1: Lowest kWh, minimum peak kW Load	**Scenario 2:** Moderate kWh, higher peak kW Load

Each Scenario has 3 Adoption Milestones:

- 25% of the E-Bus Fleet
- 50% of the E-Bus Fleet
- 100% of the E-Bus Fleet

For Each Scenario & Milestone:

Utilities need:

- # of E-Buses
- # of ports
- Avg. kW of ports
- Avg. 24-hour load profile in kW

Utilities calculate monthly avg.:

- Total kWh
- Peak kWh
- Off-peak kWh
- Peak kW
- Effective $ / kWh

Update 5: Utility Rate Analysis cont.

2 Temperature Scenarios from Route Analysis

Scenario Definitions

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Minimum Charging: Minimal pre-conditioning & cycling; SOC matched to routes (min. kWh / day)

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Update 5: Utility Rate Analysis cont.

2 Charging Scenarios

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- Off-peak kWh
- Peak kW
- Effective $ / kWh

Update 5: Utility Rate Analysis cont.

Extreme ends of the spectrum to provide range

Scenario Definitions

Charging Behavior

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Utilities need:

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- Avg. 24-hour load profile in kW

Utilities calculate monthly avg.:

- Total kWh
- Peak kWh
- Off-peak kWh
- Peak kW
- Effective $ / kWh

Update 5: Utility Rate Analysis cont.

Example:

Consultants will provide:

- # of buses (remains constant)
- # of chargers (remains constant)
- KW rating of ports (remains constant)
- 24 hr load profile (x6)
  - Peak demand, time of peak demand, total kWh for one day

This will be needed for 2 scenarios, at 3 levels of adoption each:

- Cold weather/Unmanaged charging (25%, 50%, and 100% ESB adoption)
- Temperate Weather/Managed Charging (25%, 50%, and 100% ESB adoption

Total of 6 different scenarios

Update 6: Utility Cost Estimates & Work Requests

Change:

Consultants are not expected to submit a work request to utility providers and will not get detailed cost estimates from utility providers. The exception to this is if:

1. The school district has an imminent capital project that is in design, or starting design
2. The school district has received funding, or separately purchased a bus or charger

Utility providers will still provide a capacity analysis.

Why:

A work request triggers a utility-side design process, which would provide cost estimates but only be valid for a short period after completion. This design process would also cost the school district ~$50k and would need to be redone if they are not ready for design yet. Utility providers do not want to provide cost estimates which may change later on, and we do not want districts paying for multiple design processes.

Update 7: Bus, Charger, and Infrastructure Costs

Change:

Bus/charger costs will be broken down separately into their ***current*** unit prices and will not be included in the total cost estimates.

Why:

Since bus and charger costs are so volatile, breaking down the cost by unit will prevent from inaccurate cost estimates. Some districts may still request total cost with buses and chargers included to reflect a worst-case scenario – this is OK.

Example:

Example Table: Cost Summary - Buses

Bus Type & Battery Size	Number of Buses	Cost per Bus	Possible Incentive	Cost per Bus with Incentive	Cost of Comparable Diesel/Gas Bus
155 kWh Bluebird	*5*	*$400,000*	*$257,250*	*$142,750*	*$140,000*

Update 7: Bus, Charger, and Infrastructure Costs cont.

Change:

Customer side infrastructure costs will still be estimated based on the phase of updates and the equipment that is needed.

Why:

We want to provide the district with an accurate cost estimate for any customer-side costs they would be covering when preparing to upgrade infrastructure to support charging.

Example:

Example Table: Cost Summary - Infrastructure

Item or Phase	Cost

Update 8: BOCES Charging

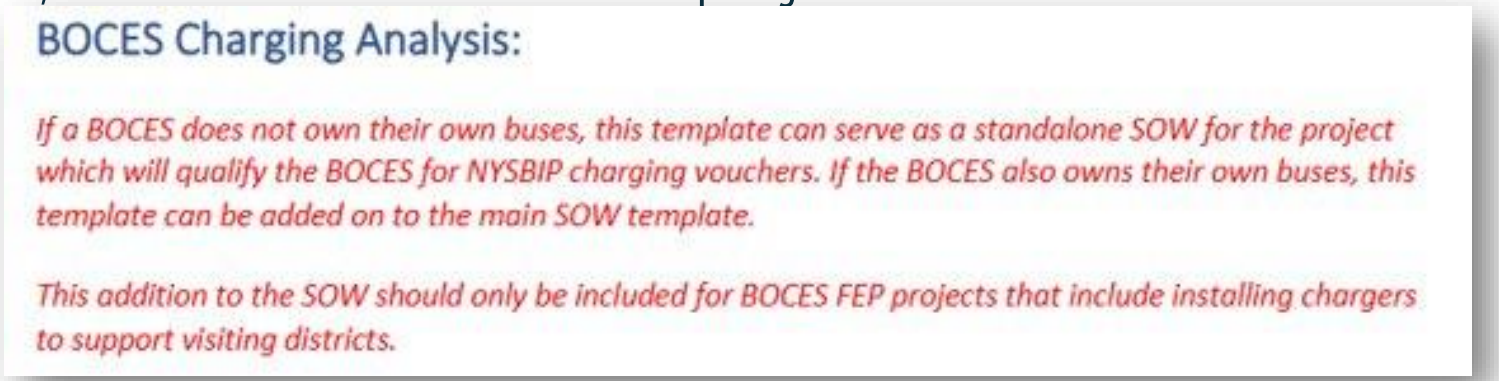
Change:

If a BOCES is interested in providing charging for their component districts, this SOW addition allows consultants to investigate what would be required to install these chargers. This can be added to the SOW or can serve as a stand-alone SOW for BOCES that do not also own their own buses. If a BOCES is planning to provide charging for visiting districts, **they automatically qualify for 100% NYSERDA cost share regardless of their depot location**.

Why:

Many BOCES are interested in installing chargers for visiting districts; we are hoping this framework allows this work to easily be added to the study. We understand that, if being added to a full SOW, this will add cost to the project.

Example:



BOCES Charging Analysis:

If a BOCES does not own their own buses, this template can serve as a standalone SOW for the project which will qualify the BOCES for NYSBIP charging vouchers. If the BOCES also owns their own buses, this template can be added on to the main SOW template.

This addition to the SOW should only be included for BOCES FEP projects that include installing chargers to support visiting districts.

Update 8: BOCES Charging cont.

Example:

- Electrification Goals
  - An overview of the electric bus assessment and the approach to fleet electrification. This may include the proposed timeline and milestones for electrification.
- Visiting Bus Analysis
  - Analysis of the time and distance involved in each visiting bus route, which is necessary to understand the power requirements of the chargers. The analysis will define the frequency of visiting buses, the duration of bus layovers, and the total energy required to charge the batteries.
- Utility Assessment
  - An assessment, performed by your Utility, that analyzes your existing grid connection and determines how much additional electrical capacity is required. This assessment will tell you what equipment needs, upgrades, and costs are needed to provide that additional power. The Utility Assessment should also include a rate analysis (to be completed by the utility as available) which summarizes the rates and rebates available and is included in the final cost estimates.
- Charging Strategy
  - Development of a charging strategy that includes Charger power ratings and quantities and expected charging times throughout the day. Given the variable nature of BOCES support charging, the charging strategy will anticipate when chargers will need to be used by visiting buses and provide recommendations to maximize the number of buses that can be charged during layovers. If applicable, the charging strategy will also estimate the use of the chargers by the public and define rules to ensure school buses have priority at chargers.
- Phasing Plan
  - Development of a phasing plan identifying necessary capital works projects and phased plan for Charger Installation. This phasing plan should include a schedule and transition cost estimate for Utility upgrade/sitework and Charger purchases. Cost estimates should also include an assessment of the possible savings associated with available incentives

Update 9: Optional SOW Add-ons

Change:

Some districts are interested in additional tasks as part of their FEP projects. We currently have templates for the following additions:

- Solar Feasibility Study
- Battery Storage to Support Charging
- Workforce Training
- Total Cost of Ownership Analysis

We are open to creating new templates if new additions are being frequently requested!

Why:

We want to provide the districts with flexibility to pursue any clean energy solutions they are interested in. We are hoping that providing these templates will reduce the amount of work for consultants as they plan out the SOW and provide guidance as to what we can cover with our funding.

Update 9: Optional SOW Add-ons cont.

Example:

Additional Task – Solar Feasibility Study:

This addition to the SOW should only be included when the customer (i.e. the district or the BOCES) wants to install solar panels to support chargers for their fleet. It must be clearly stated that this FEP will only include solar panels that support fleet charging, it cannot include solar panels for any other purpose on the campus.

This additional task should be added in conjunction with the Solar Feasibility study; if a district/BOCES is considering using solar energy to power their chargers they should understand the importance of battery storage.

Please include a brief paragraph describing the purpose of this task. If there are multiple consultants/sub-consultants, please indicate which party will be delivering this task

Scope:

- Assess the feasibility of installing solar panels to support fleet charging
  - Site Analysis
  - Cost Estimate
- Basic solar array layout
  - Where will the solar array be located, how will they be connected to the infrastructure, etc.

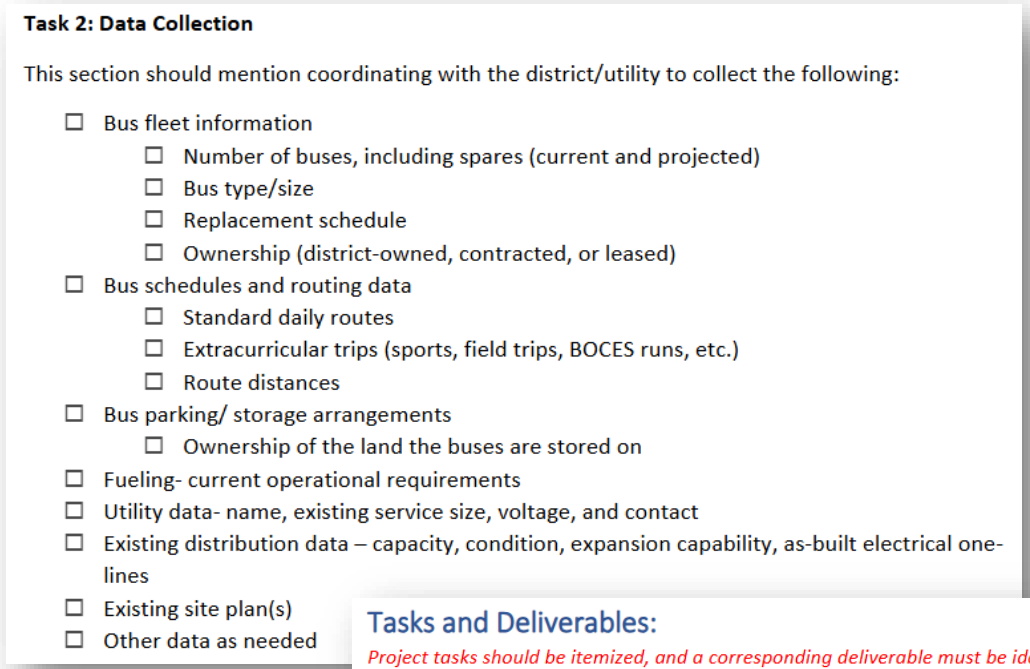
Additional items can be added to this scope as seen fit. Before adding anything else, please consult your NYSERDA PM for approval.

Checklists & Templates

The following will be shared for review, and posted online once finalized:

- SOW Checklist
- SOW Template
- Final Report Checklist
- Final Report Template
- BOCES Charging Studies & Optional Add-Ons

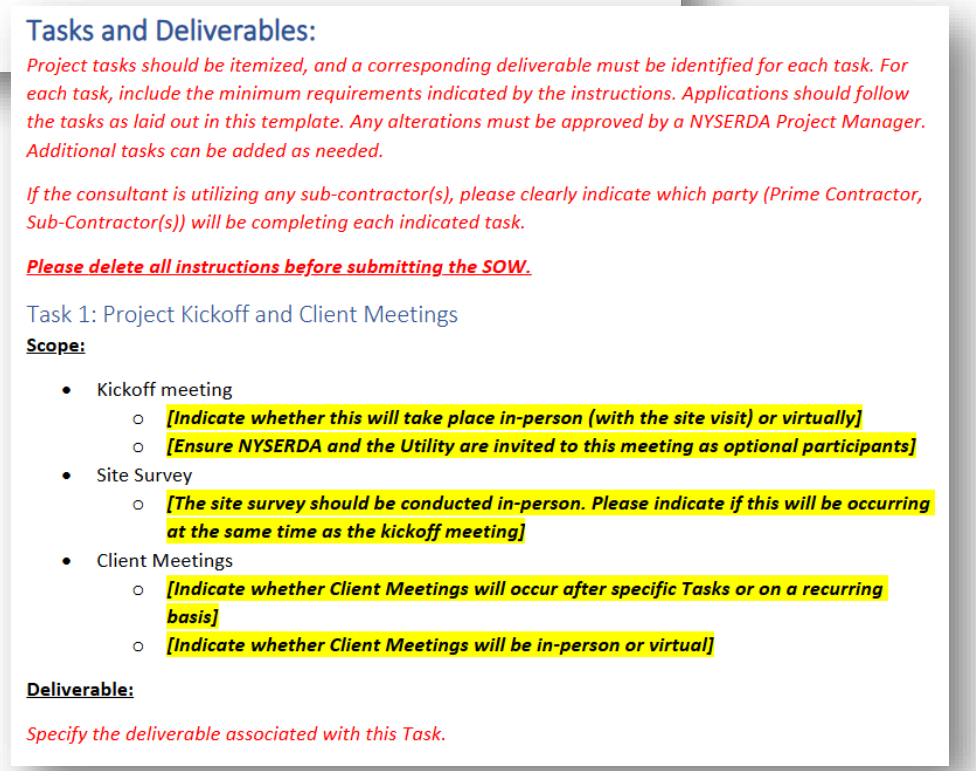
Link: NYSERDA FEP Webpage



Task 2: Data Collection

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

- ☐ Bus fleet information
  - ☐ Number of buses, including spares (current and projected)
  - ☐ Bus 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



Tasks and Deliverables:

Project tasks should be itemized, and a corresponding deliverable must be identified for each task. For each task, include the minimum requirements indicated by the instructions. Applications should follow the tasks as laid out in this template. Any alterations must be approved by a NYSERDA Project Manager. Additional tasks can be added as needed.

If the consultant is utilizing any sub-contractor(s), please clearly indicate which party (Prime Contractor, Sub-Contractor(s)) will be completing each indicated task.

Please delete all instructions before submitting the SOW.

Task 1: Project Kickoff and Client Meetings

Scope:

- Kickoff meeting
  - ***[Indicate whether this will take place in-person (with the site visit) or virtually]***
  - ***[Ensure NYSERDA and the Utility are invited to this meeting as optional participants]***
- Site Survey
  - ***[The site survey should be conducted in-person. Please indicate if this will be occurring at the same time as the kickoff meeting]***
- Client Meetings
  - ***[Indicate whether Client Meetings will occur after specific Tasks or on a recurring basis]***
  - ***[Indicate whether Client Meetings will be in-person or virtual]***

Deliverable:

Specify the deliverable associated with this Task.

Next Steps & Important Dates

Dec 6th – All draft checklists, templates, and slide show will be shared via email

Dec 6th-13th – NYSERDA will accept feedback on updates. No updates or changes are guaranteed.

Dec 16th-18th – NYSERDA will make any updates deemed necessary

Dec 18th-31st – NYSERDA will post documents to website on the FEP webpage

Jan 1st, 2025 - Updates go into effect for all applications not yet finalized

CGSI → FlexTech

The CGSI Program is being sunset and transitioned to FlexTech. This means:

- All applications will now be submitted through Salesforce
- No changes to funding that districts qualify for
- Invoicing will still happen through "old" system (not through Salesforce)

Q&A!

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