Mary Krayeske
Associate Counsel
Law Department

November 13, 2018

Honorable Kathleen Burgess
Secretary
State of New York Public Service Commission
Three Empire State Plaza
Albany, NY 12223-1350

Re: **Case 14-M-0101 – Proceeding on Motion of the Commission in Regard to Reforming Energy Vision ("REV Proceeding") - Demonstration Project Implementation Plan**

Dear Secretary Burgess:

Pursuant to the Public Service Commission's February 26, 2015 *Order Adopting Regulatory Policy Framework and Implementation Plan* in the above-referenced proceeding, Consolidated Edison Company of New York, Inc. submits the attached REV Demonstration Project Implementation Plan: Electric School Bus V2G.

If there are any questions, please contact me.

Sincerely,

/s/ *Mary Krayeske*

Mary Krayeske

Attachment

REV Demonstration Project Implementation Plan

Electric School Bus V2G

Dated: November 12, 2018

Table of Contents

Executive Summary

This Project Implementation Plan sets forth the Project's demonstration design, roles and responsibilities, work plan, budget, and reporting plan for the approved Consolidated Edison Company of New York, Inc.'s ("Con Edison" or the "Company") School Bus V2G Reforming the Energy Vision ("REV") Demonstration Project ("Project").[1] Con Edison is partnering with First Priority Green-Fleet (FPGF), an experienced provider of V2G and electric vehicle supply equipment services, to execute the Project. The Project is designed to test the technical and operational viability of using a school bus as a grid asset.

The Project will use a "shared asset" business model, whereby Con Edison will compensate FPGF for operating the bus batteries and V2G technology to provide distribution system services during summer months when the buses are not in use for transit operations.[2] A primary hypotheses is that the shared use of electric school buses makes both the electric school bus and the distributed energy resource ("DER") technology more attractive for the bus operator and the grid operator. The Project will provide critical data and insights to help answer the following questions:

- What are the financial and operational benefits of electric school buses as compared to diesel equivalents?
- Is V2G technically and operationally viable for electric school buses and project partners?
- Does V2G perform and dispatch as expected?
- Can battery degradation be managed to specific, user-acceptable benchmarks?
- Does V2G cause cost-prohibitive asset depreciation for the operator?

After an initial project planning stage, the Project will be executed in three phases:

1. Electric Bus Operations and Analysis
2. Design and Construction of Charging and V2G Infrastructure[3]
3. V2G Operations and Analysis

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[1] The Project outline, dated June 8, 2018, was assessed by the Department of Public Service ("DPS") Staff ("Staff") to be in compliance with the Ordering Clause 4 of the Public Service Commission's Order Adopting Regulatory Policy Framework and Implementation Plan. On June 20, 2018, DPS Staff issued an assessment of the Project outline, and included a discussion of the Project Implementation Plan to be filed by Con Edison.

[2] A vehicle to grid (V2G) asset is an electric vehicle that can discharge power from its battery to the power grid on command.

[3] A vehicle to grid (V2G) asset is an electric vehicle that can discharge power from its battery to the power grid on command.

Section 1: Demonstration Design

The three phases of this Project are incremental and may occur in parallel or overlap. This section will detail the hypotheses for evaluation, the populations targeted, and the scenarios for evaluation. Checkpoints, detailed in Section 1D, will be utilized to monitor and inform progress. Throughout the phases and scenarios, the benefits of electric school bus V2G will be continuously evaluated to inform future school bus grid integration.

A) Test Statements

The Project Implementation Plan demonstrates the value and efficacy of vehicle to grid to both the distribution grid and vehicle operator. Con Edison, in partnership with FPGF, will demonstrate the market potential and test related hypotheses, as defined in Table 1. The hypotheses are based on analysis of cost and revenue estimates and operational expectations. They are expected to be proven-out by Project completion.

Table 1: Implementation Hypothesis

Test Statement	Hypothesis
We believe… **Electric buses paired with V2G technology can experience lower operating costs and realize grid-based revenue streams**	**If…** electric school buses function as reliable transportation **And…** achieve lower operating costs **Then…** the bus operator can realize lower fuel and maintenance expenses than diesel vehicles (1a) **Then…**the bus operator can further leverage the vehicle by allowing it to provide grid value during the summertime (1b) **Then…** the supply of DER assets available for grid support will increase (1c)
We believe… **V2G technology can provide reliable grid-connected energy storage with acceptable levels of battery degradation**	**If…after battery use during all four seasons,** V2G is able to dispatch reliably and minimally impacts vehicle range with minimum degradation **Then…** 3rd parties may choose to work with bus operators to leverage buses as DER assets (2)

B) Test Population

The five electric school buses chosen for the demonstration represent the target vehicle type and usage profile for school bus V2G. Bus and battery size are correlated, and therefore larger buses generally provide the most potential grid value per vehicle. The five eLion full-sized buses to be used in this Demonstration Project have 100 kWh of battery capacity per bus. Like most of the region's school buses, these buses are privately owned and operated.

C) Test Scenarios

The Project implementation will evaluate multiple test scenarios (see Table 2) across each of the implementation phases. Each phase will address unique REV demonstration principles. The first set of scenarios will test vehicle performance. This will prove out the technical viability and usability of the electric school bus.

- FPGF will monitor performance of the school buses and operator satisfaction to provide feedback to the manufacturer, bus operator and/or industry stakeholders
- Following the demonstration project, Con Edison will work with FPGF and local municipalities to disseminate Project results to purchasers considering electric buses

The next test scenarios will cover the operational and technical viability of school bus V2G. The question here will be whether the V2G can successfully provide high quality, reliable discharge to the interconnected utility electric distribution system.

The final set of test scenarios will provide information on the impact of V2G usage on battery life. To provide a wider range of data, the buses will operate in the following three ways:

- Three will discharge every summer day to simulate a lifetime of seasonal battery discharge
- One will discharge 30 hours of export a season to simulate an operator attempting to discharge for demand response or distribution grid values
- One bus will not discharge at all

Comparing these discharge activities, while keeping vehicle miles travelled comparable, may provide initial data on how V2G patterns impact battery degradation. While these data will be far from statistically relevant, they will likely result in insights that spur further lines of inquiry and inform the design of a larger test in the future. If battery impacts are minimal, they may also help bus operators make usage decisions.

The Company has worked with the National Renewable Energy Laboratory (NREL) to identify appropriate goals for battery capacity degradation. NREL simulated school bus battery degradation in the New York area based on school bus duty cycle, local temperature, and the general battery cell chemistry deployed.

Battery capacity degradation is a function of several factors:

1. Depth of discharge

2. Time at high state of charge (>65% SoC)
3. Cell temperature
4. Number of cycles

Finally, battery capacity is limited by cell age. NREL does not expect battery packs to maintain sufficient vehicular capacity after 10 years. Time impedes the electro-chemical reactions.

The depreciation caused by V2G depends on whether time or usage is the main factor in battery degradation. According to NREL testing and simulations, cell temperature and time at a high state of charge are the dominate causes of battery capacity declines. For example, controlling cell temperature can result in a greater than 40% increase in battery life.[4] Good battery management has the potential of making time the main factor in battery degradation and minimizing V2G's impact on asset depreciation.

NREL's simulations of school bus use cycles and NMC batteries project remaining battery capacities of 83% to 89% at the end of the batteries 10-year useful life.[5] These results would indicate a battery with 3-9% more battery capacity than the industry benchmark of 80% at its end of life.[6]

Con Edison has two performance benchmarks. One target is to keep the batteries overall capacity at above 80% at the end of 10 years. This would keep the battery at an acceptable level of capacity throughout their calendar life. Based on NREL's simulations, that would entail annual V2G degradation to .3-.9%. The other performance benchmark is to allow no more than $2,000 of asset depreciation.[7] At today's battery prices, that would allow an additional 1% of degradation per season.[8]

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[4] K. Smith, A. Saxon, M. Keyser, B. Lundstrom, Z. Cao, A. Roc, "Life Prediction Model for Grid-Connected Li-ion Battery Energy Storage System," American Control Conference, Seattle, WA, May 30-June 1, 2017

[5] Model based on ambient NYC area temperatures without mitigating thermal management

[6] S Peterson, J Apt, JF Whitacore, "Lithium-ion battery cell degradation resulting from realistic vehicle and vehicle-to-grid utilization," Journal of Power Sources, April 15, 2010

[7] The maximum depreciation benchmark is conservative to maximize asset value

[8] Current market pack prices with a 30% retail markup. Bloomberg New Energy Finance, 2018 long term vehicle outlook, p. 13

Table 2: Test Scenarios

Scenario	Description
Vehicle Performance (Phase 1)	Evaluate vehicle performance based on: miles driven, average route, kWh/mile, energy costs, and maintenance required. Analyze data and weather impacts on vehicle range and performance. Assess e-bus performance relative to analogous diesel vehicles owned and operated at the same facility (see performance reporting in Figure 2). Test scenario provides data to address hypothesis 1a.
V2G Reliability & Operator Acceptance (Phase 2)	Monitor battery charging and discharging operations for power (kW), energy (kWh), and uptime. Log and evaluate any exceptions where the system did not perform as expected. Survey bus operator before, during and after V2G periods to assess satisfaction levels. Test scenario provides data to address hypothesis 1b.
Battery impacts (Phase 3)	Perform vehicle range analysis before and after V2G periods. Vary V2G discharge protocols to provide data on V2G impacts on battery range. *Full season discharge* - Bus discharges every day during the summer period to test above average V2G usage. *30 hour discharge* - Bus discharges for 30 hours over every summer to simulate battery wear from a user trying to achieve behind the meter Con Edison distribution demand response. *No discharge* - Bus does not discharge at all to offer a control to compare to discharge groups. Test scenario provides data to address hypothesis 2.

D) Checkpoints

Con Edison and FPGF will establish a Project management team and governance structure (see Section 2) to review and monitor the Project. Key checkpoints, listed in Table 3, will highlight milestones for the governance structure to evaluate Project execution and the need for implementation strategy adjustments. Each checkpoint has key metrics tied to it; checkpoints that do not meet expected targets will undergo further analysis to ascertain impacts on the Project and identify root causes.

Through the quarterly reports submission, as detailed in Section 4 below, the implementation team will detail checkpoint status, applicable remedies, and strategy modifications to Staff.

Table 3: Checkpoints

Checkpoint	Description	
Buses Perform as Expected as Transportation **(Phase I)**	**Measure**:	Buses perform as vehicular transportation. The major categories for acceptable performance include: a) meeting a minimum range requirement of 65 miles for 80 kWh during peak HVAC use,[9] and b) providing necessary information to the drivers so that bus range and readiness could be reasonably anticipated, c) having a vehicle uptime of 95% or greater, comparable to a conventional vehicle.
	When:	Mid-Phase I, approximately 4-6 weeks post commissioning.
	How:	Qualitative and quantitative data provides the information necessary to understand the reason for any operational failure. Quantitative data provided by a diagnostic device installed on bus controller area network (CAN) port. Weekly check-ins with bus operating company provide qualitative feedback.
	Expected Target:	No vehicle failures due to out of specification range or misleading data provided to driver.
	Impact:	If electric school buses are unreliable, they will be inferior to diesel alternatives as transportation and will not be adopted.
	Solutions/Strategies in case results are below expectations:	
		Use diagnostic data to determine cause of failures. Ensure customer (National Express) agrees with analysis and aggressively pursue any out of specification vehicle failures with manufacturer.

[9] Based on customer expectations of operating six 10-mile routes per day.

Checkpoint	Description	
Network integration and System testing (Phase II)	**Measure**:	V2G enhancements function with over 98% reliability and efficiency to the meter of over 95%.
	When:	Mid-Phase II
	How:	V2G pathway uses high efficiency invertors and 3-phase output to minimize line losses. Reliability actions include: EVSEs pre-tested to communicate with DC relay switch and vehicle updated BMS software. FPGF adds DC-relay to vehicles. Coordination with Lion for bus software over-the-air update. Efficiency maintained by minimizing electrical line losses and DC/AC conversion losses from inverter.
	Expected Target:	Reliability: inverter hardware has a 10 year expected life and works 100% of the time after pre-summer v2g period diagnostic testing. Software responds to all communication signals and control V2G discharge. Roundtrip efficiency directly impacts economic viability of project.
	Impact:	A 5% loss of battery output decreases maximum lifetime economic value by approximately $3,000.[10] Any inability to function during a VDER hour reduces annual economic value by 10%.
	Solutions/Strategies in case results are below expectations:	
		Software troubleshooting methodology from past V2G projects, onsite testing, and potential hardware replacement.

[10] Based on current VDER & LSRV values

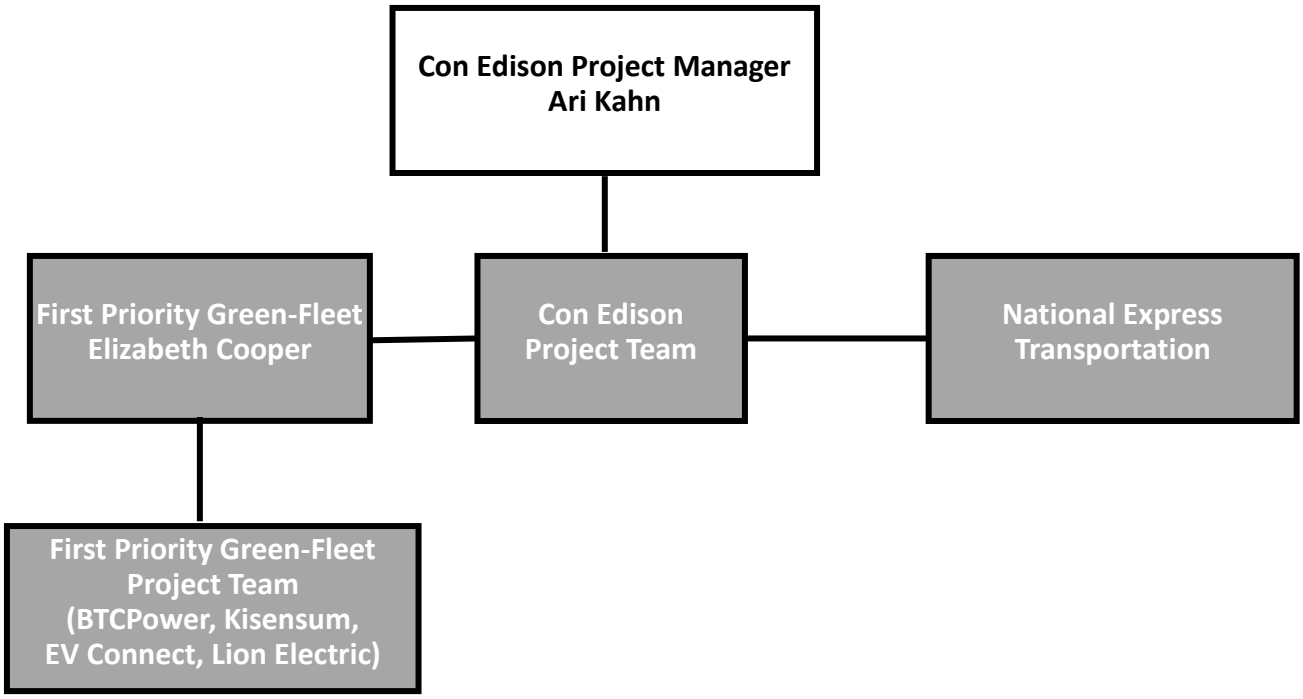
Checkpoint	Description	
Battery and vehicle impacts evaluated and documented (Phase III)	**Measure**:	Battery and vehicle evaluation to determine V2G impacts from charge/discharge cycles minimize additional expected lifetime asset depreciation to $2,000 or less.
	When:	End of summer 2019
	How:	Recorded battery data and alerts reviewed, bus test-driven and charged through three cycles, while charger software monitored for battery exceptions. battery discharge kWh overtime plotted. Any alerts below
	Expected Target:	V2G use should have little quantitative or perceived impact on the vehicle's primary transportation asset value. Performance targets are .3%-2% per season.
	Impact:	If V2G appreciably impacts battery capacity or increases maintenance costs, it will be unattractive to bus operators.
	Solutions/Strategies in case results are below expectations:	Reduce depth of discharge and peak state of charge to see if battery wear impacts can be brought to within expected parameters. Explore cell temperature controls.

Section 2: Project Structure & Governance

A) Project Team

The Project is a partnership between Con Edison and FPGF. In addition, EVConnect, Kisensum, BTCPower, and National Express will serve as key knowledge and product partners. Each partner will provide key skills and be responsible for certain Project functions in order to achieve a successful demonstration project. Con Edison will maintain overall responsibility for Project execution; FPGF is a key contributing partner. The high-level Project team makeup and alignment are depicted in Figure 1.

Figure 1: Team Leadership/Organization



Con Edison will apply staff and expertise (Table 4) to the Project aligned with its roles and knowledge as a utility and energy services provider. The Con Edison project manager will have overall responsibility for the success of the Project and will plan, coordinate, and manage activities for the scope and duration of demonstration. Similarly, Con Edison's partner, FPGF, will apply expertise unique to its focus area and aligned to its roles and responsibilities as V2G implementer.

Table 4: Utility and Partner Expertise

Con Edison Team Key Skills	FPGF Team Key Skills
• Program Management • Regulatory/Legal • Information Technology (IT) • Customer Outreach and Community Engagement • Distributed Resource Integration • Demand response • Distribution Grid Planning	• Project Oversight • Procurement • Project Management • EVSE Hardware Energy and Network Management Platforms • Operations and Maintenance • Engineering Design and Construction

B) Project Staffing

Con Edison has created a REV demonstration program team within its Customer Energy Solutions department dedicated to identifying, developing, and implementing new projects related to REV. From this team, a project manager has been identified to lead the Project. In addition, Con Edison will provide the necessary internal and external resources in key areas (*e.g.*, marketing, information resources, legal, procurement, and engineering) to augment and support demonstration activities and objectives. Con Edison's team members are listed in Table 5 along with their functional areas and current duty titles. Additional Project team members will be identified and recruited as necessary during the course of Project execution.

FPGF, a subsidiary of First Priority Group, is currently deploying 41 all electric school buses in California and New York and is the first electric vehicle company to demonstrate school bus Vehicle-to-Grid capability, with other ongoing projects in California. This team is comprised of experts in the field of electric vehicle energy management including EV Connect, Kisensum and BTCPower. FPGF's combined client group includes the California Energy Commission, the New York State Energy Research and Development Agency, the New York Power Authority, the Department of Defense, Southern California Edison, UC San Diego, UPS, Frito Lay, FedEx and several Air Quality Management Districts in northern, central and southern California.

Table 5: Project Team

Team Member	Title	Functional Area
Con Edison		
Ari Kahn	Project Manager, School bus V2G	REV Project Management
Margarett Jolly	Director, Demonstration Projects	Project Governance
John Shipman	Program Manager, EV Program	Project Oversight (REV Demonstration Program)
Project Partners		
Elizabeth Cooper, FPGF	Chief Business Development Officer	Project Oversight and V2G Expertise
Robert Lupacchino, FPGF	Chief Operations Officer	Project Management
Larry Hayashigawa, BTCPower	Director Business Development	Charging stations and V2G equipment upgrade
Paul Lipkin, Kisensum	Senior Director, Energy Solutions	Energy Management Platform. Grid interface and SW engineer
David Hughes, EV Connect	Partner, Co-founder	EVSE Installation
Raul Moreno-Carreon, National Express	General Manager	Bus Site Management
Yannick Poulin, Lion Electric	Chief Operating Officer	V2G Bus Modifications

C) Roles & Responsibilities

The Project implementation team has developed a work plan (Table 7) with specific tasks and activities aligned to the Project timeline and overall success. The breakdown of roles and responsibilities is provided in this section.

Project Planning

The initial stages of the demonstration will be focused on obtaining implementation approval from Staff and finalizing the agreements between Con Edison and FPGF, and National Express.

Table 6
Project Planning Roles and Responsibilities

Lead Responsibilities	Con Edison	FPGF
Partnership Agreement		
Con Edison will enter into an agreement with FPGF to delineate roles and responsibilities with respect to the Project execution. **FPGF** will support this activity by working with Con Edison purchasing, contracting, and legal departments.	X	X
Con Edison and National Express will enter into an agreement to delineate rights and responsibilities for e-bus usage.	X	

Phase 1 – Electric Bus Operations and Analysis

In Phase 1 the buses will be delivered by FPGF and upfitted with bus monitoring equipment. FPGF and EVConnect will install chargers on site. Bus operations and analysis will begin.

Phase 1 – Electric Bus Operations and Analysis

Lead Responsibilities	Con Edison	FPGF
Bus Commissioning		
FPGF will deliver the e-buses and provide training to bus operators.		X
FPGF will monitor bus energy and operational performance.		X

National Express will be responsible for operating the buses during the school year and keeping them in a state of good repair.

Phase 2 – Design and Construction of Charging & V2G Infrastructure

In Phase 2, FPGF will be responsible for the engineering, construction, and commissioning activities for bus charging. Con Edison will support these activities as needed. Phase 2 will be complete when FPGF demonstrates that the buses can charge and discharge simultaneously using all the networking abilities of the management software and BTCPower hardware.

Phase 2 – Roles and Responsibilities

Lead Responsibilities	Con Edison	FPGF
Engineering, Procurement & Construction		
FPGF will design, procure, and build the charging infrastructure under an Engineering, Procurement, and Construction ("EPC") contract.		X
Con Edison will support this activity with active engagement by experts in the Distributed Resource Integration business unit.	X	
Cybersecurity		
Con Edison will define the requirements.	X	
FPGF, along with the energy management software provider, EVConnect, and V2G developer Kisensum, will adhere to Con Edison's cyber security requirements.		X
EVSE Commissioning		
FPGF will deliver five 15 kW EVSE chargers designed for V2G at the end of Phase 1.		X
Con Edison will support the interconnection of the systems.	X	
V2G Engineering & Commissioning		
FPGF will lead the design and deployment of V2G hardware, including bus modifications, EVSE, and off-board inverter.		X
Con Edison will participate in the commissioning process.	X	
V2G Testing		
FPGF is responsible for interoperability with storage batteries.	X	X

Lead Responsibilities	Con Edison	FPGF
Con Edison is responsible for providing V2G dispatch schedules.		

Phase 3 – V2G Operations and Analysis

In Phase 3, FPGF will be responsible for buses performing V2G and evaluating performance. FPGF will create a performance baseline for the vehicles before the season and properly connect the vehicles to the V2G off-board hardware. During the performance season, FPGF will continually monitor system performance and ensure it operates as expected.

Phase 3 – Roles and Responsibilities

Lead Responsibilities	Con Edison	FPGF	Nat'l
V2G Battery baselining			
FPGF is responsible for determining battery state of charge going into the V2G operating period.		X	
Site preparation			
FPGF will physically secure the buses at the National Express site during the V2G period.		X	
National Express will ensure that the buses are physically available for V2G and connected to the EVSE equipment.			X
V2G Performance			
FPGF will monitor battery charging and discharging operating per schedule and consistent with expected load, time, transfer rates.		X	
FPGF will collect and analyze data from buses and chargers energy management platforms.	X		

D) Governance

The Con Edison Project Manager and Project Management team will have day-to-day execution responsibility for managing the project, coordinating tasks and activities, and conducting overall project management. The team will continuously coordinate activities throughout the project. Team meetings will be held in person, via conference calls, WebEx, or other communication means. The project team will be responsible for coordination and execution of quarterly reports. Con Edison's Senior Vice President, Customer Energy Solutions will have final

governance oversight of all team activities and will be kept apprised of progress through regular team meetings.

Section 3: Work Plan & Budget

A) Project Plan

The Project team has developed a work plan with specific tasks and activities aligned to the Project timeline and overall success. The breakdown of roles and responsibilities is provided in this section.

Table 7: Work Plan

Action Nbr.	Phases, Activities/SubTasks	Milestones	Lead	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Demonstration Planning														
0.1	Obtain Commission Approval	PSC approval received	Con Ed	■										
0.2	Finalize contract with NELLC	Contracted executed	Con Ed		■									
0.3	Finalize contract with FPGF	Contract executed	Con Ed			■								
Phase I: Electric Bus Operations and Analysis														
1.1	Buses shipped to NJ from Montreal	Buses arrive in NJ	FPGF	■										
1.2	Buses pre-inspected, customized, detailed, prepped	Buses prepped for delivery	FPGF	■										
1.3	Buses delivered and inspected	Buses pass DMV inspection	FPGF		■									
1.4	FPGF provides operational/technical training	Nat'l personnel certified to operate ebuses	FPGF		■									
1.5	Buses operational	Buses commence on routes	FPGF			■	■	■	■	■	■	■	■	■
1.6	Buses generate performance analytics	Data collected from CAN bus and telematics	FPGF			■	■	■	■	■	■	■	■	■
1.7	Quarterly Data analysis, measurement and evaluation	Analyses/findings produced and reported quarterly	FPGF			■	■	■	■	■	■	■	■	■
Phase II: Design and Construction of Charging and V2G Infrastructure														
2.1	Site assessments and engineering drawings	Plan and drawings submitted	FPGF		■									
2.1	Electrical service request	Con Ed receives service request	FPGF		■									
2.3	Utility assessment and service plan	Con Ed issues service plan	Con Ed			■								
2.4	EVSE assessment and site plan	Healy Electric completes EVSE site plan	FPGF			■								
2.5	Ordering of equipment/hardware	EV Connect orders hardware/equipment	FPGF			■								
2.6	Installation of networked charging stations (without V2G)	5 charging stations installed	FPGF			■								
2.7	Testing of interface with buses	Testing concludes with full functionality	FPGF			■								
2.8	Chargers operational	Charging stations fully operational	FPGF			■								
2.9	EV Connect provides operational training	WPBC personnel knowledgeable of charger operations	FPGF			■								
2.10	Electricity consumption patterns analysis	Duty and charge cycles established	FPGF			■								
2.11	Design and software coding	V2G software coding completed	FPGF				■							
2.12	Charging stations upgrade with inverters and software	Charging stations upfitted with inverters, one at a time	FPGF				■							
2.13	Buses modified (BMS modifications and SAE Combo plugs)	BMS sytems reengineered; SAE Combo plugs/inverters added one at a time	FPGF				■							
2.14	Network integration and system testing	charging stations and buses tied to grid through EMP	FPGF					■						
Phase III: V2G Operations and Analysis														
3.1	V2G launch (summer 1)	V2G fully operational	FPGF					■						
3.2	V2G battery baselining (summer 1)	V2G baseline established	FPGF						■					
3.3	V2G analysis (fall 1)	Battery and vehicle impacts evaluated and documented	FPGF						■					
3.4	V2G commissioning & battery baselining (summer 2)	V2G deployed	FPGF									■		
3.5	V2G analysis (fall 2)	V2G performance evaluated and documented	FPGF										■	
3.6	Data collection from Energy Management Platform	Data collected and logged from EMP	FPGF				■	■	■	■	■	■	■	■
3.7	Quarterly Data analysis, measurement and evaluation	Analysis completed with findings/recommendations; reports filed	FPGF				■	■	■	■	■	■	■	■

B) Project Budget

	2018-2019					
Timeframe:	Q3	Q4	Q1	Q2	Q3	Q4
Expected Cash-Out:	**$344,052**	**$136,722**	**$-**	**$-**	**$130,028**	**$165,000**
Expected Cash-In:						

	2020-2021							
Timeframe:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Expected Cash-Out:	**$-**	**$-**	**$209,125**	**$-**	**$-**	**$69,316**	**$-**	**$30,000**
Expected Cash-In:								

Section 4: Reporting Structure

A) Reporting Expectations

Quarterly reports will be provided to the Commission during the Project. The reports will provide an update on implementation progress according to the work plan and budget (see Figure 2), detailing deviations, and noting task and activity progress. In addition, each quarterly report will capture, to the extent available, key project information, such as bus performance, and V2G performance. The quarterly report template will be as follows:

Figure 2: Quarterly Report Outline

1.0 Executive Summary
2.0 Demonstration Highlights
- 2.1 Since Previous Quarter
  - 2.1.1 Major Tasks Completion
  - 2.1.2 Activities Overview
  - 2.1.3 Sub-Activities Overview
- 2.2 Next Quarter Forecast
  - 2.2.1 Checkpoints/Milestone Progress
  - 2.2.2 Planned Activities
  - 2.2.3 Expected Changes
- 2.3 Issues
- 2.4 Performance (Summer Months Only)
  - 2.4.1 Charging events (to bus): time, load, transfer rate
  - 2.4.2 Discharge to grid events: time, load, transfer rate
- 2.5 Performance (Non-Summer Months)
  - 2.5.1 Miles driven
  - 2.5.2 Average kWh/mile
  - 2.5.3 kWh consumption
  - 2.5.4 Vehicle maintenance and uptime

1.0 Work Plan and Budget Review
- 1.1 Phase Review
  - 1.1.1 Activity 1.0
    - Progress Assessment
    - Issues
    - 1.1.1.1 Sub-Activity 1.2
      - Progress Assessment
      - Issues
    - 1.1.1.2 Sub-Activity 1.3
- 1.2 Work Plan
  - 1.2.1 Updated Work Plan
  - 1.2.2 Updated Budget

2.0 Conclusion
- 2.1 Lessons Learned
- 2.2 Recommendations

The quarterly report will focus on the phase(s) occurring within the previous quarter or scheduled to occur within the next two quarters, providing a focus on current progress while providing Staff insight into the near future.

Checkpoint, milestone, and activity progress will provide detailed status information to inform the Commission of implementation progress and highlight issues, such as changes in scope, incremental cost, or shifts in the timeline. A stoplight chart will be used to detail progress for activities in the quarterly reports. Con Edison will provide narrative information to support the progress report.

Figure 4-A-2: Checkpoint/Milestone/Activity Progress Example

Checkpoint: V2G hardware installed and operational

Target: Buses modified (BMS modifications and SAE Combo plugs) (Phase 1 completion)

Progress Status:

Budget Impact: (Yes/On-Target/No Impact)

Incremental Cost Incurred:

Previous Quarter Updates:

Future Quarter Impacts:

The Project management team will conduct a quarterly phone call with project partners and Staff to review the quarterly report and respond to questions. Con Edison and partners will maintain contact with Staff through the duration of the project to share information and respond to inquiries, as appropriate.