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M E M O R A N D U M

Date: June 18, 2024

To: David Petrik; Jedadiah Bortz; Veronika Vostinak; Tinku Khanwalkar, Allentown, PA

From: Michael Stahly; Patrick Martin, WES

Re: **EV Scoping Summary**

1.0 INTRODUCTION

The City of Allentown is pursuing a pilot fleet electrification effort with Energy Efficiency and Conservation Block Grant (EECBG) awarded funding. The EECBG program is administered by the U.S. Department of Energy (DOE), providing funding to local governments to support energy efficiency and conservation projects. The pilot EV project will replace select vehicles from Allentown's municipal fleet and will install the electric vehicle supply equipment (EVSE) to support them.

Allentown has voiced concerns related to operational costs, maintenance expenses, and the ability to provide quality community services in comparison to current gasoline and diesel-powered vehicles. By leveraging EECBG vouchers to conduct an EV fleet pilot, essential data can be gathered to establish the groundwork for a comprehensive conversion plan, geared towards reducing fuel costs, maintenance costs, and greenhouse gas (GHG) emissions associated with the existing fleet. Allentown has replaced the Mayor's fleet vehicle with an EV in a separate effort. The information from the pilot will serve as an educational tool among City staff, elected officials, and the community to increase the awareness and understanding of EVs. Results of the preliminary analysis indicate an estimated annual cost savings of approximately $20,000 inclusive of energy and operational/maintenance costs, and an annual greenhouse gas emissions reduction of 19 metric tonnes of CO_2e from the electrification of the pilot fleet and the Mayor's vehicle.

This document serves to outline the scope of this effort including vehicles to be replaced, EVSE, high-level economics to be expected to carry out this project, and key considerations while implementing this effort. **Key project details are expected to change as the design of the project is further fleshed out, with this document serving only as the basis of a proposed scope.** As the pilot project progresses, WES intends to provide technical support and adjust project details as needed to ensure the pilot effort implemented best serves Allentown's needs.

This document is provided through support and funding from the U.S. Department of Energy's State Energy Program and the Pennsylvania Department of Environmental Protection.

2.0 LEVERAGABLE INCENTIVES

A key benefit to utilizing the EECBG funding for a fleet electrification project is the ability to leverage additional funding sources, effectively increasing the applicable scope of the effort. The following incentives have been identified to likely be applicable to this project, and providing funding beyond that

provided by EECBG and Allentown. For the scoping purposes of this memorandum, a representative leveraged incentive value has been carried and is presented in Table 4. The valuation of the final leveraged incentives will be dependent on factors such as final designs, number of EVs purchased, number of chargers installed, charger model, etc., with the maximum award values provided in Table 1.

Table 1: Incentive Summary

Leveraged Funding Source	Maximum Funding Amount
Federal Tax Credit	30%, up to $7,500 per EV 30% of qualified EVSE
AFIG	$7,500 per EV, 50% of EVSE Cumulative up to $300,000

2.1 FEDERAL TAX CREDIT

Federal tax credits are available to be redeemed by Allentown to reduce the capital outlay required to implement the pilot EV project. For the tax credits described below, it is recommended that credits be discussed with appropriate tax accountants/attorneys to ensure all requirements are met and determine the best combination of funding allocations to ensure the City realizes the maximum value of the leveraged incentives.

2.1.1 Commercial Clean Vehicle Credit

The Commercial Clean Vehicle Credit is a credit offered by the federal government to businesses and tax-exempt organizations as an incentive to purchase cleaner vehicles. The Federal Tax Credit offers the lesser of 30% of the basis in the vehicle if electrically powered or up to $7,500 per qualified vehicle. Qualified vehicles must have a gross vehicle weight rating (GVWR) of under 14,000 pounds, be made by a qualifying manufacturer, used primarily in the United States, and be used for business purposes. This tax credit was extended under the Inflation Reduction Act of 2022 to expire in 2032.

2.1.2 Alternative Fuel Vehicle Refueling Property Credit

The 30C Tax Credit is offered by the federal government to incentivize the installation of EVSE and is available to businesses, individuals, and municipalities that place qualified refueling property into service. The tax credit provides a redeemable value of 30% of the cost of the refueling property. Qualified refueling property must be placed in service within the tax year, have original use beginning with the municipality, be used in the U.S., and be within eligible census tracts that are low-income communities. DOE's 30C Tax Credit Eligibility Locator[1] identifies that Allentown is within a census tract eligible for the credit through 2029.

2.2 PENNSYLVANIA ALTERNATIVE FUELS INCENTIVE GRANT (AFIG)

The AFIG program is a reimbursement program that was established by the Pennsylvania State Government to develop new markets for alternative fuels with a goal of increasing energy security and improving air quality. AFIG has an annual budget of approximately $5 million available to organizations wanting to transition to cleaner fuel transportation. This program is used to fund the purchase of new, zero emissions vehicles as well as the cost to purchase and install EVSE. AFIG offers up to $7,500 of incremental cost per EV as well as up to 50% of the capital cost of EVSE installed, up to a maximum of

[1] 30C Tax Credit Eligibility Locator – https://experience.arcgis.com/experience/3f67d5e82dc64d1589714d5499196d4f/page/Page/

$300,000. The current round of AFIG funding is available in two application periods: one accepting applications through June 28, 2024, and one through December 20, 2024.

3.0 EV PILOT PROJECT SCOPE

Utilizing EECBG funding and leveraging other available incentives provides Allentown the opportunity to explore a fleet electrification effort with the implementation of a pilot electric fleet, EVSE, and all the infrastructure upgrades needed to support the effort at Bridgeworks, the Public Works Building which the City has determined is located in an eligible census tract of low-income communities.

3.1 ELECTRIC VEHICLE REPLACEMENT

Allentown currently utilizes a mix of vehicle types within its municipal fleet. City staff have identified applicable vehicles to be replaced within this effort based on age, mileage, and the City's replacement schedule. In addition to the municipal fleet identified, the City recently replaced a 2023 Dodge Durango with a Ford Mustang Mach-E that is outside the pilot EV scope, but is included in the economic and greenhouse gas analyses. Table 2 provides a complete list of the existing vehicles to be replaced as identified by Allentown, and a summary of their existing usage.

Table 2: Existing Vehicle Data

Tag	Year	Model	Odometer Mileage	Annual Distance Travelled, miles
7878	2012	Ford Escape	60562	2,365
7150	2015	Ford Focus	55922	6,810
7155	2015	Ford Focus	55402	3,989
7R003	2018	Chevy Cruze	38072	13,792
7306	2014	Chevy Cruze	53727	5,548
7308	2016	Chevy Cruze	55244	10,103
7313	2014	Ford Focus	33548	3,841
7810	2023	Dodge Durango, Mayor	23559	7,190

Notes: 1) The Mayor's vehicle was replaced with a Ford Mustang Mach-E as part of a separate electrification effort.

Allentown has identified that EV models used to replace the existing fleet should be SUVs with four wheel drive (4WD) or all-wheel drive (AWD) capabilities to meet the City's needs. As such, the Chevrolet Equinox EV or equivalent model have been assumed to be the EV model implemented, with the COSTARS quote of the 2LT model used as the basis for the economics presented in Table 4. The 2LT trim level is expected to coincide with the price point of including the AWD capabilities the City requires. The Chevrolet Equinox is not the only EV model which is available in this size class and potential price range, other applicable models currently or soon to be available include the Volkswagen ID.4, Chevrolet Blazer, Nissan Ariya, Tesla Model Y, Hyundai Ioniq 5, Ford Mustang Mach-E, and others. It is anticipated that further models will become available in the future, and it is recommended that the available models be evaluated once the city is at the stage of procuring vehicles and a final decision on model for the pilot be made at that point.

It is important to note that the purchase of fleet vehicles, inclusive of EVs, will likely be made through COSTARS. COSTARS is a tool used by municipalities that provides pre-negotiated costs for cars and a

simplified database of eligible vehicles to be purchased. The Chevy Equinox EV is currently not available through COSTARS, but is expected to be available in the near future.

3.2 ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)

With the implementation of a pilot EV fleet, Allentown will need to add the required charging capacity to support these vehicles. A key consideration when identifying the required charging capacity is the expected EV use, desire to future proof, use patterns, etc. For the purposes of this pilot fleet electrification effort, it is expected Allentown will utilize a mix of Level 1 and Level 2 chargers; Level 3 chargers are expected to not only provide charging capacity that is grossly above and beyond that required by the fleet, but carries capital costs to install that significantly outpace those associated with Level 1 & 2 chargers. The EVSE presented in this analysis are all assumed to be Level 2 and will be provided for the use of Allentown government fleet vehicle charging. Furthermore, it is expected that additional Level 1 EVSE can be implemented at little to no incremental cost when installing Level 2 equipment. Charging stations for public use are being evaluated as part of other efforts outside of this pilot.

In an effort to identify the appropriate charging infrastructure to install, usage data for the vehicles to be replaced was used to identify average use profiles. Using these use profiles, high-level charging characteristics were developed. Table 3 provides a summary of the estimated time to charge based on current vehicle usage for both Level 1 and Level 2 EVSE.

Table 3: Estimated EV Charging Time

Tag	Year	Model	Daily Distance Travelled, miles/day	Daily Usage, kWh/day	Time to Charge (Level 1)[1], hrs	Time to Charge (Level 2)[2], hrs
7878	2012	Ford Escape	8	2.6	1.7	0.5
7150	2015	Ford Focus	22	7.5	5.0	1.5
7155	2015	Ford Focus	13	4.4	2.9	0.9
7R003	2018	Chevy Cruze	46	15.1	10.1	3.0
7306	2014	Chevy Cruze	18	6.1	4.0	1.2
7308	2016	Chevy Cruze	33	11.1	7.4	2.2
7313	2014	Ford Focus	13	4.2	2.8	0.8
7810	2023	Dodge Durango, Mayor	20	6.5	4.4	1.3

Notes: 1) Level 1 charging assumes a charging rate of 1.5 kW
2) Level 2 charging assumes a charging rate of 5.0 kW
3) Daily distance travelled, usage, and times to charge assume consistent use during each workday. It is anticipated that charging times will be both greater and less than this on a daily basis, in accordance with fluctuations in actual use.

3.2.1 EVSE Location & Installation

Allentown is currently planning to implement the EVSE in the northern parking lot of the Public Works building. Initial investigations by City staff have identified parking spaces along a retaining wall and continuing along the building to be the most applicable location, as identified in Figure 1. The Public Works building was converted from a factory and subsequently has an electrical service that exceeds the requirements of the building, thus likely allowing for ease of tie in for the new charging infrastructure with no expected changes needed to the existing service required. In addition to the EVSE to be implemented as part of the pilot effort, a charger to support the Mayor's EV was installed at City Hall.

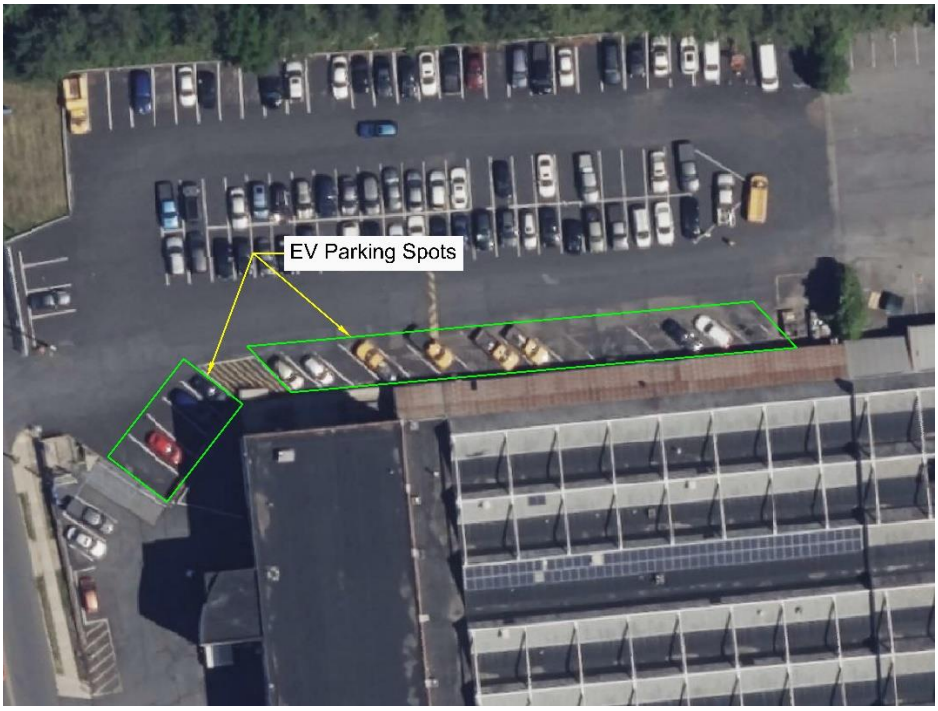

Figure 1: EVSE Locations

It is expected that the branch circuits required for the EV chargers can be implemented with the use of site staff capacity. It is worth noting that the high level economics presented in later in Table 4 are intended to present estimated costs for installation via contractors; the ultimate realized cost will likely be significantly less if City staff can implement the project. For the pilot scope, both level one and level two chargers are expected to be installed. Discussions with site staff and observations of the current electrical infrastructure in place identified that there are likely two main options for creating the necessary infrastructure to support the new EVSE:

- Existing 3-Phase Service Tie in – As noted, the site has a 3-phase service with excess capacity to provide the required electrical energy for the EVSE. This effort would entail pulling a new 3-phase feeder from the existing service to the approximate location of the EVSE. A new stepdown transformer will be utilized to convert the power to an appropriate supply voltage of three phase 208V/120V, feeding a new subpanel. The level 2 EVSE will utilize 208V single phase power, while any level 1 EVSE would utilize 120V single phase power. The EVSE installed would be balanced across the three phases to the extent possible.
- New Single Phase Service – An alternative is to pull a new service from the single phase poles directly across the street from the desired EVSE locations as detailed in Figure 1. This service would be single phase with the sole purpose of providing energy for the EV pilot. Individual circuits would then be run to the EVSE, supplying the required power.

As depicted in Table 3, Level 1 charging may be appropriate for some of the replacement EVs. Furthermore, EVs generally come with Level 1 charging included, thus would only require the addition of standard 120V outlets within the reach of the parking spaces/charging locations and would be a recommended addition to the Level 2 charging installed in this project. The additional charging

infrastructure will provide Allentown flexibility to utilize charging that best fits each EV's use profile, while allowing for charging capacity for future electrification efforts.

3.2.2 EVSE Type Considerations

There are various types of EVSE available to Allentown to install that can provide benefits from additional features, number of ports per charger, network capability, reduced cost, etc. This section will detail some key considerations to evaluate when identifying the EVSE to install.

Ports – Chargers are available in single or double port options, allowing for charging multiple vehicles with a single charging station. This has the benefit of maximizing the number of cars that can be charged with each unit, but has a higher capital cost. A dual port power sharing option can charge two EVs simultaneously, but splits the overall power between each car; a 12 kW charger with two ports would either be able to supply 12 kW to a single car, or 6 kW to two cars. Based on the current usage profiles of the identified fleet vehicles, a dual port charger model will likely provide the most value for the pilot effort.

Charging Standard – The charging infrastructure and EVs on the road in the US utilize differing plugs dependent on the manufacturer. There are two main protocols currently in use: the J1772/CCS and the North American Charging Standard (NACS), formerly known as the Tesla plug. The J1772 has served as the standard in the US, with the NACS being reserved for Tesla EVs and EVSE, but major manufacturers have announced plans to migrate to the NACS port. It will be key for Allentown to standardize a charging protocol to use for both the EVs purchased and the EVSE installed to ensure that the charging needs are continued to be met in the future and limit any compatibility issues.

Networking –Installing networked EVSE can serve as a solution to collect and utilize data indicating how the EVs are being utilized. With networked chargers, the City can set up profiles for each EV that will be able to track data points such as usage, efficiency, charging cycles, etc. Networked chargers can also be set up such that City staff, or any other EV owners at Allentown's discretion, can utilize the chargers, but at a cost defined by the City. Conversely, a non-networked approach will provide essential charging services, but not the associated data or features. Outside controls/meters would be required to ensure proper usage, identify consumption profiles, and gather data as warranted.

Access – Allentown noted a need to prevent misuse of EVSE by unauthorized personnel. There are wide ranges of applicable solutions to maintain the integrity of the system and deter unauthorized personnel from entering such as signage displaying time limits, restricted access, implementing towing zones for unauthorized vehicles, etc. If networked chargers are installed they can be set up such that they will only work for select EVs. If non-networked chargers are installed, locks can be installed to prevent use by unauthorized EVs.

3.2.3 Additional Considerations

Allentown has already identified the preferred location of the EVSE in the northern parking lot of the Public Works building along the row of parking spots against the building. An additional location that can serve as a possible suitable location is in the same parking lot, but on the Northern outer perimeter. The location would utilize a new service, but would be able to serve as a future-proof alternative. Staff identified the addition of a new service to be a low-cost addition and could be sized appropriately to support a complete fleet electrification effort.

Allentown has noted that data collection will be a critical component of a successful pilot program. The vehicle data can be gathered through the existing city vehicle telematics system (if available), a specific pilot telematics approach centered on the pilot electric vehicles, through networked charger data connections, through a site submetering scheme, or through manual data collection from the vehicle users.

Another area of interest is whether a fully turnkey solution is desired. Companies such as Charge Point offer a full turnkey solution which includes installation, software service, and maintenance of EVSE. This can include various scopes and ownership structures that can be further investigated by Allentown if interested.

3.3 EV PILOT PROJECT SCOPE SUMMARY

A summary of the anticipated scope of this pilot effort and the magnitude and source of the required funding is provided in Table 4.

Table 4: EV Pilot Project Scope Summary

Scope	Quantity Purchased/ Installed	Total Project Cost	Incentive Value			Allentown Budget
			EECBG	Federal Tax Credit	AFIG	
EV Purchase, Pilot[1,2]	7	$322,665	$120,070	$52,500	$52,500	$97,595
EV Purchase, Mayor[3]	1	$45,195	$0	$7,500	$7,500	$30,195
EVSE Installed[4]	9	$120,846	$0	$36,000	$60,000	$24,846
Total		**$488,706**	**$120,070**	**$96,000**	**$120,000**	**$152,636**

Notes: 1) All EVs within the Pilot EV scope are assumed to cost $46,095 per vehicle as described in Section 3.1.
2) It is expected that Allentown already has at minimum enough budget allotted to cover the remaining cost as part of a regular fleet replacement schedule.
3) The Mayor's EV was purchased for $45,195.
4). All chargers are assumed to cost $15,000 per charger/plug installed, with the exception of the currently installed Mayor's EVSE which carried an equipment cost $846, excluding labor/install costs.
5) Key assumptions and values are presented in Table 8.

EV costs carried assume the same vehicle model will replace those selected from the existing fleet regardless of existing car type and are based on EV considerations as detailed in Section 3.1 with the exception of the Mayor's EV which has already been purchased. The charging equipment costs carried assume contractor installation and are high-level in nature. It is expected that inhouse installation can provide significant cost savings compared to the figures shown. The scope of the EVSE is as detailed in Section 3.2. It is critical to note the disbursement scopes of awarded funding can have implications on the final tax credit value realized.

WES is not an accounting firm and is not certified to provide tax advice. It is recommended that Allentown confer with a tax account or attorney to determine the City's eligibility, allocation of funding to maximize credit value, etc.

Table 5 provides a summary of the estimated operating costs and economic profiles for the electric vehicles and a baseline of comparable gasoline vehicles. EV efficiency is assumed based on typical market available vehicles in this class whereas the gasoline vehicle efficiency is based on the average consumption of 2022 Ford Escapes currently in use in Allentown's fleet. These vehicles have been chosen to provide an appropriate comparison point between new electric and gasoline vehicles in the same class.

Table 5: Vehicle Economic Summary

Scenario	Fuel, Unit	Assumed Efficiency, miles/unit	Annual Fuel Consumption, unit/yr	Annual Fuel Cost	Annual Maintenance Cost[1]	Total Annual Cost
Baseline[2]	Gas, gal	19.2	2,789	$11,852	$11,598	$23,450
EV[3]	Electricity, kWh	3.0	17,775	$1,066	$2,494	$3,561
Net Annual Savings				**$10,785**	**$9,104**	**$19,889**

Notes: 1) Maintenance cost calculated using NYC Fleet case study[2].
2) Fuel efficiency based on average consumption of eight 2022 Ford Escapes currently in use in Allentown's fleet.
3) EV scenario calculated using same distance travelled per year as Baseline.
4) Key assumptions and values are presented in Table 8.

It is important to note that the entire cost of the pilot EV effort will not be covered wholly by EECBG and other leveraged funds; the use of funds from the Allentown budget will be required. It is assumed that there is sufficient funding within this Allentown budget line item as part of regular fleet replacement schedules and staff have indicated that this budget requirement will be available.

Table 6 provides a summary of the GHG emissions profile**s** for the electric vehicles and a baseline of comparable gasoline vehicles. The emissions accounting for fossil fuels and electricity directly follows reporting protocols as identified by the EPA, IPCC, and GHG Protocol for Scope 1 and Scope 2 emissions. Furthermore, the calculated NO_x emissions for the baseline gasoline scenario are based on California's Low Carbon Fuel Standard emissions factors.

Table 6: Vehicle GHG Summary

Scenario	Fuel, Unit	Annual Fuel Consumption	GHG Emissions Profile[1], $MTCO_2e$/yr	CO_2 Emissions, lb/yr	NO_x Emissions, lb/yr
Baseline	Gas, gal	2,789	24.6	53,978	8.7
EV	Electricity, kWh	17,775	5.6	11,685	5.6
Net Annual Savings			**19.0**	**42,292**	**3.1**

Notes: 1) Baseline scenario GHG emissions are considered Scope 1, or locally emitted. EV scenario GHG emissions are considered Scope 2, or emitted offsite.
2) EV scenario calculated using the same distance travelled per year as the baseline.
3) GHG factors are presented in Table 9.

3.4 MEASUREMENT & VERIFICATION

A key outcome of the pilot effort is to identify the realized cost savings to Allentown from fleet electrification, identify any missed opportunities or pitfalls from the implementation of the project, and provide crucial insight on future electrification efforts to maximize the benefits of the projects. To verify the success of the fleet electrification, measurements on an annual basis will be taken and used to

[2] NYC Fleet Newsletter: Reducing Maintenance Cost with Electric Vehicles, March 8, 2019 – Issue 255 https://www.nyc.gov/assets/dcas/downloads/pdf/fleet/NYC-Fleet-Newsletter-255-March-8-2019-Reducing-Maintenance-Costs-With-Electric-Vehicles.pdf

calculate results to compare with baseline data. The baseline data is expected to correspond to the operating costs for gasoline vehicles of similar characteristics e.g., there are eight (8) Ford Escapes utilized by the fleet that would likely be the best candidate to serve as the baseline for comparison against the pilot fleet of 7 EV Equinoxes, or similar, and 1 Mach-E. Table 7 outlines key metrics that are expected to be included to verify the performance of the pilot electrification effort.

Table 7: Key Metrics to Measure & Verify

Inputs	Variable	Value	Unit	Source
Average Annual EV Mileage[1]	M		miles/EV/yr	Average of Pilot Fleet
Electricity Rate[1]	R_e		$/kWh	Utility Billing
Electric Consumption[1]	C		kWh/EV/yr	Average of Pilot Fleet
Annual EV Maintenance Costs[1]	MC_e		$/EV/yr	Average of Pilot Fleet
Electric CO_2e Emission Rate	E_e	0.00030	$MTCO_2e$/kWh	2022 eGRID
Gasoline Unit Cost[1]	R_g		$/gal	Average Unit Cost in Period
Gasoline Efficiency	X_g	19.2	miles/gal	2023 Average of Baseline Fleet
Gasoline Maintenance Costs[1]	MC_g		$/car/yr	Average of Baseline Fleet
Gasoline CO_2e Emissions Rate	E_g	0.00881	$MTCO_2e$/gal	2024 GHG Emissions Factors

Notes: 1) Blank cells are measures Allentown will provide one year after implementation of project.

The logged data can then be used to derive the success of implementation in various ways. Ket metrics to measure include the resultant changes to GHG emissions profiles, operating costs, and the maintenance costs changes from fleet electrification. Example calculations are presented below for the respective identified metrics:

- $GHG\ Emissions\ Difference\ per\ Vehicle = \left(\frac{M}{X_g}\right)(E_g) - (C)(E_e)$
- $Operating\ Cost\ Difference\ per\ Vehicle = \left(\frac{M}{X_g}\right)(R_g) - (C)(R_e)$
- $Maintenance\ Cost\ Difference\ per\ Vehicle = MC_g - MC_e$

As part of the measurement and verification plan, these values should be recorded and catalogued in regular intervals to provide a continuing snapshot of the EV pilot performance. From this extended record, trends can be identified that can be used to educate the decision making process to help influence future electrification efforts to ensure the maximum value is realized. Results from verification process will be made public to provide transparency and encourage future projects within the community.

4.0 SUMMARY & NEXT STEPS

Allentown is proposing to use EECBG funding to implement a pilot municipal fleet electrification effort. City staff have identified applicable vehicles within the fleet that are to be replaced with EVs, the anticipated EV model that will be purchased, EVSE locations, and general requirements of the EVSE. The following are next steps expected for this project:

- Apply for EECBG funding to apply towards this pilot vehicle electrification scope (Application due 4/30)
    - The EECBG voucher application was submitted April 2024 and, at the time of this memorandum, is currently under review

- Apply for AFIG funding to reduce capital outlay required by the City, if awarded (Application due July 28, 2024)
    - The AFIG applications are currently being drafted at the time of this memorandum
- Evaluate the charging protocols available and select one to standardize all EV and EVSE on moving forward
- Decide upon all data collection and management mechanisms and platforms with respect to the key metrics in Table 7
- Identify the ultimate EV to be selected inclusive of trim levels, availability, options, etc. (After award of grant funds, at the time city is ready to procure vehicles)
- Identify the EVSE that will be installed to support the EVs such as specific models and design features that are desired
- Decide whether Allentown will self-install the EVSE and electrical infrastructure or contract the work out
- Connect with the applicable financial/accounting department to ensure all EV federal tax credit requirements are met and determine the best combination of fund allocation to ensure the maximum benefits of the leveraged incentives are realized

The scope outlined within this memorandum serves as the basis for the pilot fleet electrification effort for the Allentown municipal fleet. It is expected that the parameters outlined will change as the project phases proceed. As such, the figures presented will change accordingly. WES intends to support the project throughout each phase and provide technical assistance as directed by Allentown to ensure the ultimate output of the pilot effort best meets the City's needs.

5.0 KEY VALUES & ASSUMPTIONS

The key values and assumptions used to develop this project scope are presented in Table 8. GHG emissions factors are presented in Table 9.

Table 8: Key Values & Assumptions

Inputs	Value	Unit	Source
Cost of Replacement EV, Compact SUV	$46,095	$/EV	WES Assumption
Federal EV Tax Credit Value	$7,500	$/EV	IRS
AFIG EV Incentive Value	$7,500	$/EV	PA DEP
Installed Cost of EVSE	$15,000	$/EVSE	WES Assumption
Federal EVSE Tax Credit Value	30%	percent	IRS
AFIG EVSE Incentive Value	50%	percent	PA DEP
EECBG Funding Allocation	$120,070	$	Allentown
EV Energy Efficiency	3	miles/kWh	WES Assumption
Existing Fleet Average Fuel Efficiency	19	miles/gal	Allentown
Average Gasoline Unit Cost	$4.25	$/gal	Allentown
Average Electricity Unit Cost, all-in	$0.06	$/kWh	Allentown

Table 9: GHG Emissions Factors

Inputs	Value	Unit	Source
CO_2 Emitted From Gasoline	8.78	kg/gal	2024 GHG Emissions Factors
CH_4 Emitted From Gasoline	0.00038	kg/gal	2024 GHG Emissions Factors
N_2O Emitted From Gasoline	0.00008	kg/gal	2024 GHG Emissions Factors
NO_x Emitted From Gasoline	1.42	g/gal	CARB Emissions Factor Database
CO_2 Emitted From Grid Electricity	657.4	lb/MWh	2022 eGRID, RFCE
CH_4 Emitted From Grid Electricity	0.045	lb/MWh	2022 eGRID, RFCE
N_2O Emitted From Grid Electricity	0.006	lb/MWh	2022 eGRID, RFCE
NO_x Emitted From Grid Electricity	0.3	lb/MWh	2022 eGRID, RFCE
Line Losses	5.10%	percent	2022 eGRID, RFCE
CH_4 100-Year GWP	28	factor	IPCC AR5
N_2O 100-Year GWP	265	factor	IPCC AR5