DIRECT TESTIMONY OF CORMACK C. GORDON
DIRECTOR, TRANSPORTATION ELECTRIFICATION
DUKE ENERGY BUSINESS SERVICES, LLC
ON BEHALF OF DUKE ENERGY INDIANA, LLC
CAUSE NO. 45616
BEFORE THE INDIANA UTILITY REGULATORY COMMISSION

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Cormack C. Gordon, and my business address is 1000 East Main Street, Plainfield, Indiana.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Director, Transportation Electrification by Duke Energy Business Services, LLC, a service company subsidiary of Duke Energy Corporation, and a non-utility affiliate of Duke Energy Indiana, LLC ("Duke Energy Indiana," or "Company").

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I hold a Bachelor's of Science from the University of Tennessee and a Master's of Management Science and Engineering from Stanford University. I have been employed by Duke Energy since September of 2010, and worked previously as an engineering consultant, in energy efficiency as an engineer, project manager and researcher, and as a general contractor. During my time at Duke Energy, I have worked in non-residential energy efficiency, including as a Products & Services Manager responsible for the launch of the Custom Incentives program in 2012. In 2014, I assumed responsibility for the Custom Incentives suite of programs &

personnel across all of Duke Energy's territories. In 2020, after participating in several special projects related to electric transportation, I was asked to take on the role of Director, Products & Services to lead commercialization of electric vehicle infrastructure businesses. In May 2021, I assumed the role of Director, Transportation Electrification.

Q. PLEASE DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS DIRECTOR, TRANSPORTATION ELECTRIFICATION.

A. My primary responsibility as Director, Transportation Electrification is to lead the team that is accountable for executing electric transportation efforts in our various jurisdictions and for leveraging lessons learned and market trends to develop and implement new products, services and policies that enable customer adoption of electric transportation by identifying and solving for gaps in the electrification space. Members of my team are located throughout Duke Energy's service territories, including Indiana.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the individual programs included as part of Duke Energy Indiana's Electric Transportation Proposal ("ET Program"). Specifically, I will provide details of each individual program component of the ET Program, what the Company hopes to learn from each program component, and our estimated costs and benefits from the ET Program.

II. ET PROGRAM OVERVIEW

Q. PLEASE GENERALLY DESCRIBE DUKE ENERGY INDIANA'S ELECTRIC TRANSPORTATION PROGRAM PROPOSAL.

A. Duke Energy Indiana's proposed ET Program will provide the state of Indiana with currently unavailable foundational knowledge on charging behaviors and grid impacts from a wide array of electric vehicle ("EV") market segments. The ET Program will allow Indiana to join other states in deploying and understanding the benefits of utility-involved EV infrastructure to meet growing market needs. Lastly, the ET Program is designed to provide a financial benefit, as opposed to burden, for all customers, regardless of their participation.

Duke Energy Indiana's proposal consists of six distinct programs. The proposed programs are designed to identify otherwise unknown effects of increasing adoption of different types of EVs on the electric system, customer EV charging behavior, and ascertain the potential benefits to the state of Indiana. The proposed ET Program is budgeted at $4,300,000 over a two year, 24-month period.

The six programs are as follows:

- Residential EV Charging Incentive
- Commercial EV Charging Incentive
- Electric School Bus
- Electric Transit Vehicle
- Fleet Advisory

- Education and Outreach

Q. HOW WAS THE ET PROGRAM DEVELOPED?

A. The ET Program was developed in response to the Indiana Utility Regulatory Commission's ("Commission") denial of the Company's original 2019 ET Pilot proposed in IURC Cause No. 45235 S2 ("2019 ET Pilot Proposal") and with feedback from our EV collaborative stakeholder group. In the denial, there were a few concerns noted by the Commission: more evidence demonstrating that the pilot is reasonable and just; a need for a statewide policy; more evidence demonstrating the benefits for all customers; more evidence demonstrating a need to understand and manage system impacts; more evidence defining participation components; and more detailed metrics. Duke Energy Indiana revised its 2019 ET Pilot Proposal with consideration of these concerns.

A major effort in the development of this ET Program included in-depth conversations and feedback from a collaborative stakeholder process. In 2020 and 2021, we held a series of collaborative meetings with various stakeholders, seeking feedback on program components. The outcome of this process helped create the robust, well-reviewed ET Program the Company is proposing in this proceeding.

The Company also undertook effort to complete a cost-benefit analysis to demonstrate the value to non-participants using well-understood cost-effectiveness tests used in demand-side management. The Company used this

process to modify the participating customer incentive levels that I will describe below.

Q. PLEASE DESCRIBE THE COLLABORATIVE PROCESS?

A. Duke Energy Indiana scheduled eight (8) collaborative meetings over the course of six (6) months from October 2020 through March 2021. The collaborative kicked off with introductions and an overview of future timeline and meeting expectations. Duke Energy Indiana highlighted the collaborative's purpose, objectives, and goals in light of the Commission's Order in Cause No. 45253 S2. As a starting point, a modified Duke Energy Indiana ET Program was presented to the group. Following meetings focused on individual programs with helpful discussion on the structure Duke Energy Indiana proposed. Each meeting was held virtually and lasted 1-3 hours.

Q. WHO PARTICIPATED IN THE COLLABORATIVE PROCESS?

A. Parties included the Indiana Office of Utility Consumer Counsel ("OUCC"), Citizens Action Coalition ("CAC"), Greenlots, ChargePoint, Solar United Neighbors, Environmental Law and Policy Center ("ELPC"), Greater Indiana Clean Cities, and the Hoosier Electric Vehicle Association. Each meeting was facilitated by two to three Duke Energy Indiana representatives. General EV discussions outside of the collaborative core group took place as well with dealerships, mayors, businesses, economic development groups, business developers, and others.

Q. HOW DID THE COLLABORATIVE PROCESS IMPACT THE REVISED ET PROGRAM?

A. Several important changes were incorporated into the revised ET Program as a result of the collaborative process. A few notable items include having better defined metrics of success and clarified program details; calculating net benefits using standard utility cost tests to determine appropriate levels of funding and Duke Energy investment; ensuring customer choice on electric vehicle supply equipment ("EVSE"); consideration of low-income participation; researching vehicle-to-grid technology with eSchool Buses; and establishing baseline data for future EV offerings.

Q. HOW LONG DOES THE COMPANY PROPOSE TO RUN THE ET PROGRAM?

A. Two years.

Q. WHAT IS THE GOAL OF THE ET PROGRAM?

A. Duke Energy Indiana believes that the increasing adoption of electric transportation will provide strong economic and utility customer benefits over the long term. At the same time, new electric vehicles are entering the market and strong year-over-year sales growth continues nationwide. Unfortunately, Duke Energy Indiana does not have an effective process to gather information from a wide array of EV applications. The major goal of the ET Program is to identify otherwise unknown effects of increasing adoption of different types of electric vehicles on the electric system, to understand various customer EV charging

behaviors, and further verify the potential benefits to all Duke Energy Indiana customers and the state of Indiana.

Q. PLEASE EXPLAIN HOW THE COMPANY WILL DETERMINE IF THE ET PROGRAM IS SUCCESSFUL?

A. A successful program will gather information pertaining to each of the proposed ET Programs. Metrics and objectives to be measured throughout the program can be found in each of the program summaries throughout my testimony, as are summarized in Petitioner's Exhibit 1-A (CCG). A specific focus of our post-program evaluation will be calculating updated utility cost-benefit results using the actual load profiles from this Duke Energy Indiana-specific ET Program.

Q. DOES THE ET PROGRAM ALLOW FOR REASONABLE FLEXIBILITY?

A. Yes. The ET Program allows for a degree of flexibility. One example of ET Program flexibility is the ability to modify the various incentive quantities per segment, as is proposed as part of the Commercial EV Charging Incentive program. The on-going collaborative process will also guide program modifications throughout the term.

Q. HOW DOES DUKE ENERGY INDIANA PROPOSE TO SHARE THE DATA OBTAINED THROUGH THE PROGRAM WITH THE COMMISSION AND OTHER STAKEHOLDERS?

A. To the extent possible, while protecting customer privacy, aggregated data will be made available to the public through annual reports submitted to the Commission

every twelve months, for a two-year period, following the start of the ET Program. Additional data, such as program participation and lessons learned will be shared through the on-going collaborative process.

III. ET PROGRAM BENEFITS

Q. HAS DUKE ENERGY QUANTIFIED THE CUSTOMER BENEFITS RELATED TO THE ET PROGRAM?

A. Yes. In response to the Commission's Order in Cause No. 45253 S2 and feedback received during the collaborative process, the Company conducted a Ratepayer Impact Measurement ("RIM") Test, Participant Cost Test ("PCT"), and Total Resource Cost Test ("TRC"), as summarized in Petitioner's Exhibit 1-B (CCG). The RIM Test evaluates the ET Program's impact on electric rates by calculating the benefits of EV adoption due to incremental net revenue received by selling electricity to charge EVs in excess of any increases in costs of service related to the additional load. It can be thought of as the test that demonstrates the impact on non-participating customers. The intent of the PCT was to compare the program's benefits and costs from the perspective of participating customers. And lastly, the TRC was designed to compare the overall benefits and costs to all customers (participants and non-participants) as a whole.

Q. PLEASE EXPLAIN HOW THIS ANALYSIS WAS CONDUCTED.

A. As shown in Petitioner's Exhibit 1-B (CCG), for all three tests, the Company established baseline profiles for each program. These profiles included a sample EV vehicle and comparable internal combustion engine vehicle, associated cost,

fuel efficiency, useful life, miles driven per day, maintenance costs, Duke Energy Indiana rate schedule used, kWh consumed, kW demand, and time of charging. For example, the residential program included average profiles for the top registered EVs in Indiana as of 2021 (Tesla Model Y, Chevrolet Bolt, and the Chrysler Pacifica Hybrid). Program load curves were used from a 2019 Duke Energy Florida data collection program. These curves were a good starting point, but are not conclusive to all the proposed Duke Energy Indiana programs given variances in EV market segment, weather, geography, and traffic patterns. Additional inputs regarding EVSE hardware and installation costs for each profile were included based on the Company's understanding of current costs. The Company also utilized supply-side energy, capacity, and T&D rates.

Q. PLEASE EXPLAIN THE FINDINGS OF THIS ANALYSIS.

A. Detailed findings can be found in Petitioner's Exhibit 1-B (CCG). A summary is in Table 1 below. All three tests resulted in a positive net benefit for the portfolio of programs. Note that, costs and benefits of commercial public, multi-unit dwelling, and workplace segments within the commercial program were not included in the PCT and TRC tests as they do not appropriately represent the incentive's benefits.

TABLE 1. Summary of Cost Effectiveness Test Results

TEST	BENEFIT	COST	NET
RIM	$7,663,316	($7,573,686)	$89,630
PCT	$19,129,875	($18,532,048)	$597,827
TRC	$16,953,606	($16,911,989)	$41,617

Q. PLEASE EXPLAIN WHY THE PCT AND TRC COST EFFECTIVENESS TESTS ARE NOT AN EXACT FIT FOR THIS ET PROGRAM?

A. These common energy efficiency tests were utilized as the best available option to look at the costs and benefits with the proposed programs. However, it should be noted that these tests are not designed to evaluate EV charger specific programs. For example, the PCT analysis is not meaningful for the three commercial segments that do not require an EV purchase (public level 2, multi-unit dwelling, and workplace) because participants would see costs associated with the charger hardware and higher utility bills, but none of the benefits associated with reduced fuel, maintenance, and any vehicle tax credits. Therefore, we included these programs in the RIM tests, but not in the PTC and TRC results.

Q. PLEASE EXPLAIN WHY DUKE ENERGY INDIANA'S PROPOSED ET PROGRAM WILL BENEFIT ALL CUSTOMERS, DESPITE THE FACT THAT INDIVIDUAL CUSTOMER PARTICIPATION WILL BE LIMITED.

A. Designing the entire ET Program to have net benefits to all customers is important. In fact, the Company used the RIM test results to guide changes in incentive levels for participants while balancing overall Program benefits to all non-participating customers. As calculated in the RIM analysis shown in Table 1, nearly $90,000 of net benefits to all customers are anticipated from the limited participation in this ET Program. Overall ET Program net benefits were achieved with the combination of larger incentive quantities for the residential and commercial incentives with a positive net benefit and still offering important programs with more limited incentive quantities that have less positive net benefits like the Electric School Bus program.

Currently there are 5,000 light duty EVs registered in Duke Energy Indiana's service territory. The RIM analysis indicates that each residential participant drives a net benefit of $734 per vehicle after program incentive costs over a ten-year period. Applied to Duke Energy Indiana's current base of 5,000 residential light-duty EVs, this represents a $3.67M net benefit over ten years. As of August 2021, the Company forecasts that 82,000 light-duty EVs will be registered in Duke Energy Indiana's service territory by 2030. If the net benefit of $734 per vehicle is applied to the forecasted 82,000 vehicles, a $60M net benefit would be realized. The data received from these proposed programs will allow the Company to further refine per vehicle benefits using Duke Energy Indiana's specific load curves and EV charging behaviors, as well as lessons learned from what incentive structures are most successful. Increased EV

adoption in Indiana is the pathway to realize these benefits. Duke Energy Indiana believes it has an opportunity and obligation to help all customers achieve these potential benefits associated with higher EV adoption by investing in programs that deploy electric vehicle infrastructure and EV load management methods in the near term.

IV. RESIDENTIAL EV CHARGING INCENTIVE PROGRAM

Q. PLEASE EXPLAIN THE RESIDENTIAL EV CHARGING INCENTIVE PROGRAM.

A. The purpose of the Residential EV Charging Incentive Program is to collect EV charging behavior information, understand potential grid and utility impacts from EV charging, and investigate technological capabilities for managing residential EV-charging loads. The Residential EV Charging Incentive Program is designed to evaluate three different utility-offered incentives to encourage residential customer EV adoption and home charging without requiring the customer to install a new meter and service. The Company will provide ongoing quarterly participation payments ($50/quarter over two years totaling $400) for up to 500 residential customers, or approximately ten (10) percent of all registered EVs in Duke Energy Indiana, to test various incentive methods for home charging. The Company will not pay an upfront incentive to participants under this program. These methods will test a residential customer's willingness to react to utility signals on when to charge their EVs but will not affect other energy usage

patterns in the home. Customers will be randomly assigned (unless otherwise requested) to one of three method groups:

1. Baseline charging, where customers charge however needed without any price signals or messaging from the Company. This group receives the incentive regardless of charging times.
2. Off-Peak Credit of $0.05/kWh for charging between 9PM-6AM. Capped at $16.67 per month.
3. Peak Avoidance Credit of up to $16.67 per month (adding up to $200/year/customer) for charging outside of 6AM-9PM on weekdays only. Two opt-outs per month allowed.

Q. WHAT FEEDBACK WAS RECEIVED DURING THE COLLABORATIVE PROCESS THAT IMPACTED THIS PROGRAM?

A. Collaborative participants voiced concerns around allowing for unlimited EVSE choice with standard basic safety features, as well as industry certifications for hardware and software interoperability for networked chargers. Some stakeholders asked for flexibility to assign participants who prefer a specific charging incentive group to their randomly assigned group. Lastly, concerns were voiced regarding how the Company would handle solar net metering customer eligibility with residential EV charging. All of these concerns have been addressed in this proposal.

Q. WHO WILL BE ELIGIBLE FOR THE RESIDENTIAL EV CHARGING INCENTIVE PROGRAM?

A. Upon Commission approval of the Residential EV Charging Incentive Program, up to 500 total participants will be considered on a first-come, first-served basis. Customers will be eligible for only one incentive per residence. Eligible customers must own, lease, or otherwise operate on a regular basis, one or more plug-in EVs per installation. A plug-in vehicle includes plug-in hybrids ("PHEV") and battery electric vehicles ("BEV"). Customers must demonstrate the purchase and installation of their choice of level 2 EVSE at their residence. A level 2 EVSE is required to ensure a depleted electric vehicle battery is capable of being charged overnight. Participants must also charge at their residence at least one time per week on average throughout the month. Usage will be billed under the applicable residential schedule and other riders, if applicable, for the billing demand and kilowatt-hours registered or computed by or from Duke Energy Indiana's metering facilities during the current month.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE RESIDENTIAL EV CHARGING INCENTIVE PROGRAM?

A. Duke Energy Indiana intends to gather the following information: baseline EV charging data without incentives to charge off-peak; the proportion of EV charging that was incentivized to be off-peak; and the number of customer on-peak charging events. These data points will help establish Duke Energy Indiana-specific load curves for EV customers. Additionally, the Company will be looking for locations where multiple EVs are charging via the same transformer in

a neighborhood, to further understand impacts on the distribution system. Duke Energy Indiana expects to learn the following from the Residential EV Charging Incentive Program:

- Participant statistics and amount ($) of load management incentives issued
- Cost of residential EVSE hardware and installation
- Proportion of PHEV vs. BEV operated by Duke Energy Indiana customers
- Amount and timing of electricity consumption for residential EV charging (managed and non-managed)
- Patterns of electricity consumption associated with different models and types of EVs
- System impacts of residential EV charging, such as residential transformers with more than one EV charging and other notable grid impacts
- Managed charging data – established load curves for various participant groups
- Updated cost effectiveness test values
- What outreach efforts were most successful
- Effectiveness of the data collection technology platform used
- Customer satisfaction survey results
- Unforeseen Customer EV charging behaviors

Q. PLEASE DESCRIBE THE PROGRAM ADMINISTRATIVE COSTS.

A. Various technology options are available to collect charging behaviors without requiring the participant to install a new metered service. Duke Energy Indiana expects these technologies to be priced around $200 per year per customer, or $400 for a two-year program per customer.

V. COMMERCIAL EV CHARGING INCENTIVE PROGRAM

Q. PLEASE EXPLAIN THE COMMERCIAL EV CHARGING INCENTIVE PROGRAM.

A. The purpose of this program is to support installation of 1,200 EVSE incentives, including charging stations, for any public or private entity, apartment dwelling units, government, or workplace fleet operators to support EV adoption, collect utilization characteristics of EV charging-behavior for a variety of EV types and weight-classes, and better understand potential grid and utility impacts of this EV charging market segment. Upon acceptance of customer's application and verification of proper installation of all EVSE behind a separate meter, the customer will receive a one-time $500 incentive per EVSE. This program shall end after twenty-four (24) months following the initial effective date of the program, unless renewed or extended by the Company. Ten percent of all incentives (120/1,200) will be located in low-income areas as defined by the 200% level of United States Health and Human Services Poverty Guidelines for 2021.[1]

[1] HHS Poverty Guidelines for 2021 found via | ASPE (hhs.gov) on 8-23-2021

Q. WHAT FEEDBACK WAS RECEIVED DURING THE COLLABORATIVE PROCESS THAT IMPACTED THIS PROGRAM?

A. Collaborative participants voiced concerns around defining low-income guidelines and participant eligibility, as well as ensuring the incentive amount was exclusive of and incremental to any potential revenue credits applied to grid upgrades. Another suggestion from the collaborative was that all EVSE installations be networked, but it was decided not to require this as it increases customer hardware costs and limits customer EVSE choice, and also provides an uncertain and challenging path to collect program data from various networks.

Q. WHO WILL BE ELIGIBLE FOR THE COMMERCIAL EV CHARGING INCENTIVE PROGRAM?

A. Applications will be considered on a first-come, first-served basis. The Commercial EV Charging Incentive program will be available for up to 1,200 total Level 2 EVSE incentives during the program term. A minimum of 4 EVSE incentives is required per location, with a single customer limited to 20 EVSE incentives, regardless of their number of locations. Customer locations must receive electric service from the Company. EVSE incentives have been allocated to the following segments: 600 locations publicly accessible around the clock including, but not limited to parks, downtown parking, and businesses open to the public, and other general public parking locations; 200 public or private workplace locations; 200 multi-unit dwelling locations; and 200 private fleet locations. These allocations may be modified to provide program flexibility.

Private Fleet customers must own, lease, or otherwise operate on a regular basis, one or more plug-in electric vehicles per installed EVSE. Plug-in vehicles include both PHEVs and BEVs. Customers may select any eligible, available commercial rate, including time of use rates. Any usage will be billed thereunder with other applicable riders, for the Billing Demand and kilowatt-hours registered or computed by or from Company's metering facilities during the current month.

Q. WILL PARTICIPANTS BE SUBJECT TO ADDITIONAL TERMS AND CONDITIONS?

A. Yes. Participants must request new service to separately meter all EVSE funded by this incentive. The customer's charging station(s) must be installed on customer's side of a new Company meter. The incentive is incremental to any revenue credit given. These additional terms and conditions allow for unlimited customer choice of EVSE and mean that a networked charging station is not required.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE COMMERCIAL EV CHARGING INCENTIVE PROGRAM.

A. Duke Energy Indiana expects to learn the following from the Commercial EV Charging Incentive Program:

- Participant statistics and amount of incentives issued
- Establish load curves for various segments
- Whether 10% of incentives were fulfilled for low-income areas

- Rate summary, including time of use rates, and charging behaviors
- Data regarding the geographic diversity of charging locations
- Amount and timing of electricity consumption for commercial EV charging
- What percentage of installed stations are networked
- System impacts of commercial EV charging
- Customer satisfaction survey results
- Unforeseen customer EV charging behaviors

VI. ELECTRIC SCHOOL BUS PROGRAM

Q. PLEASE EXPLAIN DUKE ENERGY INDIANA'S PROPOSED ELECTRIC SCHOOL BUS PROGRAM.

A. The purpose of the EV School Bus program is to support procurement of EV school buses and associated charging infrastructure by public school transportation systems. This program will be the first of its kind in Indiana to explore the benefits and challenges associated with bi-directional power flow from EV School Bus batteries back to the distribution grid. Duke Energy Indiana is proposing to fund up to $197,000 per bus, which will include the installation of Company-owned EVSE (estimated at $85,000) and with remaining funds (estimated at $112,000) to assist the school in purchasing the EV School Bus. The $112,000 is expected to offset approximately thirty (30) percent of the cost of a new EV School Bus. The proposed program will be limited to six (6) electric school buses.

Duke Energy Indiana will install and retain ownership of the bi-directional EVSE, while the participating school corporation will be responsible for proper operation and maintenance of the charging station according to manufacturer guidelines (and the EVSEs will likely remain under warranty during the term of the ET Program). Duke Energy Indiana will establish and maintain charging station network connectivity for load control capabilities during the full 24-month Program. The school corporation will own the EV School Bus. At the conclusion of the program, Duke Energy Indiana will retain ownership rights to the EV School Bus battery and may remove and repurpose it at the end of the buses' useful life (as determined by the school).

Q. WHAT FEEDBACK WAS RECEIVED DURING THE COLLABORATIVE PROCESS THAT IMPACTED THIS PROGRAM?

A. Collaborative participants voiced interest in learning more about bi-directional power dispatching from the electric buses' battery back to the grid. Participants wanted to know more about what financial benefits were possible for the school and all ratepayers relative to the cost of each school bus incentive. The group discussed details on how the Company was to perform bi-directional events with the customer. Concerns with how low-income school customers could participate were addressed.

Q. WHO WILL BE ELIGIBLE FOR THE ELECTRIC SCHOOL BUS PROGRAM?

A. The proposed program will be available, on a first-come, first-served basis, to customers operating public school transportation systems in Duke Energy Indiana's electric service territory. However, at least half of the incentives shall be initially allocated to schools with over 30% of students on free or reduced lunches according to the USDA's Community Eligibility Provision data. Duke Energy Indiana reserves the right to select participants to ensure the broadest set of data for Indiana.

Q. WILL PARTICIPANTS BE SUBJECT TO ADDITIONAL TERMS AND CONDITIONS?

A. Yes. Participants must utilize one or more EV School Buses and provide transportation services to a public school system. Overall, incentives will be available for six (6) buses, with no more than two (2) buses per school system. Participants must grant Duke Energy Indiana access to all vehicle charging data throughout the program term and allow implementation of load management capabilities to reduce charging speeds, up to and including full curtailment and bi-directional power flow, provided such control activities do not impact the necessary duty cycle of the EV School Bus. Prior to participation under this program, the school corporation and Duke Energy Indiana will execute an Electric Vehicle School Bus Supply Equipment Site Agreement to establish the terms and conditions of EVSE and EV School Bus installation and ownership.

Q. WHAT IS MEANT BY BI-DIRECTIONAL FAST CHARGING?

A. Bi-directional charging allows not only for an EV battery to be charged as per typical operation, but for that battery to also discharge back to the electric system via interconnection. Currently there are an estimated 11,000 school buses in Duke Energy Indiana's territory, with only four (4) all-electric versions in use. This represents a large potential energy storage source, with limited usage data. A standard all-electric school bus has a battery capacity of around 200 kWh, with discharging capabilities around 50kW. If one percent (110 buses) of all school buses in Duke Energy Indiana's service territory were electric, the aggregated capacity would be around 5.5 MW. This program will study various benefits and challenges associated with mobile battery storage from the customer and Company perspectives and help develop the value-added foundation for more bi-directional bus installations across the state of Indiana.

The Company is currently installing a bi-directional fast charger to serve one of the electric buses in Duke Energy Indiana's service territory as a research opportunity. This project has already uncovered and helped resolve challenges related to deploying this new technology. However, this site will only provide discharge capacity at one location with only one bus. With the proposed program, the Company will be able to test several different locations and various aggregated discharge capacities across the Duke Energy Indiana service territory.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE ELECTRIC SCHOOL BUS PROGRAM?

A. Duke Energy Indiana expects to learn the following from the EV School Bus Program:

- Amount of energy used by a EV School Bus
- Electricity consumption and customer charging behavior
- Average load curves
- System impacts of EV School Bus charging and discharging
- Capability for bi-directional power events
- EV School Bus reliability statistics
- Impacts of various EV School Bus applications, such as geographic route differences and weather
- Customer and student experience information
- Amount of charging performed off-peak
- Number of bi-directional events were performed each year
- Impact of the program on EV school bus purchases
- Fuel and maintenance savings
- Emissions reductions
- Distance buses were able to transport students

Q. PLEASE DESCRIBE THE PROGRAM ADMINISTRATIVE COSTS.

A. For the duration of the term, Duke Energy Indiana will cover network and preventative service fees necessary to perform bi-directional power dispatching events. The Company expects these fees to be around $6,500 per year, or $13,000 for a two-year program per incentive.

VII. ELECTRIC TRANSIT VEHICLE PROGRAM

Q. PLEASE EXPLAIN THE ELECTRIC TRANSIT VEHICLE PROGRAM.

A. The purpose of the Electric Transit Vehicle program is to collect transit vehicle utilization data and other load characteristics and incentivize electric vehicles used for public transportation ("EV Transit Vehicles"). The Company proposes a $50,000 incentive to offset the cost of EVSE, including charging stations and EV Transit Vehicles. Company-sponsored incentives are available for no more than ten (10) total large transit buses and ten (10) total smaller, shuttle-like vehicles with a passenger capacity of seven (7) or more. Customers shall be responsible for selection, installation, and proper operation and maintenance of EVSE during the term.

Q. WHAT FEEDBACK WAS RECEIVED DURING THE COLLABORATIVE PROCESS THAT IMPACTED THIS PROGRAM?

A. Collaborative participants voiced support for the many benefits associated with electrified public transportation and for looking into the benefits of overnight, off-peak charging. However, the effectiveness of a $50,000 incentive, especially for the larger transit bus agencies was a concern as well.

Q. WHO WILL BE ELIGIBLE FOR THE ELECTRIC TRANSIT VEHICLE PROGRAM?

A. Participation will be available on a first-come, first-served basis to non-residential customers receiving electric service from Duke Energy Indiana. Participants must operate a commercial transit bus or vehicle system utilizing one or more EV

transit buses or shuttles, including but not limited to, transit agencies, rural transport companies, hospitals, universities, airports, and non-profit/municipal entities.

Q. WILL PARTICIPANTS BE SUBJECT TO ADDITIONAL TERMS AND CONDITIONS?

A. Yes. A participating customer must request a new service with a dedicated meter for the associated EVSE that will be used to recharge the qualifying vehicle. This provides unlimited customer choice of charging stations and the meter also provides the Company access to utilization and charging behavior data. Any usage will be billed under the customer's existing commercial rate or other applicable rate, including time of use rates. Customers are limited to no more than four (4) incentives per transportation system regardless of charging location.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE ELECTRIC TRANSIT VEHICLE PROGRAM.

A. Duke Energy Indiana expects to learn the following from the Electric Transit Vehicle Program:

- Electricity consumption and customer charging behavior for EV Transit Buses and smaller transit vehicles
- Established load curves
- System impacts of EV Transit charging
- Various charging station installation costs

- Customer operational savings associated EV Transit Vehicle deployment
- EV Transit Vehicle reliability statistics
- Customer and passenger experience information
- Impact of program on EV Transit Vehicle purchases
- Fuel and maintenance savings achieved
- Emissions reductions achieved
- Impacts of various EV transit applications, such as geographic route differences and weather
- Amount of charging performed off-peak

VIII. FLEET ADVISORY PROGRAM

Q. PLEASE EXPLAIN THE FLEET ADVISORY PROGRAM.

A. The purpose of the Fleet Advisory Program is to provide a comprehensive analysis for customers operating fleets that are interested in switching those fleets to all-electric. The Company is planning to perform 45 consultations over two years, with each consultation budgeted at $12,000. There are currently very few similar services available to Duke Energy Indiana customers, especially that focusing on local utility-integrated charging strategies. This program will assist customers in the following ways:

- Establishing a customer roadmap for fleet electrification
- Selecting appropriate vehicles and evaluating total cost of ownership
- Performing existing site capacity studies for potential charging needs

- Planning support for charging infrastructure – near, mid, and long term
- Providing OEM vehicle and hardware insights
- Providing an opportunity to educate customers on the other incentives available under this ET Program
- Assisting customer in procurement and commissioning stages

Q. WHAT FEEDBACK WAS RECEIVED DURING THE COLLABORATIVE PROCESS THAT IMPACTED THIS PROGRAM?

A. Collaborative participants voiced concerns around this program being offered by Duke Energy Indiana. The Company explained how this comprehensive service is not readily available to Duke Energy Indiana customers. Customers looking to convert have both many questions and many options to consider in making such a decision.

Q. WHO WILL BE ELIGIBLE FOR THE FLEET ADVISORY PROGRAM?

A. Participation will be available on a first-come, first-served basis to non-residential customers receiving electric service from Duke Energy Indiana. Participants must operate a commercial vehicle fleet, including but not limited to, transit agencies, logistical companies, municipal fleets, rural transport companies, hospitals, universities, airports, and non-profit entities.

Q. WILL PARTICIPANTS BE SUBJECT TO ADDITIONAL TERMS AND CONDITIONS?

A. No. The Fleet Advisory program is informational by nature, and the customer is not obligated to purchase an electric vehicle or charging infrastructure.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE FLEET ADVISORY PROGRAM.

A. Duke Energy Indiana expects to learn the following from the Fleet Advisory Program:

- Various result summaries from different customer consultations
- Costs and benefits of incremental load with given customer profiles
- Potential opportunities and benefits of charging management
- Potential operational savings from fuel and maintenance cost reductions
- Number of customers that converted their fleets to EV
- Number of participants that also utilized additional ET Program incentives
- Reasons provided by customers not converting their fleets to EV
- Total vehicles deployed as a result of consultations
- Customer experience with Fleet Advisory and electrification process
- Track deployment of different types of vehicles and market development of available product segments
- Identify fast charging gaps in state for fleet use

IX. EDUCATION AND OUTREACH

Q. PLEASE EXPLAIN THE EDUCATION AND OUTREACH PROGRAM.

A. The purpose of the Education and Outreach program is to ensure the components and benefits of each proposed program will be effectively communicated to Duke Energy Indiana customers. Various communication channels will be utilized to do this such as websites, emails, newsletters, small and medium business

outreach, social and streaming audio platforms, and other helpful channels. Successes and lessons learned from other Duke Energy EV programs outside of Duke Energy Indiana will be utilized to efficiently target this outreach. Dealership education and outreach will be a major focus of this program to pursue successful customer EV experiences. This program will also continue the collaborative meeting schedule with stakeholders to provide feedback on program status, successes, and challenges.

Q. PLEASE DESCRIBE WHAT DUKE ENERGY INDIANA PROPOSES TO LEARN FROM THE EDUCATION AND OUTREACH PROGRAM.

A. Duke Energy Indiana expects to learn the following from the Education and Outreach Program:

- What outreach programs were most effective at reaching customers
- What caused customers to back out, or not continue with program enrollment
- Customer experience and feedback for each program to understand what was done well and what can be improved
- Where applicable, how many customers ultimately decided to purchase an EV or EV charging station
- Additional feedback from the collaborative

X. RATES AND CUSTOMER PROTECTIONS

Q. WHAT TYPES OF CONSUMER PROTECTIONS DOES DUKE ENERGY INDIANA PROPOSE TO BUILD INTO ITS PROGRAMS?

A. The Company has multiple consumer protections in place. First, the proposal is limited in time. The ET Program will cease after two years, at which time Duke Energy Indiana may propose to extend certain program elements based on data gathered during the ET Program and the state of the EV and EVSE marketplace at that time. Second, the ET Program is limited in scope with specific goals for each program. Each program is limited to the number of participants necessary to generate the data necessary to inform Duke Energy Indiana on customer EV behaviors. Finally, the ET Program is limited in costs. The Company's proposal for cost recovery is capped at $4.3 million, which is comprised of approximately $0.510 million of capital spend and approximately $3.790million of O&M spend. The ET program has a total cost of about half of that initially proposed. Duke Energy Indiana witness Ms. Suzanne E. Sieferman discusses the ratemaking proposal for these costs in her direct testimony.

One hundred and eighty days after the conclusion of the ET Program, Duke Energy Indiana will file a report within this proceeding sharing the information gathered and conclusions reached. Before or after the ET Program concludes, the Company may also seek approval of newly developed EV-related customer offerings or continuation of the components of the ET Program.

XI. ET PROGRAM COSTS

Q. WHAT ARE THE PROJECTED COSTS OF THE ET PROGRAM?

A. The overall projected cost for the ET Program is $4,300,000. Additional detail is shown in Table 2 below:

TABLE 2. Overall Projected ET Program Cost

Annual Program Budgets		YEAR 1	YEAR 2	Program Totals
Residential L2	Capital	$ -	$ -	$ -
	O&M	$ 200,000	$ 200,000	$ 400,000
School Bus & Infrastructure	Capital	$ 510,000	$ -	$ 510,000
	O&M	$ 711,000	$ 39,000	$ 750,000
Transit	Capital	$ -	$ -	$ -
	O&M	$ 500,000	$ 500,000	$ 1,000,000
Commercial L2	Capital	$ -	$ -	$ -
	O&M	$ 300,000	$ 300,000	$ 600,000
Fleet Advisory	Capital	$ -	$ -	$ -
	O&M	$ 270,000	$ 270,000	$ 540,000
Education, Outreach, G&A	O&M	$ 250,250	$ 249,750	$ 500,000
Annual Totals		**YEAR 1**	**YEAR 2**	**Overall Total**
	Capital	$ 510,000	$ -	$ 510,000
	O&M	$ 2,231,250	$ 1,558,750	$ 3,790,000
				$ 4,300,000

Q. HOW DO THE COSTS OF THE ET PROGRAM BREAKDOWN BETWEEN THE VARIOUS ET PROGRAM COMPONENTS?

A. Table 2 above shows the breakdown of costs between programs. In general, the costs for each program are evenly split over two years with the exception of the Electric School Bus program, which budgets all six buses and chargers deployed in the first year to gather adequate data in year two of the program. The Residential and School Bus programs include additional costs associated with network data collection.

Q. HOW DID THE COMPANY DETERMINE THE LEVEL OF SPENDING NECESSARY TO ACHIEVE ITS GOALS?

A. The Company determined incentive and participant quantity levels by studying the existing EV market in Duke Energy Indiana, as well as considering feedback from stakeholders during the collaborative process. Furthermore, the Company performed a cost-benefit analysis using the RIM test as discussed above.

XII. PAST DUKE ENERGY EV PROJECTS

Q. HAS DUKE ENERGY INDIANA CONDUCTED EV PROJECTS IN THE PAST?

A. Yes. Duke Energy Indiana participated in Project Plug-IN from 2010 through 2013. Project Plug-IN was an EV charging station project where the Company contracted for the installation of charging stations and provided up to $1,000 toward installation fees to 85 residential customers who bought or leased an EV in the Company's service area. The Company also installed 45 commercial charging stations at no cost to the site host.

By the conclusion of the project, the Company was able to analyze and begin to understand the distribution impact and potential ways to mitigate impacts of EVs; the technical capabilities that charging stations offer to help mitigate potential impacts; and when, where, how long, and how often a customer charges their EV. Additionally, when asked about their EV, 80 percent felt strongly they saved money in fuel costs. However, only 32 percent of participants used their EV to travel distances greater than 100 miles.

Q. WHAT HAS CHANGED SINCE 2013 IN THE EV MARKET?

A. In 2013, there were approximately 1,100 light-duty residential plug-in electric vehicles registered in Indiana between 14 different models. At the time when the Company was developing the original EV Pilot filing, November 2018, there were 6,160 registered in Indiana. Fast forward to the end of Q1 2021, there were over 5,000 registered EVs in Duke Energy Indiana alone with 12,189 registered across the state between 74 different models. With current trends, Duke Energy is forecasting that 82,000 light-duty EVs could be registered within Duke Energy Indiana's service territory by 2030. With EV adoption climbing, the time is now to ensure multiple types of charging technologies for EVs are integrated safely, reliably, and cost-effectively.

Q. HAS DUKE ENERGY PROPOSED EV PROGRAMS IN OTHER JURISDICTIONS?

A. Yes. Duke Energy has approved EV programs in Duke Energy Carolinas and Duke Energy Progress in North Carolina[2] and South Carolina.[3] Additionally, Duke Energy subsidiaries implemented smaller programs in other jurisdictions between 2012-2014.

Q. HAVE STATE COMMISSIONS IN OTHER JURISDICTIONS APPROVED DUKE ENERGY'S PROPOSALS?

A. Yes. Duke Energy Carolinas and Duke Energy Progress have approved proposals from the North Carolina Utilities Commission in Docket Nos. E-2, Sub 1197 and

[2] North Carolina Utilities Commission Docket Nos. E-2, Sub 1197 and E-7, Sub 1195
[3] South Carolina Public Service Commission Docket Nos. 2018-321-E and 2018-322-E

E-7, Sub 1195, and from the South Carolina Public Service Commission in Docket Nos. 2018-321-E and 2018-322-E.

Q. ARE YOU AWARE OF EV PROPOSALS IN OTHER JURISDICTIONS?

A. Yes. Over $1 billion of utility EV programs has been approved in the US since 2010. Consumers Energy in Michigan has proposed PowerMiDrive, a three year pilot program that will provide rebates of up to $5,000 to install up to 200 Level 2 public chargers, as well as incentives of up to $70,000 for up to 24 DC Fast-Charging stations. Maryland's four electric utilities combined to propose a statewide electric vehicle portfolio consisting of residential, non-residential, and public charging solutions. Many of these solutions included utility ownership of EVSE.

On May 14, 2019, Indiana Michigan Power Company ("I&M") submitted a proposal for a three year, $2.1M pilot plan in Indiana to provide rebate incentives for residential, commercial, and industrial customers who own and install level 2 EV charging stations. I&M also calculated overall net benefits of $534 per vehicle over 10 years for participants of the program, which provides a comparison to the benefits Duke Energy Indiana projects for its customers. I&M also proposed a customer education and awareness program to help make customers aware of their pilot program.[4]

[4] Indiana Michigan Power Company. Pre-filed Verified Direct Testimony of Jeffrey W. Lehman. Cause No. 45235. Found at: https://www.in.gov/oucc/2926.htm

Q. WERE THOSE PROPOSALS APPROVED BY THE RESPECTIVE STATE COMMISSIONS?

A. On January 9, 2019, the Michigan Public Service Commission issued an order approving Consumers Energy Company's request for a three-year pilot program to invest in EV charging infrastructure.[5]

On January 15, 2019, the Maryland Public Service Commission granted BGE, Potomac Electric Power Co., Delmarva Power, and Potomac Edison Co. authority to move forward with a modified, five-year pilot program of residential, workplace and public charging stations.[6]

On March 11, 2020, the Indiana Utility Regulatory Commission approved Indiana Michigan Power Company's proposed $2.1M, three-year program to study residential and commercial EV charging applications to better advance knowledge of EV charging on the distribution grid.

Q. HAVE YOU PROVIDED THE FOLLOWING INFORMATION AS RECOMMENDED BY THE IURC IN ITS RECENT GENERAL ADMINISTRATIVE ORDER (GAO 2020-05)?

[5] *In the Matter of the Application of Consumers Energy Company for Authority to Increase Its Rates for the Generation and Distribution of Electricity and for Other Relief, Order*, Case No. U-20134, Mich. Pub. Serv. Comm'n., issued Jan. 9, 2019, *available at* https://www.michigan.gov/mpsc/0,4639,7-159-16400_17280-487034--,00.html .

[6] *In the Matter of the Petition of the Electric Vehicle Work Group for Implementation of a Statewide Electric Vehicle Portfolio, Order No. 88997*, Pub. Serv. Comm'n. of Md., issued Jan. 14, 2019, *available at* https://www.psc.state.md.us/wp-content/uploads/Order-No.-88997-Case-No.-9478-EV-Portfolio-Order.pdf.

A. Yes. The Commission recently enacted General Administrative Order 2020-05 which provides guidance for utilities filing programs like this. Specifically, in Section V it provides :

> The following shall apply to applications for approval of pilot programs: A pilot program means a limited experiment designed to evaluate the costs and benefits of the program. Applications for approval of pilot programs should show the costs of programs and describe the benefits to both participants and non-participants. Applications for pilot programs shall:
>
> A. Fully describe the need and goals of the program;
> B. Propose and design objective evaluation criteria to measure the success or usefulness of the pilot program;
> C. Provide an estimate of all the costs of the pilot program;
> D. Allow for reasonable flexibility;
> E. Propose a timeline for completion and termination of the pilot program; and
> F. Include testimony regarding why the program is in the public interest, including how participants, non-participants, and/or the general public may be affected.

My testimony provides this information.

XIII. CONCLUSION

Q. WERE PETITIONER'S EXHIBITS 1-A (CCG) AND 1-B (CCG) PREPARED OR ASSEMBLED BY YOU OR UNDER YOUR SUPERVISION?

A. Yes, they were.

Q. DOES THIS CONCLUDE YOUR PREFILED DIRECT TESTIMONY?

A. Yes, it does.

PETITIONER'S EXHIBIT 1-A (CCG)
IURC Cause No. 45616

Line No.	Residential	Commercial	EV School Bus	EV Transit	Fleet Advisory	Education and Outreach
1	Participant statistics and amount ($) of load management incentives issued	Participant statistics and amount of incentives issued	Amount of energy used by a EV School Bus	Electricity consumption and customer charging behavior for EV Transit Buses and smaller transit vehicles	Various result summaries from different customer consultations	What outreach programs were most effective at reaching customers
2	Cost of residential EVSE hardware and installation	Establish load curves for various segments	Electricity consumption and customer charging behavior	Established load curves	Costs and benefits of incremental load with given customer profiles	What caused customers to back out, or not continue with program enrollment
3	Proportion of PHEV vs. BEV operated by Duke Energy Indiana customers	Whether 10% of incentives were fulfilled for low-income areas	Average load curves	System impacts of EV Transit charging	Potential opportunities and benefits of charging management.	Customer experience and feedback for each program to understand what was done well and what can be improved
4	Amount and timing of electricity consumption for residential EV charging (managed and non-managed)	Rate summary, including time of use rates, and charging behaviors	System impacts of EV School Bus charging and discharging	Various charging station installation costs	Potential operational savings from fuel and maintenance cost reductions.	Where applicable, how many customers ultimately decided to purchase an EV or EV charging station
5	Patterns of electricity consumption associated with different models and types of EVs	Data regarding the geographic diversity of charging locations	Capability for bi-directional power events	Customer operational savings associated EV Transit Vehicle deployment	Number of customers that converted their fleets to EV	Additional feedback from the collaborative
6	System impacts of residential EV charging, such as residential transformers with more than one EV charging and other notable grid impacts.	Amount and timing of electricity consumption for commercial EV charging	EV School Bus reliability statistics	EV Transit Vehicle reliability statistics	Number of participants that also utilized additional ET Program incentives	
7	Managed charging data – established load curves for various participant groups	What percentage of installed stations are networked	Impacts of various EV School Bus applications, such as geographic route differences and weather	Customer and passenger experience information	Reasons provided by customers not converting their fleets to EV	
8	Updated cost effectiveness test values	System impacts of commercial EV charging	Customer and student experience information	Impact of program on EV Transit Vehicle purchases		
9	What outreach efforts were most successful	Customer satisfaction survey results	Amount of charging performed off-peak	Fuel and maintenance savings achieved		
10	Effectiveness of the data collection technology platform used	Unforeseen customer EV charging behaviors	Number of bi-directional events were performed each year	Emissions reductions achieved		
11	Customer satisfaction survey results		Impact of the program on EV school bus purchases	Impacts of various EV transit applications, such as geographic route differences and weather		
12	Unforeseen Customer EV charging behaviors		Fuel and maintenance savings	Amount of charging performed off-peak		
13			Emissions reductions			
14			Distance buses were able to transport students			

Total Cost-Effectiveness Results

	Number of Participants	166.7	166.7	166.7	200	200	600	200	6	10	10	9	1735
Rate Impact Measure Test													
		RESIDENTIAL			Commercial - Fleet L2	Commercial - MUD L2	Commercial - Public L2	Commercial - Workplace L2	School Bus	Transit - Full Bus	Transit -Shuttle Bus - 7 Passenger	Fleet Advisory	Total
		Tesla Model Y	*Chevy Bolt*	*Chrysler Pacifica PHEV*	*Chevy Bolt*	*Chevy Bolt*	*Chevy Bolt*	*Chevy Bolt*	*Major Brand*	*Major Brand*	*Major Brand*	*Major Brand*	
	Benefits (NPV $)												
Life-time	**Increased Utility Revenue**	$379,706	$413,209	$702,456	$1,508,401	$630,174	$1,890,522	$630,174	$129,013	$685,786	$147,444	$132,700	$7,249,585
Life-time	**V2G Value**	$0	$0	$0	$0	$0	$0	$0	$413,731	$0	$0	$0	$413,731
	Total Benefits	$379,706	$413,209	$702,456	$1,508,401	$630,174	$1,890,522	$630,174	$542,745	$685,786	$147,444	$132,700	$7,663,316
	Costs (NPV $)												
Life-time	**Increased Supply-Side Costs**	$184,967	$201,288	$342,189	$973,188	$343,908	$1,187,776	$473,346	$36,990	$344,098	$73,981	$43,956	$4,205,686
One-time	**Utility Program Costs**	$66,667	$66,667	$66,667	$0	$0	$0	$0	$78,000	$0	$0	$0	$278,000
One-time	**Participant Incentive**	$66,667	$66,667	$66,667	$100,000	$100,000	$300,000	$100,000	$1,182,000	$500,000	$500,000	$108,000	$3,090,000
	Total Costs	$318,300	$334,621	$475,522	$1,073,188	$443,908	$1,487,776	$573,346	$1,296,990	$844,098	$573,981	$151,956	$7,573,686
	RIM B/C Ratio	**1.193**	**1.235**	**1.477**	**1.406**	**1.420**	**1.271**	**1.099**	**0.418**	**0.812**	**0.257**	**0.873**	**1.012**
	RIM Net Benefits	$61,406	$78,589	$226,934	$435,213	$186,266	$402,746	$56,828	($754,245)	($158,312)	($426,537)	($19,256)	**$89,630**
	Average RIM Net Benefit per participant	$734			$901				($125,708)	($29,242)		($2,140)	

Participant Cost Test										
		RESIDENTIAL			Commercial - Fleet L2	School Bus	Transit - Full Bus	Transit -Shuttle Bus - 7 Passenger	Fleet Advisory	Total
		Tesla Model Y	*Chevy Bolt*	*Chrysler Pacifica PHEV*	*Chevy Bolt*	*Major Brand*	*Major Brand*	*Major Brand*	*Major Brand*	
	Benefits (NPV $)									
One-time	**Federal Tax Credit**	$0	$0	$1,250,000	$0	$0	$1,900,000	$0	$0	$3,150,000
One-time	**Participant Incentive**	$66,667	$66,667	$66,667	$100,000	$1,182,000	$500,000	$500,000	$108,000	$2,590,000
Life-time	**Decreased Gasoline Costs**	$1,129,218	$941,015	$1,129,218	$3,011,249	$265,721	$674,847	$404,908	$364,417	$7,920,595
Life-time	**Decreased Maintenance Costs**	$497,892	$497,892	$248,946	$896,205	$510,184	$971,780	$971,780	$874,602	$5,469,280
	Total Benefits	$1,693,777	$1,505,574	$2,694,831	$4,007,454	$1,957,905	$4,046,627	$1,876,688	$1,347,019	$19,129,875
	Costs (NPV $)									
One-time	**Incremental EV Cost**	$833,333	$1,600,000	$1,100,000	$1,920,000	$1,320,000	$3,500,000	$400,000	$360,000	$11,033,333
One-time	**EVSE Hardware and Installation**	$250,000	$250,000	$250,000	$400,000	$510,000	$600,000	$600,000	$540,000	$3,400,000
Life-time	**Increased Utility Bill**	$379,706	$413,209	$702,456	$1,508,401	$129,013	$685,786	$147,444	$132,700	$4,098,715
	Total Costs	$1,463,039	$2,263,209	$2,052,456	$3,828,401	$1,959,013	$4,785,786	$1,147,444	$1,032,700	$18,532,048
	PCT B/C Ratio	**1.158**	**0.665**	**1.313**	**1.047**	**0.999**	**0.846**	**1.636**	**1.304**	**1.032**
	PCT Net Benefits	$230,738	($757,636)	$642,375	$179,054	($1,108)	($739,159)	$729,244	$314,320	$597,827

Total Resource Cost Test										
		RESIDENTIAL			Commercial - Fleet L2	School Bus	Transit - Full Bus	Transit -Shuttle Bus - 7 Passenger	Fleet Advisory	Total
		Tesla Model Y	*Chevy Bolt*	*Chrysler Pacifica PHEV*	*Chevy Bolt*	*Major Brand*	*Major Brand*	*Major Brand*	*Major Brand*	
	Benefits (NPV $)									
Life-time	**V2G Value**	$0	$0	$0	$0	$413,731	$0	$0	$0	$413,731
One-time	**Federal Tax Credit**	$0	$0	$1,250,000	$0	$0	$1,900,000	$0	$0	$3,150,000
Life-time	**Decreased Gasoline Costs**	$1,129,218	$941,015	$1,129,218	$3,011,249	$265,721	$674,847	$404,908	$364,417	$7,920,595
Life-time	**Decreased Maintenance Costs**	$497,892	$497,892	$248,946	$896,205	$510,184	$971,780	$971,780	$874,602	$5,469,280
	Total Benefits	$1,627,110	$1,438,907	$2,628,164	$3,907,454	$1,189,637	$3,546,627	$1,376,688	$1,239,019	$16,953,606
	Costs (NPV $)									
One-time	**Incremental EV Cost**	$833,333	$1,600,000	$1,100,000	$1,920,000	$1,320,000	$3,500,000	$400,000	$360,000	$11,033,333
One-time	**EVSE Hardware and Installation**	$250,000	$250,000	$250,000	$400,000	$510,000	$600,000	$600,000	$540,000	$3,400,000
Life-time	**Increased Supply-Side Costs**	$184,967	$201,288	$342,189	$973,188	$36,990	$344,098	$73,981	$43,956	$2,200,656
One-time	**Utility Program Costs**	$66,667	$66,667	$66,667	$0	$78,000	$0	$0	$0	$278,000
	Total Costs	$1,334,967	$2,117,954	$1,758,855	$3,293,188	$1,944,990	$4,444,098	$1,073,981	$943,956	$16,911,989
	TRC B/C Ratio	**1.219**	**0.679**	**1.494**	**1.187**	**0.612**	**0.798**	**1.282**	**1.313**	**1.002**
	TRC Net Benefits	$292,143	($679,047)	$869,309	$614,266	($755,353)	($897,471)	$302,707	$295,063	$41,617

Note that costs and benefits of commercial public, multi-unit dwelling, and workplace segments within the commercial program were not included in the PCT and TRC tests as they do not appropriately represent the incentive's benefits.

VERIFICATION

I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: _____ Dated: September 23, 2021

Cormack C. Gordon