> # Summary of 60-Day Notice: Electric Vehicle Load Detection and Disaggregation Pilot

The following 60-Day Notice summarizes Public Service Company of Colorado's ("Public Service" or "the Company") action to update stakeholders of the Company's development of the Electric Vehicle ("EV") Load Disaggregation Pilot ("Pilot") within the Company's 2021-2023 Transportation Electrification Plan ("TEP"). This 60-Day Notice is issued in compliance with Decision No. C21-0017 in Proceeding No. 20A-0204E and consistent with the provisions of the Commission-approved Unanimous Comprehensive Settlement Agreement in Proceeding No. 21A-0279E.

A copy of this notice will be available on the Company's website at:
www.xcelenergy.com/company/rates_and_regulations/filings/transportation_electrification_plan

EV Load Disaggregation Pilot

Consistent with the Colorado Public Utilities Commission-approved Partnerships, Research, and Innovation ("PRI") portfolio of the Company's 2021-2023 TEP, the Company proposes to implement its EV Load Disaggregation Pilot, which is to be entirely funded through the Commission-approved PRI budget.[1]

The purpose of the EV Load Disaggregation Pilot is to enable the Company to perform load disaggregation on Advanced Meters for the purpose of using disaggregation analytics to identify EV charging. The disaggregation to be performed is limited to the detection and disaggregation of EV load only. Information from this load disaggregation research activity will be used to support marketing and grid planning efforts, as identified in the approved TEP; however, the Company will not directly market to customers in this research pilot.

Through this 60-Day Notice, Public Service is providing a description of the Pilot, the considerations made to develop the Pilot, developing an application process for participants, and the metrics that Public Service will report on and provide to stakeholders through its semi-annual TEP reports. To inform this proposal, the Company has hosted individual and group stakeholder meetings to collect input and gain insights to collectively inform this project's draft pilot designs. The Pilot is a study of the ability to detect EVs using automated methods through the distribution grid and associated enabling hardware and software. These automated methods disaggregate the EV load under various scenarios. The objective is to gain insights about grid operations, impacts, and benefits from the detection and presence of EV load.

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[1] *See* Unanimous Comprehensive Settlement Agreement, I.D.1.a.1., filed in Proceeding No. 21A-0279E. (Footnotes 1 and 2 omitted)

> ## EV Load Detection and Disaggregation Pilot

A.   Pilot Description, Goals, Roles, and Key Outcomes

Description

The Pilot is a study of the grid and customer benefits and impacts of automatically detecting EVs at customer premises, and then disaggregating the EV specific charging load at the premise. Specifically, the Company will be testing the capability of the new Advanced Meter's Distributed Intelligence ("DI") processing, which allows for the detection and disaggregation of EV load. As agreed in the Settlement Agreement in Proceeding No. 21A-0279E, the Company will enroll customers to electively opt-in to the pilot[2], at which point their meters would upload the required EV Detection DI solution. Once enabled, this solution would identify whether the customer was charging an EV at the premise, and provide additional details to the Company including but not limited to the EV's load impact on the system, the EV load compared to other system loads, time of load impact, etc. With this information, the Company will both analyze and report on this detail for the purposes of grid planning and operations through a variety of reporting solutions.

The results of this study will then be used by the Company to gain additional insight into individual feeder resiliency and reliability given the presence of added EV load from the feeder to the customer premise. Information gathered as a result of this Pilot is expected to inform grid planning and asset health evaluation, which will assist in efforts to prepare the distribution grid for an increasing level of EV adoption in the Company's service territory.

The results of the Pilot will inform the Company's grid planning for EVs as follows:

- Understanding the optimal approach for automating the detection of EV charging at the premise level;
- Identifying the optimal data sources for EV detection (e.g., DI, etc.);
- Determining what data points from detection and disaggregation can inform both grid planning, grid optimization, and customer programs;
- Informing the development of scalable and efficient tools for grid planning and capital investment optimization;
- Validating and being able to model impacts of automated EV detection vs. current customer self-identification of EV possession and use on the grid;
- Analyzing diverse grid-impacted locations and scenarios to determine risk factors;
- Developing tools to address remaining gaps in the residential (and other) EV charging planning processes;
- Developing typical EV load curves based on automated detection and disaggregation for planning purposes based on the data; and
- Potentially improving upon and issuing new construction standards for electric transformers, secondaries, and services.

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[2] Provided that the pilot participants (i.e., customers) provide their consent to do so and disaggregation is limited to the detection and disaggregation of electric vehicle ("EV") load and not other load types.

Goals

The Pilot will assist the Company in:

- Enabling greater visibility to EV charging loads at the transformer level on the distribution system, which complements reliability objectives in the Residential Resiliency and Managed Charging Project;
- Enabling greater visibility to EV Charger locations, charging activities (i.e., managed charging) and the benefits of DI deployment; and
- Informing business process modifications, using DI data, to improve ways Distribution can manage the grid with growing EV adoption, from a planning and reliability perspective.

Participant Roles and Responsibilities

The following table provides an overview of the expected roles and responsibilities of program participants.

Participant	Role
Xcel Energy	Will facilitate the Pilot and lead the process to engage and recruit participants. Coordinates among vendors, partners and participants to ensure that the tools developed are done so in a manner that aligns to Pilot goals. Reports to stakeholders, regulators and other interested parties on the merits and outcomes of the Pilot and demonstrates the value of the tools and approaches being developed.
Known EV Owners and potential adopters (known as "EV Curious") (the number of participants is to be determined)	Opt-in to the Pilot. Participate in the Pilot in a "test" capacity to help inform the viability of the Pilot's approach, and tools being developed.
Disaggregation Vendor	Co-develops the detection and disaggregation tools necessary to produce a minimum viable product to meet the intended Pilot deliverable needs and outcomes.
Measure and Verification Vendor	Independently validates research and performance outcomes of the Pilot's tools and reported data outputs.

Outcomes

The Pilot intends to:

1. Demonstrate automated EV detection and load disaggregation;
2. Contribute to the development of grid planning tools; and
3. Provide validation of the effectiveness of the solutions produced.

B. **Estimated Costs, Benefits, Value to Customers**

Table 1: Xcel Energy Pilot Spend Assumptions

Cost Category	Average Estimate
Capital Costs	
Solution design and organizational change management	$525,000
Disaggregation Solution Xcel Energy Software Development	$750,000
Disaggregation Solution 3rd party Software Development	$200,000
Grid-facing Tools Development	$150,000
O&M Expenses	
Software Maintenance and Upgrades	$150,000
Measurement and Verification	$25,000
Pilot Management	$150,000
Customer Service	$50,000
Estimated Total Pilot Cost	**$2.00 million**[3]

Benefits

The Pilot intends to deliver these benefits:

- Allowing internal distribution operations to see the precise location of an EV charger on the system so that the Company can adapt work practices to reflect the presence of that load on the system, leading to enhanced and more resilient system planning;

- Allowing distribution operations stakeholders to understand load characteristics of transformers with EV charging activity to more proactively plan, design, and manage the distribution system in more balanced and increasingly equitable ways for both current EV adopters, future EV adopters, and non-adopters alike;

- Allowing proactive response to increasingly challenging grid constraints with more EV (and distributed generation) loads at customer premise, neighborhood, and broader community levels; and

- Enabling review of more granular distribution feeder data and EV load data by Company load research personnel to better inform data-driven business decisions.

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[3] The DI and this associated "EV Load Detection and Disaggregation" Pilot work being proposed through the Partnerships, Research and Innovation ("PRI") program of the Company's 2021-2023 Transportation Electrification Plan is a subset of a larger body of associated AGIS related DI development efforts.

C.   Education and Outreach

Key insights about the Pilot will be made public by Public Service for utilization throughout the industry to assist other utilities in making grid investment decisions in support of EV adoption and growth. Those insights will also be made available in a way to communicate with customers and others who may be non-technical information consumers, policy makers, regulators, and stakeholders as appropriate and necessary.

D.   Application, Process, and Scoring

Recruitment

To enroll customers in the Pilot, the Company will first identify potential participants based on the following criteria: current EV ownership status, Advanced Metering Infrastructure ("AMI") installation status, and email address availability. All three criteria must be met for a customer to be considered for this Pilot. The Company will also focus on income qualified ("IQ") participants, disproportionately impacted communities ("DIC") and those in high emissions communities ("HEC") to ensure an equity focus for the Pilot where possible. Outreach will begin for these customers with an introductory email explaining the potential benefits to participants whether they are current EV owners or not. A web landing page will provide prospective participants with additional details about what they might expect once enrolled.

Application process

Interested customers will continue by completing a short questionnaire around their current EV adoption and interest level, followed by a description of what to expect during the course of the Pilot, and how their data will be used and protected by the Company. Once these terms have been reviewed, interested customers will submit their application for the Company's review.

Enrollment

To confirm eligibility, the Company will verify the availability of an AMI meter as well as work to ensure adequate representation among customer segments including commercial and residential customers, and again those in IQ, DIC, and HEC. Upon approval, customers will receive a confirmation email that will outline what to expect with the Pilot. This will also trigger the process to initiate the EV Detection application to the meter at the customer's premise. Enrollments will be accepted on an ongoing basis, and the Company anticipates enrolling a minimum of 200 customers in the Pilot, which will conclude at the end of 2023 along with the current 2021-2023 TEP.

E.   Reporting, Measurement, and Evaluation

Reporting on the Pilot's progress will be conducted through the semi-annul TEP reporting process. The Company will report on the following aspects of the Pilot, to the extent data is available and utilizing existing reporting tools/systems:

- Pilot costs
- Number of participants in the Pilot
- Participant EV charging start and stop times
- Participant EV charging load, both kW and kWh
- Satisfaction with the Pilot (examples could include - ease of enrollment, understanding of the pilot, support/education received from the Company)
- Geographic distribution of the Pilot's participants
- Detecting the EV level of charging speed – i.e. – level 1 (L1), level 2 (L2), possibly level 3 (L3) charging speeds
- Any and all relevant reporting, measurement, and evaluation criteria as required by the CO TEP

F.   Stakeholder Involvement

During the development of the methodology and the identification of the proposed Pilot, the Company engaged numerous stakeholders to gather feedback and refine its approach. The table below summarizes stakeholder involvement:

Table 2: Stakeholder Engagement

Stakeholder Group	Meeting Date(s)
Amended AGIS Settlement Negotiations	2/9/2022 -2/15/2022
Amended AGIS Settlement Reached	2/15/22
Transportation Electrification Plan Stakeholder Group[4]	3/25/2022

Stakeholders were receptive to the proposed Pilot, and it was recognized in the Amended AGIS Settlement, which authorizes the Company to perform load disaggregation for the purpose of the Pilot.

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[4] The TEP Stakeholder Group includes dozens of organizations spanning Colorado state government agencies, Colorado municipalities, environmental advocates, energy efficiency and electrification groups, other utilities, EV charging hardware and software providers, automobile manufacturers and dealerships, community groups, and many others.

The Amended AGIS Settlement states:

> "EV Load Disaggregation Pilot" – consistent with the Partnerships, Research, and Innovation ("PRI") portfolio of the Company's Commission-approved 2021-2023 Transportation Electrification Plan ("TEP"), the Settling Parties agree that the Company may perform load disaggregation on the Advanced Meter for the purpose of the research pilot contemplated in the TEP, provided that the pilot participants (i.e., customers) provide their consent to do so and disaggregation is limited to the detection and disaggregation of electric vehicle ("EV") load and not other load types. The Company will implement the EV Load Disaggregation Pilot through the 60/90-day notice process approved in the TEP, and all PRI requirements established by the Commission in the TEP (e.g., reporting requirements, 30 percent budgeted for income qualified and/or disproportionately impacted communities) shall apply. The Company will identify the project scope in its Distribution System Plan filing, to be filed by May 1, 2022 (see Section VI(B)(2)). Nothing in this Settlement Agreement limits Staff's ability to file a Notice of Deficiency in the 60/90-day notice process, as approved by the Commission in the TEP. The EV Load Disaggregation Pilot shall be entirely funded through the Commission-approved PRI budget. Information from this load disaggregation research activity will be used to support marketing and grid planning efforts, as identified in the approved TEP; however, the Company will not directly market to customers in this research pilot.[5]

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[5] *See* Unanimous Comprehensive Settlement Agreement, I.D.1.a.1., filed in Proceeding No. 21A-0279E. (Footnotes 1 and 2 omitted).