March 11, 2024

The Honorable Chair and Members of the
Hawai‘i Public Utilities Commission
465 South King Street, First Floor
Kekuanaoa Building
Honolulu, Hawai‘i 96813

Dear Commissioners:

Subject: Docket No. 2022-0212 – Instituting a Proceeding Relating to an Innovative Pilot Process for the Hawaiian Electric Companies
Hawaiian Electric Companies' Annual Pilot Update Report

In accordance with Decision and Order No. 37507 ("D&O 37507"), issued on December 23, 2020 in Docket No. 2018-0088, the Hawaiian Electric Companies[1] respectfully submit their Annual Pilot Update Report.[2,3] This Annual Pilot Update Report covers the following pilot projects for which the Companies filed applications in the following dockets:

- eBus Make-Ready Infrastructure Pilot, Docket No. 2020-0098
- Charge Ready Hawai‘i Pilot, Docket No. 2020-0202
- Schedule EV-J and EV-P Tariff Pilot, Docket No. 2020-0152
- Data Analytics Clearinghouse Pilot, Docket No. 2022-0212
- EV Telematics Pilot, Docket No. 2022-0212

Very truly yours,

/s/ Dean K. Matsuura

Dean K. Matsuura
Director, Regulatory Rate Proceedings

Enclosures

[1] The "Hawaiian Electric Companies" or "Companies" collectively refers to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai‘i Electric Light Company, Inc.

[2] *See* D&O 37507 at 175-176, 218, and 222. In D&O 37507, the Commission stated: "At this time, the Commission is considering opening a docket to serve as a repository for Pilot Process-related filings, such as the Workplan, Notices, and Pilot Updates, as well as to address Pilot Process-related disputes, similar in operation to Docket No. 2017-0352." D&O 37507 at 175, n.186 (emphasis added). In Order No. 38092, issued on November 30, 2021, in Docket No. 2018-0088, at 4, the Commission stated that: "Following approval of the Pilot Workplan, the Commission will open a new docket to serve as a repository for pilot process-related filings." (Emphasis added.) On October 20, 2022, the Commission issued Order No. 38663, opening the repository Docket No. 2022-0212. Accordingly, the Companies are filing the Annual Pilot Update in this docket.

[3] The Companies are submitting this Pilot Update report in advance of the March 31 deadline in order to allow the Commission and the Consumer Advocate additional time to review prior to the filing of the Companies' Spring Revenue Report.

Hawaiian Electric Companies' Annual Pilot Update

I. Introduction

In accordance with Decision and Order No. 37507 ("D&O 37507"),[1] the Hawaiian Electric Companies[2] respectfully submit this annual Pilot Update covering the following pilot projects that were active during calendar year 2023.

This Pilot Update also complies with the following decisions and orders, as applicable:

D&O # or Order #	Description	Date Issued	Docket No.
D&O 37769	Approving eBus Make-Ready Infrastructure Pilot Project (referred to as "Charge Up eBus Pilot" or eBus Pilot") Application[3]	5/7/2021	2020-0098
Order 37865	Approving the Hawaiian Electric Companies' Pilot Process[4]	7/9/2021	2018-0088
D&O 38157	Approving Schedule EV-J and Schedule EV-P Tariffs on a Pilot Basis ("EV Tariff Pilot")[5]	12/30/2021	2020-0152
D&O 38194	Approving Charge Ready Hawai'i Pilot Project (referred to as "Charge Up Commercial Pilot") Application[6]	1/24/2022	2020-0202
D&O 38753	Approving Data Analytics Clearinghouse Pilot ("Clearinghouse Pilot")[7]	12/8/2022	2022-0212
D&O 39099	Approving EV Telematics Pilot (also referred to as the "Smart Charge Hawaii Pilot")[8]	3/22/2023	2022-0212

The Companies are submitting this Pilot Update Report in advance of the March 31 deadline to allow additional time for the Commission and the Consumer Advocate to review the report prior to the filing of the Companies' 2024 Spring Revenue Report.

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[1] *See* D&O 37507 at 175-176, 218, 222.
[2] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc. ("Hawaiian Electric"), Maui Electric Company, Limited ("Maui Electric"), and Hawai'i Electric Light Company, Inc. ("Hawai'i Electric Light").
[3] *See* D&O 37769 at 38 and 40-41.
[4] *See also* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.
[5] *See* D&O 38157 at 41 and 45, n.99.
[6] *See* D&O 38194 at 50-51, n.186.
[7] *See* D&O 38753, at 19-20.
[8] D&O 39099 did not specify additional reporting requirements.

II. In-Flight Pilot Status

In total, there were five pilots active during calendar year 2023. A detailed report for each of the five pilots is attached hereto as follows:

Att. #	Pilot Description
1	eBus Make-Ready Infrastructure Pilot (referred to as "Charge Up eBus Pilot" or "eBus Pilot")
2	Charge Ready Hawai'i Pilot (referred to as "Charge Up Commercial Pilot")
3	Schedule EV-J and EV-P Tariff Pilot ("EV Tariff Pilot")
4	Data Analytics Clearinghouse Pilot ("Clearinghouse Pilot")
5	EV Telematics Pilot (also referred to as the "Smart Charge Hawaii Pilot")

The following highlights key items from Attachments 1-5.

Charge Up eBus Pilot

In 2023, the Companies received approval to extend the original pilot implementation schedule from May 7, 2024 to December 31, 2025.[9] This adjustment to the schedule addressed the impact of delays applicants experienced in procuring buses, as well as the time needed to collect charging data. Discussions with active Charge Up eBus Pilot applicants continued throughout 2023 in an effort to reach agreement on the terms and conditions of the Participation Agreement. One customer executed an agreement in December 2023, and discussions are ongoing with a second applicant. Although the overall pilot end-date is not expected to change, bus arrival and data collection are expected to shift to the second half of 2025.

Charge Up Commercial Pilot

In 2023, the Companies reopened the application portal for the month of December due to low pilot participation. As of December 31, 2023, the Company received 68 complete applications. The Companies are currently reviewing new applications and will select

[9] *See* Order No. 39131, issued on April 11, 2023, in Docket No. 2022-0212, at 4-6.

participants based on several factors, including, but not limited to: (1) basic eligibility requirements; (2) overall complexity and cost of the project; (3) challenges and opportunities associated with each site; and (4) score received on the Charge Up Commercial preliminary scorecard. As of December 31, 2023, the Company has executed 11 Participation Agreements. See Attachment 2, Participants & Metrics.

The Company filed two proposed modifications to the Charge Up Commercial Pilot. On January 10, 2024, in Docket No. 2022-0212, the Company proposed to remove the dedicated metering and Commercial EV rate (i.e., Schedule EV J and Schedule EV P) enrollment requirements for primary-metered customers only to increase eligibility and enable greater participation. On January 25, 2024, in Docket No. 2022-0212, the Company requested an extension to the Charge Up Commercial Pilot, requesting to move the end date to December 31, 2025 to accommodate new applicants. On March 7, 2024, the Commission issued Order No. 40650 approving the removal of the dedicated metering and Commercial EV rate enrollment requirements for primary-metered customers and extended the end date of the pilot to December 31, 2025. See Attachment 2, Pilot Implementation Schedule and Lessons Learned.

EV Tariff Pilot

Following the issuance of D&O 38157 on December 30, 2021, the Schedule EV-J and EV-P rates were opened on March 18, 2022 for enrollment by eligible customers on O‘ahu, Maui, and Hawai‘i Islands. On June 30, 2022, in Transmittal No. 22-02, Maui Electric requested the Commission’s approval to establish Schedule EV-J and EV-P rates for Moloka‘i and Lāna‘i on a pilot basis, and these rates opened for enrollment on August 1, 2022. See Attachment 3, Pilot Implementation Schedule.

Following the launch of Schedules EV-J and EV-P, a concerted outreach and education effort was made to ensure that stakeholders – both internal and external – were aware of the new rates, and aware of how to enroll in them. Specific actions taken in 2023 to improve outreach and education include: (1) tracking all service requests serving EV charging infrastructure to identify those satisfying enrollment criteria, and contacting these customers to propose enrollment; (2) development of an informational document detailing enrollment requirements, suitable installations, and enrollment procedures for Schedules EV-J and EV-P that was distributed to Client Management teams and sent to prospective enrollees; and (3) hosting presentations at a number of industry events. See Attachment 3, Outreach and Education.

Eligible Schedule EV-J and EV-P customers include separately-metered commercial accounts serving EV charging stations with no greater than 5 kW of ancillary load in support of the EV charging infrastructure, and certain requirements described in Attachment 3, Participants & Metrics.

As of the end of the 2023 annual reporting period, one (1) customer account is enrolled under Schedule EV-J, and two (2) customer accounts are enrolled under Schedule EV-P. According to customer survey responses, fifteen (15) charging stations, with a total of fifteen (15) charging ports were enrolled in the EV Tariff Pilot. Steps that the Companies have taken to increase enrollment are described in Attachment 3, Participants & Metrics.

The Companies will continue concerted outreach and education efforts and will report on lessons learned in future annual reports.

Clearinghouse Pilot

The overall Clearinghouse Pilot is essentially on track and the schedule remains consistent with the Notice, reflecting an estimated twenty-four (24) month duration, with

implementation expected to end in May 2024 and Early Life Support expected to end in February 2025. Program increments 2 and 3 were completed in 2023, and program increment 4 started in December 2023. The Clearinghouse access methods have been technically completed including the Clearinghouse Portal, Databricks Collaboration Workspace, and Delta Sharing. Clearinghouse participants began onboarding in February 2024 through guest accounts, with group engagement sessions and utilization of the Clearinghouse Databricks Collaboration Workspace starting at the end of February 2024. The schedule for 2024 and 2025 is subject to potential adjustments based on feedback and requirements from Pilot participants as well as adjustments regarding estimated support and system costs. Pursuant to Order No. 40648, Hawaiian Electric has until August 30, 2024 to request to extend and/or expand the Pilot.[10] See Attachment 4, Pilot Implementation Schedule.

In accordance with D&O 38753, Condition No. 1, at page 19, the Companies provided a preliminary list of use cases in the Pilot Update Report filed on February 29, 2023. Since the last Pilot Update report several use cases have been implemented and are described in Attachment 4, Use Cases.

EV Telematics Pilot

The EV Telematics Pilot was approved in D&O 39099. Upon the pilot's approval by the Commission in March 2023, the Companies began the contracting process with pilot partners, including EV Energy, Hawaiian Airlines, and Ulupono Initiative ("Ulupono"). Following the pilot's approval, the Companies also commenced the pilot set-up phase, which involved coordination with EV Energy on the development of the pilot website and outreach materials,

[10] Order No. 40648, *Granting the Hawaiian Electric Companies' Motion for Enlargement of Time Regarding the Data Analytics Clearinghouse Pilot*, issued on March 7, 2024, in Docket No. 2022-0212.

social media posts, as well as initial outreach via a joint press release with support from external media outlets. Due to limited early sign-ups at launch, the Companies focused on boosting enrollment numbers for the remainder of 2023. Focus group interviews have shifted to occur in 2024. For calendar year 2024, the focus is on the collection, dissemination, and review of charging data. Feedback surveys will be issued to both internal and external stakeholders on a quarterly basis over the course of 2024. See Attachment 5, Pilot Implementation Schedule.

III. Costs and Revenues

D&O 37507 requires the Companies to "submit the annual costs and revenues (if any) associated with any implemented pilot project as part of the Pilot Update, which will be reviewed in the spring of each year as part of the Commission's review of the Companies' Spring Revenue Report."[15]

Below is the breakdown of the annual recorded Pilot Project costs net of revenues as of December 31, 2023 for the five pilot projects active during 2023 included in this annual Pilot Update report.

2023 Pilot Project Costs Net Of Revenue	**Hawaiian Electric**	**Hawai'i Electric Light**	**Maui Electric**	**Total Companies**
Charge Up eBus Pilot	$8,312	$13,935	$7,228	$29,475
Charge Up Commercial Pilot	583,095	74,692	220,572	878,360
EV Tariff Pilot - Schedules EV-J and EV-P Clearinghouse Pilot	1,151,286	246,704	246,704	1,644,694
EV Telematics Pilot	151,253	32,411	32,411	216,075
Pilot Process Cost Recovery – Annual Net Costs	$1,893,946	$367,742	$506,916	$2,768,604
Pilot Process Cost Recovery – Annual Net Costs including revenue taxes	**$2,078,632**	**$403,602**	**$556,347**	**$3,038,581**

Amounts may not add exactly due to rounding.

[15] D&O 37507 at 219.

See each pilot's "Costs & Revenues" section in Attachments 1-5 for a detailed description of pilot costs as well as a discussion of revenues as applicable. The 2023 pilot project costs, net of revenues, will be submitted for Commission review and approval in the Companies' 2024 Spring Revenue Report.[16]

IV. Annual Cap

D&O 37507 established an annual cost recovery cap of $10 million, and each of the pilots count toward the cap under the Pilot Process.[17] Order 37865, in approving the Pilot Process, clarified that the reference to the "deferral of all pilot project costs" should refer to the "total annual expenditures," i.e., the pilot project's cost for that year, rather than the total cost for the entire project.[18] In accordance with Order 37865, the "2023 Pilot Project Costs Net of Revenue" shown in the Section III table above, reflect 2023 calendar year costs, net of revenues. The Companies will continue to track all pilot project costs and related revenues (if any) and report the total annual net expenditures for the portfolio of pilots in each pilot update.

V. Conclusion

The Companies continue to develop pilot projects in accordance with the Innovation Pilot Framework ("IPF") Workplan,[19] for subsequent submittals as Notices of Intent for the Commission's review and approval. The Companies remain committed to working with stakeholders throughout the IPF Implementation Phase and continue to discuss specific pilot

[16] Transmittal No. 24-01, Spring Revenue Report, to be filed by March 29, 2024, at Schedule G.
[17] The Companies may seek to extend or expand a pilot's scope (including potential modifications) by submitting a request to the Commission no later than one year prior to the scheduled termination of the pilot. Requests to proceed with a pilot or annual portfolio of pilots in excess of the $10 million cap must be expressly approved by the Commission. *See* D&O 37507 at 170 and 180.
[18] Order 37865 at 10 (emphasis original).
[19] *See* Order No. 38654, *Approving Hawaiian Electric's Pilot Framework Workplan*, issued on October 19, 2022, in Docket No. 2018-0088.

concepts with stakeholders. The Companies will continue to report on all active pilots in the annual pilot updates in accordance with D&O 37507.[20]

[20] *See* D&O 37507 at 175.

Charge Up eBus
Annual Pilot Update

Introduction

The Hawaiian Electric Companies'[1] Annual Charge Up eBus Pilot Update report is submitted in compliance with: 1) Decision and Order No. 37507 ("D&O 37507") issued on December 23, 2020 in Docket No. 2018-0088, and 2) Decision and Order No. 37769 ("D&O 37769") issued on May 7, 2021 in Docket No. 2020-0098, which approved the eBus Make-Ready Infrastructure Pilot (referred to as the "Charge Up eBus Pilot" or "Pilot"), subject to certain conditions.[2]

D&Os 37507 and 37769 require the Companies to report on:

- Implementation schedules and progress relative to the pilot's objective and key performance metrics;
- Pilot impacts on underserved communities;
- Pilot costs and revenues (if applicable), including cost analysis per subscriber, quantitative and qualitative benefits (for both pilot participants and non-participants), and a Net Present Value ("NPV") analysis;
- Qualitative description of the pilot and customer benefits; and
- Any proposed changes to material aspects of the pilot, such as program pricing, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations (including reason for the cancelation).[3]

D&O 37769 additionally requires the Companies to report on:

1. any costs incurred as a result of the Pilot to upgrade distribution network capacity (as indicated in CA-SIR-1.a); data regarding grid services, to the extent available (response to CA-SIR-2.a); and participant service areas, type of service provided, and intensity and range of eBus use (in number of days per week a participating eBus was used), as provided by Pilot participants;
2. Greenhouse gas ("GHG") emissions specific to the Pilot in the annual report required by Decision and Order No. 36220 in Transmittal No. 18-06, in

[1] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.
[2] *See* D&O 37507 at 175-176, 218, 222 and D&O 37769 at 38, 40-41. Although D&O 37507 requires that the annual Pilot Update be filed by March 31 of each year, the Companies are submitting this report in advance of the deadline to facilitate the Consumer Advocate's and the Commission's review.
[3] *See* D&O 37507 at 175-176 and D&O 37769 at 40-41.

accordance with the annual reporting requirements established for the E-Bus-J and E-Bus-P tariffs.[4]

This report is also filed in accordance with the Pilot Process approved in Order No. 37865 ("Order 37865"), issued on July 9, 2021, in Docket No. 2018-0088. The Pilot Process includes reporting on:

- Challenges and lessons learned, process improvements, a listing of performance relative to all key metrics, and any future permanent implementation plans based on an evaluation against the metrics established; and
- Updates to estimated costs and schedule (e.g., if there were significant delays in receiving signed agreements from government agencies).[5]

The Companies address each of the requirements above, as applicable.[6] This report reflects the work completed in 2023. As a result of delays in executing agreements and customer procurement timelines, certain implementation metrics are not available at this time.

Pilot Objectives

The Companies' application filed on July 10, 2020 in Docket No. 2020-0098 ("Application") outlined a clear purpose and objectives, summarized here:

1. Develop ways for the Companies to support make-ready infrastructure by learning how to streamline workflows, understand resource needs for charging, and track the costs of infrastructure to develop sound cost estimates for future deployment;
2. Enable and accelerate the electrification of bus fleets in the Companies' service territories by understanding customer behaviors and enable customers to transition faster; and
3. Improve renewable energy integration through bus charging on the E-Bus tariff.[7]

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[4] *See* D&O 37769 at 41.
[5] *See* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.
[6] As of 2023, reporting requirements that are not applicable include: NPV analysis, costs to upgrade distribution network capacity, data regarding grid services, participant service areas, type of service provided, intensity and range of eBus use, and GHG emissions specific to the Pilot.
[7] *See* Application at 21-22.

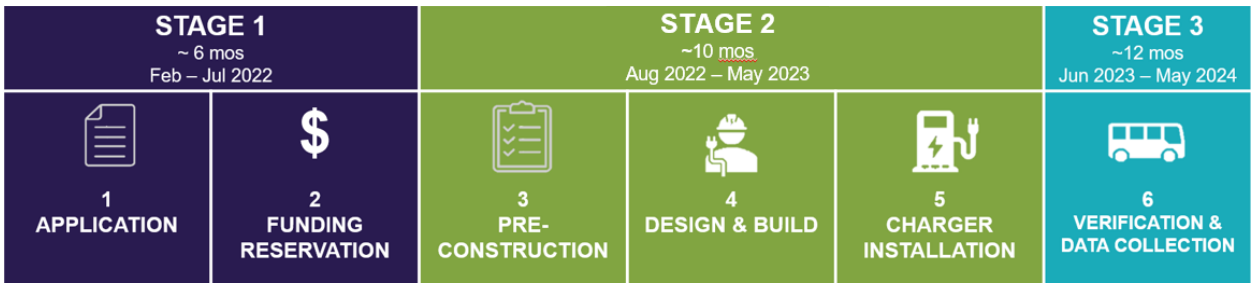
Pilot Implementation Schedule

The Pilot includes three phases:

1) Ramp up, during which the Companies will develop documentation for implementation and solicit customer interest
2) Implementation, during which the Companies will confirm customer eligibility, as well as design, construct, and install make-ready infrastructure; and
3) Data collection to support the final report.

Implementation and data collection are reflected as three stages in the customer journey shown in Figure 1.

FIGURE 1. CUSTOMER JOURNEY



Due to external factors, the customer journey required a longer implementation schedule than anticipated. This learning process is in alignment with the Pilot objective to enable and accelerate the electrification of bus fleets in the Companies' service territories by understanding customer behaviors as it illuminates a greater understanding of implementation risks. Underlying challenges include:

- Funding and procurement timelines that do not align with the Pilot schedule
- Complex/lengthy customer and landowner approval requirements & processes
- Complex/lengthy permit process
- Supply chain constraints

Stage 1: Application and Funding Reservation

The ramp-up phase concluded after the Commission and Consumer Advocate's 30-day review ended on February 6, 2022. However, unforeseen delays extended the time to complete Stage 1 of the Customer Journey from six months to approximately 20 months for one customer. Discussions are ongoing with another applicant. External factors contributing to the delays included:

- Review of Participation Agreement and Landowner Approval: Some bus operators do not own their land and therefore need approval from internal stakeholders as well as their landowner to execute Participation Agreements. Applicants required additional time for internal stakeholder review, discussions to address concerns, and final approval of the agreement. Personnel changes within the applicant's organization also required time and attention to support the transition, engagement, and alignment on the Pilot scope and terms and conditions.
- Procurement Delay: Applicants that are government entities must follow government administered procurement processes for bus and charging equipment. Although funding was secured, applicants experienced unanticipated delays in procurement timelines. In 2022, a request for proposal ("RFP") for eBus and charging equipment was delayed until the end of the year. In 2023, a bid protest further delayed awarding the RFP by nearly two months.
- Bus and Charging Equipment Verification: Due to delays in procurement processes, the Companies could not validate whether the electric buses and charging equipment met the Pilot requirements, nor develop details for the infrastructure design. These details are still outstanding for one of the applicants.

Stage 2: Preconstruction, Design & Construction, Charger Installation

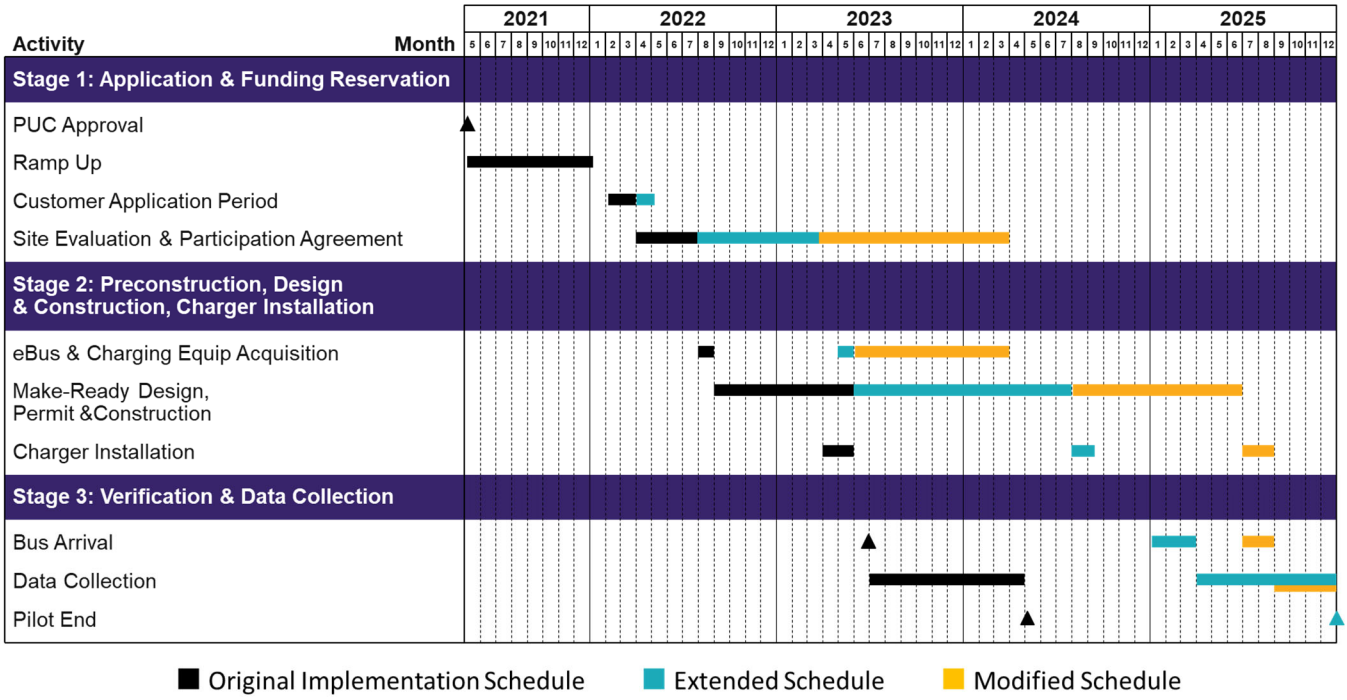
The extended period for Stage 1 impacted the start of Stage 2 preconstruction, design and construction of the make-ready infrastructure. These delays may be further exacerbated by permit review delays.

Stage 3: Verification & Data Collection

Verification and data collection will begin as soon as the eBuses begin charging. Due to delays in Stage 1 (Application and Funding Reservation) and increased demand for electric buses nationwide, applicants currently estimate buses arriving in 2025, more than 18 months after placing an order. As a result, the start of Stage 3 (Verification and Data Collection) is expected to shift to the second half of 2025. The light blue bars in Figure 2 reflect the Commission-approved revised schedule,[8] which extends the Pilot through the end of 2025. The yellow bars reflect a modified schedule based on the delays experienced in 2023. The anticipated Pilot end date remains December 2025.

[8] *See* Order No. 39131, issued on April 11, 2023, in Docket No. 2022-0212, at 4-6.

FIGURE 2. IMPLEMENTATION SCHEDULE



Participants & Metrics

Eligible participants for the Charge Up eBus Pilot include bus operators with plans to purchase at least one Class 5-8 bus on O‘ahu, Maui, and Hawai‘i Island. Thus far, one Maui applicant executed a participation agreement, one O‘ahu applicant withdrew in 2022, and discussions with one Hawai‘i Island applicant are ongoing. A new Hawai‘i Island application received in January 2024 is being evaluated. Figure 3 summarizes applicant metrics.

FIGURE 3. APPLICANT METRICS

	#
Applications Received	4
Site Evaluations Completed	3
Applications Withdrawn/Denied	1
Current Applicants	3

O‘ahu	0
Hawai‘i Island	2
Maui	1
Anticipated Number of Charging Ports Served by Make-Ready Infrastructure	7-8
Anticipated Number of Electric Buses Served by Make-Ready Infrastructure	9
Participation Agreements Executed	1
Make-Ready Designs Finalized	0
Make-Ready Sites Under Construction	0
Make-Ready Sites Complete	0
Total Participants Enrolled	**0**

Costs & Revenues

In accordance with the Pilot Process approved by the Commission in Order 37865, innovation pilot project costs are treated as deferred costs and recovered the following year, subject to the Commission’s review of the annual spring revenue report.[9] During calendar year 2023, the Companies incurred actual Pilot expenses totaling $29,475. Expenses were low relative to prior years due to the ongoing delays described above. Construction and material costs, which are expected to be the largest cost drivers, have not yet been incurred. Figure 4 reflects the allocation of annual expenses by island.

FIGURE 4. ANNUAL COSTS BY ISLAND ($)

	O‘ahu	Hawai‘i Island	Maui County	Total
2021	$43,339	$26,003	$17,336	$ 86,678
2022	$86,848	$55,296	$40,868	$183,012
2023	$ 8,312	$13,935	$ 7,228	$ 29,475

[9] *See* Order 37865 at 8-11.

During 2023, the Companies incurred $27,025 for incremental internal labor to support program management and applicant engagement. Consistent with the budget proposed in Docket No. 2020-0098, labor expenses for general program management activities were split 50% O‘ahu, 30% Hawai‘i Island, and 20% Maui based on estimated Pilot participation. Labor expenses to directly engage and support active applicants on Maui and Hawai‘i Island were also allocated to those islands. In addition, $2,450 in outside service expenses were incurred on Hawai‘i Island to conduct a site visit and validate a conceptual layout. Due to ongoing delays in executing the Participation Agreement, the hours the Product Manager expensed to Charge Up eBus were less than a full-time employee. This provided flexibility to leverage this resource to support other eBus-related work not directly associated with implementing this Pilot, and to provide continuity for the Charge Up Commercial Pilot through a staff vacancy.

All internal labor resources included in the deferred Pilot expenses directly support the implementation of the Pilot and are incremental expenses not recovered through a prior rate case. This includes internal resources that typically charge to capital projects as well as new positions specific to the implementation of the Pilot. In 2023, internal labor resources included the Charge Up eBus Product Manager and Contract Manager, which directly support the implementation of the Pilot. The Charge Up eBus Product Manager and Contract Manager positions were established to support the overall implementation of the Pilot. These positions were not included in a prior rate case and the prior positions were backfilled. Other internal labor resources included labor hours from engineers to support the evaluation of applicants, and the labor expenses only include hours that the internal engineers specifically worked on the Pilot. The Pilot labor expenses only include direct labor and direct overheads (i.e., payroll taxes, employee benefits and non-productive wages) supporting implementation of the Pilot.

In 2023, no make-ready infrastructure or charging equipment was installed. In the absence of electric buses and charging equipment, no revenue from charging sessions was collected in 2023. Revenues will be reported once the charging equipment is energized and charging equipment is in use.

Benefits & Impact to Underserved Communities

The Pilot continues to fill a need by reducing costs for charging infrastructure. Accelerating the electrification of the bus sector will result in broader ongoing benefits to all customers. eBus charging during the day facilitates greater use of renewable energy and reduces the use of diesel overall, helping the State achieve carbon emission reduction goals. Furthermore, the reduction in tailpipe emissions benefits riders, drivers, and communities that the buses operate in. Transit and school bus services in particular serve a wide range of communities, bringing clean transportation options to those that may otherwise be impacted by poor air quality conditions due to their proximity to high-traffic roadways or industrial zones.

The Charge Up Commercial Pilot program defined underserved communities in its Final Program Design Report ("Charge Up Commercial Final Program Design Report") filed on September 23, 2022, in Docket No. 2020-0202. These communities are based on census tracts that meet at least two of the following criteria:

1. High participation of LIHEAP (Low Income Home Energy Assistance Program)
2. More than six percent (6%) of energy burden
3. High level (+20 Tonnes) of annual GHG Emissions from household vehicles per acre per census tract

4. Identified as "underserved" based on the Climate and Economic Justice Screening Tool[10]

The participating Maui bus facility lies in a census tract that meets one of the criteria stated above. Additionally, this bus operator serves communities that meet two of the criteria in Kahului and Wailuku.

In addition, GHG emission analyses continue to be included in the annual report required by Decision and Order No. 36220 ("D&O 36220") in Transmittal No. 18-06, in accordance with the annual reporting requirements established for the E-Bus-J and E-Bus-P tariffs.[11] The annual report filed in Transmittal No. 18-06 includes existing customers on the E-Bus-J rate, which was available prior to the approval of the Charge Up eBus Pilot.

Customer Experience

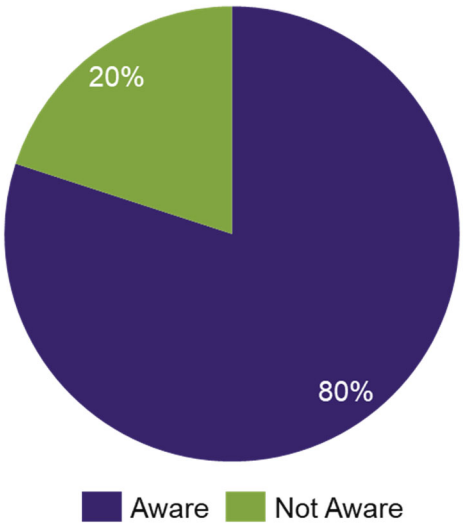
In January 2024, the Companies issued a survey to bus operators to gain insights on the Charge Up eBus Pilot and future plans. The survey was sent to 12 bus operators and the Companies received ten responses. Figure 5-Figure 7 summarize the responses.

- **Are you aware of the Charge Up eBus Pilot?**

  Two respondents indicated that they were unaware of the Pilot, highlighting opportunities to engage new points of contact.

[10] *See* Charge Up Commercial Final Program Design Report, at 14-16.
[11] *See* D&O 36220, Ordering Paragraph 3.D(11), at 42.

FIGURE 5. PILOT PROGRAM AWARENESS

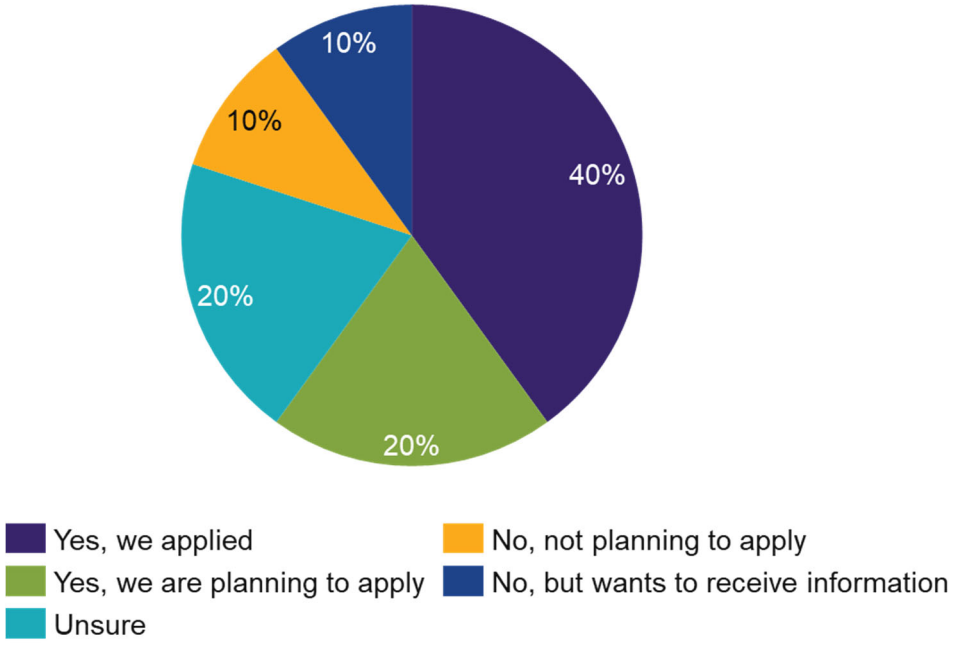


- **Is your organization planning to apply for the Charge Up eBus Pilot?**

  Responses indicated that 30% were unsure or not planning to apply to the Pilot. Varied reasons included:

  - Pilot schedule and scope do not align with organization's plans
  - Will not be acquiring an eligible Class 5-8 eBus
  - Will not be installing eligible networked charging equipment
  - Do not have an existing Schedule J or P electric service
  - E-Bus or Commercial EV rates are not a good fit for operations

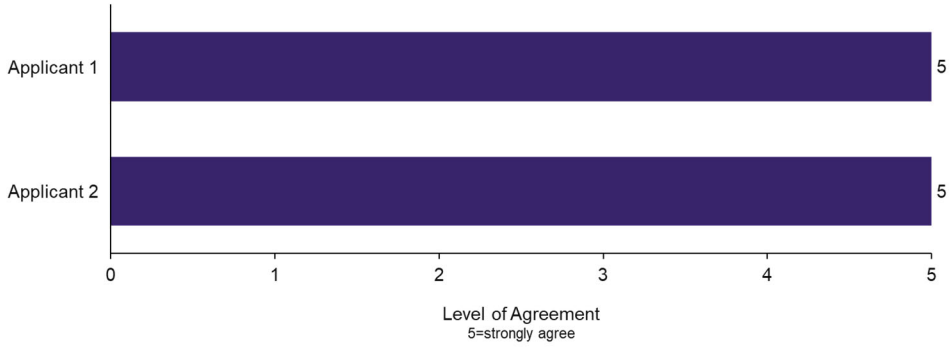
FIGURE 6. PLANS TO APPLY FOR CHARGE UP EBUS



- **I would recommend the Charge Up eBus Pilot to others**

Active applicants in 2023 indicated their level of agreement with the statement, "I would recommend the Charge Up eBus Pilot to others." Responses shown in Figure 7 are based on a 1-5 scale, with 5 indicating strong agreement.

FIGURE 7. WOULD PARTICIPANT RECOMMEND CHARGE UP EBUS



Lessons Learned

Ongoing engagement with bus operators throughout Stage 1 provided insights supporting the second objective of the Pilot, helping the Companies better understand customer needs and challenges.

Key observations in 2023 included:

- **Fewer than expected applicants:** While bus operators continue to express interest in the Pilot program, the program did not receive new applicants in 2023. Feedback from the January 2024 survey highlight several barriers to eBus adoption, including the high cost of electric buses and charging infrastructure, complexity of installing and managing charging infrastructure, limited vehicle battery range, and impact to operations. Fleet conversion continues to lag overall electric vehicle adoption in Hawai‘i as the Companies have also observed few commercial fleet applicants in the Charge Up Commercial Pilot.
- **Implementation schedule delays:** The challenges described in the Pilot Implementation Schedule section above exemplify the complexity and time

applicants need to secure their necessary internal approvals to execute the Participation Agreement.

Proposed Changes

The Companies do not have any proposed changes to the Pilot at this time; however, the Companies remain committed to transparency and will continue to discuss the status of the Pilot and lessons learned, and update stakeholders accordingly in the quarterly stakeholder meetings, annual Pilot Update, and additional Pilot filings.

Charge Up Commercial
Annual Pilot Update

Introduction

The Hawaiian Electric Companies[1] hereby submit their annual Charge Up Commercial Pilot Update Report in compliance with: 1) Decision and Order No. 37507 ("D&O 37507") issued on December 23, 2020, in Docket No. 2018-0088; and 2) Decision and Order No. 38194 ("D&O 38194") issued on January 24, 2022, which approved the Commercial Make-Ready Infrastructure Pilot ("Charge Up Commercial Pilot" or "Pilot"), subject to certain conditions.[2]

D&Os 37507 and 38194 require the Companies to report on:

- Implementation schedules and progress relative to the pilot's objective and key performance metrics;
- Pilot impacts on underserved communities;
- Pilot costs and revenues (if applicable), including cost analysis per subscriber, quantitative and qualitative benefits (for both pilot participants and non-participants), and a Net Present Value ("NPV") analysis;
- Qualitative description of the pilot and customer benefits; and
- Any proposed changes to material aspects of the pilot, such as program pricing, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations (including reason for the cancelation).[3]

D&O 38194 additionally requires the Companies to report on:

- Actual costs of the pilot, to include any costs that were previously unidentified, but were found to be necessary for pilot Implementation, with an explanation as to whether those costs were likely anomalies or would be expected to be necessary in future iterations of the program;
- Lessons learned from project deployment, including ways to improve Pilot economics and efficiencies and reduce costs, as part of a potential program expansion;
- Discussion of the interrelations of the progression of any decisions made in response to the Companies' application to commit funds in excess of $2,500,000 for the Public Electric Vehicle Charger Expansion Project, for example, the recovery of capital and

[1] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.
[2] *See* D&O 37507 at 175-176, 218, 222 and D&O 38194 at 46-47. Although D&O 37507 requires that the annual Pilot Update be filed by March 31 of each year, the Companies are submitting this report in advance of the deadline to facilitate the Consumer Advocate's and the Commission's review.
[3] *See* D&O 37507 at 175-176 and D&O 37769 at 40-41.

operations and maintenance expense costs through the exceptional project recovery mechanism, filed in Docket No. 20210173;

- An analysis of charger utilization and the feasibility of developing a minimum usage and or managed charging condition in the Pilot's final report; and[4]
- A completed plan that details how the Companies will make the 10 years of post-Pilot data collection from Pilot participants' chargers readily available to the interested public.[5,6]

This report is also filed in accordance with the Pilot Process approved in Order No. 37865 ("Order 37865"), issued on July 9, 2021, in Docket No. 2018-0088. The Pilot Process includes reporting on:

- Challenges and lessons learned, process improvements, a listing of performance relative to all key metrics, and any future permanent implementation plans based on an evaluation against the metrics established; and
- Updates to estimated costs and schedule (e.g., if there were significant delays in receiving signed agreements from government agencies).[7]

The Companies address each of these requirements in turn, as applicable.[8] This report reflects on the work completed in 2023, which includes the Application and Funding Reservation, Preconstruction, and Design and Build phases.

Pilot Objectives

The Companies' application filed on July 10, 2020, in Docket No. 2020-0202 ("Application") included the following primary purposes/objectives:

[4] This reporting requirements is listed in D&O 38194 and will be met once the final report is made.
[5] This reporting requirements is listed in D&O 38194 and will be met once the final report is made.
[6] *See* Hawaiian Electric's Commercial Make-Ready Infrastructure Pilot Final Program Design report, at 2. The feedback from customers in the eBus Pilot, in addition to the Companies' research into prominent make-ready programs, led to the Charge Up Commercial Pilot changing the data collection reporting requirement from 10 to 5 years. *See* the Companies' Response to Consumer Advocate's Final Program Design Report Comments, items 2 and 7, filed on November 23, 2022, in Docket No. 2020-0202.
[7] *See* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.
[8] As of 2023, reporting requirements that are not applicable include: NPV analysis, pilot expenses for utility-side infrastructure upgrades, data collection metrics, charger utilization, and greenhouse gas ("GHG") emissions specific to the Pilot.

1. Develop ways for the Companies to support make-ready infrastructure by learning how to streamline workflows, understand resource (grid) needs for charging, and track costs of infrastructure to develop sound cost estimates for future deployment;
2. Enable and accelerate the electrification of vehicles in the Companies' service territories by understanding customer behaviors and enabling customers to transition faster; and
3. Improve renewable energy integration through vehicle charging on the Commercial Facility tariff Schedule EV-J and Schedule EV-P.[9]

The Charge Up Commercial Pilot helps commercial properties reduce the upfront cost of installing charging equipment for electric vehicles ("EVs"), while providing greater access to charging equipment for the community.

Pilot Implementation Schedule

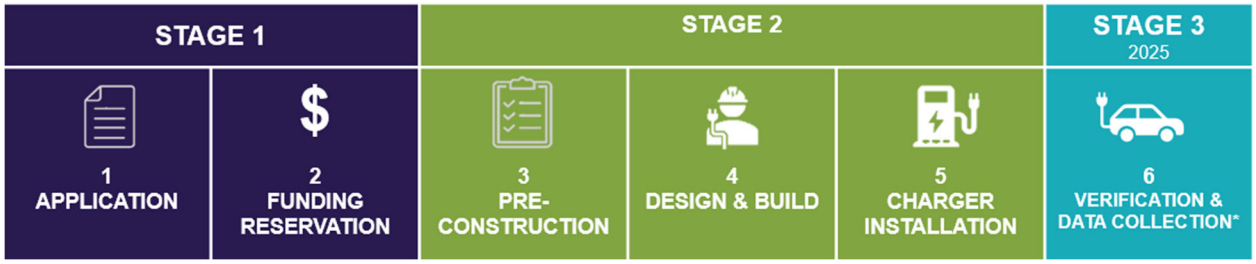
The Charge Up Commercial Pilot includes three phases:

1. Ramp-up, during which the Companies will develop documentation for implementation and solicit customer interest;
2. Implementation, during which the Companies will confirm customer eligibility and design, construct, and install make-ready infrastructure; and
3. Data collection to support the final report.

Implementation and data collection are reflected as three stages in the customer journey shown in Figure 1.

[9] *See* Application at 12-14.

FIGURE 1. CUSTOMER JOURNEY

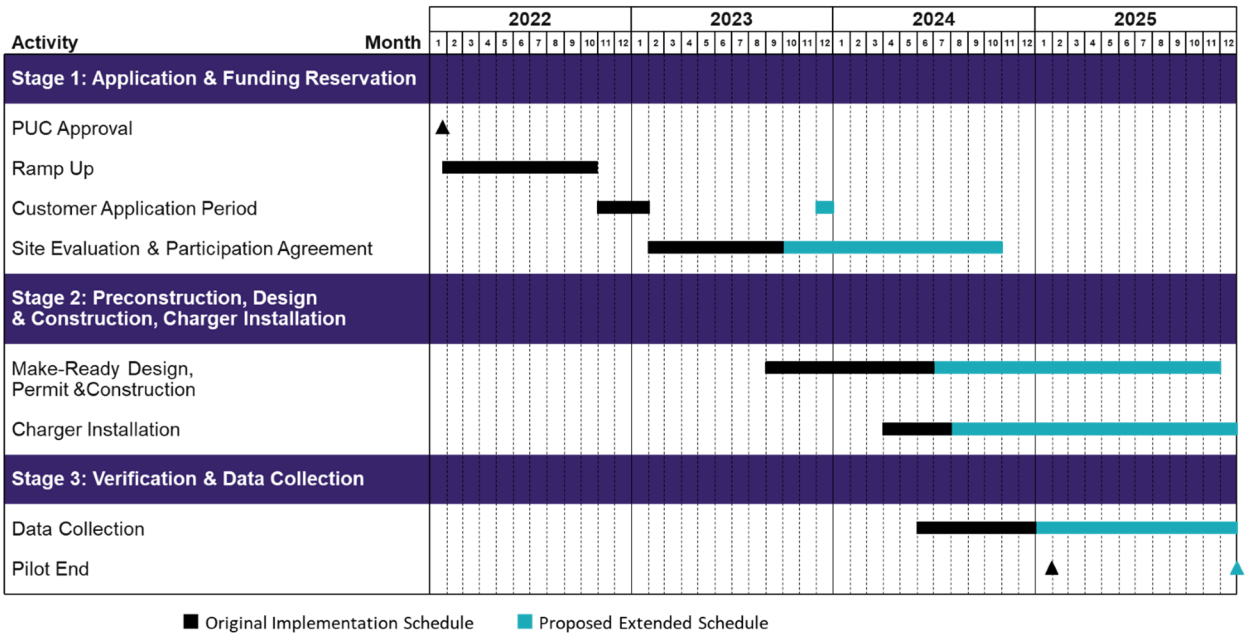


The average duration from completed application to executed agreement was 246 days (or about eight months). This longer than expected duration was due to participants requiring more time to review documents, obtain internal approvals, and select charging equipment.

In order to seek more applicants, especially on Hawai‘i Island where no participation agreements have been executed, the Companies temporarily reopened the application portal from December 1, 2023, to December 31, 2023. As a result, the Companies will need additional time to accommodate the new applicants. The Company requested an extension to the Pilot on January 25, 2024, in Docket No. 2022-0212, requesting to change the end date to December 31, 2025. Order No. 40650 approved the Companies' requested extension.[10] Figure 2 shows the adjusted implementation timeline.

[10] *See* Order No. 40650, issued on March 7, 2024, in Docket No. 2022-0212, at 2.

FIGURE 2. ADJUSTED IMPLEMENTATION TIMELINE



In 2024, the Company will assess new applicant sites and execute participation agreements with new applicants. The Company will also begin construction at original applicant sites.

Participants & Metrics

Prior to reopening the application portal, the Pilot received 55 complete applications and the Company conducted site visits at each of these sites. Eligible applicants are non-residential customers that own or lease the participating site (with at least ten years remaining on their lease) and must be the customer of record for the site meter where the charging equipment for the Pilot will be installed. Many of these sites were found to be not feasible due to limited transformer capacity and long trenching distances, while other sites were unable to meet Pilot requirements oftentimes due to their inability to comply with accessibility requirements or the 10-year commitment period.

During the application reopening period, the Companies received 13 complete applications: eight on O‘ahu, four on Maui, and one on Hawai’i Island. The Companies are currently assessing the new applicant sites. Participation selection is based on several factors, including but not limited to the following:

- Basic eligibility requirements;
- Overall complexity and cost of the project;
- Challenges and opportunities associated with each site; and
- Score received on Charge Up Commercial Preliminary Scorecard

As of December 31, 2023, the Company received 68 complete applications in total. The total number of level 2 charging ports requested from all complete applications was 302 with an average of 8.22 kW per port.

Figure 3 shows the percentage distribution of all complete applications received per island and Figure 4 displays the applicant type per island.

FIGURE 3. COMPLETE APPLICATIONS RECEIVED PER ISLAND

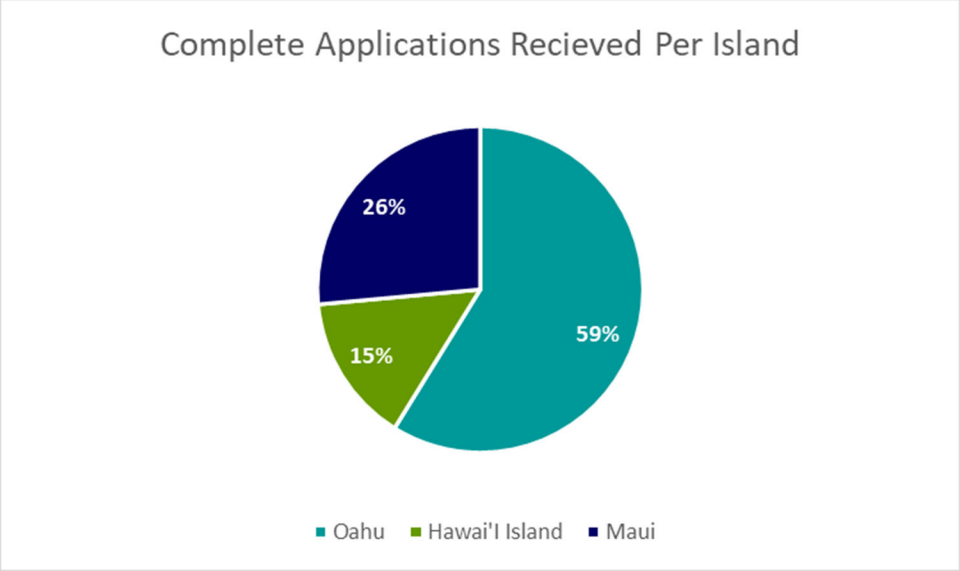
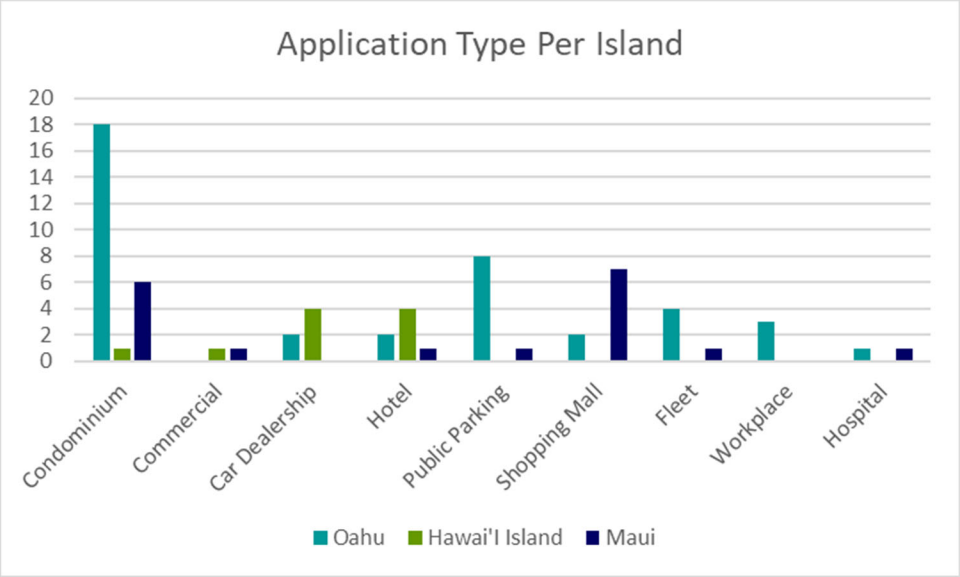
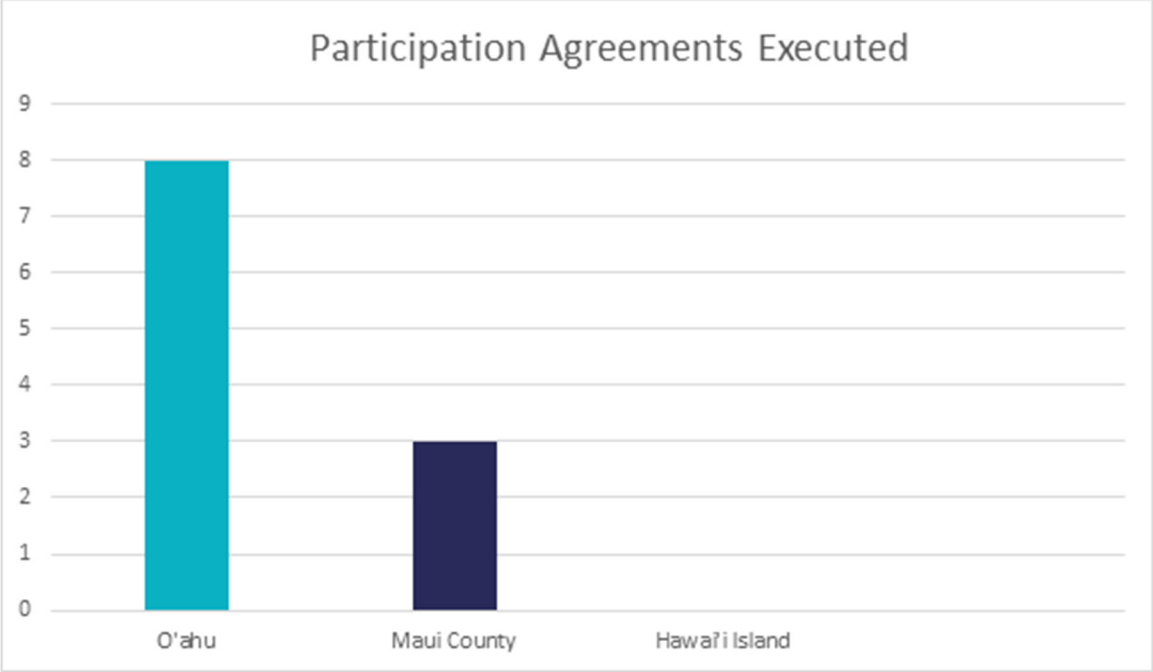


FIGURE 4. APPLICATION TYPE PER ISLAND



The most common applicant types by island were condominiums on O‘ahu, shopping malls on Maui, and hotels and car dealerships on Hawai’i Island. A total of 14 applicants withdrew from the Pilot. Of those, 10 withdrew after being accepted, including three on Hawai’i Island (all were under the same owner, resulting in zero participation on Hawai’i Island), five on Maui, and two on O‘ahu. Reasons for withdrawing included the inability to agree to the 10-year commitment period, uncertainty in future plans for the property, incremental costs above the $90,000 cap, and alternate charging plans. As of December 31, 2023, the Company executed 11 Participation Agreements. Figure 5 shows the Participation Agreements executed by island.

FIGURE 5. PARTICIPATION AGREEMENTS EXECUTED BY ISLAND



See the Companies' response to PUC-HECO-IR-04, filed on February 20, 2024, in Docket No. 2022-0212, for further detail on the status of the 68 completed applications.

Costs & Revenues

In accordance with the Pilot Process approved by the Commission in Order 37865, innovation pilot project costs are treated as deferred costs and recovered the following year, subject to the Commission's review of the annual spring revenue report.[11] Figure 6 shows the total annual Pilot costs by island.

FIGURE 6. ANNUAL COSTS BY ISLAND ($)

	O'ahu	Hawai'i Island	Maui County	Total
2022	$80,748	$39,485	$38,813	$159,046
2023	$583,095	$74,692	$220,572	$878,360

[11] *See* Order No. 37865, issued on July 9, 2021, in Docket No. 2018-0088, at 8-11.

During 2023, a total of $765,863 was spent on evaluating the feasibility of all the applicants that applied to the Pilot and designing the make-ready infrastructure for the executed Participation Agreements. The cost of a Product Manager position for the overall program management in 2023 was $112,497. Figure 7 shows the breakdown of the total cost and the average cost per site for the site evaluation and design.

FIGURE 7. SITE EVALUATION AND DESIGN ($)

	Outside Services	Internal Labor	Total	Average Cost per Site
Site Evaluation	$363,559	$113,266	$476,825	$8,670
Design	$271,584	$17,453	$289,038	$26,276
Total	$635,144	$130,719	$765,863	$34,946

The total average cost per site of $34,946 was obtained using the sum of the method below:

- Dividing the total Site Evaluation cost ($476,825) by the total number of site visits conducted (55).
- Dividing the total Design cost ($289,038) by the executed Participation Agreements (11).

The outside services expense included engineering design consultants to support the evaluation of applicants and design of the make-ready infrastructure, and an external Construction Manager to support the overall implementation of the Pilot.

All internal labor resources included in the deferred Pilot expenses directly support the implementation of the Pilot and are incremental expenses not recovered through a prior rate case. This includes internal resources that are typically charged to capital projects and new positions specific to the implementation of the Pilot. In 2023, internal labor resources included the Product Manager and a Contract Manager, which directly support the implementation of the Pilot. These positions were established to support the overall implementation of the Pilot and

were not included in a prior rate case and the prior positions were backfilled. Other internal labor resources included labor hours from engineers to support the evaluation of applicants, and the labor expenses only include hours that the internal engineers specifically worked on the Pilot. The Pilot labor expenses only include direct labor and direct overheads (i.e., payroll taxes, employee benefits and non-productive wages) supporting implementation of the Pilot.

In 2023, no make-ready infrastructure or charging equipment was installed and therefore, no revenue from charging sessions was collected in 2023. Revenues will be reported once the charging equipment is energized and charging equipment is in use.

Benefits & Impact to Underserved Communities

Charge Up Commercial will play a crucial role in accelerating the electrification of transportation and is expected to provide broad, ongoing benefits to all customers. Vehicle charging during the day facilitates greater use of renewable energy and reduces fossil fuel use overall, helping the State achieve carbon emission reduction goals. The Pilot supports the buildout of charging infrastructure in rural and underserved communities. Equitable access to charging infrastructure will encourage the adoption and use of EVs in underserved communities and is expected to result in lower GHG emissions in these communities.

The Pilot defined underserved communities in the Final Program Design Report filed on September 23, 2022, in Docket No. 2020-0202 based on meeting two out of four criteria:

1. Census tract with high participation of LIHEAP (Low Income Home Energy Assistance Program)
2. Census tract with more than six percent (6%) of energy burden
3. High level (+20 Tonnes) of annual GHG emissions from household vehicles per acre per census tract

4. Census tract considered underserved according to the Climate and Economic Justice Screening Tool[12]

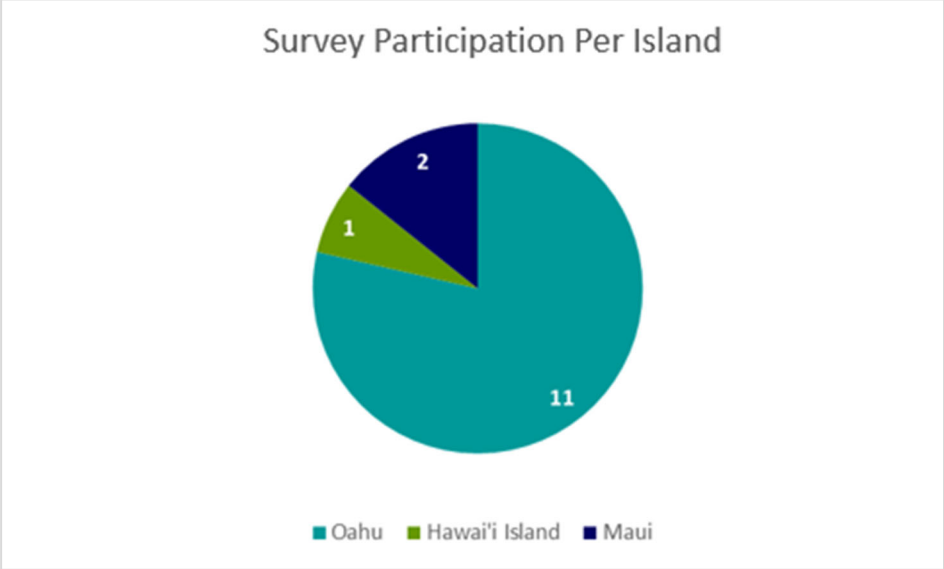
Of the 11 agreements executed to date, two sites meet at least two criteria (categorizing the sites as within an underserved community), and an additional five sites meet one criteria.

Once the data becomes available, the annual report will include GHG emission analyses as required by Decision and Order No. 36220 ("D&O 36220") in Transmittal No. 18-06, in accordance with the annual reporting requirements established for the EV-J and EV-P tariffs.[13]

Customer Experience

The Companies issued a customer experience survey to the original applicants and received 14 responses. Figure 8 shows the survey participation by island.

FIGURE 8. SURVEY PARTICIPATION PER ISLAND



[12] *See* Charge Up Commercial Final Program Design Report, at 14-16.
[13] *See* D&O 36220, Ordering Paragraph 3.D(11), at 42.

The Companies asked survey participants for their level of agreement (1 meaning strongly disagree and 5 meaning strongly agree) with specific statements concerning the Pilot. The statements and response averages are listed below.

- **Communication, materials, and/or website helped me understand the Pilot.**
    - Average: 3.6
- **The application was easy to complete.**
    - Average: 3.6
- **I am satisfied with the make-ready design for my site.**
    - Average 4.4
- **I am satisfied with the Pilot.**
    - Average 4.4

Lessons Learned

Customer Eligibility

Through the Pilot implementation process, the Companies recognized that primary metering increases the complexity and cost to enroll in a separately metered Commercial EV rate (i.e., Schedule EV-J and Schedule EV-P). In these primary-metered situations, a utility meter was installed on a high voltage distribution line and the customer installed their own transformer behind the meter to step down the voltage for the facility, as opposed to secondary-metered situations where the utility installs a transformer to step down voltage before the meter. Hawaiian Electric does not install any additional utility meters behind existing utility meters, and any new separately metered service (for existing primary-metered customers) would require a new transformer to be installed. The Companies filed proposed modifications to the

Pilot on January 10, 2024, in Docket No. 2022-0212, proposing to remove the dedicated metering and Commercial EV rate enrollment requirements for primary-metered customers only. Removing these requirements increases eligibility and enables greater Pilot participation. The removal of these requirements for primary-metered customers was approved in Order No. 40650. The Company will reconsider waitlisted/rejected applicants that are primary metered.

Pilot Costs

The Company learned that outside engineering costs for site evaluations and design would be higher than originally anticipated. As a result, the Companies revised the anticipated number of sites the Pilot budget can accommodate from 30 sites to 20 sites. See the Companies' responses to PUCHECO-IRs 05, 06, and 09, filed on February 22, 2024 and March 4, 2024, in Docket No. 20220212.

Proposed Changes

Aside from the requested modifications filed on January 10, 2024 and January 25, 2024 that were approved by Order No. 40650, there are no additional proposed changes to the Charge Up Commercial Pilot at this time. The Companies remain committed to transparency and will continue to discuss the status of the Pilot and lessons learned, and update stakeholders accordingly in the quarterly stakeholder meetings, annual Pilot Update, and additional Pilot filings.

Schedule EV-J and EV-P
Annual Pilot Update

Introduction

The Hawaiian Electric Companies'[1] annual Schedule EV-J and EV-P Pilot Update report is submitted in compliance with: 1) Decision and Order No. 37507 ("D&O 37507") issued on December 23, 2020 in Docket No. 2018-0088, and 2) Decision and Order No. 38157 ("D&O 38157") issued on December 30, 2021 in Docket No. 2020-0152, which approved Electric Vehicle ("EV") Tariffs for Schedule EV-J – Electric Vehicle Charging Service – Demand and Schedule EV-P – Electric Vehicle Charging Service – Large Demand, on a pilot basis (referred to as the "Schedule EV-J and EV-P Pilot," "EV Tariff Pilot," or "Pilot"), subject to certain conditions.[2]

D&O Nos. 37507 and 38157 require the Companies to report on:

- Implementation schedules and progress relative to the pilot's objective and key performance metrics;
- Pilot impacts on underserved communities;
- Pilot costs and revenues (if applicable), including cost analysis per subscriber, quantitative and qualitative benefits (for both pilot participants and non-participants), and a Net Present Value ("NPV") analysis;
- Qualitative description of the pilot and customer benefits; and
- Any proposed changes to material aspects of the pilot, such as program pricing, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations (including reason for the cancelation).[3]

D&O 38157 additionally requires the Companies to report on:

- Status update and adoption of the proposed Pilot rates (including the total number of customers enrolled under each Schedule on a monthly and annual basis in aggregate for each service territory and by each user/customer type (multi-unit dwellings, fleets, shopping centers, etc.);

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[1] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.

[2] *See* D&O 37507 at 175-176, 218, and 222 and D&O 38157 at 19, 29-33, 36, 38, 40-44, 45, and 47. Although D&O 37507 requires that the annual Pilot Update be filed by March 31 of each year, the Companies are submitting this report in advance of the deadline to facilitate the Consumer Advocate's and the Commission's review.

[3] *See* D&O 37507 at 175-176 and D&O 38157 at 45.

- The number of charging stations and number of ports acquired per customer account enrolled in the Pilot at time of enrollment;
- The kWh consumption by time-of-use ("TOU") period on monthly and annual basis;
- Summary of costs (if any) and revenues for each Schedule (in total and by TOU period on a monthly and annual basis, in aggregate for each service territory and by each user/customer type) and projected impact on utility rates;
- The estimated reduction in greenhouse gas ("GHG") emissions associated with the Pilot, including a description of the methodology used in calculating the emissions and supporting data;
- GHG emissions associated with the incremental load under the proposed Pilot rates (by each TOU period and in total);
- End-use pricing structures assessed by each commercial site host customer, to the extent available, any changes made to the pricing structures over time, and reasons for the end-use pricing structures selected;
- Detailed documentation of past, ongoing and future outreach and education efforts;
- Participants' feedback regarding the overall experience with, and effectiveness of the Pilot, based on the participants' responses to an annual survey;
- Lessons learned based on the results of an annual survey to gather feedback on the Pilot rates (survey instrument and aggregate results to be included as part of the annual report);
- Discussion of alignment of both the Pilot design and Pilot results with any decisions of Advanced Rate Design ("ARD") and Integrated Grid Planning ("IGP") modeling results, as well as how pilot data will inform future IGP cycles, including an analysis of docket interrelations; and
- An extrapolation that depicts the likely impact on rates if the Pilot rates were more widely adopted.[4]

This report is also filed in accordance with the Pilot Process approved in Order No. 37865, issued on July 9, 2021, in Docket 2018-0088. The Pilot Process includes reporting on:

- Challenges and lessons learned, process improvements, a listing of performance relative to all key metrics, and any future permanent implementation plans based on an evaluation against the metrics established; and
- Updates to estimated costs and schedule (e.g., if there were significant delays in receiving signed agreements from government agencies).[5]

[4] *See* D&O 38157 at 19, 29-33, 36, 38, 40-44, 45, and 47.
[5] *See* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.

The Companies address each of these requirements, as applicable. This report reflects the work completed in 2023.

Pilot Objectives

The Companies' application filed on September 30, 2020 in Docket No. 2020-0152 ("Application") included the following proposed objective: to ensure that charging options for EVs remain competitive with fuel for internal combustion engines ("ICEs") and thereby accelerate the transition to clean transportation, while also encouraging charging behavior that supports the grid.[6]

The approved EV-J and EV-P tariffs offer electricity per-kilowatt-hour ("kWh") rates for non-residential EV charging that are lower than the respective comparable commercial rates during the mid-day period from 9:00 a.m. to 5:00 p.m., daily.[7] The tariffs also provide significantly lower demand charges than the corresponding commercial rate schedules, Schedule J and Schedule P.[8] This encourages the charging of EVs during hours that coincide with the greatest amount of renewable energy penetration on the grid, and assists in offering EV charging options that remain competitive with fuel for ICEs. These fuel cost savings can help encourage greater EV adoption as they further improve the economics of owning an EV.

Pilot Implementation Schedule

In addition to the Commission's regulatory approval process, implementation of the Schedule EV-J and EV-P Pilot involved a multi-step process internal to the Companies. This process included analysis to determine rate structure, development of detailed tariffs, integration

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[6] *See* Application at 13.
[7] During the On-Peak hours, 5:00 p.m. to 10:00 p.m., daily, and Off-Peak hours, 10:00 p.m. to 9:00 a.m., daily, per kWh rates for electric vehicle charging are higher than the respective comparable commercial rates.
[8] Demand charges are $2/kW for Schedule EV-J (all islands) & Schedule EV-P (Maui & Hawai'i Island), and $4/kW for Schedule EV-P on O'ahu. Demand charges for Schedule J and Schedule P can be found at: https://www.hawaiianelectric.com/billing-and-payment/rates-and-regulations/effective-rate-summary.

with billing infrastructure, and education of internal stakeholders. Once the Commission approved the rates and they were opened for enrollment to eligible customers, the Companies launched a concerted outreach effort to ensure that industry stakeholders and potential customers understood the rates.

On March 18, 2022, following D&O 38157, the rates were opened for enrollment to eligible customers on O‘ahu, Maui, and Hawai‘i Islands. On June 30, 2022, in Transmittal No. 22-02, Maui Electric Company, Limited requested the Commission’s approval to establish Electric Vehicle Tariffs for Schedule EV-J – Electric Vehicle Charging Service – Demand and Schedule EV-P – Electric Vehicle Charging Service – Large Demand for Moloka‘i and Lāna‘i on a pilot basis. These rates opened for enrollment on August 1, 2022 for qualifying customers on the islands of Moloka‘i and Lāna‘i. The Companies launched a concerted outreach effort following the opening of the rates. Details of this outreach effort are contained within this report under the heading “Outreach & Education.”

Participants & Metrics

Eligible customers include separately-metered commercial accounts serving EV charging stations, and no greater than 5kW of ancillary load in support of the EV charging infrastructure. Furthermore, customers must meet the following eligibility requirements:[9]

- Customer must provide the Companies with a closed building permit for the EV charging station, and the ID numbers of the charging equipment;
- Customer must meet the demand thresholds detailed in the Schedule EV-J and Schedule EV-P Tariffs; and
- Customer is required to complete an annual survey, and the Companies may install a data recording device to profile the load.

[9] The Schedule EV-J and Schedule EV-P Tariffs were submitted to the Commission on February 1, 2022 in Docket No. 2020-0152 and approved in Order No. 38423, issued on March 1, 2022.

As of the end of the 2023 annual reporting period, one (1) customer account is enrolled under Schedule EV-J, and two (2) customer accounts are enrolled under Schedule EV-P. All enrolled accounts are located on O‘ahu.

Figure 1. 2023 Pilot Enrollment - O'ahu - Number of Enrolled Accounts on a Monthly Basis

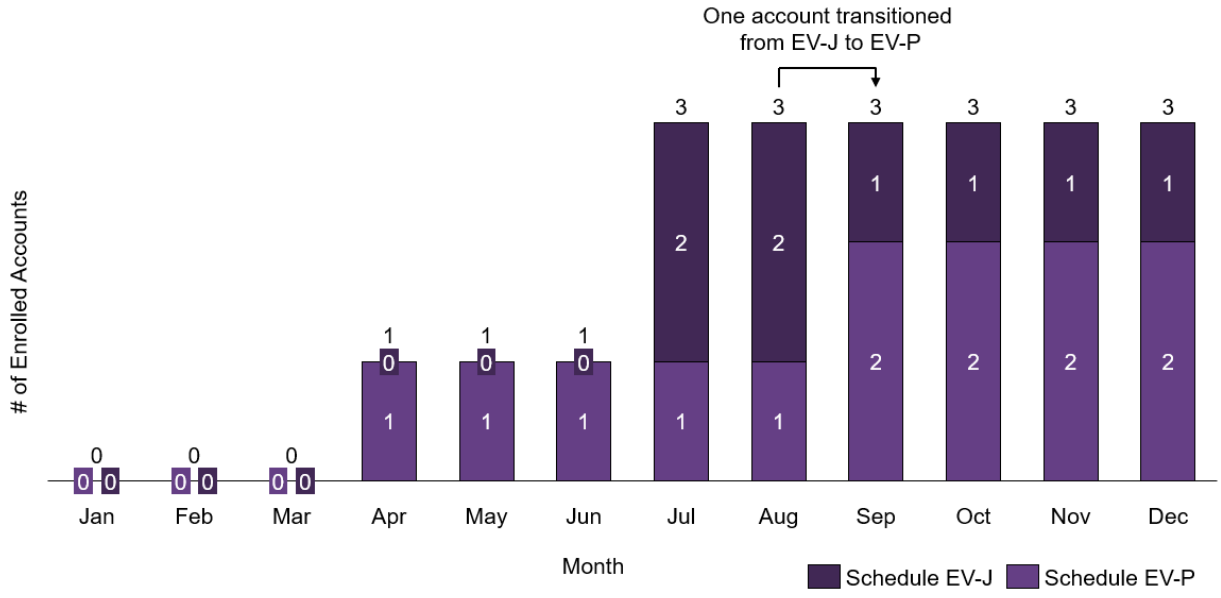


Figure 1 shows the total number of customer accounts enrolled on O‘ahu under each schedule on a monthly basis. Maui County and Hawai‘i Island are not shown, since there are no enrolled accounts in these areas. One account that was enrolled in Schedule EV-J exceeded the 300kW peak demand threshold during their August billing cycle, and subsequently transitioned to Schedule EV-P, starting with their September billing cycle.

According to customer survey responses, fifteen (15) charging stations, with a total of fifteen (15) charging ports were enrolled in the Pilot.

Figure 2. Enrolled Accounts According to Customer Type

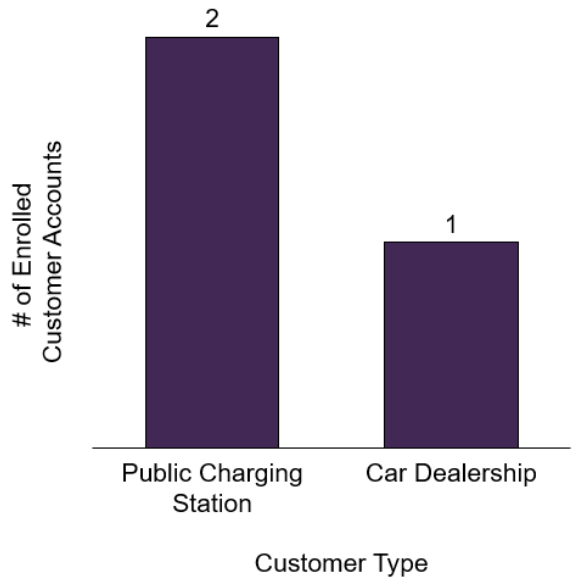


Figure 2 shows the number of customer accounts enrolled in the Pilot according to customer type.

Despite the increase in EV adoption in Hawai‘i, the development of EV charging infrastructure continues to lag. As of December 31, 2023 in Hawaiian Electric's service territory, there are only four (4) operators of public Direct Current ("DC") Fast Charging hubs, and three (3) car dealerships that make their DC Fast Chargers available for public use, for a total of 47 DC Fast Charging ports.

According to PlugShare's online database of EV charging stations, there are 301 Level 2 charging stations located within the Hawaiian Electric Companies' service territories as of January 15, 2024.[10] Most of these Level 2 stations are owned by the station's commercial host facility for the use of their patrons or guests, and not by for-profit Electric Vehicle Service Providers ("EVSPs"), like many DC Fast Chargers. Because they are owned by the host

[10] *See* https://www.plugshare.com/.

customer and draw lower loads that may often be supported by existing electrical service infrastructure, these Level 2 charging stations are typically served through the facility's existing electrical service – not via a separately-metered electrical service, as is required for enrollment in Schedules EV-J or EV-P. To increase enrollment of Level 2 charging stations in Schedules EV-J and EV-P, the Companies are actively monitoring all EV service requests and are contacting applicants that are requesting separately-metered services to encourage enrollment in Schedule EV-J or EV-P, as appropriate.

Several EVSPs have expressed interest in enrolling forthcoming DC fast charging hubs on Schedules EV-J and EV-P. These hubs are currently under construction, and the Companies expect that up to six (6) of such charging hubs will enroll in Schedule EV-J or Schedule EV-P during the 2024 reporting period once these facilities are placed into active service. Beyond these six (6) charging hubs, the Companies have spoken with fleet operators and government agencies who are actively exploring large-scale EV charging projects, which is anticipated to further increase enrollment in Schedules EV-J and EV-P.

Further, it is anticipated that Schedule EV-J enrollment will increase by up to 18 additional customer accounts during the 2024 or 2025 reporting periods once commercial Level 2 charging installations under Docket No. 2020-0202 (Charge Ready Hawai‘i) are placed into active service. The Companies expect customer types within these accounts to include multi-unit dwellings, retail, workplace charging, and fleet.

Qualifying installations under Docket No. 2020-0098 (Charge Up eBus Pilot) are also eligible to enroll in Schedules EV-J and EV-P. As such, participation in the Charge Up eBus Pilot may also lead to increased enrollment in Schedules EV-J and EV-P.

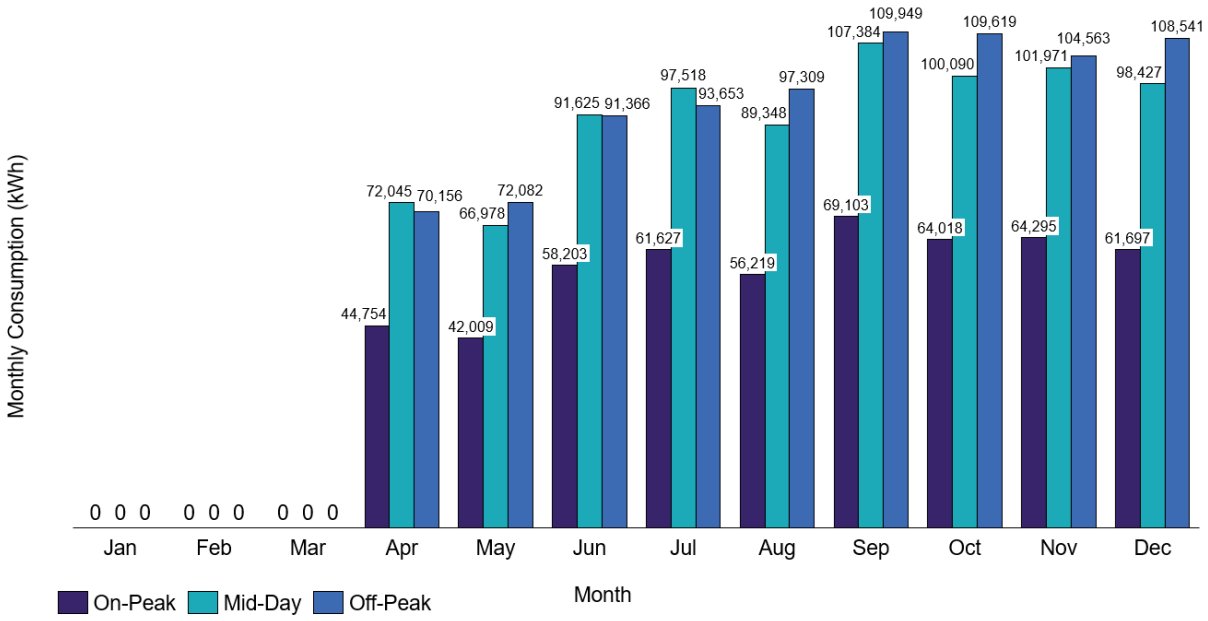
Future annual reports will document forthcoming enrollments.

Costs & Revenues

The Companies' incremental implementation costs for the Schedule EV-J and EV-P Tariff Pilot are negligible, since the Pilot is primarily administrative in nature, and does not involve the installation of any additional physical infrastructure or capital equipment. During the 2023 annual reporting period, no costs were recorded to the Pilot.

Figure 3 shows the combined monthly consumption (in kWh) by TOU period for Schedules EV-J and EV-P during the 2023 annual reporting period for enrolled accounts on O'ahu. Maui County and Hawai'i Island are not shown since there are no enrolled accounts in these areas.

Figure 3. 2023 Combined Monthly Consumption by TOU Period – Schedules EV-J and EV-P

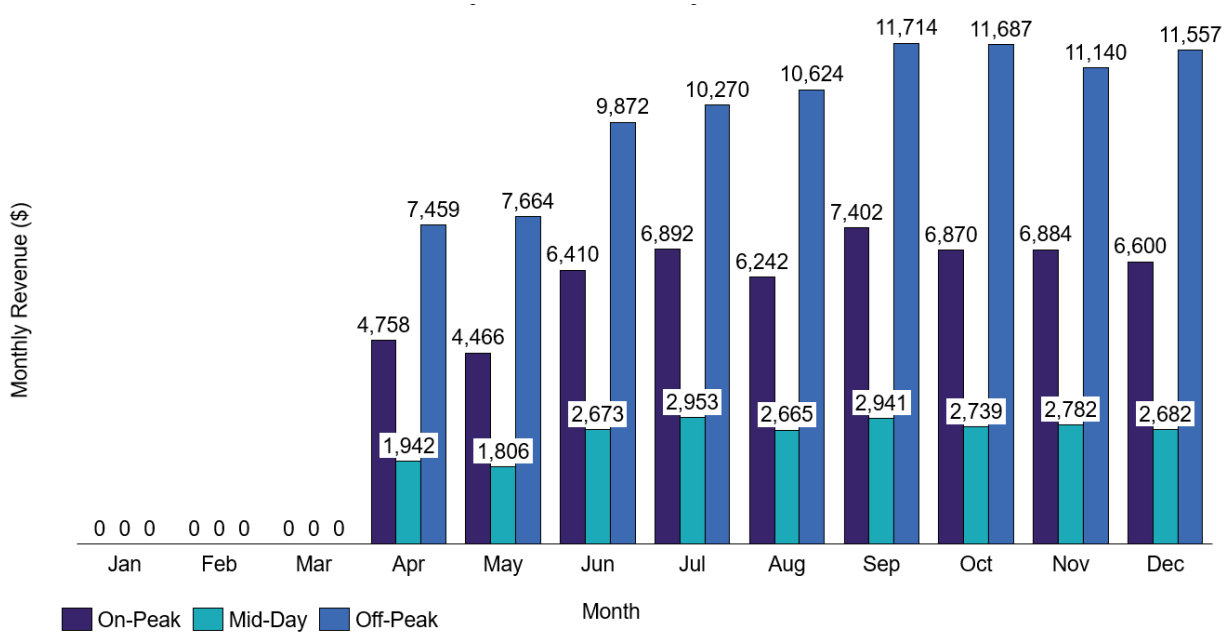


In six out of the nine months with enrolled accounts, the largest percentage of consumption (39%) occurred in the off-peak period, while 37% and 24% of consumption occurred in the mid-day and on-peak periods, respectively. Despite Schedule EV-J and EV-P's

TOU pricing structures, it is ultimately the charging station operator's decision to define the end-user pricing structure, which can influence when drivers choose to charge their vehicles.

Figure 4 shows the combined monthly revenue by TOU period for Schedules EV-J and EV-P during the 2023 annual reporting period for enrolled accounts on O'ahu. Maui County and Hawai'i Island are not shown since there are no enrolled accounts in these areas.

Figure 4. 2023 Combined Monthly Revenue by TOU Period – Schedules EV-J and EV-P



In all months with enrolled accounts, the greatest proportion of revenue (54%) was generated from consumption in the off-peak period, while 33% and 13% were generated in the on-peak and mid-day periods, respectively. This distribution is likely due to the higher off-peak energy charges coupled with the higher off-peak consumption shown in Figure 3.

Figure 5. 2023 EV Tariff Pilot Annual Revenue by Customer Type

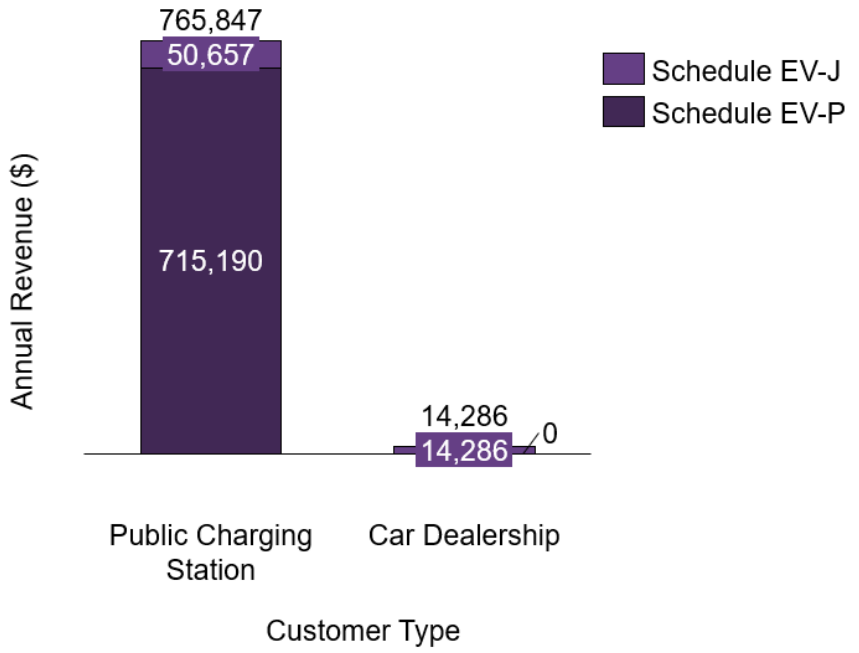


Figure 5 shows the annual revenue for Schedules EV-J and EV-P according to customer type. During the 2023 reporting period, the two accounts serving public charging stations accounted for 98% of the total annual EV Tariff Pilot revenue.

Figure 6. 2023 Annual Combined Consumption by TOU Period by Customer Type

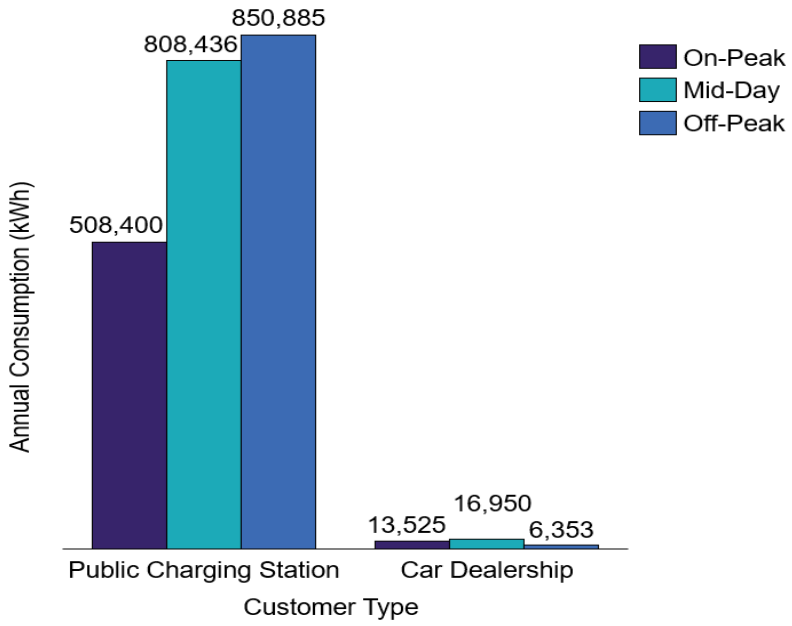


Figure 6 shows the annual combined consumption (in kWh) by TOU period for each customer type. While public charging stations can influence end-user charging behavior through time-varying rates, car dealerships are more likely to charge vehicles according to their operational needs, regardless of the time of day.

As a greater number and diversity of accounts enroll in the Pilot, it will become possible to draw further conclusions about the charging behavior of different customer types and the effectiveness of the Pilot's TOU structure.

As confirmed by customer survey, 40% of enrolled ports have implemented a TOU end-user pricing structure, while 60% of enrolled ports have a static end-user pricing structure (i.e., pricing did not vary according to TOU). Thus, the EV Tariff's TOU pricing structure appears to only have had a moderate effect in incentivizing enrolled customers to implement end-user TOU pricing structures to influence charging behavior through reduced daytime charging rates. Given the limited enrollment in the Pilot, it is not possible to extrapolate the projected impact on utility rates from the sale of electricity under Schedules EV-J and EV-P if the Pilot was more widely adopted. Similarly, a NPV calculation is not meaningful due to the limited data.

For additional consumption and revenue data, please refer to Attachment 3A – Schedule EV-J and EV-P Revenue and Consumption Data.

Revenues from Schedules EV-J and EV-P are recorded as electric sales revenue and are included in recorded adjusted revenues that would reduce the balance of the Revenue Balancing Account ("RBA"). As such, customers receive the benefit of incremental Schedule EV-J and EV-P revenues through the RBA. Therefore, Pilot costs should not be offset by Schedule EV-J

and EV-P revenues in Schedule G of the Companies' Spring Revenue Report, as such an offset would double count the recovery of EV Tariff Pilot costs.

Benefits & Impact to Underserved Communities & GHG Emissions

The availability of public charging infrastructure is a key factor in encouraging EV adoption. Access to abundant and affordable public EV charging is especially critical for those living in multi-unit dwellings ("MUDs") such as apartments and condominiums whose access to at-home charging tends to be limited. In many cases, where those residing in MUDs fall within low-to-moderate income ("LMI") populations, programs that increase public charging availability and affordability could significantly benefit underserved communities. By reducing operating overheads for public charging infrastructure, Schedules EV-J and EV-P lower the financial barriers to public EV charger operation, which can positively impact LMI communities' access to charging infrastructure and can foster more equitable EV adoption. With the data currently available, the Companies are not able to accurately conclude whether the savings offered by Schedules EV-J and EV-P have translated directly into lower EV end-user charging rates, which would further benefit underserved communities.

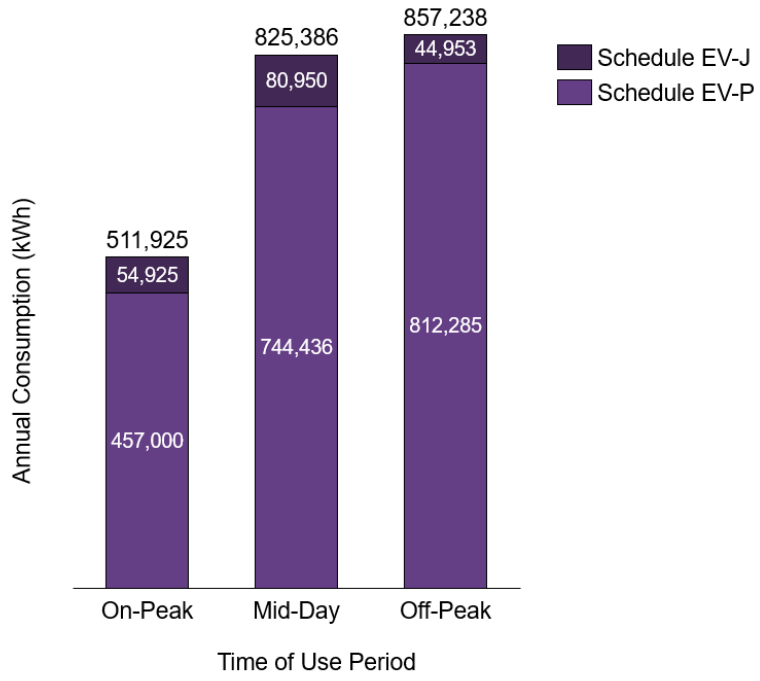
Furthermore, as noted in the "Participants & Metrics" section of this report, participants in the Commercial Make-Ready Pilot Program, approved in Docket No. 2020-0202 (Charge Ready Hawai‘i) will be enrolled in Schedule EV-J or EV-P. Within Docket No. 2020-0202, the Companies were tasked with defining "underserved communities" and a concerted effort was made to solicit applicants from communities meeting the criteria defined in the Commercial Make-Ready Infrastructure Final Program Design Report.[11]

[11] *See* Hawaiian Electric's Commercial Make-Ready Infrastructure Pilot Final Program Design Report, filed on September 23, 2022, in Docket No. 2020-0202, at 14-16.

Electric vehicles generally reduce GHG emissions when compared to conventional vehicles powered by internal combustion fossil-fuel engines. The Companies conducted a GHG analysis to determine the estimated reduction in GHG emissions associated with the Pilot, and the GHG emissions associated with the incremental load under the Pilot rates. While the analysis found that the emissions increase from the incremental load under the Pilot in 2023 was 1,465.2 metric tons ("MT") CO2e, the indirect emissions to charge electric vehicles on Schedules EV-J and EV-P were 941.8 MT CO2e less than the emissions from ICE vehicles driving an equivalent distance.

Emission reductions are calculated as the difference between indirect emissions resulting from generating the electricity that was used for vehicle charging, and the direct combustion emissions that would have otherwise been generated by ICE vehicles. A detailed explanation of the analysis assumptions and methodology is included in Attachment 3D – Greenhouse Gas Analysis.

Figure 7. Combined Annual Consumption by TOU Period



The calculated emissions are based on the energy consumed for charging in each TOU period, as shown in Figure 7. The emission factors in each period reflect different generating resources including renewables.

As EV adoption continues to increase year over year, the Companies expect to see an increase in electrical consumption on Schedules EV-J and EV-P, which will likely result in an increase in indirect emissions from electricity generation. This would result in a net decrease in GHG emissions from vehicle transportation, assuming that the miles traveled by the electric vehicles would otherwise have been traveled by an ICE vehicle. By encouraging charging during the mid-day period, the period with the lowest emission factor, the Pilot acts to further reduce ground transportation GHG emissions.

Customer Experience

Data collection is a key element to ensure the success of this Pilot. To this end, the Companies issued a survey to customers enrolled in either Schedule EV-J or Schedule EV-P to

collect participant feedback regarding the overall customer and end-user experience, as well as the effectiveness of the Pilot. The survey is expected to inform an assessment of lessons learned, areas for potential improvement, and points of success.

The survey was issued in January 2024 to all three (3) customers enrolled in Schedules EV-J and EV-P, and all three (3) customers provided responses. The survey questions are attached in Attachment 3B – Participant Survey Questions. To derive average numerical scores from customer response, a numerical value of 0 through 4 was ascribed to the statements "strongly disagree," "somewhat disagree," "neither agree nor disagree," "somewhat agree," and "strongly agree," respectively. Results were then averaged over the three (3) respondents. The following are key insights derived from the survey responses. Please see Attachment 3C – Aggregate Participant Survey Responses for aggregated responses to all survey questions.

Customers agreed that overall, they were satisfied with the EV Tariff Pilot, and that they feel that they are benefitting from energy cost savings under the rates. This is shown in Figure 8 and Figure 9.

Figure 8. Average Enrollee Response Score re: Overall Satisfaction with EV Tariff Pilot

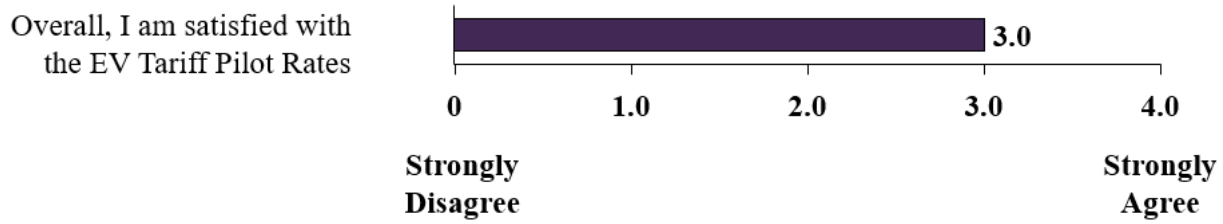


Figure 9. Average Enrollee Response Score re: Energy Cost Savings

The Companies attempted to collect details on each account's end-user pricing structure assessed by each commercial site host customer to better understand how Schedules EV-J and EV-P translated into end-user pricing. No customers agreed to share their end-use pricing, and customers shared limited information on the reason for end-use pricing structure selection and any changes made to the structures over time.

As shown in Figure 10, 40% of enrolled ports have a TOU end-user pricing structure, while 60% of enrolled ports have a static end-user pricing structure (i.e., did not vary according to TOU). Despite 40% of ports having a TOU end-user pricing structure, respondents did not

indicate strong agreement that Schedules EV-J and EV-P's higher peak period energy charges influenced end-user charging behavior, as shown in Figure 11.

Figure 10. Percentage of Enrolled Ports by End-Use Pricing Structure

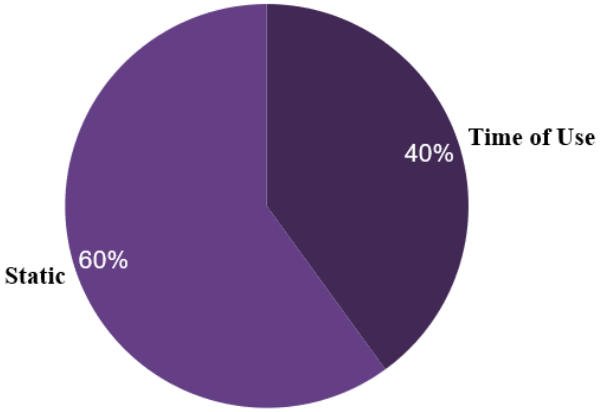
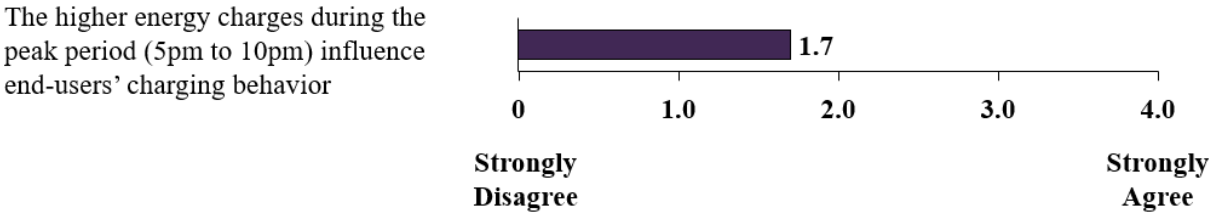


Figure 11. Average Enrollee Response Score re: Influence of Peak Energy Charges on End-User Charging Behavior



Despite being asked via the survey, only one customer agreed to provide charging session data (i.e., the number of sessions and session duration per TOU period), but had not done so by the filing date. Other customers declined to share reasoning for their selected end-use pricing structure.

From a customer experience standpoint, enrollees agreed that the conditions of enrollment were easy to understand, and that the enrollment process was clear, easy, and efficient, as seen in Figure 12 and Figure 13.

Figure 12. Average Enrollee Response Score re: Enrollment Requirement Comprehension

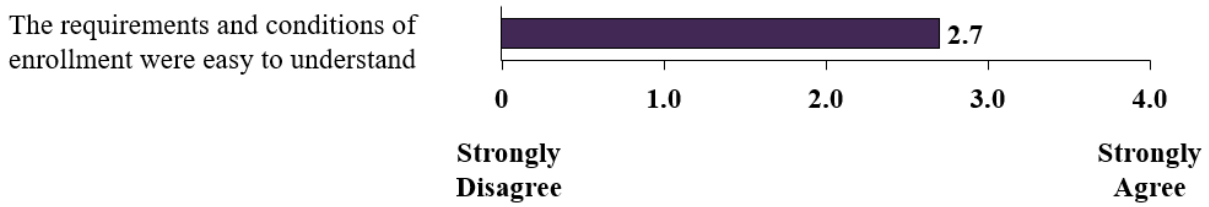
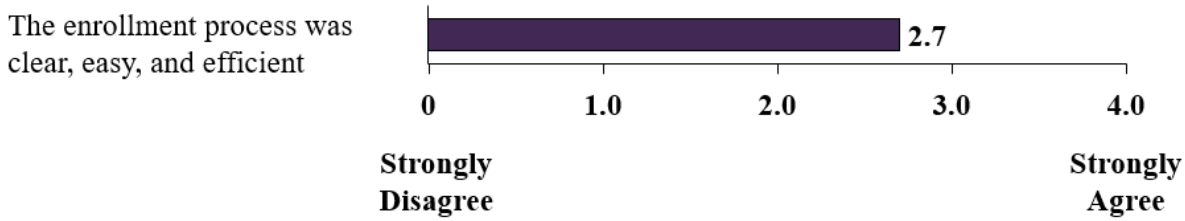
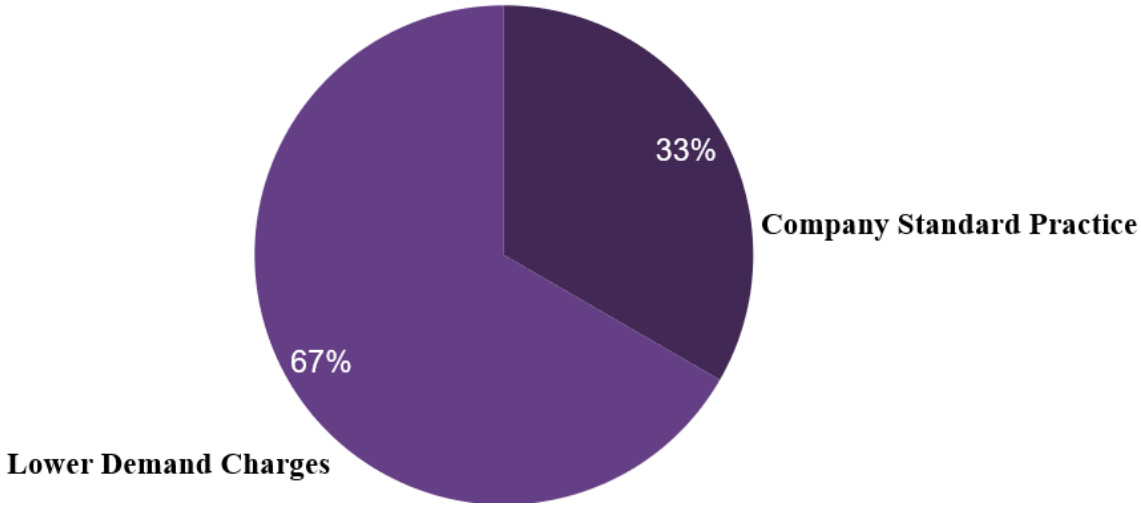


Figure 13. Average Enrollee Response Score re: Enrollment Process



Furthermore, as shown in Figure 14, most customers cited the lower demand charges as the primary reason for enrollment in the Pilot.

Figure 14. Primary Reason for EV Tariff Pilot Enrollment, by Percentage of Enrolled Customer Accounts



As shown in Figure 15 and Figure 16, most customers strongly agreed that they would enroll any future EV charger installations in the EV Tariff Pilot rates, and that they would recommend them to other eligible EV station operators.

Figure 15. Average Enrollee Response Score re: Future EV Tariff Pilot Enrollment

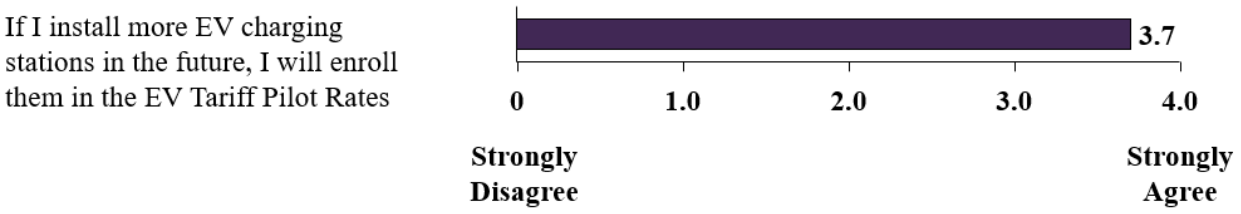
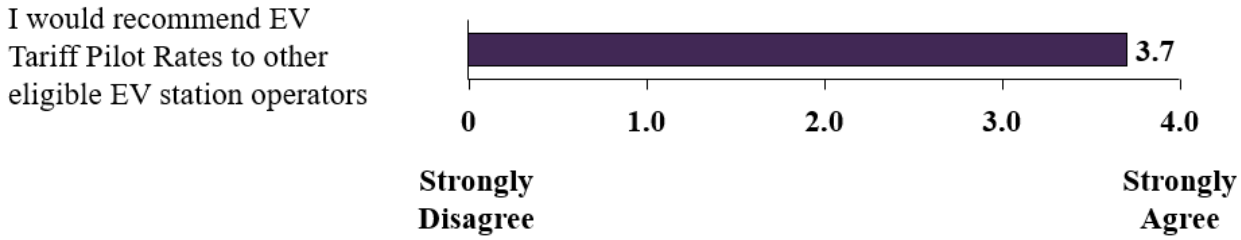


Figure 16. Average Enrollee Response Score re: Recommendation of EV Tariff Pilot



Progress to date indicates that the EV Tariff Pilot has been successful thus far, considering the limited number of eligible accounts. Based on anecdotal customer feedback, elimination of the requirement for a separately metered service would likely increase enrollment, however, elimination of the separately metered requirement would also present other technical challenges in segregating EV charging consumption from other building end-uses. Furthermore, as detailed later in this report, eliminating the enrollment requirement for a closed permit would simplify the enrollment process and improve the overall customer experience. The Companies look forward to documenting further challenges, lessons learned, performance, and opportunities for process improvement once a larger representative sample size of enrollees is available to draw relevant conclusions.

Outreach & Education

Following the launch of Schedule EV-J and Schedule EV-P, the Companies launched a concerted outreach and education effort to ensure that stakeholders – both internal and external – were aware of the new rates, and aware of how to enroll in them.

The following is a list of specific actions taken in 2023 to this end:

- The Companies continued actively tracking all service requests serving EV charging infrastructure to identify those satisfying enrollment criteria for Schedule EV-J or Schedule EV-P, and the Companies contacted these customers to propose enrollment in Schedules EV-J or EV-P.

- Upon closure of Schedule EV-F to all enrolled customers effective July 1, 2023, the Companies contacted the sole customer that remained enrolled, and encouraged them to enroll their three (3) remaining accounts in Schedule EV-J. Unfortunately, despite concerted efforts, the Companies were unable to reach the customer accounts' representative to obtain explicit consent to enroll these accounts in Schedule EV-J, despite their eligibility to do so.

- To further educate stakeholders within the Companies, the Electrification of Transportation ("EoT") department developed and shared an informational document detailing the enrollment requirements, suitable installations, and enrollment procedures for Schedules EV-J and EV-P. This document was distributed to Client Management teams and is sent to prospective enrollees to support enrollment.

- As part of regular outreach activities, the Companies often present at industry events and meetings, sharing information about the Companies' efforts to support electric transportation initiatives – including the Schedules EV-J and EV-P. These presentations include:
    - SSFM International Meeting on March 8, 2023
    - US Army – Utility Energy Service Contract Presentation on April 6, 2023
    - Hawai‘i Energy – EoT Overview on May 15, 2023
    - Hawai‘i Department of Transportation Project Management Training on August 25, 2023
    - O‘ahu Tourism Transportation Electrification Convening on October 30, 2023

The preceding activities built upon the following outreach and education activities that were undertaken in 2022 to build industry and stakeholder awareness of the Pilot:

- Created and launched an informational webpage (https://www.hawaiianelectric.com/products-and-services/electric-vehicles/electric-vehicle-rates-and-enrollment/commercial-facility) in March 2022, explaining the details of Schedule EV-J and Schedule EV-P. The website includes links to the applicable EV-J and EV-P tariff sheets and a graphical depiction of a TOU rate structure. To facilitate customer comprehension of the TOU structure, the website also includes tables comparing the effective rates (per kWh) and demand charges (per kW) for Schedules J & P (all-periods) and Schedules EV-J & EV-P (for each TOU period).

  These tables are updated monthly to reflect the actual effective rates. Following the launch of Schedules EV-J and EV-P, there were 611 visits to the webpage in March 2022, with an average of 97 monthly visits thereafter.[12] Figure 17, provided as an example from the webpage, illustrates the comparison of Schedules J and EV-J. An equivalent table comparing Schedules P and EV-P is also found on the same webpage.

Figure 17. Rate Comparison Table from Hawaiian Electric Companies' Commercial EV Rate Webpage

Island	Demand Threshold	Schedule J		Schedule EV-J		
	J & EV-J	Demand Charge ($/kW) All Day	Effective* Rate ($/kWh) All Day	Demand Charge ($/kW) All Day	Mid-Day Effective* Rate ($/kWh) 9am - 5pm	On-Peak & Off-Peak Effective* Rate ($/kWh) 5pm - 10pm & 10pm - 9am
Oahu	<300 kW	$15.74	$0.323195	$2.00	$0.308478	$0.395148
Maui	<200 kW	$15.04	$0.348624	$2.00	$0.321358	$0.431248
Lanai	<200 kW	$15.04	$0.496912	$2.00	$0.462927	$0.597895
Molokai	<100 kW	$15.04	$0.439544	$2.00	$0.414868	$0.522756
Hawaii	<200 kW	$15.31	$0.385587	$2.00	$0.361483	$0.474167

** January 2024 Rates with applicable surcharges. Price per kWh updated by calendar month*

- Published information about Schedule EV-J and Schedule EV-P in the March 2022 release of the Companies' eMobility Newsletter. This quarterly newsletter reaches a mailing list of over 300 e-mobility stakeholders located statewide and nationally.

- Issued an external press release on February 3, 2022 to local news outlets, leading to a wide distribution across the Companies' service territory.

- The Hawaiian Electric Companies' team of Commercial Client Managers was informed of Schedule EV-J and Schedule EV-P at a regularly-scheduled meeting with the Companies' EoT department on March 16, 2022, and again on November 15, 2022. Commercial Client Managers support the Companies' top 400 customers, and their responsibilities include providing advice to these customers about money-saving

[12] Companies' monthly internal review of website traffic.

programs, and new initiatives such as Schedule EV-J and Schedule EV-P, as applicable to customers' needs.

- Trained Hawaiian Electric Companies' Customer Care Representatives on the details of Schedule EV-J and Schedule EV-P in March 2022. Customer Care Representatives are the front-line personnel that respond to customer inquiries received via phone, email, and web-form, and offer support for all concerns, including rate schedule selection.

- Presented at industry events and meetings, sharing information about the Companies' efforts to support electric transportation initiatives – including the Schedules EV-J and EV-P:
    - Hawai'i Lodging and Tourism Association Engineers Advisory Council Meeting on September 22, 2022
    - Building Owners and Managers Association October 2022 Member Meeting on October 5, 2022.
    - Lightning Day – Electric Bus Showcase on November 16, 2022

Proposed Changes

At this time, there are no proposed changes to material aspects of the Schedule EV-J and EV-P Tariff Pilot, including program pricing, costs, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations.

The Companies are currently investigating a potential change to the Schedule EV-J and EV-P Tariffs, but have not yet determined whether a tariff change would be appropriate or necessary. One example of a potential change pertains to the requirement for a final closed building permit. Customers have experienced substantial delays in obtaining a final closed building permit for their projects, and having the requirement of a closed building permit within the tariff as a condition of eligibility has resulted in additional administrative burden and costs to both the customer and to the Companies, while negatively impacting the customer experience. The Companies may propose in the future to eliminate the requirement to provide: (1) a closed building permit(s), and (2) the identification number(s) of the charging equipment, as a condition of service.

Pilot Alignment with Advanced Rate Design and Integrated Grid Planning

Decision and Order No. 38680[13] provided guidance for advanced rate designs applicable to residential, small commercial, and medium commercial customers, and their implementation to a subset of customers in an opt-out TOU study period, the timing of which was modified by Order No. 40278[14] to February 2024 through January 2025, before a broader rollout is initiated. The TOU periods in ARD are slightly different than the Schedule EV-J and EV-P TOU periods, with a 9a-5p Daytime period,[15] a 9p-9a Overnight period, and a 5p-9p Evening Peak period.[16] The ARD rates have different Customer Charges, a Grid Access Charge instead of a Demand Charge, and different TOU Energy Charges. A baseline level of surcharges is included in the TOU Energy Charges, and TOU Energy Charges are set on a 1:2:3 ratio between the Daytime period, Overnight period, and Evening Peak periods. The baseline surcharges that are included in the TOU Energy Charges are updated annually.

There are currently no changes contemplated for Schedules EV-J and EV-P at this time as a result of ARD. The Companies note that there is no ARD equivalent for Schedule P customers expected during the TOU Study period. Schedules EV-J and EV-P were designed relative to Schedules J and P, and as those schedules remain available and are not contemplated to be modified during the ARD TOU Study period, Schedules EV-J and EV-P do not need to be modified at this time.

Data collected on charging patterns, such as the time of day, location, and magnitude including peak loading may serve as useful inputs developed through the Pilot to inform future forecasts in the IGP process.

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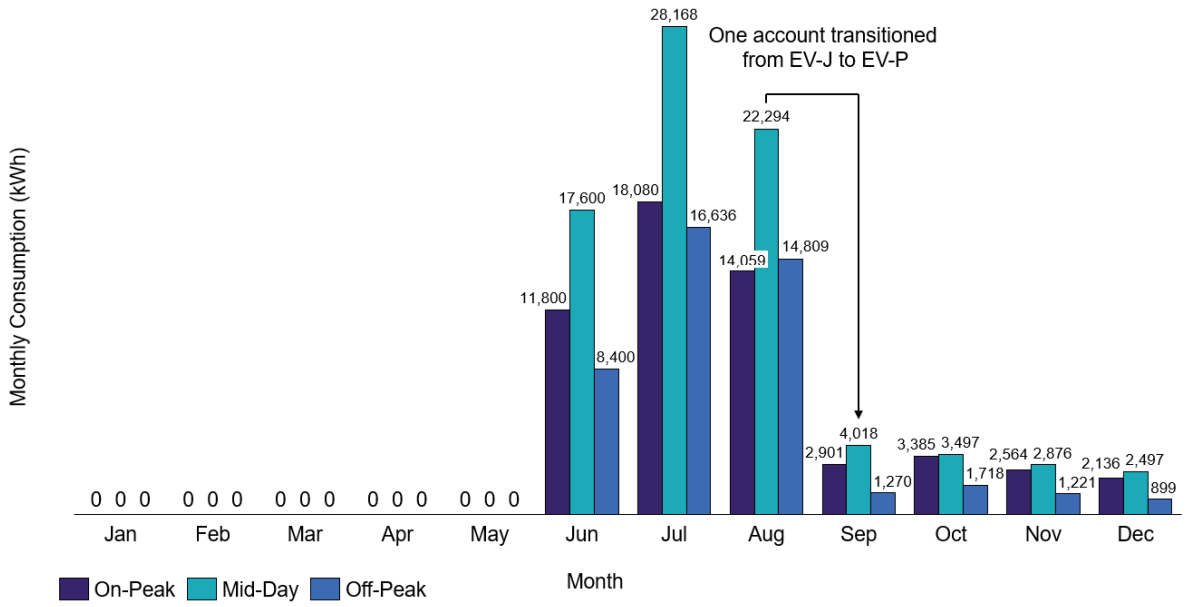
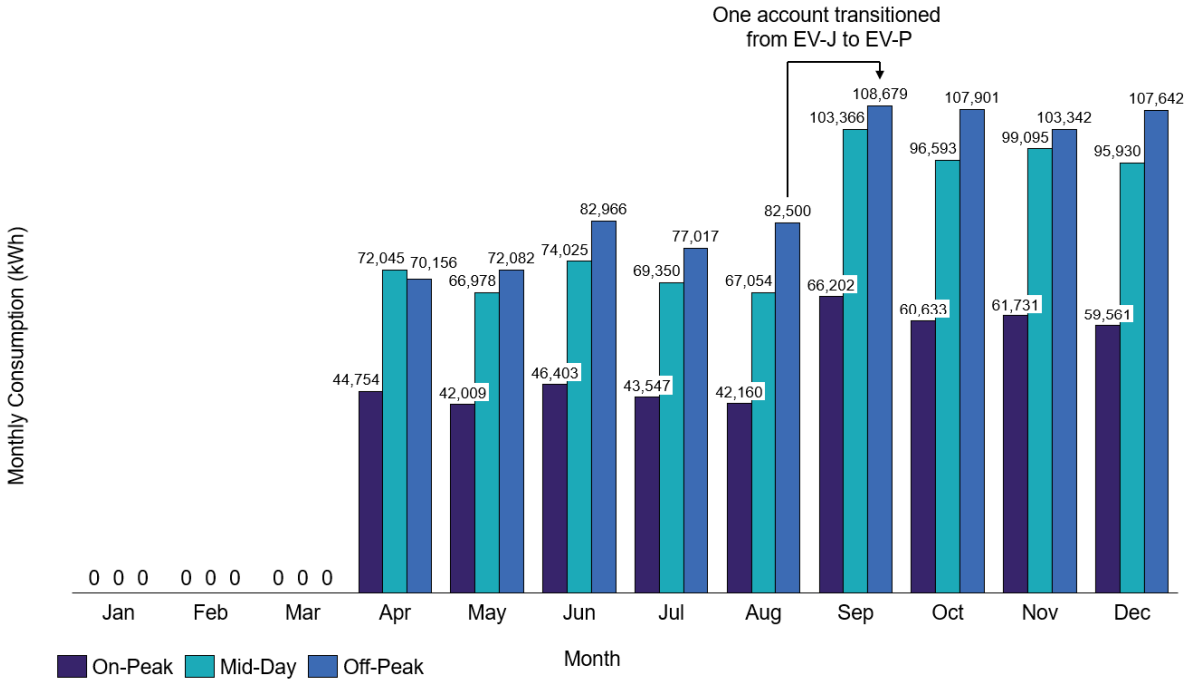
[13] Docket No. 2019-0323, issued on October 31, 2022.
[14] Docket No. 2019-0323, issued on September 22, 2023.
[15] The ARD Daytime TOU period is equal to the Schedule EV-J and EV-P Mid-Day TOU period.
[16] The ARD Evening Peak TOU Period is one hour shorter than the EV-J and EV-P On-Peak TOU period.

Schedule EV-J and EV-P Revenue and Consumption Data

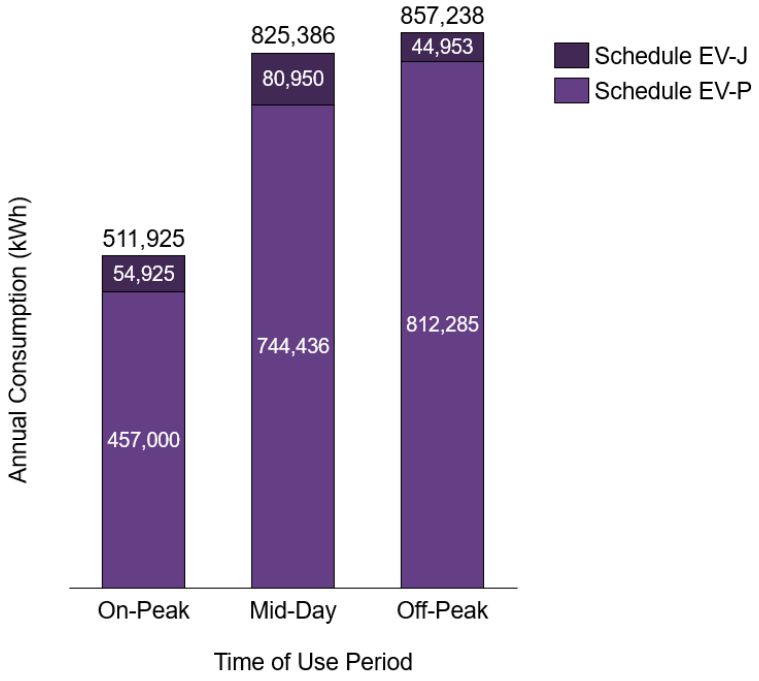
2023 Schedule EV-J Monthly Consumption by TOU Period – O‘ahu



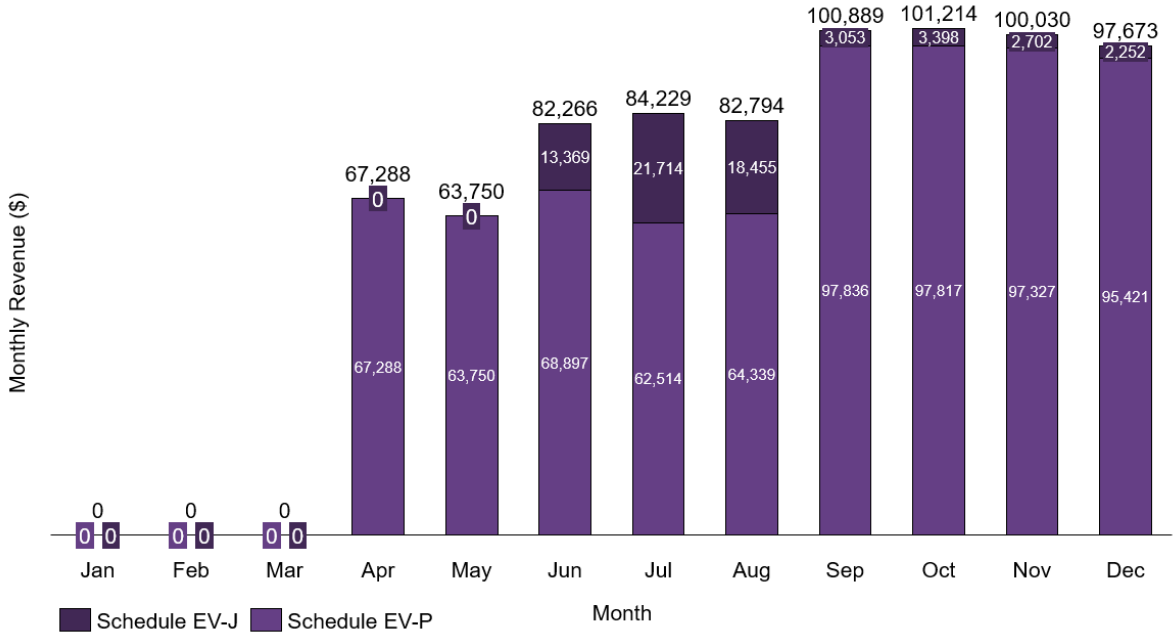
2023 Schedule EV-P Monthly Consumption by TOU Period– O‘ahu



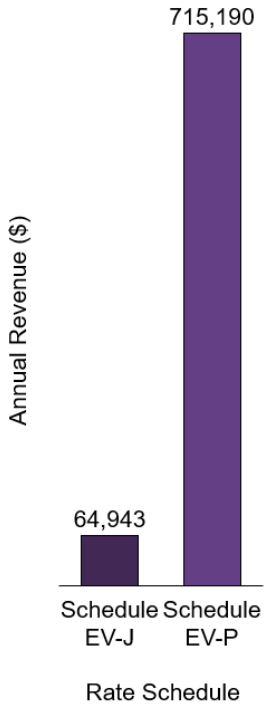
2023 EV Tariff Annual Consumption by TOU Period– O‘ahu



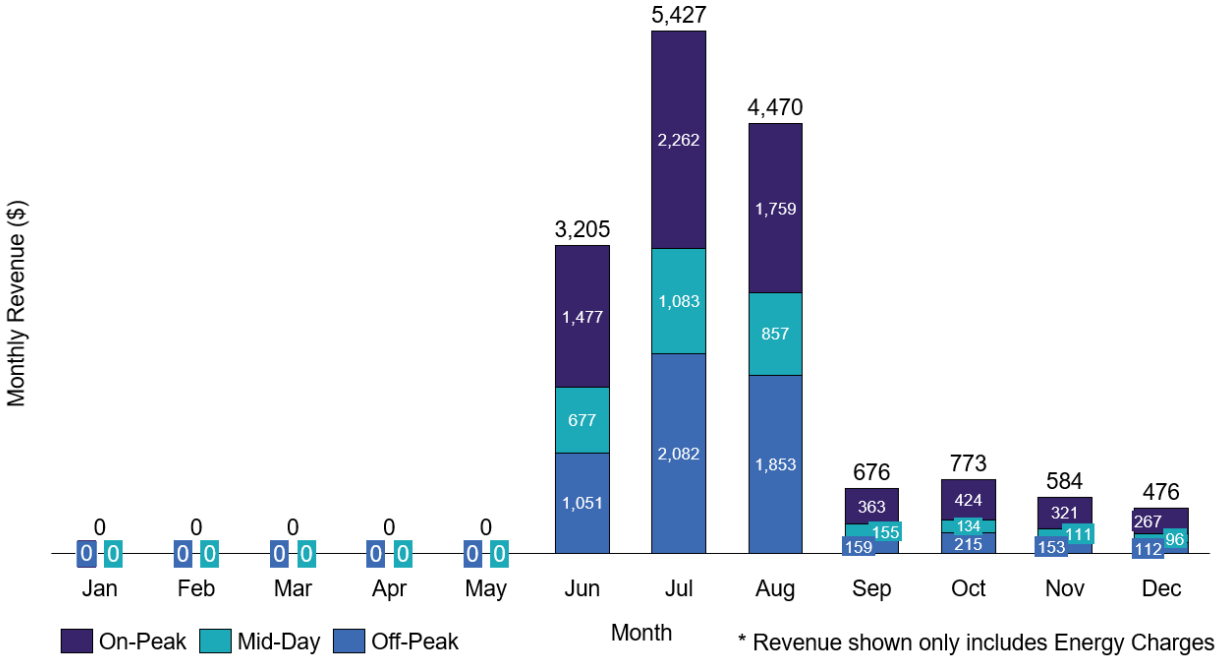
2023 EV Tariff Monthly Revenue – O‘ahu



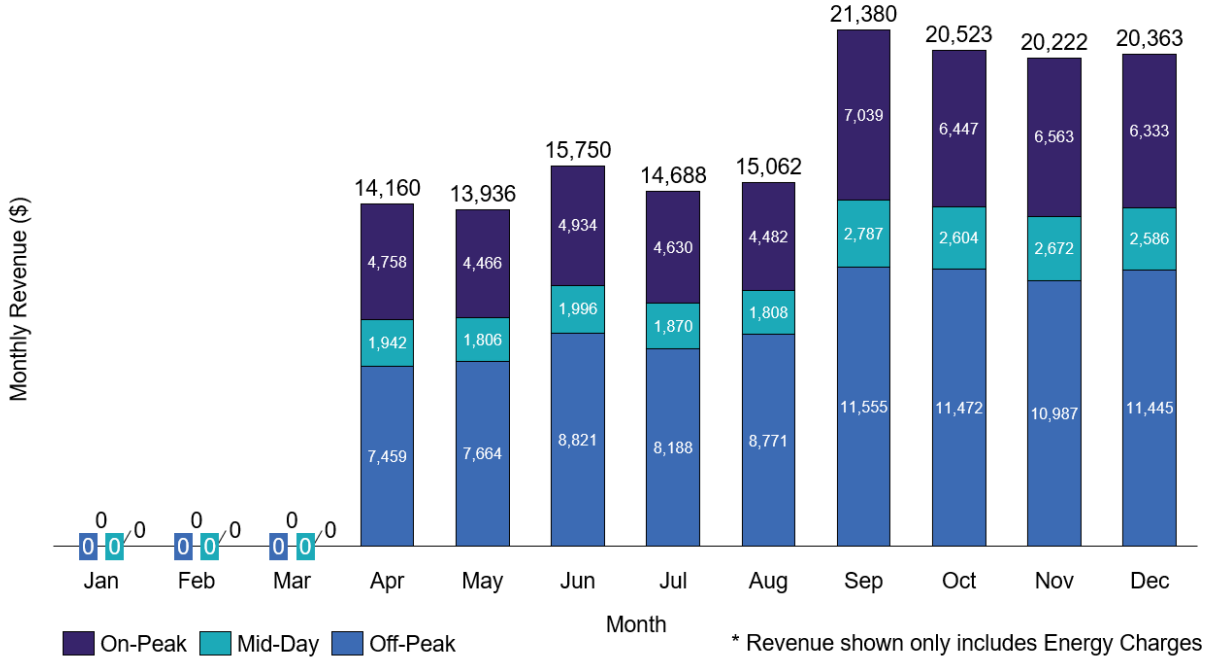
2023 EV Tariff Annual Revenue – O‘ahu



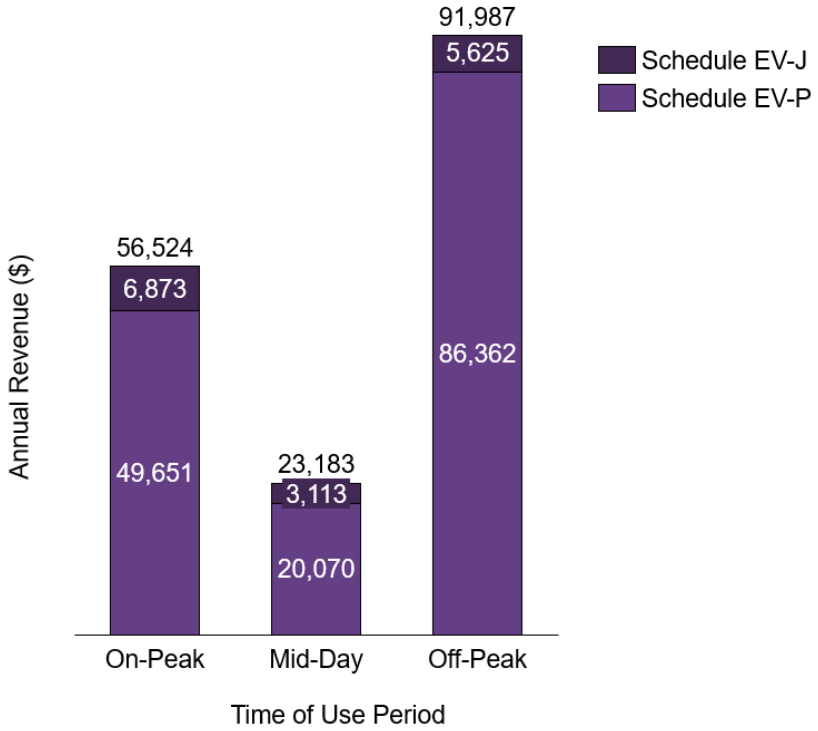
2023 Schedule EV-J Monthly Revenue by TOU Period – O‘ahu



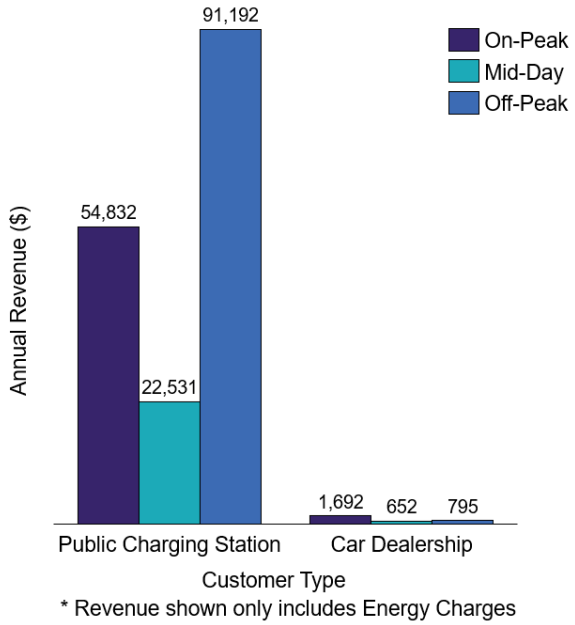
2023 Schedule EV-P Monthly Revenue by TOU Period – O‘ahu



2023 EV Tariff Annual Revenue by TOU Period– O‘ahu



2023 EV Tariff Revenue by Customer Type by TOU Period



Participant Survey Questions

Hawaiian Electric - EV Tariff Pilot Rates - Annual Survey

Aloha! You are receiving this survey as the point of contact for a Hawaiian Electric account that is enrolled in an EV Tariff Pilot Rate (Schedule EV-J or EV-P).

As part of Hawaiian Electric's pilot reporting requirements, we are collecting the following information to understand the impacts of the pilot rates on EV charging behavior and charging infrastructure deployment. This information will also be used to inform future program and rate development to better support electrified transportation options in our service territory.

This survey should take less than 20 minutes to complete. Please respond by end-of-day Thursday, January 18, 2024.

Please reach out to ethan.landy@hawaiianelectric.com with any questions. Thank you for your time and support of Hawaiian Electric's eMobility programs.

Customer & Account Information

Please provide the following general information about the Hawaiian Electric account enrolled in an EV Tariff Pilot Rate (Schedule EV-J or EV-P). If you have multiple enrolled accounts, please complete the entire form separately for each account.

Customer Name *

Service Address *

Name of Charging Station Location (if applicable)

How did you hear about Hawaiian Electric's EV Tariff rates? (select one) *

Where did you obtain the majority of your information about the EV Tariff Pilot Rates? (Select) *

Please provide your primary reason for enrolling in the EV Tariff Rates (Select one) *

How many more sites do you anticipate enrolling in EV Tariff Pilot Rates between now and 2027? *

Charger Details

In this section, please provide details on this account's charging stations that are enrolled in EV Tariff Rates (Schedule EV-J or EV-P).
Please base your answers on the stations that were installed at the time of enrollment in the EV Tariff Rates.

Date that the EV chargers were first placed into service *

mm/dd/yyyy

Select the type(s) of charging stations associated with this account *

Select the primary type(s) of end-users that use these charging stations *

Are the charging stations available for use by the general public? (Y/N) *

Enter the total quantity of charging STATIONS enrolled in EV Tariff Rates at this location *

Please respond with the number of physical charging stations at this location.
For example, a station that has two power-shared ports should be counted as (1) station.

Enter the total quantity of charging PORTS enrolled in EV Tariff Rates at this location *

Please respond with the number of simultaneously available ports at this location.
For example, a station that has two power-shared ports, where both can be used at the same time, should be counted as (2) ports.
A station that has (1) CCS port and (1) CHAdeMO port, where only one of the ports can be used at once, should be counted as (1) port.

Enter the quantity of CCS ports enrolled in EV Tariff Rates at this location *

Indicate total number of physical CCS connectors.

0

Enter the quantity of CHAdeMO ports enrolled in EV Tariff Rates at this location *

Indicate total number of physical CHAdeMO connectors.

0

Enter the quantity of NACS ports enrolled in EV Tariff Rates at this location *

Indicate total number of physical NACS connectors.

0

Enter the quantity of J-1772 ports enrolled in EV Tariff Rates at this location *

Indicate total number of physical J-1772 connectors.

0

End-User Pricing Structure

In this section, please provide details on the end-user pricing structure for the chargers enrolled in EV Tariff Rates.
"End-user pricing structure" refers to the charges that drivers pay to use the chargers.

Rates vary according to the time of day (Y/N) *

Idle fees are charged once vehicle's battery is full (Y/N) *

Charging sessions are billed based on (select one) *

If rates vary according to the time of day, please describe the time-of-use periods and associated pricing

Please provide any other relevant details describing the end-user pricing structure implemented for the chargers

Please describe why this end-user pricing structure was selected *

Please describe any changes made to the end-user pricing structure over time, and why these changes were made *

Example: change from fixed to time-of-use, implementation of session fees, increase/decrease in rates. If no changes were made, please enter "N/A".

Is charging session data (i.e., number of sessions and session duration per time-of-use period) available to be provided to Hawaiian Electric for reporting to the Public Utilities Commission and Department of Consumer Advocacy? *

If 'Yes', please provide this data in Excel or CSV format to Hawaiian Electric via email to ethan.landy@hawaiianelectric.com

Please indicate your agreement with the following statements about the EV Tariff Pilot Rates (Schedules EV-J and EV-P):

For each statement, please select an option in the drop-down menu.

Overall, I am satisfied with the EV Tariff Pilot Rates *

I feel that I am benefitting from energy cost savings under the EV Tariff Pilot Rates *

The EV Tariff's lower demand and mid-day energy charges translated to a reduction in end-user charging rates *

The higher energy charges during the peak period (5pm-10pm) influence end-users' charging behavior *

The requirements and conditions of enrollment were clear and easy to understand *

The requirement for a separately-metered electrical service was a barrier to enrollment in EV Tariff Rates *

The enrollment process was clear, easy, and efficient *

Hawaiian Electric's personnel were helpful and responsive before, during, and after the enrollment process *

If I install more EV charging stations in the future, I will enroll them in the EV Tariff Pilot Rates *

I would recommend EV Tariff Pilot Rates to other eligible EV station operators *

Feedback

Please share any feedback with Hawaiian Electric related to the EV Tariff Pilot Rates (Schedules EV-J and EV-P)

Please share any feedback, suggestions or improvements related to the EV Tariff Pilot Rates

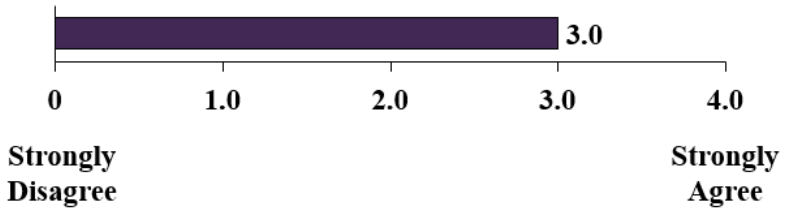
Please press "Submit" once complete. Mahalo!

Clear form

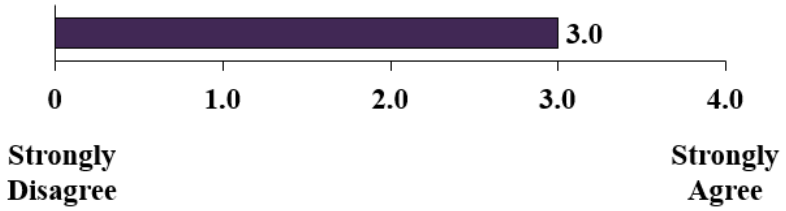
Submit

Aggregate Participant Survey Responses

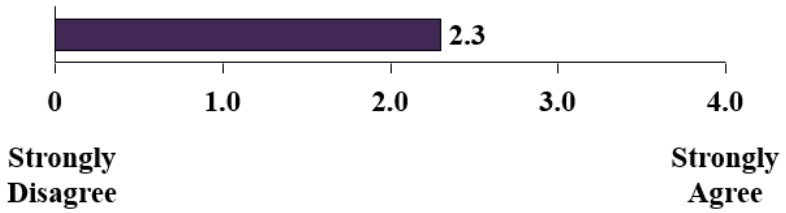
Overall, I am satisfied with the EV Tariff Pilot Rates



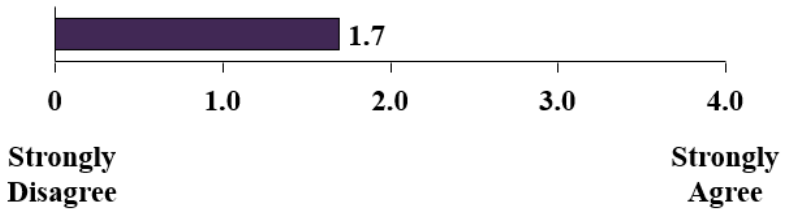
I feel that I am benefitting from energy cost savings under the EV Tariff Pilot Rates



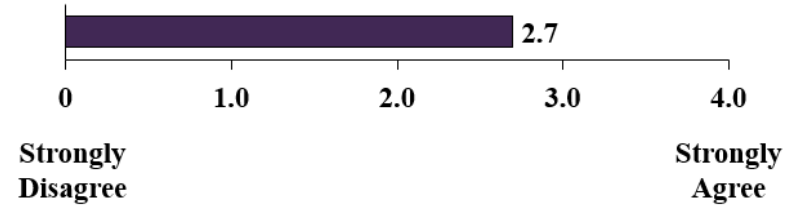
The EV Tariff's lower demand and mid-day energy charges translated to a reduction in end-user charging rates



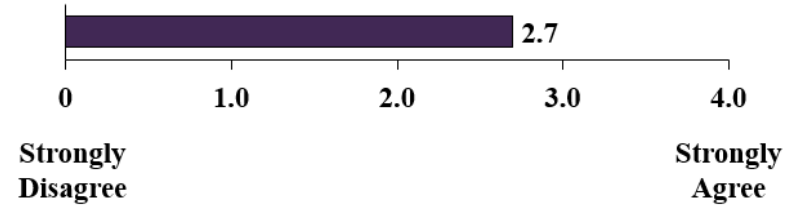
The higher energy charges during the peak period (5pm to 10pm) influence end-users' charging behavior



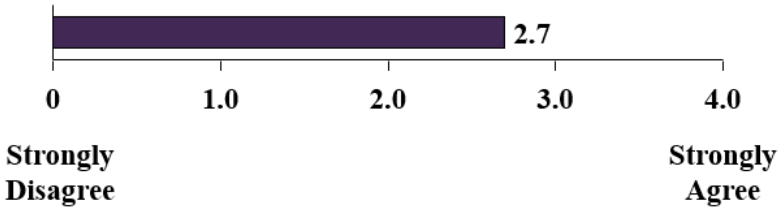
The requirements and conditions of enrollment were easy to understand



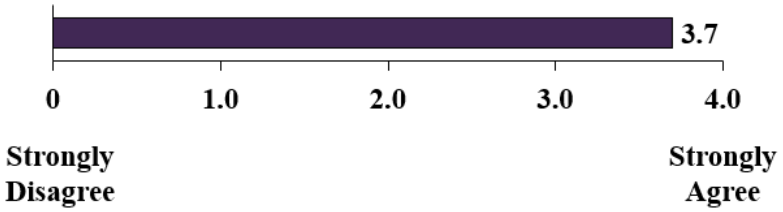
The enrollment process was clear, easy, and efficient



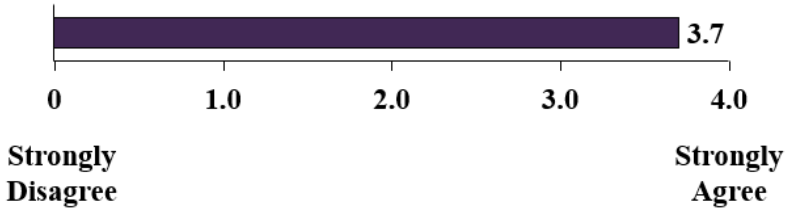
Hawaiian Electric's personnel were helpful and responsive before, during, and after the enrollment process



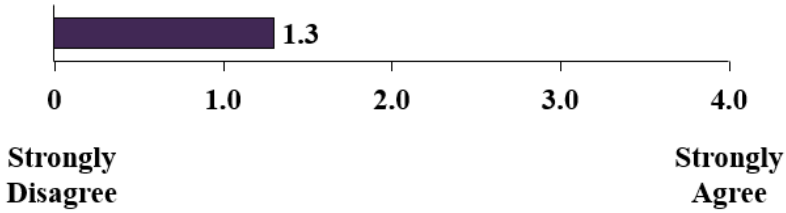
If I install more EV charging stations in the future, I will enroll them in the EV Tariff Pilot Rates



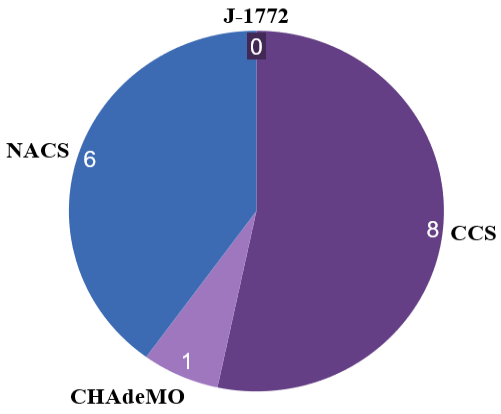
I would recommend EV Tariff Pilot Rates to other eligible EV station operators



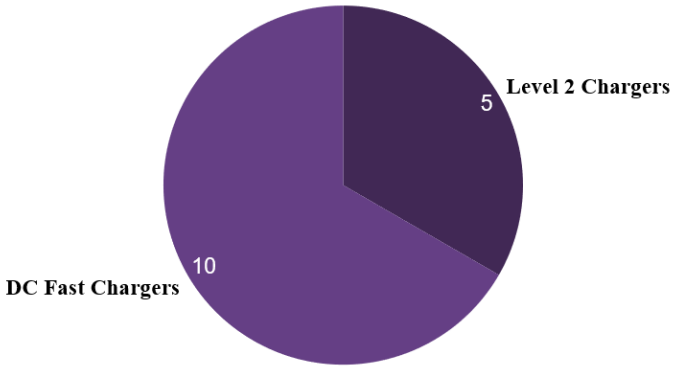
The requirement for a separately-metered electrical service was a barrier to enrollment in the EV Tariff Rates



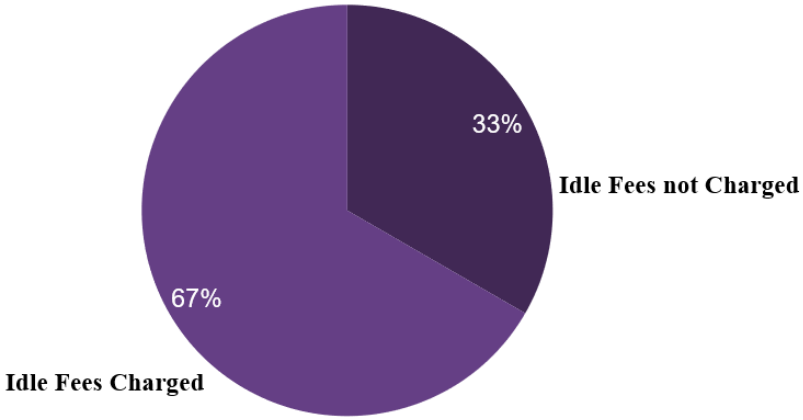
Quantity of Enrolled Charging Ports by Port Type



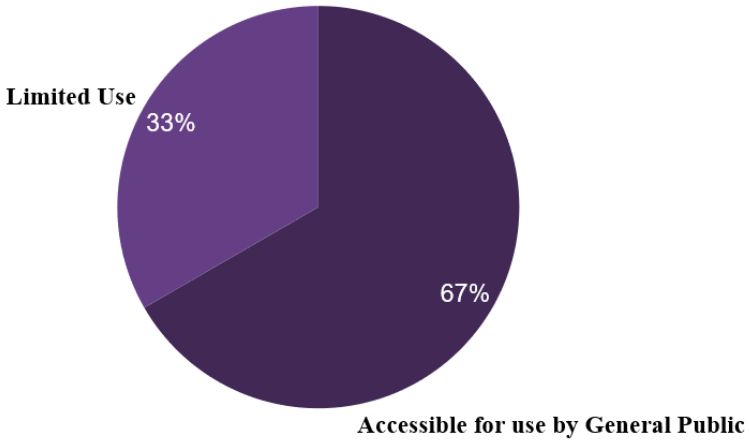
Number of Ports Enrolled in EV Tariff by Type of Charger



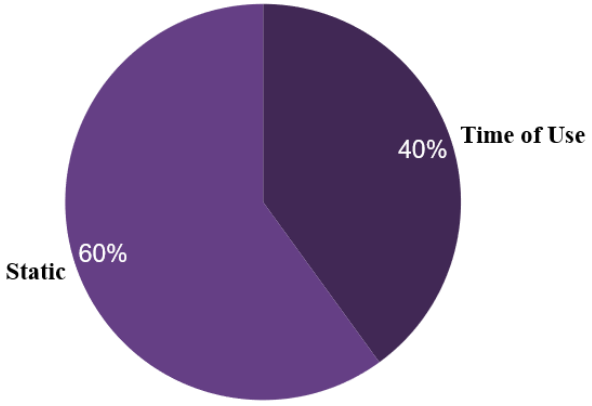
Percentage of Ports where Idle Fees are Charged



Percentage of Enrolled Ports Available for General Public Use



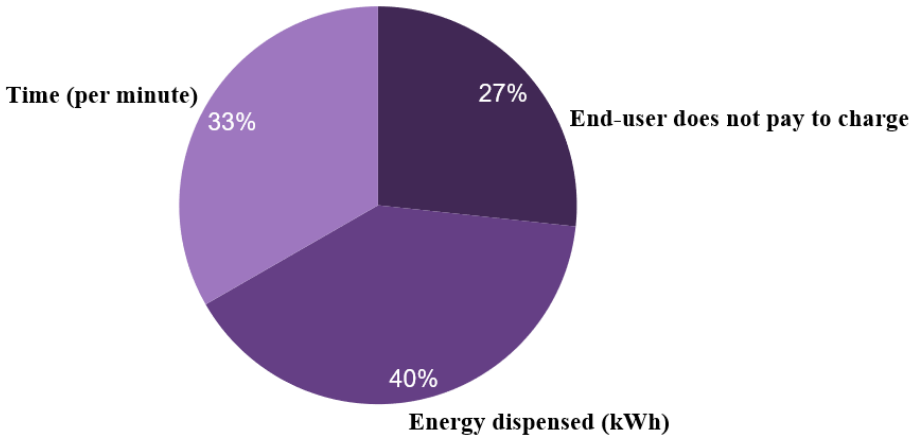
Percentage of Enrolled Ports by End-Use Pricing Structure



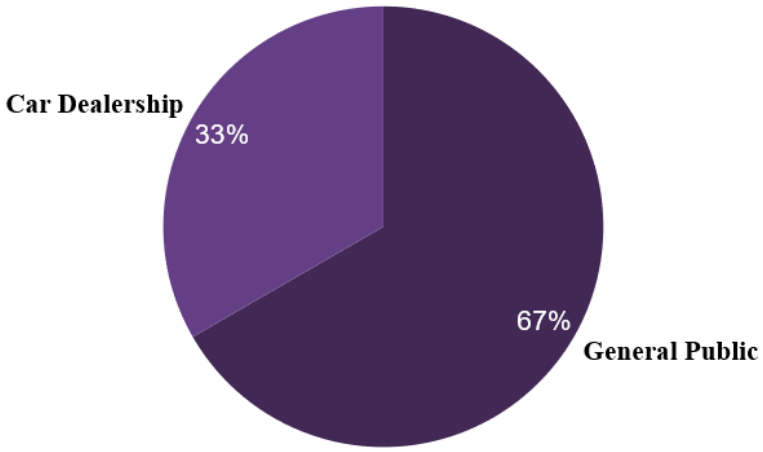
Primary Information Sources on EV Tariff Pilot Rates

- Hawaiian Electric's Website
- Hawaiian Electric's Electrification of Transportation Staff
- Hawaiian Electric's Commercial/Government Client Manager

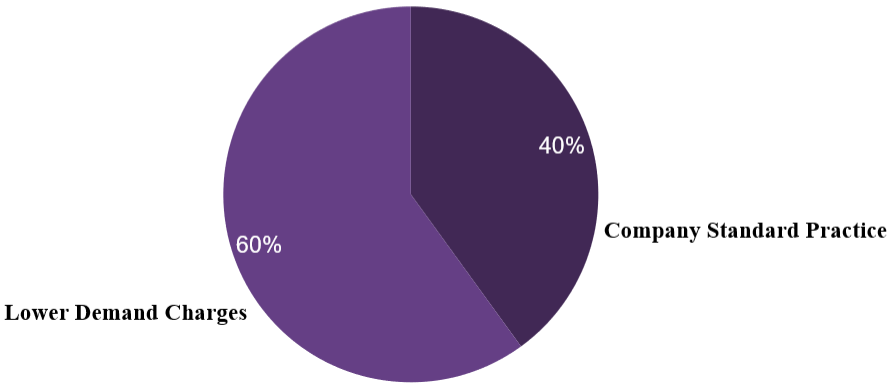
Percentage of Enrolled Ports by End-Use Billing Methodology



Percentage of Ports by Primary End-User Type



Percentage of Ports by Primary Reason for EV Tariff Enrollment



Greenhouse Gas Analysis

Table 1: Electric Car Charging Emissions Reduction for 2023 for Oahu

Inputs:

Vehicle Type	Car
Vehicle Fuel Replaced	Gasoline
Location	Oahu
Year Evaluated	2023

Assumptions and Calculations:

Description	Mid-day	Peak	Off-Peak	Units
Electricity Emission Factor[1]	1,260	1,570	1,599	(lb CO_2e/MWh)
Electricity Use for Charging Stations[2]	825,386	521,925	857,238	(kWh/year)
Fuel Economy of Fossil Fuel-Powered Vehicle[3]	26.00			(mile/fuel gallon)
Emissions from burning fuel[4,5]	19.4			(lb CO_2e/fuel gallon)
Annual Equivalent Vehicle Miles Travelled (based on electricity usage data)[6]	7,111,448			(miles)
Fossil Fuel-Powered Vehicle Combustion Emissions	338			(grams CO_2e/mile)

Emissions Reductions Calculations:

Time-of-use	Mid-day	Peak	Off-Peak	Units
Emissions Reduction for Electric Vehicle Replacing Fossil Fuel-Powered Vehicle[7]	2407.0			(MT CO_2e)
Emissions Increase from Electricity Used for Charging[7]	471.7	371.7	621.8	(MT CO_2e)
	1465.2			
Net Emissions Reduction[7]	**941.8**			**(MT CO_2e)**

Notes:

1. Time-of-use electricity emission factor provided by Hawaiian Electric for Oahu. Calculated based on each unit's heat rate, actual net generation per time-of-use, and each unit's actual GHG emissions in 2023.
2. The electricity usage takes actual billed kWh from Hawaiian Electric.
3. U.S. Environmental Protection Agency (EPA). 2023. EPA Automotive Trends Report: Greenhouse Gas Emissions, Fuel Economy, and Technology since 1975. Page ES2. Available at: https://www.epa.gov/system/files/documents/2023-12/420s23002.pdf
4. U.S. Energy Information Administration (eia). Carbon Dioxide Emissions Coefficients. 2022. Retrieved from: https://www.eia.gov/environment/emissions/co2_vol_mass.php
5. Methane and nitrous oxide emissions from U.S. Environmental Protection Agency (EPA). 2022. Emission Factors for Greenhouse Gas Inventories. https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf
6. Annual VMT reduction is based on annual equivalent vehicle miles travelled from the electricity usage at the charging stations divided by the fuel economy for electric cars.
7. Emissions reductions are calculated as the difference between indirect emissions from electricity generation used for charging and combustion emissions that would have otherwise occurred from fuel use. The indirect emissions for electricity generation are calculated by multiplying the electricity emission factor by the vehicle kWh electricity charging; while the avoided combustion emissions are calculated by multiplying the combustion emission factor by the vehicle miles traveled and applying appropriate unit conversion factors.

Abbreviations:

CO_2e - Carbon Dioxide Equivalent
EF - Emission Factors
GHG - greenhouse gas
kWh - kilowatt-hour
lb - pound
mpgge - miles per gasoline gallon equivalent
MT - metric tons
MWh - megawatt-hour
VMT - vehicles miles traveled

Methodology of Greenhouse Gas Emissions Calculations For EV Tariff Pilot Annual Report

For Operation in Calendar Year 2023

Hawaiian Electric Company, Inc.

February 14, 2024

1 Introduction

The Hawaiian Electric Company Inc. ("the Company") received approval to establish the Electric Vehicle Tariffs for Schedule EV-J – Electric Vehicle Charging Service – Demand and Schedule EV-P – Electric Vehicle Charging Service – Large Demand ("Pilot") on a pilot basis via Decision and Order No. 38157 ("D&O 38157") issued on December 30, 2021 in Docket No. 2020-0152.

This is the first reporting year (i.e., 2023) of the program with customer consumption data to report in the Annual Pilot Update Report. There are currently three accounts enrolled in the EV-J/EV-P rates, all located on O'ahu. D&O 38175 requires the Company to submit an annual report that documents greenhouse gas ("GHG") emissions associated with the incremental load under the proposed Pilot rates (by each time of use ("TOU") period and in total) and the estimated reduction in GHG emissions associated with the Pilot using the same methodology as provided in the Company's application. This memorandum documents the methodology used in calculating the resulting GHG emissions and estimated GHG reductions from the Pilot.

2 Calculation Methodology

Electric cars generally reduce GHG emissions ("emissions") compared to conventional fossil fuel-powered (diesel, gasoline, or compressed natural gas ("CNG")) cars. Electric cars result in indirect GHG emissions from electricity use, if the electricity is not all generated by carbon-free sources. These electricity GHG emissions replace GHG tailpipe emissions from fossil fuel-powered cars.

Several key variables affect the net GHG emissions reduction. These variables and the assumptions used for this analysis are as follows:

- Electricity CO_2e Emission Factors: The electricity GHG intensity factors ("factors" or "electricity factors") represent the carbon dioxide equivalent ("CO_2e") emissions in pounds ("lb") per megawatt-hour ("MWh") of electricity delivered to the grid. This varies by time of day, time of year, and electricity demand and is expected to decrease over time as the electricity grid incorporates more renewables. In 2023, Hawaiian Electric calculated electricity factors for the three TOU periods of interest using January-December 2023 averages for O'ahu. The O'ahu factors were as follows:

- Mid-Day (9:00 AM – 5:00 PM): 1,260 lb CO_2e per MWh
- Peak (5:00 PM – 10:00 PM): 1,570 lb CO_2e per MWh
- Off-Peak (10:00 PM – 9:00 AM [next day]): 1,599 lb CO_2e per MWh

These factors reveal the advantage, in terms of CO_2e emissions, of charging vehicles during the mid-day period, when renewable energy ("RE") is most abundant on the system. The factors will improve year-to-year as more RE is deployed on the grid.

The electricity factors are calculated from hourly metered energy generation in kilowatt-hours ("kWh") for the year sorted into the TOU periods, multiplied by the appropriate electricity factor for the generating unit in lb CO_2e/kWh and averaged for each TOU period. RE sources are assigned a CO_2e emission factor of zero. Fossil fuel generator intensities are calculated by dividing the CO_2e emissions by the corresponding generations. The customer solar generated electricity that is not exported to the grid is not included because it is not on the grid available for charging vehicles.

- Electric Vehicle Electricity Use: The metered electricity from charging stations was used to calculate indirect emissions from electricity generation. Metered electricity data was available on a monthly basis for each of the three time periods of interest.
- Fossil Fuel-Powered Car Fuel Economy: Fuel economy for fossil fuel-powered cars is expressed in terms of miles per gasoline gallon ("mpgg"). Based on the U.S. Environmental Protection Agency ("EPA") 2023 report *EPA Automotive Trends Report: Greenhouse Gas Emissions, Fuel Economy and Technology Since 1975*, the fuel economy averaged 26 mpgg.
- Combustion Emission Factors: The fossil fuel car emission factor represents the GHG emissions per gallon of fuel use. This calculation used a standard value of 19.4 lb CO_2e per gallon of gasoline fuel.[1,2]
- Vehicle Miles Traveled ("VMT"): The VMT represents the equivalent miles that were traveled by electric cars. This data was calculated by dividing the total charging KWH for the year by the Hawaiian Electric[3] electric car fuel economy of 0.31 kWh/mile.

Emissions reductions were calculated as the difference between indirect emissions from electricity generation used for charging cars and combustion emissions that would have otherwise occurred from fuel use of gasoline-powered cars. The indirect emissions for electricity generation were calculated by multiplying the electricity emission factor by the chargers metered electricity use; while the avoided combustion emissions were calculated by

[1] U.S. Energy Information Administration (EIA). Carbon Dioxide Emissions Coefficients. 2022. Retrieved from: https://www.eia.gov/environment/emissions/co2_vol_mass.php. Accessed: February 10, 2023.

[2] U.S. Environmental Protection Agency (EPA). 2022. Emission Factors for Greenhouse Gas Inventories. https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf.

[3] Hawaiian Electric. Electrification of Transportation. 2023. Available at:https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics/electrification-of-transportation. Accessed: February 01, 2024.

multiplying the combustion emission factor by the VMT and applying appropriate unit conversion factors.

3 Results

As shown in Table 1, in 2023, the net emissions reduction was 941.8 metric tons (MT) CO_2e when compared to tailpipe emissions from fuel that would have been consumed by fossil fueled cars for the equivalent amount of VMT.

As more vehicles participate in the program and the economy drives higher utilization of the participating electric vehicles, coupled with more renewables that are incorporated into the grid, the GHG emissions reduction will be greater. This program also results in air quality and health co-benefits, even more so as more renewable energy is integrated into the electrical grid. Electric cars reduce local criteria air pollutant and diesel particulate matter emissions compared to vehicles with tailpipe emissions. These emissions would otherwise negatively impact local air quality and health.[4]

[4] USEPA. Smog, Soot, and Other Air Pollution from Transportation. 2019. Available at: https://www.epa.gov/transportation-air-pollution-and-climate-change/smog-soot-and-local-air-pollution. Accessed: February 10, 2023.

Data Analytics Clearinghouse
Annual Pilot Update

Introduction

The Hawaiian Electric Companies'[1] Annual Clearinghouse Pilot Update report is submitted in compliance with: 1) Decision and Order No. 37507 ("D&O 37507") issued on December 23, 2020 in Docket No. 2018-0088, and 2) Decision and Order No. 38753 ("D&O 38753") issued on December 8, 2022 in Docket No. 2022-0212, which approved the Data Analytics Clearinghouse Pilot (referred to as the "DACh" or "Clearinghouse Pilot" or "Pilot"), subject to certain conditions.[2]

D&O 37507 requires the Companies to report on:

- Implementation schedules and progress relative to the pilot's objective and key performance metrics;
- Pilot impacts on underserved communities;
- Pilot costs and revenues (if applicable), including cost analysis per subscriber, quantitative and qualitative benefits (for both pilot participants and non-participants), and a Net Present Value ("NPV") analysis;
- Qualitative description of the pilot and customer benefits; and
- Any proposed changes to material aspects of the pilot, such as program pricing, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations (including reason for the cancelation).[3]

D&O 38753 additionally set three conditions, requiring the Companies to:

1. Prioritize developing a list of "use cases" as early as possible in the Data Clearinghouse development through stakeholder feedback and provide a preliminary list in the annual Pilot Update. "Use cases" should include a description of one or more data metrics (e.g., hourly consumption by income level), the data sources (e.g., Advanced Metering Infrastructure ("AMI") data, demographical data), the purpose of the metric, such as a trend that the data will

[1] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.
[2] *See* D&O 37507 at 175-176, 218, 222 and D&O 38753 at 19-20. Although D&O 37507 requires that the annual Pilot Update be filed by March 31 of each year, the Companies are submitting this report in advance of the deadline to facilitate the Consumer Advocate's and the Commission's review.
[3] *See* D&O 37507 at 175-176.

expose or a question that the data will help answer, and the venue(s) or decisions which will be informed by the data;

2. Where relevant and to the extent feasible during the implementation of the Clearinghouse Pilot, the Companies will make efforts to expand participation in and/or use of the Pilot interface to additional interested entities; and

3. In addition to metrics on the number of visitors and volume of data being analyzed, the Companies shall also track and report on the frequency of participants visiting and using the DACh data and participants' use of data (e.g., times and ways participants use data gained from the Clearinghouse Pilot and for what purpose or outcome), which can be gained through the Companies' feedback cycle (e.g., participant surveys).[4]

This report is also filed in accordance with the Pilot Process approved in Order No. 37865 ("Order 37865"), issued on July 9, 2021, in Docket No. 2018-0088. The Pilot Process includes reporting on:

- Challenges and lessons learned, process improvements, a listing of performance relative to all key metrics, and any future permanent implementation plans based on an evaluation against the metrics established; and
- Updates to estimated costs and schedule (e.g., if there were significant delays in receiving signed agreements from government agencies).[5]

The Companies address each of the requirements above, as applicable.[6]

This report reflects the work completed in 2023, which is summarized by Program Increment in the Costs & Revenues section.

Pilot Implementation Schedule

In the Data Analytics Clearinghouse Notice, the Companies had initially anticipated commencing the Pilot in the first quarter of 2023 with approximately fifteen months (15) for implementation and an additional nine (9) months Early Life Support ("ELS"), with a Pilot end date in December 2024.[7] Upon the Pilot's approval by the Commission in December 2022, the Statement of Work ("SOW") with the primary vendor was finalized on February 6, 2023, and the

[4] *See* D&O 38753 at 19-20.
[5] *See* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.
[6] As of 2023, reporting requirements that are not applicable include the NPV analysis.
[7] The Notice stated that the timeline is representative and depends on the start date for the project. Notice at 18, n.25.

formal project kickoff and beginning of the first Program Increment commenced on February 27, 2023.

The overall Pilot is essentially on track and the schedule remains consistent with the Notice, reflecting an estimated twenty-four (24) month duration, with implementation expected to end in May 2024 and ELS expected to end in February 2025.

The following program increments were completed as scheduled:

- Program Increment 2 completed in August 2023;
- Program Increment 3 completed in November 2023; and
- Program Increment 4 started December 2023 and is expected to be completed by March 2024.

The Clearinghouse access methods have been technically completed including the Clearinghouse Portal, Databricks Collaboration Workspace, and Delta Sharing. Clearinghouse participants[8] began onboarding in February 2024 through guest accounts, with group engagement sessions and utilization of the Clearinghouse Databricks Collaboration Workspace starting at the end of February 2024.

The schedule for 2024 and 2025 is subject to potential adjustments based on feedback and requirements from Pilot participants as well as adjustments regarding estimated support and system costs. Pursuant to Order No. 40648, Hawaiian Electric has until August 30, 2024 to request to extend and/or expand the Pilot.[9]

[8] Pilot participants include the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs ("Consumer Advocate"), the Honolulu, Maui, and Hawai'i County Sustainability and Resiliency offices, Hawaii Energy, the University of Hawaii through Hawaii Natural Energy Institute ("HNEI"), the University of Hawai'i Economic Research Organization ("UHERO"), the Hawaii State Energy Office ("HSEO"), and the Commission.

[9] Order No. 40648, *Granting the Hawaiian Electric Companies' Motion for Enlargement of Time Regarding the Data Analytics Clearinghouse Pilot*, issued on March 7, 2024, in Docket No. 2022-0212.

Costs & Revenues

The Pilot budget is on track with a slight underspend on system costs due to a delay in full onboarding of external users. These costs are expected to be incurred in 2024 depending on actual use.

During calendar year 2023, the Companies incurred actual Pilot expenses totaling $1,644,694, including excise tax. All of the Pilot expenses incurred in 2023 are non-labor expenses. Figure 1 reflects the expenses incurred by company.

Figure 1. Expenses Incurred by Company ($)

Year	Hawaiian Electric	Hawai'i Electric Light	Maui Electric	Total
2023	$1,151,286	$246,704	$246,704	$1,644,694

The following tables detail significant accomplishments, work that was completed, and the expenses incurred during calendar year 2023, by Minimum Viable Products ("MVPs") and Program Increments.[10]

Program Increment 1

Phase	Accomplishments
MVP 1 & Program Increment 1 from March 2023 to May 2023 total cost of outside services: $545,895	Established architecture for the Clearinghouse Portal & Collaboration Workspace with key architectural decisions and technology evaluations • Developed User Experience design for the Clearinghouse Portal • Completed Data Governance Charter for the Enterprise Data Analytics Platform ("EDAP") to support the Clearinghouse • Developed solution architecture to enhance EDAP to support the Clearinghouse • Completed Fit-Gap Analysis for the Clearinghouse Portal • Completed remediation tasks to security policies in development environment • Completed evaluation of Microsoft Purview ability to support Data Catalog Aligned on priority use cases and drafted requirements for timeseries data sharing, load profile analysis pre/post photovoltaic ("PV"), and energy burden • Developed use case Load Profile Analysis Pre/Post PV and underlying data • Developed use case Time Series Data Sharing • Developed use case Energy Burden and underlying data - first iteration Defined processes and procedures to deliver on external stakeholder demand for Clearinghouse data, reporting, and governance services

[10] Development of the Data Analytics Clearinghouse was conducted in MVPs. The purpose of MVPs is to deliver business functional capabilities that can be used by people to do their work. The MVPs are delivered incrementally in phases called Program Increments. This method is common in the agile delivery framework, which was adopted as part of this Pilot.

	• Defined services delivery model and maturity curve roadmap (based on Unified Artificial Intelligence ("UAI") model) • Aligned ways of working based on agile principles • Reporting on velocity and capacity to meet demand for both use cases and architecture enablers

Program Increment 2

Phase	**Accomplishments**
MVP 1 & Program Increment 2 from Jun 2023 to Aug 2023 total cost of outside services: $720,047	Technical release of Clearinghouse Portal & Collaboration Workspace for MVP1 • Developed Clearinghouse Portal prototype • Completed User Experience design for the Clearinghouse Portal • Completed data governance operating model and metadata playbook • Completed solution system design • Developed terms of use policy Developed first iterations of Clearinghouse use case interactive reports • Developed first iteration of AMI data for publishing to the Clearinghouse • Developed first iteration of load profile analysis pre/post PV Stakeholder engagement meeting to receive feedback, clarify requirements, and set priorities • Held external kick-off meeting with all external stakeholders (over 60 attendees) • Conducted first survey to capture feedback (9 responses) • Completed stakeholder analysis to assess readiness of external stakeholders • Completed communication plan for external stakeholders • Released first measurement & valuation survey to external stakeholders

Program Increment 3

Phase	**Accomplishments**
MVP 2 & Program Increment 3 from Sept 2023 to Nov 2023[12] total cost of outside services: $378,752	Released Clearinghouse Pilot & Collaboration Workspace MVP2 ready for user provisioning • Production release of the Clearinghouse (https://clearinghouse.hawaiianelectric.com/) for initial feedback • Developed onboarding procedures for external stakeholders • Released anonymized data to support publishing of use case data and reports • Published PV Load Profile use case reports to the Clearinghouse Portal • Published Energy Burden use case reports to the Clearinghouse Portal • Published business glossary to the Clearinghouse Portal • Published terms of use policy • Implemented system design and automated infrastructure deployment • Refined metadata playbook for Microsoft Purview • Developed system security plan Stakeholder engagement to support adoption & Measurement and Valuation • Held multiple sessions with external stakeholders to provide overview and solicit feedback

[12] Program Increment 4 initiated in December 2023, but no additional costs were incurred in December 2023.

	• Measurement and Valuation framework with metrics to report on project metrics, system metrics, usage metrics, and business function metrics • Developed interactive reports for both project metrics and system metrics • Released second survey to external stakeholders (18 responses)

Cost share was provided by Microsoft through $50,000 in End Customer Investment Funds ("ECIF") which supported usage of Microsoft products in the development of the Clearinghouse. These ECIF funds reduced expenses incurred and were applied to invoices through TEKsystems Global Services, LLC ("Tek Systems"), as a Microsoft approved partner during Program Increment 2. Tek Systems also provided an estimated $376,432 of additional business development services, which included research, development, and testing of new tools and functionality for use in the Clearinghouse, at no charge.

The Pilot did not generate any revenues in 2023.

Use Cases

In accordance with D&O 38753, Condition No. 1, at page 19, the Companies provided a preliminary list of use cases in the Pilot Update Report filed on February 29, 2023. Since the last Pilot Update report several use cases have been implemented and are described below.

Time Series Data Sharing for PII and non-PII

The purpose of this use case is to provide AMI time series data to Hawaii Energy and anonymized versions to public research entities[13] for planning, program design, and program evaluation. This use case was created to respond to the needs of the public research entities who received the data and were having challenges with the processing, storing, and utilization of the data due to the large size. This dataset has exceeded the practical use of traditional file sharing applications such as Secure File Transfer Protocol ("SFTP") tools.

[13] "Public research entities" include the Consumer Advocate, the Honolulu, Maui, and Hawai'i County Sustainability and Resiliency offices, Hawaii Energy, the University of Hawaii through HNEI, UHERO, and HSEO.

This use case focuses on Time Series Data Sharing, involving both Personally Identifiable Information ("PII") and non-PII data, between Hawaii Energy and stakeholders. This is facilitated through the following methods:

- A Databricks Collaboration Workspace (this provides the full application, compute, and storage needed with the Clearinghouse platform for analysis)
- A Databricks Delta Sharing Tool (appropriate for agencies with their own cloud compute and storage environments)

Key requirements include enabling Delta Share and provisioning a Databricks Collaboration Workspace. The process includes converting Meter Data Management System ("MDMS") kilowatt ("kW") data into 15-minute parquet datasets, shared as views for analytics.

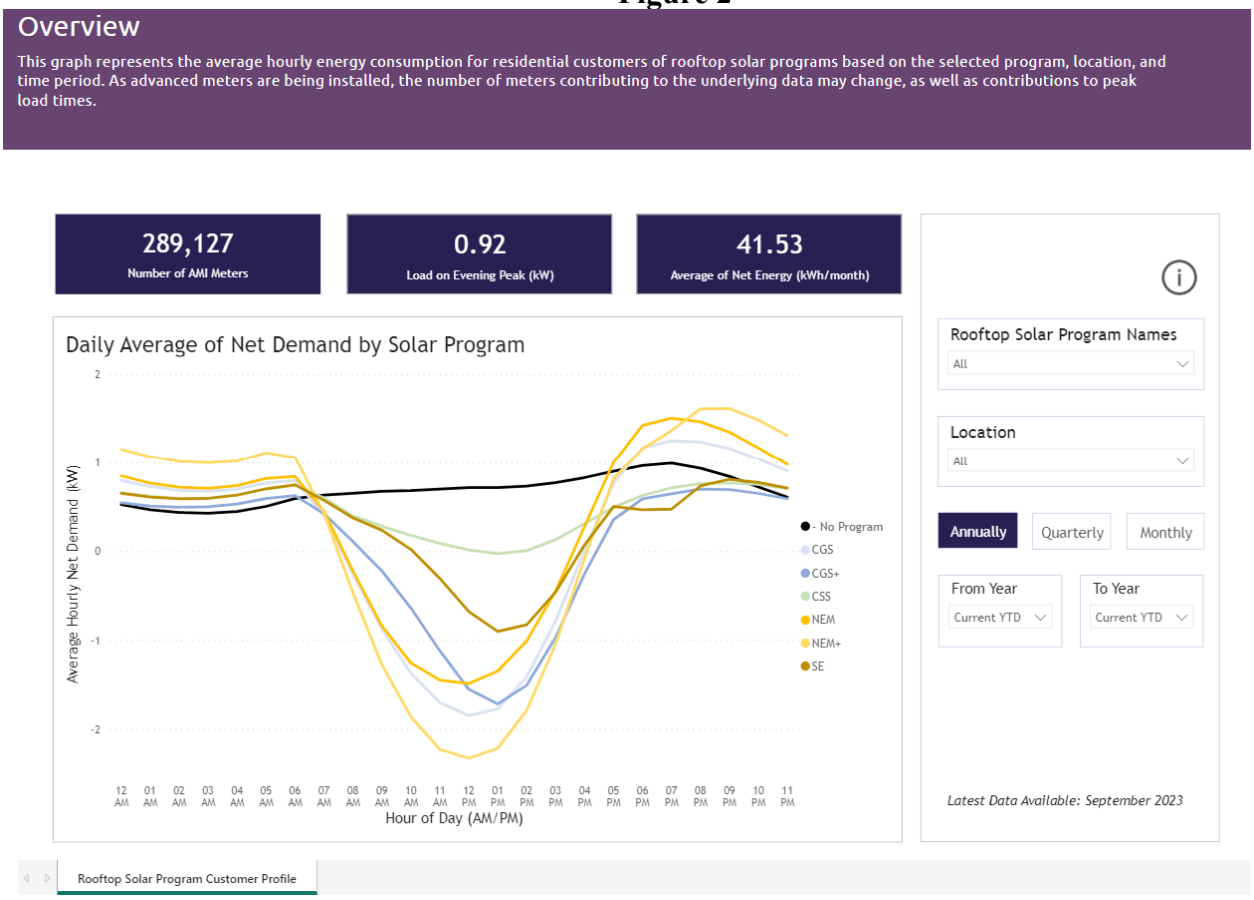
The benefit to Pilot participants and value of this use case includes meeting utility sharing requirements, enhancing data accessibility, and achieving productivity and time savings in the preparation and administration of data sharing. The benefit to non-participants is the resulting work that the public research entities will perform to inform energy decision making that impacts Hawai‘i. The Databricks Collaboration Workspace facilitates running analytics on large datasets, adding transparency into data access and usage. Categorized under Meter Data Analytics, the anticipated outcome is the establishment of a scheduled, functional, documented, and replicable infrastructure to support efficient sharing and useability of AMI time series data.

Load Profile Visualizations for Home without PV and in various PV Programs

The purpose of this use case is to provide a visualization with some filter capabilities to present a view focused on average daily load shapes among PV and non-PV customers, as shown in Figure 2 below, with the data being sourced from the large time series data. The public research entities have provided feedback that this method of presenting curated views of the time series data would be useful in their work to convey information to decision makers and as a starting point for in-depth analytics. Figure 2 below presents the average load shape for residential homes in an embedded PowerBI dashboard with the ability to select the PV program

and time period of interest. This visualization allows a comparison of how load shapes change for different PV programs using a point and click process. This allows users to review the "big data AMI" dataset without the need to use query languages. Public research entities have specifically expressed interest in the difference in load profiles with and without PV. An example is shown in Figure 2, which presents customer load profiles for solar program participants by average hourly net demand (in kW), based on AMI data from 289,127 meters, along with a baseline of customers not enrolled in a solar program.

Figure 2



Load Profile Analysis Pre/Post PV Program Participation

The purpose of this use case is to provide a visualization with some filter capabilities to present a view focused on how average daily load shapes change before and after homes began participating in a PV program, as shown in Figure 3 below, with the data being sourced from the large Time Series Data. The public research entities have expressed interest in this method of

presenting a view of the time series data. These pre/post PV load shapes may inform how PV programs are influencing behavior changes. This curated view is useful in their work to convey information to decision makers and as a starting point for more in-depth analytics.

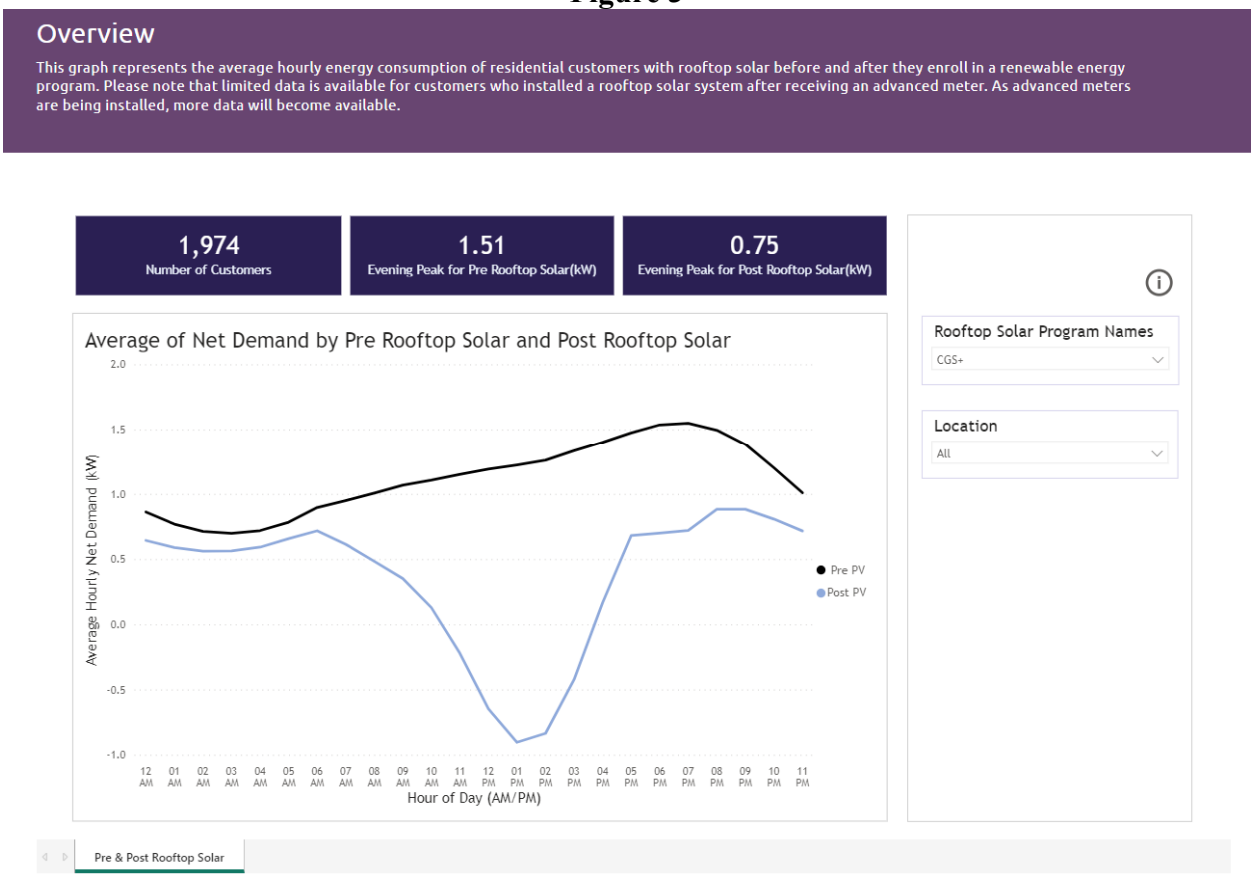
For example, this use case may help elucidate the impact of the new Smart Renewable Energy Program Export Rider to be implemented on April 1, 2024 with its three time period payment values, and further, may also help elucidate differences with the existing PV programs (i.e., the existing Standard Interconnection Agreement ("SIA"), Net Energy Metering ("NEM"), Net Energy Metering Plus ("NEM+"), Customer Self Supply ("CSS"), Customer Grid Supply ("CGS"), Customer Grid Supply Plus ("CGS+"), and Smart Export ("SE") programs). The knowledge of how customers on existing programs may change their load patterns in the future may inform energy planning, integrated grid planning, and the design of future programs.

The core value of this use case lies in the creation of Hawai‘i-specific PV load shapes categorized by program, facilitating the evaluation of program effectiveness and potential developmental pathways. The data shapes utilize anonymized load data, usage data provided by advanced meters, with key features, including PV Program, Pre- and Post-Start Date, and Residential and Commercial segmentation flags, derived from the customer and billing systems.

The implementation strategy entails crafting a curated dataset, developing visualizations for a user-friendly portal, and designing portal displays for both internal and external audiences. The ability to select each PV program allows a review of how each program influences the load shape changes. In the future, the addition of an attribute noting homes with and without batteries will allow a look at the post-PV load shapes in homes with and without batteries.

Figure 3 below presents a general example of a portal view of customer load profiles for locations with smart meter data before and after their solar program contract start date, shown by the average hourly net demand (in kW) for the group of 1,974 CGS+ customers included in the dataset.

Figure 3



Energy Burden Report

The purpose of this use case is to create a dashboard with a metric of the energy cost burden per household to inform the financial burden of electric costs on various communities with the ability to review cost impacts within underserved communities, as shown in Figure 4 below. The data is sourced from US Census and electric billing data.

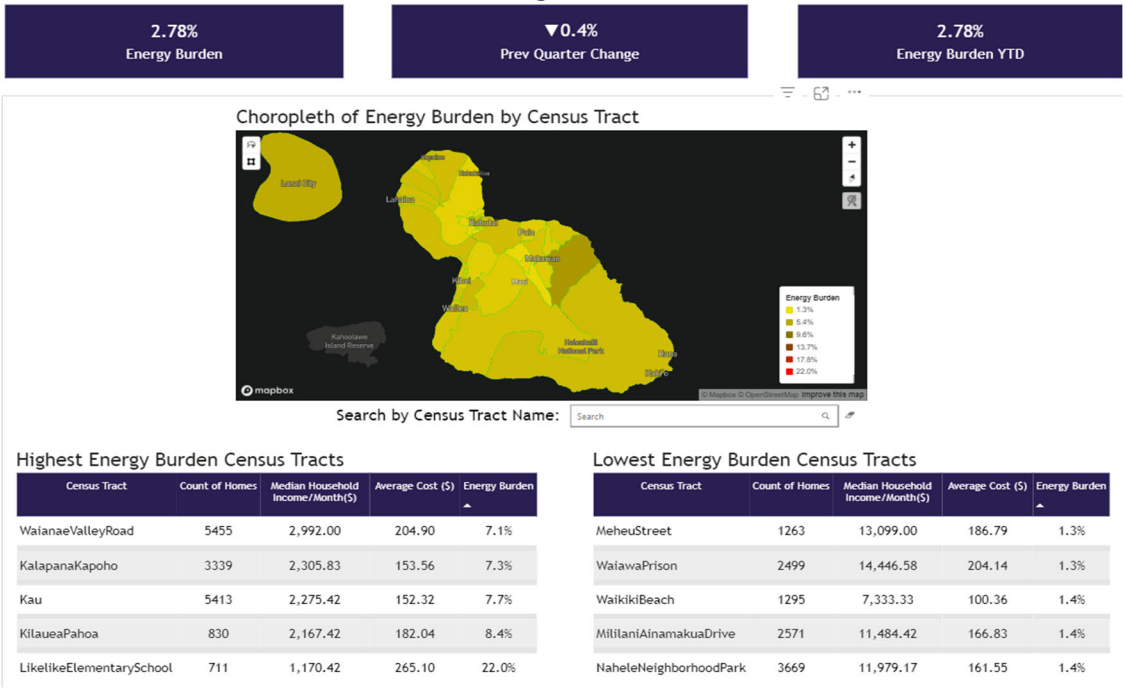
This use case addresses Pilot impacts on underserved communities by providing the automation of the creation and portal access presentation of a Low-to-Moderate Income ("LMI") report traditionally utilized to provide information to agencies related to serving the Asset Limited, Income Constrained, Employed ("ALICE") population. This data has been utilized by the City and County of Honolulu in their annual sustainability report. The aim is to streamline the process by capturing historical data and establishing a pipeline for report automation. The report covers an equity metric, including average electric bills, poverty levels, Section 8 housing,

in arrears reporting, payment plans, and disconnections. The primary focus is on areas with energy burden and Low-Income Communities ("LICs").

The detailed reports explore residential energy burden, presenting information utilizing 2020 census tract areas defined by the U.S. Census Bureau and the ability to tie this information with the census statistics published for these areas. Key factors considered in the analysis include electric cost from electrical energy billings, household median income from the U.S. Census Bureau, and resulting calculated energy burden, with a specific breakdown for PV and non-PV residential customers, separated by island. This data can be used by agencies in their grant proposal development, program audience selection, and reporting on their results over time.

An example of the portal presentation of the Energy Burden data is presented in Figure **4** where the user is presented with a central map showing the census tracts and showing the individual energy burden values both indicated by a color scale as well as showing the value for the census tract in a hover over pop up. The top 10 and bottom 10 energy burden census tracts are provided in a table format for seeing the range of energy burdens.

Figure 4



Highest Energy Burden Census Tracts

Census Tract	Count of Homes	Median Household Income/Month($)	Average Cost ($)	Energy Burden
WaianaeValleyRoad	5455	2,992.00	204.90	7.1%
KalapanaKapoho	3339	2,305.83	153.56	7.3%
Kau	5413	2,275.42	152.32	7.7%
KilaueaPahoa	830	2,167.42	182.04	8.4%
LikelikeElementarySchool	711	1,170.42	265.10	22.0%

Lowest Energy Burden Census Tracts

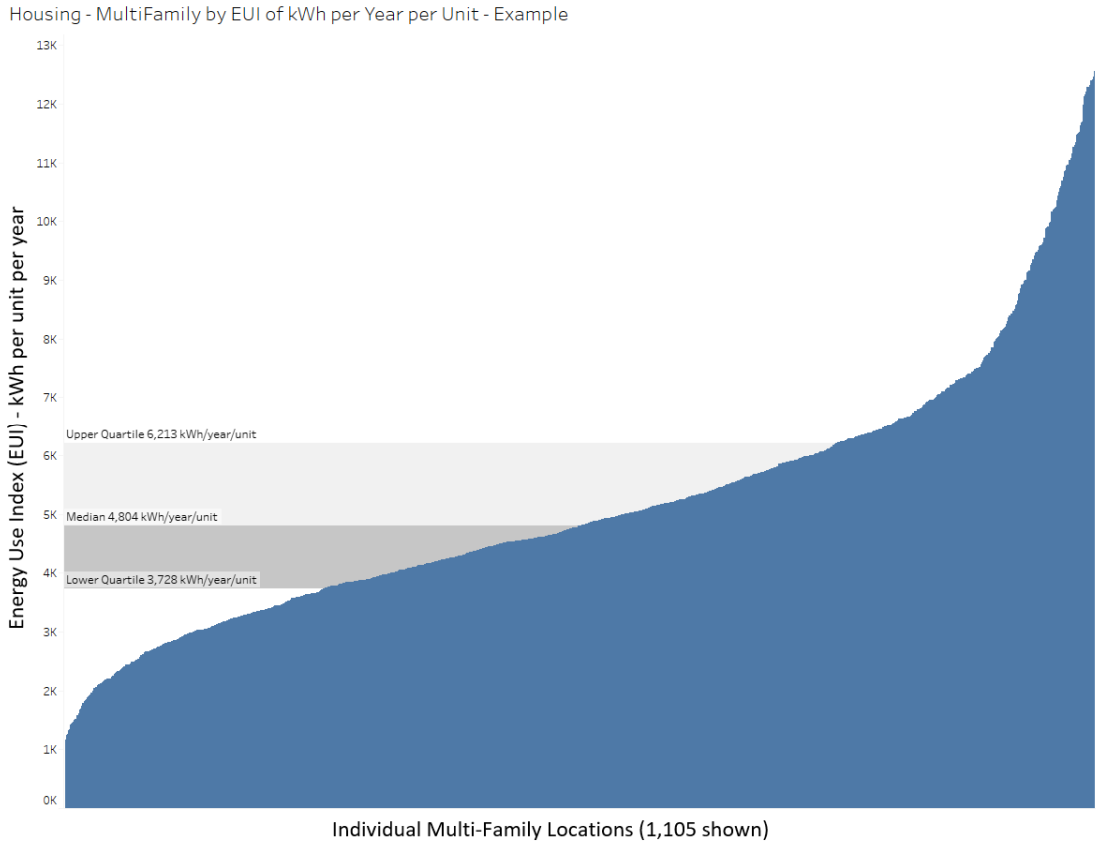
Census Tract	Count of Homes	Median Household Income/Month($)	Average Cost ($)	Energy Burden
MeheuStreet	1263	13,099.00	186.79	1.3%
WaiawaPrison	2499	14,446.58	204.14	1.3%
WaikikiBeach	1295	7,333.33	100.36	1.4%
MililaniAinamakuaDrive	2571	11,484.42	166.83	1.4%
NaheleNeighborhoodPark	3669	11,979.17	161.55	1.4%

Additional Use Cases Under Evaluation

The Hawaiian Electric Companies continue to collaborate with the Clearinghouse participants to gather their input on the dashboard and their desire for new use cases. The current use cases being developed or discussed with the Clearinghouse participants are as follows.

Benchmarking Portal Visualizations – The City and County of Honolulu is a Clearinghouse participant and has started a Better Building Benchmarking program for Oahu. Two portal dashboard visualizations are being developed to support public research benchmarking. One dashboard will present energy use index metrics for various building types. These metrics will be tailored for specific building types including energy (kWh) per square foot per year for office buildings and energy (kWh) per unit for multi-family apartments. An example of Energy Use Intensity ("EUI") for multi-family housing is shown in Figure 5.

Figure 5



The second dashboard being developed utilizes AMI data to present average daily load profiles for various building types.

EV Telematics Portal Visualizations and Data – One item that may be of interest to participants is the sharing of EV Telematics program data within a dashboard on the portal and providing access to the full dataset within the Clearinghouse. This data is a good use case candidate due to its large size and inclusion of locational data that can be matched with census tract areas within the anonymized AMI dataset.

Addition of Property Value Bins to Unique IDs in AMI Dataset – There was an inquiry from the University of Hawai‘i ("UH") as to the potential to add a feature field that provides the property values from the public county assessments to the anonymized AMI dataset, to allow research of the correlation between the property value and energy use behavior load shapes and the participation in PV programs. This work requires matching the Tax Map Key ("TMK") assessment data with Hawaiian Electric customers and will require additional checks to maintain the anonymization criteria.

Benefits

The Pilot benefits participants by providing access to and the ability to analyze Hawaiian Electric utility datasets of public research interest. These benefits are provided through the following components.

- **Big Data Analysis Platform** – The Databricks online cloud-based application provides the analytics tools and computing resources that allow query and analysis work to be performed on the smart meter data that is currently over 47 billion rows and growing. For context, Excel has a row limit of 1,048,576 rows and 16,384 columns per sheet and a single day of 15-minute smart meter data for 469,000 customers will produce 45,024,000 rows of data.

- **Collaboration Process** – The engagement of the Pilot participants within the same Databricks platform will allow the sharing of analytics work between the agencies through the sharing of queries and notebooks. This physical sharing of work product capability along with ongoing collaborative participant meetings will allow the teams to gain experience with the use of the new tools and datasets

and direct new work and dataset development that will benefit the public (non-participants) with data driven program development.

- **Processed Dashboard Visualizations –** The Clearinghouse Portal will provide PowerBI based dashboards using datasets that are developed for use cases of research interest. These curated views provide an approachable no-code review of large datasets resulting in more users of the data.

As described through the Collaboration Process example above, non-participants benefit through better data-driven decisions. In this way, non-participants indirectly benefit from the Pilot through the actions of the Pilot participants who represent the interests of customers across the State.

Lessons Learned

Several valuable lessons have emerged during the Clearinghouse Pilot, documented through regular retrospectives conducted by the core Pilot team and feedback from external stakeholder surveys. Noteworthy feedback includes the realization that research work for ongoing docketed proceedings and the evaluation of current and new program offerings are the highest values anticipated being provided by Clearinghouse stakeholders, particularly in areas including Distributed Energy Resources ("DERs"), customer renewable programs, and TOU initiatives. Stakeholder engagement sessions have highlighted that access through the Databricks Collaboration Workspace is in high demand for analysis since the platform has inherent scalable compute abilities. There is less demand for direct Data Sharing due to the size of the data and the requirement to store extremely voluminous datasets into an agency analytics system that would have to be a cloud-based environment that has similar capabilities to the Companies' base platform. The emphasis on simplicity in providing data access and straightforward visualizations, with minimal demand for pre-processing of advanced analytics, was also a key learning.

Furthermore, the Companies and the Pilot participants acknowledge the critical significance of ongoing learning and skill development, considering the rapid pace of

technological innovation that demands specialized knowledge not readily available both within the Companies and in the participating agencies. Emphasizing the need for support from diverse discipline areas and ongoing collaboration with external partners and specialized vendors, such as Databricks and Microsoft, was underscored to ensure the continuous deployment and effective support of evolving technologies. Overall, these lessons underscore the significance of adapting processes, enhancing skills, and maintaining targeted external support to ensure the successful deployment and evolution of analytics technologies.

Metrics

The Companies have implemented a comprehensive measurement and valuation framework, aligning quantitative project metrics and system metrics with survey data to capture the business value perceived by external stakeholders when utilizing data for research, analysis, advocacy, and decision-making purposes. This entails tracking and reporting the frequency of participants visiting and using the Clearinghouse data, along with details on participants' data usage, access methods, query frequency, and volume. These metrics, described further below, satisfy D&O 38753, Condition No. 3, at page 20.

Project metrics are utilized to monitor work progress and completion, including the percentage of work estimated and completed within two-week sprints. These metrics encompass planned work, completed work, and trends in newly generated work versus planned work.

System usage metrics have been established through reports generated in Power BI, leveraging system audit logs within the core platform supporting the Clearinghouse Portal. These metrics track and report the frequency of participants' visits and data usage, along with compute resource utilization. Compute resource workload within the Clearinghouse workspace is measured using a normalized unit of processing power known as a Databricks Unit ("DBU") on the Databricks Lakehouse Platform. The number of DBUs consumed by a workload is

determined by processing metrics, which may include compute resource usage and data processing volume.

In contrast to project and system metrics, which are quantifiable and discrete, business metrics are derived directionally through surveys. As participants engage with the Clearinghouse, the Company will conduct surveys to ascertain the specific purposes or outcomes for which participants have been utilizing the platform. Two surveys have been conducted thus far, focusing on user preferences for access methods, understanding of Pilot objectives, and identification of participating agencies' data and analysis needs. A future survey is planned to collect business metrics specifically related to the use cases published in both the Clearinghouse Portal and the Databricks Collaborative Workspace. Additional feedback will also be gathered through discussions as the Clearinghouse functions are utilized further.

EV Telematics
Annual Pilot Update

Introduction

The Hawaiian Electric Companies'[1] annual EV Telematics Pilot Update report is submitted in compliance with Decision and Order No. 37507 ("D&O 37507") issued on December 23, 2020 in Docket No 2018-0088.[2] The EV Telematics Pilot (referred to as the "EV Telematics Pilot," "Smart Charge Hawaii Pilot," or "Pilot") was approved in Decision and Order No. 39099 ("D&O 39099") issued on March 22, 2023 in Docket No 2022-0212.[3]

D&O 37507 requires the Companies to report on:

- Implementation schedules and progress relative to the pilot's objective and key performance metrics;
- Pilot impacts on underserved communities;
- Pilot costs and revenues (if applicable), including cost analysis per subscriber, quantitative and qualitative benefits (for both pilot participants and non-participants), and a Net Present Value ("NPV") analysis;
- Qualitative description of the pilot and customer benefits; and
- Any proposed changes to material aspects of the pilot, such as program pricing, terms or conditions, eligibility requirements, changes to the implementation schedule, or program cancellations (including reason for the cancelation).[4]

This report is also filed in accordance with the Pilot Process approved in Order No. 37865 ("Order 37865"), issued on July 9, 2021, in Docket No. 2018-0088. The Pilot Process includes reporting on:

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[1] The "Hawaiian Electric Companies" or "Companies" refers collectively to Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.

[2] *See* D&O 37507 at 175-176, 218, 222. Although D&O 37507 requires that the annual Pilot Update be filed by March 31 of each year, the Companies are submitting this report in advance of the deadline to facilitate the Consumer Advocate's and the Commission's review.

[3] Subsequent to Commission approval, the Pilot was launched as the "Smart Charge Hawaii Pilot." *See* https://www.hawaiianelectric.com/hawaiian-electric-and-evenergy-launch-smart-charge-hawaii-to-help-electric-vehicle-drivers-optimize-charging.

[4] *See* D&O 37507 at 175-176.

- Challenges and lessons learned, process improvements, a listing of performance relative to all key metrics, and any future permanent implementation plans based on an evaluation against the metrics established; and
- Updates to estimated costs and schedule (e.g., if there were significant delays in receiving signed agreements from government agencies).[5]

The Companies address each of these requirements, as applicable.[6] This report reflects on the work completed in 2023, including contracting and coordination with Pilot partners, development of the Pilot website and outreach materials, launch of the Pilot, and enrollment of new participants.

Pilot Objectives

The Companies' EV Telematics Pilot Notice of Intent ("Notice") filed on February 6, 2023, in Docket No. 2022-0212 included the following proposed objectives:

1. Enroll a representative sample size of the Companies' EV customers onto ev.energy's ("EV Energy's") platform. Assuming a total of approximately 20,000 EVs in the Companies' service area, the Companies propose an enrollment target of 2,000 participants (i.e., 10% of total EVs at the time of the Companies' Notice), including an enrollment target of 300 participants for each of Maui County (including Lanai and Molokai) and Hawai'i County.
2. Gain increased visibility into EV customer charging behavior, including an interactive heatmap of where EVs are being charged, insights on customer habits, and a breakdown of customer vehicle and charging equipment types.

[5] *See* Hawaiian Electric Companies' Pilot Process, filed on July 28, 2021, in Docket No. 2018-0088, at 5.
[6] As of 2023, reporting requirements that are not applicable include the NPV analysis.

3. Share EV data with internal and external stakeholders that have indicated a use for EV data (or request it at a later date), collect feedback over the course of the Pilot, and determine whether the data provides value.[7]

Pilot Implementation Schedule

In the EV Telematics Pilot Notice, the Companies estimated that the Pilot would run for eighteen (18) months from commencement to project close out.[8] The Companies had initially anticipated commencing the Pilot in the second quarter of 2023, which would have resulted in the Pilot ending in September 2024.[9] Figure 1 below illustrates the Companies initially proposed schedule in its Notice:

FIGURE 1. INITIALLY PROPOSED SCHEDULE

	2023												2024											
	Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
Activity	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Pilot Set-Up																								
Design Pilot Outreach emails																								
Design and build Pilot webpage																								
Integrate the Companies' tariffs into vendor's mobile app																								
Build web-based data portal for the Companies (e.g., dashboards)																								
Design and plan paid digital and print customer recruitment campaigns																								
Launch Pilot webpage																								
Launch digital and print recruitment campaigns																								
Customer Enrollment & Data Collection																								
Onboard participants and process incentive payments																								
Collect driver charging data																								
Conduct pre-Pilot focus group interviews																								
Engage customers through push notifications and periodic charging reporting																								
Ongoing front-line customer support to Pilot participants																								
Continuous digital and print marketing to reach 2,000 driver target																								
Conduct semi-annual customer feedback survey																								
Conduct post-Pilot focus group																								
Project close-out; debriefing, in-depth review of data analytics																								

Initially Proposed Pilot Launch
Initially Proposed Pilot End

[7] *See* Notice at 12.
[8] The Notice stated that the timeline is representative and depends on start date for the project. *See* Notice at 21, n.52.
[9] *See* Notice at 21.

Upon the Pilot's approval by the Commission in March 2023, the Companies began the contracting process with its Pilot partners, including EV Energy, Hawaiian Airlines, and Ulupono Initiative ("Ulupono"). Legal, procurement, and business reviews of the contracts took longer than anticipated, as the Pilot concept and accompanying technology was new to the Companies. Due to these upfront delays, the Companies and EV Energy agreed to officially start the Pilot in July 2023, three months later than originally anticipated in the Notice; this timing aligned with the date EV Energy granted the Companies access to data from the connected EVs and the date of the initial invoice from EV Energy. As illustrated in the current schedule shown in Figure 2 below, the Pilot schedule remains consistent with the Notice, reflecting an estimated eighteen (18) month duration from the updated commencement date, with the first six (6) months focused on enrollment and the final twelve (12) months focused on data capture, with the last monthly invoice from EV Energy expected on December 2024.

As shown in Figure 2, following approval of the EV Telematics Pilot, the Companies commenced the Pilot Set-Up phase, which involved coordination with EV Energy on the development of the Pilot website and outreach materials, social media posts, as well as initial outreach via a joint press release with support from external media outlets. In addition, the Companies participated in several webinars and a live KHON2 televised interview to educate the public on the Pilot. Due to limited early sign-ups at launch, the Companies focused on boosting enrollment numbers for the remainder of 2023. As such, the initially proposed pre-Pilot focus group interviews were shifted to occur in 2024, once a sizeable pool of participants had been enrolled.

FIGURE 2. CURRENT SCHEDULE

Activity	2023												2024											
	Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Pilot Approval: PUC issues D&O 39099 in Docket No 2022-0212																								
Contracting Review Process: EV Energy, Hawaiian Airlines, Ulupono Initiative																								
Administrative: Vendor payment details set-up																								
Pilot Set-Up																								
Design Pilot Outreach emails																								
Design and build Pilot webpage																								
Integrate the Companies' tariffs into vendor's mobile app																								
Build web-based data portal for the Companies (e.g., dashboards)																								
Design and plan paid digital and print customer recruitment campaigns																								
Launch Pilot webpage																								
Launch digital and print recruitment campaigns																								
EV Energy formally begins services in July (invoicing begins)																								
Customer Enrollment & Data Collection																								
Onboard participants and process incentive payments																								
Collect driver charging data																								
Updated: Conduct mid-Pilot focus group interviews																								
Engage customers through push notifications and periodic charging reporting																								
Ongoing front-line customer support to Pilot participants																								
Continuous digital and print marketing to reach 2,000 driver target																								
Conduct semi-annual customer feedback survey																								
Conduct post-Pilot focus group																								
Project close-out; debriefing, in-depth review of data analytics																								

Scheduled Pilot Launch

Scheduled Pilot End

For calendar year 2024, the focus is on the collection, dissemination, and review of charging data. Based on feedback from stakeholders, the Companies will determine the future of the Pilot (e.g., whether to scale up the Pilot, deploy a modified version, or discontinue it).

During internal Pilot meetings in 2023, various Hawaiian Electric departments expressed interest in gaining access to the EV Telematics data. EV Energy created additional user accounts and provided training to these stakeholders, who are currently examining the data available. In one use case, the Companies plan to use Pilot data in relation to the Advanced Rate Design ("ARD") Track of Docket No. 2019-0323.

As more telematics data is captured during 2024, the Companies will offer data to interested external stakeholders. Upon review of the EV Telematics data collected to date, the

Companies determined that as a large data set, it is a viable candidate for the Data Analytics Clearinghouse Pilot ("Clearinghouse Pilot"). In this way, the Companies could potentially utilize the Clearinghouse Pilot as a central repository that would make the data more easily accessible and provide compute resources for analysis to interested public research entity stakeholders, such as the City and County of Honolulu and the Hawaii State Energy Office.

Additionally, Shifted Energy, a Hawaii based distributed energy resources company, has requested a sample of Pilot data. Shifted Energy has stated their intent to leverage the data using machine learning to generate regional EV charge curves and anticipate future EV growth trajectories. Resulting analyses and insights would be shared with the Companies.

Participants & Metrics

Eligible Pilot participants must be 18 and older and be located within the Companies' service territory. In addition, participants must drive an eligible EV or have an eligible smart charger, as detailed in the FAQ section on EV Energy's website.[10]

Pilot participants can connect multiple devices (e.g., EVs or eligible residential smart chargers); however, for purposes of tracking enrollment and incentive payments, the Companies are focused on unique users as a metric. As of January 8, 2024, 593 unique individuals were enrolled in Smart Charge Hawaii, with a total of 605 connected devices, which includes multiple EVs or eligible residential smart chargers. The Companies are exploring additional outreach activities to increase participation.

In addition to the proposed 2,000 enrollee target, the Companies intended to have 300 participants in each of Maui and Hawaii County (i.e., 15% of the total target). As illustrated in Figure 4 below, the proportion of neighbor island participation is in line with the Companies'

[10] *See* "Who can participate?" under Eligibility FAQs at: https://smartchargehi.ev.energy/.

initial goal. The Companies continue to work with EV Energy and other partners, including local EV clubs, to amplify outreach on Hawaii Island and in Maui County.

Figure 3 below illustrates the Pilot's goals and outcomes and the Companies' learnings in relation to the Pilot objectives.

FIGURE 3. PILOT OBJECTIVES AND OUTCOMES SUMMARY

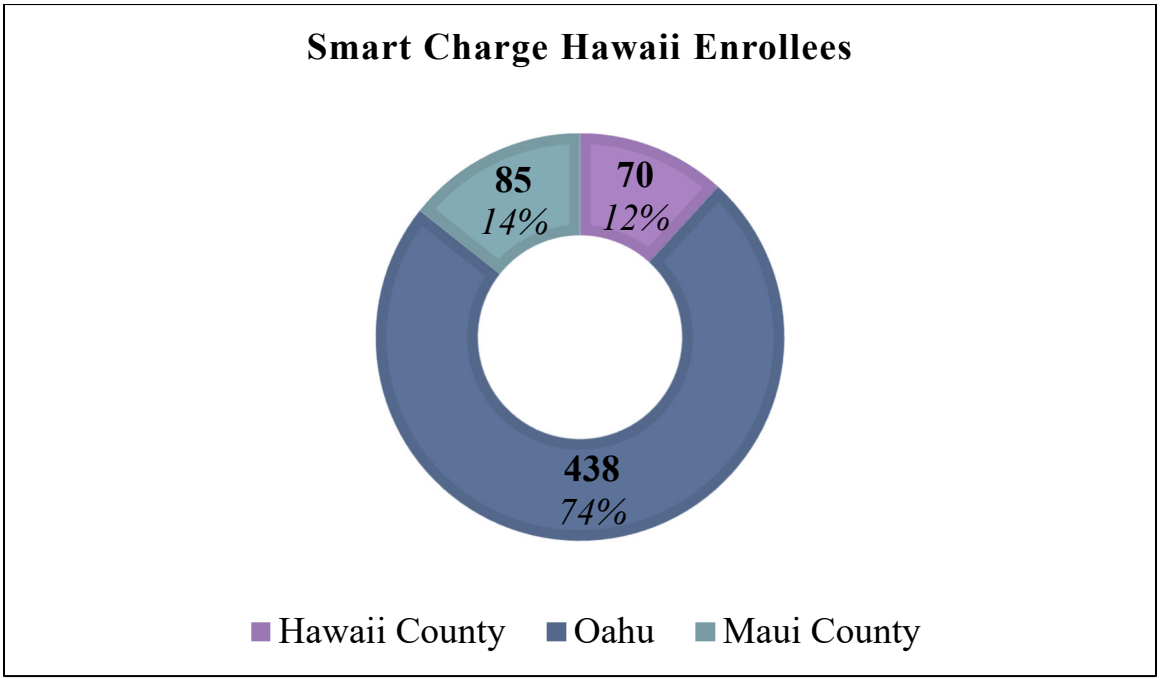
Objective	Goals/Outcomes	Actual	Learnings
Enroll a representative sample size of customers onto EV Energy's platform	1,600 (i.e., 80% of the 2,000 target) within the first three months within the first three months after EV Energy commences the recruiting campaign.	593 (i.e., 30% of target within 6 months of Pilot launch).	Participants will be surveyed and interviewed during 2024 to obtain further insights on what factors may have impacted enrollment (e.g., initial perception of the Pilot, incentive amount, app usage, etc.).
Gain increased visibility into EV customer charging behavior	EV charging data collection: • Pilot enrollment data • Vehicle make/model/trim • Days since last charge • Charging session data reported in 15 or 30-minute intervals • Plug in date/time • Battery level (kWh) at plug in • Charging session start date/time • Charge delivered (kWh) • Charging session end/time • Battery level (kWh) at unplug • Unplug date/time • Charging session location (latitude/longitude) • Estimated customer cost of the charging session	All of the expected data points are being collected and available to the Companies.	The sheer amount of data being collected may be unwieldy to analyze and share utilizing conventional spreadsheets and personal computers. However, high-computing power available in the Data Analytics Clearinghouse would make the data much more accessible and manageable for internal and external stakeholders.
Share EV data with internal and external stakeholders, collect feedback, and determine whether the data provides value	Data will be shared with internal and external stakeholders, and stakeholders will be surveyed to learn whether the data is of value to them.	Internal stakeholders have been provided full access to the Pilot data. External stakeholders have been offered access to the data, and the first stakeholder will be given a sample of the data in March 2024.	Both internal and external stakeholders will be sent feedback surveys including questions concerning the usefulness of the Pilot data. The surveys will be issued on a quarterly basis over the course of 2024.

The Companies will document and submit forthcoming enrollments in the annual Pilot Update for the 2025 reporting period.

To better illustrate the type of data being collected from the Pilot, and how the resulting data might be used, Figure 4 through Figure 8 have been provided below as examples.

Figure 4 represents a breakdown of participation in Smart Charge Hawaii, showing the distribution across each of Oahu, Hawaii County, and Maui County.

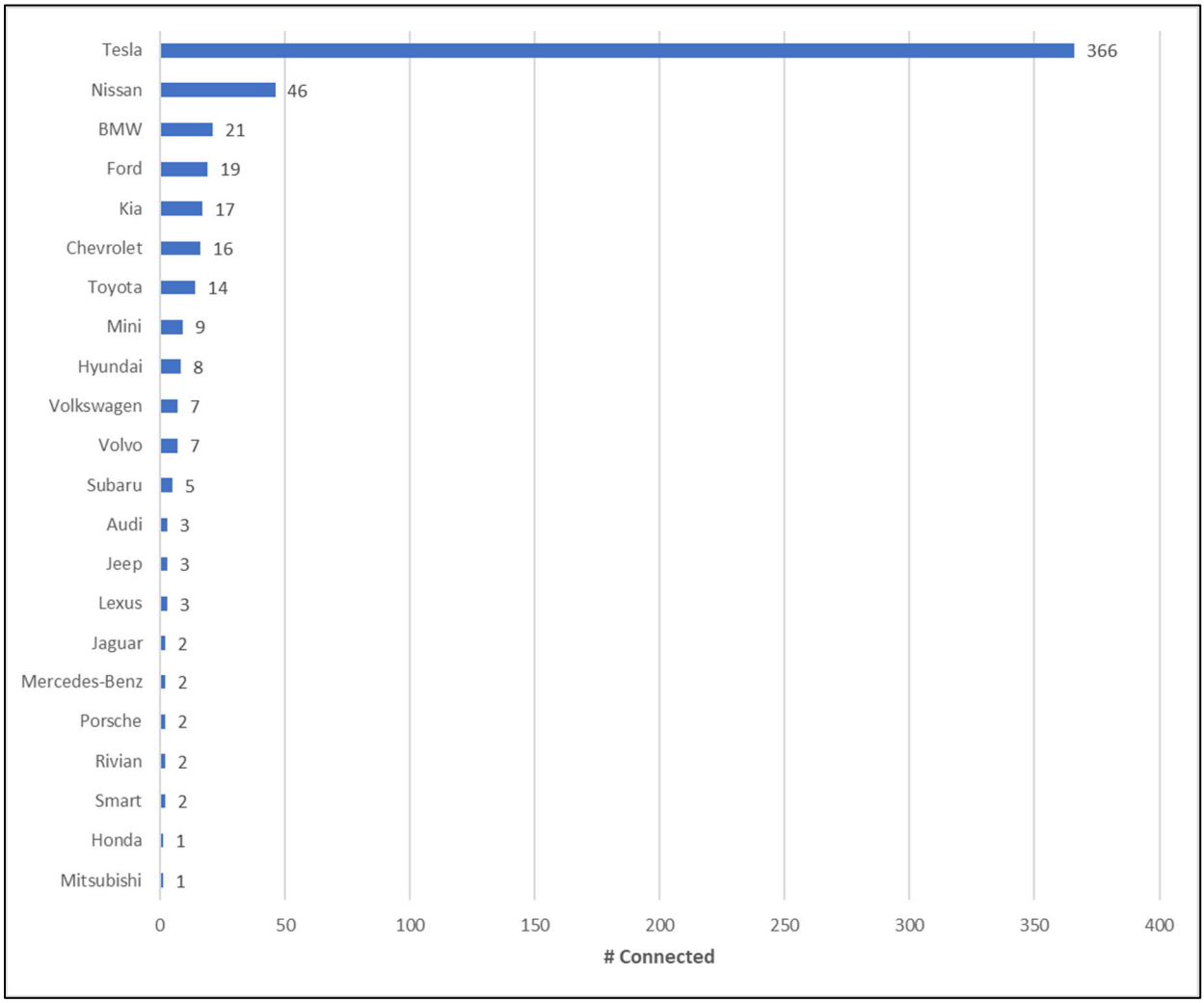
FIGURE 4. PARTICIPATION ACROSS SERVICE AREA (AS OF 1/8/2024)



EV Energy provides a current list of all eligible EVs and residential smart chargers on the Smart Charge Hawaii website.[11] Figure 5 below illustrates the diverse mix of in EVs enrolled in the EV Telematics Pilot with Tesla representing the majority of participants.

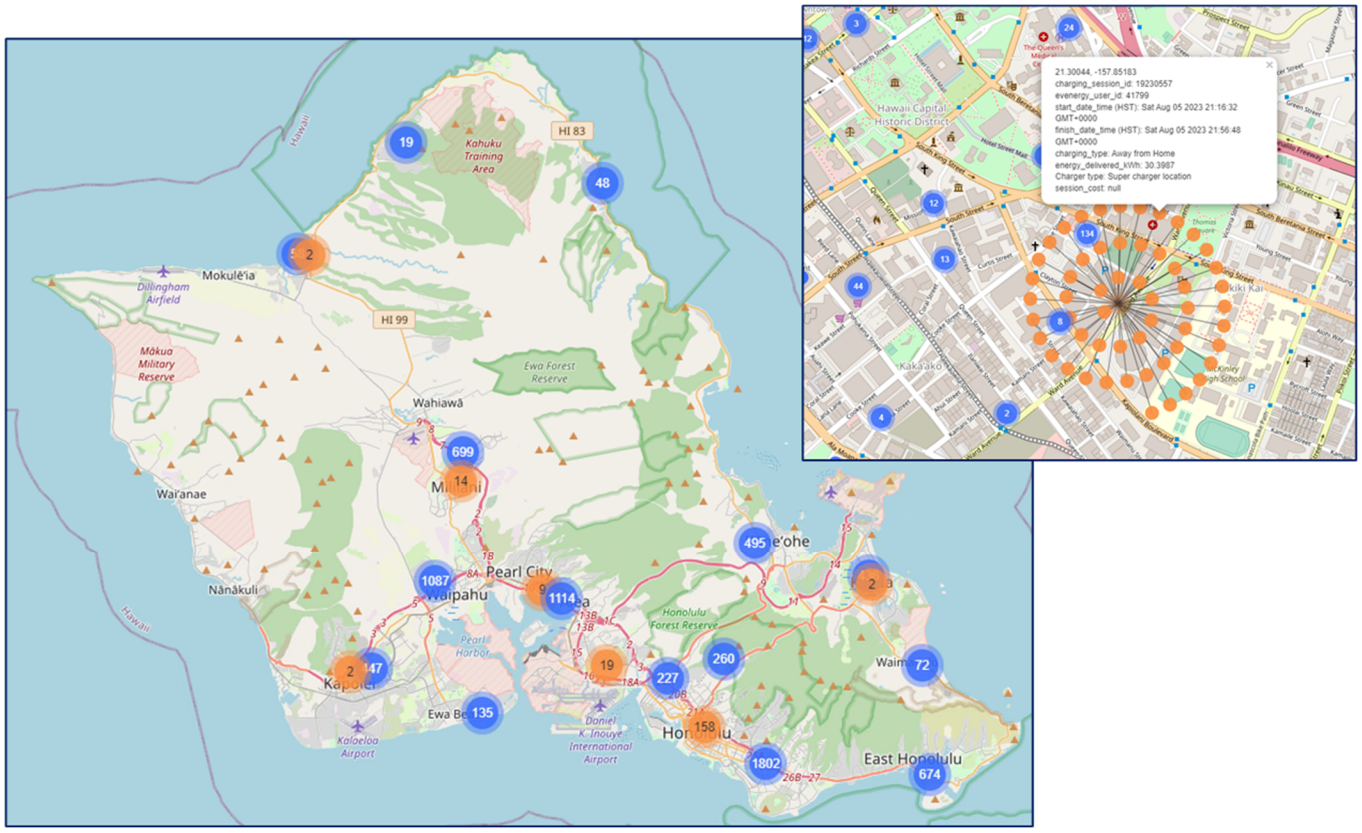
[11] *See* "Which electric vehicle models and chargers are eligible to enroll in Smart Charge Hawaii?" under Eligibility FAQs at https://smartchargehi.ev.energy/.

FIGURE 5. EV MAKES CONNECTED TO SMART CHARGE HAWAII



The Companies have access, through EV Energy, to an interactive service area-wide heat map showing EV charging sessions including start and end times, away vs. at home status, and energy dispensed in kWh. The anonymized data is available for download and includes a variety of charging metrics including charging session level details, vehicle details, and location. Figure 6 below represents zoomed in and out views of Oahu, with individual charge sessions represented by small circles (orange circles indicate the Companies' public EV chargers).

FIGURE 6. ILLUSTRATIVE EV CHARGING HEAT MAP OF OAHU



Key:
- Hawaiian Electric DC Fast Charger session
- Other public or residential charger session

EV Energy has provided the Companies with details on current participant charging equipment:

- 13% have Level 1 (120V) chargers at home
- 67% have Level 2 (240V) chargers at home
- 20% appear to only charge at public locations

The Companies also have access to data pertaining to energy dispensed that can be customized over time intervals and by island, as illustrated in the example Figure 7 and Figure 8 below.

FIGURE 7. ENERGY DISPENSED BY TIME OF DAY

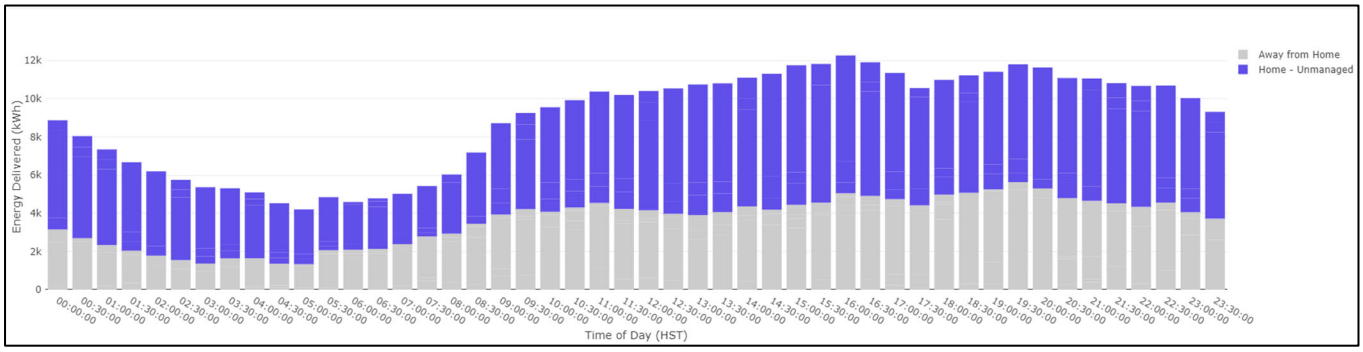


FIGURE 8. ENERGY DISPENSED BY REGION

Energy Dispensed (kWh)	County
150,416	Honolulu County
26,551	Hawaii County
24,258	Maui County

Costs & Revenues

In accordance with the Pilot Process approved by the Commission in Order 37865, innovation pilot project costs are treated as deferred costs and recovered the following year, subsequent to the Commission's review of the annual spring revenue report.[12]

During calendar year 2023, the Companies incurred actual Pilot expenses totaling $216,075, which consisted of $203,775 in outside service vendor fees and $12,300 in participant enrollment incentives. The outside service vendor fees amounting to $203,775 represents fees for the following services rendered by EV Energy in 2023:

- Building the Smart Charge Hawaii participant facing website
- Developing and implementing the Pilot marketing strategy

[12] *See* Order No. 37865 at 8-11.

- Developing outreach and education related collateral
- Creating utility dashboards for the Companies to access the Pilot data
- Program management support for the Companies
- Providing ongoing participant onboarding and support

Of the enrolled participants that provided incentive payment instructions in 2023, 164 participants opted for cash enrollment incentives (i.e., 164 participants x $75/participant = $12,300)[13] and 38 participants opted for *HawaiianMiles.*[14] There were no external project management fees incurred in 2023.

Figure 9 reflects the expenses incurred by company.

FIGURE 9. EXPENSES INCURRED BY COMPANY ($)

Year	Hawaiian Electric	Hawai'i Electric Light	Maui Electric	Total
2023	$151,253	$32,411	$32,411	$216,075

As discussed in the Pilot Notice, participants who enroll in EV Energy's app and connect their EV or networked EV charger will be paid $75 upon enrollment, and an additional $75 at the end of the Pilot provided that they remain connected to the app for the duration of the Pilot (for a total of $150 of incentives per participant).[15] Ulupono agreed to contribute $100,000 to the pilot participant incentive pool, which equates to $50 toward each participant's incentive, reducing the maximum amount that the Companies would pay for participant incentives if the Pilot is fully enrolled (2,000 participants x $100/participant = $200,000).[16] Ulupono's contribution toward the participant incentives is excluded from the Companies' reported costs in Figure 9. The

[13] Participants that remain connected to EV Energy's app for the duration of the Pilot will qualify for an additional $75 payment.
[14] Hawaiian Airlines credited 38 participants with 5,000 *HawaiianMiles* each in 2023 and expect to finalize invoices for payment by the Companies during 2024. Participants that remain connected to EV Energy's app for the duration of the Pilot will qualify for an additional 5,000 *HawaiianMiles*.
[15] *See* Notice at 24.
[16] *See id.*

Companies expect to invoice Ulupono in 2024 to recover the cost-share portion of the incentives that are paid out. The Companies appreciate Ulupono's contribution toward the customer incentive payments and their letter in support of this Pilot.[17]

The Companies intend to increase Pilot participation in 2024, however, if the 2,000 participant cap is not reached, then the incentives costs will be accordingly reduced. For example, if 1,000 participants ultimately enroll and complete the Pilot, then only $100,000 of incentives (i.e., 1,000 x $100 = $100,000) will be incurred. The Companies plan to pay incentives to participants who sign up through November 2024.

The Companies do not anticipate exceeding the proposed Pilot costs, as summarized in Figure 10 below:[18]

FIGURE 10. PILOT COSTS BY CATEGORY AND ACTIVITY

Vendor Fees (including EV Energy's proprietary EV telematics platform) - Data-Collection Setup - Marketing Setup - Program Management - Ongoing Customer Engagement - Customer Support	$510,000
Pilot Participant Incentives (i.e., $100 per Pilot participant x 2,000 participants)[1]	$200,000
Estimated External Project Management Fees - Pilot Project Management and Oversight - Project Reporting and Data Analysis - Billing and Invoice Administration - Coordination of Data Sharing	$112,000
Total:	**$822,000**

1 Ulupono agreed to contribute an additional $50 per Pilot participant, increasing the total participant incentive to $150 per Pilot participant.

No revenues were expected or recognized in 2023.

[17] *See* Notice, Exhibit A, at 6-7.
[18] *See* Notice at 23.

Benefits & Impact to Underserved Communities

In the EV Telematics Pilot Notice, the Companies did not discuss the impact of the proposed Pilot to underserved communities. The Companies did however discuss benefits of the Pilot to non-participants.[19] More specifically, by helping to accelerate broader EV deployment, the Pilot supports the electrification of the State's transportation sector. Increasing EV energy demand is expected to result in net benefits for all customers as the utilities' fixed costs for generating and distributing energy are spread across more kWh units, thereby lowering the unit cost to all customers.[20] Furthermore, increasing EV charging will reduce the use of imported fossil fuels and correspondingly reduce Greenhouse Gas ("GHG") emissions (through the reduction in fossil fuel use for ground transportation, and through the increased use of non-fossil renewable energy, including daytime PV), helping the State advance its emission reduction goals. By supporting EV adoption, the Pilot helps to deliver these benefits to all customers over the long term.

With respect to underserved communities, the Companies believe there may be ways for the Pilot to positively impact undeserved communities. The Charge Up Commercial Pilot program defined underserved communities in its Final Program Design Report ("Charge Up Commercial Final Program Design Report") filed on September 23, 2022, in Docket No. 2020-0202. These communities are based on census tracts that meet at least two of the following criteria:

1. High participation of LIHEAP (Low Income Home Energy Assistance Program)
2. More than six percent (6%) of energy burden

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[19] *See* Notice, at 19-209, for a discussion of non-participant benefits.
[20] *See* Electrification of Transportation Strategic Roadmap, filed June 18, 2018, in Docket No. 2018-0135 at 33 and 36.

3. High level (+20 Tonnes) of annual GHG Emissions from household vehicles per acre per census tract

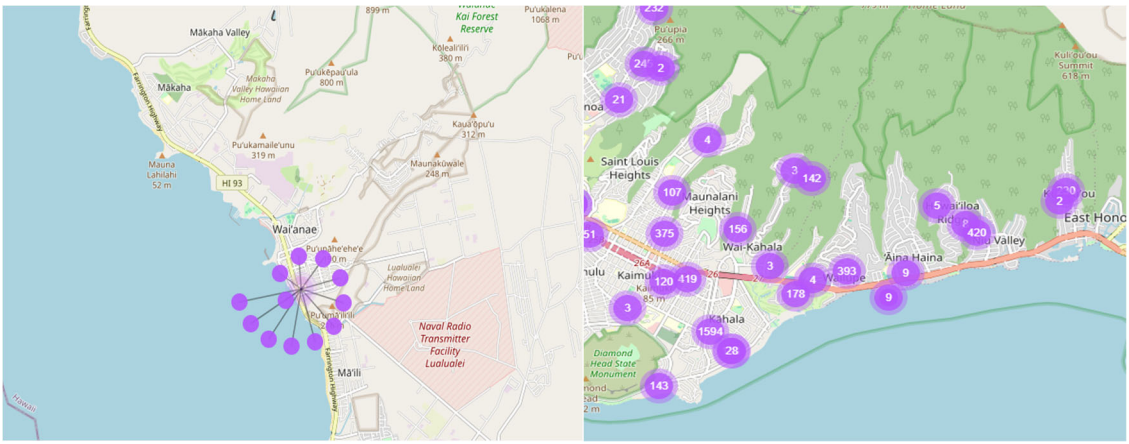
4. Identified as "underserved" based on the Climate and Economic Justice Screening Tool[21]

Since the EV Telematics Pilot records specific charging activity intervals by longitude and latitude, the Companies can observe charging activity (or lack thereof) in various locations, which can be overlayed against census tracts. In addition, the Companies have access to home address zip codes and contact information for Pilot participants, allowing for potential targeted education and outreach for customers who may reside in underserved communities. With access to Pilot data, the Companies have a clearer picture of which communities in its service area are more saturated with EVs than others, and where 'charging deserts' are located. The Companies may also be able to determine what times of day EVs are being charged in areas that meet the underserved community criteria. These insights can be factored into how the Companies determine where to build out future EV charging infrastructure, and how other programs and rates are developed in a way that creates a more equitable EV ecosystem for all communities.

Figure 11 below is an example of a stark contrast in EV charging activity in two different regions of Oahu.

[21] *See* Charge Up Commercial Final Program Design Report, at 14-16.

FIGURE 11. LOCATION BASED EV CHARGING IN OAHU (2023)



Lessons Learned

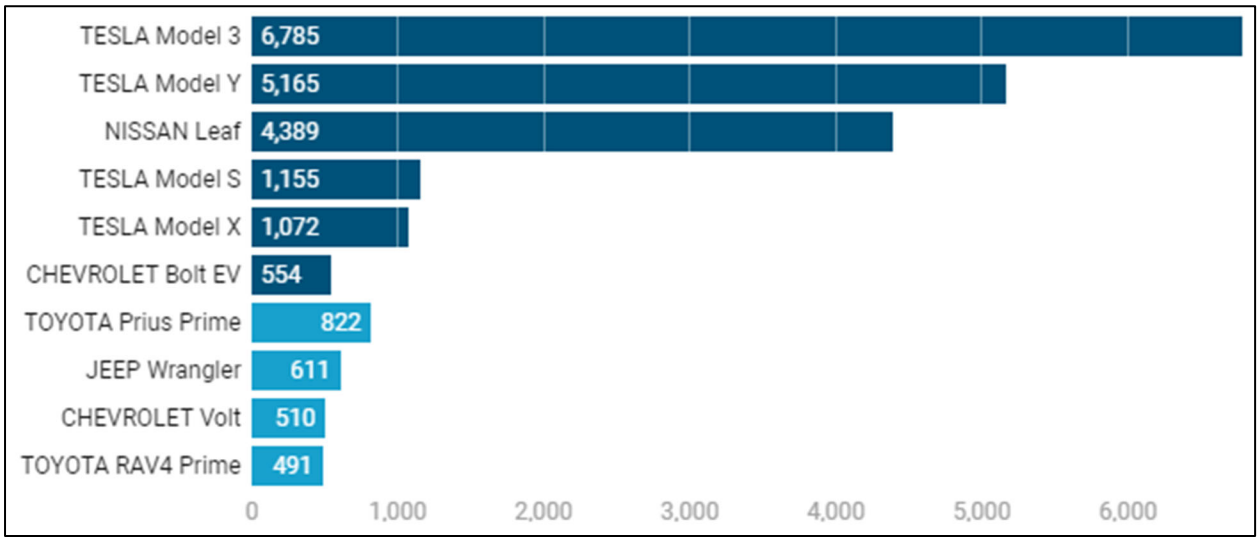
Lessons learned in 2023 include:

- **Original Equipment Manufacturer and Telematics Risk**: In the quarterly Innovation Pilot Framework ("IPF") Portfolio Update stakeholder meetings held during 2023, the Companies had identified the risk of EV Original Equipment Manufacturers ("OEMs") intentionally or unintentionally limiting access to telematics data. Largely due to the emerging nature of EV telematics, connectivity for certain EV makes and models is an ongoing Pilot risk. Certain makes and models, such as Volvo's XC40, are not yet compatible with the software platforms used by vendors such as EV Energy. During 2023, certain Ford EV drivers ran into issues connecting to their user accounts and were locked out of EV Energy's app. In addition, the Companies were informed that due to platform changes at Nissan, some Leaf EVs were no longer able to connect to EV Energy or other third-party vendors' platforms. EV Energy is in discussions with OEMs and exploring workarounds to these issues. A positive outcome in 2023 was an update Tesla made to its application programming interface ("API"), which was intended to enhance

telemetry, security, and features for its customers. Tesla also officially approved EV Energy as a third-party app to manage charging for its EVs.

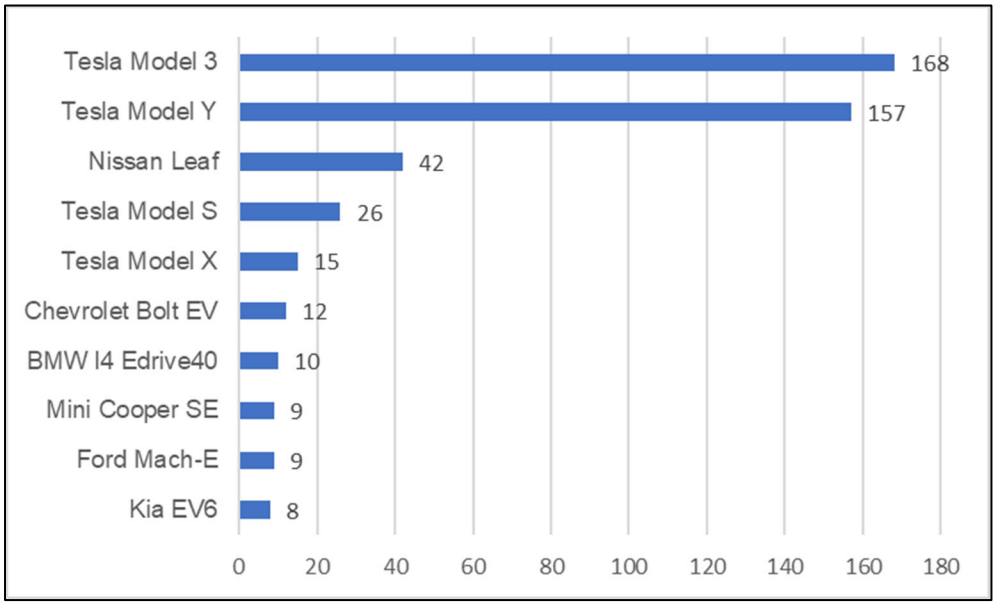
As illustrated in Figure 12 below, Tesla is the most popular EV make in Hawaii, followed by the Nissan Leaf. In comparison, Figure 13 represents the most popular EV makes enrolled in Smart Charge Hawaii, indicating similarities in the types of vehicles represented in the Companies' service area. The Companies will continue to observe the telematics marketplace and monitor how OEMs and third-party telematics vendors are working together, in anticipation of a potentially longer-term and expanded program.

FIGURE 12. TOP PLUG-IN EV MODEL REGISTRATIONS IN HAWAII (LAST UPDATED 1/21/2024) [22]



[22] *See* Top Plug-in EV Model Registrations by Month at: https://energy.hawaii.gov/energy-data/.

FIGURE 13. TOP PLUG-IN EV MODELS IN SMART CHARGE HAWAII



- **Enrollment Target Challenges**: In the Pilot Notice, the Companies proposed an enrollment target of 2,000 participants and had anticipated reaching this cap by the end of 2023. However, enrollments have been lighter than expected, in part due to challenges such as connection issues with certain EV makes. In effort to increase enrollment, the Companies requested that EV Energy seek outreach support from a locally based communications organization at no additional cost to the Companies. EV Energy subsequently retained a Hawaii-based, Hawaii-focused communications firm to support 2024 education and outreach efforts. The communications firm is in the process of rolling out more localized outreach activities, including radio station programming and in person EV-related events. EV Energy is also preparing to begin surveying and interviewing participants about their experience in the Pilot. Feedback solicited from participant panels and surveys should provide a better understanding of what actions might improve enrollments.

Proposed Changes

There are no proposed changes to material aspects of the EV Telematics Pilot, including program pricing, terms or conditions, changes to the implementation schedule, or Pilot cancellations at this time.

The data collected from this Pilot to date has promising use cases, and feedback from EV drivers and stakeholders will be valuable in determining the next steps once this Pilot concludes. The Companies are considering different options for a future or expanded program. For example:

- Transitioning the existing population of participants from the Smart Charge Hawaii data collection pilot to a managed charging pilot, where participants may receive incentives for charging or not charging at certain times of day, and EVs are explored as a demand response resource.
- Utilizing multiple telematics vendors to broaden EV make coverage and test out alternative software platforms, for reliability and data quality purposes.
- Deploying an expanded program with cost-share from multiple stakeholders, to allow for a more sustainable and scalable source of EV telematics data.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document, together with this Certificate of Service, were duly served on the following party, by electronic mail service as set forth below:

Michael S. Angelo
Executive Director
Division of Consumer Advocacy
Department of Commerce and Consumer Affairs
mangelo@dcca.hawaii.gov
consumeradvocate@dcca.hawaii.gov

DATED: Honolulu, Hawai‘i, March 11, 2024.

/s/ Kyle Kawata
Kyle Kawata
HAWAIIAN ELECTRIC COMPANY, INC.