



March 29, 2023

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

Dear Commissioners:

Subject: Docket No. 2018-0135 – Hawaiian Electric Companies
Electrification of Transportation Strategic Roadmap
Consolidated Annual EOT Report

Pursuant to Order No. 38647, filed on October 10, 2022 in Docket No. 2018-0088, Hawaiian Electric¹ respectfully submits its Consolidated Annual EOT Report, consisting of:

- *Annual Report on the Progress and Status of the Commercial Public Electric Vehicle Charging Service Pilot Rates*²
- *EV-Maui Tariff Annual Report*³
- *Annual Report on the Progress and Status of E-BUS Pilot Program*⁴

Sincerely,

/s/ Kevin M. Katsura

Kevin M. Katsura
Manager
Regulatory Non-Rate Proceedings

Attachment

cc: Division of Consumer Advocacy

¹ Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc. are each doing business as "Hawaiian Electric" and have jointly registered "Hawaiian Electric" as a trade name with the State of Hawai'i Department of Commerce and Consumer Affairs.

² See Ordering Paragraph 1.C of Decision and Order No. 31338, filed July 1, 2013 in regard to Transmittal Nos. 13-07 and 13-08 (consolidated), as modified by Decision and Order No. 34592, filed June 2, 2017 in Docket No. 2016-0168.

³ See the Company's representations in Docket No. 2018-0422, Maui Electric's Revised Schedule EV-Maui Tariff, Exhibit 2, page 5 of 15, footnote 13, filed on August 30, 2019.

⁴ See Ordering Paragraph 3.C of Decision and Order No. 36220, filed March 20, 2019 in regard to Transmittal No. 18-06.

Hawaiian Electric's Electric Vehicle Rates Report

Annual Reports on the Progress and Status of the Commercial Public Electric Vehicle Charging Service Pilot Rates EV-U and EV-F (Transmittal 13-07), and the Electric Vehicle Charging Service Rate EV-MAUI (Dkt No. 2018-0422)

March 29, 2023

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Executive Summary

In 2022, Hawaiian Electric continued to build upon its growing momentum in the electrification of transportation (“EoT”) sector, with the development of programs and actions keeping pace with the needs for electric vehicle (“EV”) charging.¹ The Company’s efforts align with the 2018 *Electrification of Transportation Strategic Roadmap* (“Roadmap”),² which provides key near-term steps, benefit and cost analyses, and 10 EoT Initiatives. These initiatives contribute to the State of Hawai‘i’s (“State”) clean energy vision and create economic benefits for all customers.

The Company’s *Critical Backbone Study: Planning Methodology* (“Backbone Study”) filed on July 30, 2019, further informs the development of charging infrastructure to support the adoption of EVs.³ The Company’s public charging efforts align with “Initiative #7 – Expand availability of public charging,” in the Roadmap, which recommends accelerating the buildout of charging infrastructure to provide “a critical backbone of reliable, public utility-owned charging stations as the launching point from which the broader electric transportation and third-party charging market in Hawai‘i can expand and solidify.”⁴ All Company-owned sites and installations moving forward since January 2020, are supported by the Backbone Study showing a need for chargers in those locations.

On October 29, 2021, the Company filed its *Public Electric Vehicle Charger Expansion Project* (“expansion project”) in Docket No. 2021-0173, which requests to expand the Company’s public charging network by constructing an additional 150 single-port direct-current fast charging (“DCFC”) and 150 dual-port level 2 charging stations at an estimated 75 sites across the Company’s service territory between 2023 and 2030. Additionally, the Company proposed a suite of changes to the existing public charging programs, including revised EV-U tariffs designed to be roughly cost-competitive with gasoline and encourage charging during the middle of the day when solar is abundant. The application also requests the termination of the EV-MAUI tariff with the goal of providing customers consistency in pricing for fast charging on each island and re-affirms the Company’s intent to close EV-F to new enrollment on O‘ahu, Hawai‘i Island, and Maui in favor of implementing recently approved revised rate structures Schedule EV-J and EV-P.⁵ On June 30, 2022, via Transmittal No. 22-02, the Company requested the State of Hawai‘i Public Utilities Commission’s (“Commission”) 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

¹ Hawaiian Electric Company, Inc., Hawai‘i Electric Light Company, Inc., and Maui Electric Company, Limited (or “Maui Electric”) are collectively referred to herein as “Hawaiian Electric” or the “Company.”

² Filed initially on March 29, 2018 in Docket No. 2016-0168, refiled on June 18, 2018 in Docket No. 2018-0135, and updated on November 29, 2018 in Docket No. 2018-0135.

³ *Electrification of Transportation Electric Vehicle Critical Backbone Study: Planning Methodology* filed July 30, 2019 in Docket No. 2018-0135.

⁴ Docket No. 2018-0135, *Electrification of Transportation Strategic Roadmap* filed March 29, 2018 at 7.

⁵ Transmittal No. 18-06 filed December 19, 2018.

⁵ Hawaiian Electric proposed a successor to EV-F in its *Application For 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, on a Pilot Basis*, filed on September 30, 2020 in Docket No. 2020-0152, in an effort to encourage charging during the day and provide demand charges lower than existing commercial electric rates.

enrollment on August 1, 2022 for qualifying customers on the islands of Moloka'i and Lāna'i, and Schedule EV-F closed to new customers on Moloka'i and Lāna'i on July 31, 2022.

On October 25, 2022, the Companies submitted a motion to reopen Docket No. 2016-0168 and extend the *Commercial Public Electric Vehicle Charging Service Pilot* ("pilot program") and related Schedule EV-U tariff until the Commission rendered a decision on the Companies' expansion project in Docket No. 2021-0173 to implement the expansion project and the corresponding proposed revised Schedule EV-U tariff rates become effective. On December 7, 2022, the Commission reopened Docket No. 2016-0168 and granted the Companies' request to extend their pilot program and related Schedule EV-U tariff until the Commission issues a decision on the Companies' expansion project in Docket No. 2021-0173.

Throughout 2022, the Company continued to execute on Roadmap Initiative #7, with key highlights including:

- The Company completed the installation of the 25 DCFC metered accounts originally approved for the EV-U pilot by the Commission by installing the remaining four metered accounts. These metered accounts are located at the following sites on O'ahu: Mililani Town Center (2 DCFC stations), Bishop Museum (2 DCFC stations), Waikiki-Kapahulu Public Library (1 DCFC station), and Kailua Foodland Marketplace (1 DCFC station)⁶ – this is at least 50 percent more DCFC stations than in any year prior.
- Energy consumption at the Company's DCFC stations on Maui County and Hawai'i Island increased by 25% in aggregate from the prior year. This increase may be attributable to the Company's focus on repair and maintenance and increases in EV ownership across the Company's service territory in 2022.
- Most of the charging usage for EV-U and EV-MAUI was initiated during the Mid-Day period of 9 AM to 5 PM – 55 percent and 61 percent, respectively. Like past years, this continued to be the most utilized period that charging usage was initiated, likely due to the Mid-Day period having the lowest energy cost.

The following report⁷ provides year ending December 31, 2022 information on the status of all Company-owned public DCFC stations implemented through Schedule EV-U: Commercial Public Electric Vehicle Charging Service and Electric Vehicle Charging Service EV-MAUI Tariff,⁸ as well as information on the status of Schedule EV-F: Commercial Public Electric Vehicle Facility Charging Service Pilot.⁹

⁶ The Company plans to install a second DCFC station at Kailua Foodland Marketplace in 2023.

⁷ In Order No. 38082 filed on November 22, 2021 in Docket No. 2018-0088, the Commission noted that it agreed with the Companies' proposal to consolidate EoT Annual Reports currently reflected in Docket Nos. 2018-0422, 2016-0168, and Transmittal Nos. 13-07, 13-08, and 18-06 into a single report, and ordered the Companies to submit a proposed modified version. The Companies provided a sample of a proposed consolidated report on March 8, 2022 in Docket No. 2018-0088 and the Commission approved the proposal in Order 38647 on October 10, 2022.

⁸ Consistent with the Company's representations in Docket No. 2018-0422, Maui Electric's Revised Schedule EV-MAUI Tariff ("Revised Schedule EV-MAUI Tariff"), Exhibit 2, page 5 of 15, footnote 13, filed on August 30, 2019.

⁹ In accordance with Ordering Paragraph 1.C. of Decision and Order No. ("D&O") 31338, filed July 1, 2013 in Transmittal Nos. 13-07 and 13-08 (consolidated), as explicitly modified by D&O 34592, filed June 2, 2017 in Docket No. 2016-0168.

Since the Commission granted the Company’s request to extend the pilot program and related Schedule EV-U tariff until the Commission issues a decision on the Companies’ application in Docket No. 2021-0173, the Company will include in its final Annual Report a discussion of post-pilot alternatives, to the extent such alternatives are not discussed in the Companies’ ‘Electrification of Transportation’ strategy, and a discussion of the Companies’ intentions related to its Schedule EV-U facilities.

Introduction

While the ongoing COVID-19 pandemic and ensuing vehicle supply shortages created headwinds in 2022, the adoption of passenger EVs increased by 25 percent in the Company’s service territory as shown in Figure 1.¹⁰ EVs continue to represent about 2 percent of the overall passenger vehicles registered in the State. Moreover, the State’s EV market share was about 8 percent in the third quarter of 2022.¹¹ The EV market is anticipated to experience tremendous growth in the next few decades based on the Company’s forecast that one in every two vehicles will be electric by 2045.¹²

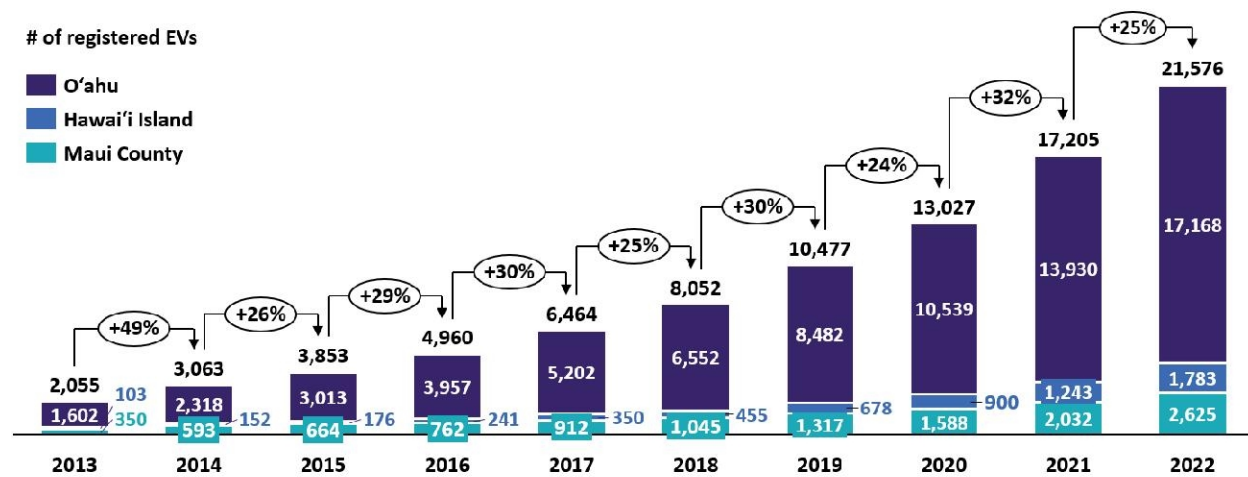


Figure 1: Cumulative EV Adoption in the Company’s Service Territory Since Pilot Program Inception

Schedule EV-U Tariff

Background

2022 was the ninth full year of the public DCFC pilot program.¹³ The introduction of Schedule EV-U in 2013 was intended to support the EV market by allowing the Company to install and operate public EV charging facilities in strategic locations to address range anxiety, support the rental EV market, and

¹⁰ Source is based upon estimated corrected data from <http://dbedt.hawaii.gov/economic/energy-trends-2/>. The Energy Trends data had vehicle registration issues for the months of October 2019 to December 2019. The estimated corrections were based upon calculated linear incremental EV adoption between September 2019 and January 2020.

¹¹ Hawaii Automobile Dealers Association Newsletter, 2022 Edition 3 at 24.

¹² Docket No. 2018-0135, Electrification of Transportation Strategic Roadmap filed June 18, 2018 at 34.

¹³ On July 3, 2013, in accordance with D&O 31338, Hawaiian Electric filed its commercial rates Schedule EV-F and Schedule EV-U to be effective July 4, 2013.

increase EV acceptance by residents living in multi-unit dwellings (“MUDs”). Schedule EV-F, simultaneously introduced in 2013, was intended to support clean energy goals by encouraging “the development of public EV charging facilities by pricing electricity at levels that are lower than Schedule EV-C¹⁴ and Schedule J at lower energy consumption levels for start-up EV public charging providers.”¹⁵

In mid-2016, the Company requested to extend the termination date of the pilot program.¹⁶ A year later,¹⁷ the Commission approved a five-year extension of the pilot program and request to convert the EV-U rate from a fixed fee to volumetric on the condition that the Company submit revised rate structures for Schedule EV-U and Schedule EV-F within ninety days and comply with applicable requirements.¹⁸ On December 12, 2017, the Company implemented the revised rate structure for Schedules EV-U and EV-F for all participating accounts, charging customers based on their actual electricity consumption. The time-of-use (“TOU”) periods for rate Schedules EV-F and EV-U are defined as follows: Off-Peak: 10 PM to 9 AM; Mid-Day: 9 AM to 5 PM; On-Peak: 5 PM to 10 PM, whereby the Mid-Day period provides a lower energy cost that reflects system needs.¹⁹

Status of Schedule EV-U Tariff

As displayed in Figure 2, 2022 marks a momentous year in which the Company completed the installation of the 25 DCFC metered accounts allowed in the EV-U pilot by installing the remaining four metered accounts, which are located at the following sites on O’ahu: Mililani Town Center, Bishop Museum, Waikiki-Kapahulu Public Library, and Kailua Foodland Marketplace.

¹⁴ By D&O 33165, issued on September 25, 2015 in Docket No. 2015-0242, the Commission approved “the Companies’ request to terminate Schedule EV-C, as of October 1, 2015.”

¹⁵ Transmittal No. 13-07 at 22.

¹⁶ On June 27, 2016, the Company filed a non-docketed transmittal requesting to extend the termination date for Schedule EV-F and Schedule EV-U from June 30, 2018 to June 30, 2028. On July 5, 2016, the Commission issued Order No. 33783 and opened Docket No. 2016-0168 for the purpose of reviewing the Company’s request. On September 15, 2016, the Commission issued Order No. 33918, establishing the procedural schedule. On November 18, 2016, the Company filed its Reply Statement of Position thereby completing the procedural schedule.

¹⁷ On June 2, 2017, the Commission issued D&O 34592 in Docket No. 2016-0168, approving a five-year extension of the pilot.

¹⁸ The Commission provided further guidance that the revised rate structures for Schedule EV-F and Schedule EV-U should (1) align Schedule EV-F and Schedule EV-U to TOU rates developed within Docket No. 2014-0192, (2) “incorporate lessons learned from time-of-use rates and demand response initiatives” into the revised rate structures, (3) contemplate various business and EV charging models that may be facilitated through various technologies, and (4) be “proactive in proposing revised rate structures and tariffs as research, technology, and market-related changes occur.” The Commission also required the Company to include discussion on efforts to forecast anticipated utilization in subsequent EV charging deployments and how costs for EV charging deployments have been and are anticipated to be recovered from customers. On September 5, 2017, the Company submitted revised rate structures and accompanying tariff sheets for Schedules EV-F and EV-U. On October 13, 2017, the Commission issued Order No. 34867 filed in Docket No. 2016-0168, approving the Company’s revised tariff sheets for Schedules EV-F and EV-U, to be implemented within 60 days.

¹⁹ In alignment with guidance provided by the Commission in D&O 34592.

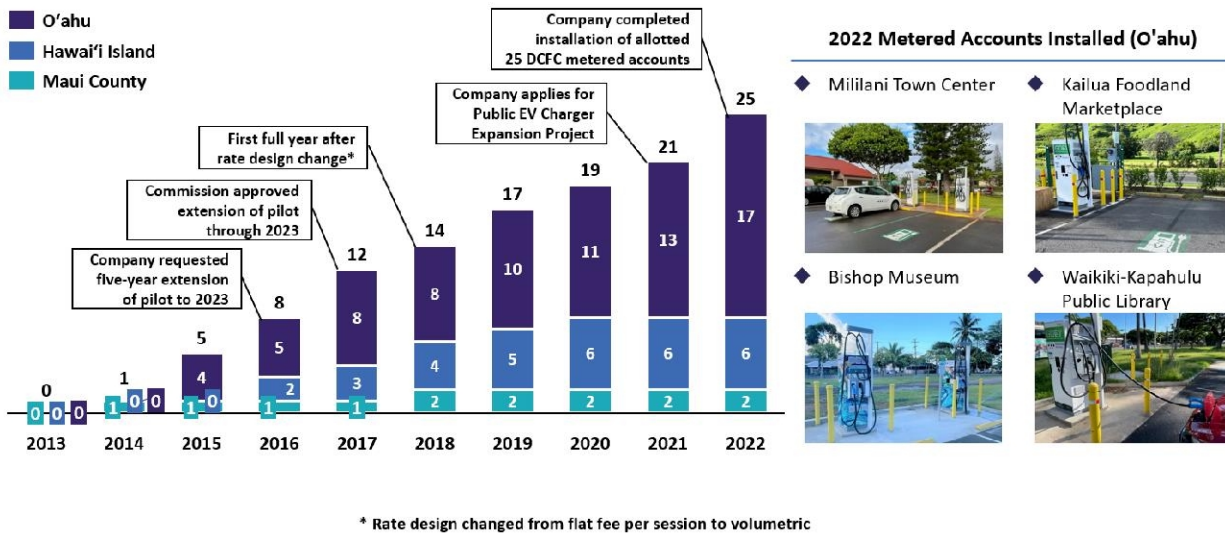


Figure 2: Cumulative Installed EV-U DCFC Metered Accounts Over Time

Figure 3 displays the annual DCFC metered account installations on each island from program inception through 2022.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
O'ahu			<ul style="list-style-type: none"> Dolo Plantation Ko'olau Center Kapolei Commons Hawai'i Kai 7-Eleven 	<ul style="list-style-type: none"> Ward 1 	<ul style="list-style-type: none"> Ward 2 Waianae Mall 801 Dillingham 		<ul style="list-style-type: none"> Times Square SC Hale'iwa TC 	<ul style="list-style-type: none"> Kapolei SC 	<ul style="list-style-type: none"> Salt Lake SC Waipio SC 	<ul style="list-style-type: none"> Mililani TC Bishop Museum Kailua Foodland Marketplace Waikiki-Kapahulu Public Library
Hawai'i Island				<ul style="list-style-type: none"> Iiilo Office Kona Office 	<ul style="list-style-type: none"> Waiimea KTA 	<ul style="list-style-type: none"> The Shops at Mauna Lani 	<ul style="list-style-type: none"> Punaluu Bake Shop 	<ul style="list-style-type: none"> Puna Kea SC 		
Maui		<ul style="list-style-type: none"> Kahului Office 								
Moloka'i						<ul style="list-style-type: none"> Kaunakakai 				

Figure 3: History of EV-U DCFC Metered Account Installations

Since the release of the Company's Backbone Study in July 2019,²⁰ the Company targeted areas in Hawai'i shown to have a high need for charging stations, and prioritized locations with willing site hosts for new charging stations accordingly.

Utilization across the Company's Service Territory

In 2022, EV-U's energy consumption utilization remained flat, with increased utilization on Maui County and Hawai'i Island and decreased utilization on O'ahu.²¹ Increased utilization on the neighbor islands may be due to an increased focus on maintenance and repair. Slight decreases in utilization on O'ahu may be due to the Ko'olau DCFC station being out of service, and the availability of third-party fast

²⁰ Docket No. 2018-0315, Electrification of Transportation Electric Vehicle Critical Backbone Study: Planning Methodology filed on July 30, 2019.
²¹ 2022 EV-U utilization: 732,535 kWh vs. 2021 EV-U utilization: 785,203 kWh

chargers on O’ahu. The third-party fast chargers may have specifically decreased energy consumption at the Ward 1 and Ward 2 DCFC stations, which are the Company’s most utilized DCFC stations.

The Company focused their efforts in 2022 on improving access to public EV charging through the following actions:

- 1) provided more charging options by installing six new DCFC stations at four new sites (Mililani Town Center, Bishop Museum, Kailua Foodland Marketplace, and Waikiki-Kapahulu Public Library) and replacing one DCFC station (Waimea KTA); and
- 2) hired dedicated staff to respond to service-related issues and streamline processes to improve communication and efficiency across the Company’s service territory.

Figure 4 shows the annual energy consumption utilization for each service territory from program inception through 2022. Figure 5 shows the number of charging sessions that occurred by month.

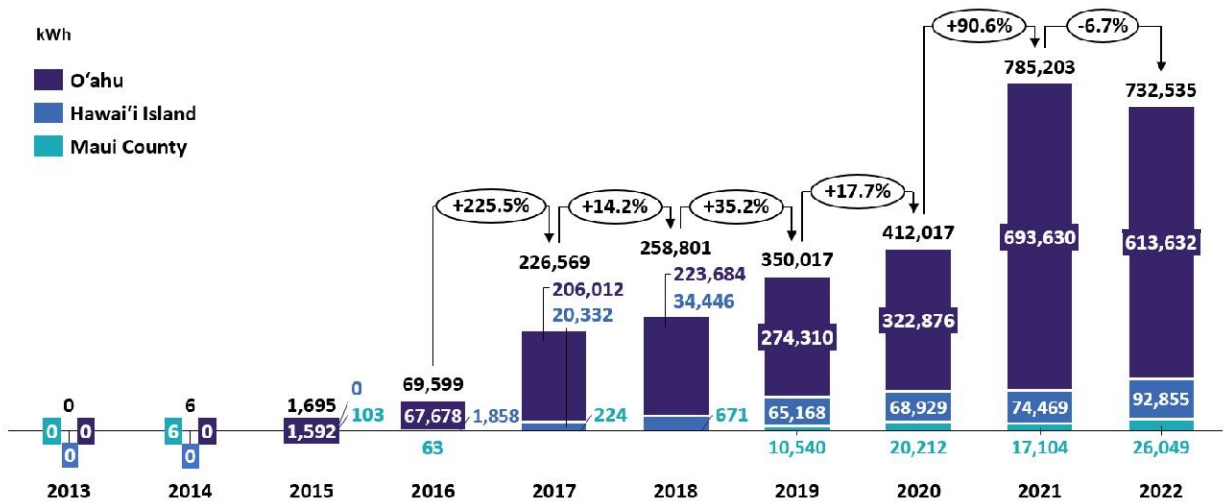


Figure 4: Annual Utilization for EV-U Pilot Through 2022 by Energy Consumption (kWh)

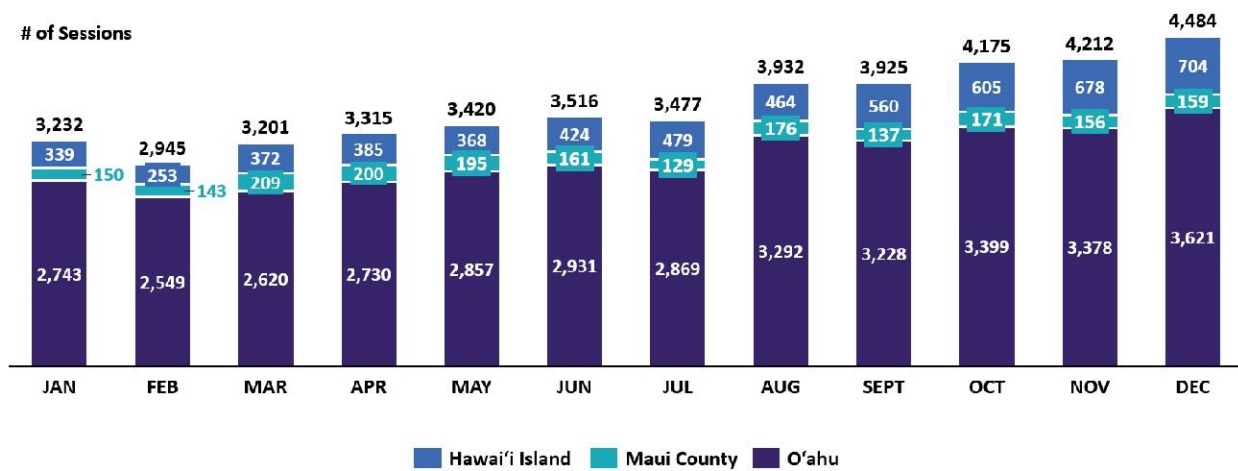


Figure 5: EV-U Monthly Utilization in 2022 by Number of Sessions

Utilization on O’ahu

In 2022, the Company installed six DCFC stations on O’ahu at the following sites: Mililani Town Center (2), Bishop Museum (2), Kailua Foodland Marketplace (1), and Waikiki-Kapahulu Public Library (1). The new DCFC stations became publicly available at Mililani Town Center in August, Bishop Museum in September, Kailua Foodland Marketplace in November, and Waikiki-Kapahulu Public Library in December. As a result, this completed the 25 metered accounts allowed under the EV-U pilot. The monthly overall utilization for the EV-U DCFC metered accounts on O’ahu is shown by number of sessions in Figure 6 and by energy consumption in Figure 7.

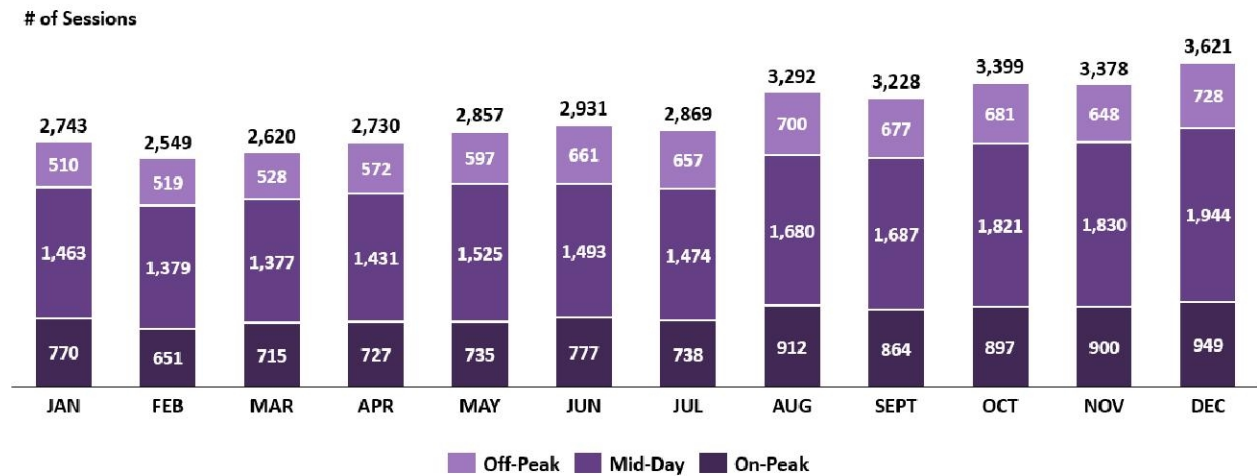


Figure 6: Monthly Number of Sessions in 2022 by TOU period for O’ahu EV-U DCFC Metered Accounts

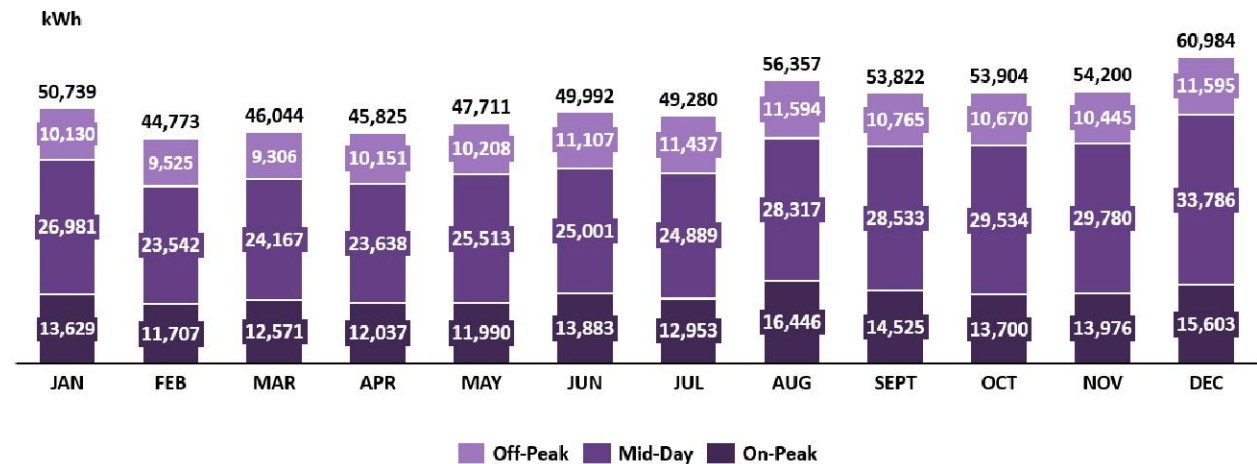
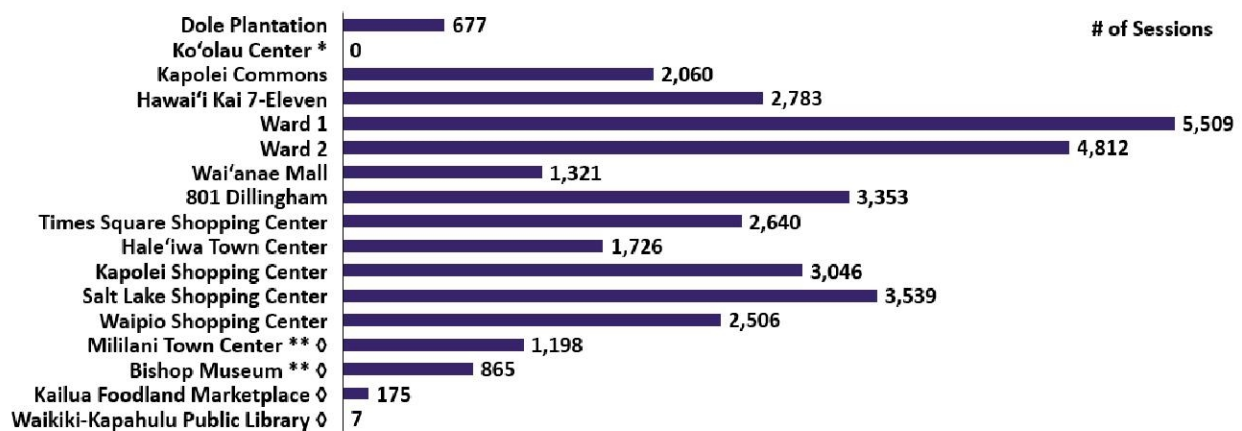


Figure 7: Monthly Energy Consumption (kWh) in 2022 by TOU period for O’ahu EV-U DCFC Metered Accounts

In 2022, the DCFC stations on O’ahu, which represent 70 percent of all DCFC stations in the pilot program, accounted for 84 percent of all charging usage in the pilot program. This reflects that the majority of EVs are located on O’ahu, comprising 80 percent of all the passenger EVs registered in the Company’s service territory at the end of 2022.

Co-located DCFC stations at Ward 1 and Ward 2, which are separately metered accounts and located in the heart of downtown Honolulu, continue to be the most utilized stations in the pilot program by number of sessions and energy consumption. The overall utilization for the EV-U DCFC metered accounts on O’ahu is shown by number of sessions in Figure 8 and by energy consumption in Figure 9. The metered accounts are listed in chronological order based on when they were made available to the public.

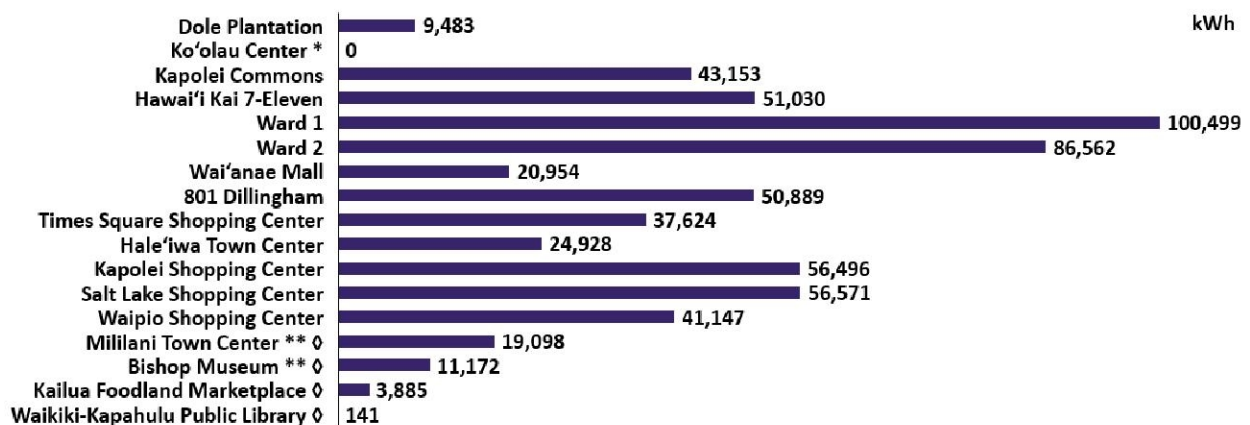


* The Ko’olau Center DCFC station was out of service in 2022 and is not supported by the manufacturer. Planned to be replaced in in late 2023 or early 2024.

** Metered account has two DCFC stations.

◊ Metered account became available to the public during the second half of 2022. As a result, utilization does not represent a full calendar year.

Figure 8: Number of Sessions in 2022 by O’ahu EV-U DCFC Metered Accounts



* The Ko’olau Center DCFC station was out of service in 2022 and is not supported by the manufacturer. Planned to be replaced in in late 2023 or early 2024.

** Metered account has two DCFC stations.

◊ Metered account became available to the public during the second half of 2022. As a result, utilization does not represent a full calendar year.

Figure 9: Energy Consumption in 2022 by O’ahu EV-U DCFC Metered Accounts

Figure 10 provides a summary of key metrics for all EV-U DCFC metered accounts on O’ahu, with TOU period utilization calculated using energy consumption (kWh) data for charging sessions initiated within the specified period. Following the table are individual discussions on the context and status of each EV charging station metered account.

	% Utilization			Avg Energy/Session (kWh)			Avg Revenue/Session (\$)			Avg Time/Session (min)		
	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak
Dole Plantation	6%	90%	4%	9	15	10	\$ 4.81	\$ 7.28	\$ 5.51	27	33	20
Ko'olau Center *	0%	0%	0%	0	0	0	\$ 0	\$ 0	\$ 0	0	0	0
Kapolei Commons	12%	55%	32%	19	20	23	\$ 10.25	\$ 9.91	\$ 13.27	34	38	39
Hawai'i Kai 7-Eleven	23%	51%	26%	18	19	17	\$ 9.54	\$ 9.49	\$ 9.76	36	35	32
Ward 1	29%	45%	26%	19	18	17	\$ 10.38	\$ 8.89	\$ 9.92	36	35	34
Ward 2	28%	46%	27%	19	18	18	\$ 9.99	\$ 8.78	\$ 10.03	37	36	34
Wai'anāe Mall	15%	56%	29%	14	15	19	\$ 7.62	\$ 7.38	\$ 10.80	26	30	32
801 Dillingham	17%	57%	26%	15	16	14	\$ 8.16	\$ 7.63	\$ 8.22	33	34	31
Times Square Shopping Center	15%	56%	29%	12	15	15	\$ 6.61	\$ 7.15	\$ 8.47	26	32	32
Hale'iwa Town Center	13%	61%	26%	11	16	14	\$ 6.16	\$ 7.61	\$ 7.98	27	34	33
Kapolei Shopping Center	20%	51%	29%	20	18	19	\$ 10.80	\$ 8.79	\$ 10.68	36	34	33
Salt Lake Shopping Center	21%	53%	27%	15	16	17	\$ 8.37	\$ 7.74	\$ 9.57	30	30	30
Waipio Shopping Center	18%	56%	26%	15	17	16	\$ 8.34	\$ 8.29	\$ 9.18	34	34	33
Mililani Town Center ** ◊	13%	58%	28%	16	17	15	\$ 8.47	\$ 8.13	\$ 8.48	34	34	33
Bishop Museum ** ◊	11%	74%	16%	15	13	11	\$ 7.92	\$ 6.51	\$ 6.09	32	29	26
Kailua Foodland Marketplace ◊	18%	61%	22%	22	26	16	\$ 11.88	\$ 12.58	\$ 9.22	39	41	29
Waikiki-Kapahulu Public Library ◊	0%	77%	23%	0	22	16	\$ 0	\$ 10.73	\$ 9.07	0	42	21

* The Ko'olau Center DCFC station was out of service in 2022 and is not supported by the manufacturer. Planned to be replaced in in late 2023 or early 2024.

** Metered account has two DCFC stations.

◊ Metered account became available to the public during the second half of 2022. As a result, utilization does not represent a full calendar year.

Figure 10: Summary of Key Metrics for O’ahu EV-U DCFC Metered Accounts²²

Dole Plantation

While the Dole Plantation DCFC station is not located near residential neighborhoods, this strategic tourist location is one of the major thoroughfares to the North Shore of O’ahu, which has little availability of public EV charging options.

At this location, the vast majority or 90 percent of charging usage continued to be initiated during the Mid-Day period. This is the highest percentage amongst all charging stations in the EV-U pilot. This is likely attributable to Dole Plantation’s business hours of 9:30 AM to 4:30 PM, although access to this charging station is sometimes extended beyond normal business hours. 6 percent and 4 percent of charging usage were initiated during the Off-Peak and On-Peak periods, respectively.

The Dole Plantation DCFC station is an older model that is no longer supported by the manufacturer and is currently in design so it can be replaced in 2023 with the latest in DCFC technology.

²² Due to rounding of percentages to the nearest whole number, the sum for each charging station will not always equal 100 percent.

Ko'olau Center

Like the Dole Plantation DCFC station, the Ko'olau Center DCFC station is on a thoroughfare that provides access to the north side of O'ahu where there are limited public EV charging options. Situated in Kaneohe, Ko'olau Center is a small shopping center that has a Times Supermarket.

The Ko'olau Center DCFC station went out of service in early January 2022. The Company repeatedly attempted to repair this station but was not successful. This DCFC station is an older model that is no longer supported by the manufacturer. The Company is in discussions with the site host to replace this station with the latest in DCFC technology. The replacement DCFC station is currently in design and is anticipated to open in late 2023 or early 2024.

Kapolei Commons

The Kapolei Commons DCFC station is situated in a shopping center near large residential neighborhoods along a major highway thoroughfare. This shopping center also provides Level 2 charging from third-party charging station providers. Moreover, the Company's Kapolei Shopping Center DCFC station is nearby. Previously, the Kapolei Commons DCFC station had provided only a CHAdeMO connector. In 2020, the Company installed a new DCFC station, which included a CCS connector and a CHAdeMO connector. This expanded support to a wider variety of EV drivers. The new DCFC station became available to the public in January 2021.

In 2022, 55 percent of charging usage for this station was initiated during the Mid-Day period, 12 percent during the Off-Peak, and 32 percent during the On-Peak.

Hawai'i Kai 7-Eleven

The Hawai'i Kai 7-Eleven DCFC station is located amongst residential homes and condominiums. Its proximity to condominiums may contribute to its continued high utilization. EV owners living in condominiums and townhouses without a garage often need to rely on public EV charging stations, such as this one, for their vehicle charging needs. Additionally, this location is the only DCFC station on the south-east side of the island.

In 2022, 51 percent of charging usage for this station was initiated during the Mid-Day period, 23 percent during the Off-Peak, and 26 percent during the On-Peak.

The Hawai'i Kai 7-Eleven DCFC station is an older model that is no longer supported by the manufacturer and is currently in design so that it can be replaced in 2023 with the latest in DCFC technology.

Ward 1 and 2

The Ward 1 and Ward 2 DCFC stations are separately metered accounts, co-located at the Hawaiian Electric building on Ward Avenue. This location is situated near the growing density of high-rise condominiums, many office buildings, and the downtown Honolulu district. The Ward 1 and Ward 2 DCFC stations are the two most highly utilized charging stations by energy consumption and number of sessions in the pilot program across the Company's service territory.

The location of the co-located DCFC stations may account for their high utilization. Combined, they make up 30 percent of usage for charging stations on O'ahu and 26 percent of usage for all stations in

this pilot program based on 2022 data. However, Ward 1 and Ward 2 DCFC stations had the lowest percentage of utilization initiated during Mid-Day in 2022, having 45 percent and 46 percent of usage initiated during this period, respectively. Charging usage initiated during Off-Peak for Ward 1 and Ward 2 DCFC stations was 29 percent and 28 percent, respectively. Additionally, charging usage initiated during On-Peak for Ward 1 and Ward 2 DCFC stations was 26 percent and 27 percent, respectively. As seen in these statistics, charging usage was very similar for both chargers during each TOU period in 2022.

As mentioned earlier, these DCFC stations experienced a slight decrease in utilization from the prior year. This may be partially due to availability of Tesla's Supercharger, which has six ports, is located at Pearlridge Center in Aiea, and opened to the public in December 2021. Additionally, the DCFC stations at Ward 1 and Ward 2 are beyond the manufacturer warranty and as a result experienced service-related issues, which contributed to the slight decrease in utilization from the prior year.

Due to the popularity of this charging location and available excess power capacity, the Company plans to add a second DCFC station to the Ward 2 metered account in 2023. The additional DCFC station will relieve wait times. In parallel with the installation of the additional DCFC station, the original DCFC stations at Ward 1 and 2 will be replaced and upgraded to the latest in DCFC technology and improved service.

Wai'anae Mall

The Wai'anae Mall DCFC station is located at a shopping center amongst restaurants and stores, and near residential neighborhoods along a highway thoroughfare. It is currently the westernmost public EV charging station of any type along Farrington Highway on the west side of the island. This location provides EV drivers assurance they can travel to and from the leeward coast and encourages EV adoption in this important area.

In 2022, 56 percent of charging usage was initiated during the Mid-Day, 15 percent during the Off-Peak, and 29 percent during the On-Peak.

801 Dillingham

The 801 Dillingham DCFC station is located near the Iwilei Costco and is adjacent to many other shops and restaurants, making it an ideal location for convenient charging while running errands.

In 2022, 57 percent of charging usage was initiated during the Mid-Day, 17 percent during the Off-Peak, and 26 percent during the On-Peak.

Times Square Shopping Center

The Times Square Shopping Center DCFC station, located in Waimalu, opened to the public in January 2019. The Company selected this location due to its population density, high penetration of MUDs, resident commuters, jobs, and traffic density. While the Company installed one dual-standard 50 kW DCFC station, the underlying electrical infrastructure supports 150 kW. The Company strategically employed this approach to enable flexibility when technology or customer needs change. Planning for

the future with additional capacity enables the Company to easily install additional DCFC stations or upgrade to a higher powered DCFC station, if deemed appropriate.

In 2022, 56 percent of charging usage was initiated during the Mid-Day, 15 percent during the Off-Peak, and 29 percent during the On-Peak.

Hale'iwa Town Center

The Hale'iwa Town Center DCFC station opened to the public in June 2019. This strategic location is expected to alleviate range anxiety as there is currently one public EV charging station within a 10-mile drive of this location, the Company's DCFC station at Dole Plantation. The Hale'iwa Town Center DCFC station also supports residents and tourists driving to and from the North Shore area of O'ahu.

In 2022, 61 percent of charging usage was initiated during the Mid-Day, 13 percent of charging was initiated during the Off-Peak, and 26 percent during the On-Peak.

Kapolei Shopping Center

The Kapolei Shopping Center DCFC station is the fourth most utilized station on O'ahu by energy consumption, behind the Ward 1 and Ward 2 DCFC stations and slightly behind the Salt Lake Shopping Center DCFC station. This is likely due to its central location in the increasingly populated Kapolei area. The Kapolei Shopping Center DCFC station is one of two public DCFC stations in this area – the Company's Kapolei Commons DCFC station is nearby and is situated next to level 2 chargers that are operated by other third-party charging station providers. The Kapolei Shopping Center DCFC station opened to the public in January 2020. While the Company installed one dual-standard 50 kW DCFC station, the underlying electrical infrastructure was designed to support 150 kW. The Company strategically employed this approach to enable flexibility when technology or customer needs change. Planning for the future with additional capacity enables the Company to easily install additional DCFC stations or upgrade to a higher powered DCFC station, if deemed appropriate.

In 2022, 51 percent of charging usage was initiated during the Mid-Day, 20 percent during the Off-Peak, and 29 percent during the On-Peak.

Salt Lake Shopping Center

The Salt Lake Shopping Center DCFC station is the third most utilized station on O'ahu by energy consumption, behind Ward 1 and Ward 2 DCFC stations, which is likely due to its central location in the urban core of Honolulu. This DCFC station opened to the public in February 2021. This strategic location, the first in the Salt Lake area, is located directly across from the Honolulu International Airport and is expected to support electrification of the car rental market. While the Company installed one dual-standard 50 kW DCFC station installed, the underlying electrical infrastructure was designed to support 150 kW. The Company strategically employed this approach to enable flexibility when technology or customer needs change. Planning for the future with additional capacity enables the Company to easily install additional DCFC stations or upgrade to a higher powered DCFC station, if deemed appropriate.

In 2022, 53 percent of charging usage was initiated during the Mid-Day, 21 percent during the Off-Peak, and 27 percent during the On-Peak.

Waipio Shopping Center

The Waipio Shopping Center DCFC station opened to the public in February 2021. This station is located at a shopping center amongst restaurants and stores, adjacent to a residential neighborhood along a highway thoroughfare. While the Company installed one dual-standard 50 kW DCFC station, the underlying electrical infrastructure was designed to support 150 kW. The Company strategically employed this approach to enable flexibility when technology or customer needs change. Planning for the future with additional capacity enables the Company to easily install additional DCFC stations or upgrade to a higher powered DCFC station, if deemed appropriate.

In 2022, 56 percent of charging usage was initiated during the Mid-Day, 18 percent during the Off-Peak, and 26 percent during the On-Peak.

EV-U DCFC Metered Accounts Installed In 2022

Mililani Town Center (2 DCFC stations)

In July 2022, two DCFC stations opened to the public at the Mililani Town Center under one metered account. This strategic and convenient location is in the heart of a dense residential neighborhood, at a shopping center with restaurants and stores, and with easy access from the H2 freeway. These are the first DCFC stations installed in the Mililani area and help to serve EV drivers traveling to and from the North Shore.

From July to December 2022, this metered account had 58 percent of charging usage initiated during the Mid-Day, 13 percent during the Off-Peak, and 28 during the On-Peak.

Bishop Museum (2 DCFC stations)

In August 2022, two DCFC stations opened to the public at the Bishop Museum under one metered account. The new fast chargers are in addition to two Level 2 chargers installed by the Bishop Museum as part of an effort to provide sustainable options for the neighborhood community of Kalihi-Palama. In a first for the pilot program, the DCFC stations at Bishop Museum feature an artistic wrap designed to be representative of the Company's and Bishop Museum's sustainability vision, executed by local artist Wooden Wave (see in Figure 11 and 12).

From August to December 2022, this metered account had 74 percent of charging usage initiated during the Mid-Day, 11 percent during the Off-Peak, and 16 percent during the On-Peak. The high Mid-Day utilization is directly related to public access to these chargers only being available during Bishop Museum's business hours of 9 AM to 5 PM.



Note: Panels 1 through 4 represent each side of the charger box

Figure 11: Artwork for the Bishop Museum DCFC stations

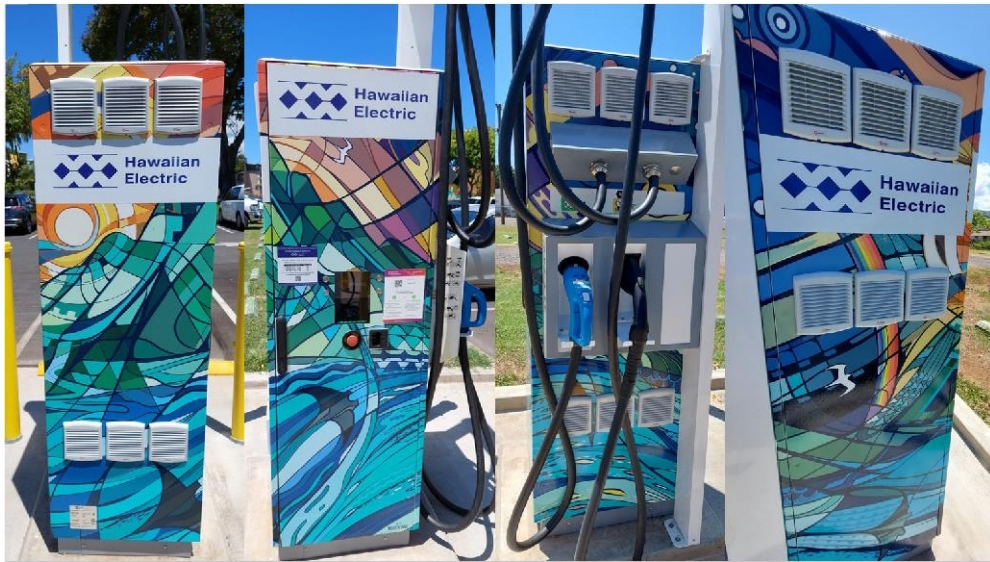


Figure 12: Artwork on one of the Bishop Museum DCFC stations

Kailua Foodland Marketplace

In November 2022, the first of two DCFC stations opened to the public at the Kailua Foodland Marketplace under one metered account. The Company was planning to install a second DCFC station at Kailua Foodland Marketplace in 2022; however, it was delayed to 2023 due to strategically relocating Kailua Foodland Marketplace's DCFC station to the Waimea KTA site (located on Hawai'i Island) to address immediate DCFC station reliability issues. While the Company ordered another DCFC station for Kailua Foodland Marketplace, the DCFC station shipment was delayed due to material supply chain disruptions. The convenient location of Kailua Foodland Marketplace, located in the central shopping district of Kailua, provides much needed fast charging options for EV drivers in the East Windward region of O'ahu and is the first DCFC station to be installed in the Kailua area.

In November and December 2022, 61 percent of charging usage was initiated during the Mid-Day, 18 percent during the Off-Peak, and 22 percent during the On-Peak.

Waikiki-Kapahulu Public Library

In mid-December 2022, one DCFC station opened to the public at the Waikiki-Kapahulu Public Library, marking the final metered account to open under the authority of the EV-U pilot. This site is strategic not just in location, but also in the potential for a broader partnership with the Hawai'i State Public Library System to add DCFC stations to other library locations in the event of the Company's expansion project is approved by the Commission. The dense commercial and tourist-centric area of Waikiki is an essential location for providing convenient and accessible EV fast charging.

During the brief period in 2022, this DCFC station had 7 sessions, in which 77 percent of charging usage was initiated during the Mid-Day, none during the Off-Peak, and 23 percent during the On-Peak.

Utilization on Hawai'i Island

In 2022, the DCFC stations on Hawai'i Island, which represent 22 percent of all stations in the pilot program, accounted for 13 percent of all charging usage in the pilot program. As of the end of 2022, Hawai'i Island had 8 percent of the passenger EVs registered in the Company's service territory. Longer driving distances on the island make public DCFC stations an essential resource for Hawai'i Island EV drivers.

The DCFC station at Hawaiian Electric's office in Kailua-Kona was the most utilized charging station on the island and is ranked ninth for energy consumption in the pilot program. The monthly overall utilization for the EV-U DCFC sites on Hawai'i Island is shown by number of sessions in Figure 13 and by energy consumption in Figure 14.

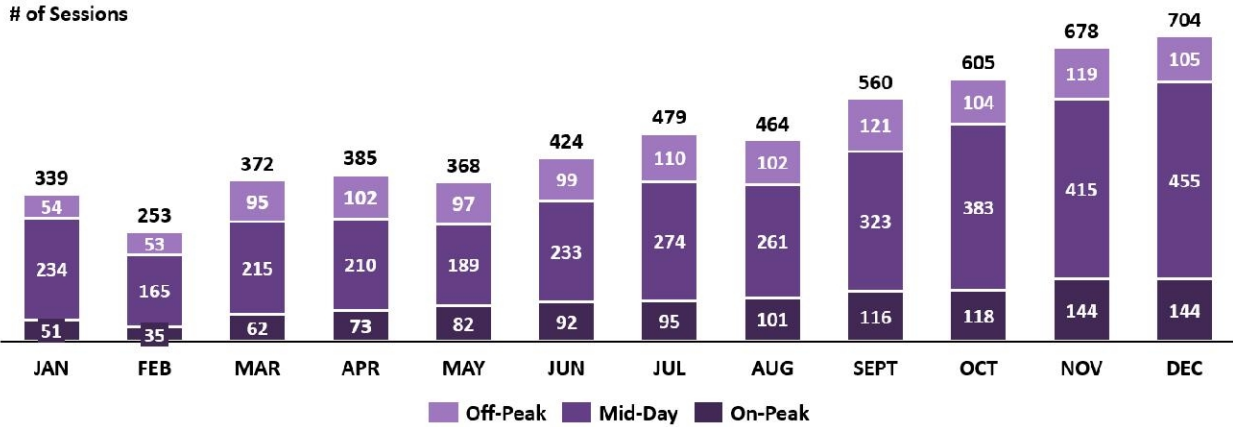


Figure 13: Monthly Number of Sessions in 2022 by TOU for Hawai'i Island EV-U DCFC Metered Accounts

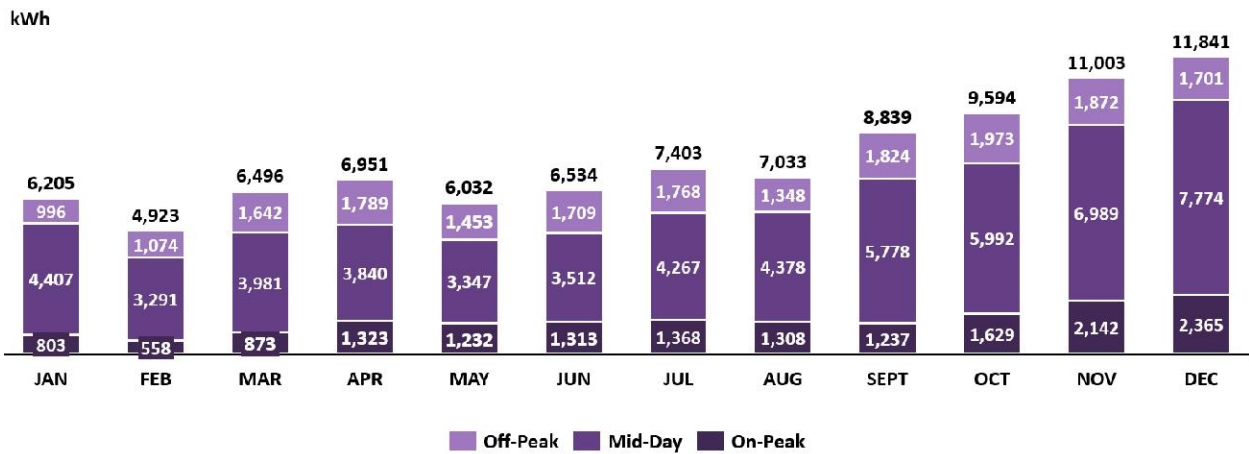


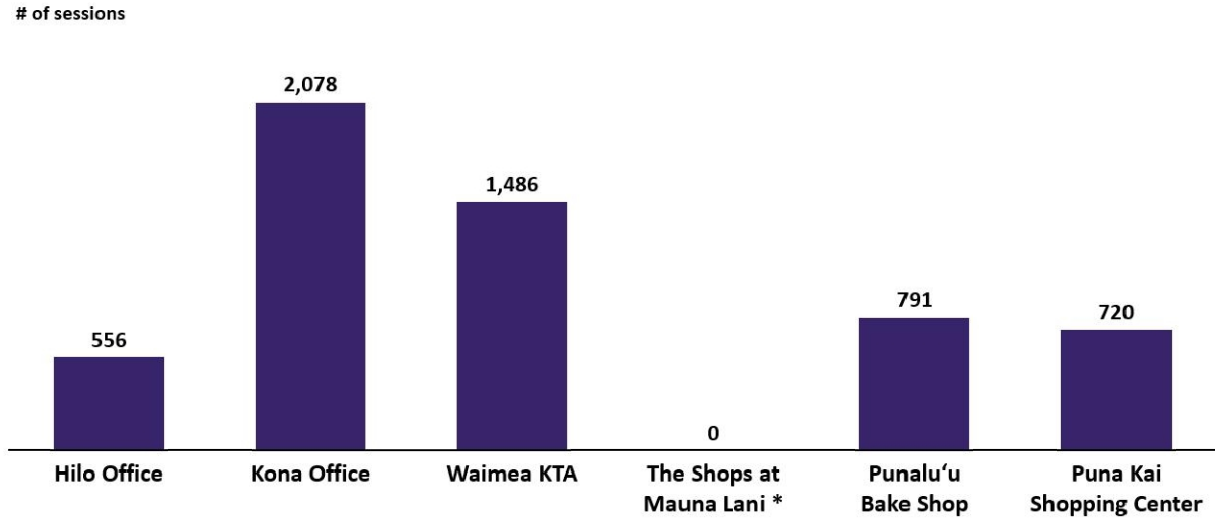
Figure 14: Monthly Energy Consumption (kWh) in 2022 by TOU for Hawai'i Island EV-U DCFC Metered Accounts

The need for repair and maintenance of the Company's public EV charging assets, especially on Hawai'i Island, resulted in lower-than-expected charging utilization in 2021 compared to the prior year. In 2022, the Company hired dedicated staff to respond to these issues and streamline processes to improve communication and efficiency across the Company's service territory. Efforts in 2022 on Hawai'i Island included updating software at the Kona DCFC station, as well as replacing the Waimea KTA DCFC station with a new one. As a result, total energy consumption increased by 25 percent or 18,386 kWh from the prior year.²³ For Hawai'i Island, this was the highest annual energy consumption utilization compared to prior years and largest annual increase in energy consumption in three years. This is also notable given that the DCFC station at The Shops at Mauna Lani was out of service throughout 2022. To further increase reliability and charging availability, the Company plans to add a second DCFC station at the Hilo Office, Kona Office, and Waimea KTA sites in 2023 or early 2024. Moreover, the original DCFC stations at

²³ 2022: 92,855 kWh vs. 2021: 74,469 kWh

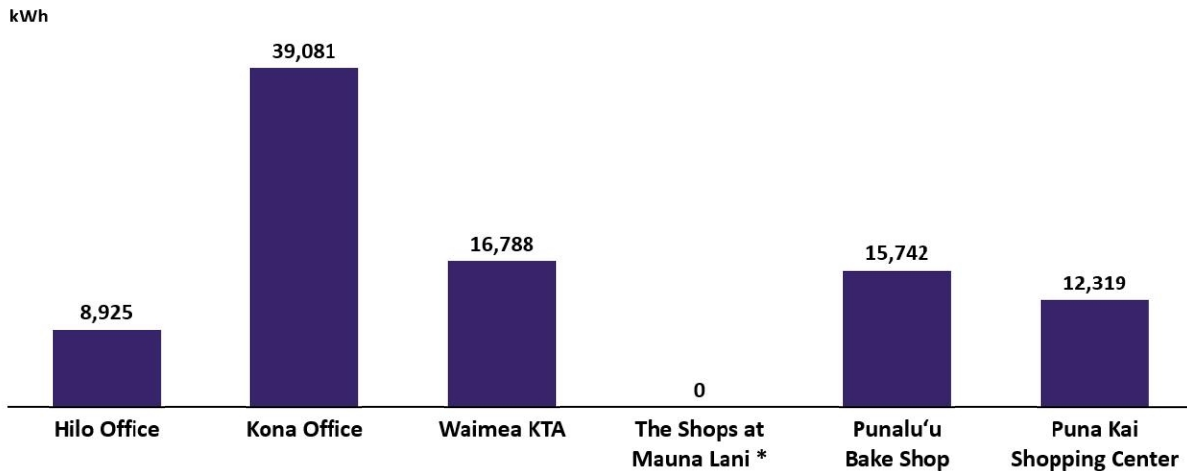
the Hilo Office and Kona Office sites will be strategically replaced in parallel with the installation of the additional DCFC stations at those sites.

The monthly overall utilization for the EV-U DCFC metered accounts on Hawai'i Island is shown by number of sessions in Figure 15 and by energy consumption in Figure 16. The metered accounts are listed in chronological order based on when they were made available to the public.



* The Shops at Mauna Lani DCFC station was out of service in 2022 and is not supported by the manufacturer. Planned to be replaced in 2024.

Figure 15: Number of Sessions in 2022 by Hawai'i Island EV-U DCFC Metered Accounts



* The Shops at Mauna Lani DCFC station was out of service in 2022 and is not supported by the manufacturer. Planned to be replaced in 2024.

Figure 16: Energy Consumption in 2022 by Hawai'i Island EV-U DCFC Metered Accounts

Figure 17 provides a summary of key metrics for all EV-U DCFC metered accounts on Hawai'i Island with TOU period utilization calculated using energy consumption (kWh) data for charging sessions initiated within the specified period. Following the table are individual discussions on the context and status of each EV charging station metered account.

	% Utilization			Avg Energy/Session (kWh)			Avg Revenue/Session (\$)			Avg Time/Session (min)		
	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak
Hilo Office	12%	68%	20%	15	16	18	\$ 8.97	\$ 8.12	\$ 11.04	29	29	32
Kona Office	17%	62%	21%	17	20	18	\$ 10.14	\$ 10.18	\$ 11.12	31	32	28
Waimea KTA	14%	65%	21%	9	13	9	\$ 5.33	\$ 6.58	\$ 5.96	25	30	26
The Shops at Mauna Lani	0%	0%	0%	0	0	0	\$ 0	\$ 0	\$ 0	0	0	0
Punalu'u Bake Shop	48%	49%	4%	23	18	18	\$ 14.04	\$ 9.04	\$ 11.26	32	36	29
Puna Kai Shopping Center	14%	70%	15%	16	18	15	\$ 9.97	\$ 9.14	\$ 9.25	31	35	29

Figure 17: Summary of Key Metrics in 2022 for Hawai'i Island EV-U DCFC Metered Accounts²⁴

Hilo Office

This station is located at Hawaiian Electric's main Hawai'i Island office in Hilo. While no retail stores share the parking lot, there are some shops and eateries within a short walking distance. The strategic location of this site, its popularity, and the availability of excess capacity within the electrical infrastructure make this site a top priority for the addition of a second charging station in late 2023 or early 2024. Adding a second charging station will increase charging availability in the Hilo area and improve the reliability of this location as a charging hub for long distance travel or local errands. In parallel with installation of the additional DCFC station, the original DCFC station at the Hilo Office will also be replaced and upgraded to the latest in DCFC technology.

In 2022, 68 percent of charging usage was initiated during the Mid-Day, 12 percent during the Off-Peak, and 20 percent during the On-Peak.

Kona Office

This station is located at Hawaiian Electric's office in Kailua-Kona and is the only DCFC station in the area. This site is near many commercial businesses with some markets and restaurants located a few blocks away. In 2022, this DCFC station had the highest utilization amongst all EV-U stations on Hawai'i Island and is ranked ninth in the pilot program for energy consumption. The strategic location of this site, its popularity, and the availability of excess capacity within the electrical infrastructure make this site a top priority for the addition of a second charging station in late 2023 or early 2024. In parallel with installation of the additional DCFC station, the original DCFC station at the Kona Office will also be replaced and upgraded to the latest in DCFC technology.

In 2022, 62 percent of charging usage was initiated during the Mid-Day, 17 percent during the Off-Peak, and 21 percent during the On-Peak.

²⁴ Due to rounding of percentages to the nearest whole number, the sum for each charging station will not always equal 100 percent.

Waimea KTA

This station is located at a grocery store in Waimea in the northwest portion of Hawai'i Island, near other retail businesses. While the Company installed one dual-standard 50 kW DCFC station, the underlying electrical infrastructure was designed to support 150 kW. The strategic location of this site, its popularity, and the availability of excess capacity within the electrical infrastructure make this site a top priority for the addition of a second charging station in late 2023 or early 2024. The closest DCFC station to this site is the Company's DCFC station at The Shops at Mauna Lani, which is 18 miles away and was out of service in 2022. The Waimea KTA DCFC station was out of commission from October 2021 through the end of 2021 and experienced issues from January 2022 to July 2022. In August 2022, this DCFC station was replaced with a new one. This resulted in the monthly energy consumption and sessions doubling, since it was replaced.

In 2022, 65 percent of charging usage was initiated during the Mid-Day, 14 percent during the Off-Peak, and 21 percent during the On-Peak.

The Shops at Mauna Lani

This station is located at a resort's shopping area along the Kohala coast and was intended to support EV drivers between Waimea and Kona, including those bound for the Kona Airport. The Shops at Mauna Lani DCFC station had intermittent maintenance issues throughout 2021 and was out of commission in October of that year. In 2022, the Company repeatedly attempted to repair this station but was not successful. This DCFC station is an older model that is no longer supported by the manufacturer. The Company is coordinating with the site host to replace this station with the latest in DCFC technology. The replacement station is anticipated to open in 2024.

Punalu'u Bake Shop

The Punalu'u Bake Shop DCFC station in Na'ālehu opened to the public in March 2019. This location was chosen to alleviate range anxiety, since there are not any DCFC stations on the south side of Hawai'i Island, which in turn is expected to support EV adoption. A public DCFC station in this area is important to provide residents and tourists the confidence to travel to destinations within and through the south side of Hawai'i Island.

In 2022, most of the charging usage was initiated during the Mid-Day and Off-Peak periods with 49 percent and 48 percent, respectively. 4 percent of charging usage was initiated during the On-Peak period.

Puna Kai Shopping Center

The Puna Kai Shopping Center DCFC station in Pahoia opened to the public in August 2020. This location is intended to alleviate range anxiety and support EV adoption on Hawai'i Island.

In 2022, 70 percent of charging usage was initiated during the Mid-Day, 14 percent during the Off-Peak, and 15 percent during the On-Peak.

Utilization in Maui County

In 2022, the Company’s EV-U stations in Maui County accounted for nearly 10 percent of all DCFC stations in the pilot program and only 4 percent of charging usage in the pilot program. Maui County had 12 percent of the passenger EVs registered in the Company’s service territory.

In 2022, the total utilization of EV-U DCFC stations in Maui County amounted to 26,049 kWh, which represents a 52 percent or 8,945 kWh increase from the prior year.²⁵ This increase may be attributable to the Company’s focus on repair and maintenance across the Company’s service territory in 2022. Additionally, this could be an indication that EV adoption is increasing and there’s more public awareness about the benefits of driving an EV.

The monthly overall utilization for the EV-U DCFC metered accounts in Maui County is shown by number of sessions in Figure 18 and by energy consumption in Figure 19.

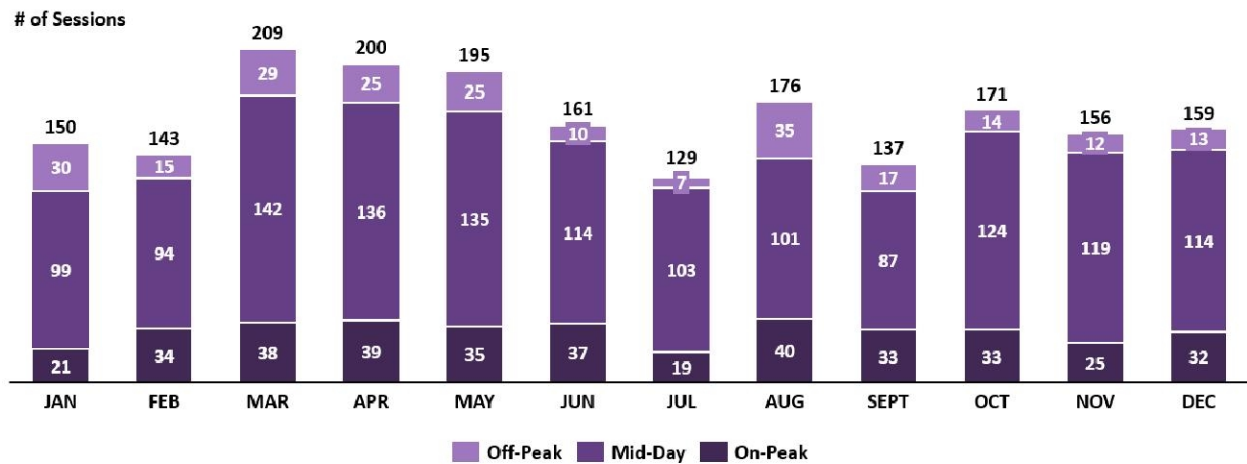


Figure 18: Monthly Number of Sessions in 2022 by TOU for Maui County EV-U DCFC Metered Accounts

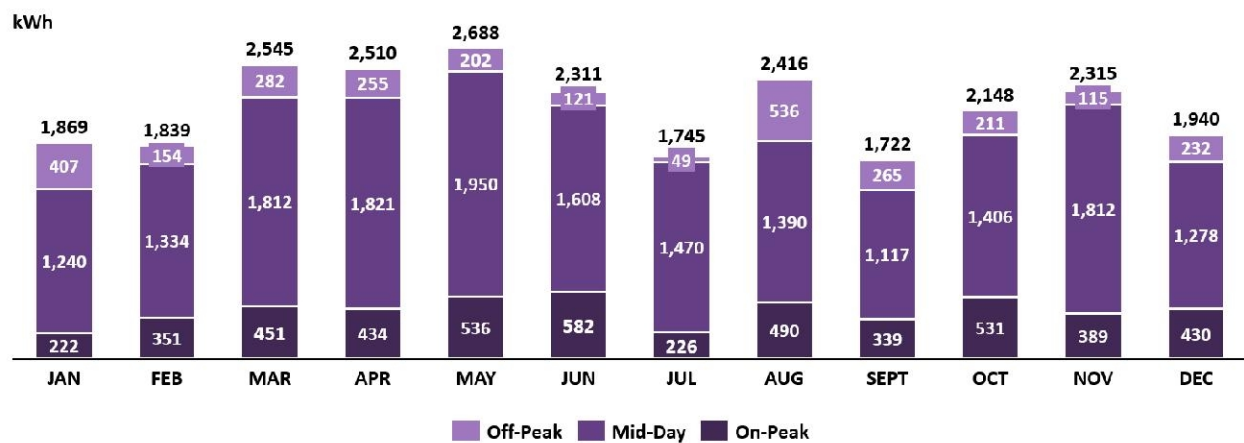


Figure 19: Monthly Energy Consumption (kWh) in 2022 by TOU for Maui County EV-U DCFC Metered Accounts

²⁵ 2021 EV-U utilization in Maui County: 17,104 kWh

The overall utilization for individual metered accounts in Maui County under EV-U is shown by number of sessions in Figure 20 and by energy consumption in Figure 21. The metered accounts are listed in chronological order based on when they were made available to the public.

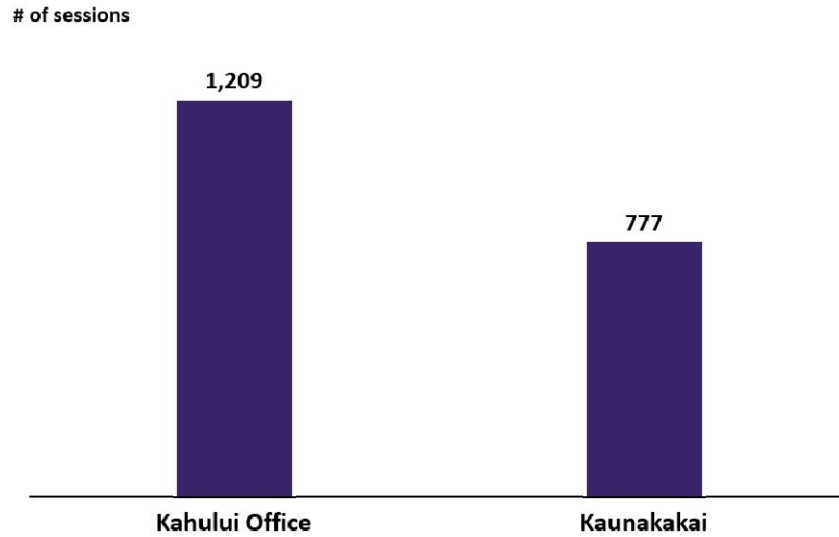


Figure 20: Number of Sessions in 2022 by Maui County EV-U DCFC Metered Accounts

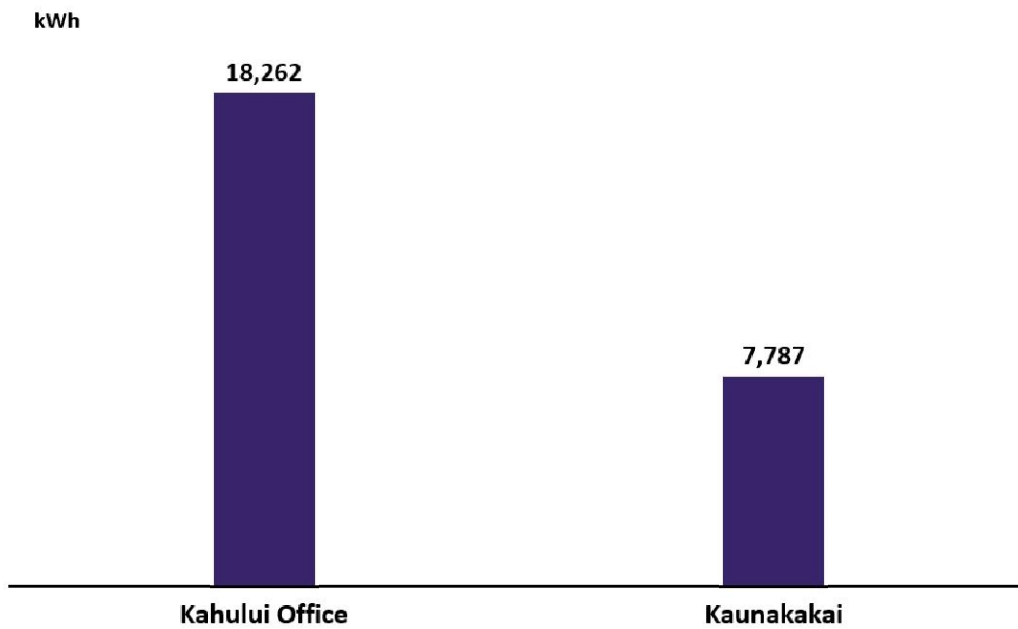


Figure 21: Energy Consumption in 2022 by Maui County EV-U DCFC Metered Accounts

Figure 22 provides a summary of key metrics for all EV-U DCFC metered accounts in Maui County, with TOU period utilization calculated using energy consumption (kWh) data for charging sessions initiated within the specified period. Following the table are individual discussions on the context and status of each EV charging station metered account.

	% Utilization			Avg Energy/Session (kWh)			Avg Revenue/Session (\$)			Avg Time/Session (min)		
	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak
Kahului Office	13%	64%	23%	14	16	14	\$ 8.14	\$ 7.80	\$ 8.67	30	33	30
Kaunakakai	7%	84%	10%	8	10	9	\$ 5.43	\$ 5.57	\$ 5.90	23	24	20

Figure 22: Summary of Key Metrics in 2022 for Maui County EV-U DCFC Metered Accounts²⁶

Kahului Office

While the DCFC station at the Company’s Kahului Headquarters is not co-located with retail businesses, shopping centers and restaurants are nearby.

In 2022, 64 percent of its charging usage was initiated during the Mid-Day, 13 percent during the Off-Peak, and 23 percent during the On-Peak.

Kaunakakai

In 2018, the Company installed a new DCFC station on Ala Malama Avenue in Kaunakakai, fronting restaurants and retail shops. This DCFC station remains the only public EV charging station on Moloka’i and is centrally located to provide fast charging service to those driving to and from Kaunakakai, the main location of commerce on the island. Interestingly, while this charger is the only publicly available charger on Moloka’i, it has the lowest average energy consumption per session utilization out of all metered accounts in the pilot program. The most probable reason for this may be that the EV drivers on Moloka’i needing the charge are observed to be lower capacity and older model EVs. Also, most of the population on Moloka’i resides near the charger, making driving distances relatively short.

In 2022, energy consumption tripled from the prior year due to the number of charger users increasing by nearly 60 percent from the prior year. This could be an indication that EV adoption is increasing on Moloka’i and there’s more public awareness about the benefits of driving an EV.

In 2022, 84 percent of charging usage was initiated during the Mid-Day, 7 percent during the Off-Peak, and 10 percent during the On-Peak.

2023 EV-U Site Development

As mentioned earlier, the Company plans to install a second DCFC station at Kailua Foodland Marketplace in 2023.

Focused on improving charger reliability, the Company plans to replace several end-of-life or unreliable charging stations with new charging stations. In 2023, the Company will submit completed designs to

²⁶ Due to rounding of percentages to the nearest whole number, the sum for each charging station will not always equal 100 percent.

authority having jurisdictions (e.g., The City and County of Honolulu, Department of Planning and Permitting) for construction permits at the following metered accounts on O’ahu and Hawai’i Island: Dole Plantation, Ko’olau Center, Hawai’i Kai 7-Eleven, Ward 1, Ward 2, Hilo Office, Kona Office, and The Shops at Mauna Lani.

Lastly, the Company identified several sites with EV-U metered accounts that have available capacity to add additional charging stations. The Company is currently evaluating those sites and reaching out to the site hosts, if needed, for the following eight existing metered accounts on O’ahu and Hawai’i Island: Ward 2, Times Square Waimalu, Kapolei Shopping Center, Salt Lake Shopping Center, Waipio Shopping Center, Hilo Office, Kona Office, and Waimea KTA. Installing additional chargers would increase charging availability and can reduce overall costs by leveraging existing electrical infrastructure. As seen with the Ward 1 and Ward 2 DCFC stations on O’ahu, co-located charging stations are very popular as they provide more charging opportunities and increase the chances of a port being available at those locations. They also create redundancy in the event one charger needs repair. These eight additional DCFC stations, along with the second DCFC station at Kailua Foodland Marketplace will bring the total EV-U DCFC stations from 27 to 36 at the 25 metered accounts under the EV-U pilot.

Analysis of EV-U Rate

Figure 23 provides aggregate energy consumption by service territory and TOU period.²⁷ As shown below, the Mid-Day period continues to be the most utilized charging period, which is in-line with the lowest charging rates for each service territory.

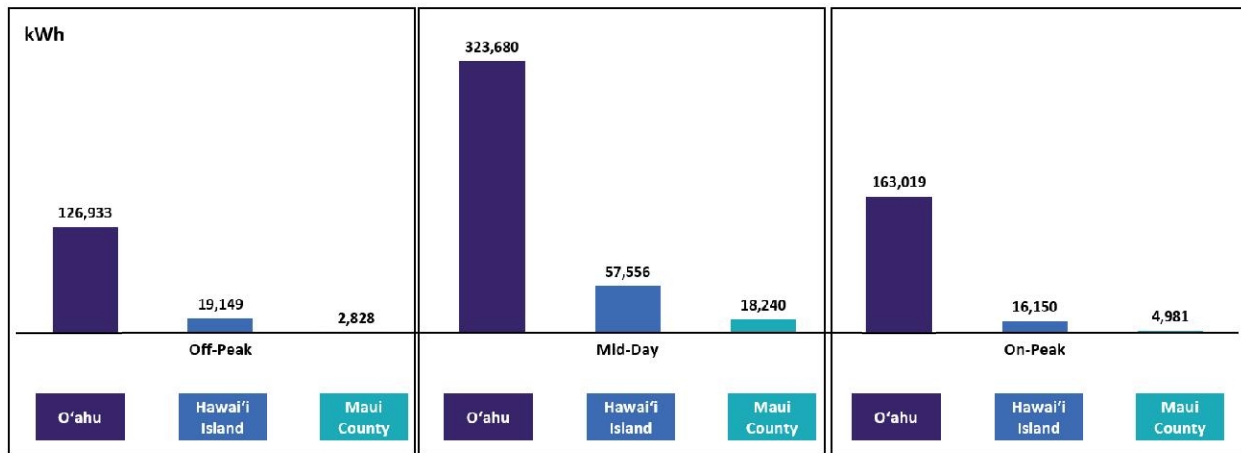


Figure 23: EV-U Energy Consumption in 2022 by Service Territory and TOU Period

²⁷ Off-Peak occurs from 10 PM to 9 AM, Mid-Day occurs from 9 AM to 5 PM, and On-Peak occurs from 5 PM to 10 PM.

Figure 24 shows the percent share of charging energy consumption by service territory and TOU period, again indicating that the Mid-Day period is the most utilized, and in aggregate represents 55 percent of all energy consumed at the EV-U chargers in 2022.

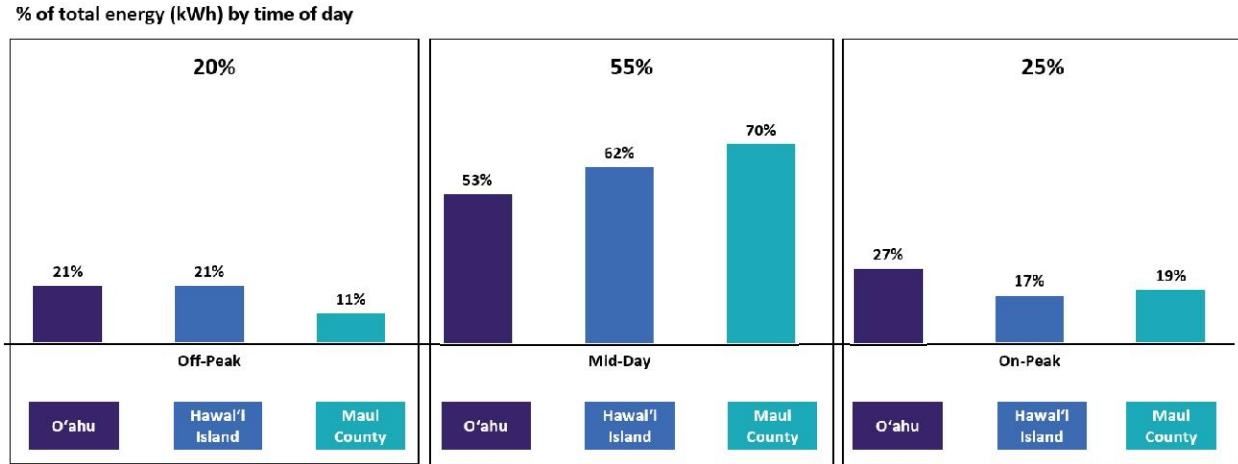


Figure 24: EV-U Share of Energy Consumption in 2022 by Service Territory and TOU Period

Figure 25 shows the aggregate number of sessions by service territory and TOU period. The largest number of sessions for all service territories occurred during the Mid-Day period.

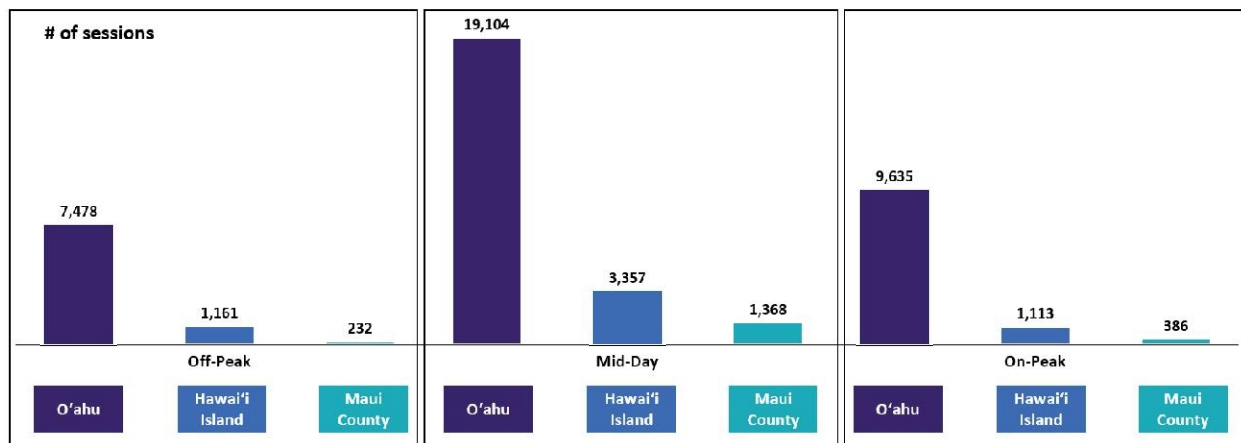


Figure 25: EV-U Sessions in 2022 by Service Territory and TOU Period

Figure 26 shows the percentage of sessions by service territory and TOU period. The Mid-Day period is the most utilized by each service territory and on aggregate is 54 percent of all charging sessions in 2022.

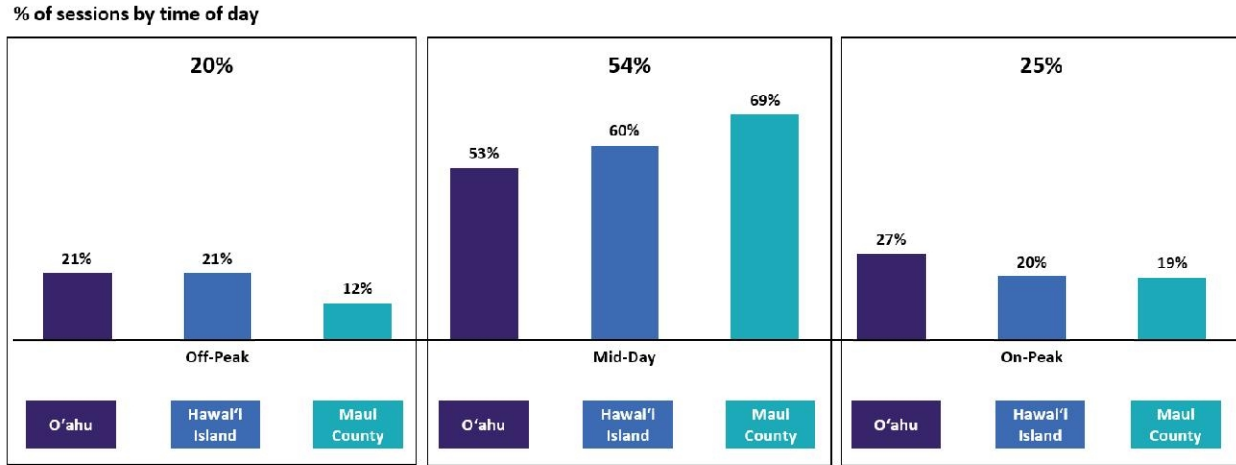


Figure 26: EV-U Share of Charging Sessions in 2022 by Service Territory and TOU Period²⁸

Figure 27 shows the average time duration per session by service territory and TOU period for all EV-U charging stations.

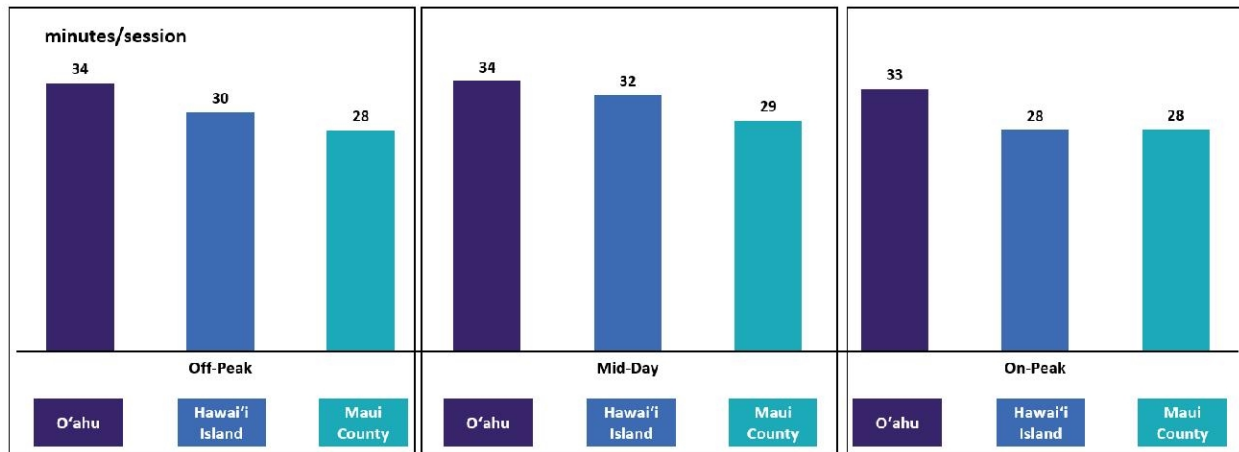


Figure 27: EV-U Average Time per Session in 2022 by Service Territory and TOU Period

²⁸ Due to rounding of percentages to the nearest whole number, the sum for each charging station will not always equal 100 percent.

Figure 28 illustrates the average energy consumption per session by service territory and TOU period.

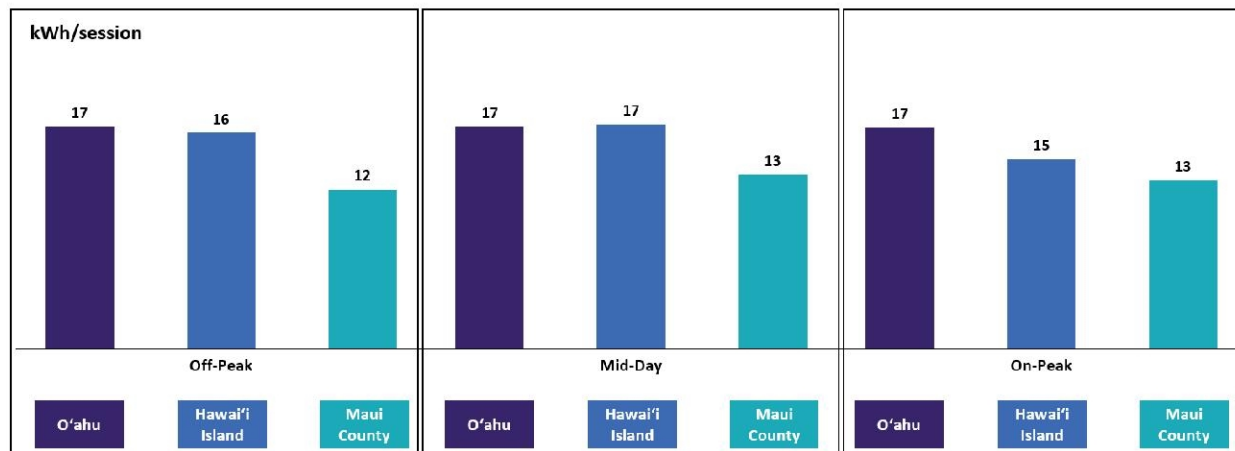


Figure 28: EV-U Average Energy Usage per Session in 2022 by Service Territory and TOU Period

Summary of Cost and Revenue²⁹

In D&O 34592, the Commission ordered the Company to provide “a discussion of how and to what extent the costs for each DCFC facility have been and/or are proposed to be recovered from ratepayers.”³⁰ The recovery of capital and operating and maintenance (“O&M”) costs for Company-owned and operated DCFC stations is discussed herein.

Revenue and Operating and Maintenance Expenses

In the early stages of the EV-U/EV-F pilot program development, there were stakeholder concerns regarding the Company’s influence on the EV charging market and competitive fairness. As a result, the Company took steps to report O&M costs by reflecting incurred costs in a similar fashion to a third-party charging station provider. Therefore, the equivalent cost of electricity associated with charging station use was included in reported O&M costs per site in this section of the report. In October 2017, the Commission approved the proposed Schedule EV-U rate change “to provide greater alignment with charging session costs (moving Schedule EV-U rates from a fixed charging session rate to volumetric rate), system costs (incorporating certain program costs into Schedule EV-U rates), and system needs by adopting the Schedule TOU-RI time periods and structuring rates so that they are directionally consistent with the availability of photovoltaic generation and difference in generation costs.”³¹ Therefore, site operating expenses also include volumetric transactional fees.

Since the Company does not report electricity sales to itself, the Company had previously provided a manual calculation showing the equivalent cost of electricity, by creating a “faux bill” (i.e., billing the Company and then reversing the charge). Providing this calculation was a time-consuming and

²⁹ Details of Revenues, Expenses, and Capital from inception of the program can be found in Appendix B.

³⁰ D&O 34592, filed June 2, 2017 in Docket 2016-0168, at 68.

³¹ D&O 34867, filed October 13, 2017 in Docket 2016-0168, at 11. The new rates became effective December 12, 2017.

administratively burdensome process that was not a reporting requirement for the pilot program.³² With the pilot program coming to an end in the near-term, for the 2022 Annual Report filed in 2023, it was the first year that the company stopped the faux billing process, which calculated and tracked the cost of electrical service associated with charging consumption. As such, the equivalent cost of electrical service is no longer included in this report.

Figure 29 illustrates the revenue³³ and expenses for each service territory in 2022.

2022 Actuals:	Program Costs, January - December 2022			
	O'ahu	Hawai'i	Maui County	Totals
Revenue	\$ (316,404)	\$ (50,914)	\$ (14,714)	\$ (382,032)
Expenses	\$ 144,457	\$ 58,094	\$ 24,855	\$ 227,406

Figure 29: EV-U Summary of Revenue and Expenses in 2022

For further details regarding revenue and expenses for 2022 and the program, see Appendix B.

Capital Costs

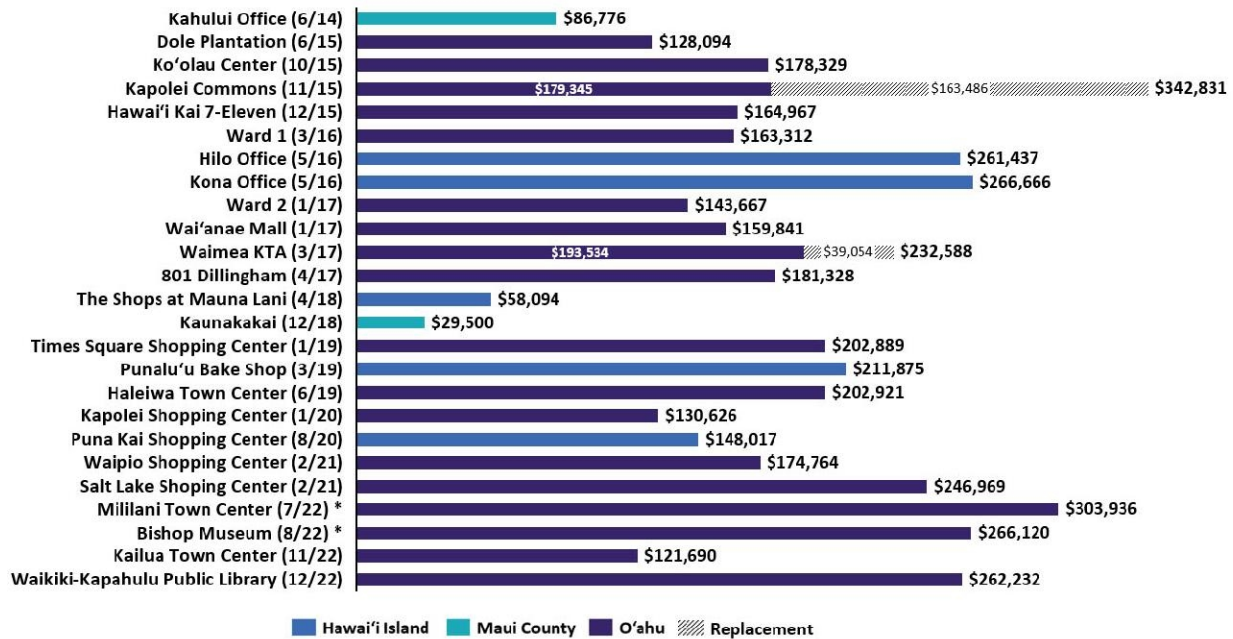
Figure 30 provides the capital costs of each DCFC metered account as they were chronologically placed in operation. Average capital cost for the Company is \$186,779 per installed DCFC metered account. The average capital cost after factoring in Contribution In Aid of Construction (“CIAC”) is \$178,677 per metered account.³⁴ While the Company identifies locations at a site to minimize construction costs, the overall development costs largely vary based upon the site’s location, the availability of existing electrical infrastructure, condition of the existing parking space, and site host’s desired location on their property.

In 2022, the Company energized six new DCFC stations under four metered accounts – two at Mililani Town Center in July, two at Bishop Museum in August, one at Kailua Foodland Marketplace in November, and one at Waikiki-Kapahulu Public Library in December. Additionally, the Company installed one replacement DCFC station at Waimea KTA in August. No additional EV-U metered accounts were added on Hawai'i Island or Maui County in 2022.

³² D&O 31338, filed July 1, 2013, at 41.

³³ On a monthly basis, the Company undergoes a reconciliation process to assess net revenue owed by the DCFC network providers who collect payment from customers. The network provider submits a monthly report of session data including energy usage, billed amounts, and transaction fees. The Company then validates the data to determine actual amounts of revenue and fees. Accounting requires monthly data to be provided by the first business day following each month, so to meet such requirements, estimated monthly revenue and transaction fees based upon the previous month’s usage are accrued and then adjusted the following month when actuals are available.

³⁴ A CIAC of \$163,486 was provided by Electric Research Power Institute (“EPRI”) for the original battery-tied experimental DCFC station at Kapolei Commons.



* Metered account has 2 DCFC stations

Figure 30: Capital Cost Associated with In-Service EV-U DCFC Metered Accounts in Chronological Order of Operational Date (Mo/Yr)³⁵

Subsidization by non-participating customers

A key consideration in developing EV rates and programs is to reduce barriers to the adoption of EVs for customers. Because the EV market is still below 10 percent market share in Hawai'i and transportation decarbonization is a State policy goal, it is prudent to provide a rate that will support the development of public EV charging infrastructure. The EV load from charging stations in the EV-U pilot is incremental discretionary load that needs to be served by the system in general should not necessarily be characterized as benefitting from a subsidy. Therefore, Schedule EV-F and EV-U rates that support this incremental load should not entirely be characterized as being subsidized by other customers. Further, the revenues collected by the incremental discretionary load of EV charging contributes to fixed costs and support the State's transition to cleaner transportation, not to overall Company profits. With continued EV growth, the long-term impact of aggregate growth of EVs in the State will also serve to eliminate any subsidization by non-EV drivers. As identified in the Roadmap, the Company anticipates that the electrification of transportation will provide long-term economic benefits for the Company's customers, as increased energy demanded by EV drivers to charge their vehicles creates net benefits for all the Company's customers – not just for EV drivers. This is because as EV drivers demand more

³⁵ For Kapolei Commons, the capital cost incurred includes a replacement DCFC station, which was installed in 2020. Additionally, the cost shown does not include the offset of a \$163,486 CIAC from EPRI. If CIAC is subtracted from the Kapolei Commons original battery-tied experimental charging station, the net capital cost is \$179,345. For Waimea KTA, the capital cost incurred includes a replacement DCFC station, which was installed in 2022.

energy, the utility’s fixed costs for generating and distributing energy are spread across more kWh units, thereby creating net benefits for all customers.

Figure 31 summarizes the total annual revenue from Schedule EV-U compared to the potential revenue from Schedule J. This illustrates that the total EV-U earned revenue is 90 percent of the potential Schedule J³⁶ revenue for 2022.³⁷

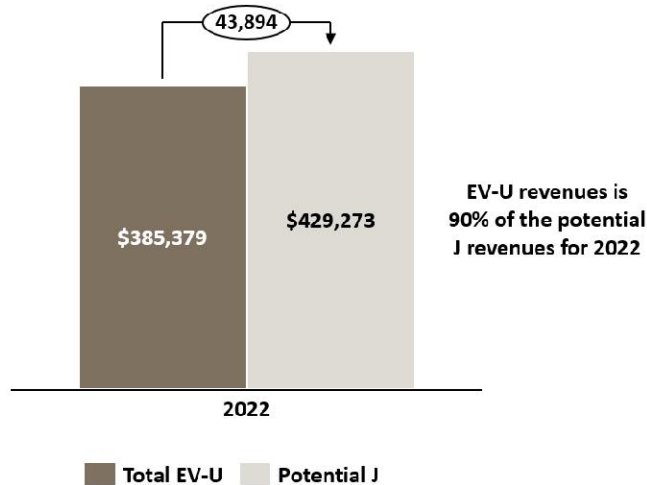


Figure 31: Difference Between Potential Schedule J and Actual EV-U Revenue for 2022

Schedule EV-F Tariff

Background

Schedule EV-F (“EV-F”) was implemented to alleviate potential demand charges whereby “the absence of a demand charge and the inclusion of TOU rates serve to encourage the development of public EV charging facilities by keeping electricity costs low for new, start-up public EV charging facilities.”³⁸ Globally, public EV charging facilities continue to show increasing signs of technological maturity. Companies such as Electrify America are installing DCFC facilities with “charging speeds of up to 150kW” and are now locating “charging power levels up to 350kW”³⁹ in North America. However, profit margins are still relatively slim due to the higher installation, equipment, and maintenance costs. These difficult business prospects have limited the development of non-utility fast charging facilities in the State.

³⁶ The potential Schedule J revenues were based upon the reported monthly kWh energy provided to charge EVs under Schedule EV-U and an assumed 47.5 kW billing demand. A typical EV will fast charge at power up to 50 kW but will reduce power as the battery state of charge increases.

³⁷ Earned revenue of \$385,379 differs from booked revenue of \$382,032 due to accrual of estimates based on prior month usage which is done to meet accounting deadlines and results in a one-month lag from actuals.

³⁸ Transmittal No. 12-05 at 23.

³⁹ <https://www.electrifyamerica.com/our-plan>

Adoption of Schedule EV-F Tariff

Schedule EV-F allows relief of demand charges for commercial customers providing public EV charging facilities for electric service up to 100 kW. Adoption of Schedule EV-F remains low as investment in DCFC infrastructure in Hawai'i remains low. Public fast charging installations outside of Hawai'i are including high-capacity charging stations above 100 kW, as well as multiple stations installed at charging hubs. The State and counties have policies and procurement plans to convert their fleets to electric. Electric conversion of private fleets will increase the electrical demand at charging locations and are not eligible for enrollment under Schedule EV-F.

In 2022, no new customers enrolled in schedule EV-F. Moreover, enrollment closed to new customers on March 18, 2022 (July 31, 2022 for customers on Lāna'i and Moloka'i). As of year-end 2022, there is one EV-F metered account on Maui at the Haiku Marketplace, which serves a DCFC station that is owned and operated by Shell Recharge. On Hawai'i Island there are three Schedule EV-F metered accounts, serving two DCFC stations that are owned and operated by Shell Recharge, and one Level 2 charger that is owned by the owner/operator of a retail shopping plaza. There are no Schedule EV-F metered accounts located on O'ahu.

Figure 32 illustrates the adoption of the EV-F rate from inception through 2022. Further details of the 2022 statistics for EV-F adoption are provided in Appendix C.

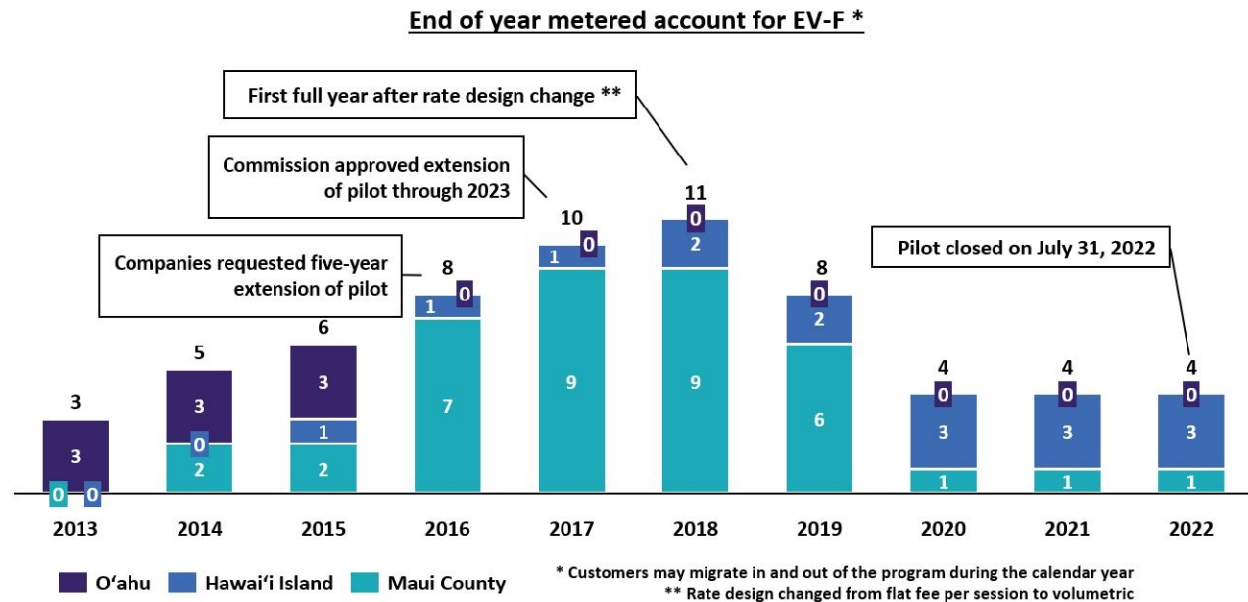


Figure 32: Cumulative Metered Accounts for EV-F Pilot from Program Inception Through 2022

Despite the low adoption of Schedule EV-F, the Company continues to receive multiple inquiries from prospective customers interested in installing charging infrastructure in the State. These prospective customers have stated an interest in rate designs that can help alleviate demand charges for a period of

time in order to facilitate the investment in infrastructure, especially high-capacity charging that may be greater than 100 kW service.

To meet market needs, the Company proposed a successor to EV-F in its *Application For 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, on a Pilot Basis* submitted on September 30, 2020. In the application, the Company requested that upon approval of Schedules EV-J and EV-P, the Commission close EV-F to new enrollment and allow existing EV-F customers to continue service under EV-F until the rate’s pilot period expires, or they transition to another rate, whichever comes first⁴⁰. In D&O 38157 issued on December 30, 2021 in Docket No 2020-0152, the Commission approved Schedule EV-J and EV-P, which became effective March 18, 2022 for O’ahu, Maui, and Hawai’i Island, and on August 1, 2022 for Lāna’i and Moloka’i.⁴¹

The Company is actively contacting the four remaining Schedule EV-F accounts, encouraging them to migrate to Schedule EV-J, as appropriate. All Schedule EV-F accounts are expected to be transitioned to other rates prior to June 30, 2023.

Summary of Cost and Revenue

In Figure 33, the revenue generated each month from Schedule EV-F for the Company’s service territory is illustrated (O’ahu has no metered accounts on Schedule EV-F). In 2022, \$42,928 in revenue was generated from metered accounts under the Schedule EV-F program. Incremental costs to support the Schedule EV-F program, including the cost to enroll and bill customers, are minimal.

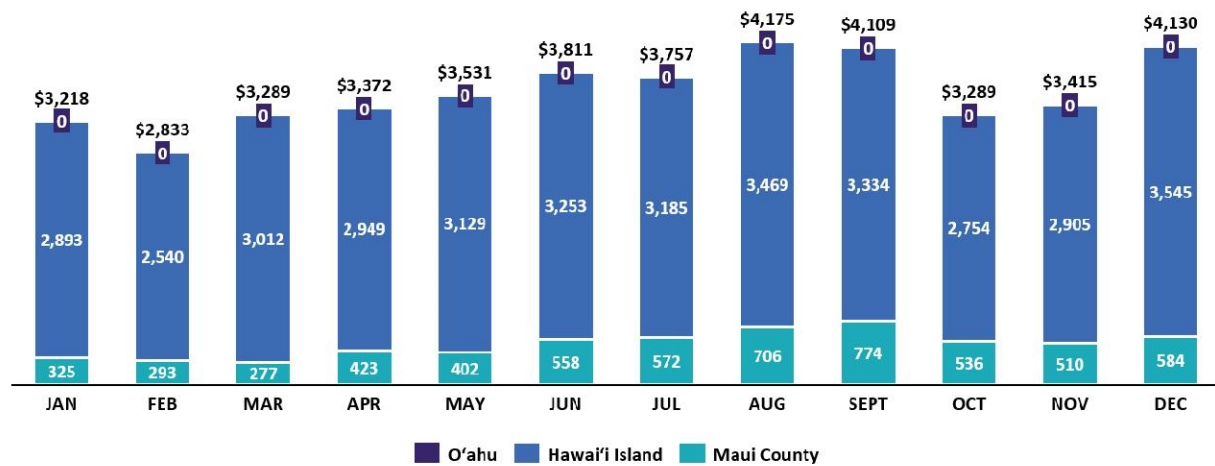


Figure 33: Revenues Collected from EV-F Metered Accounts in 2022 by Service Territory

⁴⁰ Docket No. 2020-0152, Application For 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, on a Pilot Basis filed September 30, 2020 at 10.

⁴¹ See D&O 38157, issued on December 30, 2021 in Docket No. 2020-0152.

Subsidization by non-participating customers

Figure 34 summarizes the total annual revenue from Schedule EV-F compared to the potential revenue generated if the charging facilities were billed under each utility's respective Schedule J.⁴² The potential revenue under Schedule J in 2022 was \$23,911 higher than revenues from Schedule EV-F.

Schedule EV-F is a TOU rate with the lowest rate during the Mid-Day to incentivize charging during the peak solar generation hours of 9 AM to 5 PM. As this Mid-Day utilization increases in comparison to the On-Peak and Off-Peak hours, the difference between total Schedule EV-F revenue and the potential Schedule J revenue will widen. In 2022, 49 percent of all energy provided by Schedule EV-F was consumed during the Mid-Day, 27 percent during On-Peak, and 24 percent during Off-Peak.

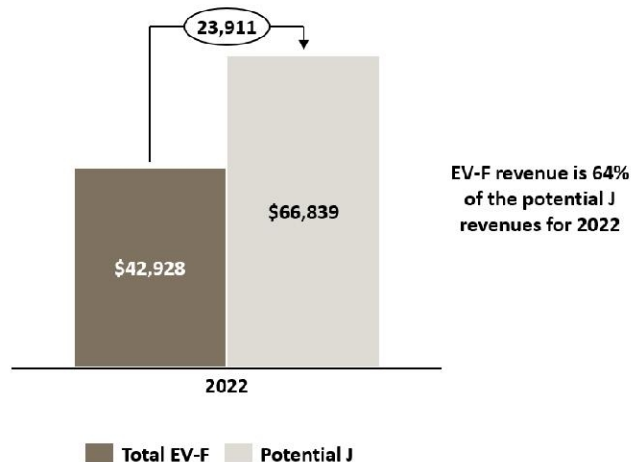


Figure 34: Comparison of Total EV-F Revenue and Potential Schedule J Revenue for 2022

Schedule EV-MAUI Tariff

Background

Maui Electric submitted its Revised Schedule EV-MAUI Tariff on August 30, 2019 and proposed taking ownership of four DCFC sites from the EVohana network, which was previously owned and operated by the Maui Economic Development Board.⁴³

The revised Schedule EV-MAUI rates were 35 percent to 42 percent less than the corresponding rates that were previously proposed for all TOU periods (i.e., Mid-Day, On-Peak, and Off-Peak), with the greatest percent reduction in rates for the Mid-Day period. The revised rate design incentivized charging during hours of solar generation, sent appropriate pricing signals to current and potential EV drivers, and was tailored for Maui's specific grid needs.⁴⁴

⁴² General Service Demand rate applicable to general light and/or power loads that exceed 5,000 kWh per month or exceed 25 kW three times within a twelve-month period but are less than 300 kW per month and supplied through a single meter.

⁴³ Pursuant to D&O 36229 issued on March 22, 2019 in Docket No. 2018-0422.

⁴⁴ See D&O 36229 at 35-36.

The Commission approved Maui Electric’s revised Schedule EV-MAUI and accompanying proposal to own and operate four EV DCFC stations⁴⁵ and reiterated its approval of Maui Electric’s request for deferred accounting treatment in light of Maui Electric’s adoption of the shared savings mechanism set forth in D&O 36229.

The EV-MAUI program launched in 2020, with the first charger installed and made available to EV owners on August 18, 2020 at the Pukalani Terrace Shopping Center (“PTC”), and three additional chargers installed in December 2020, at the Lahaina Aquatic Center (“LAC”), Pi’ilani Village Shopping Center (“PVC”), and Queen Ka’ahumanu Center (“QKC”). These four stations were selected based on residential customer feedback, market pricing information, historic data, and forecasted charging network information. Additionally, the EV-MAUI charging stations increased access to public EV charging beyond the previous CHAdeMO-only charging ports under the EVohana program to be able to charge nearly 100 percent of full battery EVs (i.e., Tesla vehicles with adapters).

EV-MAUI DCFC Utilization

The EV-MAUI DCFC sites provide four of the six available DCFC stations on the island of Maui. The other two sites consist of the EV-U DCFC station located at Maui Electric’s Kahului Office and the other is located at the Haiku Marketplace, which is operated by a third-party charging station provider. The total aggregate utilization of EV-MAUI DCFC stations for 2022 amounted to 196,551 kWh over 13,466 sessions, which represents a 22 percent or 35,242 kWh increase from the prior year.⁴⁶ This increase may be attributable to the Company’s focus on repair and maintenance across the Company’s service territory in 2022 and increased EV registrations.

The monthly overall utilization for the EV-MAUI sites is shown by number of sessions in Figure 35 and by energy consumption in Figure 36.

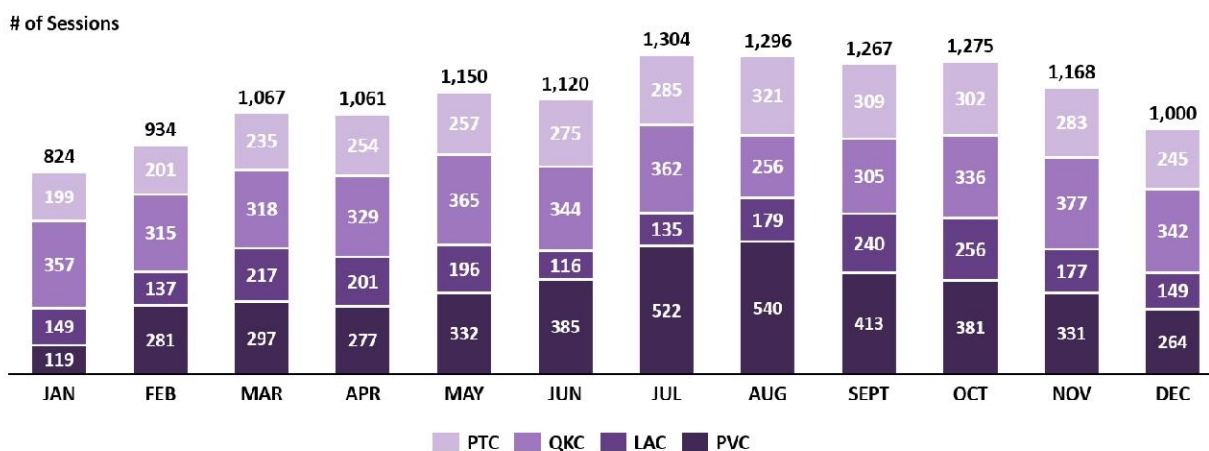


Figure 35: Monthly Number of Sessions in 2022 by EV-MAUI DCFC Metered Accounts

⁴⁵ See D&O 36943 issued on January 10, 2020 in Docket No. 2018-0422.

⁴⁶ 2021 EV-MAUI utilization: 161,309 kWh over 11,577 sessions

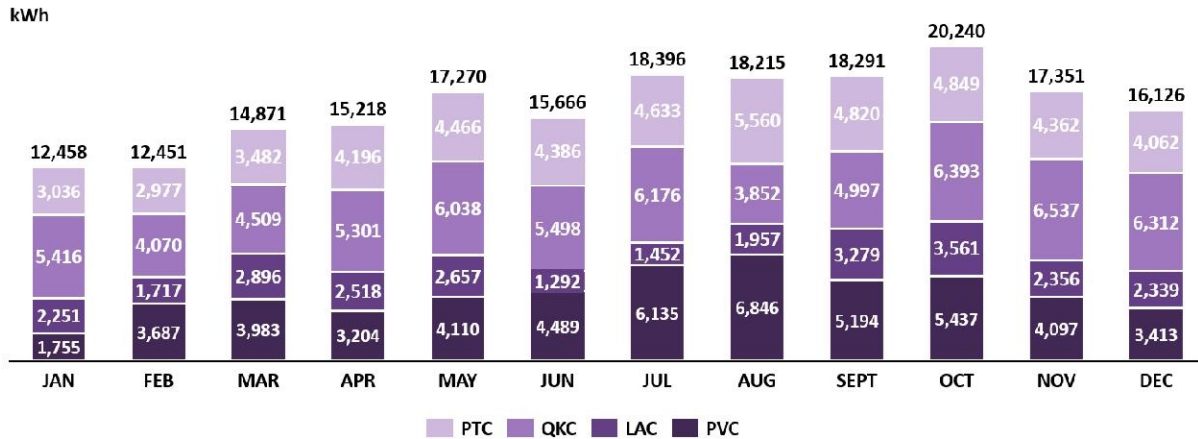


Figure 36: Monthly Energy Consumption (kWh) in 2022 for EV-MAUI DFC Metered Accounts

Market research from two surveys, analysis of historic utilization data, geographic diversity, and the Company’s Backbone Study were some of the criteria used in the selection of sites.⁴⁷ As shown in the usage summaries for each metered account, most of the charging is initiated during the Mid-Day period. This may be mostly attributed to the large price difference with the lower costs during the Mid-Day period. The TOU pricing per kWh for the EV-MAUI tariff is as shown below:

Off-Peak (10 PM to 9 AM)	Energy Charge - per kWh	38.3412¢
Mid-Day (9 AM to 5 PM)	Energy Charge - per kWh	28.3412¢
On-Peak (5 PM to 10 PM)	Energy Charge - per kWh	40.3412¢

The start time of the charging session determines the applicable time-of-use period.

Figure 37 provides a summary of key metrics for EV-MAUI DFC metered accounts, with TOU period utilization calculated using energy consumption (kWh) data for charging sessions initiated within the specified period. The metered accounts are listed in chronological order based on when they were made available to the public. Following the table are individual discussions on the context and status of each EV charging station metered account.

	% Utilization			Avg Energy/Session (kWh)			Avg Revenue/Session (\$)			Avg Time/Session (min)		
	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak	Off-Peak	Mid-Day	On-Peak
Pukulani Terrace Shopping Center	17%	63%	20%	18	17	13	\$ 6.83	\$ 4.66	\$ 5.35	31	30	29
Queen Ka’ahumanu Center	18%	63%	19%	17	17	14	\$ 6.60	\$ 4.67	\$ 5.67	34	34	28
Lahaina Aquatic Center	14%	67%	18%	14	14	11	\$ 5.15	\$ 3.86	\$ 4.39	27	29	26
Pi’ilani Village Shopping Center	19%	55%	25%	14	13	11	\$ 5.20	\$ 3.63	\$ 4.54	30	28	25

Figure 37: Summary of Key Metrics in 2022 for EV-MAUI DFC Metered Accounts⁴⁸

⁴⁷ Revised Schedule EV-MAUI Tariff, Exhibit 2 at 14, footnote 37.

⁴⁸ Due to rounding of percentages to the nearest whole number, the sum for each charging station will not always equal 100 percent.

Pukalani Terrace Shopping Center (PTC)

The PTC DCFC station became available to the public on August 18, 2020. PTC is in Upcountry Maui and serves the areas of Pukalani, Makawao, and Kula. It is accessible 24 hours per day, seven days per week; although most of the PTC located businesses' hours align with the Mid-Day period.

In 2022, 63 percent of charging usage was initiated during the Mid-Day, 17 percent during the Off-Peak, and 20 percent during the On-Peak.

Queen Ka'ahumanu Center (QKC)

The QKC DCFC station became available to the public on December 9, 2020. QKC is in Central Maui and serves the Kahului area and is accessible 24 hours per day, seven days per week.

Under the previous EVohana program, the QKC location was the most utilized site in the entire EVohana network. This trend continued in 2022, and it was the most utilized metered account for EV-MAUI. Moreover, 63 percent of charging usage was initiated during the Mid-Day, 18 percent during the Off-Peak, and 19 percent during the On-Peak.

Lahaina Aquatic Center (LAC)

The LAC DCFC station became available to the public on December 17, 2020. This DCFC station provides critical access to fast charging to the West Maui community, as well as drivers traveling in this area. There are several times a year when the two-lane highway ("Pali") is shut down for hours due to reasons including vehicular accidents and brush fires, limiting access to other chargers. For EV drivers in West Maui, this site is their only public DCFC option within 20 miles. Furthermore, during the pandemic, other EV Level 2 charging options were not available due to site and facility closures. The LAC DCFC station serves the areas of Lahaina, Kahana, Napili, and Kapalua.

In 2022, 67 percent of charging usage was initiated during the Mid-Day, 14 percent during the Off-Peak, and 18 percent during the On-Peak. Most of the charging sessions at this location were during the Mid-Day period. This may be partially attributed to LAC's business hours, which vary between 9 AM to 4 PM throughout the week.

Pi'ilani Village Shopping Center (PVC)

The PVC DCFC station became available to the public on December 17, 2020. PVC is the only DCFC site open to the public in South Maui and serves the areas of Kihei and Wailea and is accessible 24 hours per day, seven days per week. It is located at a large hub for shopping and restaurants.

In 2022, the PVC DCFC station was the second most utilized next to the QKC DCFC station. Moreover, 55 percent of charging usage was initiated during the Mid-Day, 19 percent during the Off-Peak, and 25 percent during the On-Peak.

Analysis of EV-MAUI Rate

Figure 38 provides aggregate energy consumption by TOU period. As shown below, the Mid-Day period continues to be the most utilized charging period that is in-line with the lowest charging rates.

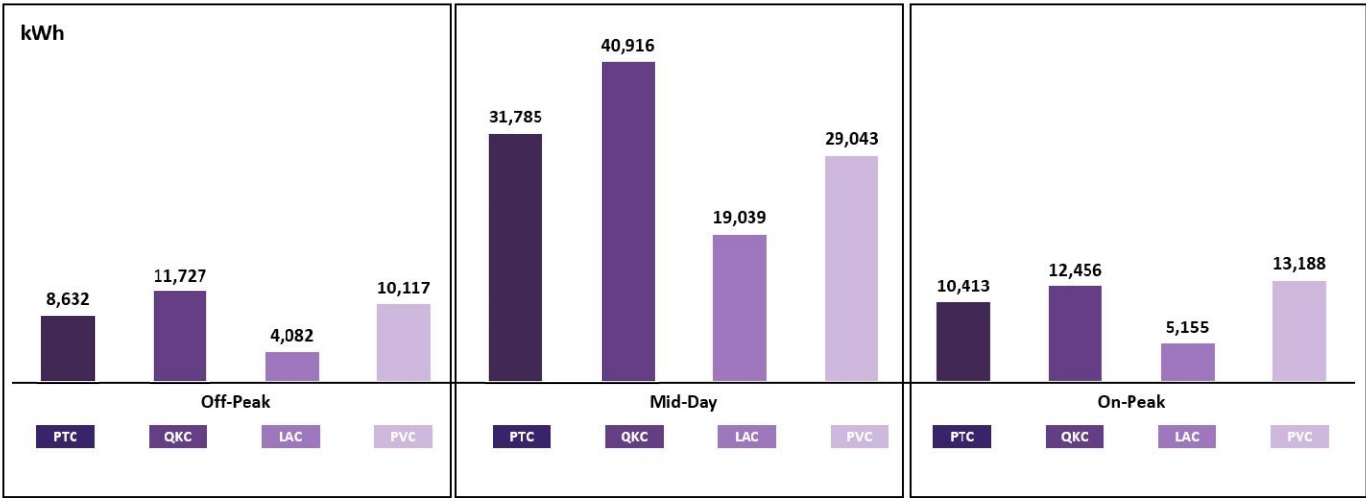


Figure 38: Aggregate Energy Consumption in 2022 by Site and TOU Period for EV-MAUI Metered Accounts

Figure 39 shows the percent share of energy consumption for each site by TOU period for 2022. The Mid-Day period is the most utilized by each utility and on aggregate is 61 percent of all energy consumed in 2022 under Schedule EV-MAUI.

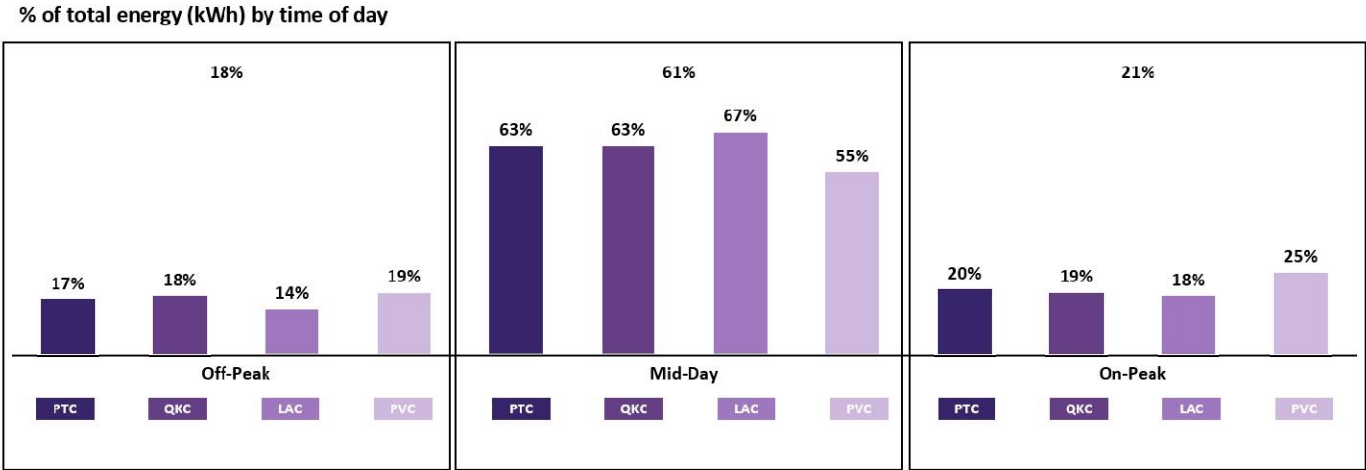


Figure 39: Percent of Energy Consumed in 2022 by Site and TOU Period for EV-MAUI Metered Accounts

Revenue and Operating and Maintenance Expenses

As mentioned in the EV-U section, 2022 was the first year that the Company stopped the faux billing process, which calculated and tracked the cost of electrical service associated with charging consumption. As such, the equivalent cost of electrical service is no longer included in this report.

Figure 40 illustrates the revenue⁴⁹ and expenses for EV-MAUI in 2022.

2022 Actuals:	Program Costs, January - December 2022
Revenue	<u><u>\$ (63,766)</u></u>
Expenses	<u><u>\$ 14,135</u></u>

Figure 40: 2022 Annual Revenue, O&M and Net Values for EV-MAUI Metered Accounts

For further details regarding revenue and expenses for 2022 and the program, see Appendix D.

Deferred Operating and Maintenance Expenses

In Maui Electric’s Application for Approval to Establish Schedule EV-MAUI Electric Vehicle Fast Charging Service and Related Accounting Treatment filed on December 21, 2018 and resulting information request (“IR”) response PUC-MECO-IR-103 in Docket No. 2018-0422, the following O&M items were requested for deferral:

1. Fixed annual O&M for year:
 - a. Networking Plan;
 - b. Extended Warranty;
 - c. Routine Maintenance;
 - d. Unplanned Repair;
 - e. Tax rate of 4.712%

2. Variable annual O&M:
 - a. Transaction Fees

In D&O 36229, the Commission conditioned its approval of Maui Electric’s request for deferred accounting treatment upon implementation of a Shared Savings Mechanism (“SSM”) and noted its expectation that this SSM will incentivize Maui Electric to control costs and maximize revenues for the benefit of Maui Electric and its customers.⁵⁰

⁴⁹ On a monthly basis, the Company undergoes a reconciliation process to assess net revenue owed by the DCFC network providers who collect payment from customers. The network provider submits a monthly report of session data including energy usage, billed amounts, and transaction fees. The Company then validates the data to determine actual amounts of revenue and fees. Accounting requires monthly data to be provided by the first business day following each month, so to meet such requirements, estimated monthly revenue and transaction fees based upon the previous month’s usage are accrued and then adjusted the following month when actuals are available.

⁵⁰ See D&O 36229 at 30 (“The Commission expects that implementation of the shared savings mechanism will provide incentives for [Maui Electric] to control costs and maximize revenues, for the benefit of [Maui Electric] and [Maui Electric]’s customers.”).

As noted in D&O 36229, the Commission anticipates that implementation of the SSM will require corresponding adjustments to existing cost recovery mechanisms to reconcile total expenses, revenues, and net costs.⁵¹ The Commission approved Maui Electric's request for deferred accounting treatment for the actual O&M expenses incurred before Maui Electric's next interim or final decision and order in Maui Electric's next rate case with a cap of \$180,000.⁵²

Total deferred O&M expenses for 2022 is \$13,870.⁵³

Summary of the Shared Savings Mechanism ("SSM")

In D&O 36229, the Commission conditioned its approval of Maui Electric's ("MECO") request for deferred accounting treatment upon implementation of an SSM.

In D&O 36943, the Commission approved MECO's proposed Revised Schedule EV-MAUI tariff as just, reasonable, and in the public interest provided implementation of the SSM.

The SSM is as follows:

For years 1 through 5, customers and MECO shall share in the net costs (i.e., the total expenses minus revenues), via the recording of a regulatory asset, related to MECO's ownership and operation of the chargers on stepped-down basis as follows:

- Year 1: 100% customers - 0% MECO
- Year 2: 80% customers - 20% MECO
- Year 3: 60% customers - 40% MECO
- Year 4: 50% customers - 50% MECO
- Year 5: 0% customers - 100% MECO

To the extent revenues exceed costs in the first four years, Maui Electric may retain the entirety of any net revenues (i.e., the profit). However, in consideration of the significant potential customer contribution to net costs in years one through four, beginning in year five, if revenues generated by the stations exceed the total expenses, thereby resulting in profit, such net revenues shall be shared between customers and Maui Electric as follows:

- Year 5: 80% customers 20% MECO⁵⁴

Figure 41 shows graphically the SSM and the allocation of costs and revenues between Maui Electric and customers for the EV-MAUI program:

⁵¹ D&O 36229 at 39, footnote 117.

⁵² See D&O 36229 at 33 ("For the purposes of the shared savings mechanism, annual O&M expenses shall be based on actual annual O&M expenses, capped at [Maui Electric]'s estimate of \$180,000."). \$180,000/8 sites = \$22,500 O&M expense cap per site.

⁵³ Inclusive of (\$2.74) in November 2021 overhead expenses which was reclassified to the deferred order in a correcting entry processed in February 2022.

⁵⁴ D&O 36229 at 31.

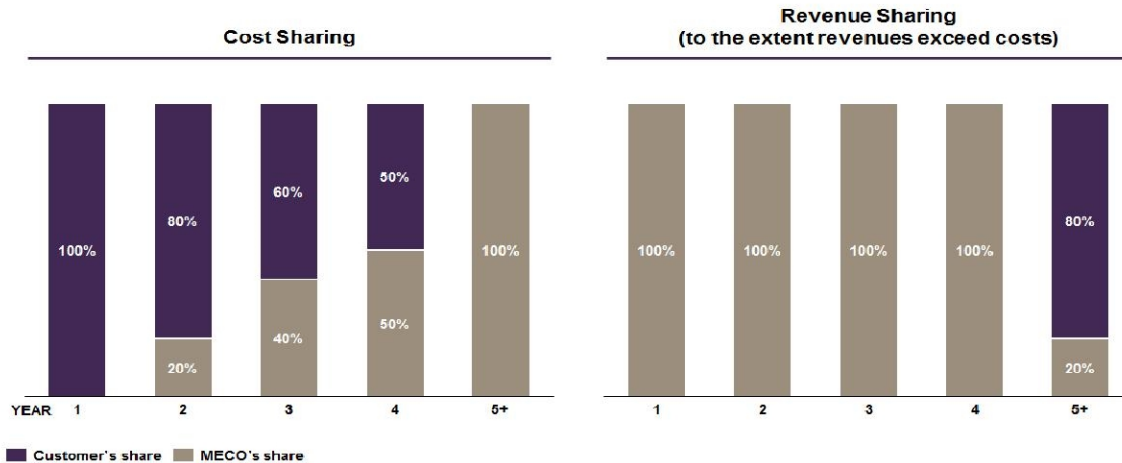


Figure 41: EV-MAUI Shared Savings Mechanism

Maui Electric's *Schedule EV-MAUI Tariff Annual Report* filed on March 31, 2021 in Docket No. 2018-0422 provided the EV-MAUI shared savings/cost mechanism calculation for each of the four EV-MAUI sites for Year 1 (calendar year 2020).⁵⁵ Since only Pukalani Terrace Center showed revenues that exceeded expenses in the first year, and Maui Electric is allowed to retain 100 percent of the profits in Year 1, there was no sharing of profits with the customers. For the other three sites (LAC, PVC and QKC), at the end of December 2020, project amounts had to be finalized to factor in straggling costs; as such the allowed return calculation was based on preliminary project amounts and the preliminary calculation resulted in net cost with no offsetting revenues. The installation of the fast chargers at these three sites was completed late in December 2020 and no revenue/ incremental expense accrual was recorded as there was no reasonable basis available at that time to determine the accrual. While costs greater than profit in Year 1 (2020) can be 100 percent allocated to ratepayers, the amounts were deemed immaterial, and Maui Electric has forgone recording a regulatory asset for the customers share of costs for Year 1 (2020).

Further, in Year 1 (2020), Maui Electric treated EV-MAUI revenues (other operating revenues) similar to EV-U revenues (other operating revenue) and thus included EV-MAUI revenues in adjusted revenues used in the calculation of its monthly RBA adjustment in accordance with D&O 31338 on Transmittal No. 13-07 (Schedules EV-U and EV-F).⁵⁶ As a result, Maui Electric's RBA balance as of December 31, 2020 was slightly understated by the amount of EV-MAUI revenues it had included in its RBA adjustment, to the benefit of the customers.

⁵⁵ The EV-MAUI SSM is calculated on a calendar year basis. The customer and company share of any cost/profit is calculated on a consolidated basis.

⁵⁶ See D&O 31338 issued on July 1, 2013 on Transmittal No. 13-07 *Application for Approval to Establish Schedule EV-F – Commercial Public Electric Vehicle Charging Facility Service Pilot, and Schedule EV-U – Commercial Public Electric Vehicle Charging Service Pilot* and Transmittal No. 13-08 *Application to Modify Tariff Rule 15 – Supply to Separate Premises and Resale of Electric Energy* (Consolidated) at 25. As noted in D&O 31338, "all customers will benefit from any kWh sales under these rates" when other operating revenues, such as EV-U revenue, are included in adjusted revenue used for the determination of RBA adjustment.

In Year 2 (2021), Maui Electric recognized that the treatment of EV-MAUI revenues should have conformed with the Commission's conditioned approval of Maui Electric's request for deferred accounting treatment upon implementation of the SSM.⁵⁷ Therefore, beginning in Year 2 (2021), the Company included EV-MAUI revenues in the SSM calculation as ordered in D&O 36229 and excluded EV-MAUI revenues from the determination of the monthly RBA adjustment to properly evaluate the performance of the EV-MAUI operation and share the O&M expenses, capital expenditures, and electric vehicle charging revenues between Maui Electric and its customers through the EV-MAUI SSM.⁵⁸

In Year 2 (2021), for purposes of the SSM, EV-MAUI total consolidated revenues exceeded consolidated costs by approximately \$13,500. As Maui Electric is allowed to retain 100 percent of the profits in Year 2, there was no sharing of these net consolidated profits with customers. Therefore, there was no recording of a regulatory asset for Year 2 (2021).

In Year 3 (2022), total consolidated revenues exceeded consolidated costs by approximately \$24,400. As Maui Electric is allowed to retain 100 percent of the profits in Year 3, there was no sharing of these net consolidated profits with customers. Therefore, there was no recording of a regulatory asset for Year 3 (2022).

Appendix E to this Annual Report is an excerpt from the Revised Schedule EV-MAUI Tariff⁵⁹ that contains the details of the financial model for the four sites, including the consolidated revenue sharing mechanism, bill impact and assumptions used for each site selected. Appendix F to this report includes the actual 2022 Shared Savings/Cost Mechanism Accounting Sheets for each of the four EV-MAUI sites.⁶⁰

Capital Costs

Figure 42 provides the capital costs of each EV-MAUI DCFC metered account installation to date. Utilizing the previous EVohana sites greatly reduced installation time and electrical infrastructure costs. Each site took approximately three days to remove the former EVohana chargers, install the new charger, and commission the new charger for public use. Average capital cost for the Company is \$71,481 per site. This is less than the average capital cost for EV-U of approximately \$186,779 per site, because the EV-MAUI chargers did not require engineering and infrastructure development to the same extent as a "green" site where no existing DCFC-compatible service exists.

⁵⁷ See D&O 36229 at 30 and D&O 36943 Ordering Paragraph 2 at 34.

⁵⁸ See D&O 36229 at 17.

⁵⁹ See Revised Schedule EV-MAUI Tariff, Attachment C at 1.

⁶⁰ Transmittal 22-01 *Notice to Update Target Revenue through the Major Project Interim Recovery Adjustment Mechanism and Calculation of 2021 Performance Incentive Mechanism and Shared Savings Mechanism Financial Incentives* filed on February 25, 2022, reported SSM data (MECO-WP-E-008) that had excluded some deferred overheads that should have been included in calculations contributing to the Allowed Return on Chargers line item. The impact is minimal and is properly reflected in the SSM accounting sheets included as appendices to this report.

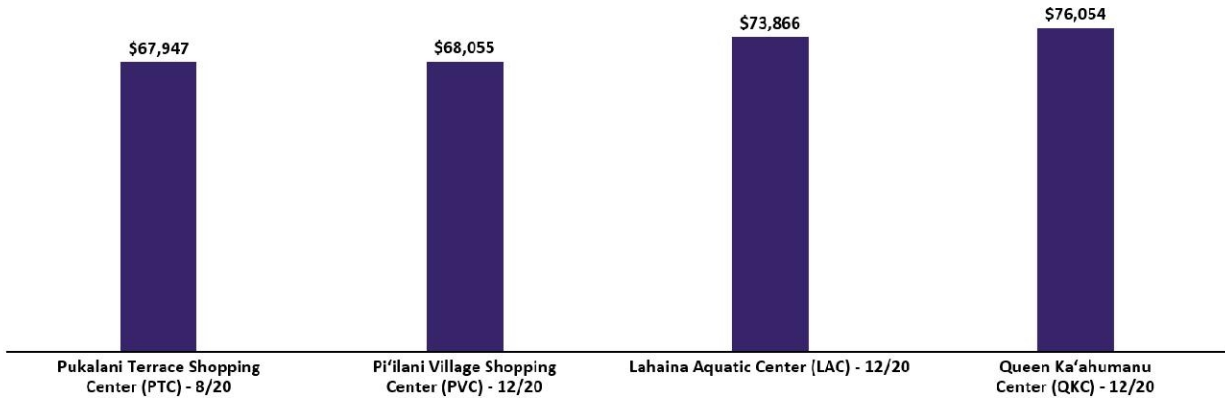


Figure 42: Associated Capital Cost for EV-MAUI DCFC Metered Accounts in Chronological Order of Operational Date (Mo/Yr)

Recommendation of Revisions to Rate Structures

On December 30, 2021, the Commission approved the Company's *Application For 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, on a Pilot Basis*, a request for time-of-use commercial rates that provide lower prices for energy during the Mid-Day and demand charges lower than existing commercial electric rates.⁶¹ The effective date of these new rates, March 18, 2022, officially closed Schedule EV-F to new enrollment on O'ahu, Hawai'i Island and Maui. Schedules EV-J and EV-P became effective on August 1, 2022 for the islands of Lāna'i and Moloka'i, where enrollment in Schedule EV-F closed to new customers on July 31, 2022.

On October 29, 2021, the Company filed its *Public Electric Vehicle Charger Expansion Project* in Docket No. 2021-0173 which requested a dramatic expansion of public charging offerings and a suite of changes to the existing public charging programs. This application proposed, among other things, revised EV-U tariffs designed to be roughly cost-competitive with gasoline and which encourage charging during the middle of the day when solar is abundant. Revisions include the removal of charging O&M costs and network fees from the EV-U rate design itself, and an update of the underlying basis of the rate to be the proposed EV-J rate for each Company.⁶² The application also proposes to terminate Schedule EV-MAUI rate and have existing EV-MAUI meters included under the revised Schedule EV-U rate for Maui Island when the revised Schedule EV-U takes effect. The Company contends that having a uniform rate offering for public charging at Company owned sites will improve customer experience, improve internal administrative efficiency, and increase utilization of all Company DCFC on the island of Maui.⁶³ The Company also proposed to continue the SSM for the four existing EV-MAUI charging stations until the end of their useful life, or when they are replaced if prior to the end of their useful life. Once

⁶¹ See D&O 38157.

⁶² Docket No. 2021-0173, Public Electric Vehicle Charger Expansion Project filed October 29, 2021 at 31.

⁶³ Docket No. 2021-0173, Public Electric Vehicle Charger Expansion Project filed October 29, 2021 at 32.

those stations are replaced, the Company proposes that the replacement chargers will no longer be subject to the SSM.⁶⁴

Customer Engagement and Outreach (Roadmap Initiative #1)

As part of the Company's Roadmap, Initiative #1, customer engagement and outreach, is foundational and paramount to the success of the electrification of transportation in Hawai'i. The Company discovered that there is limited awareness, understanding, and enthusiasm for EVs among fleet operators, auto dealerships, and the public.⁶⁵ By working with partners⁶⁶ who share clean transportation objectives and who are willing to contribute their knowledge and expertise, the Company has leveraged the unique abilities of each partner and is hopeful that partners will continue to contribute financial and/or in-kind resources to this effort. Ultimately, the extent of the Company's action needed on outreach and education will depend on the ability of partners to assist.

Additionally, the Company included a Go to Market Plan as part of the refiling of the EV-MAUI tariff.⁶⁷ This plan included the following components:

- Objectives to create awareness and increase use of the charging station;
- Audience identification to target communications;
- Product value to meet customer charging need;
- Channels for media and publicity; and
- Promotional opportunities

In 2022, the Company contributed to the EV-U, EV-F, and EV-MAUI program education and outreach effort in the following ways:

- Keeping the Company's website updated as a go-to resource for many customers seeking information about the Company's DCFC stations, including location, operation status (i.e., in-service or out-of-service), and applicable rates (ongoing)
- Press and social media alerts announcing the opening of new DCFC stations (ongoing)
- Speaking engagements at schools, workshops, member organizations, digital and broadcast television shows, and radio shows (ongoing)
- E-newsletter to customers and key stakeholders (quarterly)
- Continued to facilitate Drive Electric Hawaii meetings to increase knowledge sharing across many stakeholder groups

⁶⁴ Docket No. 2021-0173, Public Electric Vehicle Charger Expansion Project filed October 29, 2021 at 32-33.

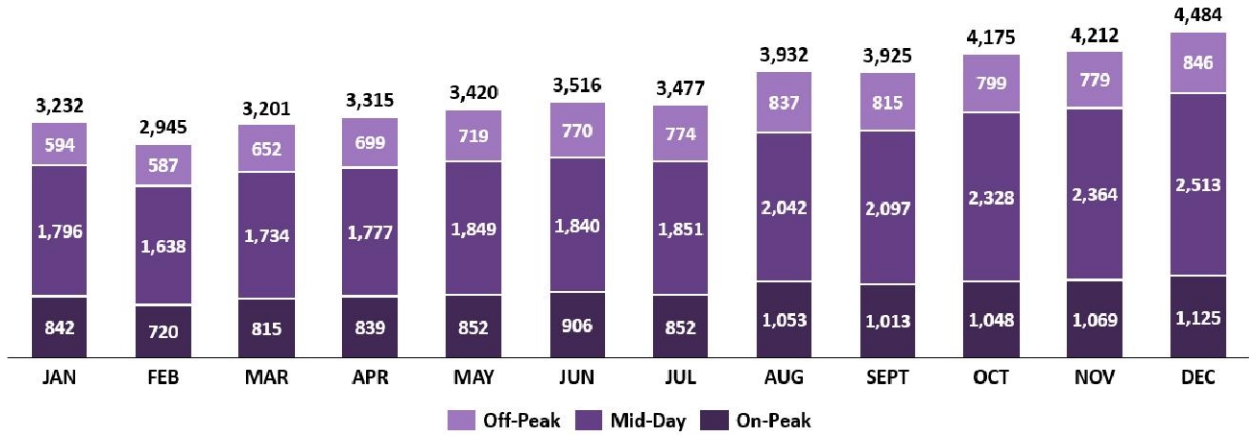
⁶⁵ Docket No. 2018-0135, Electrification of Transportation Strategic Roadmap filed March 29, 2018 at 69.

⁶⁶ Potential partners identified in the Roadmap: Drive Electric Hawai'i, Hawai'i Energy, NGOs, Automakers, Electrify America, and Dealerships and Hawai'i Automotive Dealer Association.

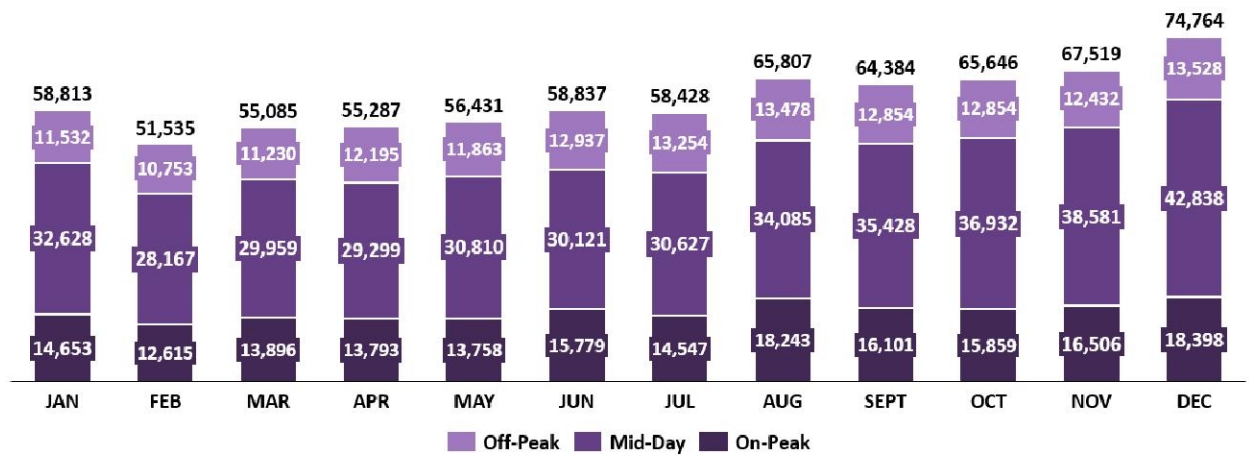
⁶⁷ See Attachment E to the Revised Schedule EV-MAUI Tariff, filed separately on September 16, 2019 in Docket No. 2018-0422.

Appendix A – Summaries of All EV-U Charging Locations by TOU period

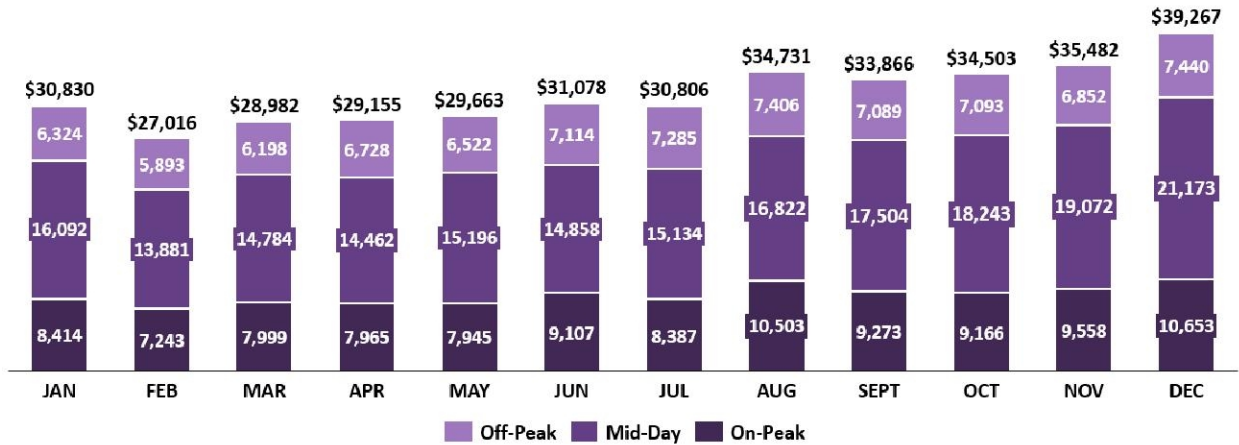
2022 Aggregated - # of Sessions by TOU



2022 Aggregated - Energy (kWh) by TOU

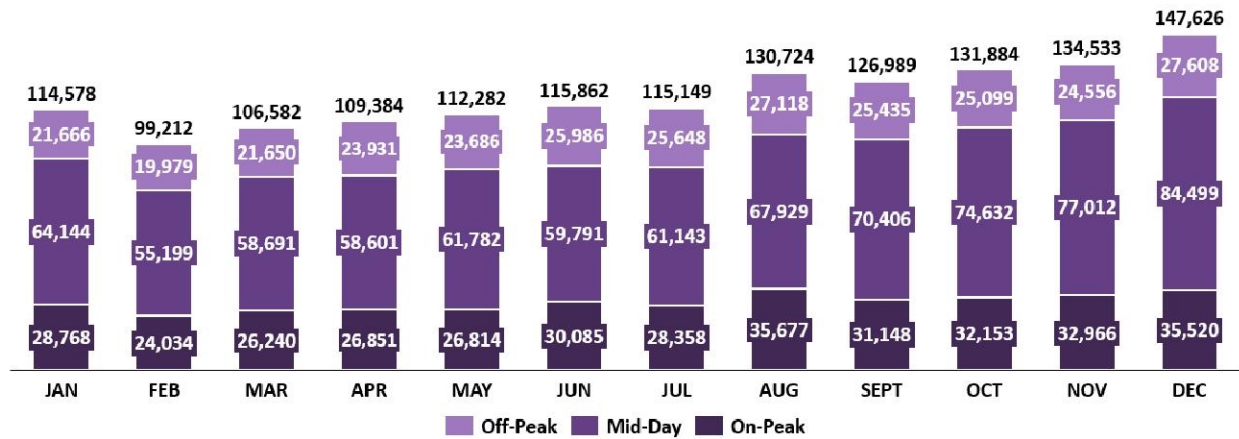


2022 Aggregated - Gross Revenue (\$) by TOU



Note: The aggregated gross revenue (\$) by TOU shown above is extracted from the network provider and does not represent booked annual revenue for the program.

2022 Aggregated - # of Minutes by TOU



Appendix B – Details for Schedule EV-U for 2022

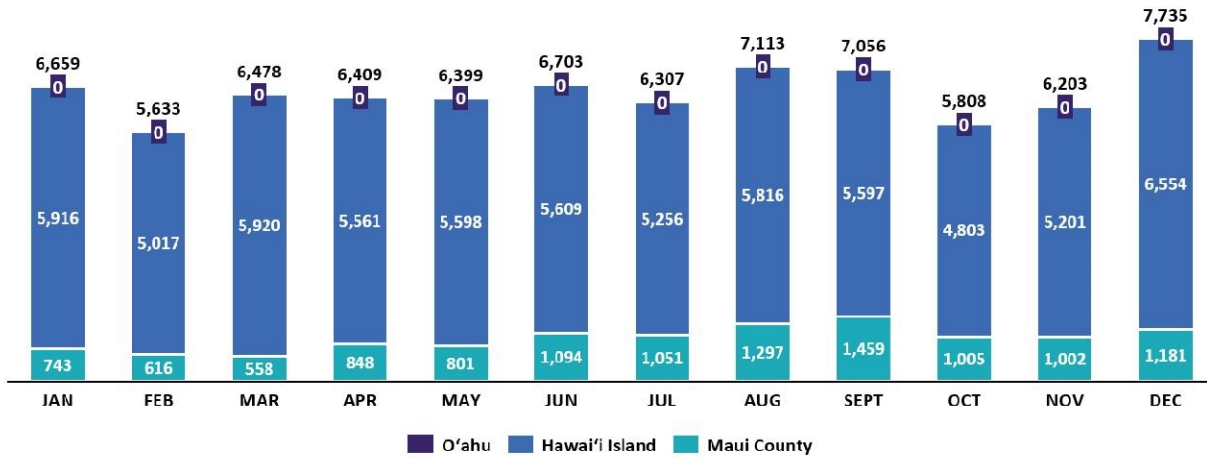
Details of Revenues, Expenses, and Capital for EV-U for 2022 and from inception of pilot program.

2022 Actuals:	Program Costs, January - December 2022			
	O'ahu	Hawai'i	Maui County	Totals
Revenue	\$ (316,404)	\$ (50,914)	\$ (14,714)	\$ (382,032)
Expenses				
O&M				
Labor	\$ 30,992	\$ 6,185	\$ 5,157	\$ 42,334
Non-labor	\$ 113,465	\$ 51,909	\$ 19,699	\$ 185,073
Total Expenses	\$ 144,457	\$ 58,094	\$ 24,855	\$ 227,406
Capital costs, net of CIAC	\$ 730,294	\$ 79,799	\$ -	\$ 810,093
2022 PTD:	Program Costs, Pilot Inception Through December 2022			
	O'ahu	Hawai'i	Maui County	Totals
Revenue	\$ (1,194,063)	\$ (198,778)	\$ (41,392)	\$ (1,434,233)
Expenses				
O&M				
Labor	\$ 843,644	\$ 14,271	\$ 51,298	\$ 909,213
Non-labor	\$ 529,252	\$ 131,899	\$ 84,582	\$ 745,733
Total Expenses	\$ 1,372,896	\$ 146,171	\$ 135,879	\$ 1,654,946
Capital costs, net of CIAC	\$ 3,353,089	\$ 1,219,421	\$ 116,276	\$ 4,688,786

Note: Reflected labor costs are direct labor costs only. Overhead costs are included in non-labor. Additionally, totals may not foot due to rounding to the nearest whole number.

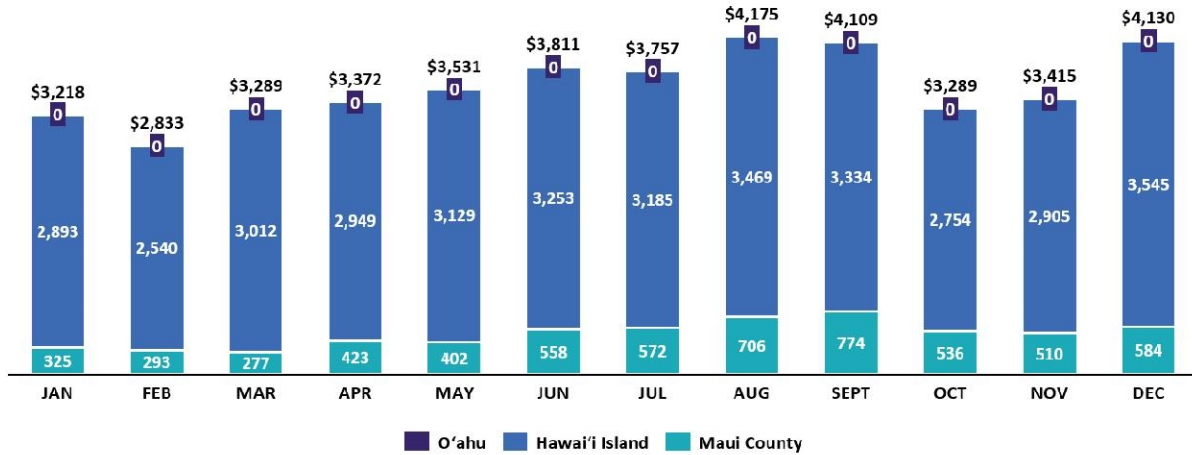
Appendix C – Details of Schedule EV-F for 2022

2022 Energy Consumption (kWh) by Service Territory



Note: Energy Consumption data is reflected in alignment with the bill month.

2022 Gross Revenue (\$) by Service Territory



Appendix D - Details for Schedule EV-MAUI for 2022

Details of Revenues, Expenses, and Capital for EV-MAUI for 2022 and from inception of pilot program.

2022 Actuals:	Program Costs, January - December 2022	
Revenue	\$	(63,766)
Expenses		
* Deferred O&M	\$	13,870
** O&M	\$	266
Total Expenses	\$	14,135
Capital costs, net of CIAC	\$	-
2022 PTD:	Program Costs, Pilot Inception Through December 2022	
Revenue	\$	(119,463)
Expenses		
Deferred O&M	\$	30,056
** O&M	\$	9,994
Total Expenses	\$	40,050
Capital costs, net of CIAC	\$	285,922

*(\$2.74) in November 2021 overhead expenses was reclassified to the deferred order in a correcting entry processed in February 2022.

**Note: "O&M" refers to all program related O&M expenses not eligible to be deferred. For 2022, all non-deferred O&M expenses were non-incremental labor.

Appendix E - Revised Schedule EV-MAUI Tariff Attachment C

EV-MAUI

Consolidated - Queen Kaahumanu Center (QKC), Piilani Village Shopping Center (PVC), Pukalani Terrace Center (PTC) and Lahaina Aquatic Center (LAC)

Shared Savings Mechanism

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Expenses																
1	Incremental O&M expense	-	10,122	20,649	21,062	21,483	21,913	22,351	22,798	23,254	23,719	24,193	24,677	25,171	25,674	26,188
2	Amortization expense (Deferred O&M)	-	4,168	8,336	8,336	4,168	-	-	-	-	-	-	-	-	-	-
3	Depreciation expense	-	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507	17,507
4	Allowed return on chargers	8,504	16,752	15,320	13,085	11,205	9,719	8,389	7,162	6,145	5,233	4,321	3,382	2,416	1,449	483
5	Federal Income Tax	1,671	3,293	3,011	2,572	2,202	1,910	1,649	1,408	1,208	1,029	849	665	475	285	95
6	State Income Tax	509	23	(63)	(197)	(309)	(398)	(478)	(551)	(612)	(667)	(722)	203	145	87	29
7	Total Expenses	10,685	51,865	64,760	62,364	56,257	50,651	49,417	48,324	47,502	46,821	46,149	46,434	45,713	45,002	44,302
8	Revenue Taxes	1,042	5,058	6,315	6,081	5,486	4,939	4,819	4,712	4,632	4,566	4,500	4,528	4,458	4,388	4,320
9	Total Expenses including Revenue Taxes	11,727	56,922	71,075	68,446	61,742	55,591	54,236	53,036	52,134	51,387	50,650	50,962	50,171	49,391	48,622
Revenues																
10	Charging Station Revenues	8,008	10,891	11,109	11,331	11,557	11,788	12,024	12,265	12,510	12,760	13,015	13,276	13,541	13,812	14,088
11	Revenues Total	8,008	10,891	11,109	11,331	11,557	11,788	12,024	12,265	12,510	12,760	13,015	13,276	13,541	13,812	14,088
12	NET COST/(PROFIT)	3,719	46,032	59,966	57,115	50,185	43,802	42,212	40,771	39,624	38,627	37,634	37,686	36,630	35,579	34,534
O&M Adjustment																
13	O&M Cap	-	45,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
14	O&M above cap not recovered	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Revenue Taxes on the above cap O&M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Total non-recoverable O&M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	NET COST/(PROFIT) ADJUSTED FOR O&M CAP	3,719	46,032	59,966	57,115	50,185	43,802	42,212	40,771	39,624	38,627	37,634	37,686	36,630	35,579	34,534
Shared Savings Mechanism																
18	Customer Share Allocation of Cost	100%	80%	60%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	Customer Share Allocation of Profit	0%	0%	0%	0%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
20	Customers' share of Cost/(Profit)	3,719	36,825	35,980	28,558	-	-	-	-	-	-	-	-	-	-	-
21	MECO's share of Cost/(Profit)	-	9,206	23,987	28,558	50,185	43,802	42,212	40,771	39,624	38,627	37,634	37,686	36,630	35,579	34,534

Notes

* Includes 4 charging stations - Queen Kaahumanu Center (QKC), Piilani Village Shopping Center (PVC), Pukalani Terrace Center (PTC) and Lahaina Aquatic Center (LAC)

Line

- 1 2% escalation applied to O&M.
- 4 Allowed return based on 9.50% ROE from MECO TY2018 Rate Case Dkt 2017-0150 Interim D&O No. 35631 (Exhibit A, dated 8/9/18).
- 5/6 Federal and State Income Taxes were included in the calculation of Net Cost/(Profit) in order to capture all costs of project expenditures.
- 12 Total expenses minus revenues results in "net costs," which may be a loss or a profit depending on whether total expenses exceed revenues.
- 13 Per D&O 36229, "For the purposes of the shared savings mechanism, annual O&M expenses shall be based on actual annual O&M expenses, capped at MECO's estimate of \$180,000." \$180,000/8 sites = \$22,500 O&M expense cap per site.
- 16 Per D&O 36229, "To the extent that annual O&M expenses exceed the cap of \$180,000, MECO may not recover such excess costs from customers."
- 18/19 Per D&O 36229, "For years 1 through 5, customers and MECO shall share in the net costs (i.e., the total expenses minus revenues) related to MECO's ownership and operation of the chargers on a stepped-down basis. To the extent revenues exceed costs in the first four years, MECO may retain the entirety of any net revenues." However, beginning in year 5, if revenues generated by the stations exceed the total expenses, thereby resulting in a profit, such net revenues shall be shared between customers and MECO 80% customers/20% MECO.
- 21 MECO's share of Net Cost/(Profit) includes non-recoverable O&M.

**Appendix F - Actual 2022 EV-MAUI Shared Savings/Costs Mechanism
Accounting Sheets**

**Shared Savings/Costs Mechanism
2022 Year 3**

<u>CONSOLIDATED</u>		<u>Queen Kaahumanu</u>	<u>Piilani Shopping Center</u>	<u>Pukalani Terrace Center (PTC)</u>	<u>Lahaina Aquatic Center</u>	2022 Total
QKC, Piilani, Pukalani, Lahaina Aquatics						
<u>Expenses</u>						
1	Incremental O&M expense	-	-	-	-	-
2	Amortization expense (Deferred O&M)	-	-	-	-	-
3	Depreciation expense (Capital)	5,072.80	4,539.25	4,532.04	4,926.90	19,071.00
4	Allowed return on chargers (Capital and Deferred O&M)	4,409.74	4,174.98	4,078.65	4,155.88	16,819.26
5	Federal Income Tax	-	-	-	-	-
6	State Income Tax	-	-	-	-	-
7						
	Total Expenses	9,482.55	8,714.23	8,610.69	9,082.78	35,890.26
8	Revenue Taxes	924.68	849.76	839.66	885.70	3,499.81
9	Total Expenses including Revenue Taxes	10,407.23	9,563.99	9,450.36	9,968.48	39,390.06
<u>Revenues</u>						
10	Charging Station Revenues	21,319.53	16,918.25	16,720.24	8,808.05	63,766.07
11						
	Revenues Total	21,319.53	16,918.25	16,720.24	8,808.05	63,766.07
12	NET COST/(PROFIT)	(10,912.30)	(7,354.26)	(7,269.88)	1,160.43	(24,376.01)
<u>O&M Adjustment</u>						
13	O&M Cap	22,500.00	22,500.00	22,500.00	22,500.00	90,000.00
14	O&M above cap not recovered	-	-	-	-	-
15	Revenue Taxes on the above cap O&M	-	-	-	-	-
16	Total non-recoverable O&M	-	-	-	-	-
17	NET COST/(PROFIT) ADJUSTED FOR O&M CAP	(10,912.30)	(7,354.26)	(7,269.88)	1,160.43	(24,376.01)
<u>Shared Savings Mechanism</u>						
18	Customer Share Allocation of Cost	60%	60%	60%	60%	60%
19	Customer Share Allocation of Profit	0%	0%	0%	0%	0%
20	Customers' share of Cost/(Profit)	-	-	-	696.26	-
21	MECO's share of Cost/(Profit)	(10,912.30)	(7,354.26)	(7,269.88)	464.17	(24,376.01)

EV-Maui
Shared Savings/Costs Mechanism
2022 Year 3

Queen Kaahumanu

Plant Add date per PowerPlan 12/17/20. Project #MZ.005053.01

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	2022 Total
Expenses													
1 Incremental O&M expense	-	-	-	-	-	-	-	463.45	53.43	55.21	54.65	(626.74)	-
2 Amortization expense (Deferred O&M)	-	-	-	-	-	-	-	-	-	-	-	-	-
3 Depreciation expense (Capital)	422.73	422.73	422.73	422.73	422.73	422.73	422.73	422.73	422.73	422.73	422.73	422.73	5,072.80
4 Allowed return on chargers (Capital and Deferred O&M)	375.27	374.67	373.87	373.07	372.27	369.47	365.61	363.36	361.30	359.16	357.58	364.11	4,409.74
5 Federal Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
6 State Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
7 Total Expenses	798.01	797.40	796.60	795.81	795.01	792.20	788.34	1,249.55	837.46	837.10	834.96	160.10	9,482.55
8 Revenue Taxes	77.82	77.76	77.68	77.60	77.52	77.25	76.87	121.85	81.66	81.63	81.42	15.61	924.68
9 Total Expenses including Revenue Taxes	875.82	875.16	874.28	873.41	872.53	869.45	865.22	1,371.39	919.13	918.73	916.38	175.71	10,407.23
Revenues													
10 Charging Station Revenues	2,088.45	1,784.13	1,784.13	1,784.13	1,784.13	450.63	1,847.30	2,217.98	826.97	1,995.23	2,491.12	2,265.33	21,319.53
11 Revenues Total	2,088.45	1,784.13	1,784.13	1,784.13	1,784.13	450.63	1,847.30	2,217.98	826.97	1,995.23	2,491.12	2,265.33	21,319.53
12 NET COST/(PROFIT)	(1,212.63)	(908.97)	(909.85)	(910.72)	(911.60)	418.82	(982.08)	(846.59)	92.16	(1,076.50)	(1,574.74)	(2,089.62)	(10,912.30)
O&M Adjustment													
13 O&M Cap	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	22,500.00
14 O&M above cap not recovered	-	-	-	-	-	-	-	-	-	-	-	-	-
15 Revenue Taxes on the above cap O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
16 Total non-recoverable O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
17 NET COST/(PROFIT) ADJUSTED FOR O&M CAP	(1,212.63)	(908.97)	(909.85)	(910.72)	(911.60)	418.82	(982.08)	(846.59)	92.16	(1,076.50)	(1,574.74)	(2,089.62)	(10,912.30)

EV-Maui
 Shared Savings/Costs Mechanism
 2022 Year 3

Piilani Shopping Center

Plant add per PowerPlan 12/23/20. Project #MZ.005053.03

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	2022 Total
Expenses													
1 Incremental O&M expense	-	-	-	-	1,500.00	(1,500.00)	-	-	-	-	-	-	-
2 Amortization expense (Deferred O&M)	-	-	-	-	-	-	-	-	-	-	-	-	-
3 Depreciation expense (Capital)	378.27	378.27	378.27	378.27	378.27	378.27	378.27	378.27	378.27	378.27	378.27	378.27	4,539.25
4 Allowed return on chargers (Capital and Deferred O&M)	352.26	350.73	352.35	353.98	350.01	348.81	349.66	344.87	341.44	340.72	339.46	350.69	4,174.98
5 Federal Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
6 State Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
7 Total Expenses	730.53	729.00	730.63	732.25	2,228.28	(772.92)	727.93	723.15	719.71	718.99	717.73	728.96	8,714.23
8 Revenue Taxes	71.24	71.09	71.25	71.40	217.29	(75.37)	70.98	70.52	70.18	70.11	69.99	71.08	849.76
9 Total Expenses including Revenue Taxes	801.76	800.09	801.87	803.66	2,445.57	(848.29)	798.91	793.66	789.89	789.10	787.72	800.04	9,563.99
Revenues													
10 Charging Station Revenues	619.83	1,182.96	1,182.96	1,182.96	1,182.96	709.18	1,610.30	1,791.63	3,519.13	1,150.58	1,881.95	903.81	16,918.25
11 Revenues Total	619.83	1,182.96	1,182.96	1,182.96	1,182.96	709.18	1,610.30	1,791.63	3,519.13	1,150.58	1,881.95	903.81	16,918.25
12 NET COST/(PROFIT)	181.93	(382.87)	(381.09)	(379.30)	1,262.61	(1,557.47)	(811.39)	(997.97)	(2,729.24)	(361.48)	(1,094.23)	(103.77)	(7,354.26)
O&M Adjustment													
13 O&M Cap	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	22,500.00
14 O&M above cap not recovered	-	-	-	-	-	-	-	-	-	-	-	-	-
15 Revenue Taxes on the above cap O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
16 Total non-recoverable O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
17 NET COST/(PROFIT) ADJUSTED FOR O&M CAP	181.93	(382.87)	(381.09)	(379.30)	1,262.61	(1,557.47)	(811.39)	(997.97)	(2,729.24)	(361.48)	(1,094.23)	(103.77)	(7,354.26)

EV-Maui
 Shared Savings/Costs Mechanism
 2022 Year 3

Pukalani Terrace Center (PTC)
 Plant add per PowerPlan 10/7/20. Project #MZ.005053.04

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	2022 Total
Expenses													
1	Incremental O&M expense												
2	Amortization expense (Deferred O&M)												
3	Depreciation expense (Capital)	377.67	377.67	377.67	377.67	377.67	377.67	377.67	377.67	377.67	377.67	377.67	4,532.04
4	Allowed return on chargers (Capital and Deferred O&M)	343.19	342.57	341.95	341.34	340.72	338.77	337.58	338.64	338.24	337.56	336.98	4,078.65
5	Federal Income Tax	-	-	-	-	-	-	-	-	-	-	-	-
6	State Income Tax	-	-	-	-	-	-	-	-	-	-	-	-
7	Total Expenses	720.86	720.24	719.62	719.01	718.39	716.44	715.25	716.31	715.91	715.23	714.65	8,610.69
8	Revenue Taxes	70.29	70.23	70.17	70.11	70.05	69.86	69.75	69.85	69.81	69.75	69.69	839.66
9	Total Expenses including Revenue Taxes	791.16	790.48	789.80	789.12	788.44	786.31	784.99	786.16	785.72	784.98	784.33	9,450.36
Revenues													
10	Charging Station Revenues	1,432.01	1,146.11	1,146.11	1,146.11	1,146.11	1,092.12	1,549.86	1,692.89	2,236.80	1,349.53	1,545.05	16,720.24
11	Revenues Total	1,432.01	1,146.11	1,146.11	1,146.11	1,146.11	1,092.12	1,549.86	1,692.89	2,236.80	1,349.53	1,545.05	16,720.24
12	NET COST/(PROFIT)	(640.85)	(355.63)	(356.31)	(356.99)	(357.67)	(305.81)	(764.87)	(906.73)	(1,451.08)	(564.55)	(760.72)	(7,269.88)
O&M Adjustment													
13	O&M Cap	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	22,500.00
14	O&M above cap not recovered	-	-	-	-	-	-	-	-	-	-	-	-
15	Revenue Taxes on the above cap O&M	-	-	-	-	-	-	-	-	-	-	-	-
16	Total non-recoverable O&M	-	-	-	-	-	-	-	-	-	-	-	-
17	NET COST/(PROFIT) ADJUSTED FOR O&M CAP	(640.85)	(355.63)	(356.31)	(356.99)	(357.67)	(305.81)	(764.87)	(906.73)	(1,451.08)	(564.55)	(760.72)	(7,269.88)

EV-Maui
 Shared Savings/Costs Mechanism
 2022 Year 3

Lahaina Aquatic Center

Plant add per PowerPlan 12/17/20. Project #MZ.005053.02

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	2022 Total
Expenses													
1 Incremental O&M expense	-	-	-	-	-	-	-	451.43	53.43	55.21	54.17	(614.24)	-
2 Amortization expense (Deferred O&M)	-	-	-	-	-	-	-	-	-	-	-	-	-
3 Depreciation expense (Capital)	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	4,926.90
4 Allowed return on chargers (Capital and Deferred O&M)	358.77	356.32	353.95	351.59	349.23	347.11	344.70	341.85	339.12	336.76	334.63	341.86	4,155.88
5 Federal Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
6 State Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-
7 Total Expenses	769.35	766.89	764.53	762.17	759.80	757.68	755.28	1,203.85	803.12	802.54	799.38	138.20	9,062.78
8 Revenue Taxes	75.02	74.78	74.55	74.32	74.09	73.88	73.65	117.39	78.32	78.26	77.95	13.48	885.70
9 Total Expenses including Revenue Taxes	844.37	841.68	839.08	836.49	833.89	831.57	828.93	1,321.25	881.44	880.80	877.33	151.67	9,968.48
Revenues													
10 Charging Station Revenues	322.17	443.37	443.37	443.37	443.37	2,085.18	822.02	349.72	459.95	1,466.09	1,198.66	330.78	8,808.05
11 Revenues Total	322.17	443.37	443.37	443.37	443.37	2,085.18	822.02	349.72	459.95	1,466.09	1,198.66	330.78	8,808.05
12 NET COST/(PROFIT)	522.20	398.31	395.71	393.12	390.52	(1,253.61)	6.91	971.53	421.49	(585.29)	(321.33)	(179.11)	1,160.43
O&M Adjustment													
13 O&M Cap	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	1,875.00	22,500.00
14 O&M above cap not recovered	-	-	-	-	-	-	-	-	-	-	-	-	-
15 Revenue Taxes on the above cap O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
16 Total non-recoverable O&M	-	-	-	-	-	-	-	-	-	-	-	-	-
17 NET COST/(PROFIT) ADJUSTED FOR O&M CAP	522.20	398.31	395.71	393.12	390.52	(1,253.61)	6.91	971.53	421.49	(585.29)	(321.33)	(179.11)	1,160.43

HAWAIIAN ELECTRIC'S ANNUAL REPORT ON THE PROGRESS AND STATUS OF THE E-BUS-J AND E-BUS-P TARIFF PILOT

EoT Roadmap Docket 2018-0135

March 29, 2023

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BACKGROUND

The transportation sector continues to account for nearly two-thirds of Hawai‘i’s petroleum use,¹ making clean transportation solutions a critical component of the State of Hawai‘i’s transition to a sustainable and clean energy future. Electric transportation not only reduces carbon emissions, but it also complements the integration of additional renewable energy resources necessary to achieve 100 percent clean energy and support the State’s commitment to be carbon negative by 2045.

High-mileage fleets, such as buses, make excellent candidates for electrification due to reduced lifetime maintenance; however, they require more resources than light-duty vehicles due to the higher vehicle and charging infrastructure costs. Understanding these factors, significant goals and investments are being made nationally and locally to assist the transition of medium and heavy-duty vehicles. Federal funding is allocated annually from the U.S. Environmental Protection Agency (EPA) to reduce vehicle emissions from medium and heavy-duty diesel vehicles. The Bipartisan Infrastructure Law established in 2021, supports the transition to low- and zero-emission school buses by providing \$5 billion in rebate funding over five years through the EPA’s Clean School Bus Program. In 2022, the EPA awarded nearly \$1 billion to 389 school districts², including \$4.9 million to the Hawai‘i Department of Education.³ Through the 2022 Inflation Reduction Act, the EPA will also provide \$1 billion in grants and/or rebates through

¹ Hawai‘i State Energy Office 2020. Hawai‘i Energy Facts & Figures, P. 4. Available at: https://energy.hawaii.gov/wp-content/uploads/2020/11/HSEO_FactsAndFigures-2020.pdf.

² Biden-Harris Administration Announces Nearly \$1 Billion from EPA's Clean School Bus Program for 389 School Districts. October 26, 2022. Available at: <https://www.epa.gov/newsreleases/biden-harris-administration-announces-nearly-1-billion-epas-clean-school-bus-program>

³ HIDOE awarded nearly \$5 million to begin electrifying school bus fleet. October 26, 2022. Available at: <https://www.hawaiipublicschools.org/ConnectWithUs/MediaRoom/PressReleases/Pages/electric-school-buses.aspx>

2031 for zero-emission heavy-duty vehicles. Together, these investments will provide unprecedented support for transitioning the transportation sector to zero-emission solutions.

In December 2017, the four Hawai‘i county mayors and their representatives committed to 100 percent public and private renewably fueled ground transportation by 2045, with Honolulu, Maui, and Kaua‘i Counties signing proclamations to transition their fleets to renewable fuel by 2035. In 2019, Hawai‘i was named a beneficiary of \$8.125 million of Volkswagen Environmental Mitigation Trust Funds with approximately \$6.9 million⁴ allocated to bus electrification projects. Additionally, Hawai‘i signed on to the multi-state memorandum of understanding,⁵ pledging to expand the market for electric medium and heavy-duty vehicles with a goal of 100 percent of all new medium and heavy-duty vehicle sales be zero emission vehicles by 2050.

Hawaiian Electric’s⁶ Electrification of Transportation Strategic Roadmap outlines ten key initiatives to accelerate the adoption of electric vehicles (“EVs”), including electric buses.⁷ In support of this initiative, the Company submitted an application for the Schedule E-BUS-J and Schedule E-BUS-P tariffs on a Pilot basis (collectively “E-BUS Tariffs Pilot”). In March 2019, the Hawai‘i Public Utilities Commission (“Commission”) approved the Company’s request to implement a pilot time-of-use (“TOU”) rate for electric bus charging.⁸ The approved E-BUS-J

⁴ Hawaii State Energy Office 2019. Beneficiary Mitigation Plan. <https://energy.hawaii.gov/wp-content/uploads/2019/01/Hawaiis-Proposed-Beneficiary-Mitigation-Plan-for-the-VW-Environmental-Mitigation-Trust-January-2019.pdf>

⁵ <https://energy.hawaii.gov/commitment-to-zero-emission-vehicles>

⁶ Hawaiian Electric Company, Inc., Hawai‘i Electric Light Company, Inc. (“Hawai‘i Electric Light”) and Maui Electric Company, Limited (“Maui Electric”) are collectively referred to herein as “Hawaiian Electric” or the “Company.”

⁷ See Docket No. 2016-0168, Electrification of Transportation Strategic Roadmap, filed March 29, 2018.

⁸ See generally, Docket No. 2016-0168. See also Transmittal No. 18-06 (Non-Docketed), Decision and Order No. 36220 (“D&O 36220”), filed March 20, 2019, Establishing an Electric Bus Tariff for Schedule J- General Service Demand and Schedule P – Large Power Service on a Pilot Basis.

and E-BUS-P tariffs offer electricity per-kWh rates for bus 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, and the Off-Peak period from 10:00 p.m. to 9:00 a.m., daily.⁹ The tariffs also provide an exemption from demand charges during the Mid-Day and Off-Peak periods.¹⁰ This keeps the cost of vehicle charging low in most hours of the day to encourage investment in electric buses. Over the approved five-year pilot period, the program can serve a total of 20 customer accounts in Hawaiian Electric’s service territory.¹¹ In addition, on May 7, 2021, the Commission filed Decision and Order No. 37769 (“D&O 37769”) in Docket No. 2020-0098, approving Hawaiian Electric’s request for a three-year pilot to deploy electric bus make-ready infrastructure at no cost to eligible participants. Customers that participate in the make-ready pilot, Charge Up eBus, will also enroll in either the E-Bus-J tariff or E-Bus-P tariff. As such, Hawaiian Electric expects to file a request in the third quarter of 2023 to extend the tariffs to align with the Charge Up eBus pilot.

For the duration of the E-Bus-J and E-Bus-P tariffs pilot, Hawaiian Electric will provide the Commission with annual updates on the information outlined in D&O 36220.¹² Specifically, D&O 36220 requires Hawaiian Electric to provide, at a minimum, the following information disaggregated by service territory:

- (1) The number of customer accounts enrolled in the E-BUS Program.

⁹ During the On-Peak hours, 5:00 p.m. to 10:00 p.m., daily, per kWh rates for bus charging are substantially higher than the respective comparable commercial rates.

¹⁰ Demand charges apply for load served during On-Peak hours that exceeds the billing demand of the host commercial account. An existing host commercial account is required for participation in the E-BUS pilot rates.

¹¹ The approved pilot tariff rates are effective from March 31, 2019 through December 31, 2023.

¹² See Ordering Paragraph 3.C of Decision and Order No. 36220, filed March 20, 2019 regarding Transmittal No. 18-06 (non-docketed)

- (2) The number of battery electric buses acquired per customer account enrolled in the E-BUS Program.
- (3) Based on the participants' responses to an annual survey, the participants' feedback regarding the overall experience with and effectiveness of the E-BUS Program.
- (4) The estimated E-BUS Program implementation costs.
- (5) Revenues collected under the E-BUS Program.
- (6) The kWh consumption by TOU period.
- (7) Assessment of whether a demand charge is appropriate, including the supporting analysis and data.
- (8) The total number of battery electric bus miles in each pilot program year.
- (9) The number of customer accounts expected to be enrolled in the next pilot program year.
- (10) The number of battery electric buses expected for each anticipated customer account.
- (11) The estimated reduction in greenhouse gas emissions associated with the pilot program, including a description of the methodology used in calculating the emissions and supporting data.¹³

The following sections provide implementation data and information as directed by the Commission. Requirements 1, 2, 9, and 10 are included in the E-BUS Tariff Adoption section. The Bus Utilization and Environmental Impact section summarizes requirements 6, 8, and 11. The Customer Experience section highlights responses to the annual customer survey requirement 3. The Implementation Costs section addresses requirement 4. The Revenue section addresses requirement 5, and the Demand Charges section addresses requirement 7.

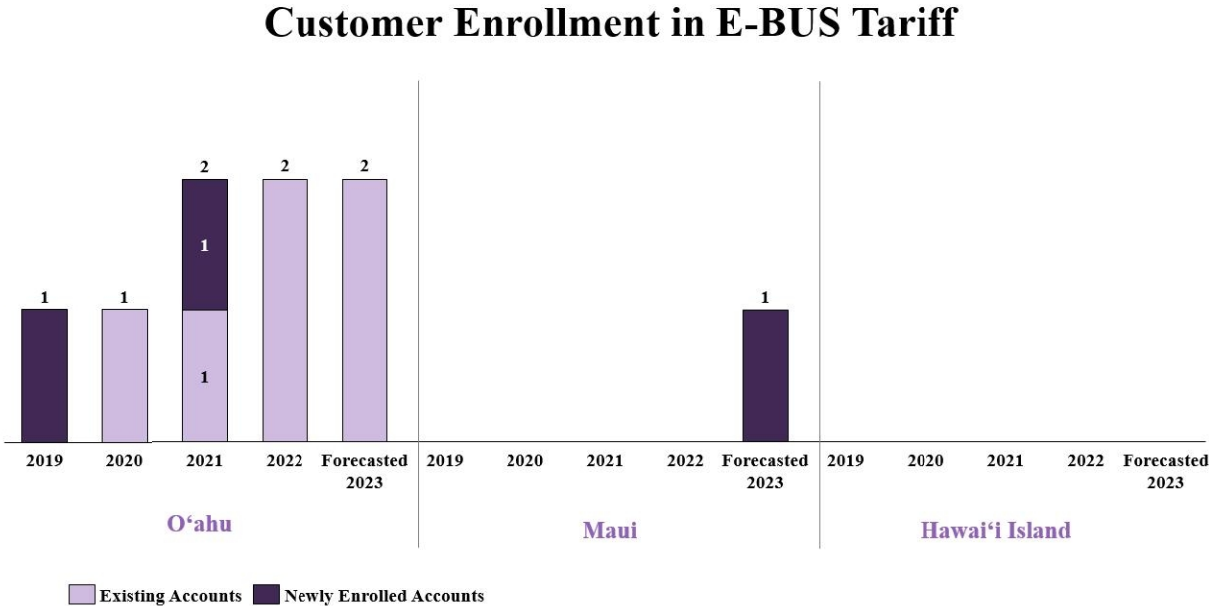
¹³ D&O 36220, P. 41-42. Available at: <https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A19C21A91005F00524>
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E-BUS TARIFF ADOPTION

Hawaiian Electric continues to support fleet operators in the planning and construction of charging infrastructure. The economic impacts of the COVID-19 pandemic disrupted fleet electrification plans for many bus operators. However, incentives supported by the Bipartisan Infrastructure Law and Inflation Reduction Act are expected to accelerate electric bus adoption going forward. In 2022, no new customers enrolled in the E-Bus tariff as shown in Figure 1 below. However, plans for several electric bus charging facilities on O‘ahu, Maui, and Hawai‘i Island are progressing and targeting completion in the next two years.

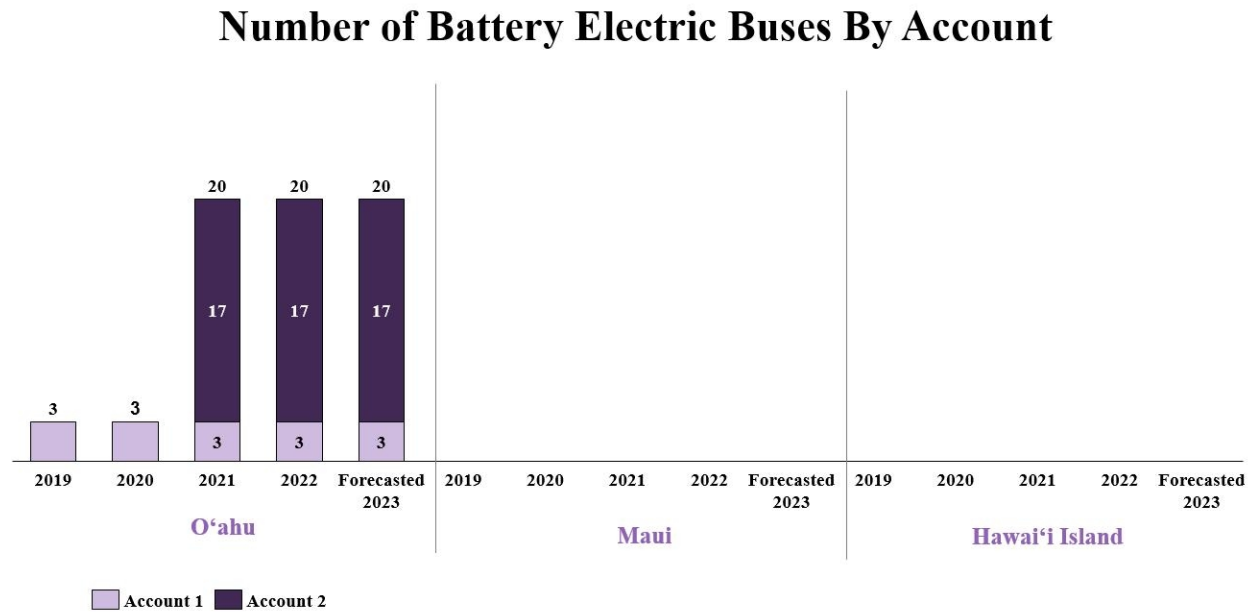
One new electric bus charging site is expected to enroll in an E-bus rate in 2023, and two more are expected in 2024 if the E-Bus tariff is extended. This includes two active applicants in the Charge Up eBus Pilot, which provides no-cost make-ready infrastructure to eligible customers.

Figure 1: Number of Customer Accounts Enrolled in E-BUS Tariff by Service Territory



The arrival of electric buses is expected to lag due to delays in procurement and long bus-manufacturing lead times. As reflected in Figure 2, below, no new electric buses are anticipated in 2023.

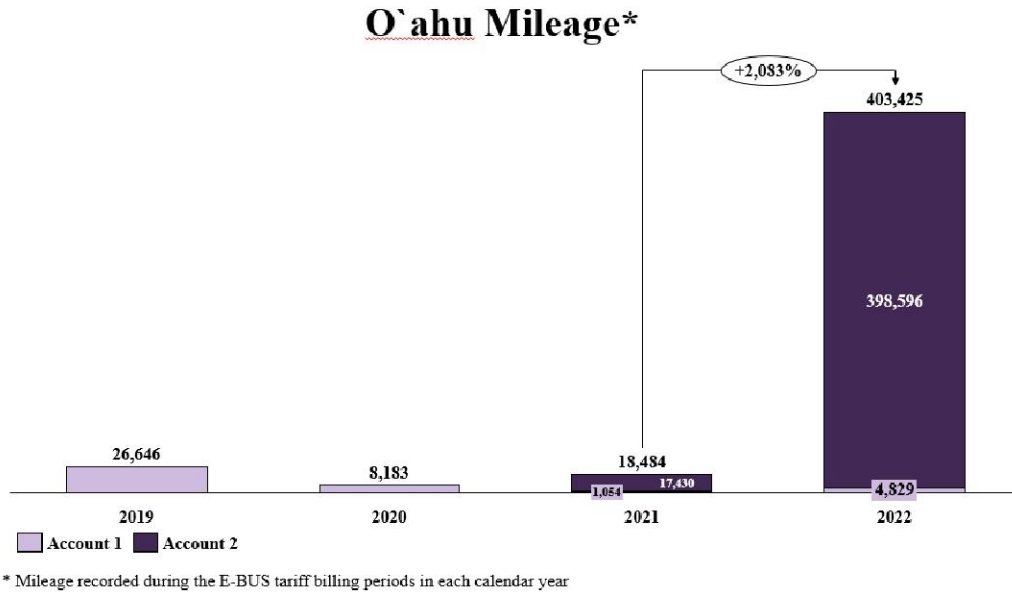
Figure 2: Number of Battery Electric Buses by Account and Service Territory



BUS UTILIZATION AND ENVIRONMENTAL IMPACT

In 2022, 20 battery electric buses operating on O’ahu accrued a total of 403,425 miles (Figure 3 below) billed under the E-BUS Program. This increase of over 20-fold from the prior year is driven by a full year of 17 electric buses used by one customer for public transportation. The mileage of three other buses used for a visitor transportation service increased from 2021, but remained approximately 80% below 2019’s pre-pandemic levels. Mileage, energy consumption, and emissions data reported below reflect electric buses on O’ahu. There were no electric buses enrolled in the program on Maui or Hawai’i Island.

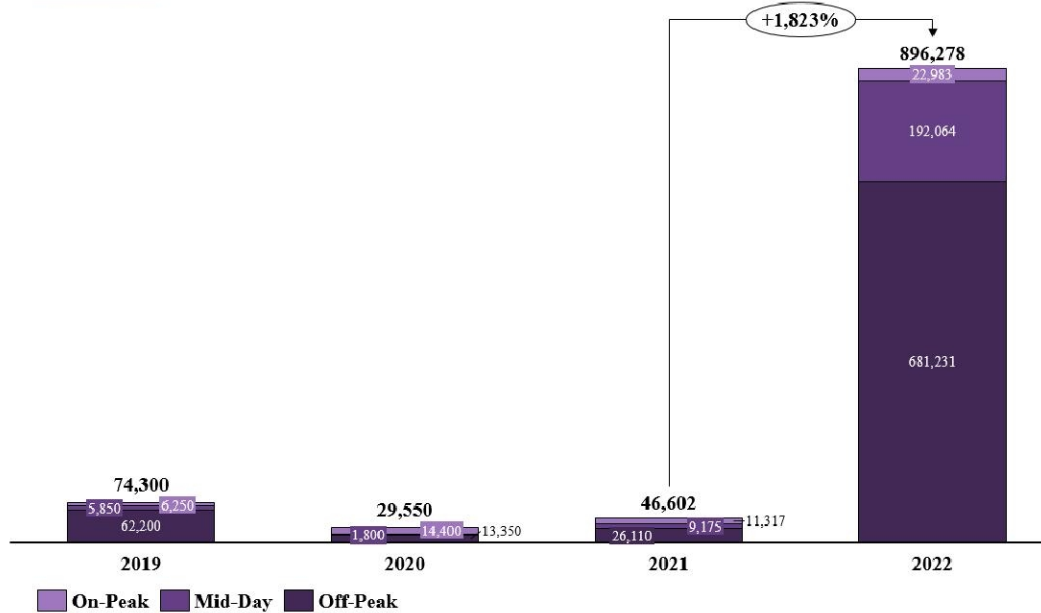
Figure 3: Electric Bus Mileage



As shown in Figure 4, total energy consumption for bus charging increased by over 18-fold on O`ahu. Since buses typically operate during the day, the ability to charge during the Mid-Day period is limited. Approximately 76% of energy consumed occurred during the Off-Peak period, and 21% occurred during the Mid-Day period. Less than 3% of energy consumption occurred during the On-Peak period when rates are highest and demand charges apply. The time-of-use rate pricing signals continue to minimize charging during the On-Peak period, thereby reducing the impact to the grid when resources are constrained.

Figure 4: Energy Consumption by Time-of-Use Period

O`ahu kWh Consumption by Time-of-Use Period*



Electric buses generally reduce greenhouse gas (“GHG”) emissions when compared to conventional fossil fuel-powered (diesel, gasoline, or compressed natural gas (“CNG”)) buses. Emission reductions are calculated as the difference between indirect emissions resulting from electricity generation used for vehicle charging, and combustion emissions that would have occurred from diesel-powered buses. A detailed explanation of the assumptions and methodology is included in the attached Appendix A – Methodology of Greenhouse Gas Emissions Calculations for Electric Bus Annual Report for Operation in Calendar Year 2022. The calculated emissions are based on the energy consumed for charging in each time-of-use period. The emission factors in each period reflect different generating resources including

renewables. In 2022, electric bus charging emissions were 364.3 metric tons (MT) CO_{2e} less than diesel buses driving an equivalent mileage.¹⁴

Electric bus utilization significantly increased in 2022 as reflected in mileage and energy consumption data. By the end of 2022, the number of visitors returned to pre-pandemic levels. However, international visitors lagged significantly due to strict pandemic border restrictions in countries such as Japan. As a result, bus operators serving those markets continue to see a slow return to pre-pandemic operations. GHG emission reductions are expected to increase as more vehicles participate in the program, the economy drives higher utilization of participating electric buses, and more renewables are incorporated into the grid.

The E-BUS tariffs will also result in improved air quality and health benefits. Electric buses reduce diesel particulate matter emissions and other criteria air pollutants compared to buses with tailpipe emissions. These tailpipe emissions would otherwise negatively impact local air quality and the health of residents and commuters.

CUSTOMER EXPERIENCE

In support of this annual report, Hawaiian Electric issues a survey to local bus operators.

Customers enrolled in the E-BUS Tariff Pilot provide feedback on the operational impact, and overall satisfaction. Questions regarding future adoption include both enrolled and non-enrolled bus operators. Responses are based on a 1-5 scale, with 5 indicating a favorable experience. The survey questions are attached in Appendix B.

¹⁴ See Appendix A at Page 22.
Hawaiian Electric

Operational Impact

Feedback on participating in the E-BUS Tariff Pilot was positive from an operational perspective. Existing customers noted a substantial to significant savings benefit (see Figure 5 below). However, minimizing charging during the peak period was a substantial impact to operations (see Figure 6 below). In addition, when comparing the convenience of charging electric buses to refueling non-electric buses, the response was somewhat inconvenient (see Figure 7 below). While managed charging solutions can help to delay and sequence vehicle charging, technical issues have hindered anticipated operational efficiencies for some participants.

Figure 5: Energy Cost Savings Benefit



Figure 6: Impact to operations by minimizing peak charging

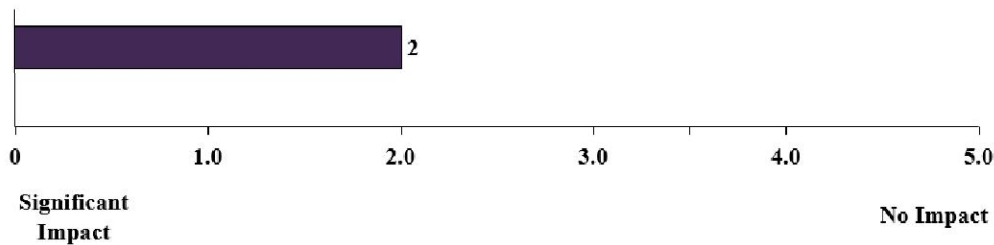


Figure 7: Level of convenience when comparing fueling electric fleet to fueling the existing non-electric fleet



Overall Satisfaction

Among customers enrolled in the E-Bus Tariff, the overall level of satisfaction with the program and likelihood of recommending it to other bus operators is very strong (see Figures 8 and 9 below).

Figure 8: Overall Satisfaction

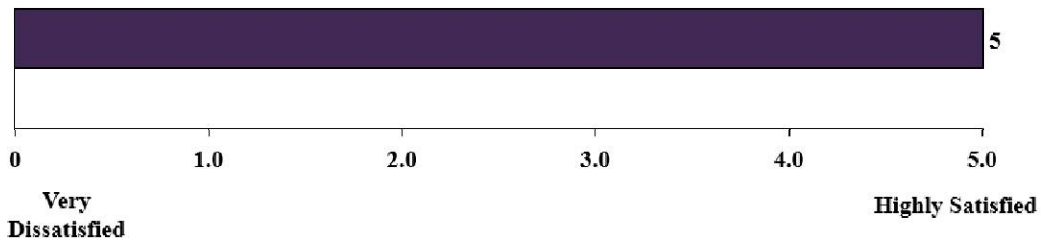


Figure 9: Likelihood to Recommend E-BUS Program



Adoption

Bus operators indicate that the availability of the E-Bus Tariff is perceived as a substantial influence on future electric bus purchases (see Figure 10 below). In addition, customers indicate a high likelihood of enrolling future charging facilities in the rate if it is still available (see Figure 11 below). However, if the commercial demand charges are reinstated in the future, the likelihood of participating on an E-BUS rate is uncertain (see Figure 12 below).

Figure 10: E-BUS Program Influence on Future Electric Bus Purchases

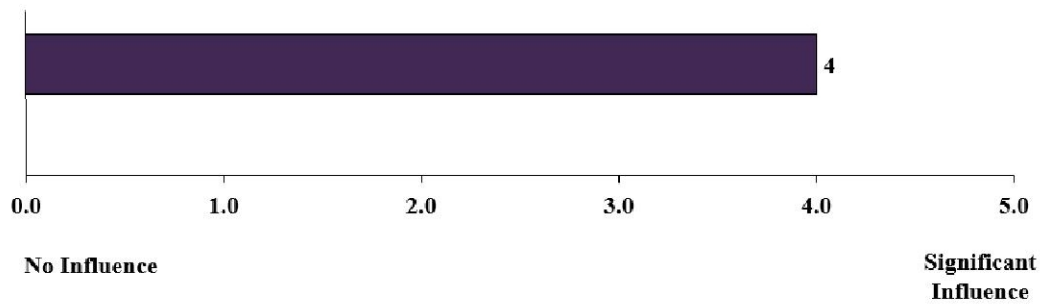


Figure 11: Likelihood of Enrolling Future Charging Facilities in the E-Bus Rate if it is Available

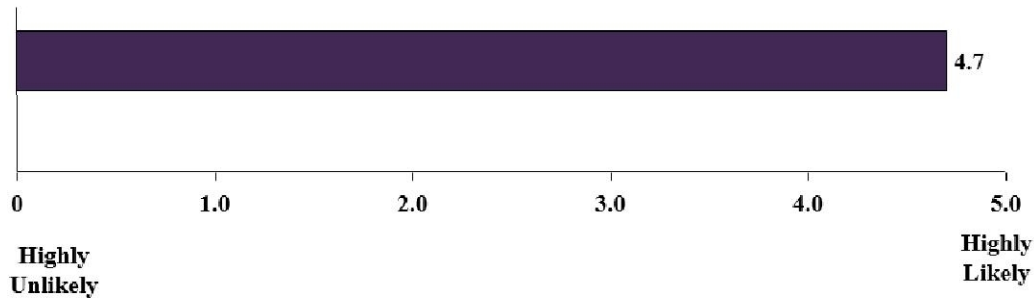
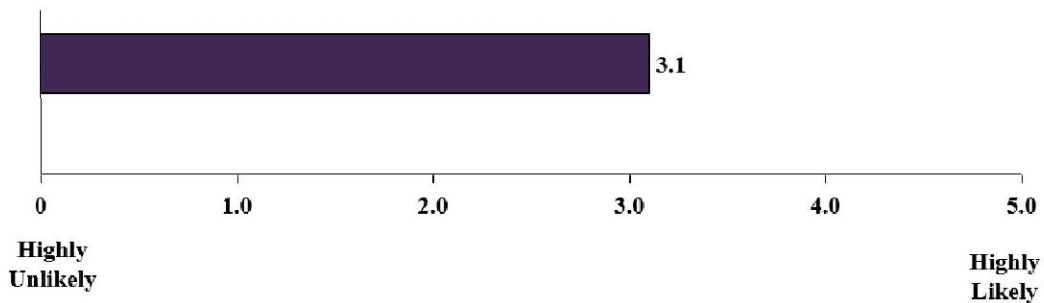


Figure 12: Likelihood of Participating in an E-BUS Rate with Demand Charges

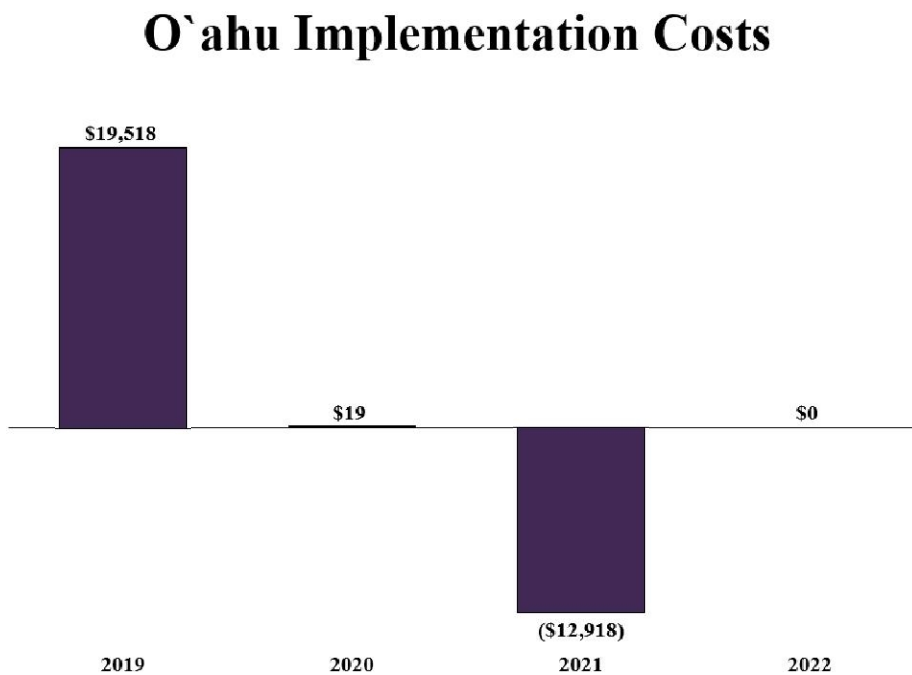


IMPLEMENTATION COSTS

Hawaiian Electric’s implementation costs for the E-BUS Tariff Pilot include one-time capital costs for transformer and meter equipment, as well as ongoing meter network service fees.

Incremental labor expenses to support E-BUS-J and E-BUS-P, such as enrolling and billing customers were negligible. Labor to support customer participation is similar to other rates and is also limited to 20 metered accounts. There were no new participants in 2022, resulting in no additional implementation costs (see Figure 13). In addition, there are no participant costs on Maui and Hawai’i Island.

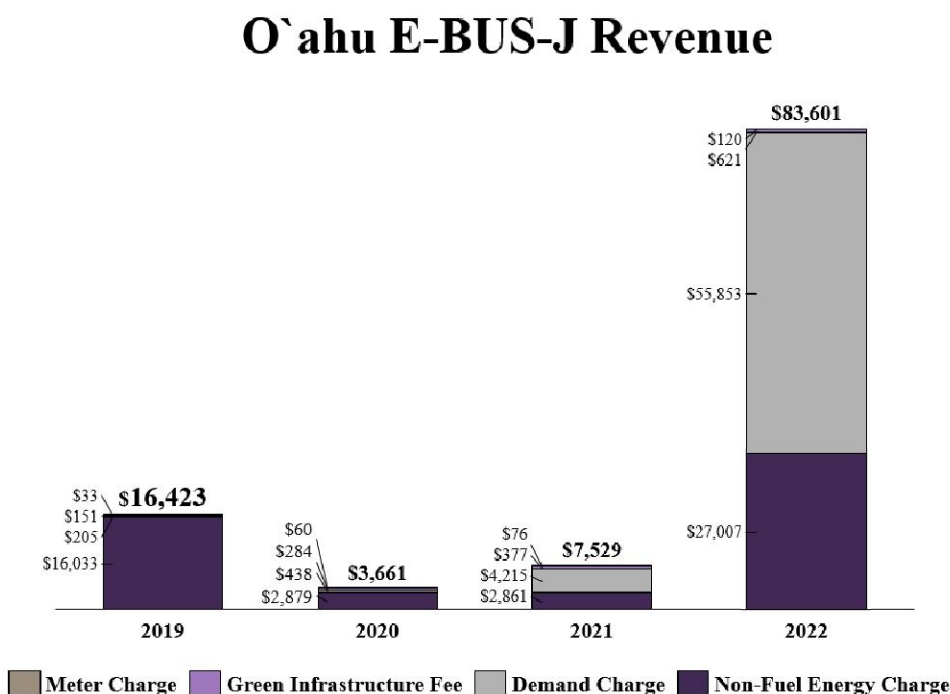
Figure 13: Implementation Costs



REVENUE

Initial capital costs, which are predominantly one-time expenses, are offset over time by revenues from meter, demand, and non-fuel energy charges. Figure 14 below summarizes the total revenue from E-BUS-J, which was approximately \$83,601 in 2022¹⁵. In 2022, there were no E-BUS-J participants in Maui County or on Hawai'i Island, and no customers were enrolled in E-BUS-P.

Figure 14: E-BUS-J Revenue by Service Territory



DEMAND CHARGES

E-BUS-J and E-BUS-P are intended to reduce the financial risk for bus operators that are transitioning to electric fleets by eliminating demand charges in the Mid-Day and Off-Peak periods, as well as lowering non-fuel energy charge rates in those periods. In addition, demand

¹⁵ Figure 14 does not include revenues from surcharges other than the Green Infrastructure Fee.
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charges only apply to On-Peak period usage that exceeds the billing demand of the host commercial account. As a result, customers are incentivized to charge during the Mid-Day and Off-Peak periods, providing new load on the electric system when there are abundant renewable resources, and aligning with participants' operations.

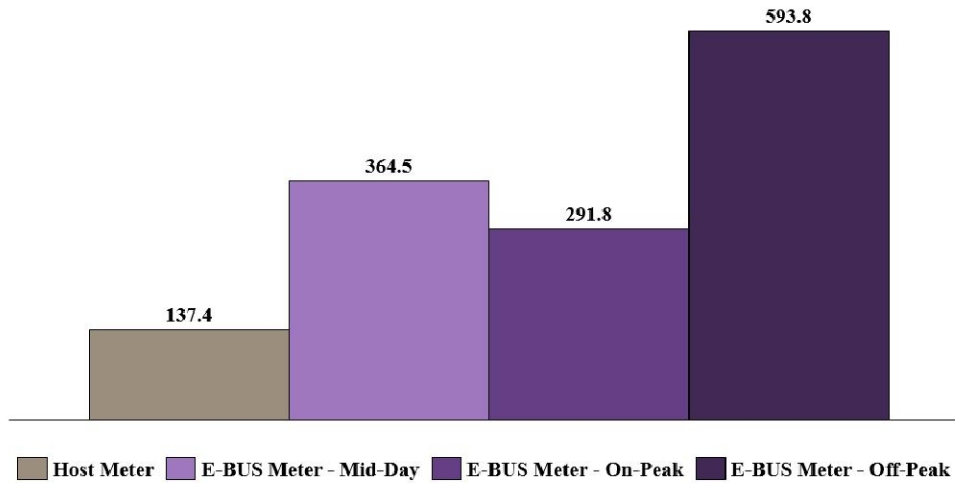
In 2022, the average measured demand in each of the time periods for E-BUS-J on O'ahu was above the average measured demand of 137 kW for host accounts (Figure 15 below)¹⁶. This reflects an increase in greater bus utilization, resulting in more charging. Demand charges made up approximately 67 percent of E-BUS-J 2022 revenues shown in Figure 14, above. There were no participants in Maui County or on Hawai'i Island.

Host accounts capture energy use for the facility, excluding electric bus charging, and are not billed by time-of-use periods. E-Bus rates are structured by time-of-use periods and incur incremental demand charges when energy demand exceeds the host account during the On-Peak period. In 2022, the highest average demand occurred during the Off-Peak period when demands on the grid are typically low (see Figure 15 below). The next highest demand occurred during the Mid-Day period, when renewable energy is typically most abundant. The average demand during the On-Peak period was the lowest, providing a positive indication that the E-Bus Tariff incentives support an overall shift in energy usage that minimizes the impact to the grid when demand is typically highest.

¹⁶ For billing purposes, On-Peak period measured kW demand of the E-Bus meter is compared to the billed kW demand of the host commercial account, which is based on the measured kW demand of the host account. The data reflects the annual average measured demand in 2022 for host and E-Bus meters.

Figure 15: Average Measured Demand (kW) of Host Schedule J Accounts Compared to E-BUS-J Accounts

2022 O’ahu Average Measured Demand (kW) for Schedule J and E-BUS-J



2022 reflects the first full year of electric transit bus operations as well as a gradual return of tour bus operations since the start of the COVID-19 pandemic. In addition, a recall in 2022 temporarily impacted many electric buses. These factors along with limited use cases, makes it challenging to identify trends or draw conclusions at this time. However, as more customers enroll in E-Bus rates, the Company will gain a more diverse set of inputs to better understand energy and demand requirements that can inform future rate design.

APPENDIX A

Methodology of Greenhouse Gas Emissions Calculations for Electric Bus Annual Report for Operation in Calendar Year 2022

Hawaiian Electric Company, Inc.

1 Introduction

Hawaiian Electric completed its fourth pilot program year of the electric bus (“E-BUS”) tariff under a time-of-use rate structure. The Public Utilities Commission (“Commission”) Decision and Order No. 36220 requires Hawaiian Electric to submit an annual report that documents “[t]he estimated reduction in greenhouse gas emissions associated with the pilot program, including a description of the methodology used in calculating the emissions and supporting data.”¹ This memorandum documents the methodology used to calculate the greenhouse gas (“GHG”) emissions reductions from the E-BUS operations.

2 Calculation Methodology

Electric buses generally reduce GHG emissions (“emissions”) compared to conventional fossil fuel-powered (diesel, gasoline, or compressed natural gas [“CNG”]) buses. Electric buses 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 the fossil fuel-powered buses.

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

- Electricity CO₂e Emission Factors: The electricity GHG intensity factors (“factors” or “electricity factors”) represent the carbon dioxide equivalent (“CO₂e”) 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 2022, Hawaiian Electric Companies achieved a consolidated Renewable Portfolio Standard (RPS) of 32 percent.² On O’ahu, the RPS achieved was 28 percent.³ In July 2022, Governor Ige signed Act 240 (H.B. 2089) that amended the RPS calculation from renewable energy as a percentage of sales to renewable energy as a percentage of total system generation. The change in definition causes a lower RPS.

For 2022, Hawaiian Electric calculated electricity factors for the three time of use

¹ Decision and Order No. 36220, P. 42. Available at: <https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A19C21A91005F00524>.

² Docket No. 2007-0008, Renewable Portfolio Standards Law Examination, filed February 17, 2023, P. 1. Available at: <https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A23B21A83320A03614>

³ See footnote 2.

(“TOU”) periods of interest using January-December 2022 averages for O’ahu. The O’ahu factors were as follows:

- Mid-Day (9:00 AM – 5:00 PM): 1,258 lb. CO₂e per MWh
- Peak (5:00 PM – 10:00 PM): 1,636 lb. CO₂e per MWh
- Off-Peak (10:00 PM – 9:00 AM [next day]): 1,594 lb. CO₂e per MWh

These factors reveal the advantage, in terms of CO₂e 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. CO₂e/kWh and averaged for each TOU period. RE sources are assigned a CO₂e emission factor of zero. Fossil fuel generator intensities are calculated by dividing the CO₂e emissions by the corresponding generations. Behind-the-meter customer RE is not included because it is not on the grid available for charging buses.

- Electric Bus Electricity Use: The E-BUS Program in 2022 included three 40-passenger Proterra Catalyst E2 buses and seventeen Oahu Transit Services buses. The metered electricity from charging these buses 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 Bus Fuel Economy: Fuel economy for fossil fuel-powered buses is expressed in terms of miles per diesel gallon equivalent (“mpdge”). Based on the National Renewable Energy Laboratory (“NREL”) Electric Bus Progress Report, the fuel economy for NABI 42-ft CNG buses averaged 4.15 mpdge in 2018. Similarly, another NREL report showed that Gillig 40-ft diesel buses averaged 4.24 mpdge.⁴ Hawaiian Electric’s consultant, Ramboll US Consulting, averaged these values to estimate the GHG emissions that would have been generated from a fossil fuel-powered bus as 4.2 mpdge.
- Combustion Emission Factors: The fossil fuel bus emission factor represents the GHG emissions per diesel gallon of fuel use or fuel gallon equivalent for CNG use. This calculation used a standard value of 22.5 lb. CO₂e per gallon of diesel fuel.^{5,6}
- Vehicle Miles Traveled (“VMT”): The VMT represents the miles that were traveled by electric buses instead of fossil fuel-powered buses. This could be calculated using several

⁴ NREL. 2016. Fuel Cell Buses in US Transit Fleets, Table 7. Available at: <https://www.nrel.gov/docs/fy17osti/67097.pdf>.

⁵ 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.

⁶ U.S. Environmental Protection Agency (EPA). 2018. Emission Factors for Greenhouse Gas Inventories. https://www.epa.gov/sites/default/files/2018-03/documents/emission-factors_mar_2018_0.pdf. Uses the global warming potentials from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) for methane and nitrous oxide.

methodologies depending on data availability, including use of odometer readings for buses or fuel use totals. Local bus operators provided the actual VMT for electric buses.

Emissions reductions were calculated as the difference between indirect emissions from electricity generation used for charging the buses and combustion emissions that would have otherwise occurred from fuel use of diesel-powered buses. The indirect emissions for electricity generation were calculated by multiplying the electricity emission factor by the E-BUS metered electricity use; while the avoided combustion emissions were calculated by multiplying the combustion emission factor by the VMT and applying appropriate unit conversion factors.

3 Results

As shown in Table 1, in 2022, the E-BUS Program avoided overall GHG emissions by 364.3 metric tons (MT) CO₂e when compared to tailpipe emissions from fuel that would have been consumed by fossil fueled buses for the equivalent amount of VMT.

Year 2022 marked the return of tourism and public transportation as the economy recovers following the shutdown during most of 2020 and partially 2021 due to the pandemic. Higher utilization of the participating buses drove significantly higher avoided GHG emissions in 2022 compared to the avoided emissions in 2021.

As more vehicles participate in the program and the economy drives higher utilization of the participating e-vehicles, coupled with more renewables that are incorporated into the grid, the GHG emissions reduction will be greater.

The E-BUS program also results in improved air quality and health benefits, even more so as more renewable energy is integrated into the electrical grid. Electric buses reduce local criteria air pollutant and diesel particulate matter emissions compared to buses with tailpipe emissions. These emissions would otherwise negatively impact local air quality and health.⁷

⁷ 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.

Table 1
Electric Bus Charging Emissions Reduction for 2022 for Oahu
Hawaiian Electric
Hawai'i, USA

Inputs:

Vehicle Type	Bus
Vehicle Fuel Replaced	Diesel
Location	Oahu
Year Evaluated	2022

Assumptions and Calculations:

Description	Mid-day	Peak	Off-Peak	Units
Electricity Emission Factor ¹	1,258	1,636	1,594	(lb CO ₂ e/MWh)
Electricity Use for Charging Stations ²	192,064	22,983	681,231	(kWh/year)
Fuel Economy of Fossil Fuel-Powered Vehicle ³	4.20			(mile/fuel gallon equivalent)
Emissions from burning fuel ^{4,5}	22.5			(lb CO ₂ e/fuel gallon equivalent)
Annual VMT Reduction All Stations (based on E-BUS data) ⁶	403,425			(miles)
Fossil Fuel-Powered Vehicle Combustion Emissions	2,438			(grams CO ₂ e/mile)

Emissions Reductions Calculations:

Time-of-use	Mid-day	Peak	Off-Peak	Units
Emissions Reduction for Electric Vehicle Replacing Fossil Fuel-Powered Vehicle ⁷	983.5			(MT CO ₂ e)
Emissions Increase from Electricity Used for Charging ⁷	109.6	17.1	492.5	(MT CO ₂ e)
Net Emissions Reduction⁷	364.3			(MT CO₂e)

Notes:

- 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 2022.
- The electricity usage takes actual billed kWh from Hawaiian Electric.
- Average between CNG bus fuel economy (in mpdge) from National Renewable Energy Laboratory (NREL). 2018. Foothill Transit Agency Battery Electric Bus Progress Report, Page 13. Available at: <https://www.nrel.gov/docs/fy18osti/71292.pdf>; and diesel bus fuel economy from NREL. 2016. Fuel Cell Buses in US Transit Fleets, Table 7. Available at: <https://www.nrel.gov/docs/fy17osti/67097.pdf>.
- U.S. Energy Information Administration (eia). Carbon Dioxide Emissions Coefficients. 2022. Retrieved from: https://www.eia.gov/environment/emissions/co2_vol_mass.php
- Methane and nitrous oxide emissions for heavy-duty vehicles from 2008-present from U.S. Environmental Protection Agency (EPA). 2018. Emission Factors for Greenhouse Gas Inventories. https://www.epa.gov/sites/default/files/2018-03/documents/emission-factors_mar_2018_0.pdf
- Annual VMT reduction is based on actual E-BUS usage for the three (3) participating JTB buses and seventeen (17) Oahu Transit Services (OTS) buses for the duration enrolled during the reporting year.
- 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:

CO₂e - Carbon Dioxide Equivalent
 EF - Emission Factors
 GHG - greenhouse gas
 kWh - kilowatt-hour

lb - pound
 mpdge - miles per diesel gallon equivalent
 MT - metric tons
 MWh - megawatt-hour
 VMT - vehicles miles traveled

APPENDIX B
E-BUS Customer Experience Survey

E-Bus Tariff and Make-Ready Customer Experience Survey

Thank you for taking time to complete this survey. Your valuable feedback helps us understand the growing needs of our customers.

Customer Type

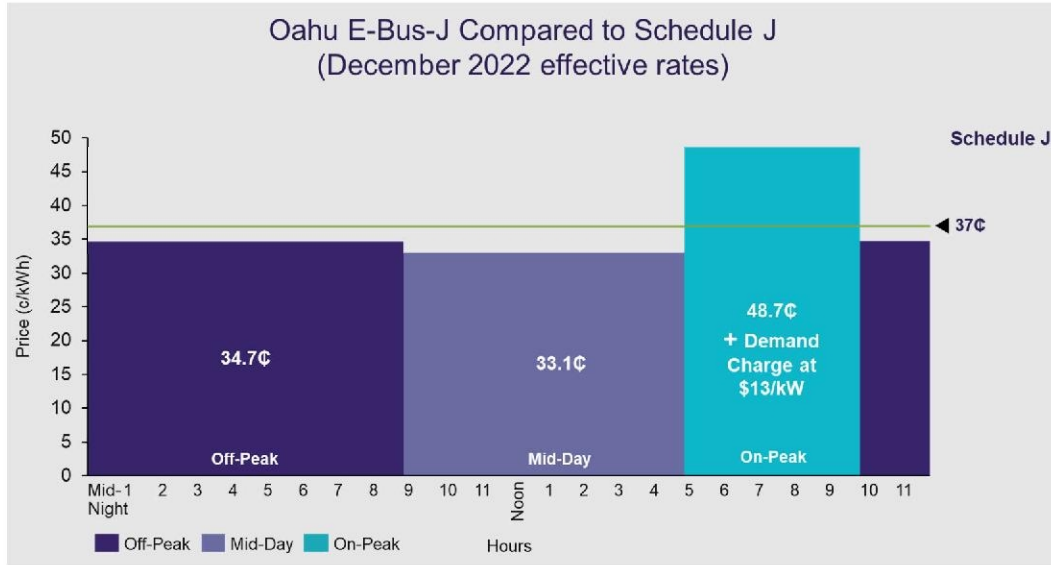
1. Who do your buses provide transportation for (select all that apply)?
 - Visitors
 - Commuters
 - Students/youth (under the age of 18)
 - Low-income residents
 - Elderly
 - Disabled
 - Other: [text box]

2. Approximately how many passengers per year do you serve?

E-Bus Rate

3. Please select one of the following:
 - Our organization is currently enrolled in Hawaiian Electric's E-Bus rate (skip questions #4, 8, 12)
 - Our organization is not enrolled in Hawaiian Electric's E-Bus rate (skip questions #7, 9, 11, 14-16)
 - I do not know if our organization is enrolled in Hawaiian Electric's E-bus rate (skip questions #7, 9, 11, 14-16)

Hawaiian Electric Company's E-Bus rates provide discounted rates and no demand charges for bus charging in the Mid-Day (9:00 AM – 5:00 PM) and Off-Peak periods (10:00 PM – 9:00 AM next day). Under these pilot rates, bus charging must be separately metered on a premise where there is also a "host" meter on Schedule J or Schedule P. Demand that occurs during the On-Peak period (5 PM -10 PM) and exceeds the maximum demand on the host meter will be subject to demand charges (e.g., \$13/kW on E-Bus-J).



4. Are you aware of Hawaiian Electric Company's E-Bus rate described above?

- Yes, I am aware (skip questions #7, 9, 11, 14-16)
- No, I am not aware (skip questions #5, 6, 7, 9, 11, 14-16)

5. How did you find out about the E-bus rate?

- Email
- Webinar
- Website
- Vendor or contractor
- Other: [text box]

6. How well do you feel you understand the E-Bus rate?

1 2 3 4 5
 No Knowledge Limited Moderate Above Average Well Understood

7. To what degree do you feel you are benefiting from energy cost savings under the E-Bus rate?

1 2 3 4 5
 No Savings Minimal Moderate Substantial Significant

8. What impact would minimizing charging during the peak period (5 PM – 10 PM) have on your operations?

1	2	3	4	5
Significant	Substantial	Moderate	Minimal	None

9. What impact does minimizing charging during the peak period (5 PM – 10 PM) have on your operations?

1	2	3	4	5
Significant	Substantial	Moderate	Minimal	None

10. How likely would you be to enroll future charging facilities in the E-Bus rate if it's available?

1	2	3	4	5
Highly Unlikely	Somewhat Unlikely	Uncertain	Somewhat Likely	Highly Likely

11. Under the E-Bus rate, there are no demand charges in the mid-day (9 AM – 5 PM) and off-peak (10 PM – 9 AM the next day) periods. If the demand charges were reinstated (e.g., \$13/kW) throughout the day, but the discounted mid-day and off-peak energy rates continued, how likely would you be to stay on the rate?

1	2	3	4	5
Highly Unlikely	Somewhat Unlikely	Uncertain	Somewhat Likely	Highly Likely

12. Under the E-Bus rate, there are no demand charges in the mid-day (9:00 AM – 5:00 PM) and off-peak periods (10:00 PM – 9:00 AM next day). If instead, the demand charges were reinstated (e.g., \$13/kW) throughout the day, but the discounted mid-day and off-peak energy rates continued, how likely would you be to enroll in the rate?

1	2	3	4	5
Highly Unlikely	Somewhat Unlikely	Uncertain	Somewhat Likely	Highly Likely

13. To what degree will having a rate like the E-Bus rate influence your organization's decision to purchase electric buses in the future?

1	2	3	4	5
No Influence	Minimal Influence	Moderate Influence	Substantial Influence	Significant Influence

14. How likely would you be to recommend the E-Bus rate to other bus operators?

- 1
Highly Unlikely
- 2
Somewhat Unlikely
- 3
Uncertain
- 4
Somewhat Likely
- 5
Highly Likely

15. Rate your overall satisfaction with the E-Bus rate

- 1
Very Dissatisfied
- 2
Somewhat Dissatisfied
- 3
Neutral
- 4
Somewhat Satisfied
- 5
Highly Satisfied

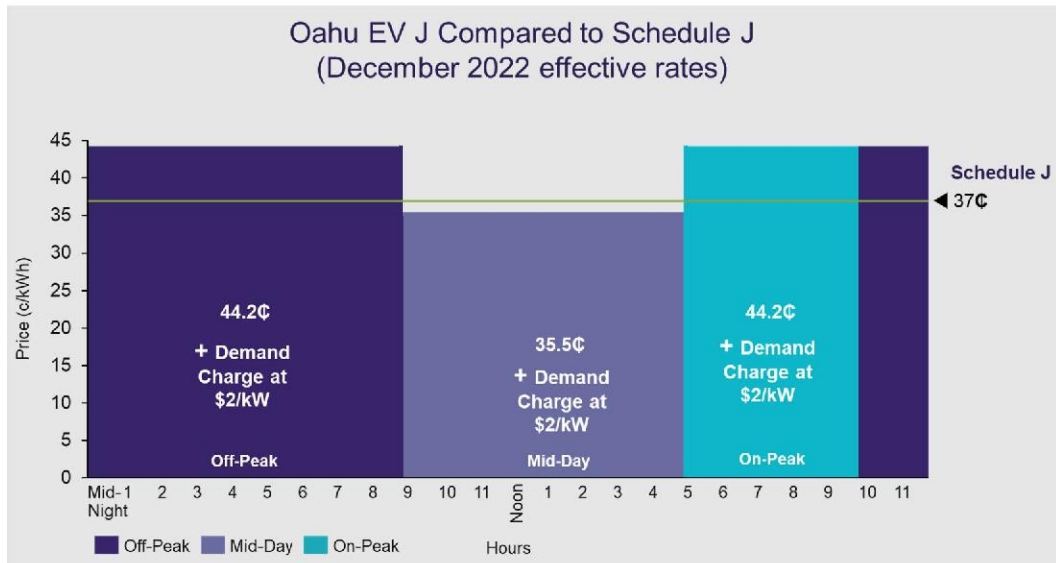
16. Compared to fueling your existing non-electric fleet, how much more convenient/inconvenient is it to fuel your electric fleet?

- 1
Very Inconvenient
- 2
Somewhat Inconvenient
- 3
Same
- 4
Somewhat Convenient
- 5
Very Convenient

17. Please provide any additional feedback on your experience with the E-Bus rate.

Commercial EV Rate

Unlike the E-Bus rates, the new Commercial EV rates do not require a separate “host” meter. They offer low energy charges during the mid-day period between 9 AM – 5 PM and low demand charges (e.g., \$2/kW on Schedule EV-J) throughout the day.



18. How well do you feel you understand the Commercial EV rate?

1	2	3	4	5
No Knowledge	Limited	Moderate	Above Average	Well Understood

19. What is the likelihood you would enroll in a commercial EV rate?

1	2	3	4	5
Highly Unlikely	Somewhat Unlikely	Uncertain	Somewhat Likely	Highly Likely

20. If the rates were the same regardless of the time of day, what hours of the day would you charge electric buses based on your operational needs?

Make Ready

In 2022, Hawaiian Electric launched *Charge Up eBus*, which is a make-ready infrastructure pilot program. As part of this pilot, Hawaiian Electric designs, installs and maintains charging infrastructure up to the point of connection with the customer's charging equipment (as shown below). Charge up eBus provides infrastructure for Level 2 (120V/240V) and/or DC fast charging (277V/480V).



21. Are you aware of the Charge Up eBus Pilots?

- Yes, I am aware
- No, I am not aware (skip question #22)

22. How did you find out about the pilot program?

- Email
- Webinar
- Website
- Vendor or contractor
- Other: _____

23. Is your organization planning to apply for Charge Up eBus Pilot?

- Yes, we applied (skip question 24)
- Yes, we are planning to apply (skip question 24)
- No, but I'd like to receive more information
- No, we are not planning to apply
- Unsure

24. If you are not planning to apply or are unsure, please share why your organization has not applied to Charge Up eBus (select all that apply):

- Not aware of the pilot program
- Pilot program schedule does not align with organization's plans
- Pilot program scope does not align with the organization's plans
- Number of charging ports supported by the pilot is too few.
- We will not be acquiring an eligible Class 5-8 eBus(es)
- We will not be installing eligible networked charging equipment at our facility
- Our facility does not have an existing Schedule J or P electric service
- E-Bus or Commercial EV rates are not a good fit for our operations
- Other: _____

If you applied to Charge Up eBus, please indicate your level of agreement with the following statements:

25. Communication, materials, and/or website helped me understand the pilot program.

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

26. The application was easy to complete.

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

27. I would recommend the Charge Up eBus Pilot to others.

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

Existing Bus Fleet

28. “What was your average cost per gallon for diesel in 2022?”

\$ _____ /gallon

29. How many different types of non-electric buses do you currently operate?

Bus Type	Number of buses	Fuel Type (e.g., diesel, hybrid)	Average annual mileage per bus	Average years in service before replacement

30. How many different types of battery electric buses does your organization currently operate?

	eBus Model 1	eBus Model 2	eBus Model 3
Bus Type (e.g., 40’ transit)			
Number of electric buses			
Number of passenger seats per bus			
Average annual mileage per bus			
Average number of days per month in operation			
Vehicle Battery Size (kW)			
Are the buses registered in Hawaii? (Yes/No)			
Date the bus started operation (mm/yyyy)			
How many are test/demonstration electric buses?			
If applicable, what is the expected end date for the test/demonstration? (mm/yyyy)			

31. How many non-electric vehicles were retired/replaced by electric buses in 2022?

Type (e.g., 40' transit)	Number of Buses Retired

Future Bus Fleet Plans

32. Indicate the type (e.g., 40' coach, 60' articulated, etc.) and number of new electric buses that you anticipate adding to your fleet in the next few years.

Type (e.g., 40' transit)	Number of Buses	Year In Service (YYYY)

33. Where are you planning to install charging in the next few years?

Charging Location (Address)	Type of Charging (e.g., Level 2, DCFC, pantograph)	Total Charging Load (kW)	Year In Service (YYYY)

34. Please provide any additional feedback on how our company can further assist with the transition to electric buses.

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