Solar PV Battery Installations in Honolulu
2025 Update

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STATE OF HAWAI'I • DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

RESEARCH AND ECONOMIC ANALYSIS DIVISION

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

STATE OF HAWAII

This report provides an update of the status of solar photovoltaic (PV) battery installations in Honolulu County. The report was first published in 2018 to enhance our understanding of battery installation activities on Oahu and has been updated annually. This 2025 update report was prepared by Xiufu Shuai, Research Statistician under the direction of Yang-Seon Kim, Research and Statistics Officer.

Statistics in this report were calculated based on building permit data from the Department of Planning and Permitting (DPP), City and County of Honolulu. Building permits for solar PV and battery installation were identified based on the type of work reported in the permit applications.[1]

[1] Battery installation was not explicitly indicated in permit application until 2017, so it had to be identified based on job description. Since 2017, the building permit application offers two types of PV related projects to choose: "Solar PV Installation Only (no battery)" and "Solar PV Installation w/ Battery Storage", making it easier to tell if the PV project included a battery storage or not.

Residential PV and battery installation

Trends

Solar PV installation on Oahu started to increase gradually since 2008 and boomed in 2012 and 2013 with about 28,000 PV systems installed in this two-year period alone. However, installing battery storage together with PV system was very rare until 2017. Although the first building permit for residential PV battery installation was issued in February 2008, the number of cases installing battery storage with PV was no more than ten per year until 2015.

Battery-connected PV systems became more attractive since October 2015 when the State Public Utilities Commission closed the net-metering program and reduced compensation for excess solar power exported to the grid. This policy shift rendered battery-paired systems significantly more attractive. As a result, 2017 marked a turning point, with 731 permits issued for PV installation with battery storage in that year. This figure doubled in 2018 and again in 2019, before growth moderated.

Adoption of the battery system accelerated again between 2021 and 2023, supported by the state's Battery Bonus Program, which provided incentives for battery installation from July 2021 through December 2023. Permits for PV systems with battery storage reached 6,830 in 2023, the highest level on record. Following the program's expiration, participation declined in 2024. However, the anticipated expiration of the federal investment tax credit (ITC) for residential solar and battery systems on December 31, 2025, prompted a renewed surge in installations. In 2025, a total of 5,938 permits were issued for PV plus battery installation — an increase of 24.1% from 2024, though still 13.1% below the 2023 peak.

Table 1 summarizes the total numbers of residential building permits issued for PV and/or battery installation for the period 2017-2025. As shown in Table 1 and Figure 1, battery integration has become the standard for new residential solar projects. PV plus battery permits represented 26.8% of total residential PV permits in 2017, rising to 62.7% in 2018 and exceeding 90% by 2022. The share remained high at 92.4% in 2025.

In addition to combined PV-and-battery installations, a small number of permits were issued for standalone battery system ("battery only" henceforth), presumably additions of a battery to the existing solar PV system. Between 2017 and 2025, a total of 816 battery-only permits were issued, accounting for just 2.3% of all battery-related permits during the period.

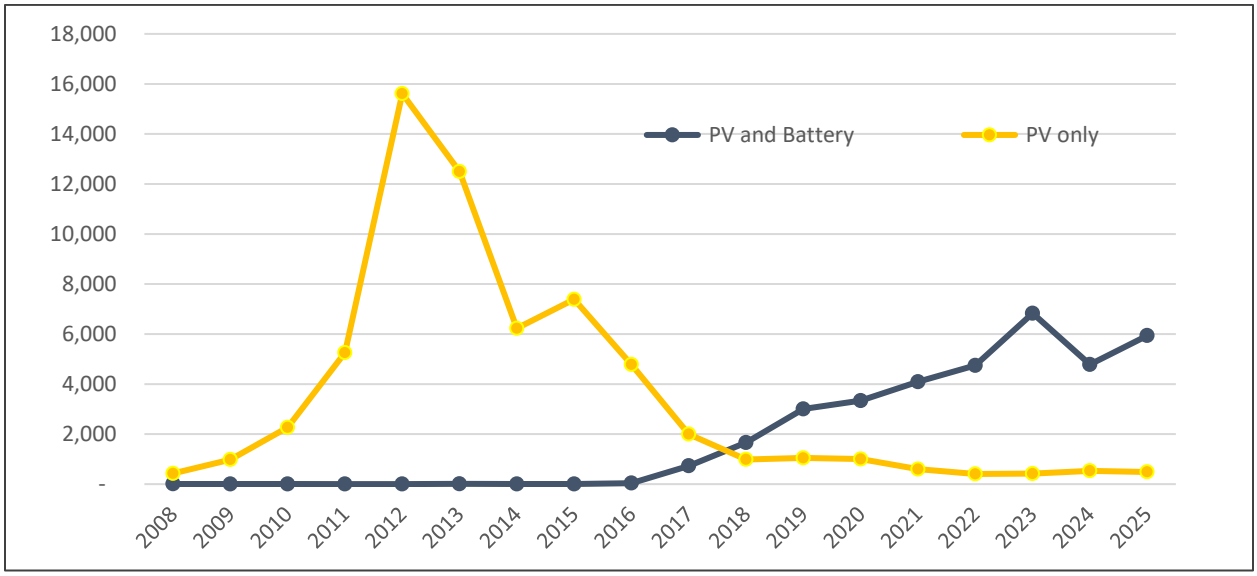
Table 1 also presents the average and median permit values for solar PV and battery installation for the period 2017-2025. Despite substantial growth in the number of solar and battery systems over the period, average and median project costs have remained relatively stable, exhibiting periodic fluctuations rather than a sustained upward trend consistent with general inflation.

Table 1. Building permits issued for residential PV and battery installation, 2017-2025 [1]

Year	PV plus battery (number)	PV plus battery (average value[2])	PV plus battery (median value[2])	Battery only (number)	Battery only (average value[2])	Battery only (median value[2])	PV only (number)	PV only (average value[2])	PV only (median value[2])
2017	731	29,475	27,552	33	12,799	12,400	1,996	24,407	23,000
2018	1,659	34,995	32,000	21	7,971	8,000	985	23,045	22,000
2019	3,003	35,491	31,000	11	7,773	7,000	1,046	18,744	15,633
2020	3,336	30,987	28,000	39	6,788	4,000	1,003	18,737	15,000
2021	4,092	31,708	29,000	120	15,506	14,000	599	19,045	15,000
2022	4,743	34,351	30,000	4	9,750	11,500	406	19,220	16,250
2023	6,830	31,996	28,000	87	11,084	10,500	419	16,897	13,000
2024	4,783	35,590	31,500	315	12,330	11,500	532	14,203	12,000
2025	5,938	37,670	35,500	186	14,776	11,500	491	17,604	15,000

[1] Permits that were cancelled or revoked after being issued were excluded.
[2] Average and median values were calculated based on "accepted value" indicated in the building permit. PV/battery permits that were combined with other types of building work were excluded from calculating the average or median permit values because the PV related cost could not be separated from other costs.

Figures 1. Trend of residential PV installation with or without a battery, 2008-2025
(Number of PV permits issued)



Residential PV and battery installation in 2025: Cost of installation

The average cost of installing a PV-plus-battery system in 2025 was $37,670, representing 5.8% increase from the 2024 average of $35,590. Approximately one-quarter of the PV-plus-battery projects issued in 2025 fell within the $30,000 and $40,000 range, while another quarter exceeded $40,000. The median project cost of PV-plus-battery installation was $35,500, about $2,000 lower than the average cost.

The average permit value for installing battery-only and PV-only in 2025 were $14,776 and $17,604, respectively, both less than half the average cost of combined PV-plus-battery systems.

Table 2. Cost of residential PV and battery installation in 2025 [1]

Value	PV plus battery	Battery only	PV only
< $5,000	11 (0.2%)	5 (2.7%)	20 (4.2%)
$5000 - $10,000	64 (1.3%)	19 (10.3%)	92 (19.2%)
$10,000 - $20,000	702 (14.4%)	117 (63.2%)	204 (42.6%)
$20,000 - $30,000	1,468 (30.0%)	37 (20.0%)	111 (23.2%)
$30,000 - $40,000	1,303 (26.7%)	5 (2.7%)	35 (7.3%)
> $40,000	1,339 (27.4%)	2 (1.1%)	17 (3.5%)
Total	4,887 (100%)	185 (100%)	479 (100%)
Average value	$37,670	$14,776	$17,604
Median value	$35,500	$11,500	$15,000

[1] Average and median values were calculated based on "accepted value" reported in the building permit. PV/battery permits that were combined with other types of building work were excluded from calculations because the PV related cost could not be separated from other costs.

Residential PV and battery installation in 2025 by month

The monthly number of building permits issued for residential PV and battery installations rose sharply in late 2025, with the final four months accounting for 46% of the annual total. This surge was driven by homeowners rushing installations ahead of the expiration of the federal investment tax credit on December 31, 2025. The expiration date was established under the "One Big Beautiful Bill," signed into law on July 4, 2025, which set a firm deadline for residential solar and battery storage credits. To qualify, systems had to be installed by December 31, 2025.

Table 3. Permits issued for residential PV and battery installation in 2025 by month (number)

Permit Type	2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PV plus battery	5,938	321	385	464	396	377	386	433	428	700	915	556	577
Battery only	186	17	14	14	4	13	6	12	6	32	24	24	20
PV only	491	27	26	37	27	42	26	33	45	48	77	35	68

Residential PV and battery installation by neighborhood

The numbers of building permits issued for PV battery installation are presented by neighborhood in Table 4 and Table 5. In 2025, the Ewa area recorded the highest level of activity, with 658 permits issued for PV-plus-battery installation. Other areas with strong adoption of PV-plus-battery in 2025 included Waipahu (537), Kailua (470), and Mililani–Waipi‘o–Melemanu (349).

Table 4. Permits issued for residential PV and battery installation in 2025 by neighborhood

Neighborhood Name	PV plus battery	Battery Only	PV only
Aiea	276	12	20
Ala Moana-Kakaako	1	0	0
Aliamanu-Salt Lake-Foster Village-Airport	143	1	11
Diamond Head-Kapahulu-St Louis Ht.	107	5	4
Downtown-Chinatown	1	0	0
Ewa	658	15	38
Hawaii Kai	309	12	36
Kahaluu	87	7	10
Kailua	470	16	53
Kaimuki	153	10	16
Kalihi Valley	101	0	3
Kalihi-Palama	106	0	1
Kaneohe	322	10	25
Koolauloa	70	2	3
Kuliouou-Kalani Iki	167	12	25
Liliha-Kapalama	157	4	12
Makakilo-Kapolei-Honokai Hale	255	12	18
Makiki-Lower Punchbowl-Tantalus	39	1	4
Manoa	130	11	30
Mccully-Moiliili	16	0	1
Mililani Mauka-Launani Valley	130	11	18
Mililani-Waipio-Melemanu	349	7	36
Moanalua	74	2	7
Nanakuli-Maili	138	3	8
North Shore	106	1	7
Nuuanu-Punchbowl	91	6	13
Palolo	62	5	3
Pearl City	309	4	24
Wahiawa	188	4	9
Waialae-Kahala	114	9	18
Waianae	163	1	10
Waimanalo	41	0	5
Waipahu	537	3	23

Source: DBEDT calculation using the neighborhoods defined by City and County of Honolulu.

The cumulative data since 2017 shows a similar geographic concentration. Over the nine-year period from 2017 to 2025, the Ewa area recorded nearly 5,000 permits for battery installations (including both "PV-plus-battery" and "battery-only" categories), while nearly 3,000 permits were issued for battery installation in Waipahu and Kailua each.

Table 5. Permits issued for residential PV and battery installation by neighborhood
: Cumulative number between 2017 and 2025

Neighborhood Name	PV plus battery	Battery Only	PV only
Aiea	1,497	48	357
Ala Moana-Kakaako	13	1	8
Aliamanu-Salt Lake-Foster Village-Airport	716	12	155
Diamond Head-Kapahulu-St Louis Ht.	653	12	166
Downtown-Chinatown	4	0	1
Ewa	4,703	69	693
Hawaii Kai	1,693	77	414
Kahaluu	499	16	88
Kailua	2,612	75	676
Kaimuki	938	38	297
Kalihi Valley	423	3	67
Kalihi-Palama	351	2	54
Kaneohe	1,772	42	382
Koolauloa	524	8	90
Kuliouou-Kalani Iki	1,282	48	300
Liliha-Kapalama	678	20	207
Makakilo-Kapolei-Honokai Hale	2,084	41	418
Makiki-Lower Punchbowl-Tantalus	250	11	67
Manoa	829	43	246
Mccully-Moiliili	77	0	26
Mililani Mauka-Launani Valley	809	27	225
Mililani-Waipio-Melemanu	1,720	29	407
Moanalua	346	9	84
Mokapu	4	0	0
Nanakuli-Maili	1,200	13	191
North Shore	557	11	145
Nuuanu-Punchbowl	560	22	119
Palolo	401	10	115
Pearl City	1,418	23	332
Wahiawa	708	15	101
Waialae-Kahala	647	29	184
Waianae	1,018	13	144
Waimanalo	257	3	69
Waipahu	2,876	33	452
Unidentified	996	13	197

Source: DBEDT calculation using the neighborhoods defined by City and County of Honolulu.

Commercial PV and battery installation

In 2025, a total of 76 permits were issued for commercial PV-plus-battery installations, with an average permit value of $115,891 and a median permit value of $45,012. The average was more than double the median reflecting the influence of numerous large-scale commercial projects. Even so, the 2025 average remained well below the unusually high averages observed in 2021 ($2,256,862) and 2024 ($906,461).

In addition, five permits were issued for commercial battery-only projects in 2025, with an average value of $457,877 and a median value of $352,186.

Table 6. Building permits issued for commercial PV and battery installation during 2017-2025

Year	PV plus battery (number)	PV plus battery (average value[1])	PV plus battery (median Value[1])	Battery only (number)	Battery only (average value[1])	Battery only (median value[1])	PV only (number)	PV only (average value[1])	PV only (median value[1])
2017	7	44,443	26,000	2	4,750	4,750	199	174,537	53,550
2018	49	89,360	42,500	1	12,400	12,400	113	486,727	85,675
2019	69	39,753	37,029	1	20,000	20,000	109	1,139,891	75,000
2020	56	230,613	35,000	3	4,000	4,000	94	424,723	188,824
2021	40	2,256,862	38,480	2	8,000	8,000	49	152,296	45,000
2022	30	97,382	42,460	42	656,250	656,250	47	164,068	80,384
2023	35	50,247	46,185	1	442,999	442,999	111	336,846	129,326
2024	84	906,461	41,000	5	20,840	22,000	127	334,181	133,075
2025	76	115,891	45,012	5	457,877	352,186	82	407,727	88,000

[1] Average and median values were calculated based on "accepted value" reported in the building permit. PV/battery permits that were combined with other types of building work were excluded from calculations because the PV related cost could not be separated from other costs.

Table 7. Permits issued for commercial PV and battery installation in 2025 by month

Permit type	2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PV plus battery	76	8	4	2	5	9	11	18	1	3	3	1	11
Battery only	5	0	0	0	1	2	0	2	0	0	0	0	0
PV only	82	3	10	1	20	1	13	7	1	3	13	7	3