



**Hawaiian Electric
Maui Electric
Hawai'i Electric Light**

Hawaiian Electric Company
P.O. Box 2750 • Honolulu, Hawai'i 96840-0001
Maui Electric Company
P.O. Box 398 • Kahului, Hawai'i 96732-0001
Hawai'i Electric Light Company
P.O. Box 1027 • Hilo, Hawai'i 96721-0001



12/2013



GUIDE TO NET ENERGY METERING



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Welcome to Net Energy Metering

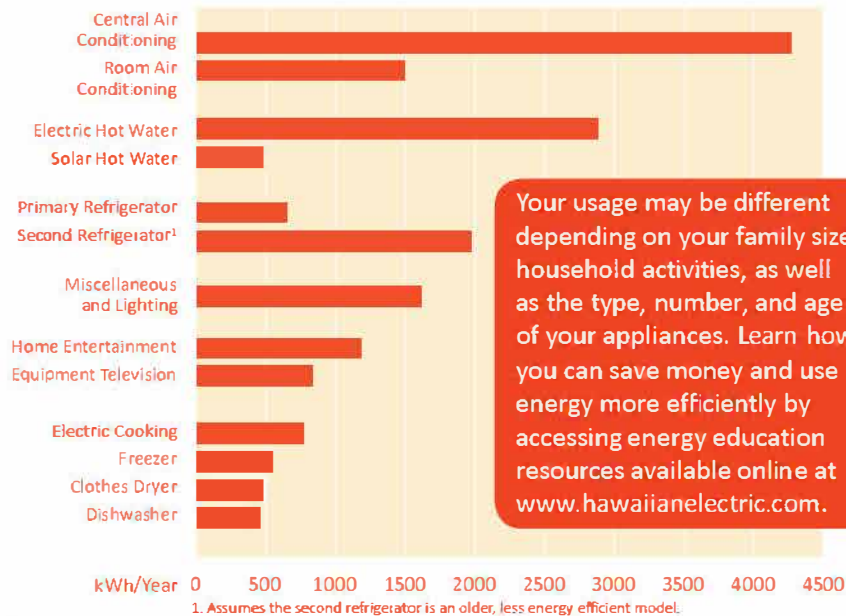
As a Net Energy Metering customer, you are helping Hawai'i reach its clean energy goals. Your photovoltaic system should have been sized to offset a portion or all of your typical electricity use. As you continue to manage your household or facility's energy use, it is important to practice good energy conservation habits and understand factors that can impact the amount of electricity you produce and consume. Factors that can impact your energy consumption and bill include:

WEATHER AND SEASONAL CONDITIONS

During summer months when there are longer hours of sunlight, your PV system will likely generate more electricity compared to the winter months which tend to have overcast conditions and shorter daylight hours. Seasonal use of appliances or equipment, such as air conditioners, can also impact your electricity consumption.

USE OF APPLIANCES

The graph below shows annual energy use for a typical family of four and illustrates which items use the most energy and cost the most to operate. Most electricity is used for air conditioning, water heating, refrigeration, lighting, and home entertainment equipment. Concentrating on conserving energy for these uses first will yield the largest savings reward for your effort.



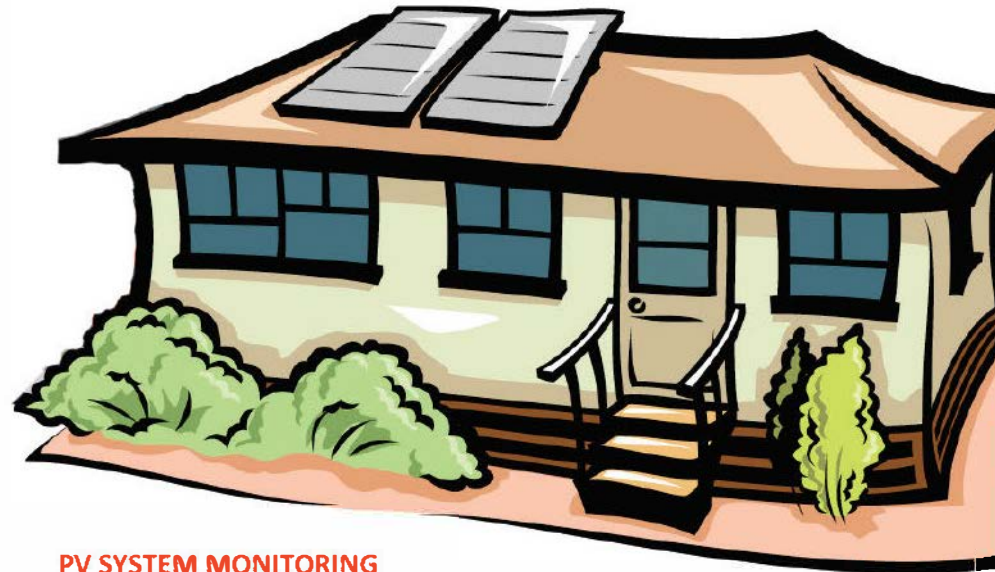
Your usage may be different depending on your family size, household activities, as well as the type, number, and age of your appliances. Learn how you can save money and use energy more efficiently by accessing energy education resources available online at www.hawaiianelectric.com.

Monitoring and Maintenance

PV systems, like any major appliance or equipment, require maintenance. Maintenance of your PV system's components is your responsibility or, in some cases, the responsibility of the PV contractor you hired. General maintenance is needed for the inverters, solar modules (panels), and wiring up to the utility meter.

Periodic cleaning of the panel surfaces and checking of the operating systems will help to ensure that your system functions efficiently. Many contractors provide maintenance plans and services.

Your electric utility (Hawaiian Electric, Maui Electric, or Hawai'i Electric Light Company) is responsible for the utility meter and the wiring leading up to the weatherhead for delivering electricity to and from your house or facility.



PV SYSTEM MONITORING

Many solar systems come with a monitor or web portal to track your energy production. By monitoring the system's performance, you can ensure that it is working efficiently and keep track of how much energy is being produced. Your monitor will show more energy generated by your PV system than received by the utility NEM meter because energy you generate powers your electrical appliances and equipment first.

Consult your solar contractor to learn more about PV system monitoring and maintenance.

Understanding Net Energy Metering

NEM is a simple way to connect renewable energy systems¹ up to 100 kilowatts to the grid to offset part or all of your electricity purchases. With NEM, excess energy produced by your PV system and not immediately used by your household/facility is sent to the electric grid and credited to your account. The utility's grid backs up your PV system to ensure you are provided with electricity at night or on days when your use exceeds the amount produced by your PV system. When electricity is purchased by you from the electric utility, your NEM credit will be applied toward eligible energy charges.

1. Renewable energy systems eligible for NEM include solar, wind, biomass or hydro, or a hybrid system consisting of two or more of these systems.

Electric water heaters use a lot of electricity. You can decrease your energy consumption by washing clothes with cold water and taking shorter showers. Replacing your electric water heater with a solar water heater can be a smart, energy-saving investment.

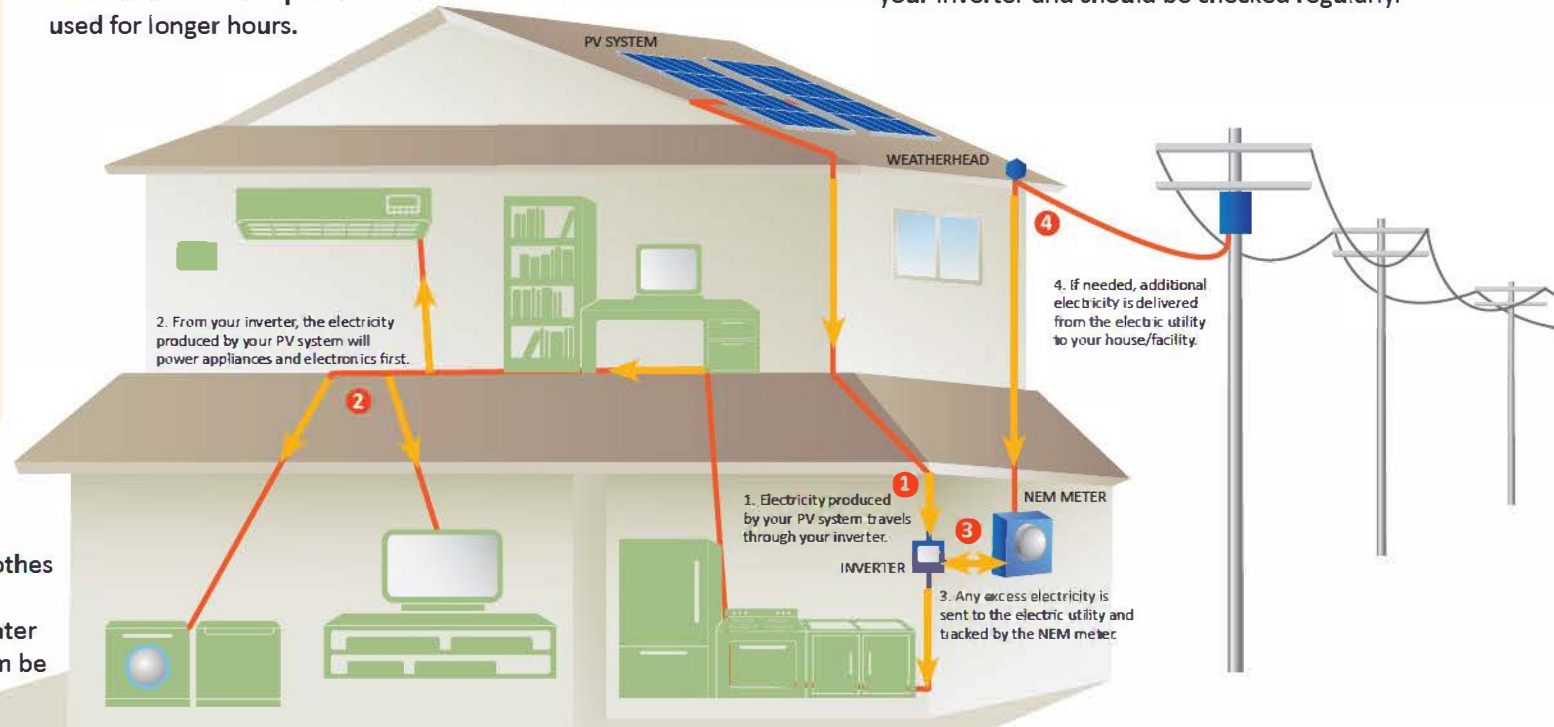


Cooling appliances or equipment such as refrigerators and air conditioners use a lot of electricity. Energy use will increase when they are set at cooler temperatures or used for longer hours.

Weather conditions such as cloud cover can impact the amount of solar energy your PV system is able to produce. On overcast days your PV system will produce less energy than on clear and sunny days.



During the day, energy from the sun is captured by PV panels usually on the roof of your house/facility. Energy produced by your PV system is tracked by your inverter and should be checked regularly.



If your PV system produces more electricity than you need at the time, the excess is sent to the electric grid and recorded by your NEM meter. The meter can only register electricity that passes through the metering point. For example, if your PV system produces 1 kW of electricity and your refrigerator uses 1 kW of electricity, no electricity will pass through the metering point.

How to Read Your NEM Meter

A net meter is a bi-directional meter that registers the amount of electricity flowing to and from your house/facility. The flow of electricity is tracked by three ID display codes (03, 33, 23) on the NEM meter. The difference between the energy DELIVERED to you (display 03) and the energy RECEIVED from you (display 33) is the NET amount (display 23).

- ID 03:** Energy DELIVERED to your house/facility from the electric utility
- ID 33:** Excess energy RECEIVED by the electric utility from your PV system
- ID 23:** Net Energy

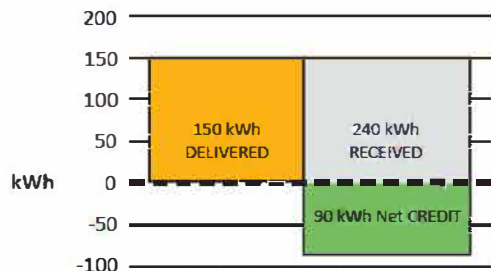
The following examples show how a NEM meter display might look:

Example 1:
The electric utility RECEIVED MORE energy than it DELIVERED to you.



150 kWh DELIVERED - 240 kWh RECEIVED = 90 kWh Net CREDITED

The bar chart below illustrates this example:



Since your NEM meter cannot display negative numbers, -90 kWh may be displayed as 99910 (100000 - 90).

It is important to note that the **CURRENT READING** numbers noted on your bill are cumulative. Thus, to track the actual amounts of energy RECEIVED by the utility company (REC KWH) and DELIVERED to you (DEL KWH) over each month, you will need to subtract the **PREVIOUS READING** from the **CURRENT READING**. Only the **NET KWH** reading may increase and decrease from month to month. This is shown on your bill in the **BILL PERIOD** section:

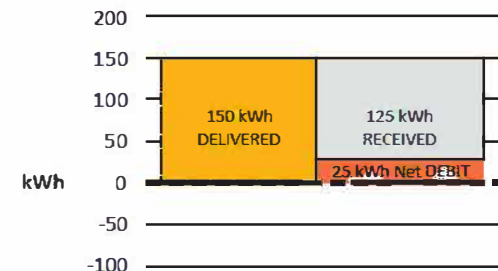
REGISTER	CURRENT READING	PREVIOUS READING	USAGE
NET KWH	160.00	67.00	93.00
DEL KWH	3,145.00	2,668.00	477.00
REC KWH	2,985.00	2,601.00	384.00

Example 2:
The electric utility RECEIVED LESS energy than it DELIVERED to you.



150 kWh DELIVERED - 125 kWh RECEIVED = 25 kWh Net DEBITED

The bar chart below illustrates this example:



After your NEM meter has been installed, you may accumulate credit for excess energy produced by your PV system and received by the electric utility on a monthly basis. This credit will be automatically applied to monthly bills within the 12-month period when the amount of electricity you purchase exceeds the Minimum Charge.

Energy Production and Energy Use

You can estimate your household or facility's total energy consumption by recording your PV system's output and the utility meter readings over the same time period. Then, follow this formula below:

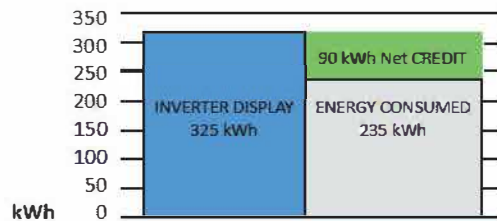
$$\text{Net Energy} + \text{Total Energy Produced} = \text{Total Energy Consumed}$$

Example 1:

Your PV system **PRODUCED MORE** energy than you **CONSUMED**.

NET ENERGY (DISPLAY 23)	+	TOTAL ENERGY PRODUCED (ON INVERTER)	=	TOTAL ENERGY CONSUMED
-90 kWh	+	325 kWh	=	235 kWh

Your PV system produced 325 kWh and your house/facility only needed 235 kWh. Thus, the excess 90 kWh will be credited to you for future use.

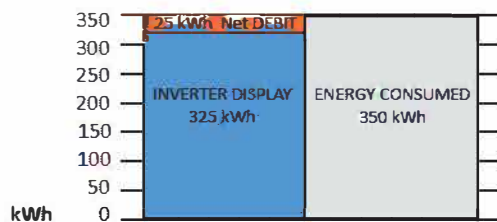


Example 2:

Your PV system **PRODUCED LESS** energy than you **CONSUMED**.

NET ENERGY (DISPLAY 23)	+	TOTAL ENERGY PRODUCED (ON INVERTER)	=	TOTAL ENERGY CONSUMED
25 kWh	+	325 kWh	=	350 kWh

Your PV system produced 325 kWh but your house/facility needed 350 kWh. Thus, the additional 25 kWh was purchased from the electric utility.



Energy Basics

To better understand how these numbers relate to your energy consumption, below are common energy terms:

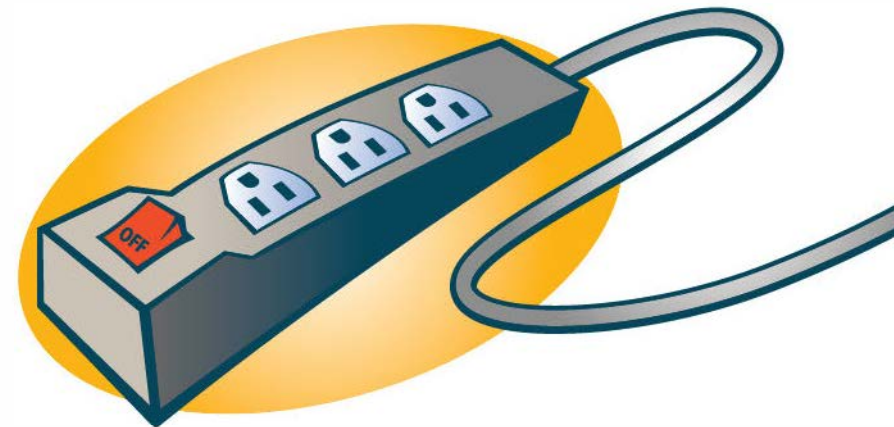
Watts: A watt is the standard unit of measurement for electrical power. For example, if a compact fluorescent light bulb with a power rating of 24 W is turned on for one hour, the energy used is 24 watt-hours.

Kilowatts: A kilowatt is equivalent to 1,000 W. Since we use large amounts of electricity at one time, electricity is often described in terms of kW.

$$1 \text{ kW} = 1,000 \text{ W}$$

Kilowatt-Hours: The number of kW used in one hour. This unit of measurement is shown on your NEM meter as kWh.

Kilowatt-Hours Per Day: The average number of kWh purchased from the electric utility per day during the billing period. This is calculated by dividing the total kWh by the number of days in the billing period and will appear on your billing statement as kWh/day.



Understanding Your NEM Bill

Understanding how to read your electric bill will help you to manage your electricity use every month. Various sections of a sample bill are explained on the following pages.

HOW YOU ARE BILLED: NEM customers are either charged a Minimum Charge or a non-energy Customer Charge plus the net energy consumed from the electric utility. During your 12-month NEM billing cycle, NEM credit will be applied toward eligible charges that exceed the Minimum Charge in a given month.

ELEMENTS OF YOUR BILL

ACCOUNT SUMMARY: This section shows the electric service billing period for the current bill and summarizes what is owed.

ACCOUNT SUMMARY		
(See Bill Detail section for more information)		
Service Period	09/17/2013 -	10/17/2013
Previous Balance	\$17.00	
Payments	+ \$17.00-	
OUTSTANDING BALANCE		\$ 0.00
Current Charges	\$17.00	
Adjustments	+ \$ 0.00	
Current Charges		\$17.00
TOTAL AMOUNT DUE 11/09/2013		\$17.00

BILL PERIOD: This section provides information related to your energy use as recorded by your NEM meter for the Service Period noted on your bill.

BILL PERIOD						
R Residential Service Signed NEM Contract				FROM 09/17/13 TO 10/17/13 31 DAYS		
METER#	REGISTER	CURRENT READING	PREVIOUS READING	DIFFERENCE	MULTIPLIER	USAGE
MPX00009995	NET KWH	47.00	- 83.00	= 36.00	x 1	= -36.00
	DEL KWH	2,204.00	- 1,740.00	= 464.00	x 1	= 464.00
	REC KWH	2,157.00	- 1,657.00	= 500.00	x 1	= -500.00
	BILLING KWH	00.00				
	NET GENERATION	36.00				

Service Period: The dates you received electric service covered by the bill.

Previous Balance: The amount that was due in your previous statement.

Payments: The payment amount that was received by the electric utility toward paying your previous month's balance.

Outstanding Balance: If you paid your last statement in full, this amount should be \$0.00. However, if you missed a payment or were unable to pay your previous balance in full, the amount that you still owe will be noted here and added on to the TOTAL AMOUNT DUE for this billing period.

Current Charges: The cost for electric service that was provided to you on the days covered in the Service Period.

Adjustments: If you have any fees or credits that can be applied, those amounts will be noted here.

Total Amount Due: This is the total amount that you owe to the electric utility. A due date for this payment will be provided on your statement.



The Online Customer Service Center allows you to view your bill, set-up automatic bill payment, review billing and payment history, and update your account information. Set-up your Online Customer Service Account at www.hawaiianelectric.com.

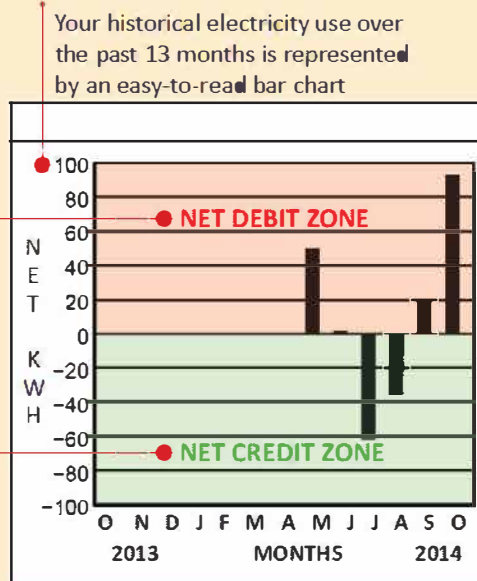
DEL KWH: Energy DELIVERED to your house/facility from the electric utility
- REC KWH: Excess energy RECEIVED by the electric utility from your PV system
NET KWH: The difference between energy DELIVERED and RECEIVED

Understanding Your NEM Bill

USAGE PROFILE: This section shows your electricity use history over the past year. When your net meter is installed, your historical data will only show the readings that have been displayed on your new NEM meter.

NET DEBIT ZONE: number of kWh the electric utility delivered to your house or facility in excess of what your PV panels produced. When the electric utility delivers more kWh to you than it receives, the net amount that you purchased will be recorded here.

NET CREDIT ZONE: number of kWh the electric utility received from your house or facility and issued to your account as full retail credit. When the electric utility receives more kWh from you than it delivers, the net amount that you earned as credit will be recorded here.



Your historical electricity use over the past 13 months is represented by an easy-to-read bar chart

DATE: The ending date of a billing period

DEL: The number of kWh delivered to your house or facility

AMOUNT: The total cost for the kWh delivered from the electric utility plus non-energy charges

KWH/DAY: Your average daily electricity use

USAGE PROFILE

ELECTRIC USAGE PROFILE FOR METER MPX00009995

DATE	NET	DEL	REC	AMOUNT	DAYS	KWH/DAY	\$/DAY
10/17/13	93	477	384	\$39.77	31	3.00	1.28
09/16/13	20	464	444	\$17.00	33	0.61	0.52
08/14/13	-36	464	500	\$17.00	29	-1.24	0.59
07/16/13	-62	474	536	\$17.00	31	-2.00	0.55
06/15/13	2	440	438	\$17.00	31	0.06	0.55
05/15/13 ¹	50	557	507	\$25.46	30	1.67	0.85
04/15/13	0	0	0	\$85.51	30	0.00	2.85
03/16/13	0	0	0	\$93.68	30	0.00	3.12
02/14/13	0	0	0	\$171.74	29	0.00	5.92
01/16/13	0	0	0	\$297.00	33	0.00	9.00
12/14/12	0	0	0	\$286.36	29	0.00	9.87
11/15/12	0	0	0	\$286.68	30	0.00	9.56
10/16/12	0	0	0	\$267.89	32	0.00	8.37

NET: The NET number of kWh consumed or generated

REC: The number of kWh received by the electric utility from your PV system

DAYS: Number of days in the billing period, usually ranging from 27-33 days

\$/DAY: Average daily cost for the amount of electricity you used in that period

1. As shown by the example above, a net meter installed in May began recording kWh data in that billing cycle and monthly data is collected from this moment in time going forward. The concept of Net Zero is to have your annual NET DEBIT equal your annual NET CREDIT.

Understanding Your NEM Bill

BILL DETAIL: This section breaks down your total bill by individual charges.

BILL DETAIL		
DESCRIPTION	AMOUNT	TOTALS
PREVIOUS BALANCE	\$17.00	
Incoming Payment on 09/26/2013 - Thank You	\$17.00	
Outstanding Balance		\$0.00
CURRENT CHARGES		
Electric Service Residential Service Signed NEM Contract		
Customer Charge	\$9.00	
* Base Fuel Energy	\$12.65	
Non Fuel Energy	\$7.54	
Energy Cost Adjustment	\$6.53	
** IRP Cost Recovery	\$0.08	
PBF Surcharge	\$0.63	
Purchased Power Adjustment	\$2.98	
RBA Rate Adjustment	\$0.33	
Renewable Infrastructure Program	\$0.03	
NEM Credit	\$30.77-	
Total for Current Charges		\$9.00
Total Amount Due		\$9.00

* The Energy Charge (Column M, pg. 15) includes Base Fuel Energy and Non-Fuel Energy and varies by utility.
 ** Other Adjustments (Column O, pg. 15) includes IRP Cost Recovery, PBF Surcharge, Power Purchase Adjustment, RBA Rate Adjustment, and Renewable Infrastructure Program. These charges also vary by utility.

FUEL-RELATED CHARGES:

Base Fuel Energy: This is the cost of fuel used in power plants to produce electricity. It also includes the cost of energy purchased from independent power producers. This charge is based on the fuel prices and purchased energy prices used in your electric utility's last completed rate case.

NON FUEL-RELATED CHARGES:

Non Fuel Energy: This charge covers some of the costs (excluding fuel) to provide electric service to you. These include costs to operate power plants and maintain the electrical system.

Public Benefits Fee Surcharge: This surcharge collects funds that are used to pay for energy efficiency programs, including customer incentives such as rebates, to reduce electricity use in Hawai'i. The programs are managed by a third party administrator, "Hawaii Energy," reporting to the Public Utilities Commission.

Revenue Balancing Account Rate Adjustment: This will appear as a charge or credit approved by the PUC under a new method of setting electric rates called "decoupling," which supports the electric utility's clean energy efforts.

During months when your energy use falls in the Net Debit Zone and exceeds the Minimum Charge, previously accrued NEM Credit will be applied toward eligible energy use charges.

Although your PV system may be sized to generate all of the electricity needed by your house/facility, remaining connected to the electric grid ensures you are delivered firm power from the electric utility at night when your PV system is not generating electricity and on days when your PV system does not generate enough electricity to meet your daily energy needs. NEM customers contribute toward some of the fixed costs of maintaining electrical service to their house/facility by paying a Customer Charge or Minimum Charge. NEM Credit cannot be applied toward these charges.

Your bill will reflect a Minimum Charge during months you are a "NET producer" and accrue NEM Credit or when the amount of electricity purchased from the electric utility does not exceed the Minimum Charge. During months you are a "NET consumer" and purchase electricity from the electric utility in excess of the Minimum Charge, your bill will reflect a Customer Charge plus the amount of electricity purchased and available credit will be applied to eligible charges.

Energy Cost Adjustment: This adjustment reflects increases or decreases in the cost of buying energy from independent power producers and in the price of fuel from the levels initially used to set the Base Fuel Energy Charge in your electric utility's last rate case.

Integrated Resource Planning Cost Recovery: This allows the electric utility to recover the costs of its long-term energy planning process, Integrated Resource Planning, and the costs of certain energy management programs.

Purchased Power Adjustment: This applies to residential rate schedules, R, TOUR, TOU-EV, and EV-R. It recovers expenses and related taxes for non-energy purchased power costs from independent power producers, which were formerly recovered through the Non Fuel Energy Charge.

Renewable Infrastructure Program: This charge, approved by the PUC, collects funds that are used to recover the cost of certain projects that facilitate the development and/or integration of renewable energy.

Interim Increase: This adjustment reflects any interim rate adjustments approved by the PUC. This item may not always appear on your bill.

Understanding Your NEM Bill

This section summarizes the amount of energy the electric utility delivered to you, excess energy the electric utility received from your PV system, and the NET energy supplied or received for each billing period. This section also shows your accumulated NEM credit and balance.

When the electric utility RECEIVES more kWh from you than it DELIVERS to your house/facility, these kWh will be converted to credit which can be applied toward future bills or previous months when the reconciliation is done for your 12-month NEM billing cycle. Net Customer Generation Credit/Month is the sum of the Energy Charge Credit, Energy Cost Adjustment Credit, and Other Adjustments Credit, which are based on your Net kWh consumption.

Date	Kilowatt Hours (kWh)			Credit for Net Customer Generation					
	Supplied by Company (A)	Received from NEM Customer (B)	Net kWh (C=A-B)	kWh for billing purchases (D)	kWh for Credit Calculation (E)	Energy Charge Credit (F)	Energy Cost Adjustment Credit (G)	Other Adjustments Credit (H)	Net Customer Generation Credit/Month (J)=sum(F:H)
05/15/2013	557	507	50	50	0	\$0.00	\$0.00	\$0.00	\$0.00
06/15/2013	440	438	2	2	0	\$0.00	\$0.00	\$0.00	\$0.00
07/16/2013	474	536	-62	0	-62	\$10.35	\$8.01	\$2.95	\$21.31
08/14/2013	464	500	-36	0	-36	\$6.02	\$4.44	\$1.85	\$12.31
09/16/2013	464	444	20	20	0	\$0.00	\$0.00	\$0.00	\$0.00
10/17/2013	477	384	93	93	0	\$0.00	\$0.00	\$0.00	\$0.00
Total				165	-98	\$16.37	\$12.45	\$4.80	\$33.62

When the electric utility DELIVERS more kWh to you than it RECEIVES from your house/facility, these kWh will be converted to charges shown in your Bill Detail section. Previously accrued NEM Credit can be applied toward eligible charges that exceed the Minimum Charge. Billing kWh and Total Bill columns will show billable charges before any accrued credit has been applied.

Net Customer Generation Credit/Month will be added to your Cumulative Credit Balance to be used toward charges Eligible for a Refund. In this example, \$33.62 NEM Credit was available and \$30.77 of the charges were Eligible for a Refund. Thus, \$30.77 credit was applied, leaving a Cumulative Credit Balance of \$2.85 (\$33.62 - \$30.77).

Date	Billing kWh (K)=(D)	Total Bill (L)	Eligible for a Refund			Bill Refund		Cumulative Credit	
			Energy Charge (M)	Energy Cost Adjustments (N)	Other Adjustments (O)	Credit Applied (P)	Bill Net Of Credit (Q)=(L-P)	Applied (R)	Balance (S)
05/15/2013	50	\$25.46	\$8.35	\$6.57	\$2.18	\$0.00	\$25.46	\$0.00	\$0.00
06/15/2013*	2	\$17.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.00	\$0.00	\$0.00
07/16/2013	0	\$17.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.00	\$0.00	\$21.31
08/14/2013	0	\$17.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.00	\$0.00	\$33.62
09/16/2013*	20	\$17.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.00	\$0.00	\$33.62
10/17/2013	93	\$39.77	\$20.19	6.53	\$4.05	\$30.77-***	\$9.00**	\$30.77	\$2.85
Total	165	\$133.23	\$28.54	\$13.10	\$6.23	\$30.77-	\$102.46		

Previously accrued NEM Credit will be applied to any charges Eligible for a Refund that exceed the Minimum Charge, which fall under the Energy Charge, Energy Cost Adjustments, and Other Adjustments columns.

During months you accrue NEM Credit or your kWh use does not exceed the Minimum Charge, your bill will reflect a Minimum Charge to contribute toward some of the fixed costs of maintaining your electric service.

* Since the charges for purchasing electricity from the electric utility for these months did not exceed the Minimum Charge, NEM credit was not applied and the Minimum Charge (\$17.00 in this example) was due.

** Since NEM credit cannot be applied toward the Customer Charge (\$9.00), the Customer Charge amount will appear on the Bill Net of Credit column.

*** When credit is applied, that amount (Column P) will be deducted from the available Cumulative Credit Balance (Column S).

Frequently Asked Questions

If the electric circuit on my street already has a lot of PV systems connected, does this mean I can't install my system?

When you submit a NEM application, the electric utility must first check that it is safe to add more PV to your local circuit and that the addition won't impact safety or reliability for all customers on the circuit. For a small (10 kW or less) system, it is likely that the system can be installed without an Interconnection Requirements Study but upgrades may apply. On circuits with very high PV penetration and for larger systems, an IRS may be required before installation can be approved. To check your circuit, visit www.hawaiianelectric.com/lvm.

Does it matter what month my NEM agreement starts?

No. Over a 12-month period, you will normally send more power to the electric grid than you receive in summer months and less in winter months. In most cases, a PV system sized to offset your annual average electricity consumption should balance out at the end of any 12 months.

If you generate NEM credit, it will either be applied to eligible charges in subsequent months during the 12-month period or to remaining eligible charges at the end of the 12-month period when a credit reconciliation is done. Thus, the month your NEM agreement starts only impacts when your NEM credit will be applied during the 12-month period.

What happens if I still have unused credit at the end of my 12-month period?

If you have credit remaining at the end of your 12-month period, you will get a refund for eligible energy charges you previously owed the electric utility within the 12-month period. Any credit that remains after that will be forfeited. The refund will be shown as a credit adjustment on your electric bill. A PV system properly sized to offset your annual electricity consumption should have little or no credit remaining after the 12-month reconciliation.

Why does my PV monitor/inverter show that I generated more energy than the electric utility received?

Your PV monitor/inverter measures all the energy your system generates. Most of that energy is consumed in your house/facility. The utility meter only measures the excess energy over what you've already consumed.

What if I want to add more capacity?

If you have an executed NEM agreement with Hawaiian Electric and want to increase your capacity, you (or your contractor on your behalf) must submit a NEM Addendum application to the electric utility. Maui Electric and Hawai'i Electric Light Company requirements may vary.

Contact Us

Hawaiian Electric Company

Customer Service	808-548-7311
Net Energy Metering E-Mail	nem@hawaiianelectric.com
Net Energy Metering Office	808-543-4760
Net Energy Metering Information	hawaiianelectric.com/nem
Solar Information	hawaiianelectric.com/goingsolar

Maui Electric Company

Customer Service, Maui	808-871-9777
Customer Service, toll-free	1-877-871-8461
Net Energy Metering Office, Maui	871-8461 ext. 2445
Net Energy Metering Office, toll-free	1-877-871-8461 ext. 2445
Net Energy Metering E-Mail	NEMmauicounty@hawaiianelectric.com
Net Energy Metering Information	hawaiianelectric.com/nem

Hawai'i Electric Light Company

Customer Service, Hilo	808-969-6999
Customer Service, Kona	808-329-3584
Customer Service, Kamuela	808-885-4605
Net Energy Metering Office	808-969-0358
Net Energy Metering Information	hawaiianelectric.com/nem

Additional Resources

Database of State Incentives for Renewables and Efficiency

Information on federal tax credits.
dsireusa.org

Department of Commerce and Consumer Affairs

Information on PV contractor business practices.
Customer Resource Center 808-587-4272

Hawaii Energy

Information on energy efficiency rebates and incentives.
hawaiienergy.com 808-537-5577

State of Hawaii Department of Taxation

Download the N-342 form and instructions to see if you qualify for a state renewable energy tax credit.
hawaii.gov/tax