

NEMA Billing – the Basics

Net Energy Metering Webinar Series

June 3, 2015



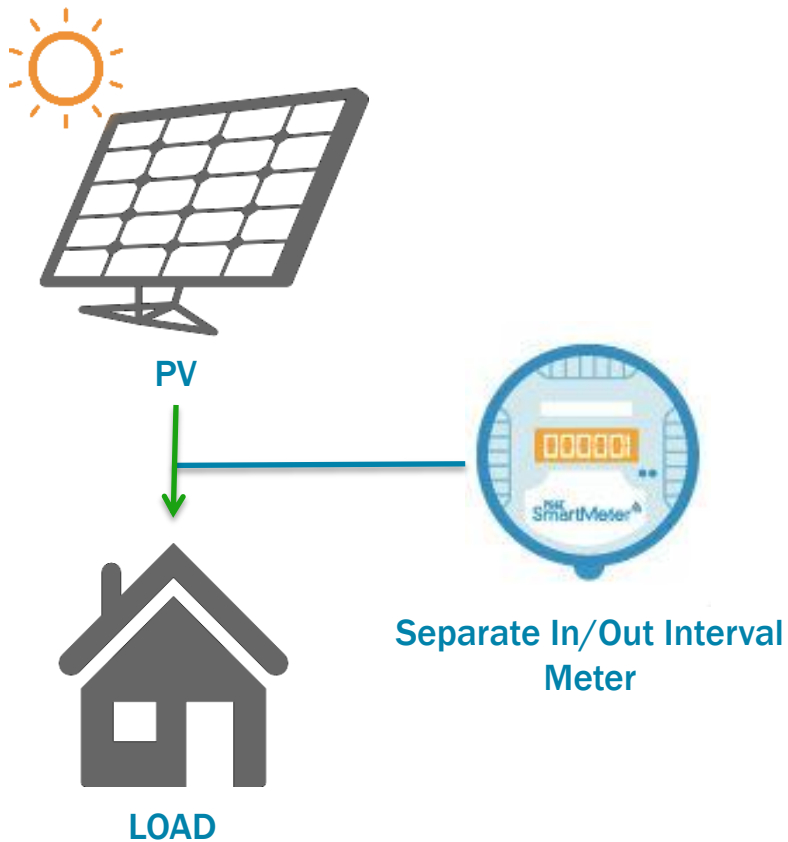
While PG&E strives to be accurate about the material presented in these slides, if there is any discrepancy between these slides and PG&E's tariff's, PG&E's tariff's have authority. All programs are subject to change.



NEMA Billing

Step 1: The Generator Account

The generator offsets any simultaneous load on the generator account.

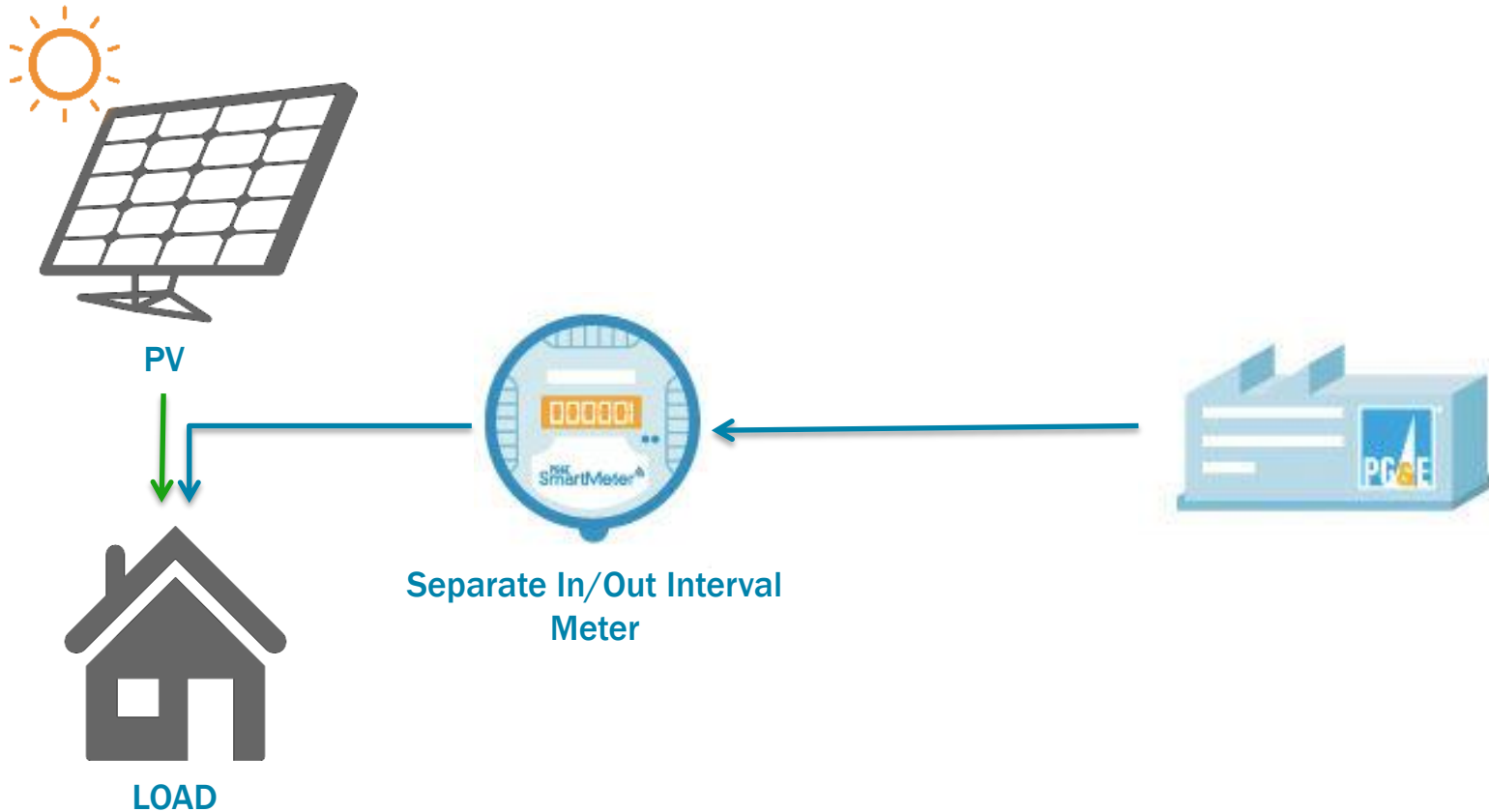




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Step 2: Imported Energy

If the generator does not produce enough energy, PG&E supplies the energy. The meter records this kWh input from PG&E on the import channel (channel 1) on an interval basis.

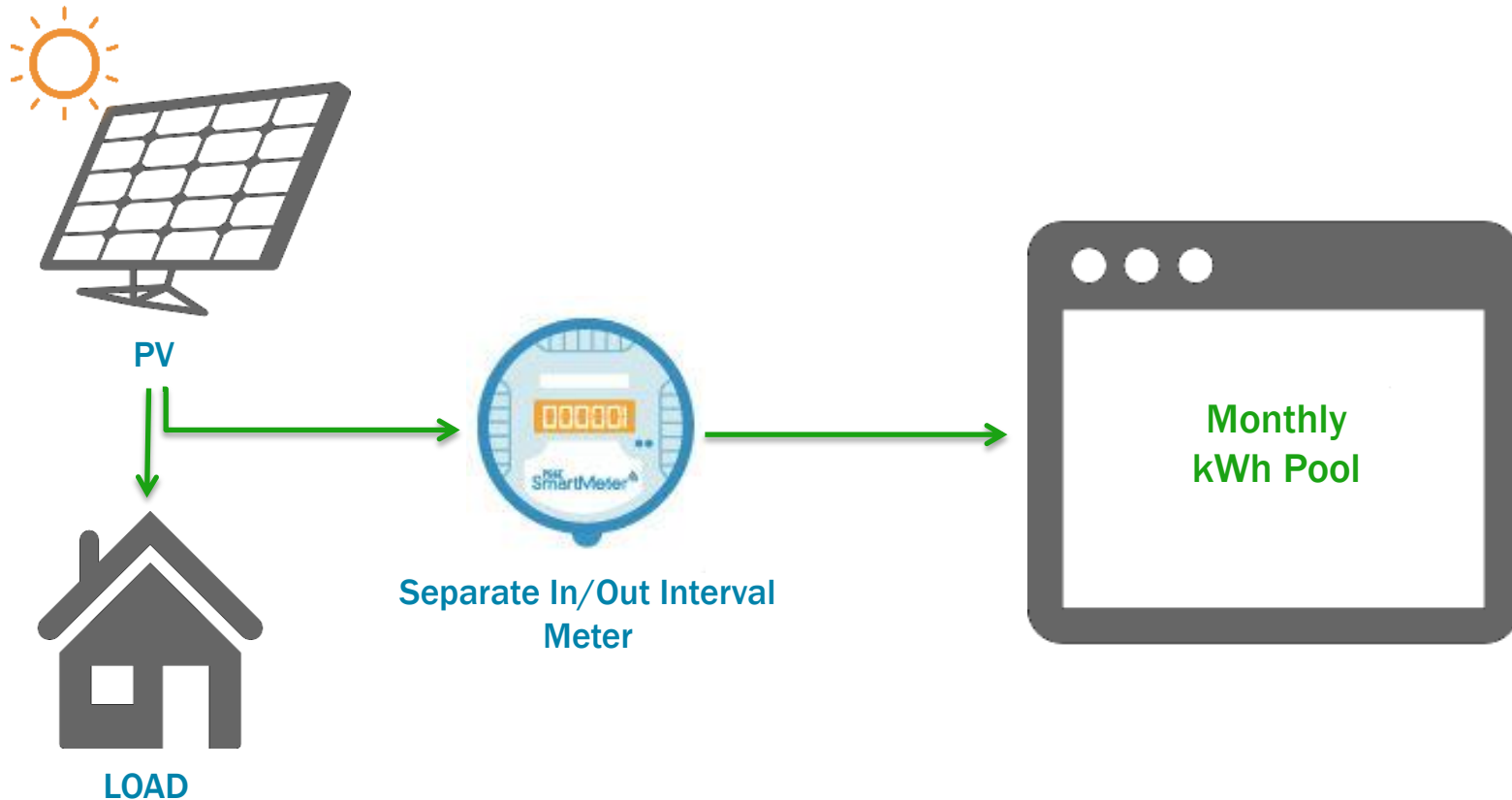




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Step 3: Exported Energy

If the generator produces extra energy, the energy is sent to PG&E's grid. The meter records the output kWh on the export channel (channel 2) on an interval basis for the month.

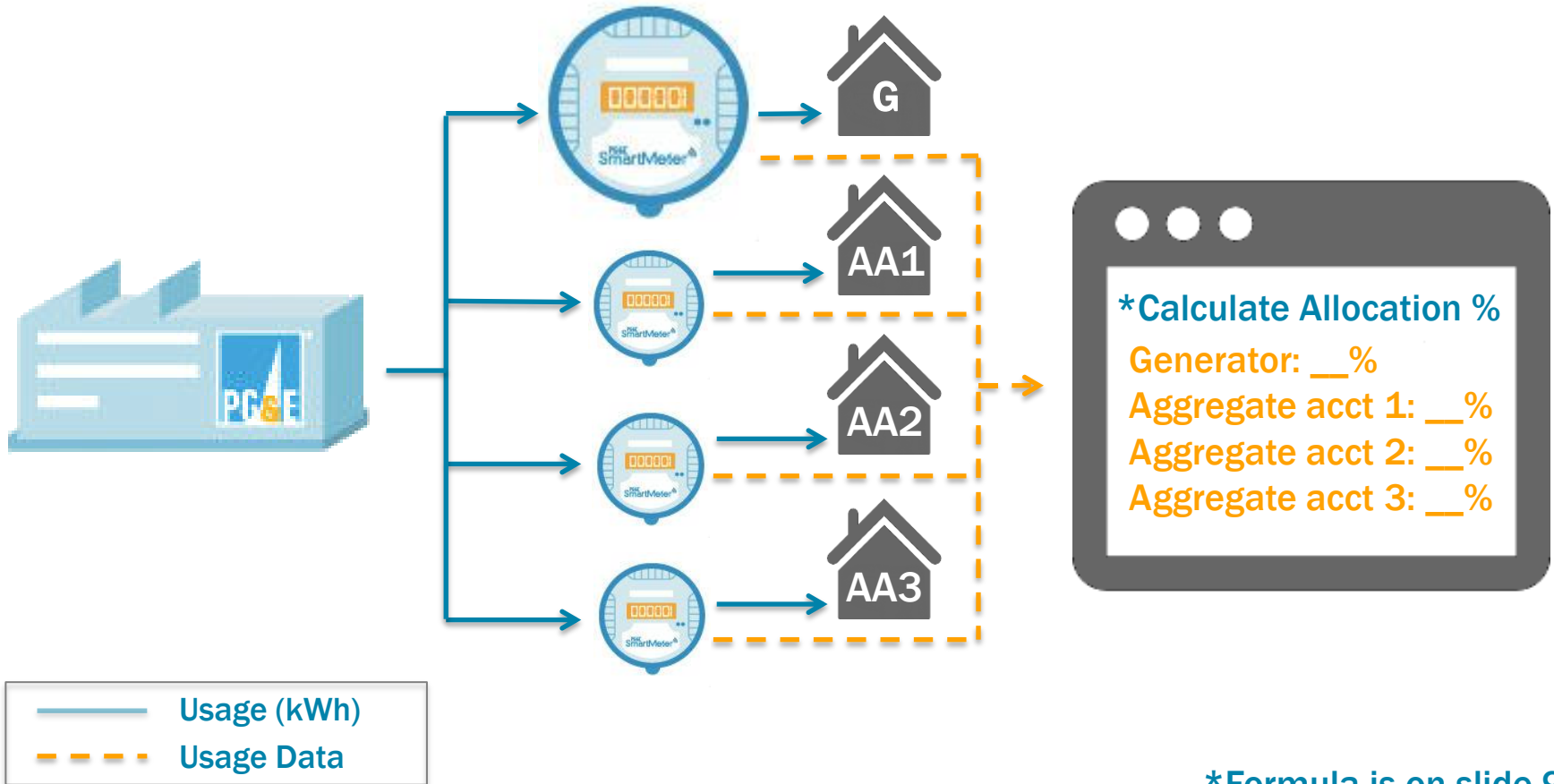




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Step 4: End of Billing Month Allocation Calculation

At the end of every billing month, the usage history (from channel 1) for each account is used to dynamically calculate the allocation percentages for each account.



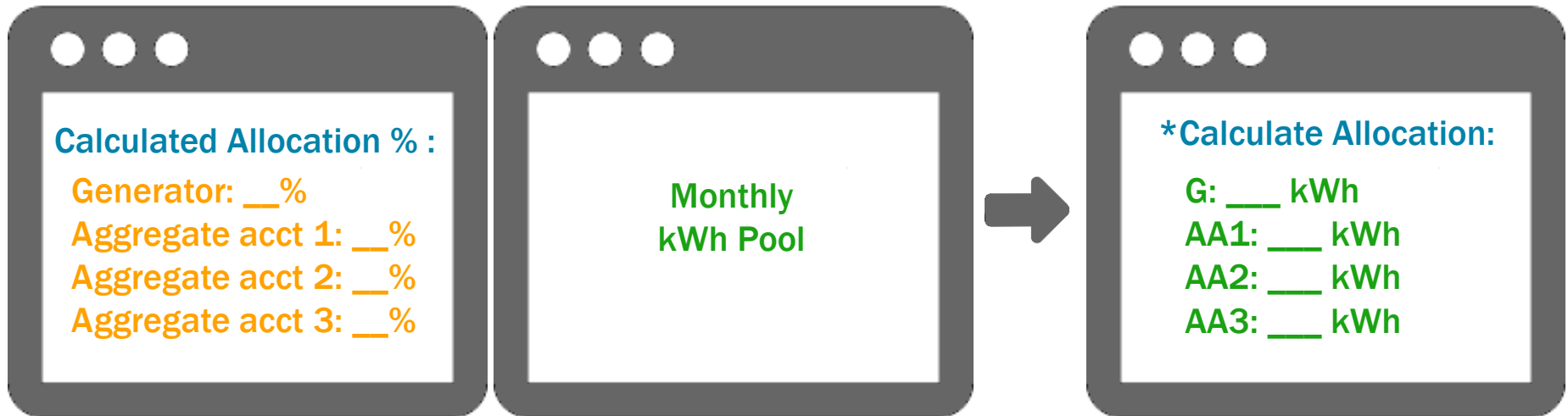
*Formula is on slide 9



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Step 5: End of Billing Month Allocation

The percentages are then used to allocate that month's total pool of energy (kWh) that was sent to PG&E's grid (recorded on channel 2).



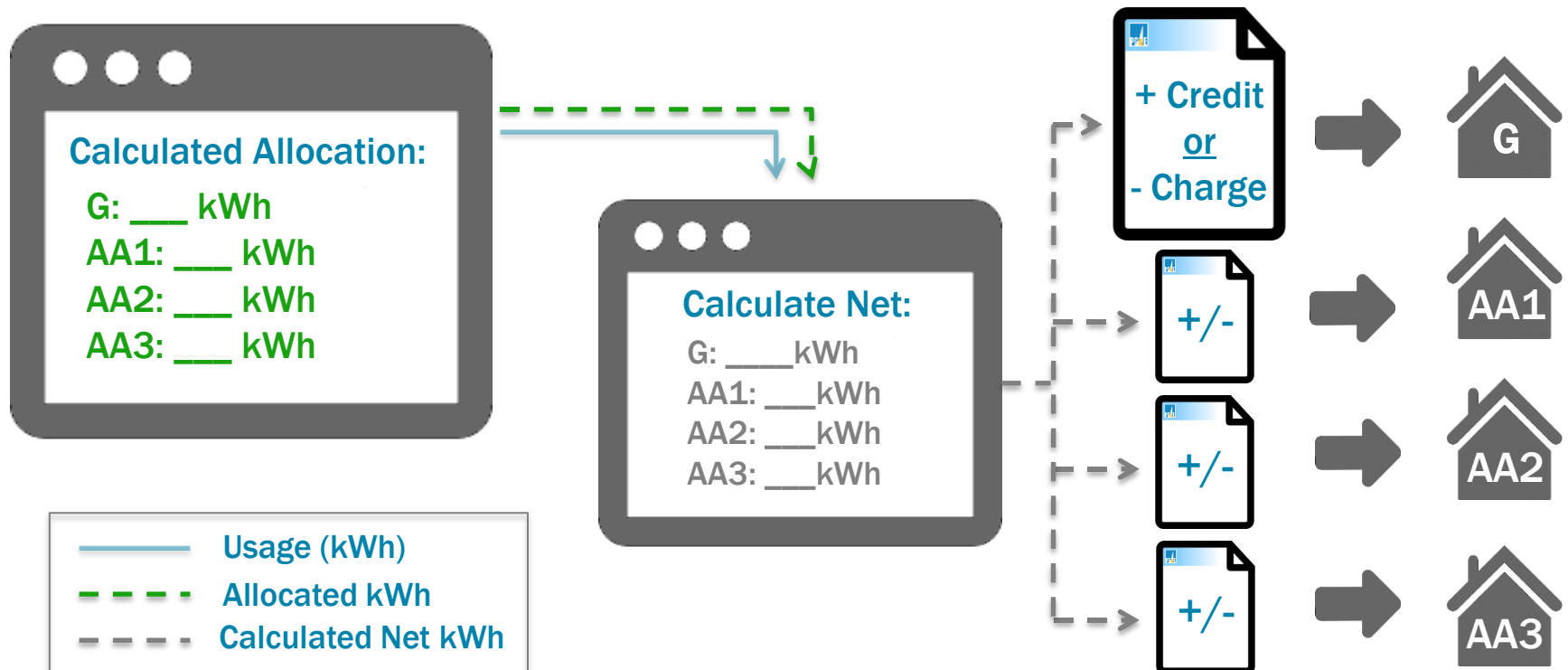


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Step 6: Net Monthly Energy to Determine Bill Charge/Credit

For each account, the net of its allocated energy and the PG&E energy used by that account is calculated.

If the account is a net kWh user, then it receives energy bill charges based on its rate.
If the account is a net kWh generator, then it receives energy credit based on its rate.



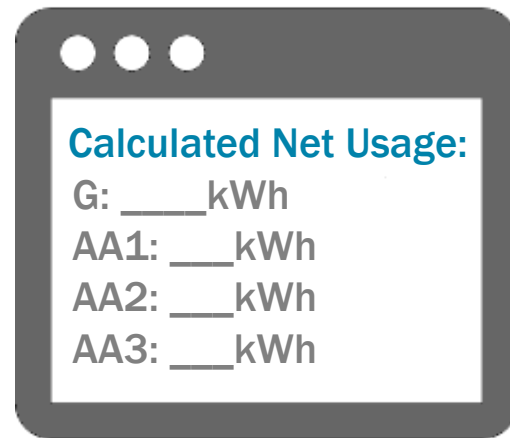


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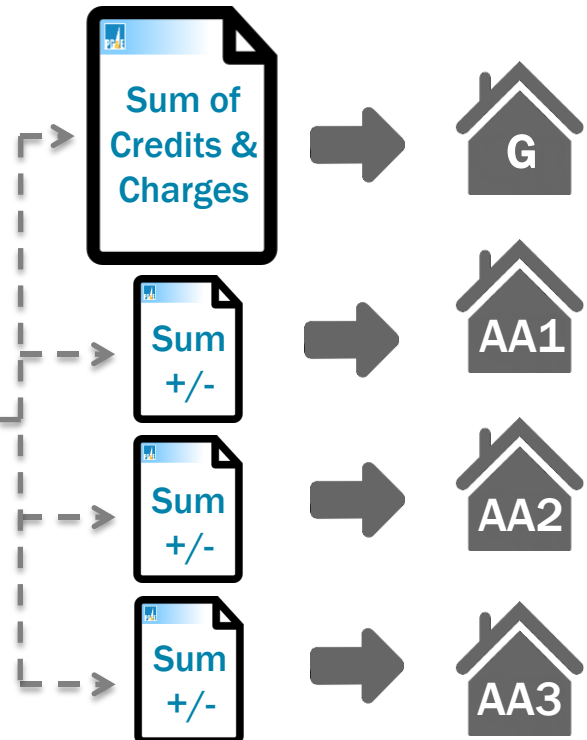
Step 7: Annual True-Up

On the 12th billing month, each account's generation credits will be used to offset its energy charges. This will be the customer's energy bill.

Note: Each account is trued-up independently. Once credits are allocated to an account, they cannot be shared with other accounts. There is no Net Surplus Compensation.



--- Calculated Net kWh





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Allocation Formula:

$$\left\{ \frac{\text{sum(acct 1 monthly usage kWh)}}{\text{[sum (acct 1 monthly usage kWh) + ... + sum(acct n monthly usage kWh)]}} \times \text{sum(monthly gen exports kWh)} - \text{sum(acct 1 prior monthly allocated gen kWh)} \right\}$$

Diagram labels and brackets:

- RELATIVE PROPORTION OF LOAD FOR ACCT 1 (bracketed under the fraction)
- TOTAL HISTORIC GENERATION (bracketed under the multiplier)
- TOTAL PRIOR ALLOCATION (bracketed under the subtraction term)

Where n = number of accounts in the arrangement

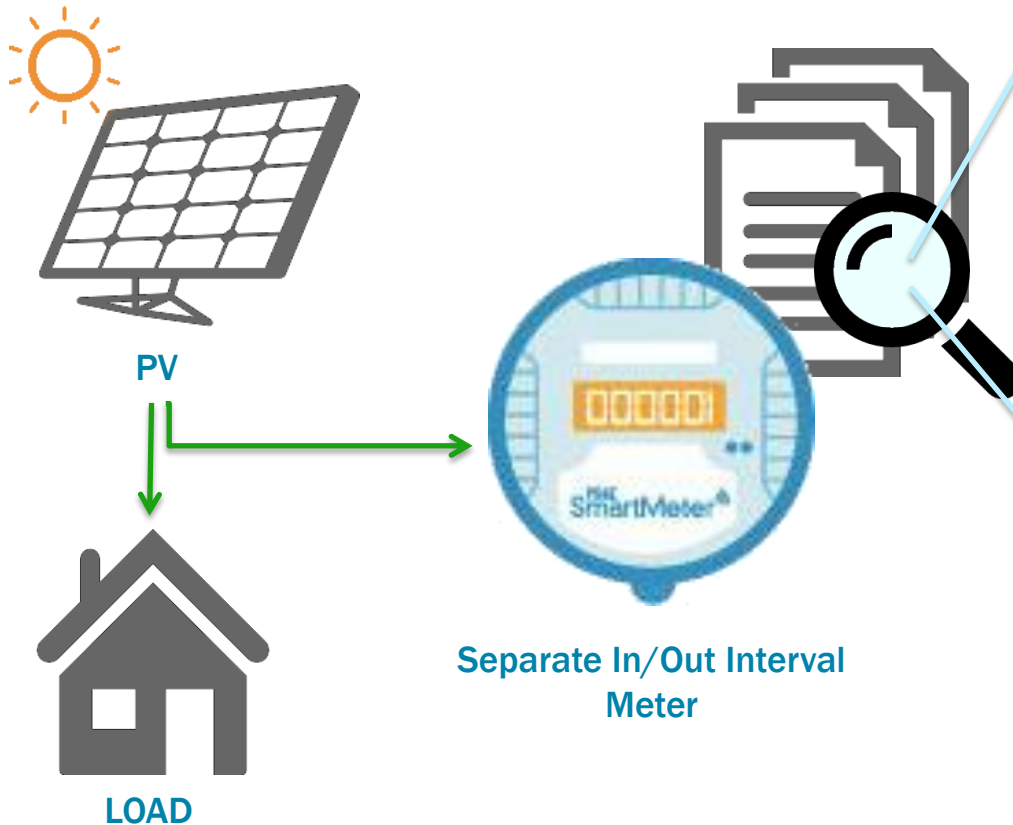


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Interval Calculation & TOU Example:

The meter records the output kWh on the export channel (channel 2) on an interval basis for the month.

Interval data shown for a 24 hour period.



Time	Received (ch.2)
01:00	0
02:00	0
03:00	0
04:00	0
05:00	0
06:00	100
07:00	100
08:00	200
09:00	100
10:00	300
11:00	400
12:00	400
13:00	300
14:00	300
15:00	200
16:00	100
17:00	200
18:00	100
19:00	100
20:00	50
21:00	0
22:00	0
23:00	0
24:00	0



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Interval Calculation & TOU Example (Continued):

At the end of the billing month, the calculated allocation percentages are used to allocate that month's total pool of energy that was sent to PG&E's grid (recorded on channel 2) at the interval level.

Example shows channel 2 allocation for a 12 hour period. Assume the following calculated allocation percentages:

Calculated Allocation % :

- Generator: 20 %**
- Aggregate acct 1: 50 %**
- Aggregate acct 2: 10 %**
- Aggregate acct 3: 20 %**

Time	Received (ch.2)	G (20%)	AA1 (50%)	AA2 (10%)	AA3 (20%)
01:00	0	0	0	0	0
02:00	0	0	0	0	0
03:00	0	0	0	0	0
04:00	0	0	0	0	0
05:00	0	0	0	0	0
06:00	100	20	50	10	20
07:00	100	20	50	10	20
08:00	200	40	100	20	40
09:00	100	20	50	10	20
10:00	300	60	150	30	60
11:00	400	80	200	40	80
12:00	400	80	200	40	80



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Time	Received (ch.2)	G (20%)	AA1 (50%)	AA2 (10%)	AA3 (20%)
01:00	0	0	0	0	0
02:00	0	0	0	0	0
03:00	0	0	0	0	0
04:00	0	0	0	0	0
05:00	0	0	0	0	0
06:00	100	20	50	10	20
07:00	100	20	50	10	20
08:00	200	40	100	20	40
09:00	100	20	50	10	20
10:00	300	60	150	30	60
11:00	400	80	200	40	80
12:00	400	80	200	40	80
13:00	300	60	150	30	60
14:00	300	60	150	30	60
15:00	200	40	100	20	40
16:00	100	20	50	10	20
17:00	200	40	100	20	40
18:00	100	20	50	10	20
19:00	100	20	50	10	20
20:00	50	10	25	5	10
21:00	0	0	0	0	0
22:00	0	0	0	0	0
23:00	0	0	0	0	0
24:00	0	0	0	0	0

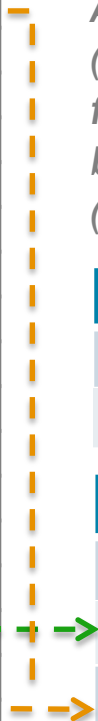
Interval Calculation & TOU Example #1:

The allocated generation is then grouped into TOU periods according to OAS and applied to the account.

Assume Aggregate Account 2 (AA2) is on the E6 rate. The following will be the TOU breakdown for one day (Tuesday during Winter):

TOU Period	Hours
Part Peak	17:00 - 20:00
Off Peak	All Other Hours

TOU Period	Sum kWh
Total	295
Part Peak	25
Off Peak	270





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Time	AA2 (10%)
01:00	0
02:00	0
03:00	0
04:00	0
05:00	0
06:00	10
07:00	10
08:00	20
09:00	10
10:00	30
11:00	40
12:00	40
13:00	30
14:00	30
15:00	20
16:00	10
17:00	20
18:00	10
19:00	10
20:00	5
21:00	0
22:00	0
23:00	0
24:00	0

Interval Calculation & TOU Example #1 (Continued):

The allocated generation is then netted with the account's usage in the same TOU periods.

Assume the following usage for Aggregate Account 2 (AA2) for one day:

TOU Period	Usage (kWh)
Total	510
Part Peak	10
Off Peak	500

...and the allocated generation (from previous slide).

TOU Period	Sum kWh
Total	295
Part Peak	25
Off Peak	270

TOU Period	Net (kWh)
Total	510 - 295 = <u>215</u>
Part Peak	10 - 25 = <u>-15</u>
Off Peak	500 - 270 = <u>230</u>

Note: this is a simplified example. Billing calculations for one month take into account total historic kWh from prior months within the true-up period.



NEMA Billing

Time	Received (ch.2)	G (20%)	AA1 (50%)	AA2 (10%)	AA3 (20%)
01:00	0	0	0	0	0
02:00	0	0	0	0	0
03:00	0	0	0	0	0
04:00	0	0	0	0	0
05:00	0	0	0	0	0
06:00	100	20	50	10	20
07:00	100	20	50	10	20
08:00	200	40	100	20	40
09:00	100	20	50	10	20
10:00	300	60	150	30	60
11:00	400	80	200	40	80
12:00	400	80	200	40	80
13:00	300	60	150	30	60
14:00	300	60	150	30	60
15:00	200	40	100	20	40
16:00	100	20	50	10	20
17:00	200	40	100	20	40
18:00	100	20	50	10	20
19:00	100	20	50	10	20
20:00	50	10	25	5	10
21:00	0	0	0	0	0
22:00	0	0	0	0	0
23:00	0	0	0	0	0
24:00	0	0	0	0	0

Interval Calculation & TOU Example #2:

The allocated generation is then grouped into TOU periods according to OAS and applied to the account.

Assume Aggregate Account 1 (AA1) is on the AG4B rate. The following will be the TOU breakdown for one day (Tuesday during Summer):

TOU Period	Hours
Peak	12:00 - 18:00
Off Peak	All Other Hours

TOU Period	Sum kWh
Total	1475
Peak	600
Off Peak	875



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Time	AA1 (50%)
01:00	0
02:00	0
03:00	0
04:00	0
05:00	0
06:00	50
07:00	50
08:00	100
09:00	50
10:00	150
11:00	200
12:00	200
13:00	150
14:00	150
15:00	100
16:00	50
17:00	100
18:00	50
19:00	50
20:00	25
21:00	0
22:00	0
23:00	0
24:00	0

Interval Calculation & TOU Example #2 (Continued):

The allocated generation is then netted with the account's usage in the same TOU periods.

Assume the following usage for Aggregate Account 1 (AA1) for one day:

TOU Period	Usage (kWh)
Total	1675
Part Peak	475
Off Peak	1200

...and the allocated generation (from previous slide).

TOU Period	Sum kWh
Total	1475
Peak	600
Off Peak	875

TOU Period	Net (kWh)
Total	1675 - 1475 = <u>200</u>
Part Peak	475 - 600 = <u>-125</u>
Off Peak	1200 - 875 = <u>325</u>

Note: this is a simplified example. Billing calculations for one month take into account total historic kWh from prior months within the true-up period.