

NET Metering

- **NET metering enables a customer to generate power and feed energy back on to the power grid.**
- **NET metering means the utility receives energy, as well as delivers energy**
- **NET metering requires special equipment**
- **NET metering has safety considerations**
- **NET metering is a special rate at most utilities**
- **NET metering typically is used with small/limited distributed generation and normally limited to Kwh and maybe a demand in the delivered direction**
- **Bi-Directional Metering typically is used with larger distributed generation and may have Kwh, Kvarh, Kvah and demands in both directions**



Net Metering – Delivered and Received Energy

Just because a customer has a generator, does NOT mean they will send energy back to the grid

This will only occur when the customer's generation provides more energy than their load consumes

Many solar panels and wind turbines provide less energy than their rating:

Sun doesn't shine 24 hours a day

Wind doesn't blow at 15+ MPH 24/7

Average residential customer needs 1 kW on average, but has peak demand of 3-5 kW to heat, cool, cook, water heating, etc.



NET Metering – Follow the Flow of Energy

+Positive energy is energy **delivered** to a Household (load)

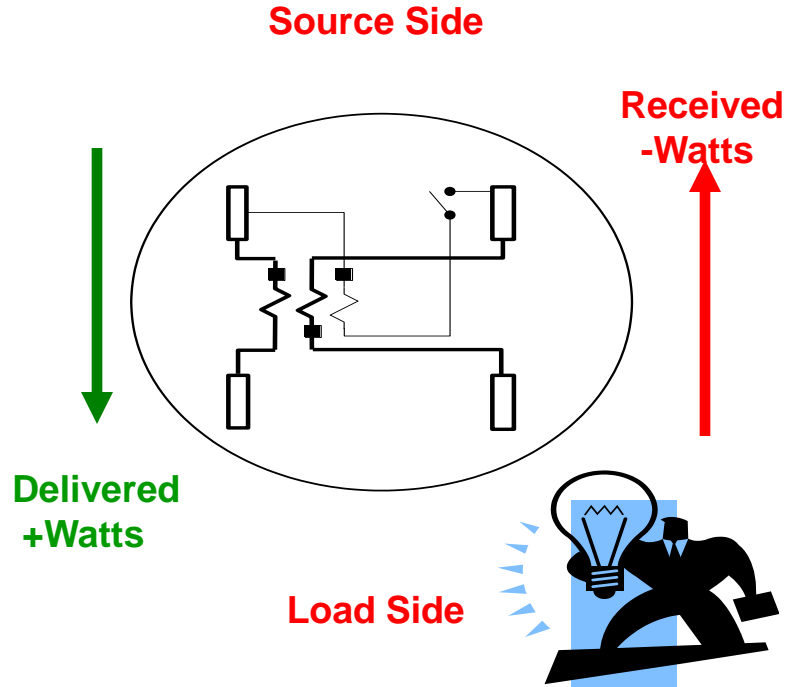
+Negative energy is energy **received** from the Household (generator)

+NET energy is the difference:

$$\text{NET} = \text{delivered} - \text{received energy}$$



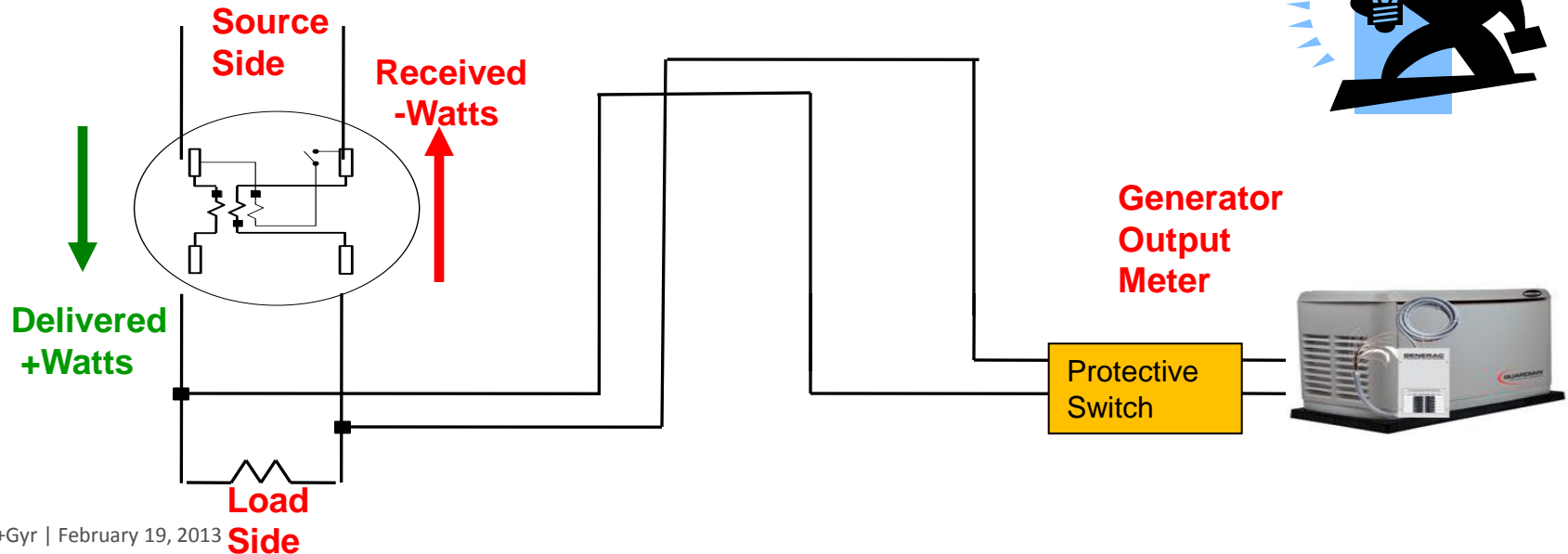
The “Source” is always the point of reference. The “Source” Delivers Power to the Load and Receives Power from the “Load”.



NET Metering – Special Equipment

A single watt-hour meter can only provide the NET power (delivered – received)

A single watt-hour meter can NOT tell how much energy is generated by the customer's equipment



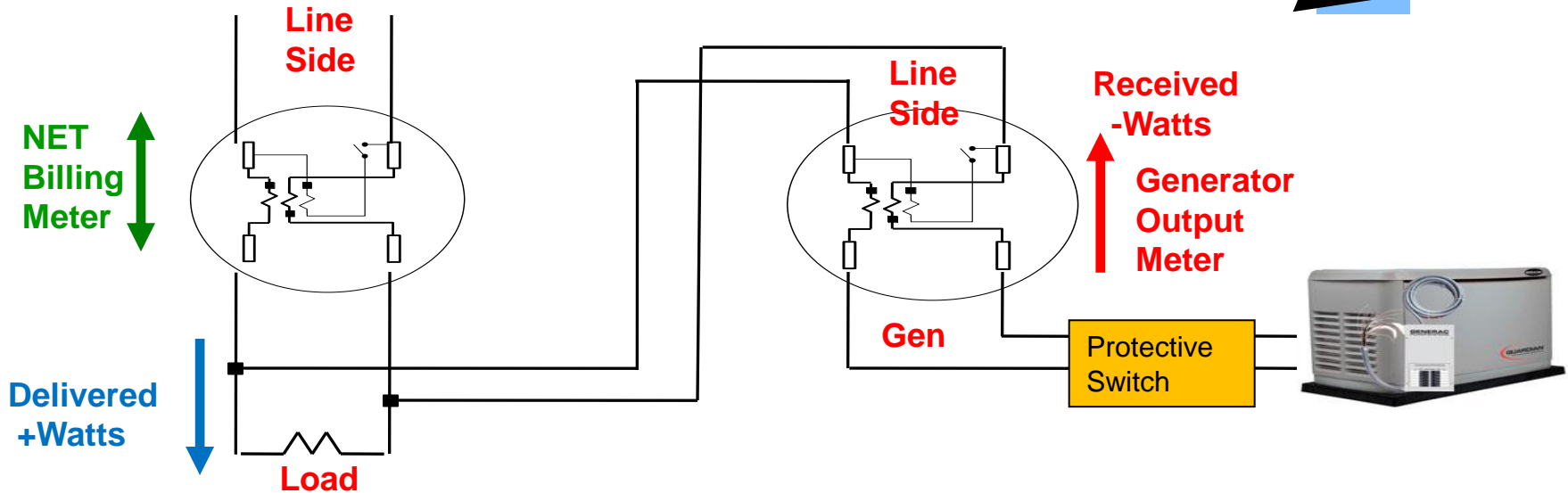
NET Metering – Special Equipment

To determine how much energy is generated, a second watthour meter must be connected between the generator and the service.

The generator meter measures the energy generated.

The generator meter doesn't

- Provide the amount of energy used by the load.
- Provide the amount of energy sent back to the Utility



A NET metering customer's electric generator is typically held to the same standard of care, as the utility is required to maintain. **The safety of the general public and the utility's personnel and equipment cannot be reduced or impaired as a result of the customer's generator interconnect.**

A NET metering customer's electrical generator must be:

1. Equipped with protective functions designed to prevent the generator from being connected to a de-energized utility circuit.
2. Equipped with the necessary protective functions designed to prevent connection or parallel operation if the distribution service voltage and frequency are not of normal magnitude.

Utility Goal of a NET Metering Customer:

The quality, reliability and the availability of service to the Utility's other customers cannot be diminished or impaired as a result of the Interconnection.

KWH Meter Display Option

Delivered KWH

Received KWH

Net Delivered KWH (Delivered – Received)

Net Received KWH (Received – Delivered)



NET Metering – What about Demand Rates?

L+G has never heard of a utility “crediting” a generated demand peak back to a customer.

Demand is always based on Delivered Energy. The reasons are:

- 1. Demand has to do with the size of the distribution wires, breakers, transformer, and service. These still have to be a certain size even if the customer generates power.**
- 2. Demand peak charges have to do with the customer load varying. Loads aren't flat and predictable. A customer with a generator is typically the worst! Their load varies from Delivered to Received! The swing can be quite large!**

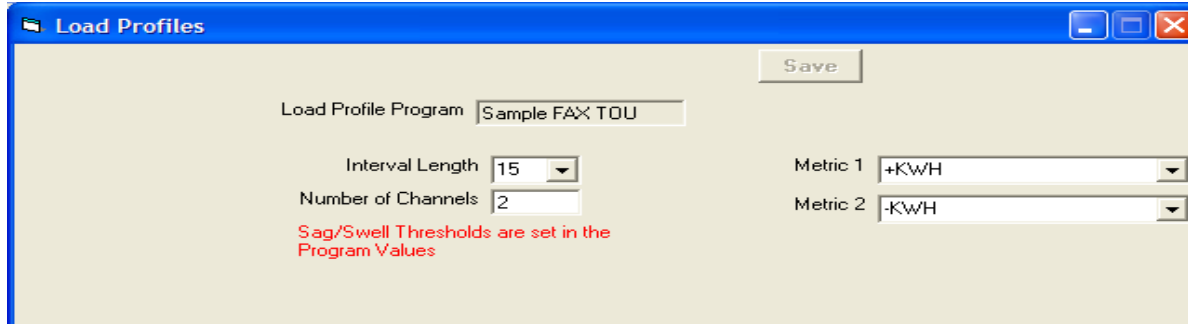


NET Metering – Use of Load Profile

If a utility needs Received Demand, another option is to use a smart meter equipped with load profile

Configure the meter for 2 channels: Delivered KW and Received KW

Most back office software will perform the “NET” of the 2 channels



The screenshot shows a software window titled "Load Profiles" with a blue title bar and standard Windows window controls. The main area is light beige and contains the following configuration options:

- A "Save" button in the top right corner.
- A text field for "Load Profile Program" containing the value "Sample FAX TOU".
- A dropdown menu for "Interval Length" set to "15".
- A text field for "Number of Channels" set to "2".
- A dropdown menu for "Metric 1" set to "+KWH".
- A dropdown menu for "Metric 2" set to "-KWH".
- A red text note at the bottom left: "Sag/Swell Thresholds are set in the Program Values".

Does NET Metering Work for All Customer Types?

Net metering is normally Active Energy Only (KWH)

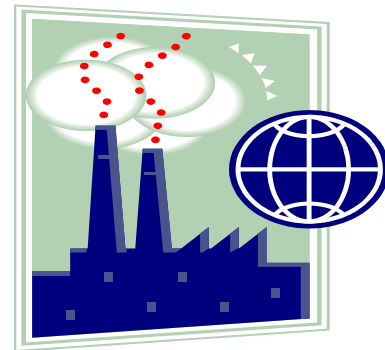
Bi-Directional metering can have:

Active Energy

Reactive Energy

Apparent Energy

Demands in both directions

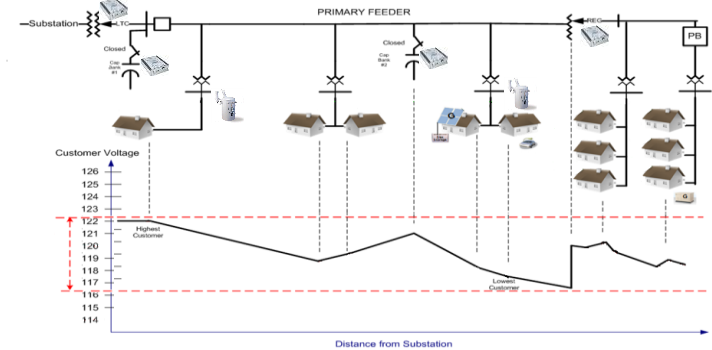


**Delivered KVARH (Q1 + Q2)
Received KVARH (Q3 + Q4)**

**Net KVARH Delivered (Q1 + Q2) – (Q3 + Q4)
Net KVARH Received (Q3 + Q4) – (Q1 + Q2)**

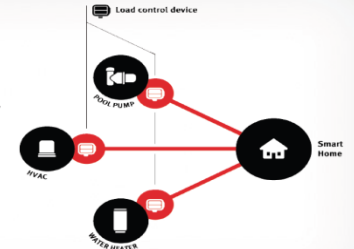
**KVARH Delivered Power (Q1 + Q4)abs
KVARH Received Power (Q2 + Q3) abs
KVARH Delivered Power (Q1 – Q4)net
KVARH Received Power (Q3 – Q2)net**

Demand Voltage Reduction Conservation Voltage Reduction Direct Load Control



INSTALL DEVICE FOR MEASUREMENT AND CONTROL.

- Device Controller (DC) on major energy-consuming appliances
- 40% to 60% of home energy consumption is under control and manageable
- Electric Vehicles are an option



Thank you for your attention

