Uni-directional meters: are solar owners being scammed?

By: Roberto Verzola, January 2020

At the top of our list of the worst barriers to solar deployment is the uni-directional electric meter. Some of the country's biggest electric utilities have been replacing their analog bi-directional meters with uni-directional meters for some time.

A bi-directional meter runs forward when a grid-connected solar owner is using electricity from the utility. This happens not only at night, but also in the daytime if the solar panels are not producing enough electricity to meet the total demand of the solar owner. Then part of the daytime need has to be filled by the utility. Electricity flows from the grid into the home, so the bi-directional meters runs forward, as it should.

A bi-directional meter runs backward when a grid-connected solar owner is sending out electricity to the grid. This happens when the solar panels are producing more than the solar owner's total demand at that moment. The surplus electricity will find a path of least resistance. This is based on the laws of physics, and not on any institutional rule or utility permission. Electricity, like water, simply behaves this way. The path of least resistance for surplus power from solar panels are the nearest neighbors' electrical appliances which are turned on.

So, to the extent that a solar-owner's bi-directional meter runs backward from the export of electricity, the exported electricity makes the neighbors' electric meters run forward, registering the exported electricity as combined consumption by the neighbors.

Thus, a bi-directional meter, whether the new digital types or the old analog ones, are good. They are perfectly compatible with the provisions of net metering by the Philippine Renewable Energy (RE) Act. The backward turn of the bi-directional meter offsets/cancels an equivalent amount in kilowatt-hours of previous consumption by the solar owner. The exported solar electricity is in turn sold by the utility to neighbors at full retail price, recovering all the costs of the offset amount.

Future grids can expect more and more consumers to produce their own electricity, most commonly from solar panels. Some of these consumer-produced electricity will be exported to the grid when these consumers produce more than they consume, usually on a cloudless midday. Grids today already experience this bi-directional flow of power, and more so in the future, as solar prices drop.

So, by retaining the old bi-directional analog meters or by installing new bi-directional digital meters, an electric utility is preparing it for the future.

What happens if the solar owner happens to have a uni-directional electric meter instead?

The uni-directional meter runs forward whether the solar owner is importing grid electricity *or exporting* surplus electricity from his solar panels. Thus, instead of being credited for his exported kilowatt-hours, as the RE Act and its Implementing Rules and Regulations (IRR) say, he is being charged the full retail price for these exported surplus. This is bad enough. But the exported surplus also registers on the neighbors' electric meters. Thus, the neighbors are *also charged* the full retail price for that export, for which the solar owner *has already been charged*!

It is a scam, pure and simple.

This is what electric utilities that have installed uni-directional meters are inflicting not only to grid-tied solar owners but also to their neighbors.

Worse, electric utilities that install uni-directional meters are also squandering their stockholders' money by buying obsolete equipment and making a backward move to the past, a past when their

customers simply consumed electricity and never produced any (except during power outages).

Suppliers of electric meters will make money selling obsolete uni-directional meters to the utilities, and will make money again when they sell bi-directional meters to these utilities in the future, when utilities have no more choice but to adapt to a bi-directional grid.

In short, uni-directional electric meters are bad. Really bad.

The Department of Energy and the Energy Regulatory Commission should ban the installation of uni-directional meters, because they scam grid-connected solar owners and their neighbors. These two government agencies should ask every utility for an inventory of the number of uni-directional meters the latter have installed and order these utilities to replace them with bi-directional meters as soon as possible. *The scam should stop immediately!*

Rooftop owners who are aware of this scam will obviously avoid installing solar panels on their rooftops. Because they are such a deal-breaker, uni-directional meters are a big barrier to solar deployment.

Undersizing a solar installation will not stop the scam either. As long as a grid-connected solar panel is installed on one's rooftop, there will be occasions on cloudless days when most of the loads in the home are turned off, including appliances that are always plugged in, such as refrigerators. Remember that refs and air cons are thermostat-controlled. They turn on or off depending on the temperature and the thermostat setting. And these are usually a home's biggest loads (as well as appliances with heating elements). Especially when most of the family is out of the house, solar panels could be exporting some surplus production to the grid, with the solar owner ending up with additional charges instead of the expected savings.

There are other workarounds, like buying an export limiter, or switching to a more expensive inverter with a built-in limiter , and then using the surplus electricity to charge a battery or simply dumping this surplus. But these workarounds force solar owners to incur additional unnecessary expenses. They therefore contradict the basic principle that we should try to produce electricity *at the least cost*.

Some electric utilities offer a way to avoid this scam: they offer to replace the uni-directional meter with a bi-directional one if the solar owner enters into a contract with the utility. The contract is supposedly a net metering contract.

Unfortunately, the contract usually includes additional provisions that impose new additional charges on the customer.

The next section explains the effects of this supposed “net-metering” contract between the consumer and the utility: the money which the prospective solar owner expects to save due to lower electricity charges instead ends up going to the utility.

Electric utility charges discourage solar adoption

When trying to get out of the confinement imposed by uni-directional electric meters, utility customers are given another option: sign a net metering agreement with the utility.

Unfortunately, this option involves lots of utility charges, some of which the customer has to pay even before he realizes a single centavo of savings from his solar investment. In effect, the utility gets prior rights to the customer's savings, and only when the utility is satiated will it let the next round of savings go to the customer. The other utility charges are recurring charges, such as monthly distribution supply and meter reading charges, which are ridiculously bloated, as we will show here.

The first of the utility charges are for impact studies. Meralco, for instance, imposes this requirement.

The distribution impact study (DIS) applies to all net metering customers, including the smallest ones who may install only a 300-watt grid-tied system. The charge started at P20,000. This later went down to P9,000 for smaller installations, which further went down recently to P1,900. Meralco continues to charge higher amounts for larger installations. This study is supposedly needed to determine the impact of an own-use solar facility on Meralco's grid.

Let us say that Meralco charges a customer for a 1-kW DIS. The problem is that if neighbors also want to install a similar system, each neighbor will also be charged the same amount. If thousands of customers each wanted a 1-kW system, each will need to pay as well. Shouldn't Meralco just do the DIS once, for various levels of solar penetration, and be done with it? After all, it needs these studies to prepare itself for the future, so it should in fact carry the cost of these studies. In fact, the U.S. Agency for International Development (AID), had already commissioned such a study, which concluded that the grid can absorb up to 50% renewable energy with little problem.

The distribution asset study (DAS) applies only to larger facilities, and it can exceed P100,000. There are two aspects to this charge: I) the study itself; and ii) the cost of any necessary upgrade to the utility's distribution lines or transformers.

In fact, the impact of a rooftop solar installation on grid facilities is generally positive, because a solarized roof is a demand-side measure that reduces overall demand on the grid. As a rooftop solar panels produce more electricity, the solarized household needs less electricity from the grid, which reduces the load on distribution lines and transformers, a good thing for utilities because these assets will run cooler. If the panels produce more electricity than what the solarized home or building can consume, then the surplus is exported to the grid, which starts loading the distribution lines and transformers again. If the surplus is so high that it equals the consumer's load, the distribution lines and transformers that serve the customer will simply be loaded once more to the same amount that was designed for that customer. The assets can be exposed to higher than their designed loads only if customers install panels that are more than twice their peak demand. But customers will usually install solar capacity only up to their peak demand – usually less. So the customer will never exceed the load it was originally set up for, when it was not yet solarized.

In short, an impact study can be expected to show the positive impacts of solar rooftop installations on the utility's transformers, distribution lines, and other assets. Clearly, if Meralco wants to know more about these positive impacts, it should pay for these studies itself. Even if it wanted to look for negative impacts, Meralco needs to do these generic studies anyway – and not on a per-customer basis – to prepare itself for a bi-directional grid. DIS and DAS are unnecessary for solar owners and should be done by Meralco and other utilities at the latter's own cost.

We discussed above the up-front charges imposed by some electric utilities on solar installations – a kind of prior right by the utility to enjoy the solar benefits first, ahead of the customer.

But there are also new recurring charges for solar customers who want to get out of the confinement of a uni-directional meter by agreeing to a net metering contract.

Here's an example of the additional charges by a utility, given by a solar installer's client:

Before net metering:

- Distribution metering charge: P849.44
- Supply charge: P845.17

Total: P1,694.61

After net metering:

- Distribution metering charge: P3,525.12
- NM-Fixed Metering charge: P3,525.12
- Supply charge: P3,505.46
- NM-Fixed supply charge: 3,505.46

Total: P14,060.16

The recurring charge has jumped from around P1,700 to more than P14,000!

Why should the customer pay more, when in fact a solar owner will be buying less electricity from the grid? Thus the charges should also be lower, not higher. Furthermore, these are not one-time charges, unlike the cost of a new meter or the impact studies. The solar owner will need to suffer through these bloated charges month after month.

These are the worst barriers that prevent ordinary households and businesses from embracing solar wholeheartedly. They delay our enjoyment of cheap solar power that is also friendly to the environment and to our climate.