Small Roof-top Solar Metering and Payment

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Roof-top private solar for residences

1kW to 3 kW residential solar

Off-sets house load

About the same usage every day

Roof-top solar for commercial facilities and government buildings

Commercial/Government building solar (typically around 10 kW up to 50kW or more)

Commercial/Governmental loads often have a much lower load on weekends and therefore surplus solar

Metering of small grid-connected solar installations

Dual meters

Single meter providing net metering by reversing

Single meter without reverse metering

"solar" meter

Prepayment meter

"Smart" meter

Dual Meters

Solar is connected directly to the grid through one meter

Grid electricity is delivered to the building through the other meter

Grid electricity minus solar electricity = the payment required from the customer to the utility or credit to be received by the customer for excess energy delivery

This is the preferred approach for metering in the islands

Single meter that provides net-metering directly

The solar is connected on the building side of the meter and surplus energy from the solar runs the meter backward. Negative reading indicates a credit, positive reading indicates a billing amount.

Does not show either the customer or the utility the amount of solar energy or grid energy used by the building, only the net energy

Single meter without reversing

Solar connected on building side of the meter

Does not run backward when solar output exceeds building use

Some meters may allow the excess solar to enter the grid (providing the utility free power)

Most "one-way" meters will block energy flow from the building to the grid so utility does not receive the excess energy, it is lost to both utility and customer.

Benefits neither the utility nor the customer

"Solar" meter

A meter specifically designed for grid-connected solar. Has two readings, one for solar generation and one for total energy used by the house

Expensive

"Smart" meter

Utility can manage the metering of charges for grid power and credits for solar generation remotely. Most useful for utilities with high peak load generation costs and large diverse service area

Typically shows only the net flow of power unless more expensive solar metering is specified. Solar generally not directly metered

Can meter at different tariffs for different times of the day

Expensive

Solar when pre-payment meters are used

Solar is connected to the grid directly and a separate meter is used to measure solar delivery

Credits for solar are provided the customer through the provision of top-up vouchers for the kWh shown on solar meter readings

Only practical for flat tariffs (the same charge per kWh for all usage)

Payment arrangements for solar inputs

Feed-in tariff for all generation

Solar offsets grid energy use for the building only (no payment or credit for surplus solar generation)

Net metering – solar directly offsets grid usage and surplus can be time shifted for later use by the customer or paid for by the utility using a 'Feed In Tariff'

Feed-in tariff – Rate Paid for Solar kWh input

Specific payment per kWh given for surplus power delivered to the grid

Solar kWh that offsets grid kWh is effectively valued at the tariff rate since the customer saves that amount (and the utility loses that amount)

Payment is strongly related to fuel offset cost but is best termed 'avoided cost of energy delivery'

Government may make the feed-in payment higher than the grid power tariff to encourage installing more solar

May be lower than fuel offset cost or even zero if the utility does not want to encourage private solar for customers

Offset of grid energy use only

Effectively zero feed-in payment for surplus energy.

OK for the customer whose main energy use is during the day

- Commercial/government customers usually ok
- Residential customers usually not, most use of energy is at night

Net-metering

Credit to pay for future energy use is provided when surplus energy is delivered to the grid

Effectively feed-in tariff is the grid power tariff for the customer when full kWh credit is given for surplus

Usually credits are cleared periodically so they do not accumulate beyond reasonable levels

Frequency of clearing surplus solar kWh credits

Monthly

For countries with reasonably constant solar over the year

Annually

- For countries with seasonal solar clearing credits at the beginning of the high solar season makes sense

A feed in tariff may be paid when resetting surplus solar credits

DISCUSSION