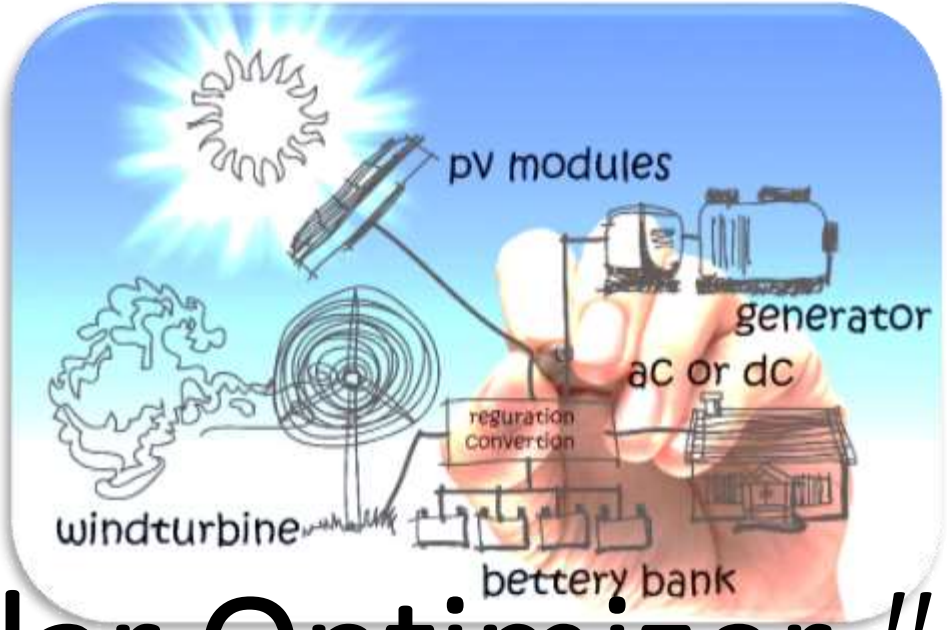

Solar Optimizer *"ABJA"*

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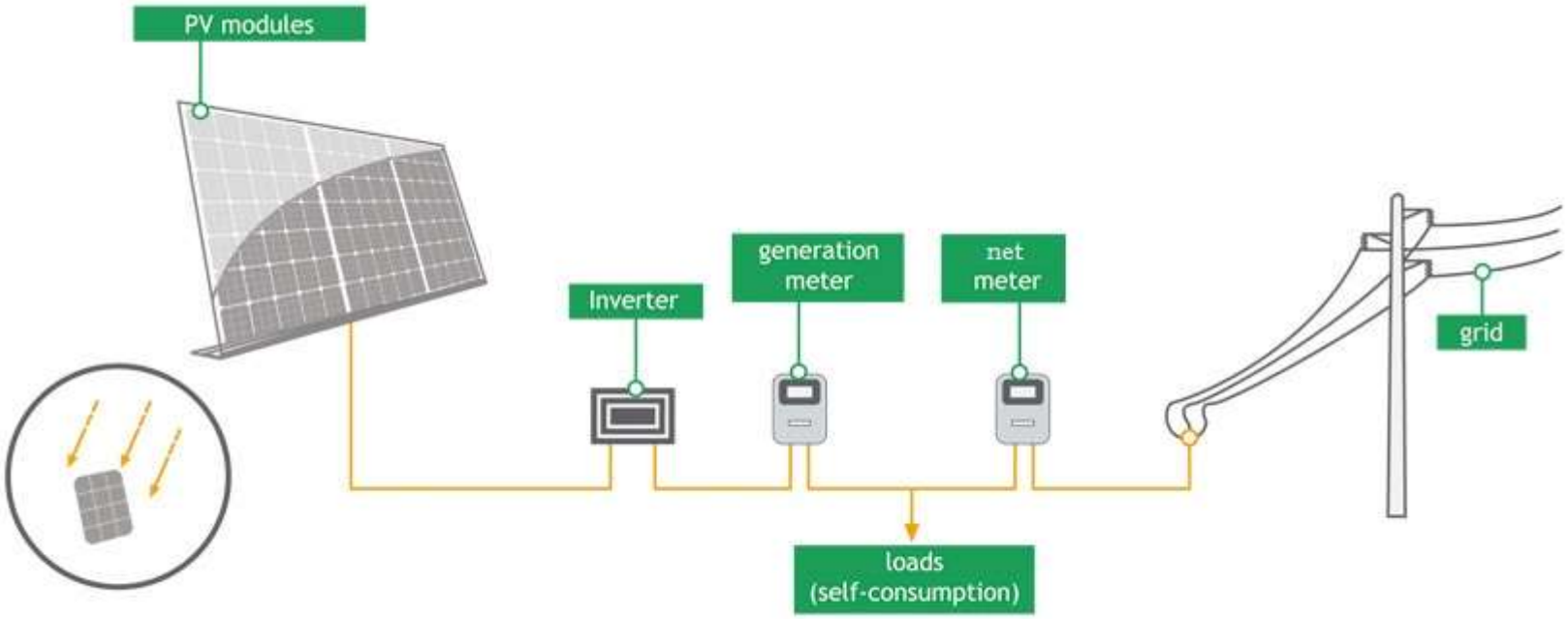
On-Grid systems: New tech on the block



- Integrates the photovoltaic solar with the existing electricity grid.
- Inverter synchronizes the AC output with the existing connection via a PLL.
- Different inverter topologies and control available in market.
- Inverter can be controlled for scheduling dispatch.

- Generate your own power
- Reduce your energy reading
- Sell excess energy to state electricity board (net-metering scheme)
- No sizing required; support entire household

System Integration

A grid intertie system requires a full understanding of the system & process before connecting to the grid.

System Integration

- Solar PV Panel
- Inverters
- Protection systems
- Net-meter

Interoperability Test Response

- Panel – Inverter
- Inverter – net meter
- SRT system – Grid

Solar grid connect: Challenges to traditional power systems

- Government incentives & exponential demand of electrical energy loads to increase number of solar on-grid system.

  - Causes pockets of high penetration.
  - Variable & unmanaged source of power.
  - Impact on stability reliability & efficiency of P.s. grid.
  - No longer a negative load, very significant for planning & operation.
  - Make them difficult to manage as increase & reliability is required.

    - Unplanned location,
    - variable sizes,
    - variable capabilities,
    - fluctuating response to environmental & power situation

Solar : Challenges to system installers

- Sync. With the grid.
- Anti islanding.
- Technical feasibility.
- Power quality problems (different problems in different areas).
- Lack of interest of the field stall of distribution licensee.
- No service level agreement with the residential, small commercial or low voltage customers.

Why a the SRTPV plant faces such problems?

- DISCOM has a huge area with both active and reactive power requirements.
- SRTPV provides only active power. It might happen, that the amount of active power injected in the DISCOM grid might not fully reflect at its input specified for such large system where DER placement is random, unplaced & unmanaged. Disturbs voltage regulation.
  - Unplanned location,
  - variable sizes,
  - variable capabilities,
  - fluctuating response to environmental & power situation.
- Power Quality problems already persistent in the system.
- Long rural/urban feeders length disturbs voltage regulation.

Our Solution

- Practically, we provide a “OLTC” type solution.
- Just like an On-Load tap changer, our optimizer, regulates the voltage at the solar inverter just enough to keep it in sync with the grid.
- Voltage regulation increases due to the installed solar system itself.
- Over time, the system heals itself and continues at proper voltage.

Solar output optimizer basic model: ABJA

- A Variac (auto transformer) controlled by a servo motor.
- Commands to the servo motor fed through a comparator circuit.
- High insulation rating to allow higher currents to enter the system.

Pilot solar optimizer connected at 3 kW solar grid connect site at Bhopal.

3 kW solar grid connect site photograph at Bhopal.

3 kVA Solax make inverter running smoothly via the optimizer.

Pilot solar optimizer connected at 3 kW solar grid connect site at Bhopal.

The system was connected through wi-fi module and kept under scrutinization for 2 weeks.

Voltage received from the grid was 247 V RMS. Rated voltage of the inverter (single phase) is 230 V.

System out of sync at site for two weeks prior to optimizer installation. Average output per kW = 0 kWh units.

After, pilot installation system in sync for 2 weeks with 11 units of electrical energy output per day (3.9 units average per kW).

Thank You