Guidance Notes on the Electricity Connection and Supply Regulations

The Electricity Connection and Supply Regulations (S.L.545.41)(ECSR) entered into force on the 29th October 2024 through legal notice 282 of 2024. These regulations replace the Electricity Supply Regulations (S.L.545.01). These regulations provide the terms and conditions for the connection of loads, generators from renewable energy(RES), combined heat and power and storage to the electricity distribution grid up to the electricity service meter, metering, billing and electricity tariffs.

New regulations in the ECSRs impacting PVs

1. *Regulation 11: Generating installations and energy storage facilities*

Regulation 11(3) (a) : RES generators or CHP or energy storage with an AC rating not exceeding 4.6kW (in case of PVs this is the inverter rating) on any phase equipped with volt-Var control is exempted from the need to request a grid study:

- All the capacity on that phase shall have volt-Var control.
  i.e. it will not be acceptable to add a 3kW inverter with volt-Var to an existing 1.2kW inverter without volt-Var.
- PVs not equipped with volt-Var exceeding 3.68kW AC on any phase still require a grid study

For the volt-Var settings, please refer to the Enemalta's Web Site :
https://www.enemalta.com.mt/2018/01/21/technical-service-specifications/

Regulation 15: Electrical installations

Regulation 15(2) requires that loads and generation capacity connected on a three phase connection are effectively balanced and allows only a tolerance of 10% unbalance between phases:

- Any new or upgraded generating system on a three phase connection must comply with 10% unbalance tolerance. Upgrade here means an **increase** in the inverter output capacity i.e. the kW(AC) capacity connected to the grid.

- Where the service is a three-phase connection any addition of generation AC capacity must result in a balance system within the tolerance of regulation 15(2). Please refer to Annex A for the method of calculating such an imbalance.

- In a premises serviced with a three phase connection and with an existing PV/generator having an AC capacity 3.68kW on two phases, it will not be allowed to install another inverter of 4.6kW(with volt-Var) on the other phase as this will exceed the 10% unbalance. The new Inverter with volt-Var should be limited for example to 4kW, or otherwise the existing inverters of 3.68kW are changed and upgraded.

- The requirements of regulation 15(2) will be applicable for applications received by the REWS for approval, for new PV/generation capacity, changes in configuration, additional capacity, relocation etc . after 29th October 2024.

- It is the engineer's responsibility to confirm that the changes being made will finally result in a generation capacity balanced on all phase in compliance regulation 15(2), in particular when at the time of the application there is no electricity service yet.

Note: Electrical Installations behind the electricity meter are regulated by the Electrical Installations Regulations(S.L.545.24)

Annex A-Methodology Check and Calculate Unbalanced Current:

1. **Measure Phase Currents: Use a clamp-on ammeter to measure the current in each phase (I_a, I_b, I_c) (or rating of the inverter when the checks are being done at the generator (example new PV system or inverter upgrade design stage)**
2. **Calculate Average Current: Add the three measurements and divide by 3:**

$$\textbf{Average Current} = \frac{I_a + I_b + I_c}{3}$$

Find Maximum Deviation: Identify which phase current (Ia,Ib,or Ic) differs the most from the average current calculated in the previous step, and calculate the absolute difference (maximum deviation).

3. **Calculate Percent Unbalance:**

$$\%\textbf{Unbalance} = \left(\frac{\textbf{Max Deviation from Average}}{\textbf{Average Current}}\right) \times 100$$

Example 1: If currents are 100A, 104A, and 96A, average is 100A, max deviation is 4A, and unbalance is

$$(4/100) \times 100 = 4\%$$

Example 2: If inverters are 3.68kW, 3.68kW and 4kW, currents are 16A, 16A and 17.39A respectively

Average current is 16.46A, Unbalance = (17.39-16.46)/16.46 x100% = 5.65%