# Additional information

## DNOs to demonstrate a satisfactory methodology that matches solar array output to consumption

***Ref: A1.21***

1. Given that electricity generated from Solar PVs must be used immediately, either on site, stored in a battery, or sent to the grid, there are three main PV systems that are evaluated for use at sites:

    a. A **grid connect system** works with the local utility grid so that when solar panels produce more solar electricity than the associated house is using, the surplus power is fed into the grid. Alternatively, when the house requires more power than the solar panels are producing, the remaining electricity needed is supplied by the utility grid. At night, all electrical needs are supplied by the grid because the grid connect system does not store the power generated during the day.

    b. A **stand alone solar system** is where the solar panels are not connected to a grid but instead are used to charge a bank of batteries. These batteries store the power produced by the solar panels and then the electrical loads draw electricity from these batteries. Stand-alone solar power systems have been used for a long time in areas where no public grid is available.

    c. A **hybrid solar system** combines solar and battery storage; solar energy that is generated during the day is stored and then used at night. When the stored energy is depleted, the grid is connected as a back up. Hybrid systems are also able to charge the batteries using cheap off-peak electricity.

2. Solar PV systems are made up of several panels that generate direct current (DC) electricity. Because the electricity used for lighting and appliances tends to be alternating current (AC), an inverter is installed along with the system to convert DC electricity to AC.

3. Most inverters on the market have in-built export limitation functionality. The typical approach to configuring an export limitation system is to install a metering device at the network connection point. This sends power flow data to the inverter which adjusts the output power to ensure it stays

below a preset export limit, which can be set to zero. This represents the impossibility of injecting any amount of electrical power into the network. In the default approach, all solar energy produced that is in excess of demand is shunted off, serving no useful purpose.

4. A smarter approach, in which a smart energy management system is deployed, would allow this excess energy to be either put to good use then and there, or sent into a battery for later.

5. Northern Powergrid are currently working through options for renewable energy and will be contracting the project out as a turnkey for the design, supply and install of our renewable systems. As part of the technical specification of the project, regardless of PV system chosen, and to satisty the requirements set forth in SLC 43B (Prohibition of Generation) there will be a requirement for a zero export limit to be maintained at all times. The exact solution to be deployed at a site will be dependent upon the site's electricial characteristics, building type and any physical restrictions.

6. In short, there are many ways to prohibit the self-producer from feeding back the energy produced to the network. But even if our systems are network connected, we will implement a zero feed-in system and will therefore maintain compliance with the requirements of SLC 43B.