TUTORIAL: Increasing the PV Hosting Capacity of Distribution Networks: The role of Smart Inverters and Storage.

Many countries around the world are already experiencing the rapid uptake of residential photovoltaic (PV) systems. Australia, for instance, has currently the largest penetration: almost 1 in 5 houses have PV. As a result, Distribution Network Operators (DNOs) are finding it challenging to allow customers to continue to install the technology as there are many unknowns around the grid's ability to cope with the voltage and thermal impacts resulting from high PV penetrations. To remove barriers for the widespread adoption of residential PV, speed up connection times, and reduce costs, it is, therefore, crucial for DNOs to quantify the PV hosting capacity of their low voltage (LV) and medium voltage (MV) networks. Adequately exploiting the capabilities of Smart Inverters (found in most PV installations) and residential Battery Energy Storage systems will be key in this endeavor.

This tutorial will present and discuss different aspects required to assess the residential PV hosting capacity of distribution networks. Furthermore, the tutorial will explain and demonstrate the benefits but also the potential challenges from exploiting the capabilities of smart inverters (Volt-Watt, Volt-var, export limits) and residential storage systems to increase hosting capacity. Real case studies from Australia will be used to demonstrate the quantification of PV hosting capacity considering potential strategies to make the most of smart inverters and storage.

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