

Paris Session 2022



Analytic and Heuristic Optimal Reactive Power Management with Shunt Capacitors in Distribution System of Southern Regional Grid of India

C6 – Protection and Automation

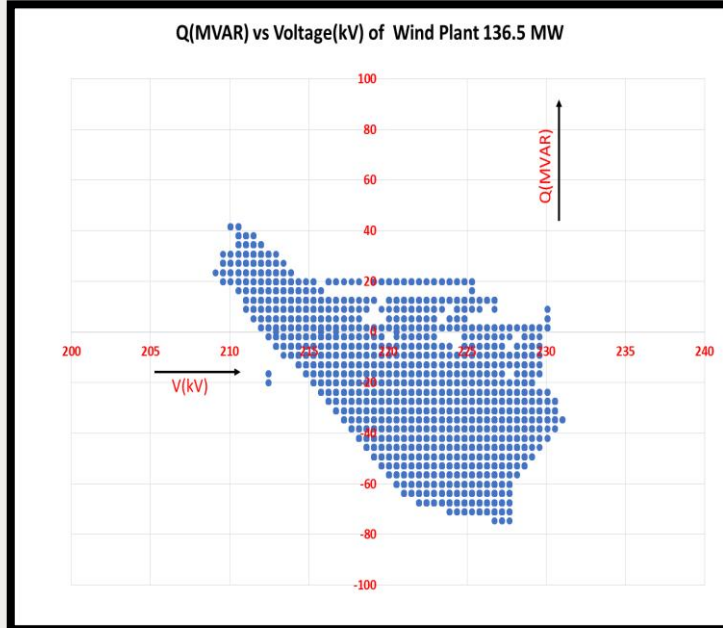
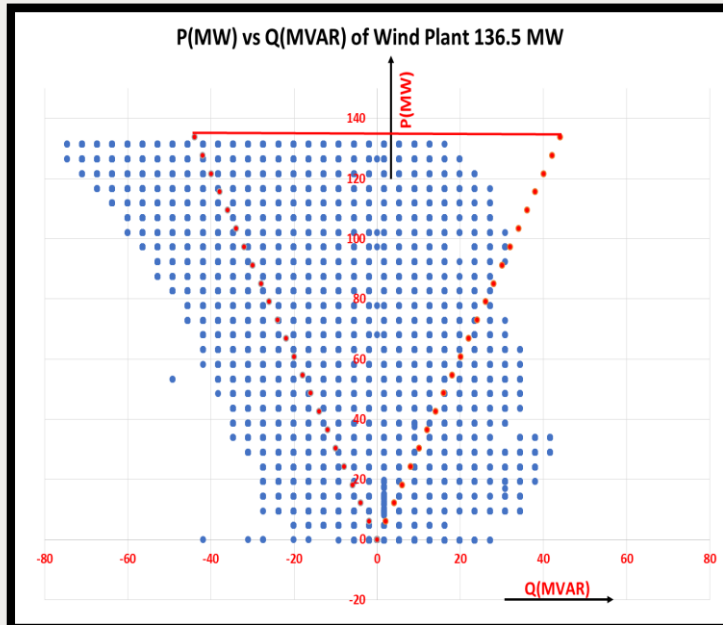
Question 2.6 Regarding voltage issues resulting from RES/DER integration, are there any actual cases where the reactive power control of an inverter is applied? Are there any evaluation or consideration dealing with prioritization, or the combination of various types of voltage control methods? When trying to utilize the resources on the customer side, how should fairness between the resource owners be taken into account?

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Actual Cases of Reactive Power Control of Inverters

- Most of the RE plants in the Southern part of India are operating on voltage control mode during generation hours.
- Most of the inverters are equipped with the capability to absorb/inject reactive power using a feature known as Night mode/ Static Var Generator(SVG) mode.
- The inverters have the reactive capability varying from 33% to 95% of active power capacity for absorption during night hours i.e., during non-generation hours.
- Case studies conducted in Northern Region (NR) and Southern Region (SR) of India have indicated that sufficient reactive capabilities are available in inverters to address high voltages.
- The reactive power support was observed to be limited to the value corresponding to 0.95 lag to 0.95 lead power factor as per regulatory mandate.
- Currently the generators are not willing to extend the reactive support for the grid as there is no commercial/regulatory mechanism.
- The commercial mechanism has to address the following for enabling utilisation of night mode/SVG facility.
 - Incremental real power consumed during the night mode/SVG operation of plant for reactive support.
 - Increased annual maintenance in the form of additional manpower, spares, increased frequency of maintenance etc.

Group Discussion Meeting



Actual Cases of Reactive Power Control of Inverters

- The minute wise data plotted is from 01.06.2022 to 19.07.2022
- Plots of a typical Solar Plant 250MW and Wind Plant 136.5MW in Southern Region of India are shown.
- From the plots, it can be observed that the developer is operating on both Injection and absorption of Q mode.
- From Q vs V plot it is evident that whenever the voltage is going below 1.0 p.u., the developer is Injecting Q into the grid.

