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Effect of harmonics and its solution

Title of the Research : Effect of harmonics and its solution

Present System: Currently, Tamilnadu is the only state in India who is imposing penalty on the harmonics generation and that too only on the high demand consumers. There are no any states in India who is imposing penalty on harmonics feeding consumers.

Limitations of present system: With the Increase use of Nonlinear electric loads common office equipment such as computers and printers, Fluorescent lighting, battery chargers, electronic ballasts, variable frequency drives, and switching mode power supplies. The harmonics problems increases. Harmonic distortion in the power may cause poor power factor, transformer and distribution equipment overheating, random breaker tripping, or even sensitive equipment failure, insulation failure, excessive heating of neutral conductor etc.

General Observations of GERC Regulation in context to Harmonics:

- No clarity in monitoring and implementation methodology for Harmonics and Voltage regulation. No penalty on account of failure to maintain voltage and harmonics within prescribed limits.
- Consumer is responsible for taking corrective action for harmonics injection.
- DISCOMs need to monitor the Harmonics at regular interval at strategic points where it is prone to harmonics voltage generation.

Detail report of Innovation: harmonics generation pattern of various types of consumers and its non-linear loads. Research Activity to analyze the utility performance in terms of technical losses, de-rating & failure of equipment.. To find out the causes and effect of harmonics present & its impact on distribution.

Field study report :

- Procurement of Harmonic Analyzer meter, Modem and Energy Server for measurement and continuous monitoring was done.
- Wiring and Fabrication of the metering & communicable accessories in SMC box done.
- Testing of Harmonic Analyzer setup done.
- Site Visit & Selection of Harmonic Prone connection of Induction Furnace based industry done.
- Modem Communication failure workout is under progress.

How does new innovation help to overcome Limitations of present system:

For the state such as Gujarat, where the 100 % electrification target has been already achieved, it now gets necessary to think beyond the box for the power quality. As stated by the APQI, Up till now, the “power quality” term was considered by the utility in term of reliability indices only. With the drastic increased use of the non-linear devices in the recent era, it is mandatory to think upon harmonics effect and its mitigation techniques.