

Regulation of Electricity Metering in South Africa through NRS057

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Introduction

Formal metering regulations for the electricity supply industry has been developed and documented through NRS057 – Code of electricity metering.

The NER has recently amended the licence agreements of electricity supply authorities by including NRS057 in their supply agreements.

Electricity supply authorities will need to evaluate the requirements of NRS057 and amend their operating environment for metering to align with NRS057.

This paper portrays the implications of the regulatory aspects for the electrical energy metering process.

NRS057

NRS 057 is a generalized code of practise which promotes uniform electricity metering requirements for application in the South African Electricity Supply Industry. The requirements have been specified based on similar international practises applied within electricity metering.

The regulatory requirements is applicable to electricity metering in its entirety, including all equipment requirements, design requirements, maintenance requirements, metering data capturing and data retention requirements and service agents requirements.

Many of the provisions of NRS057 have significant impact on the way that electricity supply utilities will conduct metering in the future. NRS057 contains requirements which electricity supply utilities may only be in a position to conform to progressively and the electricity supply utilities need to engage with the NER to formulate and agree on an implementation plan.

The following paragraphs provides for an overview on the major impact areas related to the requirements of NRS057.

Installation design requirements

The installation design may not necessarily be done by the electricity supply utility's own staff, and can in many cases be consultants. Everyone involved should make themselves familiar with the

minimum requirements that need to be taken into account with the installation design.

Metering installations have been categorised based on the supply size that are to be metered. Minimum equipment class accuracies were specified for each of these categories. The relevant international specifications were also listed for the major equipment in a metering installation.

The design should not only specify the correct equipment to be installed, but should also cater to minimise the technical losses by specifying correct cabling to measurement instrument transformers and specifying correct current instrument transformer ratios to be used.

Maintenance requirements must also be considered through the design by providing for the appropriate ancillary test equipment and test points in the metering circuits.

Approved equipment

The licensee is responsible to maintain a list of approved metering equipment to be used in their metering installations.

Metering equipment must be evaluated to determine if it meets requirements based on international standards and the electricity supply utilities own requirements. Type test records from a SANS recognised facility must be available for all major components of a metering installation.

Large electricity supply utilities may be in a position to perform such evaluations in-house, but smaller utilities may not have the necessary resources to do so. They will have to either contract the work to external consultants or establish an agreement with a larger utility to adopt their approved listing.

Metering equipment installation

NRS057 is very specific with the requirements pertaining to the equipment installation.

Voltage - and current instrument transformers used in the installation must be accompanied with calibration test certificates obtained from a SANAS accredited test facility. The major manufacturers of CTs and VTs do not have SANAS approved testing facilities. They may use equipment that has been calibrated at a SANAS accredited facility, but their own operating environments are not SANAS approved. Manufacturers need to invest into

obtaining SANAS accreditation for the testing of CTs and VTs. Electricity supply utilities will thus not be in a position to comply with this requirement at this stage, but they need to put pressure on the manufacturers to implement formal accreditation.

The same argument is relevant to the manufacturers and suppliers of electricity meters. Utilities must have records of calibration certificates for each meter. There are only a few test houses that have obtained SANAS accreditation for the calibration of energy meters, but this may also change once utilities specifies this requirement in their tenders.

NRS057 not only specifies the requirements for equipment to be installed, but also the requirements for the staff that is responsible for the installation and commissioning of the equipment. NRS057 has categorised installations based on the complexity of the installation. For each category certain minimum requirements are specified for staff related to technical qualification, training and experience.

The electricity supply utility may only contract staff for commissioning of installations that meets the requirements as specified for that installation. To ensure conformance to this requirement the utility will have to maintain a list of accredited staff or contractors for specific work.

Installation maintenance

Metering installations need to be maintained at minimum intervals and the frequency of maintenance is based on the supply size. Utilities will need to align their maintenance policies with the frequencies as specified in NRS057.

Certain minimum requirements are specified for meter installation maintenance. Not only must installation equipment be re-tested, but the metering data must also be evaluated to determine if the final billing data is aligning with meter advances.

Staff which is responsible for maintenance must again conform to certain minimum requirements related to technical qualification, training and experience.

Metering access

NRS057 specifies that access by customers or customer representatives to meters, metering circuits and metering data shall be restricted to ensure that the integrity of the metering device, *metering installation* and meter data are not at risk. This requirement safeguard the electricity supply utility from risk to the metering installation, but the customer has a right to obtain his metering data from the supply utility. The supply utility must

therefore be able to provide for historical metering data upon request from the customer. A web based application with password control may prove to be the most ideal solution for electricity supply utilities.

Current - and voltage instrument transformers must be dedicated only to the utility's metering equipment. Customer equipment may thus not be installed into the utility's CT and VT circuits. Customers and consultants must take this requirement into consideration when providing for a design on additional metering equipment.

Metering data access

NRS057 specifies minimum intervals for retrieving billing data from meters in the field (pre-payment meters excluded). The frequency for obtaining the billing information is again based on the supply size of the installation.

The electricity supply utility needs to put the necessary plans in place to obtain the billing data at the pre-determined intervals. Technology today provides for ease of obtaining the billing information. Automated meter reading may be one solution to achieve this requirement.

Metering data validation

Metering data must be validated before the bill is produced to check for inaccurate data, missing data, consumption that is not in line with the customer historical data etc.

A log must also be kept of any changes or estimations that are made to the billing data.

Frequencies are also specified for the validation of meter billing data versus meter advances. Only few of the utilities have this requirement in place for their customers.

Where monthly meter reads are taken directly from the meter (manual reading) this validation is simple to just check with data in the billing system, but where automated metering is employed the validation becomes involved.

Typically the AMR system obtains metering interval data (kWh and kvarh) per half hour – the AMR system does not obtain meter advances. Multiplication constants are applied to these half-hourly values to get the final billing values. There is a chance that errors can be introduced in this billing process through manual operation by system operators. It is thus important to validate the actual meter advance to the final billing values to determine if the whole billing process is accurate.

Metering data retention

Five years of historical billing data must be kept by the electricity supply utility.

If the billing was done from interval data, then the interval data must also be available for at least five years.

Any logs on data estimations must also be kept for at least five years.

Conclusion

By including NRS057 in the license agreement of electricity supply utilities, the requirements have become regulatory and it has a definite impact on the metering process being employed by the utilities.

Some requirements cannot be implemented immediately, but it is the responsibility of each electricity supply utility to formulate and establish an implementation plan for these requirements.