

Title: **EVALUATION CRITERIA FOR A
SMART PREPAYMENT
SYSTEMS**

Unique Identifier:

240-97225295

Alternative Reference Number: **n/a**

Area of Applicability:

Engineering

Documentation Type:

Report

Revision:

2

Total Pages:

25


Next Review Date:

n/a

Disclosure Classification:

**Controlled
Disclosure**

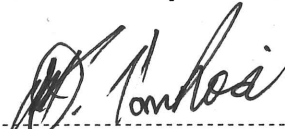
Compiled by



Edison Makwarela

Senior Consultant

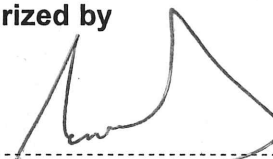
Functional Responsibility



Deon Van Rooi

**Manager: Metering DC &
Security Technologies
(Acting)**

Authorized by



Richard McCurrach

**Senior Manager: PTM&C
Engineering**

Date: **04-04-2018**

Date: **04-04-2018**

Date: **4/4/2018**

Content

	Page
1. Introduction	4
2. Supporting clauses	4
2.1 Scope	4
2.1.1 Purpose	5
2.1.2 Applicability	5
2.2 Normative/informative references	5
2.2.1 Normative	5
2.2.2 Informative	6
2.3 Definitions	6
2.3.1 General	6
2.3.2 Disclosure classification	7
2.4 Abbreviations	7
2.5 Roles and responsibilities	8
2.6 Process for monitoring	8
2.7 Related/supporting documents	8
3. Overview of the evaluation	8
4. Technical Tender Returnables	10
5. Section 1 – Evaluation of Meters, Modems and Data Concentrators	11
5.1 Overview of the evaluation of Meters, Modems and Data Concentrators	11
5.2 Initial Phase evaluation	11
5.3 Supply and Development Phase evaluation	11
5.3.1 Supply & Development Phase – Technical Sub-Category: Product A&B Schedules	12
5.3.2 Supply & Development Phase – Technical Sub-Category: Risk and Support	12
5.3.3 Supply & Development Phase – Technical Category: Demonstration Evaluation	13
5.4 Production Phase Evaluation	14
5.4.1 Production Phase – Technical Sub-Category: Product A&B Schedules	15
5.4.2 Production Phase – Technical Sub-Category: Risk and Support	16
5.4.3 Production Phase – Technical Category: Demonstration Evaluation	16
6. Section 2 – Head End System Evaluation	17
7. Additional Requirements	19
7.1 DLMS/Cosem keys and passwords	19
7.2 STS Test key	20
7.3 Testing of meters and DCs in the Supply & Development Phase	20
8. Authorization	20
9. Revisions	20
10. Development team	21
11. Acknowledgements	21
Annex A – Gatekeepers Requirements	22
Annex B – Gatekeepers Requirements for HES	25

Tables

Table 1: List of items for enquiry	4
--	---

ESKOM COPYRIGHT PROTECTED

When downloaded from the WEB, this document is uncontrolled and the responsibility rests with the user
to ensure it is in line with the authorized version on the WEB.

Table 2: Technical scoring breakdown	11
Table 3: Supply and Development scoring breakdown	11
Table 4: Scoring of items in Technical Schedules A&B	12
Table 5: Scoring of items in Demonstration Evaluation.....	13
Table 6: Technical scoring breakdown	15
Table 7: Production Phase scoring breakdown	15
Table 8: Scoring of items in Technical Schedules A&B	15
Table 9: Scoring of items in Demonstration Evaluation.....	16
Table 10: Technical scoring breakdown for A&B Schedules with Risk and System Demonstration	19
Table 11: Scoring of items in Demonstration Evaluation.....	19
Table 12: HES scoring criteria for the different categories	19
Table 12: Gate Keeper Requirements of Different Phases	22

Figures

Figure 1: Overview of meters and DCUs evaluation	8
Figure 2: Interoperability between HES and field devices	10
Figure 3: Overview of the HES evaluation.....	18

1. Introduction

This document provides an overview of Eskom's technical requirements for an enquiry for the supply of single and three phase smart prepayment meters, Head End System (HES), CIU's, modems and Data Concentrators.

The document sets out the evaluation criteria for smart, split prepayment metering systems for residential and urban households as well as small commercial customers. The document provides an overview of the requirements stated in the enquiry for smart prepaid meters, and acts as a supplement to the detailed specification.

This document defines the technical evaluation criteria, along with the technical schedules A and B (defined in the spreadsheet and not this document) that will be used to evaluate the enquiry for smart prepayment system.

2. Supporting clauses

2.1 Scope

This document provides information relating to an enquiry for the evaluation, testing, acceptance and supply of smart prepayment systems to be utilized in Eskom.

After the functional evaluation of the minimum requirement and full requirements of the Supply & Development Phase and the Production phase, the tenderers that meet the minimum threshold will be invited to a demonstration session where they will be required to demonstrate the functionality of their systems based on *Eskom Standard 240-126910106 Particular Requirements for Eskom Smart Metering System*.

Note:

The NRS049 companion specification may still be modified based on field and implementation experience and as such supplier must be willing and able to accommodate such changes.

The tender is for the development and supply of the following smart metering systems components:

Table 1: List of items for enquiry

	Item
1	Single Phase Split Meter with CIU
2	Three Phase Split Meter with CIU
3	Modems
4	Gateway/Data Concentrators (DCU)
5	Head end System

Supplier may tender for single phase meters or three phase meters taking into consideration that both single phase and three phase meters must be supplied with associated DCUs, CIUs and / or modems.

Where a supplier only manufactures or supplies the DCUs, the supplier will be allowed to tender for the DCU only provided the tendered DCU is compatible with meters from different suppliers.

Suppliers shall ensure that all DCUs and or meters are supplied with their associated modems and cabling where required. Thus, no modem only suppliers will be accepted.

It is anticipated that the meter and Customer Interface Unit will operate as a matching pair although additional Customer Interface Units (like cell phones) may also be incorporated or an advanced CIU may be provided with options to connect to a computer or possibly with an integrated graphic display.

Eskom already has one HES and the intention is to procure a least two (2) additional Head end Systems and all meters and DCUs will be required to communicate with at least one of the three Head end Systems during the development phase. The two (2) additional HESs will be selected based on the evaluation scores of the HES section by selecting the two top suppliers with the highest scores.

Thus, all smart metering components (meters, modems, DCU, CIU, ACD, etc.) will have to be fully compatible with one of the approved smart metering HES by the completion of the developmental phase. The HES will be evaluated and awarded separately.

The tenderers who achieve the minimum threshold score during functional evaluations of the Supply & Development Phase and the Production Phase will be required to demonstrate the complete operation of the system before moving to the next phase.

Successful tenderers at the end of the complete evaluation (on contract award for production phase) shall be required to provide the necessary type test certificates for the field equipment, calibration certificates for the meters and training material as well as providing ongoing product training and support.

Eskom may choose to subject approved meter types and DCUs with associated modems, which have passed the evaluation, to Accelerated Environmental Stress Testing (AEST). Eskom will contact successful supplier(s) to arrange for the supply of thirty encoded meters and six concentrators within four weeks after the technical evaluation. The AEST consists of a variety of tests to simulate the life of the equipment under test in an accelerated fashion. The AEST tests are conducted by Eskom technical staff, covering the tests indicated below which are described in detail in the Procedure for Accelerated Environmental Stress Testing of solid state metering equipment. Vibration and drop tests

- Temperature and humidity cycling
- Supply voltage / load current profile
- Voltage interruptions
- Voltage dips
- Fast transient bursts
- Electrostatic discharges
- Lightning impulses

Meters and DCUs with its associated modems that are subjected to the above tests are required to pass the above tests without compromising any of its functionality. If any serious failures or deficiencies are detected in the accelerated environmental stress testing, the supplier shall, at his cost, address the deficiency to Eskom's satisfaction and replace the equipment that may have been installed already.

2.1.1 Purpose

This document provides evaluation criteria information relating to a commercial enquiry for the manufacture, development, testing, acceptance and supply of single and three phase smart prepayment meters, CIU's, modems, HES and Data Concentrators for use in Eskom over a period of 5 years.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] 240-126910106 Particular requirements for a smart metering system

- [2] Group IT Business Requirement Specification (BRS) AMI head-end solutions (AMI Project) - GCS20".
- [3] NRS049:2016 Advanced metering infrastructure requirement for smart metering system
- [4] SANS 1524-1 Electricity payment systems – Part 1: Payment meters

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
Appliance control	Process by which a customer and/or the utility can connect or disconnect specific appliances to/from the supply or modify the operation of specific appliances upon command via the customer communications gateway or an in-house controller [SANS 62051]
COSEM	Companion Specification for Energy Metering" - sets the rules, based on existing standards, for data exchange with energy meters
Customer Interface Unit	The CIU is part of the split meter that provides the user with a convenient interface to the remote MCU. The CIU includes a visual consumption rate LED and the numeric keypad data entry terminal. In the smart meter context a CIU could also be facilitated via a smart- or normal cell phone interface. Optionally a more advanced CIU may be provided with options to connect to a computer or possibly with an integrated graphic display.
Data Concentrator	Device that communicates to the AMI master station for data uploads and downloads and communicates with several meters associated with that concentrator
DIN Rail	Common configuration of distribution board fitted with electrical equipment e.g. earth leakages, circuit breakers, demand controllers, timers and electricity meters used nationally and internationally
DLMS	Device Language Message specification" - a generalised concept for abstract modelling of communication entities
Dynamic load control	Closed-loop control of the load such that the restoration of the load to customers through the AMI system to a part of the network is limited to avoid localised overloading of the network, based on feeder or transformer loading data received by the AMI system
IDIS	IDIS is a publicly available technical interoperability specifications based on open standards and supports the implementation in interoperable products. The specification is for smart metering companies who are committed to providing interoperable products based on open standards.
Interoperability	Interoperability is the ability of a system to exchange data with other systems of different types and/or from different manufacturers.
Load control by utility	procedure to limit the supply or load at the customer's premises by a command from a point remote from the customer's premises
Measurement Unit (MU or MCU)	Measurement Unit (or Measurement Control Unit) as defined in SANS 1524-1

Definition	Description
Non-volatile memory	Storage device, that can retain information in the absence of any external power source
PLC	Power line communication or power line carrier (PLC), mains communication, or Broadband over Power Lines (BPL) are systems for carrying data on a conductor also used for electric power transmission.
Power Limiting	An automatic load disconnection function provided in prepayment meters to limit the average power consumed, to the value programmed in the meter with the relevant STS management token. The average power consumed is calculated over a number of pulses and is therefore not suitable to serve as input for any protection feature.
Self-registering	Ability of the meter upon being added to the AMI master station when installed and commissioned to register or configure itself with the AMI system so that it will commence performing its proper functions without further local intervention
Split Meter	Meter where the Measurement Unit and Customer interface Unit are contained in separate enclosures.

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
ACD	Appliance Control Device
CIU	Customer Interface Unit
COSEM	Companion Specification for Energy Metering
DLSM	Device Language Message specification
HAN	Home Area Network
HES	Head End System
IDIS	Interoperable Device Interface Specification
IEC	International Electrotechnical Commission
MDMS	Meter Data Management System
PLC	Power line communication
QOS	Quality of supply
RF	Radio Frequency
SANAS	South African National Accreditation System
STS	Standard Transfer Specification
TOU	Time of Use

2.5 Roles and responsibilities

This document defines the technical evaluation criteria that will be used by the Eskom technical evaluation team for the evaluation of single and three phase smart prepayment meters, CIU's, modems, Data Concentrators and HES.

2.6 Process for monitoring

Not Applicable

2.7 Related/supporting documents

Not Applicable

3. Overview of the evaluation

- 3.1. When submitting tenders to Eskom, suppliers shall inform Eskom the category under which they fall on the day of submitting the tender.
- 3.2. The evaluation of meters and DCUs and its associated modems will be based on the diagram in Figure1 and will include the evaluation of both Category 1 and Category 2 suppliers.
- 3.3. Category 1 suppliers are those suppliers that meet the gatekeeper requirements of the "Category 1 suppliers" as stipulated in Annex A of, Table 12, Column B on the day when the tender is submitted to Eskom.
- 3.4. Category 2 suppliers are those suppliers that meet the gatekeeper requirements of "Category 2 Suppliers" as stipulated in Annex A of, Table 12, Column A of this document on the day when the tender is submitted to Eskom and have already started working on their products to meet the gatekeeper requirements of the Development Phase within 6 (six) months after having meter passed the applicable gatekeeper evaluation for which Eskom would need to inform the Supplier.

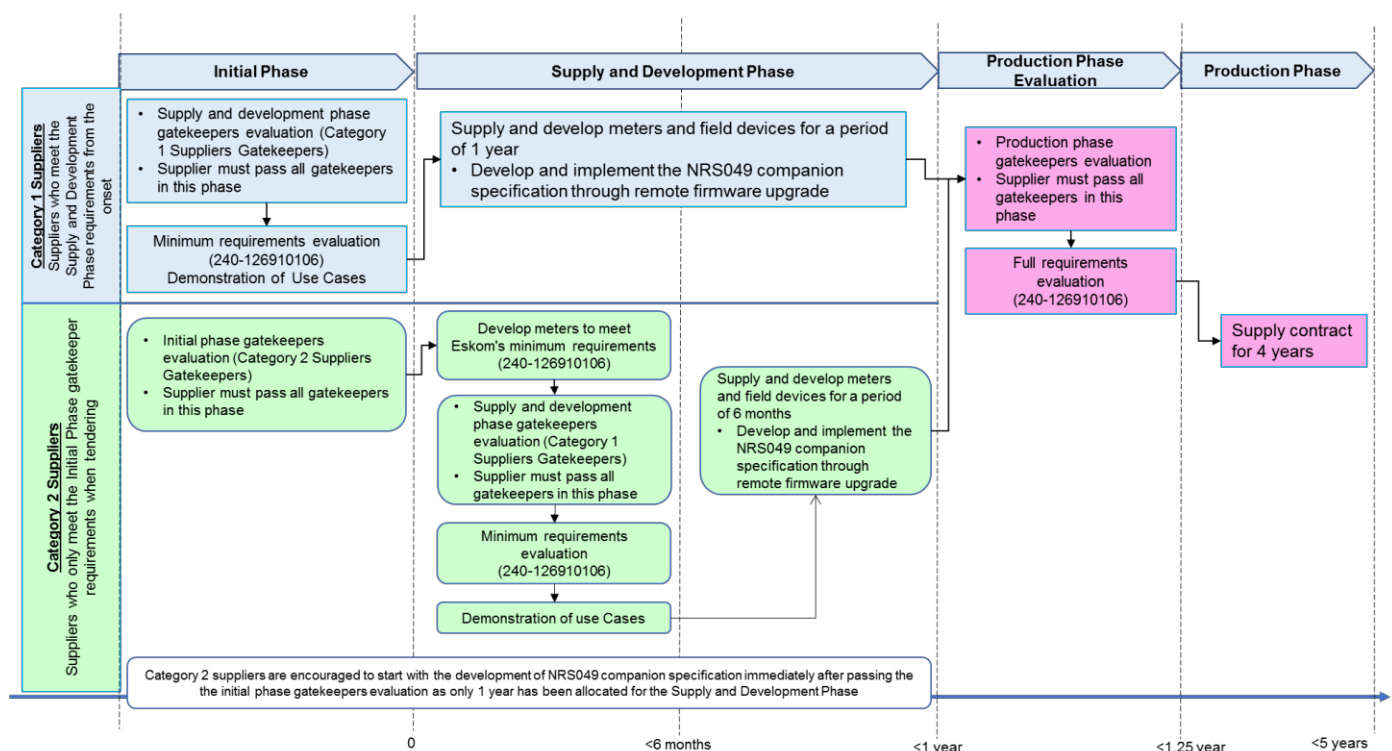


Figure 1: Overview of meters and DCUs evaluation

ESKOM COPYRIGHT PROTECTED

- 3.5. The evaluation of **Category 1** suppliers is as follows:
- a) Suppliers are evaluated based on Category 1 gatekeeper requirements stipulated in Column B of Table 12 under Annexure A of this document.
 - b) Suppliers that meet all Category 1 gatekeeper requirements will proceed to the functional evaluation section based on the minimum requirements as stipulated in Annex A of 240-126910106.
 - c) Based on the functional evaluation of the minimum requirements as stipulated in Annex A of 240-126910106, successful supplier will be required to supply and develop their products for a year to meet the full requirements of 240-126910106 including the NRS049 companion specification.
 - d) After 1 year of supply and development, suppliers are evaluated based on gatekeepers requirements of the Production Phase as stipulated in Annex A of, Table 12, Column C
 - e) Supplier that meet all the requirements based on gatekeepers requirements of the Production Phase as stipulated in Annex A of, Table 12 Column C of this document are then moved on to the full functional evaluation as stipulated in Annex A of 240-126910106.
 - f) Suppliers who fail to meet all the gatekeepers' requirements of the Production Phase as stipulated in Annex A of, Table 12, Column C of this document will be disqualified and excluded from further evaluation.
 - g) Suppliers who fail to meet the minimum threshold of the full requirements of 240-126910106 at the end of the 1 year development phase will be disqualified and prohibited from further supplying the products to Eskom. At this stage, the supplier would still need to support the installed meters for the life span of the meters although the supplier is not offered a production contract.
- 3.6. The evaluation of **Category 2** suppliers is as follows:
- a) Supplies are evaluated based on gatekeepers requirements of the Category 2 Suppliers as stipulated in Annex A, Table 12, Column A of this document
 - b) After a period of 6 (six) months, suppliers are subjected to section 3.5 of this document as they are expected to would have developed the products to Category 1 Suppliers level.
 - c) Category 2 suppliers have 1 year to meet the requirements of both the development and production phases.
- 3.7. Figure 2 below summaries how interoperability between HES and metering field devices will be achieved after the 1 year supply and development phase.

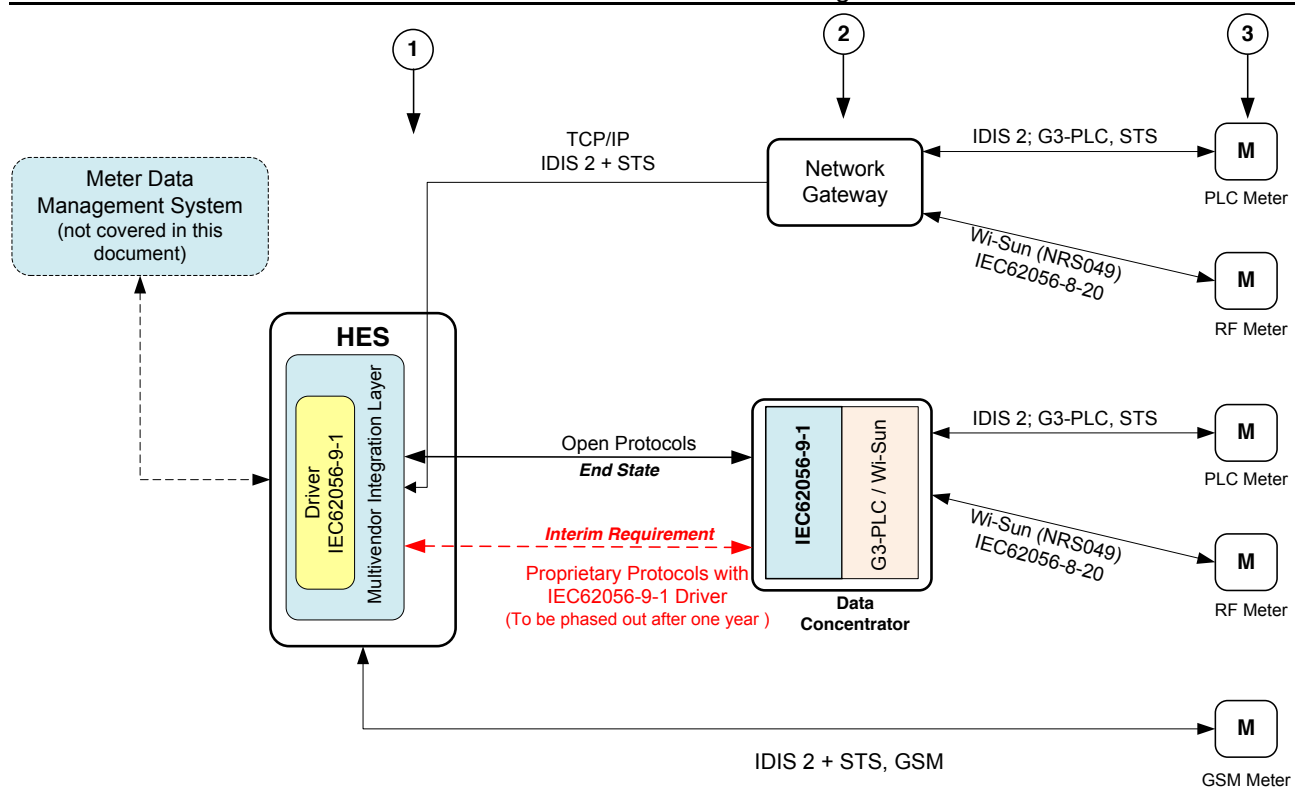


Figure 2: Interoperability between HES and field devices

4. Technical Tender Returnables

Tenderers shall supply the following information:

- 1) Declaration of Category under which the supplier will be tendering
- 2) A declaration of compliance to the gatekeepers in the Excel file for each item and category
- 3) Excel files (Schedule A & B) must be returned to Eskom in Excel format (electronic) and in addition, converted to Acrobat for auditing purposes.
- 4) Completed general questionnaire as listed in the Excel file
- 5) Completed technical schedules for all items tendered as listed in the Excel file
- 6) Completed risk and support questionnaire as listed in the Excel file. Suppliers are to complete a separate risk and support questionnaire sheet for each item/product being offered.
- 7) Details regarding the make and model numbers of all items offered and auxiliary components.
- 8) Data sheets, brochures and detailed product manuals for all components offered.
- 9) Category 1 bidders, must provide a list of DLMS/COSEM objects (or object model) implemented in their existing products or those under development.

5. Section 1 – Evaluation of Meters, Modems and Data Concentrators**5.1 Overview of the evaluation of Meters, Modems and Data Concentrators****5.2 Initial Phase evaluation**

Tender responses shall be evaluated using the methodology of the Preferential Procurement Policy Framework Act (05 of 2000). High level gatekeeper criteria are applicable, represented by minimum scoring thresholds in two evaluation categories. Category 1 suppliers must pass this phase to be able to continue with the evaluation process. Category 2 suppliers must pass this phase to continue to the Supply and development phase. Any Tenderer that is not successful in this process will be disqualified.

This section details the methodology to be employed by Eskom in evaluating suppliers to qualify them for the initial phase. The scoring methodology for other categories is provided elsewhere amongst the tender documentation.

This phase is for suppliers who do not meet the requirements to be accommodated in the Supply and Development Phase and have declared in their submission that they are Category 2 Suppliers. In order to be considered for this phase of evaluation, suppliers are evaluated based on gatekeeper's requirements of the Initial Phase (Category 1 Suppliers Gatekeepers) as stipulated in Annex A, Table 12, Column A of this document.

5.3 Supply and Development Phase evaluation

Tender responses shall be evaluated using the methodology of the Preferential Procurement Policy Framework Act (05 of 2000). High level gatekeeper criteria are applicable, represented by minimum scoring thresholds in two evaluation categories. Tenders must pass all two categories to be able to continue with the evaluation process. Any Tenderer that is not successful in this process will be disqualified.

This section details the methodology to be employed by Eskom in scoring the Supply and Development Phase. The scoring methodology for other categories is provided elsewhere amongst the tender documentation.

Each tender shall pass all gatekeepers' requirements of the Supply and Development Phase as stipulated in Annex A, Table 12, Column B of this document.

Tenders not meeting any of the Technical Gatekeepers shall be immediately excluded from further evaluation, and shall be assigned a Technical score of 0%. The overall technical scoring shall be made up of scoring in the various sub-categories during the different phases of the technical evaluation as follows:

Table 2: Technical scoring breakdown

Technical Criteria	Weightings
A&B Schedules as well as Risk and Support (Supply and Development Phase)	50
Functional evaluation with System Demonstration (Supply and Development Phase)	50
Total	100
Minimum threshold for qualification	85

Supply and Development Phase shall be made up of scoring in two sub-categories and shall be adjudicated a score out of 100 as follows:

Table 3: Supply and Development scoring breakdown

Phase 1 - Technical sub-category	Weightings
Product A&B Schedules	60
Risk and Support	40

ESKOM COPYRIGHT PROTECTED

Total	100
Minimum threshold for qualification	85

Only suppliers that meet the minimum threshold score of the Supply and Development Phase will be considered for participation in the Production Phase. Tenders that do not meet the minimum threshold shall be immediately excluded from further evaluation.

The Supply and Development Phase is also made up of scoring the system demonstration and shall be adjudicated a score out of 100 with a **minimum threshold for qualification of 85%**.

Modems will be subjected to the same criteria as set out in table 2 and 3 for cat 1 suppliers under the initial phase. **Modem functionality will be evaluated and demonstrated as part of the system functionality, but will be scored separately. The minimum threshold for qualification for category 1 modem suppliers under the initial phase is 70%.** This minimum threshold qualification of 70% will be the same for Category 2 suppliers when evaluated under the supply and development phase.

5.3.1 Supply & Development Phase – Technical Sub-Category: Product A&B Schedules

This section shall comprise scoring of the technical schedules. Major deviations to scored items shall be addressed in Sub-category: Risk and Support. **This section will only focus on the requirements that are marked as “full requirements” in Annex A of 240-126910106.**

The A&B Schedules use a default weight of 1 for each scored item. Critical items are assigned higher weights. For example, a weight of 10 indicates that the item will count the same as ten items with weight 1. Each item will be assigned a score by the Eskom evaluation team based upon the tendered response and cross-checked with the supporting documents provided.

Table 4: Scoring of items in Technical Schedules A&B

Criteria	Score
Fully compliant (Indicated as Y in A&B Schedules)	3
Partially compliant - minor deviation (Indicated as P in A&B Schedules)	1
Non-compliant - major deviation (Indicated as N in A&B Schedules)	0

The score for each item will be multiplied by its weight to obtain the total score per item. All scores for the A&B Schedule will be tallied and shall be calculated based on the maximum possible score. This will be recorded as the percentage score.

5.3.2 Supply & Development Phase – Technical Sub-Category: Risk and Support

The Eskom technical team will evaluate the risk and support capability of the supplier / product based on the Risk and Support Questionnaire as listed in the Excel file, deviations schedules and from the non-scored components in Sub-category: Production A&B Schedules. The evaluation of the risk and support of the product / supplier shall be adjudicated a score out of 100 made up of two areas as follows:

Product Risk (60): A score derived for the product risk based on the following areas and weighted as follows:

- Installed base / time that a similar system (containing Head End, Concentrators, Meters and Modems) has been installed (weight 25)
- Deviations from standards (weight 25)
- Ability to deliver (weight 25)
- Historical performance of similar systems (weight 25)

Support (40): A score derived for support based on the following areas and weighted as follows:

ESKOM COPYRIGHT PROTECTED

- Local expertise (weight 30)
- Maintenance (weight 30)
- Spares holding (weight 20)
- Training for all components of system (weight 20)

5.3.3 Supply & Development Phase – Technical Category: Demonstration Evaluation

For the Supply and Development Phase demonstration evaluation, suppliers will be allowed to connect the meters to their own Head end System to demonstrate the required metering capabilities.

The Data Concentrator, Meter, modem Customer Interface Unit shall be functionally evaluated against the requirements of the respective specifications by the Eskom technical team and allocated a score based on the criteria listed below. **This section will focus on the requirements that are marked as “minimum requirements” and “Developmental Phase/Future Development” in Annex A of 240-126910106.** The scoring principals’ applied to the Technical Schedules A&B shall apply the Demonstration evaluation as per the following table.

Table 5: Scoring of items in Demonstration Evaluation

Criteria	Score
Fully compliant	3
Partially compliant (minor deviation)	1
Non-compliant (major deviation)	0

Use Cases that will be evaluated during the demonstration: (Weight 100)

- 1) Remotely change meter to post-paid operation. (Weight 10)
- 2) Remotely load three-rate tariff on meter via schedule and on demand, and synchronise clock on meter. (Weight 10)
- 3) Remotely change meter to prepaid operation. (Weight 10)
- 4) Demonstrate firmware upgrade for meter (remote or local). (Weight 10)
- 5) Demonstrate load limiting functionality (Weight 10)
- 6) Manually register a customer and meter on HES. (Weight 3)
- 7) Read meter configuration on demand per register (including total kWh to date, available credit and all STS information defined). (This step is to ensure the system operates correctly when the process starts.) (Weight 3)
- 8) Read meter billing data via schedule, (Weight 5)
- 9) Demonstrate CIU display every use case during prepaid and post-paid operation. (Weight 3)
- 10) Demonstrate automatic detection, notification and auto-registration of newly installed meter. (Weight 5)
- 11) Demonstrate tamper alarm / fraud detection. (Weight 3)
- 12) Demonstrate remote Disconnection and Reconnection. (Weight 5)
- 13) Demonstrate automatic detection and registration of new Concentrator installed on the network. (Weight 5)
- 14) Demonstrate the Concentrator functionality that is available from the HES. (Weight 3)
- 15) Demonstrate security of communication between HES and Concentrator. (Weight 3)
- 16) Demonstrate security of communication between concentrator and meter. (Weight 3)

- 17) Demonstrate Power Quality features. (Weight 3)
- 18) Demonstrate Load Profile management. (Weight 3)
- 19) Demonstrate the reports available e.g. meters and concentrator availability, new and missing devices detected, device configurations, consumption, credit, tamper / fraud alarms, power quality etc. (Weight 3)
- 20) Demonstrate utilising the modem software for the configuration of:
 - a. APN Settings (Weight 3)
 - b. Serial Settings (Weight 3)
 - c. Client/Server mode (Weight 3)
 - d. Watchdog times (Weight 3)
 - e. Security settings (Weight 3)
 - f. Dual SIM functionality (Weight 3)
- 21) Utilising the modem software for querying statuses locally and remotely where applicable such as:
 - a. Signal strength indication (Weight 3)
 - b. Modem start-up monitoring (Weight 3)
 - c. Overall modem settings (Weight 3)
- 22) Demonstrate the following requirements operationally:
 - a. Client and server mode with applicable HES, DCU's and Meters (Weight 10)
 - b. Watchdog timer modes or functionality through subjecting modem to certain conditions (Weight 10)
 - c. Modems ability to connect to the fastest available network seamlessly (including, subjecting modem to certain conditions to test the fall back options, e.g. 3G/LTE modem connecting via GPRS (Weight 10)
 - d. Operating voltages and deviations (Weight 3)

5.4 Production Phase Evaluation

For the Production Phase demonstration evaluation, suppliers will be allowed to connect the meters/DCU to their own Head end System to demonstrate the required metering capabilities.

Tender responses shall be evaluated using the methodology of the Preferential Procurement Policy Framework Act (05 of 2000). High level gatekeeper criteria are applicable, represented by minimum scoring thresholds in two evaluation categories. Tenders must pass all two categories to be able to continue with the evaluation process. Any Tenderer that is not successful in this process will be disqualified.

This section details the methodology to be employed by Eskom in scoring the Production Phase. The scoring methodology for other categories is provided elsewhere amongst the tender documentation.

Each tender shall pass all gatekeepers' requirements of the Production Phase as stipulated in Annex A, Table 12, Column C of this document

Tenders not meeting any of the Technical Gatekeepers shall be immediately excluded from further evaluation, and shall be assigned a Technical score of 0%. The overall technical scoring shall be made up of scoring in the various sub-categories during the different phases of the technical evaluation as follows:

Table 6: Technical scoring breakdown

Technical Criteria	Weightings
A&B Schedules as well as Risk and Support (Production Phase)	50
Functional evaluation with System Demonstration (Production Phase)	50
Total	100
Minimum threshold for qualification	85

Production Phase shall be made up of scoring in two sub-categories and shall be adjudicated a score out of 100 as follows:

Table 7: Production Phase scoring breakdown

Production Phase - Technical sub-category	Weightings
Product A&B Schedules	60
Risk and Support	40
Total	100
Minimum threshold for qualification	85

Only suppliers that meet the minimum threshold score of the Production Phase will be considered for participation in the Production Phase. Tenders that do not meet the minimum threshold shall be immediately excluded from further evaluation.

The Production Phase is also made up of scoring the system demonstration and shall be adjudicated a score out of 100 with a **minimum threshold for qualification of 85%**.

Modems will be subjected to the same criteria as set out in table 6 and 7 for both category 1 and 2 suppliers. Modem functionality will be evaluated and demonstrated as part of the system functionality, but will be scored separately. The minimum threshold for qualification for both category suppliers under the production phase is 85%.

5.4.1 Production Phase – Technical Sub-Category: Product A&B Schedules

This section shall comprise scoring of the technical schedules. Major deviations to scored items shall be addressed in Sub-category: Risk and Support. **This section will only focus on the requirements that are marked as “minimum requirements” in Annex A of 240-126910106.**

The A&B Schedules use a default weight of 1 for each scored item. Critical items are assigned higher weights. For example, a weight of 10 indicates that the item will count the same as ten items with weight 1. Each item will be assigned a score by the Eskom evaluation team based upon the tendered response and cross-checked with the supporting documents provided.

Table 8: Scoring of items in Technical Schedules A&B

Criteria	Score
Fully compliant (Indicated as Y in A&B Schedules)	3
Partially compliant - minor deviation (Indicated as P in A&B Schedules)	1
Non-compliant - major deviation (Indicated as N in A&B Schedules)	0

The score for each item will be multiplied by its weight to obtain the total score per item. All scores for the A&B Schedule will be tallied and shall be calculated based on the maximum possible score. This will be recorded as the percentage score.

5.4.2 Production Phase – Technical Sub-Category: Risk and Support

The Eskom technical team will evaluate the risk and support capability of the supplier / product based on the Risk and Support Questionnaire as listed in the Excel file, deviations schedules and from the non-scored components in Sub-category: Product A&B Schedules. The evaluation of the risk and support of the product / supplier shall be adjudicated a score out of 100 made up of two areas as follows:

Product Risk (60): A score derived for the product risk based on the following areas and weighted as follows:

- Installed base / time that a similar system (containing Head End, Concentrators and Meters) has been installed (weight 25)
- Deviations from standards (weight 25)
- Ability to deliver (weight 25)
- Historical performance of similar systems (weight 25)

Support (40): A score derived for support based on the following areas and weighted as follows:

- Local expertise (weight 30)
- Maintenance (weight 30)
- Spares holding (weight 20)
- Training for all components of system (weight 20)

5.4.3 Production Phase – Technical Category: Demonstration Evaluation

The Data Concentrator, Meter, modem and Customer Interface Unit shall be functionally evaluated against the requirements of the respective specifications by the Eskom technical team and allocated a score based on the criteria listed below. **This section will focus on the requirements that are marked as “minimum requirements” and “Developmental Phase/Future Development” in Annex A of 240-126910106.** The scoring principals applied to the Technical Schedules A&B shall apply the Demonstration evaluation as per the following table.

Table 9: Scoring of items in Demonstration Evaluation

Criteria	Score
Fully compliant	3
Partially compliant (minor deviation)	1
Non-compliant (major deviation)	0

Use Cases that will be evaluated during the demonstration: (Weight 100)

- 1) Remotely change meter to post-paid operation. (Weight 10)
- 2) Remotely load three-rate tariff on meter via schedule and on demand, and synchronise clock on meter. (Weight 10)
- 3) Remotely change meter to prepaid operation. (Weight 10)
- 4) Demonstrate firmware upgrade for meter (remote or local). (Weight 10)
- 5) Demonstrate load limiting functionality (Weight 10)
- 6) Manually register a customer and meter on HES. (Weight 3)
- 7) Read meter configuration on demand per register (including total kWh to date, available credit and all STS information defined). (This step is to ensure the system operates correctly when the process starts.) (Weight 3)

- 8) Read meter billing data via schedule, (Weight 5)
- 9) Demonstrate CIU display every use case during prepaid and post-paid operation. (Weight 3)
- 10) Demonstrate automatic detection, notification and auto-registration of newly installed meter. (Weight 5)
- 11) Demonstrate tamper alarm / fraud detection. (Weight 3)
- 12) Demonstrate remote Disconnection and Reconnection. (Weight 5)
- 13) Demonstrate automatic detection and registration of new Concentrator installed on the network. (Weight 5)
- 14) Demonstrate the Concentrator functionality that is available from the HES. (Weight 3)
- 15) Demonstrate security of communication between HES and Concentrator. (Weight 3)
- 16) Demonstrate security of communication between concentrator and meter. (Weight 3)
- 17) Demonstrate Power Quality features. (Weight 3)
- 18) Demonstrate Load Profile management. (Weight 3)
- 19) Demonstrate the reports available e.g. meters and concentrator availability, new and missing devices detected, device configurations, consumption, credit, tamper / fraud alarms, power quality etc. (Weight 3)
- 20) Demonstrate utilising the modem software for the configuration of:
 - a. APN Settings (Weight 3)
 - b. Serial Settings (Weight 3)
 - c. Client/Server mode (Weight 3)
 - d. Watchdog times (Weight 3)
 - e. Security settings (Weight 3)
 - f. Dual SIM functionality (Weight 3)
- 21) Utilising the modem software for querying statuses locally and remotely where applicable such as:
 - a. Signal strength indication (Weight 3)
 - b. Modem start-up monitoring (Weight 3)
 - c. Overall modem settings (Weight 3)
- 22) Demonstrate the following requirements operationally:
 - a. Client and server mode with applicable HES, DCU's and Meters (Weight 10)
 - b. Watchdog timer modes or functionality through subjecting modem to certain conditions (Weight 10)
 - c. Modems ability to connect to the fastest available network seamlessly (including, subjecting modem to certain conditions to test the fall back options, e.g. 3G/LTE modem connecting via GPRS (Weight 10)
 - d. Operating voltages and deviations (Weight 3)

6. Section 2 – Head End System Evaluation

- a) The HES evaluation has the following categories: (1) Gatekeepers, (2) Schedule A&B & Risk and Support and (3) System Demonstration. The different categories shall be evaluated as indicated in Figure 3

- b) The evaluation of the HES is based on the document “Group IT Business Requirement Specification (BRS) AMI head-end solutions (AMI Project) GCS20” which will be included in the tender documents that will be issued with the enquiry.
- c) Eskom already has one HES and the intention is to procure a least two (2) additional Head end Systems and all meters and DCUs will be required to communicate with at least one of the three Head end Systems during the development phase. The two (2) additional HESs will be selected based on the evaluation scores of the HES section by selecting the two top suppliers with the highest scores.
- d) When the enquiry is issued, a separate functional evaluation scoring sheet with gatekeeper requirements for the HES will be provided. The demonstration of the HES is an integral part of the evaluation.
- e) HES suppliers shall ensure that their systems are compatible with meters from different suppliers as required in **240-126910106** and shown in **Figure 2** of this document and work with different meter suppliers to ensure that this requirement is achieved. In addition, HES suppliers are required to ensure seamless integration between their systems and the Eskom current and future Meter Data Management Systems.

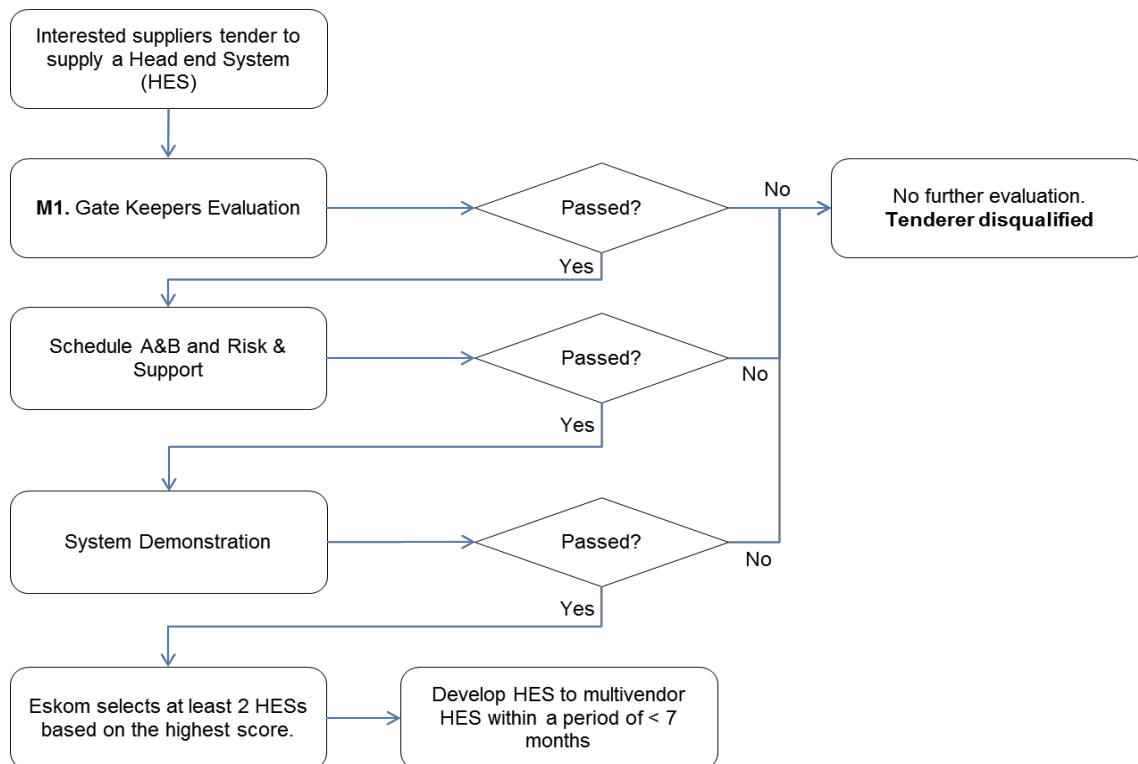


Figure 3: Overview of the HES evaluation

- f) Each tender shall pass all Technical Gatekeeper criteria (Annex B) as listed in the respective “Technical Gatekeeper” Excel sheet for the HES. Tenders not meeting any of the Technical Gatekeepers shall be immediately excluded from further evaluation, and shall be assigned a **Technical score of 0%**.
- g) The overall technical scoring shall be made up of scoring in the various sub-categories during the different phases of the technical evaluation. This section details the methodology to be employed by Eskom in scoring the A&B Schedules with Risk & Support and System Demonstration technical categories that the tenders must successfully pass in order to proceed to the next round of evaluation. If the threshold requirements of a particular category are not met, no further evaluation shall be conducted and the tender shall be disqualified.

Table 10: Technical scoring breakdown for A&B Schedules with Risk and System Demonstration

Technical Criteria	Weightings
A&B Schedules with Risk and Support	40
Functional evaluation with System Demonstration	60
Total	100
Minimum threshold for qualification	70

The Head End System shall be functionally evaluated against the requirements of the respective specifications by the Eskom technical team and allocated a score based on the criteria listed below. The scoring principle applied to the A&B Schedules with Risk category shall apply to the System Demonstration category evaluation as per the following table.

Table 11: Scoring of items in Demonstration Evaluation

Criteria	Score
Fully compliant	3
Partially compliant (minor deviation)	1
Non-compliant (major deviation)	0

Tenderers need to achieve a minimum of 70% Technical Score on the A&B Schedules with Risk & Support category to be considered for System Demonstration category and for further evaluation.

The weights of A&B Schedules with Risk & Support and System Demonstration categories of technical evaluation and the associated thresholds are as follows.

Table 12: HES scoring criteria for the different categories

Phase Description	Threshold	Weight
A&B Schedule with Risk & Support	70%	40%
Functional evaluation with System Demonstration	70%	60%
Total	70%	100%

- h) The functional evaluation which included the demonstration of the HES shall cover all use cases in Section of the "Group IT Business Requirement Specification (BRS) AMI head-end solutions (AMI Project) GCS20"
- i) For the purpose of the demonstration evaluation of the HES, the supplier of the HES shall demonstrate the required use cases on at least 3 smart meters from different suppliers. The 3 smart meters shall be provided by the HES supplier.

7. Additional Requirements

7.1 DLMS/Cosem keys and passwords

For the purposes of functional and interoperability testing the smart meter system manufacturer/vendor shall provide test samples (incl. HES, network gateways and meters) with known encryption keys and passwords. The supplier/vendor shall also declare their product's DLMS/Cosem conformance block.

ESKOM COPYRIGHT PROTECTED

7.2 STS Test key

For the purpose of testing meters, Eskom requires all meters, irrespective of the manufacturer of that meter to be loaded with one "test" meter key. This makes it easier for Eskom to test the meter using the STS simulator to generate tokens. The details of the key that is required to be loaded into the meter are provided below:

Meter Serial Number:	04060000009
Supply Group code:	333333
Supply Group Type:	2
Meter Key:	6caff4b54a3776a6
Tariff index:	01
Key revision number:	1
All meters submitted for testing must be loaded with REAL TABLES	
Note: That the "Meter Key" shown above must be programmed directly in every meter that is submitted for evaluation and not derived like it is done for production meters.	

7.3 Testing of meters and DCs in the Supply & Development Phase

During the supply and development phase, suppliers will be required to provide Eskom with samples of their meters and data concentrators for the purpose of DLMS/COSEM compliance using the DLMS/COSEM test suit. The results of the testing will be made available to the suppliers to aid with the development of products.

8. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Richard McCurrach	PTM&C Engineering Senior Manager
Deon van Rooi	Metering, DC and Security Technologies Manager (Acting)

9. Revisions

Date	Rev	Compiler	Remarks
Jul 2015	1	J. O'Kennedy	New document required for the issue of enquiry
Sep 2017	2	M E Makwarela	<ul style="list-style-type: none"> Revise document to align with the requirements of NRS049 Included a section for the HES and a development phase for 1 year

10. Development team

The following people were involved in the development of this document:

- Andre Le Roux
- Deon Van Rooi
- Edison Makwarela
- Henri Groenewald
- Hylton Hiralal
- Jimmy O’Kennedy
- Mohammed Omar
- Reginald Brooks
- Shawn Papi
- Wernher Schmidt
- John Hope-Sotherton
- Tebogo Modiba

11. Acknowledgements

Not applicable.

Annex A – Gatekeepers Requirements**Table 13: Gate Keeper Requirements of Different Phases**

		Column A Gatekeepers for Category 2 Suppliers/Vendors <i>(Initial Phase - No Installation)</i>	Column B Gatekeepers for Category 1 Suppliers/Vendors <i>(Supply & Development Phase)</i>	Column C Production Phase Gatekeepers <i>(Full Requirements NRS049)</i>
1	Submissions are complete and should contain at least the following:			
	a. Gatekeeper schedule completed			
	b. Technical schedules completed			
	c. Risk and Support questionnaire completed			
	d. Detailed technical manuals provided			
2	Declaration of the Category the suppliers falls in on the day of submitting the tender to Eskom as per Section 3 of this document	Declaration	Declaration	Not Applicable
3	The Meters, Concentrators and/or Head-End System shall all implement the DLMS/COSEM messaging standard.	Declaration and roadmap (plan) to implement DLMS/COSEM messages on meters, DC and HES within 6 months	Declaration and roadmap (plan) to implement DLMS/COSEM messages on meters, DC and HES within 1 year and provide the applicable certificate	DLMS/COSEM implemented in the meter, DC and HES according to NRS049 companion specification. UA certificate required.

ESKOM COPYRIGHT PROTECTED

EVALUATION CRITERIA FOR SMART PREPAYMENT SYSTEM

Unique Identifier: **240-97225295**

Revision: **2**

Page: **23 of 25**

		Column A Gatekeepers for Category 2 Suppliers/Vendors (Initial Phase - No Installation)	Column B Gatekeepers for Category 1 Suppliers/Vendors (Supply & Development Phase)	Column C Production Phase Gatekeepers (Full Requirements NRS049)
4	All meters shall be of the split meter design as defined in Eskom standard	Declaration and roadmap (plan) to implement to produce a split meter design as defined in Eskom standard within 6 months	All meters shall be of the split meter design as defined in Eskom standard	All meters shall be of the split meter design as defined in Eskom standard
5	It shall be possible to switch a meter mode between prepaid and post-paid without having to visit the meter.	Declaration and roadmap (plan) to implement to produce a split meter design as defined in Eskom standard within 6 months	It shall be possible to switch a meter mode between prepaid and post-paid without having to visit the meter	It shall be possible to switch a meter mode between prepaid and post-paid without having to visit the meter using Eskom approved HES
6	When meters are configured in prepaid mode, they shall be STS compliant and as a minimum support STS with kWh energy tokens.	Must have previously developed an STS compliant product and provide commitment and roadmap (plan) to implement STS on proposed platform within 6 months and provide an STS certificate for the product.	When meters are configured in prepaid mode, they shall be STS compliant and as a minimum support STS with kWh energy tokens.	When meters are configured in prepaid mode, they shall be STS compliant and as a minimum support STS with kWh energy and currency tokens.
7	When meters are configured in both pre-paid and post-paid mode, they shall be DLMS/COSEM compliant and support at least four-rate time of use tariff as well as have a real time clock.	Declaration and roadmap (plan) to implement DLMS/COSEM messages on meters and time of use within 6 months	When meters are configured in post-paid mode, they shall be DLMS/COSEM compliant and support at least four- time of use tariff as well as have a real time clock.	When meters are configured in pre-paid mode, they shall be DLMS/COSEM compliant and support at least four-rate time of use tariff as well as have a real time clock
8	Bi-directional metering	Declaration and roadmap (plan) to implement Bi-directional metering within a year	Declaration and roadmap (plan) to implement Bi-directional metering within a year	Bi-directional metering

ESKOM COPYRIGHT PROTECTED

EVALUATION CRITERIA FOR SMART PREPAYMENT SYSTEMUnique Identifier: **240-97225295**Revision: **2**Page: **24 of 25**

		Column A Gatekeepers for Category 2 Suppliers/Vendors <i>(Initial Phase - No Installation)</i>	Column B Gatekeepers for Category 1 Suppliers/Vendors <i>(Supply & Development Phase)</i>	Column C Production Phase Gatekeepers <i>(Full Requirements NRS049)</i>
9	Remote Firmware upgrade declaration	Declaration and roadmap (plan) to implement Remote Firmware upgrade declaration with 6 months	Remote Firmware upgrade declaration	Remote Firmware upgrade declaration
10	The tenderer must provide a road map with an implementation plan of how they will update the firmware of existing meters to implement Companion specification in NRS049 and STS currency algorithm.	The tenderer must provide a road map with an implementation plan of how they will update the firmware of existing meters to implement Companion specification in NRS049 and STS currency algorithm.	The tenderer must provide a road map with an implementation plan of how they will update the firmware of existing meters to implement Companion specification in NRS049 and STS currency algorithm.	Companion specification in NRS049 and STS currency algorithm implemented
11	G3 PLC/ Wi-SUN/Netricity (IEEE 1901.2) certificate for meters and DCUs	Declaration that certificate will be available before contract is signed with supplier for the Production Phase	Declaration that certificate will be available before contract is signed with supplier for the Production Phase	G3 PLC/ Wi-SUN/Netricity (IEEE 1901.2) certificate provided by supplier
12	Commitment and declaration to fully integrate with all Eskom approved HESs according to NRS049 within 1 year	Commitment and declaration to fully integrate with all Eskom approved HESs according to NRS049 within 1 year	Commitment and declaration to fully integrate with all Eskom approved HESs according to NRS049 within 1 year	Fully integrate to at all Eskom approved HES
13	Modem independent hardware and software watchdog timers	Declaration that modem will have independent watchdog timers implemented	Declaration and plan to implement watchdog timers within a 6 months period	Implemented hardware and software watchdog timers
14	Modem client and server mode capability	Declaration that modem will be capable of operating in client and server mode	Modem to operate in server mode and plan to implement client mode capability	Modem to operate both in client and server mode

ESKOM COPYRIGHT PROTECTED

Annex B – Gatekeepers Requirements for HES

	Gatekeepers	Required from Suppliers
1	Submissions are complete and should contain at least the following:	
	a. Gatekeeper schedule completed	
	b. Technical schedules completed	
	c. Risk and Support questionnaire completed	
	d. Detailed technical manuals provided	
2	Support a rich variety of meters (4 minimum) and the mainstream protocol IEC62056 (DLMS). Features secure pull and push mechanisms (IDIS,DLMS/COSEM) for data retrieval from metering devices	HES Support a rich variety of meters(4 minimum) and the mainstream protocol IEC62056 (DLMS). Features secure pull and push mechanisms (IDIS,DLMS/COSEM) for data retrieval from metering devices
3	Managing DCUs and meters: debugging DCUs, dismantling/replacing meters, checking meters for errors and theft, and switching DCUs/ meters	Declaration and roadmap (plan) to implement the function for a variety of meters as defined in Eskom standard within 6 months
4	Remote control: allowing remote switch-on or switch-off, adjusting tariffs, setting alarming or credited threshold, and monitoring communication channels.	Declaration and roadmap (plan) to implement to produce the function for other meters as defined in Eskom standard within 6 months
5	Querying electricity consumption: providing information services such as detailed power consumption data, tariffs, state of meters, meter alarming, and accepted credit threshold	Declaration and roadmap (plan) to implement to produce the function for other meters as defined in Eskom standard within 6 months
6	Support a large number of concurrent connections and the management of a large number of meters.(500 000 meters)	The HES shall support concurrent connections and manage large number of meters
7	Provide open service software development kit (SDK) interfaces, support advanced application development, and integrate third-party applications. A powerful Web Services based integration layer required.	Declaration and roadmap (plan) to implement to produce the function for other meters as defined in Eskom standard within 6 months
8	A minimum of two reference sites where the head end has been implemented and in used.	Declaration

ESKOM COPYRIGHT PROTECTED