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## SERVICE REQUEST DETAILS

<b>Business Division</b>	Transmission
<b>Business Unit</b>	Transmission
<b>Business Process</b>	Transmission
<b>Demand Name</b>	Transmission Meter Data Management System

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## 1. CONTROL TABLE

The table that defines what sections of the document need to be completed for the different types of BRS's is available at the end of the document.


## DOCUMENT TRACKER

Date	Author Name	Changes (section changed, page number, from what to what)
04/08/2010	Janeen Vengotha	Replaced 1st draft of BRS with information received from stakeholders
07/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
15/08/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Made changes to section 5.1 and 5.2.1</li> </ul>
08/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
08/08/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Made changes to section 5.2.2</li> <li>Reviewed section 6.1.1 and 7.1</li> </ul>
08/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
08/08/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Made changes to section 5.2.2</li> </ul>
08/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
08/08/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Completed sections 5.2.3, 6.1 and 6.2</li> </ul>
08/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
08/08/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Completed section 7.1</li> <li>Started with the detailed requirements section 7.2.1</li> </ul>
14/11/2010	Janeen Vengotha	Updated BRS after workshop with stakeholders
20/01/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Continue with section 7.2.1</li> </ul>
20/01/2010	Janeen Vengotha	Updated BRS after workshop with stakeholders
20/01/2010	Janeen Vengotha	Continue with section 7.2.1
20/01/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
20/01/2010	Janeen Vengotha	Updated Detailed requirements and Integration requirements sections
20/01/2010	Janeen Vengotha	Completed the draft of implementation section 8.1
19/05/2010	Janeen Vengotha	Updated BRS after workshop with stakeholders
19/05/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Completed section 7.2.1</li> </ul>
19/05/2010	Janeen Vengotha	Updated BRS after workshop with stakeholders
19/05/2010	Janeen Vengotha	<ul style="list-style-type: none"> <li>Completed sections 8.1 and 8.2</li> </ul>
08/08/2010	Janeen Vengotha	Updated BRS from draft with stakeholders
08/08/2010	Janeen Vengotha	Project stopped, no budget available
04/05/2011	Janeen Vengotha	Revised project to be available
14/06/2011	Janeen Vengotha	Update BRS with Quality of Supply information
14/06/2011	Janeen Vengotha	Finalise BRS with stakeholders
08/08/2011	Janeen Vengotha	Updated BRS from draft with stakeholders

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<del>17/11/2021</del>	<del>Legal Separation</del>	<del>Report on the Legal Separation of Eskom Holdings SOC Limited from Eskom Holdings SOC Limited</del>
		legal separation
<del>20/11/2021</del>	<del>Legal Separation</del>	<del>Report on the Legal Separation of Eskom Holdings SOC Limited from Eskom Holdings SOC Limited</del>
		impact of the legal separation
<del>18/12/2021</del>	<del>Legal Separation</del>	<del>Report on the Legal Separation of Eskom Holdings SOC Limited from Eskom Holdings SOC Limited</del>

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## 2. CUSTOMER AND STAKEHOLDER DETAILS


### 2.1 Customer Information

Name	Department & Division	Role / Expertise	Contact Info	Participation
[REDACTED]	Services Department	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	Operations Department	Manager	[REDACTED]	[REDACTED]
[REDACTED]	Services Department	Expert	[REDACTED]	[REDACTED]
[REDACTED]	Department	Expert	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Expert	[REDACTED]	[REDACTED]
[REDACTED]	Group Technology	Expert	[REDACTED]	[REDACTED]
[REDACTED]	Technology and Commercial	Expert	[REDACTED]	[REDACTED]
[REDACTED]	Maintenance	Expert	[REDACTED]	[REDACTED]
[REDACTED]	Maintenance	Expert	[REDACTED]	[REDACTED]
		Business Process Owner		
If BRS is being developed for an approved project the following additional information needs to be defined:				
		Business Sponsor/s		

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## 2.2 Group IT Information

Name	Department & Division	Role / Expertise	Contact Info	Participation
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	Compiler of document
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Middle Manager	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Middle Manager	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Relationship Manager	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Consultant	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Support Manager	[REDACTED]	[REDACTED]

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### 3. GLOSSARY OF TERMS / DEFINITIONS


Term	Definition
Analytics	Refers to the business intelligence capability.
Business Continuity	Business continuity encompasses planning and preparation to ensure that an organization can continue to operate in case of serious incidents or disasters and is able to recover to an operational state within a reasonably short period.
Business Intelligence	The term Business Intelligence (BI) refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information. The purpose of Business Intelligence is to support better business decision making. It can also be described as a broad set of data analysis applications, including ad hoc analysis and querying, enterprise reporting, online analytical processing (OLAP), mobile BI, real-time BI, operational BI, cloud and software as a service BI, open source BI, collaborative BI and location intelligence.
Business Requirements Specification	Business requirements specification is the eliciting, analysing and documenting of business requirements early in the development cycle to guide the design of the solution.
Business Rule	A business rule is a rule that defines or constrains some aspect of business and always resolves to either true or false. Business rules are intended to assert business structure or to control or influence the behaviour of the business. Business rules describe the operations, definitions and constraints that apply to an organization. Business rules can apply to people, processes, corporate behaviour and computing systems in an organization, and are put in place to help the organization achieve its goals.
Change Request	A change request is when an enhancement is made to an existing system that meets specific criteria.
Disaster Recovery / Disaster Recovery Plan	A disaster recovery plan (DRP) is a documented process or set of procedures to recover and protect a business IT infrastructure in the event of a disaster. Such a plan, ordinarily documented in written form, specifies procedures an organization is to follow in the event of a disaster. It is "a comprehensive statement of consistent actions to be taken before, during and after a disaster".
External Agents	Sends information to and receive information from analysis area of study/focus area.
Innovation	Innovation generally refers to changing processes or creating more effective processes, products and ideas. For businesses, this could mean implementing new ideas, creating dynamic products or improving your existing services. Predominantly focuses on digitisation type projects.
Process	Set of activities that describe how an activity is executed.

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Term	Definition
Project	A project consists of a concrete and organized effort motivated by a perceived opportunity when facing a problem, a need, a desire or a source of. It seeks the realization of a unique and innovative deliverable, such as a product, a service, a process, or in some cases, a scientific research. Each project has a beginning and an end, and as such is considered a closed dynamic system. It is developed along the 4 Ps of project management: Plan, Processes, People, and Power. It is bound by the triple constraints that are calendar, costs and norms of quality, each of which can be determined and measured objectively along the project lifecycle. Each project produces some level of formal documentation, the deliverable(s), of course, and some impacts, which can be positive and/or negative.
Software License Purchase	A software license is a legal instrument (usually by way of contract law, with or without printed material) governing the use or redistribution of software. All software is copyright protected, in source code as also object code form. The only exception is software in the public domain. A typical software license grants the licensee, typically an end-user, permission to use one or more copies of software in ways where such a use would otherwise potentially constitute copyright infringement of the software owner's exclusive rights under copyright law.
System	An organized, purposeful structure that consists of interrelated and interdependent elements (components, entities, factors, members, parts etc.). These elements continually influence one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system
Meter	Device for measuring and totalling the variable consumption of a product. Note in general a meter consists of a sensor and an integrating device that displays the total consumption in metrological units. (Integrated values).
Metering	Recording of active and reactive energy, with units of MWh and Mvarh respectively.
Quality of Supply	Quality of supply data to be extracted from the meters include, tamper detection, enhanced load profiling, SCADA functionality, under voltage, over-voltage, power down, power up, under frequency detection, etc.
MV90	MV90, a metering data acquisition system, is used to retrieve customer and statistical meter readings for the purpose of customer billing and settlements.
MDMS	It is an application that receives metering data from a head-end system, stores, processes and disseminate data to other systems
Tx MDMS	This is Tx Meter Data Management System and its purpose is to process all meter data files sent to it via FTP from the central MV90 instance and then validate and store the data. The metering data being retrieved is Tx substation metering as well metering for Tx customers.
Phoenix	The Transmission plant system that does outage co-ordination, load forecasting, monitors power system generation status, Tx maintenance scheduling and plant/network performance
THEMIS	This is a system used to perform settlements between Gx, Tx and Dx for energy transferred
PMR	A file of participant metering data sent from MDMS to THEMIS

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Term	Definition
GMR	A file of Generation Metering Data sent from Phoenix to the THEMIS system for a specified date/time and power station
Send-outs	The amount of active energy that have been supplied by the unit to the Transmission power network during a defined 1 hour period and measured at Gx/Tx interface boundary
Ops	A file of Operational Data sent from Phoenix to the THEMIS system for a specified date and power station (or for all stations)
ETS	<p>The Energy Trading System is primarily focused on 3 concepts – Market Scheduling, Energy Settlement and Financial Settlement. The ETS facilitates bilateral energy trade.</p> <ul style="list-style-type: none"> <li>• The 'Market Scheduling' module journals all scheduled trade. This is typically agreed/contracted trade between parties.</li> <li>• The 'Energy Settlement' module settles all metered values and scheduled trade.</li> <li>• The 'Financial Settlement' module applies contractual rules against the settled energy.</li> </ul> <p>This system was built to facilitate bilateral energy trades between various parties in the Southern African Power Pool.</p>
GPSS	Generation Production and Sales System contains measures taken at various power station generating units, including the amounts of energy produced and energy losses as a result of planned, unplanned events
EMDAS	This system is available at the majority of the Power Stations and records various energy related information from the generating units, including energy sent out.
TEMSE	This is the Scada system which contains warnings and alarms for the various Tx network components, including 5 min interval energy data being transmitted across the Tx network. It is used to monitor and manage what the statuses of the Interconnected Power System network are to ensure a stable and reliable supply of electricity to the end customer
ALFS	ALFS is an in house, web based application designed to assist the user with enquires and management of metering data uploaded via the Regional MV90 to CC&B.

#### 4. BUSINESS REQUIREMENTS SPECIFICATION FOCUS


The purpose of this document is thus to record and confirm the business requirements for:

- Software purchase of a new Meter Data Management System (MDMS) platform
- Total system replacement of the existing Transmission (Tx) MDMS system

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## 5. REASON FOR THE REQUIREMENT

### 5.1 Define the current business challenges / issues that need to be addressed

Eskom installs various types of meters, to measure energy as well as quality of supply purposes throughout the country and across the borders in neighbouring countries where Eskom has supply agreements. The meters are generally located within the Power Stations, Transmission (Tx), Distribution (Dx), International boundaries and customer sites. All these meters serve multiple purposes. Each division has historically managed its metering data requirements and thus has developed different metering data management strategies and systems.

In Generation, the meters serve to monitor individual and combined power station efficiencies through continuous comparison between generated values and the power delivered to Transmission. The Energy Management Data Acquisition System (EMDAS) at each power station is used to collect the generator unit's metering for the stations operational requirements. Generation Data is then loaded from EMDAS, TEMSE, Tx MDMS into Phoenix and then replicated through to the Generation Power Sales System (GPSS) for operational purposes.

In Transmission, all boundaries where power flows in or through the network, are metered. The metering points are generally located at the High Voltage (HV) side of the generating transformers, the Main Transmission Substations (MTS) and the boundaries with the neighbouring countries. In Transmission, metering installations are on the Medium Voltage (MV) side of Coupling Transformers, as well as on the HV side of Generating Transformers and Station Transformers. All meters installed by Transmission are four-quadrant meters, which can be remotely interrogated. Collection of metering data is done through a central data acquisition system, the Multi Vendor 90 Utility Translation System (MV90), from Eskom meters as well as IPP meters. MV90 retrieves data on a daily bases.

The requirements for metering data include but are not limited to the following:


1. Generation output,
2. Load forecasting,
3. Interdivisional billing,
4. Key customers and international customer billing,
5. Independent power producer monitoring,
6. Long term planning,
7. Losses calculation and reporting

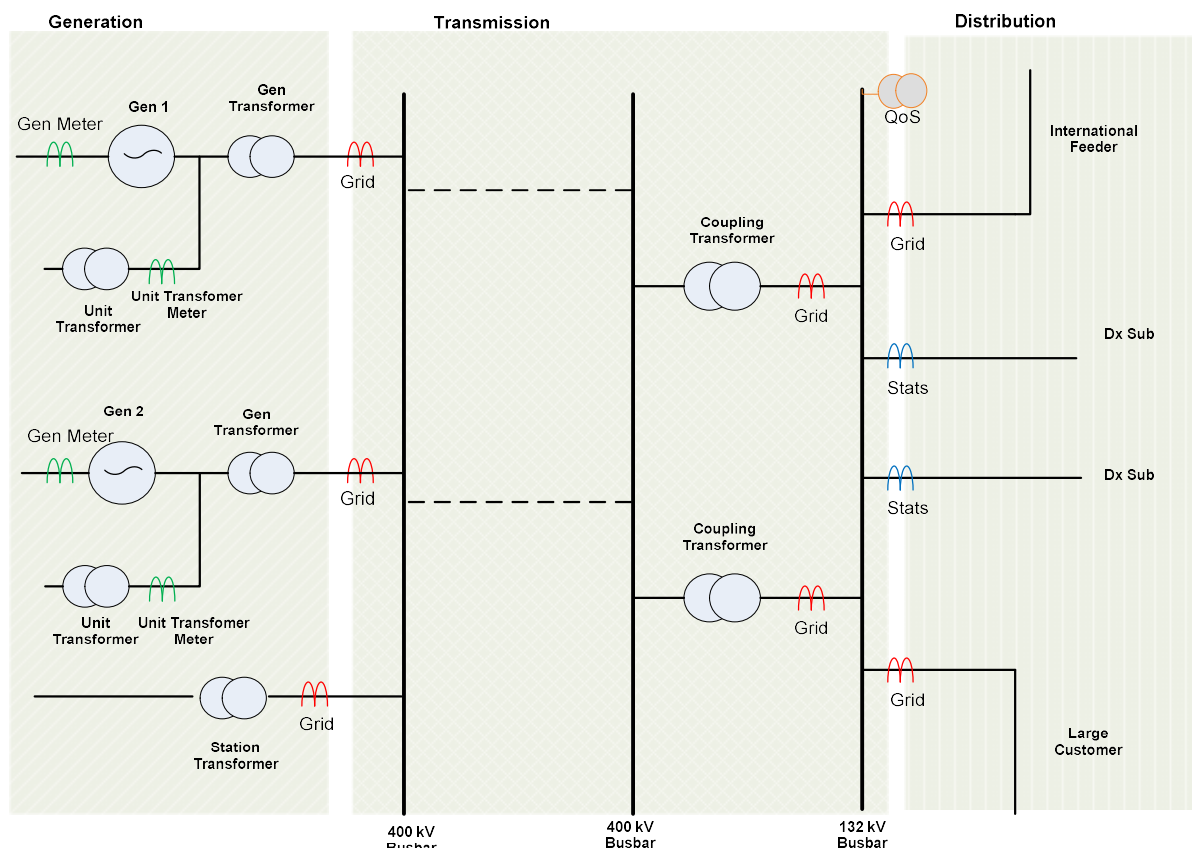
Transmission's metering data is transferred and stored in the Transmission Metering Data Management System (Tx MDMS). The below picture provides an overview of what is described above:

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**Figure: Grid Metering on the Eskom Network**

As a result of the multiple sources of meter reading data in Eskom and the IT strategy to Optimise and Standardise, the company had come to a decision to implement a single meter-reading repository, across the business. This means that all meter readings that exist in Eskom across all divisions, such as Generation (Gx), Transmission (Tx) and Distribution (Customer Services), must be included in a single meter reading repository, which will be the MDMS.

In addition to the above challenges, the division must also address the following issues:


1. The company has been locked in with the same vendor for many years
2. The software used is outdated and we are not using the latest version of the software
3. Loss of resources and skills in critical areas

This document will focus on specifying the requirements for Transmission as input to the MDMS project. Distributions and other requirements will be documented in their own separate Business Requirements Specification.

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## 5.2 Define the high level gaps between the “As-Is” and “To-Be” state

### 5.2.1 As-Is state

**This section will describe the current scenario w.r.t the Tx MDMS platform and systems that integrates directly with it**

Grid Metering is broadly classified as metering installed at the interface boundaries between the Transmission Grid and Generation, Distribution, International Tie-lines and IPPs. These metering points have historically been referred to as Internal Tariff Metering (ITM) points. Grid Metering technology, much like the commercial and industrial metering, are high-end meters that facilitate the implementation of complex tariffs, four quadrant metering, protocol based communication, automated meter reading (AMR) and modular communications that support multiple communication interfaces.

Grid metering data is currently retrieved via an automated meter reading (AMR) system which in Transmission’s case is the MV90 DAS system and is warehoused within a customized Transmission Metering Data Management System (Tx MDMS). The Tx MDMS is used to ratify billing information, warehouse data and to disseminate metering data to non-Transmission parties and to ancillary Transmission processes, such as those within the System Operator environment. The implementation of protocol-based communication between the grid meters and the SCADA environment at the Generator interface facilitates the provision of operational data to the Power Stations and National Control. The Tx MDMS system was custom developed by Enerweb for Eskom and has been in production for quite a few years.

The following customers use the Tx MDMS for the following functions:


Customer	Use of information
Tx (Settlement)	<ul style="list-style-type: none"> <li>• Billing of Tx, Gx, and Dx</li> <li>• IPP’s and Market Participants</li> <li>• Market settlements calculations</li> </ul>
National Control Centre (NCC)	<ul style="list-style-type: none"> <li>• Scheduling</li> <li>• Forecasting</li> </ul>
Key Sales and Customer Service (KSACS) International Trader	<ul style="list-style-type: none"> <li>• Billing of international customers</li> </ul>
Dx	<ul style="list-style-type: none"> <li>• Losses calculation</li> <li>• Ring-fencing regional consumption</li> <li>• Contracts for differences management</li> <li>• Energy trading</li> </ul>

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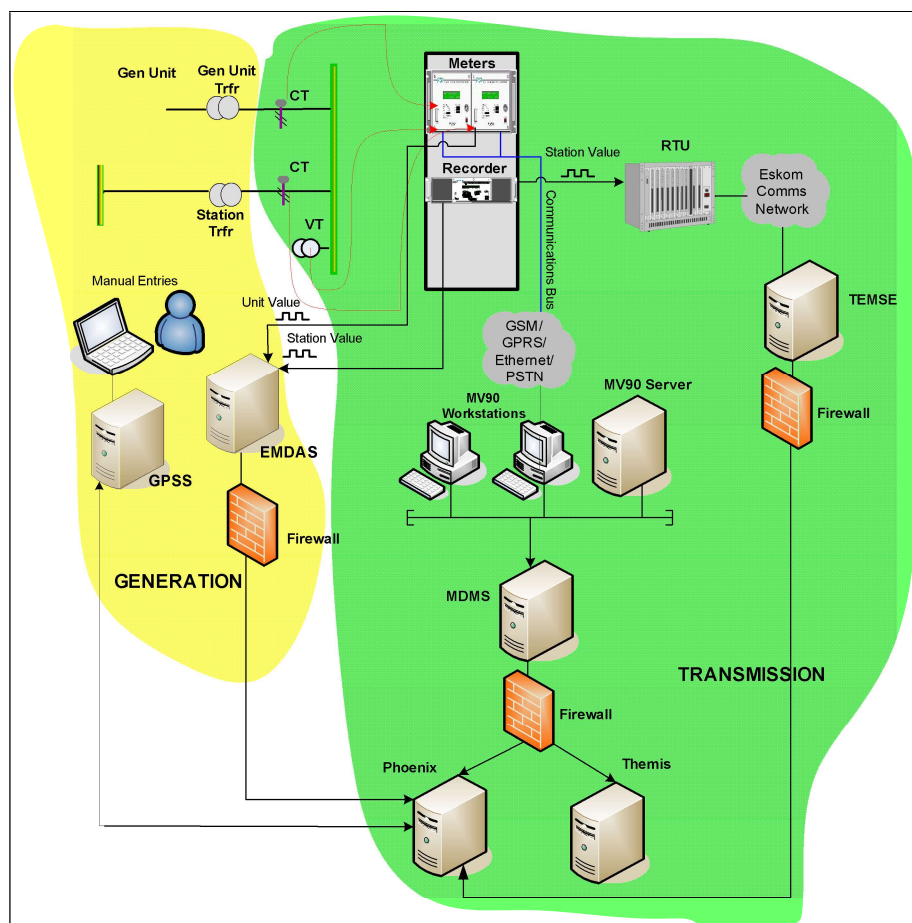
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Gx	<ul style="list-style-type: none"> <li>Accounting for the sent-out/Tx network infeed</li> <li>Network balance management by comparing actual against contract values</li> <li>Scheduling of power stations</li> </ul>
Expansion Planning	<ul style="list-style-type: none"> <li>Transmission network planning and investment decision-making</li> </ul>
Statistics South Africa	<ul style="list-style-type: none"> <li>Economic growth calculation and statistical record keeping</li> </ul>
National Electricity Regulator of South Africa	<ul style="list-style-type: none"> <li>Electricity industry monitoring</li> </ul>
Southern Africa Energy	<ul style="list-style-type: none"> <li>SAPP Pool operations and settlements</li> </ul>


The Tx MDMS system gets data inputs from MV90 and has data outputs to Phoenix, Themis and ETS. The diagram below provides a holistic picture of the overall architecture.



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**Figure: Components of the TX / GX metering system**

### **Data Acquisition – Tx MV90**

Modems are deployed at remote metering sites and are used for the remote retrieval of data from the meters through to the MV90 system using cellular data communications. Tx have initiated a process of migrating their remote communications from cellular based services to Eskom Telecoms IP network.

- Remote interrogation is used to retrieve interval, register and event data from the GENTRAN meters via GPRS/Eskom Telecoms IP technology or other communication methods on a daily basis. In the event that remote dialing is unsuccessful, manual dialing will take place.
- MV90 will then do 1st line verification on the data received. Validation is used to confirm the quality of data extracted from the meter, using a host of user selected criteria. General, channel and interval-based validations can be defined as well as validation comparisons to previous time periods.
- Editing and estimation is used to make adjustments to data that has failed validation. Data can be added, deleted, replaced, restored, adjusted, or altered by a multiplier. Estimations are done when metering data is not available. Estimations are done using either historical data or data available from TEMSE. [See Appendix B for the full Estimation Process](#)
- Once the data has been accepted either by the system or the manual validation process, the data is then exported manually or automatically to the Tx MDMS system on a daily basis.

### **Data Storage – Tx MDMS**


- Metering data is transferred daily from MV90 to MDMS.
- Once the file has been received from MV90, MDMS immediately runs the 2nd line verification and validation according to the specified rules.
- The individual power station unit values are then summated to obtain an hourly power station sent out value.
- The following information are stored in the MDMS system:
  - IPP, energy, consumption and production data
  - Main Transmission Station (MTS) tariff related metering data
  - International Energy import and export data
  - Individual power station unit values and the power station values
- The above information is then transferred to various systems to be used for billing, settlement, reporting and forecasting purposes.
- In addition MDMS provides a web based interface for registered end users and stakeholders to view their respective energy data.

The Tx MDMS also receives ad hoc/manual files from Phoenix (in the event of a total data loss from the GENTRAN meters). These files are received on an ad-hoc basis. The data is loaded & verified in accordance to the specified verification rules as defined for the normal collection process. A flag indicates that the data is obtained from Phoenix. A log is also kept of all files received and when it was received.

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#### **Data Dissemination – Tx MDMS to Phoenix, Themis, ETS**


- The IPP, energy, consumption and production data are sent to Themis on a daily basis for billing, settlement and reporting purposes.
- MDMS also sends MTS related data to Themis on a daily basis for billing and settlement purposes
- International Energy data are sent to Themis and import data are sent to Phoenix on a daily basis for billing and settlement purposes
- International Energy export and import data are extracted to ETS for billing and settlement purposes
- The individual power station unit values and the power station values are transferred to the Phoenix database on a daily basis to be used by National Control for load forecasting.
- The official station values are then transferred over a secure link to Themis, on a daily basis for billing and settlement purposes.
- IPP data is also exported to Phoenix

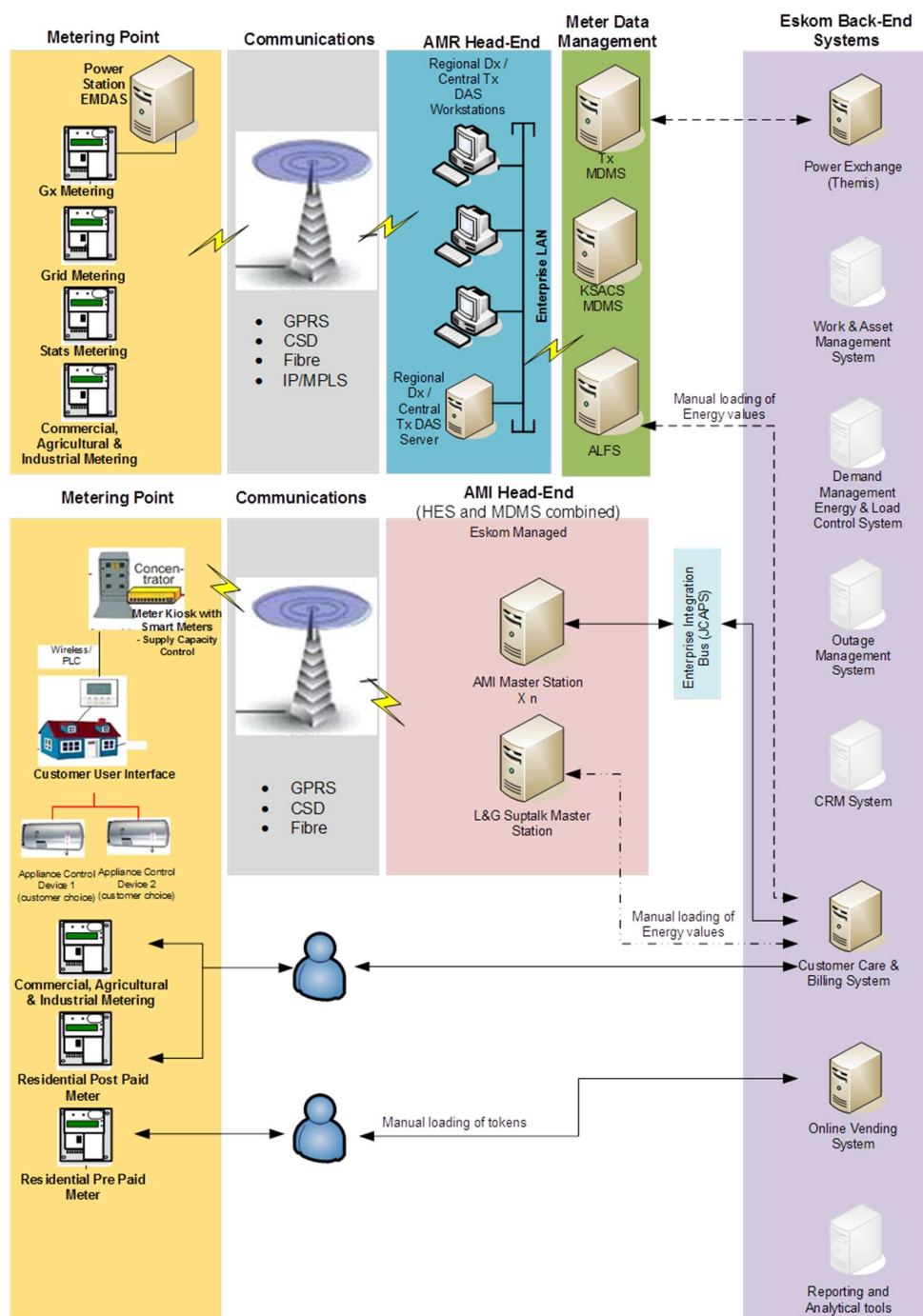
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**Figure: Current Metering Architecture**

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### 5.2.2 To-Be state


**This section describes the future state of the MDMS system, one MDMS system will be sourced but both Dx and Tx will have separate instances.**

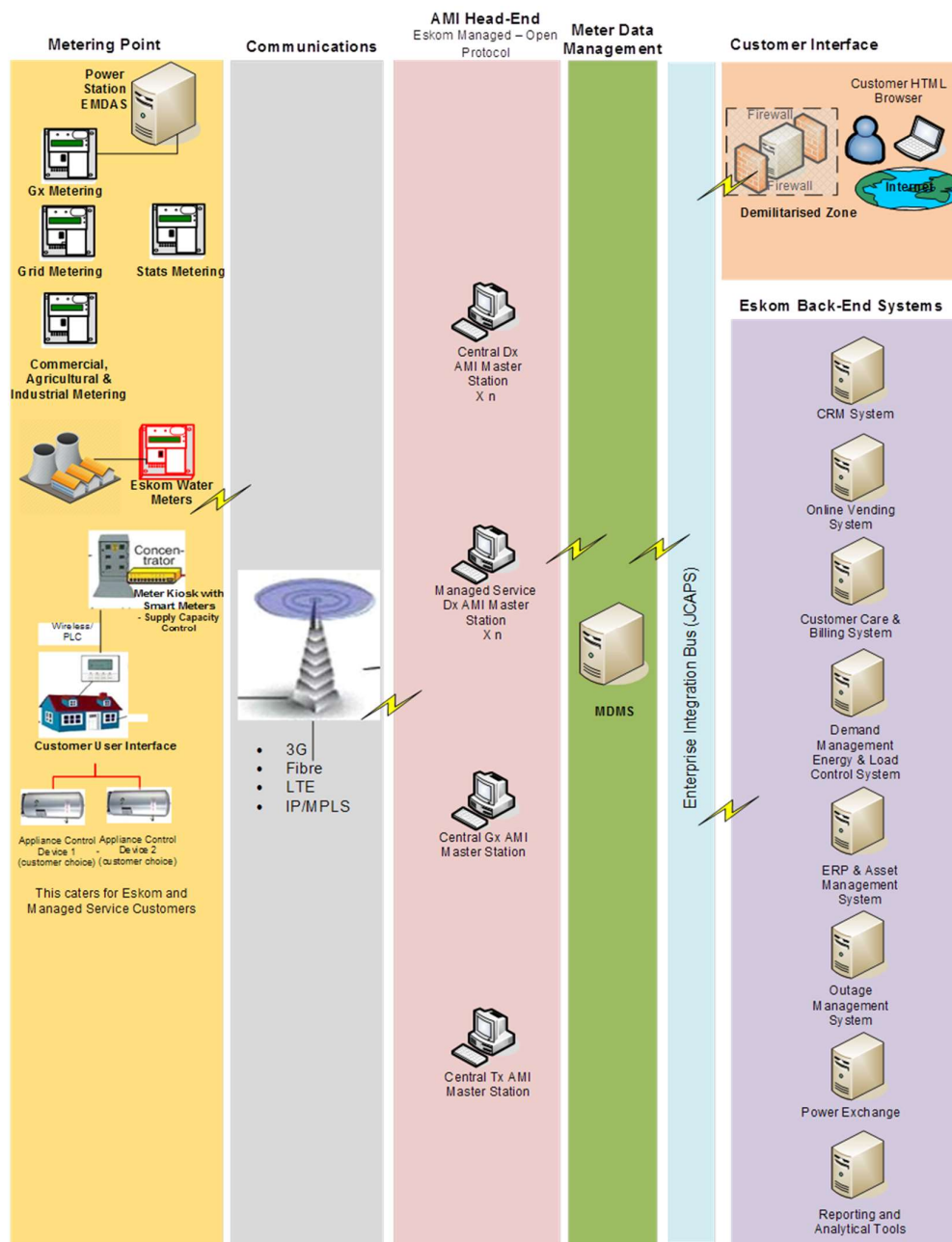
- All meter readings that exist in Eskom across all divisions, such as Distribution, Transmission (Tx) and Generation (Gx) to be included in a single meter reading repository, which will be the MDMS.
- Even though a centralised MDMS will be implemented, but to ensure that all participants data are treated confidentially with access restricted within the Tx environment, each entity will have their own instance of the MDMS.
- It is expected that the MDMS will be the existing Transmission MDMS as the current repository of metering data storage.
- The MDMS will serve as a centralised repository from which the Tx systems will be able to query 'raw' and 'checked' metering data and more.
- The MDMS system needs to enable all profiling related negotiations and structures to enable appropriate billable values to be created for special arrangements, wheeling agreements etc.
- The Demand Response system will utilize the metering and event data that is stored on the MDMS both pre and post a Demand Response event.
- The MDMS may be utilized to support a demand response programme as well as to store 3rd party data such as municipalities, water, gas, IPP facility metering and developer projects in future.
- MDMS must be able to store data from various sources e.g TEMSE against the same logical metering point so that it can be used for verification.
- MDMS will be one of the base data sources used for the Smart Grid Metering.
- The MDMS must be able to source the metering data at any requested intervals and not just hourly or daily, the interrogation must be flexible enough to cater for various requirements.
- Metering data must be available 24x7
- The Head-end System (HES) must transfer Generation, other Generators and Transmission metering data to MDMS and then push this data through to the required systems at any requested user frequency.

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**Figure: To be Situation (Long term Architecture)**  
**Note: Transmission and Distribution will have their own instance of MDMS**

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As Is Statement	To Be Statement	Therefore the high level gap is:
Multiple meter reading repositories	Single meter reading repository	Transition all meter reading repositories into one central meter repository. Each entity will have their own instance of the MDMS thus only Tx users to have access to Tx data
Daily sourcing of meter readings from the various meters	User requested interval sourcing of the meter readings	Use technology that allows for flexible data sourcing

## 6. AS IS AND TO BE BUSINESS PROCESS ACTIVITY MAPPING

### 6.1 As-is business process


6.1.1 Identify the PCM and list the PCM activities that are impacted:

PCM number	PCM description	ARIS / EHPUM link
240-65034203	Process Control Manual (PCM) for Manage Customer Master Data	<a href="https://hyperwave.eskom.co.za/240-65034203">https://hyperwave.eskom.co.za/240-65034203</a>
240-56302025	Process Control Manual (PCM) for Manage Revenue	<a href="https://hyperwave.eskom.co.za/240-56302025">https://hyperwave.eskom.co.za/240-56302025</a>
240-55054906	Process Control Manual (PCM) for Manage Customer Base	<a href="https://hyperwave.eskom.co.za/240-55054906">https://hyperwave.eskom.co.za/240-55054906</a>
240-55054915	Process Control Manual (PCM) for Manage Energy Losses	<a href="https://hyperwave.eskom.co.za/240-55054915">https://hyperwave.eskom.co.za/240-55054915</a>
240-56536765	Process Control Manual (PCM) for Integrated Demand Forecasting and Supply Planning	<a href="https://hyperwave.eskom.co.za/240-56536765">https://hyperwave.eskom.co.za/240-56536765</a>
240-41708860	Transmission Manage Generators	<a href="https://hyperwave.eskom.co.za/240-41708860">https://hyperwave.eskom.co.za/240-41708860</a>
240-133820218	Manage Wholesaler External Settlements and Clearing	<a href="https://hyperwave.eskom.co.za/240-133820218">https://hyperwave.eskom.co.za/240-133820218</a>
240-133775484	Manage Wholesaler Internal Settlements and Clearing	<a href="https://hyperwave.eskom.co.za/240-133775484">https://hyperwave.eskom.co.za/240-133775484</a>
32-1313	Process Control Manual (PCM) for Operate and Monitor Plant	<a href="https://hyperwave.eskom.co.za/32-1313">https://hyperwave.eskom.co.za/32-1313</a>
240-131063263	Process Control Manual (PCM) for Generation Production Assurance Management	<a href="https://hyperwave.eskom.co.za/240-131063263">https://hyperwave.eskom.co.za/240-131063263</a>

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## 6.2 To-be business process


- 6.2.1 Define any new business processes that will be a result of this requirement, if applicable. If no change in business process, state that.

Note: Changes to the business process / initiation of new business processes are the responsibility of the business to initiate.

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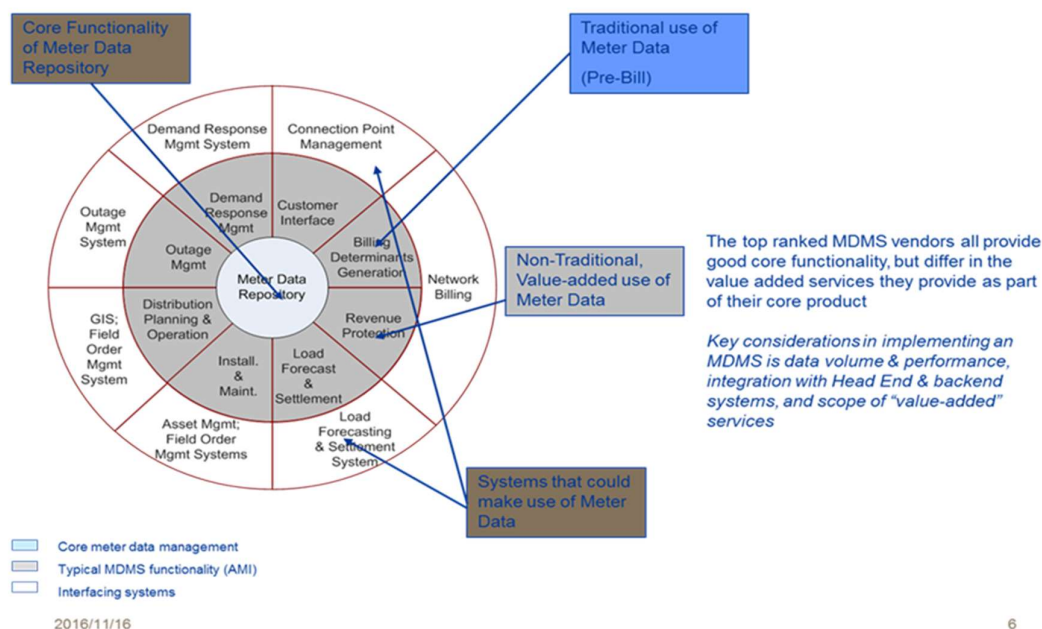
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## 7. BUSINESS REQUIREMENTS

### 7.1 High level Requirements for MDMS Solution

The solution procured and implemented must deliver the following requirements:

A Meter Data Management (MDMS) solution that will support and manage metering data across Eskom that serves as a repository of metering data from different metering data collection sources. It must be capable of providing Validation, Editing and Estimation (VEE); use calculation; and aggregation to support billing, load profiling, forecasting and asset management functions. The MDMS will have to communicate with various AMR Master Stations (Head End Systems) and then interface with various Eskom systems, either receiving or sending data.



**Figure: MDMS Core, Traditional and Value added Capabilities**

The required solution must provide for both Core MDMS and Value Added functionality as described below:


- AMR Data collection & processing
- VEE functionality (validation, estimation and editing)
- Billing Determinant Generation and AMR interval data interface to billing systems
- HES File Transfer Capabilities
- On demand request and response capabilities

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- Demand response management
- Management of smart grid data and non-consumer devices (Managing non-technical losses, Managing of meter events (tamperers, outages) and alarms)
- Meter Events and Statuses

#### Core MDM Functionality

- On demand request and response capabilities
- **AMI Data collection & processing**
- Ability to process AMI interval and usage data from disparate AMI systems, back office systems & communication devices
- Interval and diagnostic data processing, storage and versioning
- Operational data store, process aggregator and enabler for AMI Systems
- **Device lifecycle management**
- Ability to synchronize information on associations between physical devices (meter, channels, network) and customer information (premise, service point, account)
- Registering, de-registering, commissioning, de-commissioning of meters
- **Reporting and Analytics**
- Deployment & read reports, error & exception management
- Support actual load analysis by Load management systems

#### Traditional Use of MDMS (Pre-Bill)

- Billing Determinant Generation
- Complex billing functionality, TOU/CPP billing support
  - AMI interval data interface to billing systems
  - Configurability of VEE rules


#### Value-Added Use of MDMS

- Management of smart grid data (statuses, events, instrumentation) and non-consumer devices (e.g. feeder meters, transformer meters)
- **Revenue Protection & Theft detection support (irregular consumption patterns, leakage)**
  - Short- and long-term forecasting assessment
- Two-way communication capability (e.g. remote connects/disconnects, power status check, interactive reads, pings)
  - **Real time VEE**
- Support for HAN device lifecycle management and DR pre-event and post-event planning
- **Support business process automation via event notification services**
- Customer portal support for what-ifs, consumption, costs and rate information
  - Support for Load management via aggregated consumption information
    - Provide data for Outage and Power Quality analysis
  - Demand response measurement and verification analysis

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## 7.2 Detailed requirements and Business rules for Tx MDMS

7.2.1 Define the detailed business requirements in number form ensuring that the functionality is sorted and described in functionality groupings.

### A. AMR Data collection & processing


Functionality grouping	BRS Number	Functionality	Business Rule No and Description
Data Acquisition		<p><b><u>Data Collection – Head-end Systems</u></b></p> <ul style="list-style-type: none"> <li>Interval, register and event data to be captured by various meters and automated metering devices in the field and transferred to the relevant Head-End System (HES) to store and/or process the data. This will be the energy values and not instantaneous values <ul style="list-style-type: none"> <li>Interval data (1min, 5min, 10min, 15 min, 30 min, 60 min, etc)</li> <li>Register readings</li> <li>Voltage and Current profiles</li> </ul> </li> <li>The number of channels on which meter data must be collected should not be a set value, but rather configurable based on the metering capability.</li> <li>Remote interrogation to be used to communicate and retrieve interval, register and event data from the various meters via any communication method at any interval basis</li> <li>The MDMS should be flexible enough to obtain interval and register readings automatically when pushed from the Head-End System (HES) as well as manually when remote dialing are unsuccessful</li> <li>The HES must perform a 1<sup>st</sup> line validation to confirm the quality of data extracted from the meter, using a host of user selected verification criteria.</li> </ul> <p><b><u>Data Storage – MDMS</u></b></p> <ul style="list-style-type: none"> <li>MDMS to be able to store data from all meter suppliers that conform to the best practice for metering.</li> <li>The MDMS will be required to obtain Load Profiling data or meter reads.</li> <li>The MDMS must be able to obtain initial meter reads from the HES</li> <li>Metering data to be transferred on user-specified intervals from the HES to MDMS.</li> <li>Once the file has been received from the HES, MDMS must immediately run 2nd line verification and validation according to the specified rules.</li> </ul>	<p><b>Note:</b> It is imperative that interval data should be visible to customers, users etc. to enable transparency and quick resolution of business and customer queries.</p>

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Functionality grouping	BRS Number	Functionality	Business Rule No and Description
		<ul style="list-style-type: none"> <li>The individual power station unit values (kwh) must be summated to obtain user-specified interval power station sent out values.</li> <li>The following information to be stored in the MDMS system: <ul style="list-style-type: none"> <li>IPP, energy, consumption and production data</li> <li>Main Transmission Station (MTS) tariff related metering data</li> <li>International Energy import and export data</li> <li>Individual power station unit values and the power station values, including unit values for multiple modes of operation i.e. Gen Mode, SCO Mode, Pump Mode and Standstill Modes for peaking stations</li> </ul> </li> <li>The MDMS must have the capability for user specified data transfers to various systems to be used for billing, settlement, reporting and forecasting purposes.</li> <li>In addition, MDMS to provide a web-based interface for registered end users and stakeholders to view their respective energy data.</li> </ul>	


## B. VEE functionality (validation, estimation and editing)

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
Data Validation		<p>Data validation to be performed whereby all the data is checked and corrections to be done automatically by the system and classified in two categories namely 1st line validation and 2nd line validation.</p> <ul style="list-style-type: none"> <li>First line validation – Is the validation of data that is done automatically by the HES as it retrieves the data from the meters.</li> <li>Second line validation – Is the validation of data that is done by the MDMS after the data has been transferred from the HES.</li> </ul> <p>In the instance where the data failed validation, a notification should be provided and allow for editing or estimation to adjust the data.</p> <p><a href="#">Data validation rules – refer to Appendix A</a></p>	
Data Editing & Estimation		<ul style="list-style-type: none"> <li>Allow for data estimations to be done on the HES where data loss occurs on the meter.</li> <li>If either the main or check data is missing, copy data for the same period from the available meter's data to the</li> </ul>	In the instances where TEMSE and customer data was used, the client needs to be

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Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
		<p>other meter, of the same transformer. The edited data should be flagged on the HES under data edited.</p> <ul style="list-style-type: none"> <li>In the case where both main and check data is not available, copy data for the same period from the TEMSE database. Measurement data of the same station to be used for estimation.</li> <li>In the case where both main and check data is not available, copy data for the same period from another meter of the same station, but another transformer with similar profile. The edited data to be flagged on the HES under data edited.</li> <li>In the case where both main and check data is missing and there is no transformer of the same profile, copy data from the same transformer but (n-7) days back. Perform profile analysis by checking if the profile is the same and if it can be used for estimation.</li> <li>When both main and check data is missing and the previous data profile cannot be used, allow the use other sources to estimate for example customer data</li> </ul> <p>The metering data that was estimated in the HES must be flagged as estimated and send through as flagged to the MDMS.</p> <p><a href="#">Estimation Process – refer to Appendix B</a></p>	<p>informed and the feedback given by the client should be documented.</p>


### C. Billing Determinant Generation and AMR interval data interface to billing systems

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
Billing		<p>Allow the MDMS to transfer various information to multiple systems for billing and settlement purposes at minimum every hour.</p> <p><b>Wholesale settlements (IPP's)</b></p> <ul style="list-style-type: none"> <li>IPP energy, consumption and production metering data must be send from MDMS to Themis on user-specified intervals to perform the necessary calculations to determine wholesale settlements.</li> </ul> <p><b>Energy Trading (Exports and Imports)</b></p> <ul style="list-style-type: none"> <li>International export and import data must be send from MDMS to Themis for billing purposes</li> </ul>	

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Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
		<ul style="list-style-type: none"> <li>MDMS must send international import data to Phoenix for billing purposes</li> <li>In addition, MDMS must send international import and export data to ETS for settlement purposes with the energy trading partner</li> </ul> <p><b>Internal Settlements</b></p> <ul style="list-style-type: none"> <li>Internal unit and station values as well as MTS tariff data must be send from MDMS to Themis on user-specified intervals.</li> </ul>	

#### D. HES File Transfer Capabilities

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
HES File Transfer Capabilities		<ul style="list-style-type: none"> <li>Ability to push data to MDMS from the HES automatically or manually.</li> <li>The data must be pushed automatically from the HES system after the download occurred at user-specified intervals to MDMS (under normal circumstances)</li> <li>Ability to manually push the data from the HES to MDMS if changes were made to the remote interrogation files or if files (remote interrogation files) were combined.</li> </ul>	<p>HES capability</p> <p>After validation were done and the files were not accepted for some or other reason (validation rules), business must go and check the files and make corrections accordingly</p>


#### E. On demand request and response capabilities

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
On demand requests		<ul style="list-style-type: none"> <li>Metering data to be pushed at an ad-hoc basis from the HES to MDMS to the requesting system.</li> <li>MDMS to capture metering data from other sources not only the HES and be able to distinguish the source of the data from the same metering point.</li> </ul>	
On demand response		<ul style="list-style-type: none"> <li>Ability to cater for requests of more than 3 months data extraction for the user.</li> <li>Users are currently limited to pull data for 3 months at a time.</li> </ul>	Note: The data is available in MDMS but user data limits apply

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## F. Demand Response Management

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
Metering information for Demand response		<ul style="list-style-type: none"> <li>Allow for metering information to be send from the meters to MDMS via the HES and then transferred to the demand response systems.</li> </ul>	The information will be flagged that it has been validated and estimated.


## G. Management of smart grid data and non-consumer devices (Managing technical losses, Managing of meter events (tamper, outages) and alarms)

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
Technical Losses		<p><u>Meters commissioned at Station</u></p> <p>The metering data from the stations and boundary meters to be pulled from the HES to MDMS, the relevant losses calculations must take place, and the following reports to be generated:</p> <ul style="list-style-type: none"> <li>Losses per hour</li> <li>YTD losses,</li> <li>Moving month average and</li> <li>Monthly losses reports</li> </ul> <p>The reports are then distributed to business</p> <p><u>Unavailable Gen Tran data on MDMS</u></p> <ul style="list-style-type: none"> <li>Unavailable MDMS generation official metering data should be retrieved from the Phoenix system</li> </ul>	<p>In future, ability for users to pull those reports themselves</p> <p><b>Tx Losses = (GEN (imports) + INT (Imports) + Tx IPP (Imports))-(Pumping (Exports) + SCO (Exports) + INT (Exports) + DX (Export- Import) + GEN (Exports) + Tx IPP (Exports) + Tx STN TRFR (Exports-Imports))</b></p>
Meter Events (tamper, outages, alarms, etc)		<p><u>Alarms</u></p> <ul style="list-style-type: none"> <li>Alarm events must pull through from the HES to MDMS</li> <li>Examples of alarms that MDMS must receive: <ul style="list-style-type: none"> <li>VT fuse fail alarm(phase missing) – Data quality is affected</li> <li>Battery low alarm</li> <li>Meter time alarm</li> <li>AC/DC supply fail alarm – Data missing</li> <li>TEMSE Breaker Open alarm - In the event that a breaker is open provide an “Open breaker status alert”</li> </ul> </li> </ul> <p><u>Meter Tamper</u></p>	<p><b>Notes:</b> If supply to the main meters fails, you can use the data from the check meter. If both main and check meter supply fails, the data from the TEMSE (measurement instruments) system can be used. Should the TEMSE data be incorrect, you use the data from the adjacent transformer, only if the MVA rating is the same and they are coupled</p>

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Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
		<p><i>Might have future requirements – only for Dx environment</i></p> <p><u>Meter Outages</u></p> <ul style="list-style-type: none"> <li>Outage alarms received by the HES must be send to MDMS.</li> <li>Notifications must be send from EMS or TEMSE to MDMS, especially when breakers are opened</li> <li>If the bay is out of service the meters will read zero's</li> </ul>	together (sharing the load equally)


## H. Meter Statuses

Functionality grouping	BRS Number	Functionality	Business Rule No and Description & Comments
		<p><u>Meter Statuses</u></p> <ul style="list-style-type: none"> <li>Meter statuses to be indicated by a specific symbol or colour whether the meter is commissioned or de-commissioned</li> <li>Report to be drawn from MDMS to indicate the status of the meter, for both main and check meters</li> </ul> <p><u>TEMSE (SCADA) Breaker Status</u></p> <ul style="list-style-type: none"> <li>In the event that the load breaker is open (indication from EMS (SCADA) system), the meter consumption should read zero.</li> <li>If the consumption/metering data is however &gt; 0, provide an alert on the system, and indicate as an "Open breaker status alert"</li> <li>Integrate with the TEMSE (EMS) system for breaker statuses</li> </ul>	

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### 7.3 Information/data requirements


#### 7.3.1 Define the following information:

Classification of data / information	Data / Information type	Availability of data	Migration of data
Generation/Transmission Boundary	Metering	Yes MDMS	Yes
Transmission/Distribution boundary	Metering	Yes MDMS	Yes
International Customers	SAPP Customer Metering	Yes MDMS	Yes
IPP data	IPP (Facility) metering data Eskom (System) metering data	Yes MDMS	Yes
Statistical	Metering	Yes MV90	Yes
Direct Customers	Metering data	Yes MDMS	Yes

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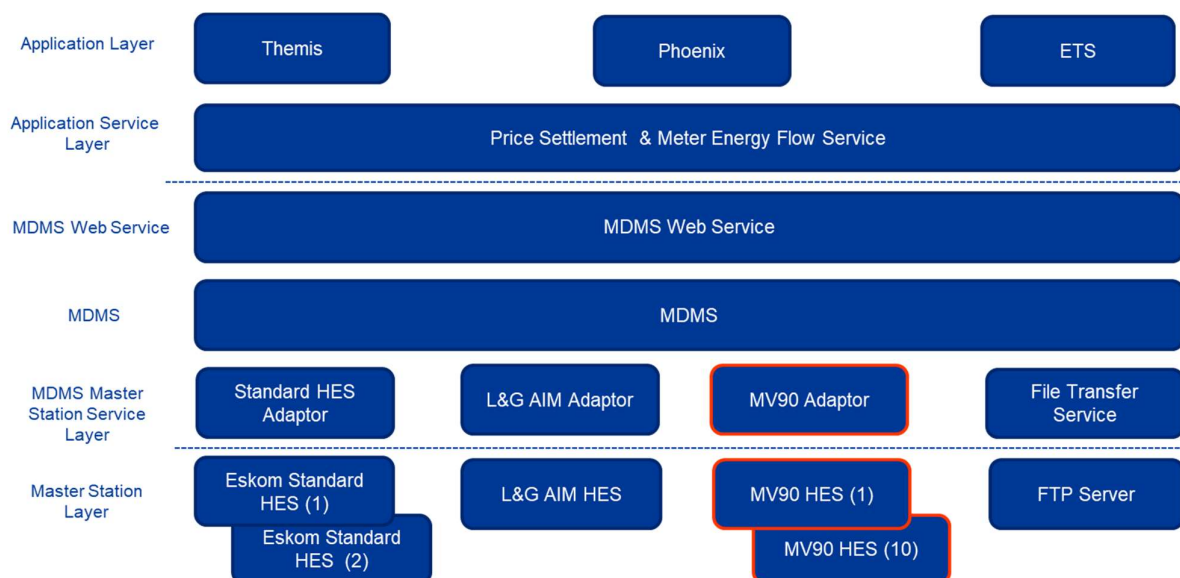
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7.3.2 If any data is currently not available the business needs to define the plans they have in place to ensure how and when the data will be available.

BRS Number	Gap	Owner of data	Business plan to source data
	Cluster Cross border metering	Dx	Tx to get Cross border meter information from Dx to map on MDMS (Still under negotiation)
	Statistical metering data	Dx/Tx	Tx Statistical metering points currently on MV90 to be configured on MDMS. Dx requested Stats metering to be configured on MDMS (Still under negotiation)
	Demand response metering data	Dx/Tx	Metering installation data to be supplied to System Operator Metering and Data Services by the Demand response team To be added on the new MDMS

## 7.4 Data flow diagram OR Context diagram

This is used to assist in understanding the scope of the business requirement. It serves as the starting point for the documentation of the detailed business requirements.




**Note: Red circles indicate the current HES**

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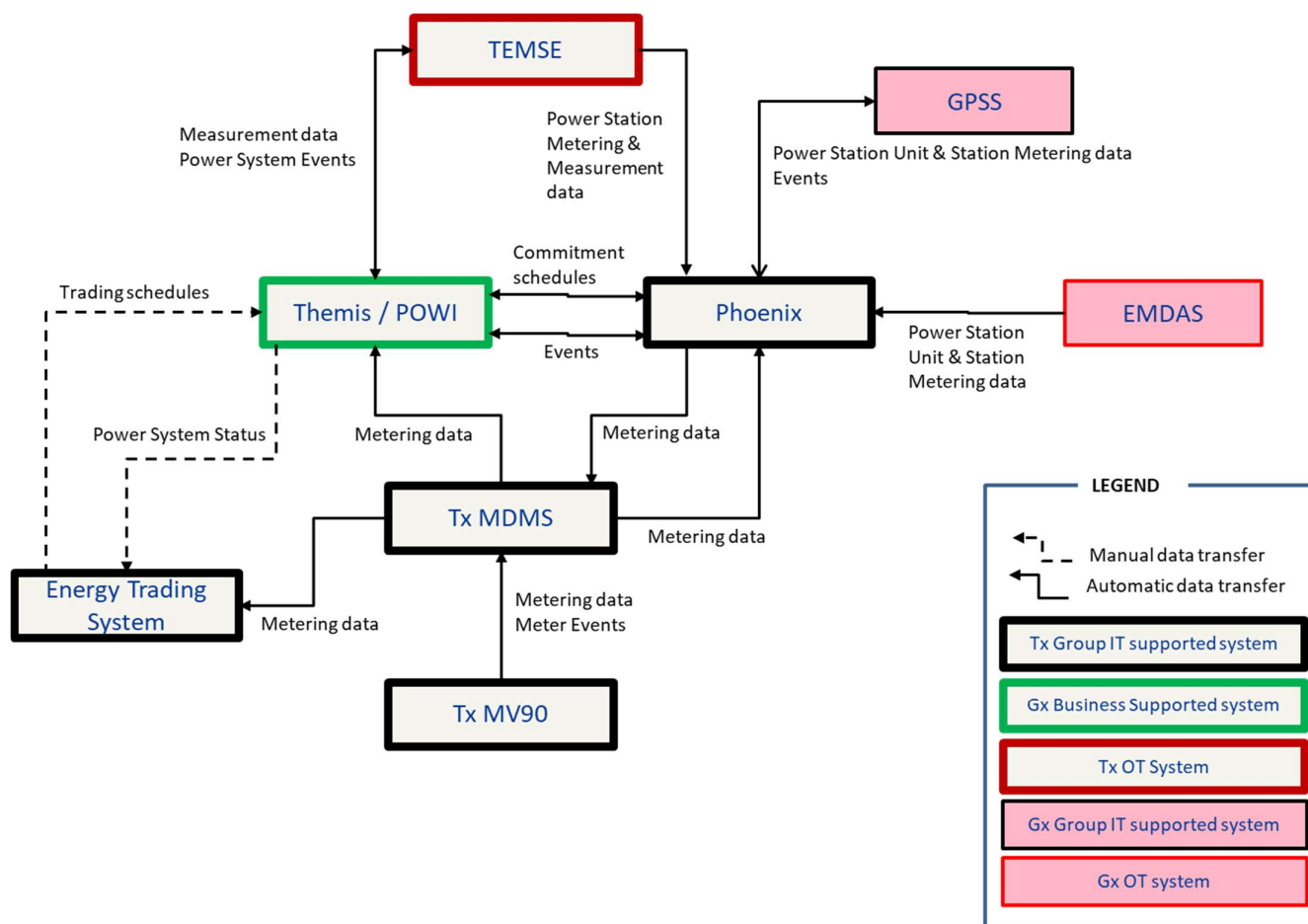


Figure : Data Flow Diagram

## 7.5 Use Case Diagram

7.5.1 Insert the use case diagram based on the business requirements that have been defined.


Each request will be determined on its own merits in terms of whether a use case diagram needs to be provided or not.

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## 7.6 Define the legal requirements.

BRS Number	Functionality	Legal Requirement. Response Y/N If Yes, provide legal document number / clauses


## 7.7 Intellectual Property

All intellectual property belongs to Eskom.

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## 8. REPORTING REQUIREMENTS

### 8.1 High level reporting requirements


8.1.1 Define the high level reporting requirements in number form.

Nr	Report Name	Functionality	Define strategic objective being supported	Phasing / Priority
HLR1	Dial Out Successful Rate Log / Remote Interrogation Log	Dial out Failure information, so that the user can see which meter to dial manually	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR2	Validation Report	Report that provides the results of the files after 1st line validation	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR3	MV90 Upload Log	Provide upload status of files uploaded from MV90 to MDMS	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR4	Data Availability Report	Provide main and check meters data availability per meter point and per region	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR5	Official Report	Provide the information indicating which meter was the official meter for that day	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR6	Losses Report	Provide losses per interval, send-out international import/export, pumping, etc	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR7	Gx Billing/Data Availability Report	Provide the hourly metering data per power station	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1

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HLR8	International Daily Status Report	Provide the data availability of international meters	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR9	International Monthly Billing Report	Provide the complete dataset status for international meters	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR10	IPP Weekly Data Availability Report	Provide the data availability of IPP meters	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR11	IPP Billing Report	Provide the complete dataset status for IPP meters	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR12	Percentage variance report	Comparison of main data vs check data	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR13	Data Variance (POWI) Report	Comparison of official data vs TEMSE data	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR14	Data Management/ Change data Log	Audit Trail of any activity of changes made to the metering information by a user	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR15	Missing Data Report	Provides a view of how many days of data is missing per meter point	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR16	Auto-plugged Report	Consolidate all reports that shows missing data for all meter points to redial meter manually	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR17	kVA Report	Provide the calculated KVA per meter (official) and station (total)	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1

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HLR18	Power Factor Report	Calculates the Power factor of the meter point or station	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR19	Official/Totalised Excel	Provides the hourly or 30min official or totalised data per station	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR20	Official/Totalised Profile Data	Provides the hourly or 30min official negative, positive or official totalised data per station	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR21	Meter Profile Data Report	Provides the main, check and all channels profile data	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR22	Meter Status Report (New)	Provides a view of which meters are commissioned and decommissioned	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR23	Meter Alarm Report	Provides a view of which alarms were received from the meters (VT fail, AC fail, Time alarm and battery low)	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1
HLR24	Data Comparison Report	Comparison of Nett Total vs Nett TEMSE v Nett Official vs Nett Main vs Nett Check meter	Ensure and maintain financial viability and sustainability Provide reliable and predictable electricity	Phase 1

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## 8.2 Detailed reporting requirements


8.2.1 Define the reporting requirements in number form ensuring that the functionality is sorted per report.

Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
DR1	SO Data Quality KPI	Dial Out Successful Rate Log / Remote Interrogation Log	What meter were successfully dialled vs what did not dial	% success rate		Dial out Failure information, so that the user can see when to dial the meter manually	Hourly	Hourly interval		Y (MV90)
DR2		Validation Report	Files accepted vs rejected	% failed and % passed	1 <sup>st</sup> line validation criteria	Report that provides the results of the files after 1 <sup>st</sup> line validation	Hourly	Any interval		Y MV90
DR3		MV90 Upload Log	MV90 files uploaded vs MV90 files failed to upload	% failed and % passed	No partial data, gaps or unreleased data will be passed from the staging environment to the data stores	Provide upload status of files uploaded from MV90 to MDMS	At any time of the day	Any interval		Y MDMS
DR4		Data Availability Report	Data available vs Not available vs partial availability vs estimated		Estimation rules run in MV90	Provide main and check meters data availability per meter point and per region	Daily Hourly	Availability Per day Future - Hourly		Y MDMS
DR5		Official Report	Status of official main or check meter for that day	%main meter official vs %check meter official	The main meter is the official meter but if that is not available the check meter is used, once the main meter is available it will take over the role of the official meter	Provide the information indicating which meter was the official meter for that day	Daily Hourly	Status of official meter		Y MDMS

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Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
DR6		Losses Report	Energy sent in Tx network minus energy consumed of Tx network	(GEN (imports) + INT (Imports) + Tx IPP (Imports))- (Pumping (Exports) + SCO (Exports) + INT (Exports) + DX (Export- Import) + GEN (Exports) + Tx IPP (Exports) + Tx STN TRFR (Exports-Imports))	If a source is not available, the losses value will be skewed Previous FY will be the trend for setting the target of the current FY Target will be based on the result of the study	Provide losses per interval, sent-out international import/export, pumping, etc.	Monthly	Per Interval	Share holder compact	MDMS and Phoenix
DR7		Gx Billing/ Gx Data availability Report	Data available vs Not available vs estimated		MDMS data taken as priority as official values, if MDMS is not available, the TEMSE and EMDAS/LOG (Power station value) data will be used	Provide the daily metering data per power station	Daily Hourly	Per day		MDMS, TEMSE and EMDAS/Logs
DR8		International Daily Status Report	Data available vs not available	Future - % availability vs % not available		Provide the data availability of international meters	Daily	Per day		Manual report in MDMS
DR9		International Monthly Billing Report	Data complete vs verified final data			Provide the complete dataset status for international meters for billing purposes	Monthly			Manually generated using data from MDMS Future – Report to be automated
DR10		IPP Weekly Data Availability Report	Data complete vs Incomplete	Future - % availability		Provide the data availability of IPP meters for billing purposes	Weekly			Manually generated using data from MDMS

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Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
										Future – Report to be automated
DR11		IPP Billing Report	Data complete vs verified final data			Provide the final IPP dataset status for billing purposes	Monthly			Manually generated using data from MDMS Future – Report to be automated
DR12		Percentage variance report	Main vs Check meter	% variance per meter point	Variance between the main and the check meter shouldn't be more than the accuracy class of the meter	Comparison of main data vs check data	Weekly and Monthly			MDMS
DR13		Data Variance (POWI) Report	Meter data vs TEMSE data	% variance per meter point	Variance between the meter data and TEMSE data shouldn't be more than the measuring accuracy class of the instrument	Comparison of meter data and TEMSE data	Adhoc	Per interval		MDMS and POWI
DR14		Data Management/ Change data Log				Audit Trail of any activity of changes made to the metering information	Adhoc			MDMS
DR15		Missing data Report	Count of days for missing data	n-1 missing data		Provides a view of how many days of data is missing per meter point	Daily			MDMS
DR16		Auto-plugged Report				The report is filtered per customer. The data area shows the data for each official for the	Daily			MDMS

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Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
						Chosen customer that has been filled with zeros. The fields in the data area are: Official: The official I.D. that has been plugged with zeros. Date Plugged: Date which was plugged				
DR17		kVA Report	The KVA report will calculate the KVA import and export values on a half-hourly interval basis	$\text{KVAH nett} = \sqrt{(\text{KWHexp} - \text{KWHimp})^2 + ((\text{KVARH exp} - \text{KVARH imp})^2)}$		Provide the calculated KVA per meter (official) and station (total)	Adhoc	Per interval		MDMS
DR18		Power factor Report	Power factor is based on the Active Demand divided by the Apparent Demand	(kW/kVA)		Calculates the Power factor of the meter point or station	Adhoc	Per interval		MDMS
DR19		Official/ Totalised Excel				Provides the hourly or 30min official or totalised data per station	Adhoc	Per interval		MDMS
DR20		Official/Totalised Profile data				Provides the hourly or 30min official negative, positive or official totalised data per station	Adhoc	Per interval		MDMS

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Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
DR21		Meter Profile data	Compare main vs check data			Provides the main, check meter data for all channels	Adhoc	Per interval		MDMS
DR22		Meter Status Report (New)	Commissioned vs Decommissioned			Provides a view of which meters are commissioned and decommissioned	Adhoc			MDMS
DR23		Meter Alarm Report (New)	VT Fail Alarm AC/DC Supply fail alarm Breaker Open Alarm Time alarm and Battery low		<p>If VT fail alarm or the AC/DC supply fail are sustained for &gt;=60 seconds, flag the data for that period</p> <p>Any meter out of time synch by 3min should be alerted</p> <p>If the consumption/metering data is however &gt; 0, provide an alert on the system, and indicate as an "Open breaker status alert"</p>	Provides a view of which alarms were received from the meters	Adhoc			EMS, MV90
DR 24		Data Comparison Report (Future)	Nett Total vs Nett TEMSE v Nett Official vs Nett Main vs Nett Check meter	%Main check variance and % Nett official TEMSE variance	Variance between the meter data and TEMSE data shouldn't be more than the measuring accuracy class of the instrument and meter	Comparison of Nett Total vs Nett TEMSE v Nett Official vs Nett Main vs Nett Check meter	Adhoc	Per interval		MDMS, TEMSE

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Nr	KPI	Name of Measure	Business Definition of Measure	Business calculation (how)	Business Rule	Functionality	Frequency	UOM (Unit of Measure)	KPA	Is data available for reports? Indicate Y/N and define what the data sources are/will be
					class Threshold for Main vs Check variance					

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## 9. NON FUNCTIONAL REQUIREMENTS

### 9.1 User interface requirements


9.1.1 Define the high-level user interface requirements in relation to the functionality required.

BRS Number	Functionality	Type of user interface	For new solution/requirement: Provide visual view of how the user will interact with the screen
UI1	Data processing	Web / GUI Interface	Process the meter readings into the meter data store
UI2	Meter asset validating	Web / GUI Interface	Validates the meter asset against the Enterprise Asset Management
UI3	Meter data management	Web / GUI Interface	Repository for interval and non-interval meter readings. Provides validation, editing and estimations and prepares meter reading for billing.
UI4	Command management	Web / GUI Interface	Enables the MDMS to send the commands to the meter i.e ping command, online meter readings etc
UI5	Billing determinants calculations	Web / GUI Interface	Functionality within MDMS that deals with all billing events
UI6	Meter reading aggregation	Web / GUI Interface	Aggregating the meter readings by power station or MTS service point
UI7	Audit and Reporting	Web / GUI Interface	Provides the operational reporting and auditing trails that comes standard as part of the MDMS
UI8	Exception Management	Web / GUI Interface	Functionality handles meter device, interface, reports exceptions and raises workflow items for action
UI9	Meter Events Management	Web / GUI Interface	Functionality within MDMS that handles all variants of events and alerts.
UI10	Configuration Management	Web / GUI Interface	Functionality with in the tool that looks after optimal functioning of all elements that defines the usefulness of the tool.
UI11	Validation, Editing and Estimation	Web / GUI Interface	This is the core MDMS functionality to validate, edit and estimate missing reads in order to prepare for billing determinants
UI12	Meter Reading Profiling	Web / GUI Interface	Capability to provide customers load profiles. The presentment of the load profile can be through a portal.
UI13	MDMS Administration	Web / GUI Interface	Provides MDMS administration functionality to create users and profiles to administer the MDMS.

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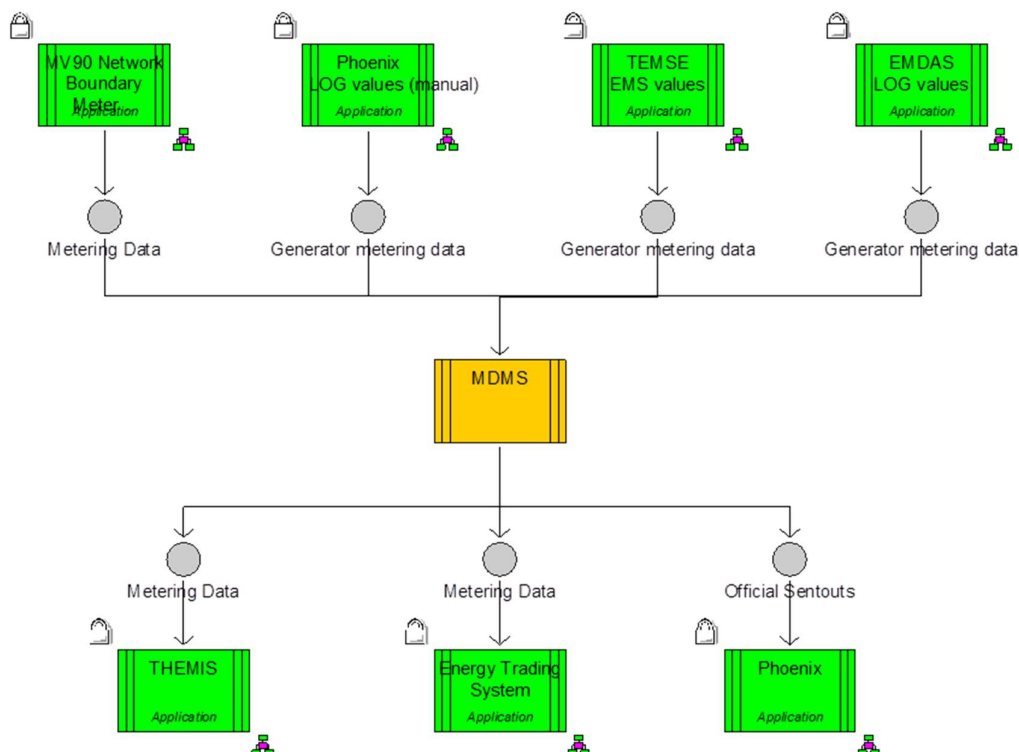
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		Authorisation Date	9 November 2018		
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## 9.2 System Integration requirements

### 9.2.1 Define if and what the system integrations might be.




BRS Number	Functionality	Impacted Systems (if known)	Sending System Owner (if known)	Receiving System Owner (if known)	What information needs to be integrated
SI1	Interval metering and event data	Tx Mv90 and Tx MDMS	Tx Mv90	Tx MDMS	Meter readings of Transmission customers and substations
SI2	Participant metering data (PMR file)	Tx MDMS and Themis	Tx MDMS	Themis	IPP data, Main Transmission (MTS) metering data and International export data In Future, International import data to be included
SI3	Generation metering data (GMR file)	Tx MDMS and Phoenix	Tx MDMS	Phoenix	Individual unit and station values as well as International import data
SI4	Generation metering data (GMR file)	Phoenix and Themis	Phoenix	Themis	Official station sent-out values

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BRS Number	Functionality	Impacted Systems (if known)	Sending System Owner (if known)	Receiving System Owner (if known)	What information needs to be integrated
					Remove the GMR data link between Phoenix and Themis and have it between Tx MDMS and Themis
SI5	Adhoc GMR file	Phoenix and Tx MDMS	Phoenix	Tx MDMS	Metering values in case of data loss from
SI6	International import and export data	Tx MDMS and ETS	Tx MDMS	ETS	International Energy export and import data
SI7	Measurement data	THEMIS (POWI) and TX MDMS	THEMIS (POWI)	Tx MDMS	Measurement (TEMSE) data import and export
SI8	TEMSE meter and breaker status alarms	TEMSE (EMS) and Tx MDMS	TEMSE	Tx MDMS	Alerting of meter and breaker status alarms
SI19	Generation metering data (GMR file)	EMDAS and Tx MDMS	EMDAS	Tx MDMS	Individual unit and station values

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### 9.3 Access requirements

9.3.1 Define different types of access roles that are required.

BRS Number	Role	Define different types of access and what permissions that role has
AR1	Auto Reports	Access to Auto plug report and Missing data Reports System user that performs auto generates reports
AR2	MDMS Operator	MV90 operator and special reports
AR3	MDMS User	Special reports and viewing rights only
AR4	System Administrator	Access and permission rights to the system
AR5	Transmission Administrator	All rights as above except the system admin rights

### Security Requirements

- System to be isolated from other Division, should be ring-fenced to Transmission Division only
  - High security in place to avoid any unlawful access to the system
- There is confidential information in the system so only users that have access right must be able to access the system
- Certain defined roles to have access to specific data but not the system
- Access to system will only be allowed after approval of access rights by the system administrator and the relevant authorised business area (eg, Single Buyer Office)
- Appropriate back-up routines shall be established to ensure that data is kept secure at all times. Security and confidentiality requirements for back-up files shall be the same as for the original raw meter data files
- Transparent Access Audit trial log to provide information of who accessed the system and who made changes to data
- Only the System and Transmission administrator allowed to change the metering data and in addition allow the reason for this data change to be pulled through to MDMS

### 9.4 Archiving requirements


9.4.1 State the retention / archiving period required for the data/information.

Retention Period
<ul style="list-style-type: none"> <li>All metering data (raw, estimated, etc.) of the last 5 years must be retained to be accessible immediately</li> <li>All metering data (raw, estimated, etc.) of 10+ years before the last 5 years must be archived and retrievable on request</li> </ul>
Archiving Requirements
<ul style="list-style-type: none"> <li>All downloaded metering information must be archived in such a manner that it cannot be altered without leaving a detailed audit trail, and a copy of the raw meter data must be kept for a minimum period of five years. This raw meter data must be available on request.</li> <li>Procedures must be in place to minimize the possibility of such raw meter data being accessed by unauthorized personnel, and to ensure that the raw meter data cannot be modified in any way. The means that the storage of the raw meter data shall be such that any access to it is recorded.</li> <li>Logs may be printed and filed or maintained as data files, in a secure form, along with other archived information</li> </ul>

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## 9.5 Disaster recovery requirements

### 9.5.1 Define the high-level disaster recovery requirements.

Data loss	Time to recover
72% - Last transaction to Last Sync	<8hrs

The disaster recovery site is Duvha Power Station in Witbank


The Tx MDMS has been classified as Mission Critical and below is the high level recovery process.

Figure: Tx MDMS High level recovery process

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## 9.6 Business continuity requirements

### 9.6.1 Confirm the business continuity information.


Business continuity plan exists	Y
Name of BCP	Transmission Metering Data Management System IT System Continuity Plan
Name of BCP owner	Siphiwe Lamunu
If BCP does not exist, what plans are in place from a customer view to define a BCP	N/A
If BCP needs to change, what plans are in place from a customer view to update the BCP	

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## 10. PRECONDITIONS


### 10.1 Define any preconditions and dependencies that impact the business requirement

Unique identifier number	Business Activities	Processes	Projects (IT and Business)	Technology (if known)	Other (define)
P1	Base MDMS to be implemented		MDMS Project	Existing system	Precondition
P2	New MDMS and current Tx MDMS to be operated simultaneously for a period of time		MDMS project	New and existing systems	Precondition

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## 11. TRAINING

### 11.1 Define the high level training requirements:

BRS Number	Functionality
T1	Supply a training environment
T2	All users to be trained on the new solution
T3	Flexible training environment

### 11.2 Define the possible types of high level training that will be required:

Course Name/Types of training
User Training
Operator Training
System and Transmission Administrator Training

## 12. CORPORATE, DIVISIONAL AND DEPARTMENTAL PLAN ALIGNMENT

### 12.1 Strategic alignment


#### 12.1.1 Select the Eskom Shareholder's Strategic Intent Statement (SIS) that are supported by this requirement:

SIS	Supported (Y/N)	How
Provide reliable, predictable and affordable electricity in line with the approvals and regulatory model by NERSA.	Y	To provide customers with verified metering data and support national control with power system condition monitoring through the use of data acquired through well managed data acquisition and data information systems Enhances National Control's operations and grid plant maintenance through condition monitoring systems located within the control room
Ensure and maintain a financially viable and sustainable company.	Y	Provide metering data to ensure revenue collection and billing of IPP and International trading purposes Produce Tx losses monthly reports and shareholder compact input
Consolidate socio-economic contribution to ensure alignment to national transformation imperatives.		
Reduce the impact on the environment.		
Ensure that company structure is responsive to changing energy landscape.		
Submit annual strategic documents and report on progress.		

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Conduct reporting in line with regulatory model, with profit and loss for each licensee.		
--	--	--

**12.1.2 Define the Divisional Focus areas / mandates being supported and indicate how the requirement is in support thereof.**

To reliably control, maintain, plan, expand and provide access to an integrated Transmission system, trade energy, influence customer demand and effect opportunities in the SADC region


**12.1.3 Define the Departmental Focus areas / mandates being and indicate how the requirement is in support thereof.**

To provide customers with verified metering data and support national control with power system condition monitoring using data acquired through well-managed data acquisition and data information systems.

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13. **CHANGE REQUEST COSTING ONLY** (mandatory for BRS C's but not other BRS types; responsibility of the Business Relationship Manager according to the demand management process)

<i>Number of development man-hours &amp; cost per skill level:</i>		
Define quantity of personnel here		
For example Senior Developer x 1	400	R 400 000
<i>Number of testing manhours &amp; cost per skill level:</i>		
Define quantity of personnel here		
For example Junior Testers x 2	220	R 220 000
License costing		0
Vendor costing		0
Any other costing information		0
<b>TOTAL APPROXIMATE COST</b>	-	R 620 000

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## 14. POSSIBLE OPTIONS


### a) Option 1: Implementation of MDMS Solution using Cloud: **Software as a Service**

Description	Implement a Meter Data Management System to store, process and manage meter data. The MDMS solution will include meter data management functionality for data, validation, processing, and aggregation. It will interface with various Eskom systems, either receiving or sending data, and with AMI Master Station/s
Critical knowledge /skills /enabling factors required to provide a successful delivery	<ul style="list-style-type: none"> <li>• Cloud Implementation</li> <li>• Security</li> <li>• Integration</li> </ul>
Option Risks	<ul style="list-style-type: none"> <li>• Unable to interface with systems</li> <li>• Unavailability of resources</li> <li>• Unacceptably slow performance</li> <li>• No business buy in</li> <li>• Failure of pre-deployment testing</li> <li>• Failure of data take-on</li> <li>• Systems bypass MDMS for metering Data Access</li> <li>• Non-Metering data is stored in MDMS</li> <li>• Complex data calculations and manipulation is implemented</li> <li>• Changes need to be made to data source systems</li> <li>• System becomes responsible for data uploads to other systems</li> <li>• System becomes responsible for complex data validation</li> <li>• Simultaneous implementation of meter reading software and other supporting applications</li> <li>• Delays in resolving key project issues as required over the entire course of the project</li> </ul>
Advantages	<p><b>Business:</b></p> <ul style="list-style-type: none"> <li>• Increase in collection of revenue</li> <li>• Reduction in non-technical energy losses</li> <li>• Effective meter device management including lifecycle management as well as device type management that will</li> <li>• Reduce poor quality devices that increase costs to the utility and the consumers</li> <li>• Increase in productivity</li> <li>• Data Interfaces saving as billing determinant programs are not required in the billing application reducing</li> <li>• overhead costs of CIS solution</li> <li>• Reporting saving</li> </ul> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>• Will always have the latest technology software solution</li> <li>• Inclusive of maintenance</li> <li>• Customer can perform configuration</li> </ul>

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	<ul style="list-style-type: none"> <li>The most cost effective Cloud service as you only lease the software and not the resource. Reduces the cost of software ownership by removing the need for technical staff to manage install, manage, and upgrade software</li> <li>Reduces the cost of licensing software.</li> <li>Requires minimal planning and is easy to setup, as applications are usually simple in usage and readymade.</li> <li>Rapid deployment as the software is fully provisioned on demand</li> <li>The customer does not need to worry about the management of applications, as this is all handled by the provider.</li> <li>Software is usually very stable, as it is supported by the Cloud provider's large infrastructure and I.T team</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>Would incur capital and operating expenditure</li> </ul> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>Although configuration will be permitted, not much customization will be permitted</li> <li>The customer has no control over the system processing its data.</li> <li>There is no control over which customers use the software; the software is used by a large amount of users.</li> <li>Little control over deployment, upgrade and testing methodology (e.g. Dev, UAT, Live systems availability)</li> <li>Currently only a limited number of software solutions are offered in the form of SaaS.</li> <li>Integration with other software on any other systems is either difficult or unsupported (e.g. single sign-on)</li> <li>Cloud provider has full access to customers' data, unless cryptography is used (But this would mean no processing could be done on the Cloud thus reducing the usefulness of the Cloud).</li> </ul>
Fit to need:	100%
Estimated implementation duration:	TBD


**b) Option 2: Implementation of MDMS Solution using Cloud: Platform as a Service**

Description	Implement a Meter Data Management System to store, process and manage meter data. The MDMS solution will include meter data management functionality for data, validation, processing, and aggregation. It will interface with various Eskom systems, either receiving or sending data, and with AMI Master Station/s. The Implementation of the MDMS Solution will be using Cloud: Platform as a Service. This solution can be either Off Premise/ On premise or a Hybrid solution
Critical knowledge /skills /enabling factors required to provide a successful delivery	<ul style="list-style-type: none"> <li>Cloud Implementation</li> <li>Security</li> <li>Integration</li> </ul>

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Option Risks	<ul style="list-style-type: none"> <li>• Unable to interface with systems</li> <li>• Unavailability of resources</li> <li>• Unacceptably slow performance</li> <li>• No business buy in</li> <li>• Failure of pre-deployment testing</li> <li>• Failure of data take-on</li> <li>• Systems bypass MDMS for metering data access</li> <li>• Non-Metering data is stored in MDMS</li> <li>• Complex data calculations and manipulation is implemented</li> <li>• Changes need to be made to data source systems</li> <li>• System becomes responsible for data uploads to other systems</li> <li>• System becomes responsible for complex data validation</li> <li>• Simultaneous implementation of meter reading software and other supporting applications</li> <li>• Delays in resolving key project issues as required over the entire course of the project</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>• Meter Reading Cost Savings</li> <li>• Improved Accuracy and Customer Services</li> <li>• Enhanced Revenues and Reduced Bad Debt Write-Offs</li> <li>• Meter Tampering and Theft Detection</li> <li>• More Accurate Outage Location to Support Rapid Restoration</li> <li>• Improved Outage Information Sharing and Customer Notification</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>• Would incur capital and operating expenditure</li> </ul> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>• Need to have additional contracts for software solution</li> <li>• No Control over the VM or processing of data, this is a big security risk, as you don't know what's happening with your data.</li> <li>• Possibly no control over platform depending on Cloud provider.</li> <li>• Platform is most likely a shared platform.</li> <li>• Management task can become time consuming and tedious, as you are responsible for updates and upgrades of application.</li> <li>• Not as cost effective as SaaS and not as much control over VM as IaaS.</li> </ul>
Fit to need:	80%
Estimated implementation duration:	TBD

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**c) Option 3: Do Nothing – Data remain stored in the head-end solutions and Tx MDMS**

Description	The do nothing option implies that you leave the system as it currently is.
Critical knowledge /skills /enabling factors required to provide a successful delivery	None
Option Risks	<ul style="list-style-type: none"> <li>Eskom would not be able to utilise the benefits of access to a single central portal to meter reading data.</li> <li>Various systems would still need to interface with each other for the acquisition of meter management data, resulting in the need for customized development on each of these systems.</li> <li>Productive man hours will be lost due to the searching for unavailable metering data.</li> <li>Project development costs of projects reliant on metering data will escalate.</li> <li>The benefits of better quality of meter management data cannot be leveraged.</li> </ul>
Advantages	Saving of MDMS Project costs
Disadvantages	<ul style="list-style-type: none"> <li>Cost of systems requiring access to meter data. I.e. cost of interfacing with meter reading data.</li> <li>Inability to curb revenue loss due to unavailability of accurate meter usage data in a single repository.</li> <li>Cost of custom development for data calculations.</li> <li>Unavailability of a single meter reading data set.</li> <li>Inability to effectively calculate trends and forecasts, as well as statistical information.</li> <li>Loss of productivity due to unavailability of clear meter reading data access guidelines.</li> </ul>
Fit to need:	0%
Estimated duration of implementation:	Not applicable

**Recommended Option:**


Option number	<b>Option 1: Implementation of MDMS Solution using Cloud: Software as a Service</b>
Can it be done under the current SLA:	TBD
If YES, list the vendor and the contract reference #.	TBD
Is software or licenses required? Provide details	Yes
Estimated Cost:	TBD

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## 15. REFERENCES


The following documents have been referenced or used to compile this Business Requirements Specification including Process Control Manuals.

Number	Name	Location
240-105049062	Tx BMS Manual- rev2 2018	<a href="#">Tx BMS Manual</a>
342-307	Metering & Data Services Priority Plan	<a href="#">M&amp;DS Plan</a>
ENE_TX_MDMS_FS_1005	Functional Specification_Tx MDMS	Enerweb Document
GENTRAN - MDMS and MV90 URS - ver 2	GENTRAN - MDMS and MV90 User Requirements Specification	GENTRAN project Document
240-48907866	Technology Roadmap for Metering	<a href="#">Technology Roadmap for metering</a>
240-161901555	Transmission Group System Operator Operational plan	<a href="#">Transmission System Operator Plan</a>
240-91559934	Technology Plan for Transmission and Distribution	<a href="#">Technology Plan for Tx and Dx</a>

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Name	Role	Signature	Date
<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXX</del>
<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXXXXXXXXXX</del>	<del>XXXXXXXXXXXX</del>

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Name	Role	Signature	Date
[REDACTED]	Group IT Business Process Manager	[REDACTED]	
[REDACTED]	Senior Business Manager / Business Sponsor	[REDACTED]	31/12/2021
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	Group IT Application / Support Manager	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	

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## 18. ABBREVIATIONS

Abbreviation	Description
ACE	Analytics Centre of Excellence Department
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
ARIS	Architecture of Integrated Information Systems
BCP	Business Continuity Plan
BI	Business Intelligence (also known as Analytics)
BPM	Business Process Manager
BRS	Business Requirements Specification
CC&B	Customer Care and Billing
CR	Change Request
DAS	Data Acquisition System
DFD	Data Flow Diagram
DR	Disaster Recovery
Dx	Distribution Division
DXSETT	Distribution Settlements system
EMDAS	Energy Management Data Acquisition System
GIT	Group Information Technology Division, also referred to as Group IT
GMR	Generation Metering Data
GPRS	General Packet Radio Service
GPSS	Generation Power Sales System
HES	Head-end System
HV	High Voltage
IPP	Independent Power Producer
IT	Information Technology
ITM	Internal Tariff Metering
ITSO	Information Technology Service Operations
KPA	Key Performance Area
KPI	Key Performance Indicator
KSACS	Key Sales and Customer Service
MTS	Main Transmission Station
MV	Medium Voltage
MV90	Multi-Vendor 90 Utility Translation System
NCC	National Control Centre
OPS	Operational data

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	<b>Group IT Business Requirement Specification (BRS) Transmission Meter Data Management System DEM-02167-L6K5</b>	Template Identifier	240-83570075	Rev	6
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Abbreviation	Description
OVS	Online Vending System
PCM	Process Control Manual
PHOENIX	Transmission plant database
PMR	Participant Metering Data
QOS	Quality of Supply
SAPP	South African Power Pool
SCADA	Supervisory Control and Data Acquisition System
SIS	Strategic Intent Statement
SLA	Service Level Agreement
TEMSE	Transmission Energy Management System Evolution
THEMIS	Transmission Settlements system
TOU	Time of Use
Tx	Transmission Division
TXMDMS	Transmission Metering Data Management System
UI	User Interface
VT	Voltage Transformer

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## 19. CONTROL TABLE

This table defines what sections of the document need to be completed for the different types of BRS's.

Section Number	Section Description	Change Request	BRS1	BRS2	BRS A (Analytics)	Innovation Project
2.1	Customer information	Y	Y	Y (Review)	Y	Y
2.2	Group IT information	Y	Y	Y (Review)	Y	Y
3	Glossary of terms / definitions	Y	Y	Y (Review)	Y	Y
4	Business requirements specification focus area	Y	Y	Y (Review)	Y	Y
5	Reason for the requirement					
5.1	Define the current business challenges / issues that need to be addressed	Y	Y	Y (Review)	Y	Y
5.2	Define the high level gaps between the "As-Is" and "To-be" business	Y	Y	Y (Review)	Y	Y
6	As-is and To-be business process mapping					
6.1	As-is business process	Y	Y	Y (Review)	Y	Y
6.2	To-be business process	N	N	Y (Review)	Y	Y
7	Business requirements					
7.1	High level requirements	Y	Y	Y (Review)	Y	Y
7.2	Detailed requirements and business rules	Y	Y	Y (Review)	Y	Y
7.3	Information/data requirements	Y	Y (Highlevel)	Y (Detail)	Y (Detail)	Y (Highlevel)
7.4	Data flow diagram / Context diagram	N	N	Y	Y	N
7.5	Use case diagram	N	N	Y	N	Y (Optional)
7.6	Legal requirements	Y	Y	Y (Review)	Y	Y

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**Group IT**  
**Business Requirement Specification (BRS)**  
**Transmission Meter Data Management System**  
**DEM-02167-L6K5**


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Section Number	Section Description	Change Request	BRS1	BRS2	BRS A (Analytics)	Innovation Project
7.7	Intellectual property	Y	Y	Y (Review)	Y	Y
8	<b>Reporting requirements</b>					
8.1	High level reporting requirements	Y	Y	N	Y	Y
8.2	Detailed reporting requirements	Y	Y (Review)	Y	Y	N
9	<b>Non-functional requirements</b>					
9.1	User interface requirements	N	N	Y	Y	N
9.2	System Integration requirements	N	N	Y	Y	N
9.3	Access requirements	Y (Depends)	N	Y	Y	Y
9.4	Archiving requirements	N	N	Y	N	Y
9.5	Disaster recovery	N	Y	Y (Review)	Y	N
9.6	Business continuity	N	N	Y	Y	N
10	<b>Out of scope and preconditions</b>					
10.1	Define any preconditions and dependencies that impact the business requirement	Y	Y (Highlevel)	Y (Review)	Y	Y (Highlevel)
11	<b>Training</b>					
11.1	High level training requirements	Y	N	Y	Y	N
11.2	Possible types of high level training that will be required	Y	N	Y	Y	N
12	<b>Corporate, divisional and departmental plan alignment</b>					
12.1	Business strategy supported	Y	Y	Y (Review)	Y	Y
12.1.1	Eskom strategic pillar/s that are supported by this requirement	Y	Y	Y (Review)	Y	Y
12.1.2	Critical targets that are supported by this requirement	Y	Y	Y (Review)	Y	Y
12.1.3	Divisional plans supported by this requirement	Y	Y	Y (Review)	Y	Y

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Section Number	Section Description	Change Request	BRS1	BRS2	BRS A (Analytics)	Innovation Project
12.1.4	Departmental plans supported by this requirement	Y	Y	Y (Review)	Y	Y
13	Change request costing (BRM responsibility according to demand management process)	Y	N	N	N	N
14	Possible options	Y	N	N	Y (Depends)	N
15	References	Y	Y	Y (Review)	Y	Y
16	Document acknowledgement	Y	PDF no signatures	Y	Y	Y
17	Document approval	Y	PDF no signatures	Y	Y	Y
18	Abbreviations	Y	Y	Y (Review)	Y	Y
19	Control table					

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## 20. APPENDIX A – Data Validation rules

The loading of the files does the following checks:

### Validation checks on file structure

1. File size is greater than 200 bytes and less than 409800 bytes (does not apply to GMR)
2. Source file spec:
  - MDEF for Mv90
  - GMR format for Phoenix
3. Value Check: Data interval values is greater than or equal 0 and less than 99999999
4. Customer ID must be a non-empty string
5. Start/End Dates – not empty
6. Meter ID must be a non-empty string
7. Interval Length = 30
8. Intervals starting at 00 min, or 30 min of an hour.
9. Customer, meter and channel details are automatically updated on loading.

Failed files are moved to a failed directory. The MV90 Upload Log will inform the user as to why the file failed to upload.

### **The data processing rules are as follows:**

All data will be validated in the staging environment and only successful and 'released' data will reach the Short and Long Term Data Stores. Different sets of business rules may be applied to different data sources to determine whether data is to be automatically accepted or not. The following tests include utilising a group of functions related to all the reports and audits available to users online. This feature may be accessed under Reporting and Auditing. The tests thus perform a dual function in that they also indicate compliance to the reporting functionality required of MDMS. To prevent duplicate testing, these tests have been referenced by other sections in this document, specifically the analytical side of the data repository, reporting.

The following should be made clear:

- Current Data: Data in the system that is 7 days or less old
- Old Data: Data in the system that is more than 7 days old

### Business Rules 1-5 deal with the generation of official data

**Business Rule 1:** Use Main Meter data to generate the Official whenever it is available.


**Business Rule 2:** Use Check Meter data to generate the Official only when Main Meter data is unavailable.

**Business Rule 3:** Utilise Main Meter data to update officials when it becomes available at a later stage (within seven day cycle).

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**Business Rule 4:** Estimated main or check data must be 'released' by the account's responsible person before updating the original data in the system (within the 7 day cycle).

**Business Rule 5:** Automated plugging of officials with zeros will occur on a daily basis, when no data is available for both main and check Meters.

Business rule 6 deals with the replacement of meter data. Versions of data are kept on the system

**Business Rule 6:** Replacement of data (changed data) will occur automatically with no acceptance required, within the 7 day cycle.

The following business rules deal with the replacement of main or check data beyond the 7 day cycle

**Business Rule 7:** Old data will automatically update officials for which there is no data or where the data has been auto-plugged.

**Business Rule 8:** Old data will only be used to update officials upon being accepted by an authorised user.


**Business Rule 9:** Old estimated data will have to be released by the responsible person(s). The user authorised to accept estimated/error data may not have permission to force old (> 7 days) data through the system. On accepting estimated data, the business rule 8 condition becomes true. Data will then needs to be released by the accountable person.

**Business Rule 10:** Partial data will be used to generate official data.

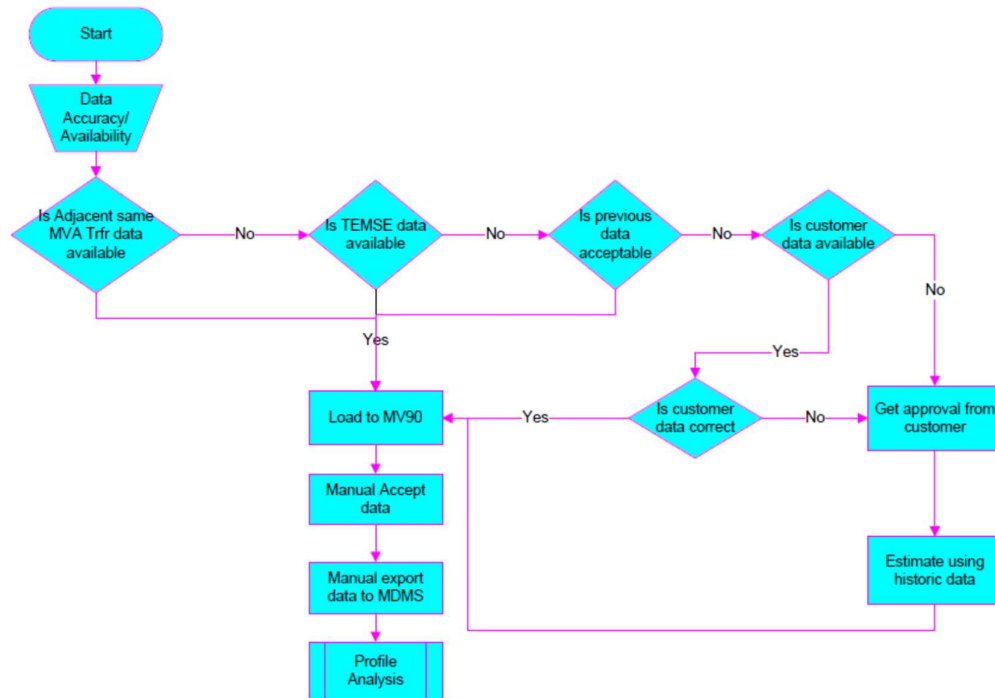
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## 21. APPENDIX B: ESTIMATION PROCESS



### Detailed Estimation Process


Data estimations are done on the MV90 by the DAS operator for numerous reasons of loss of data on the meter. Data is estimated in alignment with the (NRS057:2009) the Code of Practice for Electricity Metering and in agreement with SLA drawn between Metering and Data Services department and its stakeholders.

- If either the main or check data is missing DAS operator will copy data for the same period from the available meter's data to the other meter, of the same transformer. The edited data will be flagged on the MV90 system under data edit.
- In a case where both main and check data is not available, DAS operator will copy data for the same period from Temse database. Measurement data of the same station will be used for estimation.
- In a case where both main and check data is not available, DAS operator will copy data for the same period from another meter of the same station, but another transformer with similar profile. The edited data will be flagged on the MV90 system under data edit.
- In a case where both main and check data is missing and there is no transformer of the same profile, DAS operator will copy data from the same transformer but (n-7) days back. Firstly the operator does profile analysis, checking if the profile is the same and can be used for estimation.
- When both main and check data is missing and the previous data profile cannot be used, DAS operator must use other sources (Customer data) to estimate.

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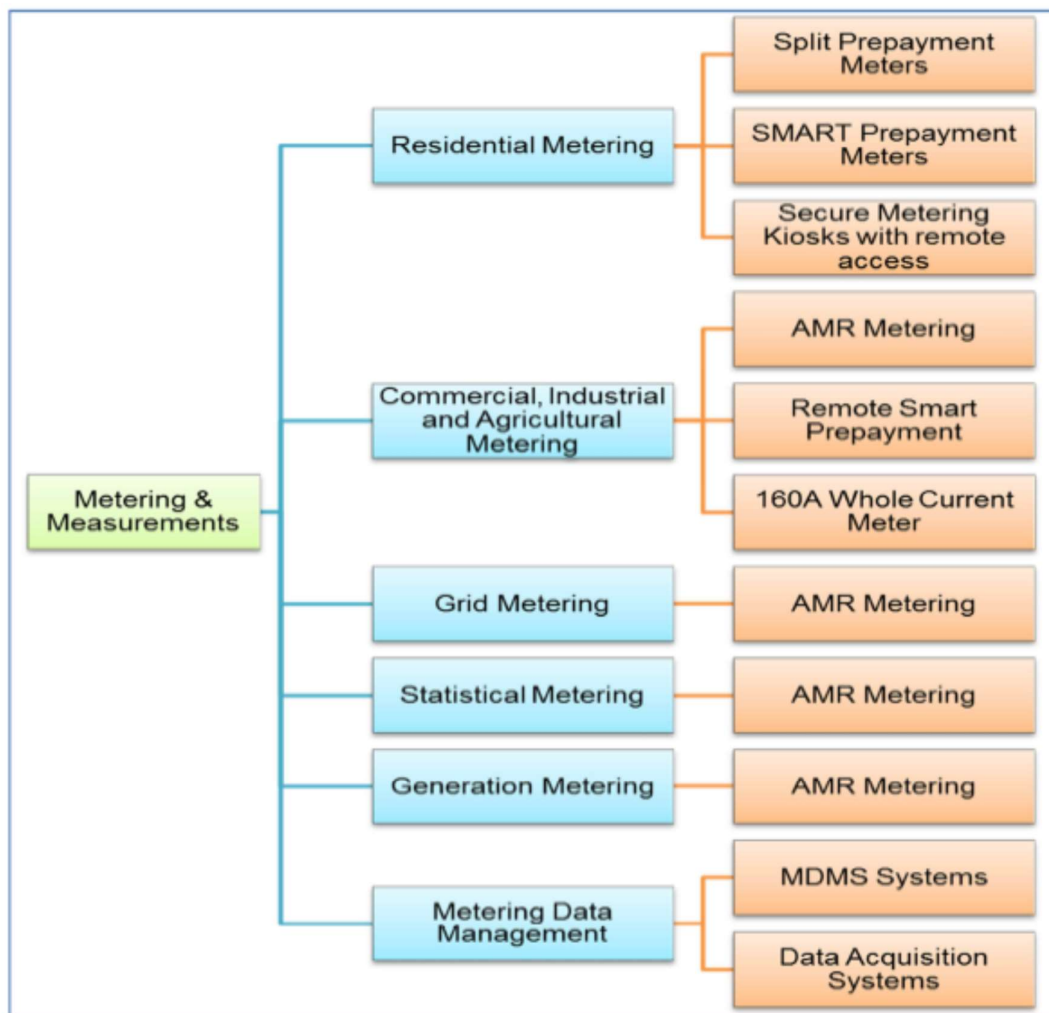
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In the instances where Temse and customer data was used, the client needs to be informed and the feedback given by the client should be documented.

## 22. APPENDIX C: METERING TECHNOLOGY LANDSCAPE



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