Background

Municipalities are faced with a major backlog of unpaid utility services resulting in revenue shortages. This is primarily due to billing discrepancy disputes and reduced revenue collection due to interim billing, a direct result of aging infrastructure and in-accurate consumption figures as well as many unbilled points.

The replacement of legacy metering infrastructure with Smart metering for both Electricity and Water will provide an increase in accurate electricity and water consumption data in real-time, for billing purposes, facilitating a reduction in monthly municipal interim billing and a noticeable improvement in revenue collection. This coupled with smart prepaid metering, which focuses on ensuring that bypasses and ghost vending are eradicated, will ensure financial viability of municipalities.

Thanks to our wildly innovative Internet of Things (IoT) solutions, many Smart Cities are already active and deploying rapidly. All spheres of government can leverage cellular and Low Power Wide Area Network (LPWAN) IoT technologies such as NB-IoT, Sigfox, and Lora WAN to connect and improve infrastructure, improve efficiency, reduce costs, and enhance convenience and quality of life for citizens.

Utilities Challenges

The following challenges have been identified in the utility sector:

Utility Challenge	**Our Smart Utility Solutions**
Reliable data for informed planning, maintenance, and management.	• Accurate, clean, and verified data to allow for effective management and maintenance regarding the utility's infrastructure (both electricity and water). • Reliable data to allow for informed future planning for utility upgrades, investment, and expansion of utility services
Improved Revenue Collection, Financial Management and Strategic Planning.	• Accurate billing which promotes trust and encourages payment for utility services utilised. • The ability to budget and plan based using reliable revenue and expense data for financial and alternative infrastructure expenditure scenarios for strategic planning. • Increased ability to invest in future capital projects. • Reliable data regarding consumption, billing and infrastructure status will provide for greater budgetary control. • Stronger financial control and infrastructure management will promote creditworthiness and borrowing cost reduction.
Change management for citizen payment behaviour change.	• The need to change people's behaviour from a culture of non-payment for services to payment for services.

Utility Challenge	Our Smart Utility Solutions
Socio-Economic Upliftment.	• Job creation and upskilling of local artisans is a primary need to foster competency strengths in the utilities sector.

Typical Cost-Benefits experienced through the deployment of our Smart Utility solutions include:

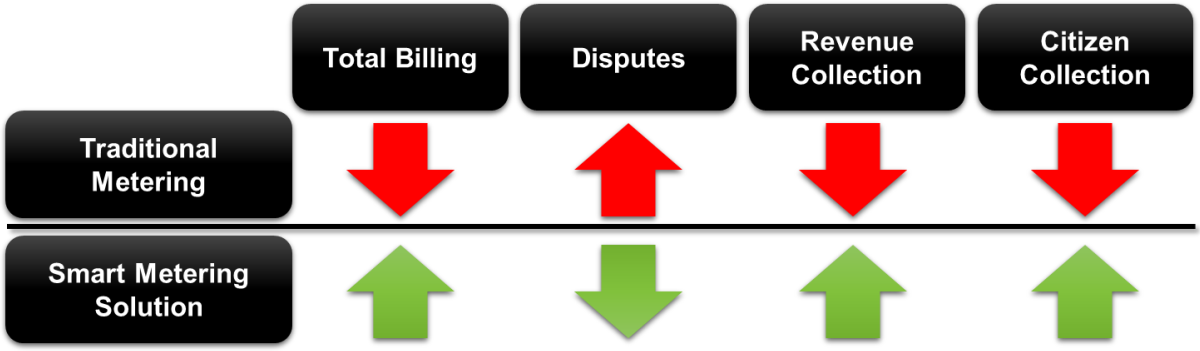


Figure 1.1: Benefit Realisation of Smart Metering

The reduction of interim billing; building citizen confidence, promoting revenue collection, and reducing billing disputes.

Accurate billing removing interim billing (the usage of estimated average consumption) which increases revenue recovery.

Smart notification of meter tampering (electrical and water meter bypasses), including vandalism and ghost vending, allowing for quicker resolution.

Smart identification of previously unbilled meters not yet loaded onto the municipal platform; increasing billing points.

The ability to identify water leaks early; limiting water wastage and improve restoration response time.

Historical information is available. Data is digitised and stored with access 24/7. This data is for analytics and planning purposes.

The ability to access verified customer information and their consumption of electricity and water.

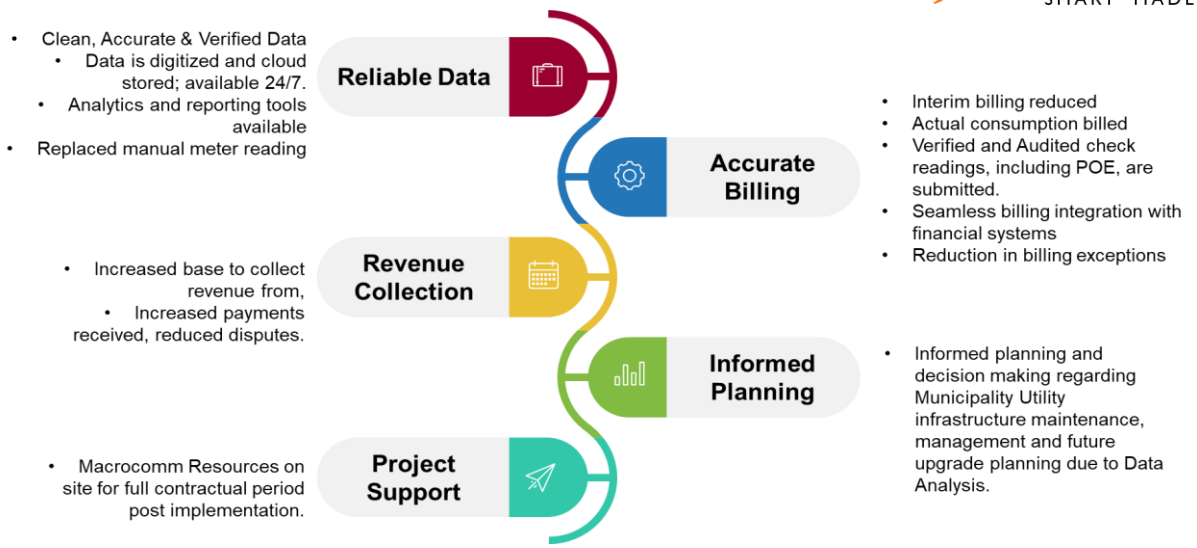


Figure 1.2: Smart Metering Solution – Benefit Highlights

We understand and respect the current constraints Government institutions experience; unfunded budgets, low revenue generation, little to no capital expenditure, and increasing operational expenditure with a very low revenue recovery rate.

Our smart metering solution focuses on enhancing revenue within government institutions by focusing on revenue protection, enhancement, and recovery. These three pillars form the basis of this intervention.

Smart Utility Benefits

Implementation of Smart Utility Solutions for electricity and water results in the following benefits for each municipality, government departments and the Country as a whole.

The table below depicts the smart utility metering solutions for both electricity and water, and the corresponding benefits.

Smart Metering Solution Offering	Smart Metering Solution Benefits
Accuracy and completeness of meter readings for automatic and seamless integration into the billing system; removing manual meter reading risks in accordance with mSCOA.	• Accurate meter readings resulting in accurate billing. • Citizen confidence. • Increased revenue collection; allowing the credit control department better control over their book. • Fewer disputes over billing. • Removal of interim billing for electricity and/or water • Improved monthly financial reports. • Improved reporting on vandalism, water leakages and other billing exceptions.

Smart Metering Solution Offering	Smart Metering Solution Benefits
Efficiency through seamless integration into the billing (municipalities financial system) removing human intervention risks, as data is transmitted securely using encryption.	• Billing and financial data transferred securely through an encrypted file for uploading into the municipalities financial system (billing). • Citizens can access their electricity and water accounts on their phone using the Mobile App.
Tamper reporting through system signals and alerts which allows for faster investigations and interventions to protect revenue and integrity of the electricity and water grid.	• Tamper signals and alerts communicated frequently allowing for investigation and intervention to protect revenue collection.
Remote disconnection and reconnection of electricity and water meters as required, based upon customer payment status	• The reconnect and disconnect fee per water meter can be saved using functionality provided with the smart electricity and water meter solution system via remote AMR platform.
Our data is digitised	• All data captured via FDM (Field Deployment Manager – Installation Tool), Verification Tool and data consumed from other data sets, is available on the IoT platform in real-time, and is cloud stored for ease of access – 24/7. • Analytics & reporting tools are available on the IoT platform. A myriad of standard reports is currently available, with the ability to request for additional templates timeously.
Verification Tool & Data Cleansing – including the "vetting process"	• We will be able to assist in the identification of any data integrity issues with the data sets provided for the implementation of the Smart Metering Project and is able to conduct independent data cleansing activities. • We will implement a Verification/Audit process, which involves the in-field site audit of every ERF within the boundaries of each municipality, with the updating of the following critical data; o GEO location, o Street address, o Electricity and Water meter numbers, o Account numbers, o ERF ref, etc. • All above data is "vetted" prior to being uploaded onto the IoT platform. This process entails back-office resources reviewing all information captured using the in-field application, against

Smart Metering Solution Offering	Smart Metering Solution Benefits
	POE (Proof of Evidence) available, thereafter either accepting, rejecting, or escalating data elements. It is understood that data cleansing is a key aspect of implementing the new smart utility metering infrastructure. • The QA process ensure that data being uploaded onto the IoT platform is accurate. • The above process proves vital in resolving any "unmatched" records/accounts for billing purposes.

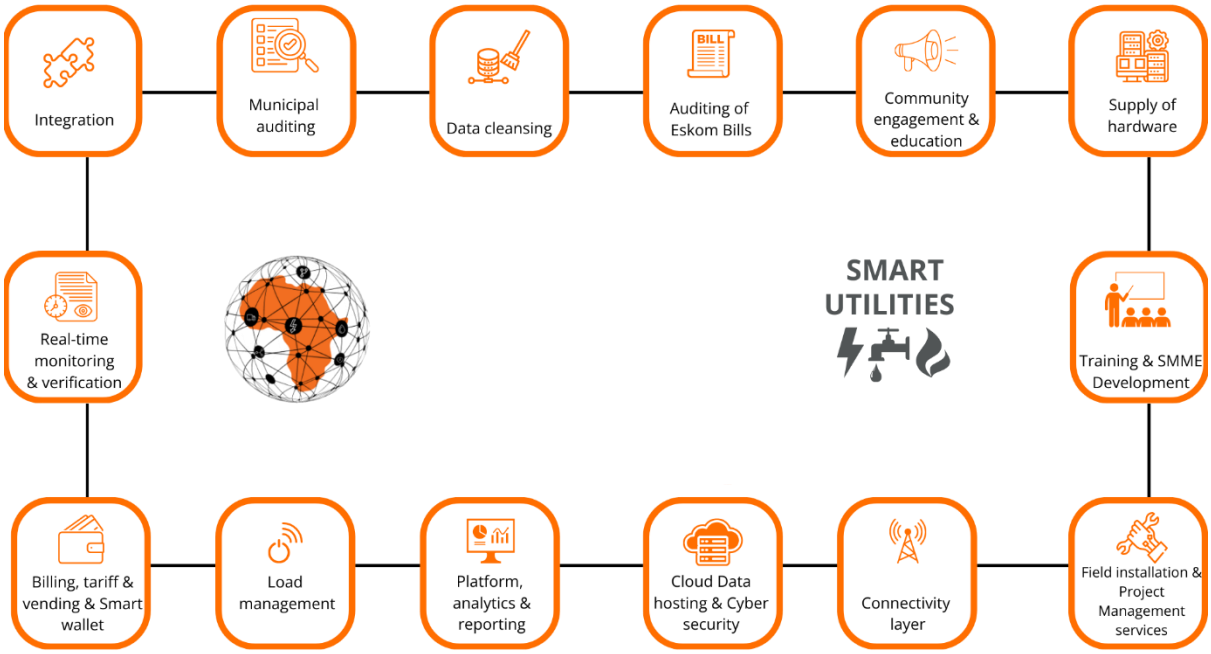
FDM (Field Deployment Manager) Tool – Including the "Vetting" process	• We use an in-house developed FDM for the successful installation, configuration & commissioning of in-field IoT hardware (Electrical & Water Smart Meters).
	• This tool is in the form of a smart phone application which is available on the play store at no charge.
	• Data captured on the FDM Tool is used to activate devices onto the IoT platform and ensure correct information is being uploaded.
	• All above data is "vetted" prior to being uploaded onto the IoT platform. This process entails back-office resources reviewing all information captured using the in-field application, against POE available, thereafter either accepting, rejecting or escalating data elements.
	• This tool is also used for device "swap-outs", which ensures no duplication of devices per account/ERF. We request that municipalities technical (Water & Electricity) utilise this tool, to ensure continuity of data cleansing with matching of devices to account. The data captured via this tool will accurately update the existing records, seamlessly. We can provide detailed SOP (Standard Operating Procedure) for this process, including training on the use of the tools.
	• The FDM "swap out" function covers the variations of:
	  ○ Water meter swap-out: Replacing of an old non-functional water meter with a new one.
	  ○ Smart pulse unit swap out: Only the Smart pulse unit is swapped out, with the current water meter being "linked" to the new pulse unit.

Smart Metering Solution Offering	Smart Metering Solution Benefits
	• Both water meter & pulse units being swapped out: The IoT platform is updated with new information on the new devices for a particular account. Old units are made in-active on the platform, thereby ensuring accurate billing in real-time.
Check Readings	• We are committed to supplying in-field verified & audited check readings, including POE, for billing purposes. • Where AMR (Automatic Meter Reading) issues are being experienced, we are committed to supplying in-field verified & audited check readings, including POE, for billing purposes. • It is important that readings which have been checked and are approved as accurate are sent through and utilised, to drive the removal of all interim billing exceptions.
Billing integration	• Our Billing registers can be seamlessly integrated into any municipal billing platform.

Reduced billing exceptions	• Our solution can highlight billing exceptions such as:
	  ○ Unbilled – water and energy usage: municipalities currently billing customer for all services except Water usage
	  ○ Incorrect meter number on a municipal billing system, e.g.: captured as "NEW". Our Commissioning sheet not being used to update the billing data.
	  ○ New & old meters active on the Municipality financial system. Customer being billed interim on old meter & actual on new meter (Double billing).
	  ○ 1 x Account number linked to multiple addresses: Incorrect consumer being billed.
	  ○ Duplicate Meter numbers – 1 x Meter number linked to multiple accounts/ Different stands.
	  ○ Incomplete Meter serial numbers, e.g.: Correct meter number: C-SKG4373. Municipal billing system has: 4373.
	• In-correct and in-complete street addresses from the municipal data set.

Comprehensive Solution Offering

Due to our extensive experience in the smart municipal utility management space, we have developed systems and solutions that add value to our clientele. We believe that through constant system and solution research, development, and improvements, we can ensure that governments operate at optimal utility management standards while maintaining service delivery commitments and optimising revenue management in their utility management operational stream.



Macrocomm will provide an end-to-end service for hardware supply, field installation & project management, AMR services, vending & collection services, and SLA & maintenance contracts as part of the smart metering solution. The process on how this will be achieved has been stated below:

Auditing and Data Cleansing

We start with an audit service that is included in the overall solution. This focuses on understanding the key challenges faced in the revenue management of the institution. We are able to identify major areas that can be quickly fixed to make a difference to the government institution and focus on these areas as the first phase of the project.

Resolution of current disputes

All government institutions are faced with disputed accounts daily. Through a national contact centre or a consumer engagement smart phone application, teams can address consumer queries and deploy trained staff to address disputes, driving revenue recovery and creating a culture of payment adoption through accurate and trusted billing.

Tariff correction and alignment
The implementation of approved tariffs, appropriately aligned to customer accounts, is key for revenue enhancement. Data analytics will identify the correct customer allocations ensuring accurate billing and tariff alignment.

Revenue recovery
Government institutions are faced with billions of historical debt. As part of our Value-Added Services (VAS), we will implement the debt recovery regulations and manage the full recovery process.

Revenue enhancement - LPU reconstruction
Large Power Users are the highest revenue-contributing customers of any government institution. As part of the VAS, our teams will focus on these customers to ensure the accuracy & correctness of the AMI. (Automatic Meter Infrastructure)

Statistical Metering solutions
Ensuring a healthy network infrastructure is key to any distribution. The solution will focus on a turnkey methodology by managing incomers, substations, kiosks, and end supply points. This provides insights into technical and non-technical loses, allowing municipalities to take corrective action.

Energy Storage Solutions
Generation and storage in these networks become key in ensuring constant quality supply. Storage is a major contributor to revenue enhancement based on TOU tariff management.

Supply of Hardware
With our supplier agreements with leading hardware OEM partners, we can provide superior quality accredited products at cost-effective pricing. Electricity & Water meters will support GSM/LTE & NB-IoT modules. Our experience in the field and working at mass has taught us the hardware with individual communication modules is much more effective than concentrator type on PLC. This is primarily due to communication problems experienced by the latter.

Automatic Meter Reading (AMR) services
AMR services are the only way of effectively monitoring and managing all revenue interventions or programs. AMR services provide real-time alerts on all possible exceptions that may arise and enable government institutions to not only protect current but also future revenue. Effective budget and financial forecasting is facilitated with this process.

Vending & collection services

- We will deploy a full vending solution to drive revenue collection.
- The vending solution will be linked to the AMR system and the monitoring of token purchases against consumption patterns, in real time, can identify possible ghost vending.
- Alerts for partial or complete by-passes and equipment tampering is also reported on the AMR platform.
- We have implemented numerous collection gateways for government institutions, including secure online or infield payment channels and smart wallets.
- Money is securely collected and transferred to the various government institutions at agreed timeframes, thereby assisting with cashflow management.

Technical Diagrams