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# THE PENDING BUSINESS RISK ON MUNICIPAL STANDARD TRANSFER SPECIFICATION (STS) TOKEN IDENTIFIER (TID) ROLLOVER METER RESET

## 1. Introduction

The Standard Transfer Specification (STS) is the global standard for the transfer of electricity and other utility prepayment tokens. It secures message protocol that allows information to be carried between a point-of-sale (POS) and a prepayment meters and is currently finding wide application in electricity metering and payment systems. Municipalities use the STS technology in their electricity and water utilities business to measure and charge water and electricity. The STS was first introduced in South Africa in 1993 and subsequently published by the International Electro-technical Commission as the IEC62055 series of specifications. The application of the technology is licensed through the STS Association, thus ensuring that the appropriate key-management encryption practices are applied to protect the security of the prepayment transactions of utilities.

Figure 1 below illustrates a consumer making a payment at the vending station and a token being generated to pass the information concerning the payment on to the meter. The disposable magnetic card tokens, as well as number-based tokens for keypad entry at the meter are using the STS standard to transfer the information. STS is centred on the information transferred to the meter, this includes the manner in which the vending station encodes the token with the information, and the way in which the meter decodes and interprets the information.



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Figure 1: Electricity metering and payment system (Source: Rollover process-Guidelines for Utilities, 2020)

The STS is used by over 500 utilities across the world in over 40 countries. According to STS Association, South Africa has over 10 million STS electricity prepaid meters, which 7 million are managed by Eskom and over 3 million are managed by municipalities including metropolitans. The STS provides the facility of generating (e.g., credit transfer) tokens which can only be used by the intended meter, and furthermore in the case of credit tokens, can only be used once in that meter. Each credit token has a unique token identifier (TID) encoded into the 20 digits to prevent token replay at the meter. The TID is a 24-bit field, contained in STS compliant tokens, that identifies the date and time the token was generated.

The use of the STS standard prevents:

- Fraudulent transfer of credit resulting from hit and miss attempts at entering the correct number;
- Fraudulent generation of tokens from a stolen vending station;
- Fraudulent generation of tokens from legitimate vending stations outside of the utility's area;
- Fraudulent re-use of tokens which have already been used; and
- Tampering of legitimate tokens e.g. to change the value

## **2. Statement of the problem**

All prepayment meters based on STS technology will stop dispensing electricity on **24 November 2024**, thus presenting a significant risk to the service levels, sales and revenue collection of all municipalities to end user customers in the electricity utilities business. The TID is referenced to a base date of 1993 and will run out of range in 2024 (known as the TID Rollover event), thus causing the prepayment meter to stop accepting new tokens.

Therefore, the prepayment meters will stop accepting new credit tokens, and will then stop dispensing electricity after the existing credits are used up. Any tokens generated after this date and utilizing the 24 digit TID, calculated on base date 1993, will be rejected by the meters as being old tokens as the TID value encoded in the token will have reset back to 0. Thus, there is a need for a proper plan and structures in place to manage this risk, thereby ensuring that municipalities perform the TID rollover for each and every prepayment meter by November 2024. This requires substantial time, effort and resource loading on the part of the

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municipalities, so it is imperative that the remedial action process commences as a matter of urgency.

### **3. Technical remedy in addressing the risk**

Municipalities need to request their vending system suppliers to upgrade the municipal vending software to STS Edition 2 or Key Revision Number (KRN) 2. After the vending system has been certified to STS Edition 2 by the STS Association, then new meters may be purchased already coded to base date 2014. These new meters procured after the municipal vending system is upgraded do not need to be “Reset” again. Moreover, the new range of TIDs will then start from a new base date of 2014 and run out in 2045, thus extending the useful functional life of the meter. To change the cryptographic key this is done by means of entering two (2) special tokens on each meter.

In order to overcome the TID rollover occurrence, all meters will require key change tokens with the roll over bit set. In addition to this, the base date of 01 January 1993 will be required to be changed to a base date of 01 January 2014. This process will force the meters to reset the TID stack memory to 0. To avoid previously used tokens from being accepted by the meter due to the TID stack reset, the key change process changes the meter key at the same time.

Two options presented by the STS Association for consideration by municipalities for the TID rollover are:

- **OPTION 1:** When the customer purchases his/her next credit token he/she also receives the two “Reset” tokens for entering into his meter; and
- **OPTION 2:** A dedicated field team enters the two “Reset” tokens into each meter.

### **4. SALGA’s intervention**

#### **4.1 STS TID rollover status**

In 2021 SALGA conducted a survey to establish the status quo of the STS prepayment meters TID rollover in different municipalities across the country in order to recommend measures to ensure that prepayment meters are reset by 24 November 2024. The specific objectives are to gauge the progress made by municipalities on the TID rollover project towards 2024; and to determine the total number of electricity prepayment meters that need to

be reset in each municipality by November 2024; and lastly to identify challenges and support needed by municipalities for this project.

With 43% of the response rate it was found that there are 3 092 824 prepaid meters<sup>1</sup> across the country. The actual total prepayment meters should be higher than the reported figure of 3 092 824 because not all municipal distributors have completed the questionnaire. Therefore, the total number of prepaid meters in the municipalities far exceed 3 million in South Africa.

The Western Cape has the highest number of prepayment meters with 893 853, followed by Gauteng and KZN with 639 600 and 490 449 respectively (Figure 2). These are three economic and business hubs of the country, hence, the high number of prepayment meters. The Northern Cape and Limpopo Provinces have the least number of prepayment meters that need to be reset. It should be noted that with a 43% response rate the picture could be different especially in North West, Northern Cape and KZN where the response rate was less than 21%.

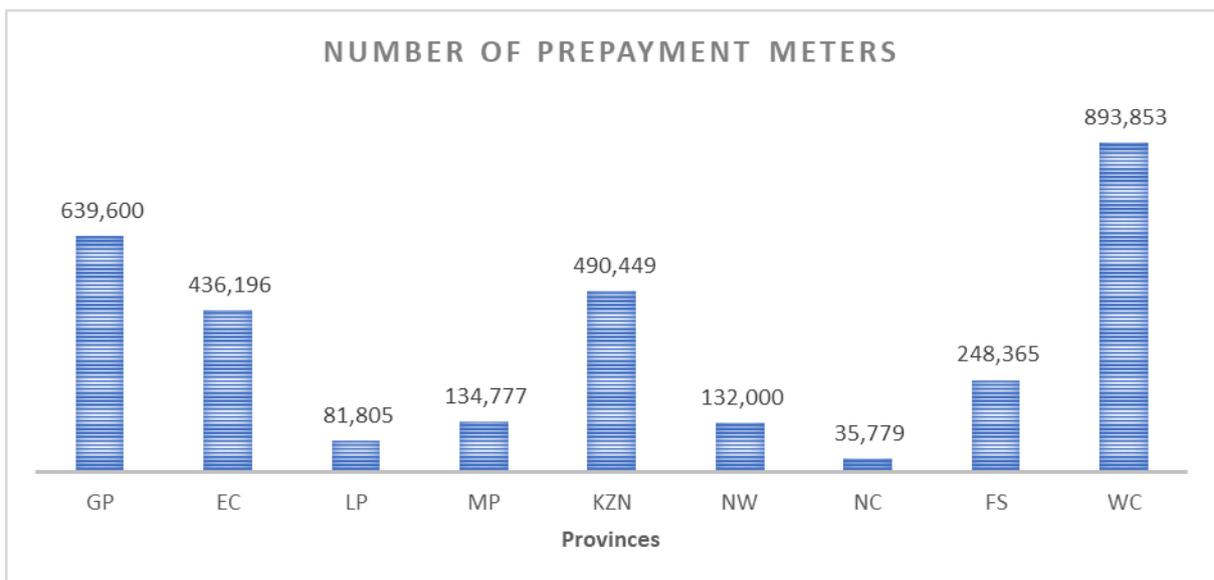


Figure 2: Number of prepayment meters per province

Metropolitan municipalities have 2 160 760<sup>2</sup> prepayment meters. This represents 69% of the total number of prepayment meters in all municipalities across the country. City of Cape Town has the highest number of prepayment meters in all metropolitan municipalities, eThekweni and Ekurhuleni are second and third with 400 000 and 350 000 prepayment meters respectively (Figure 3). Buffalo City has the least number of prepayment meters with 180 000.

<sup>1</sup> From 72 municipal distributors that have completed the questionnaire

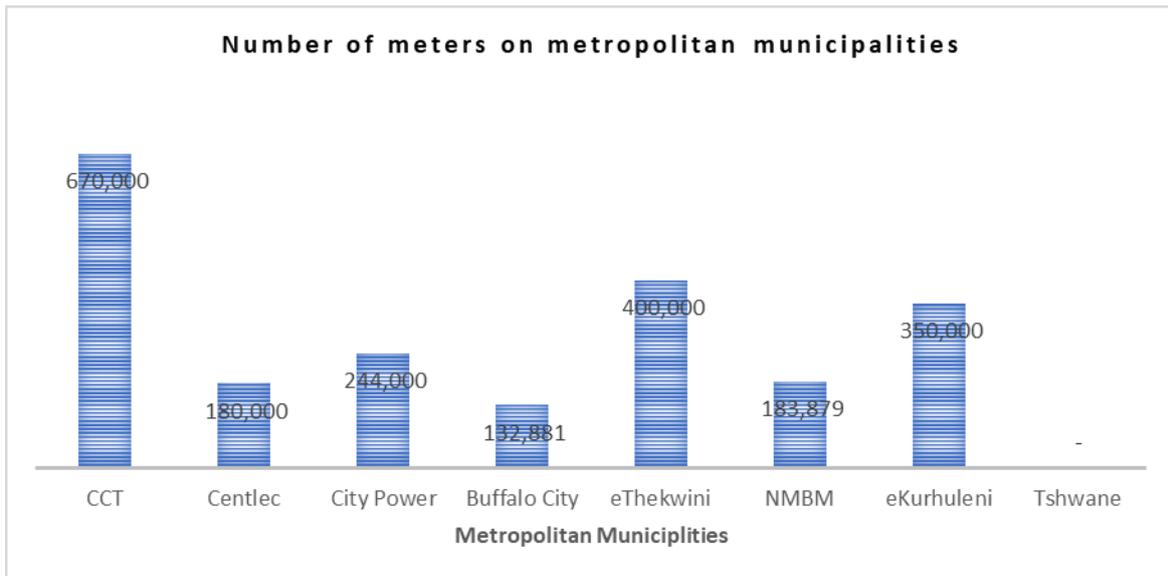


Figure 3: Number of prepayment meters in Metropolitan municipalities

#### 4.2 SALGA’s led STS TID rollover meter reset workshops

On 24 August 2021, SALGA hosted a workshop with the municipalities to discuss the progress made on the STS prepayment meter reset rollout project including Eskom, Buffalo City and Dr Beyers Naude municipalities presented the progress on prepayment meters TID rollover. Eskom was still at a planning phase, and the mechanisms used by the afore-mentioned municipalities in resetting the prepayment meters were noted and acknowledged. To date, there are more municipalities have made significant progress in resetting the meters, City of Cape Town is a point in case, which it has issued a communication to the customers on how to reset their prepayment meters.

Moreover, SALGA has hosted a 2<sup>nd</sup> workshop on 24 March 2022 in order to establish the status quo and progress made by municipalities and Eskom in rolling out the prepayment meter reset project; and to launch the SALGA dashboard for STS prepayment meter reset project; discuss challenges that municipalities are facing with regard to the rolling out of the STS prepayment meter reset project and to establish what further support that SALGA and its partners (AMEU, STS Association, SANEDI, Eskom, CoGTA and NT) can offer to municipalities. It became clear that there are common challenges that cut across municipalities, and it is important for municipalities to learn from one another.

<sup>2</sup> No data from City of Tshwane

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#### **4.2 Establishment of the STS prepayment meter reset dashboard**

SALGA has established a dashboard where the status of TID rollover meter reset is displayed. The dashboard consists of various parameters on the TID rollover data, such as total number of prepayment meters to be reset, number of prepayment meters that have been reset per municipality, outstanding number of prepayment meters. This dashboard is on the SALGA website.

SALGA is collecting data from municipalities on a quarterly basis by means of an online questionnaire. The data for Q1 (January to March 2022) is currently being collected, and the dashboard is live and keeps on updating as and when municipalities are completing the questionnaire. The dashboard will give an up-to-date information on the progress that municipalities are making in resetting the meters.

Currently there are 44 licensed municipal distributors that have input their data in the dashboard. There are just over 2 million prepaid meters that need to be reset, 28% have already been reset and 72% are outstanding. It is anticipated that the number of prepaid meters will be over 3 million as there is still over 100 municipal distributors that need to input their data in order to have an accurate picture of how many meters that are outstanding and needs to be converted to KRN 2 before November 2022.

#### **4.3 National Treasury Transversal tender**

National Treasury (NT) presented is working on appointing a transversal tender where municipalities can source service providers from the panel. The purpose is to ensure that there is a panel of legitimate service providers that are competent to perform the prepayment meter reset. Moreover, the transversal tender seeks to assist municipalities in simplifying their processes of getting the service providers instead of going out on full tender that may take long time.

### **5. Assistance and support needed for TID rollover meter reset**

In response to the question on support needs for each municipality. Most of the municipalities (over 30) indicated that they will need financial support and assistance from government. The other main support need is around human capital to support the rollover projects. A total of 17 municipalities reported that they do not need any support from government in rolling out their TID rollover projects. Support and assistance required by the municipalities has been grouped as follows:

- Funding;

- Public awareness and education
- Human capital
  - For meter auditing
  - Meter/data capturing and cleansing
  - Project implementation
- Training and capacity building
- Service provider
- Technical assistance

There is 54% of the municipalities that need financial support from the government, this followed by the human capital needed, which 29% of the municipalities need such support (Figure 4). The specific support needed from human capital is mainly seconded Electricians for meter auditing, meter capturing and skills transfer. However, 6% of the municipalities need support in public awareness and education as well as technical assistance (Figure 9). Other municipalities need information on available service providers for the TID rollover meter reset and the training and capacity building, these constitutes 6% of the municipalities that need this support.

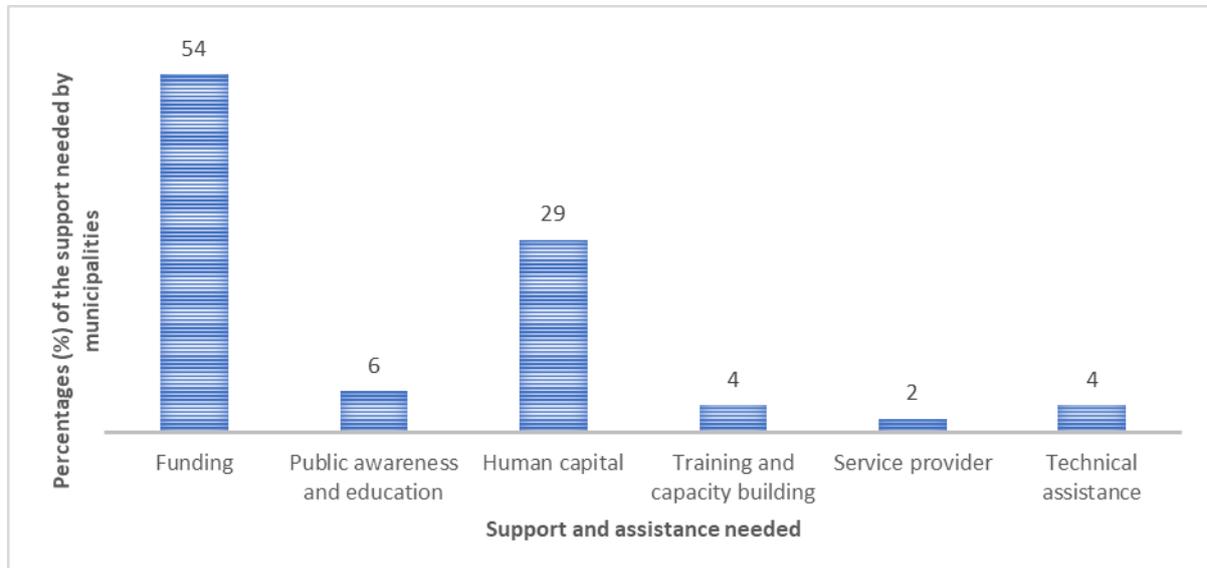


Figure 4: Support and assistance needed by municipalities

## 6. Conclusion

It is important that municipalities are aware of the risk associated with the prepayment meters by November 2024. Moreover, municipalities need to have a concrete plan of action with time lines from the beginning to the end of the project, *i.e.* based on the number of

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prepayment meters that a municipality has, when it will start the TID rollover meter reset, and the anticipated completion date before November 2024. Furthermore, it is worth noting that this project requires budget for the capital and operational resources, therefore municipalities should start the project now because time is of essence.

SALGA in collaboration with stakeholders (NT, COGTA, SANEDI, STS Association, AMEU and Eskom) will continue to support and assist municipalities through advisory services on the TID rollover meters reset. Moreover, SALGA will facilitate regular sessions for peer to peer learning, knowledge and information sharing on various aspects of the TID rollover including the financial implication (costs) for the project, time frame for rolling out this project, *i.e.* how long does it take to reset certain number of prepayment meters etc.