TOTAL UTILITIES MANAGEMENT SERVICES

CREATING FINANCIAL AND TECHNOLOGY SOLUTIONS...

...TRANSFORMING MUNICIPAL SERVICES

TRANSFORMING MUNICIPAL SERVICES
DELIVERING SMART METERING WHILE SECURING REVENUE
BACKGROUND
Key challenges faced by municipalities are driven by a set of competing needs.

- Unlimited demands versus limited resources
- Maintenance of current infrastructure versus providing new infrastructure
- Expectation of citizens versus financial capability of municipalities
- Short-term versus long-term needs
- Being in the front line of service delivery versus being in the back line of fiscal allocation
- Ageing infrastructure with replacement cycles behind the curve versus strategic desire to modernise and become ‘Smart’
Critical Issues for CoT

Non or late payment of electricity bills

High losses and expenses associated with the debtors’ book

High rate of theft & non-technical losses

Current electricity metering infrastructure is outdated

Desire to create technology platform to underpin a ‘Smart City’ environment

Processes to collect revenue are inefficient and costly

CoT largely credit-based & cash resources locked up in funding

Estimated and irregular billing creating disputes

CoT had to come up with innovative initiatives
Addressing the Issues

“...we will, during the 2012/13 MTREF, be launching an initiative called the Security of Revenue Project that entails a full roll-out of prepaid electricity meters throughout Tshwane. The project will link all consumers of electricity in the city to a prepaid meter and this will be enforceable by law. Once in full swing, the project will help the City overcome problems of inaccurate billing and loss of revenue to the City, and secure the financial position of the City. This is a game-changing project and will most likely redefine local government's financial management.”

City of Tshwane Executive Mayor - Kgosientso Ramokgopa
State of the City Address in March 2012
TUMS offered CoT a fully funded, off balance sheet solution to establish a technology implementation consisting of:

- Installation of >430k electricity Prepaid Smart Meters in initial roll-out phase increasing to c.800k
- Managed Service Operation of electricity metering utilizing:
  - The latest in Meter Data Management System (MDMS) technology
  - Fully managed prepayment platform
  - NOC linked to CoT’s Revenue Protection Unit
- Enhanced customer experience through:
  - Customer Information Units for residential customers
  - A dedicated Contact Centre
THE TUMS SOLUTION
Key design principles

**SCALABILITY**
- Solution supports more than 5,000,000 meters
- Handling meter readings at 15-minute intervals for every connected meter
- Meter data storage for 7 years through a combination of online, offline and archive

**HIGHLY RESILIENT**
- No single point of failure
- Established data back-up regime
- Data Centre Redundancy
- DR Plan defined

**SECURITY**
- Physical security – e.g. embedded SIMS, secure enclosures, tamper alerts
- Logical security – at network and application layers
- Operational security – access permissions, auditable operator activity

**STANDARDS BASED**
- Products meets SANS, SABS, IEC & NRS standards
- Compliance with NRS049, NRS773 etc.
- Built on industry standard hardware and software

**CONFIGURABILITY**
- Supports new business models, emerging regulations (e.g. demand management, load control)
- Supports complex tariff structures
- Supports automation of highly repetitive processes

**SYSTEM INTERFACES**
- Minimised wherever possible
- Maximise ease of interface to existing City systems
- Low operational overhead on City’s systems

**SOLUTION ARCHITECTURE**
- Solution avoids proprietary lock-in
- Baseline for ‘SMART’ systems to include electricity, water metering and broadband communications
Outline System Architecture

TUMS Systems
- Portal
- Vending System
- TUMS CRM System
- TUMS ERP System
- Smart Meter
- Customer Interface Unit
- Load Control Unit
- Override
- Interfaces to banks etc
- Demand Management System
- Appliance
- Network Operations Centre
- GIS
- TUMS Contact Centre
- Customer Payment Channels (via mobile, internet, vending kiosk etc)
- TUMS Systems Co
- Network alarms
- Tampering alarms
- Contact Centre
- Network Operations Centre
- eMeter MDMS
- Netinium Headend
- TUMS CRM System
- TUMS Customer Database
- Customer / Supplier Financials
- Trouble Ticket
- Workforce Management
- Asset Management
- TUMS ERP System
- Customer Database
- Billing System
- NMC
- CoT
- Revenue Policing
- CoT
- Call Centre
- Electricity eMeter MDMS
- MDMS
- Front End System
- Electricity Smart Meter
- Customer Interface Unit
- Demand Management System
- Control Unit
- Override
- CoT Systems
- Portal
- Customers (via mobile, internet etc)
- CoT CRM System
- Demand Management System
- CoT
- Customer Database
- Billing System
- CoT
- Revenue Policing
- NMC
- CoT
- Call Centre
The solution consists of the acquisition, funding, operation and maintenance of a smart prepaid electricity metering service.

Installation of prepaid smart meters at all residential, commercial and industrial users;

- Capable of two-way communication with a back end system;
- Automated outage detection and notification – with “last gasp” and “first breath” capabilities;
- Automated meter tamper alarms and support for theft detection and other analytics;
- Ability to supply emergency and negative credits;
- Allows the implementation of complex tariffs;
- Capability of remote software upgrades;
- Allow for the provision of free basic electricity to indigent residents;
Key Solution Features (2)

An integrated back end system, incorporating a Meter Data Management System and Prepaid Vending System together with associated supporting databases and ERP systems:

- Remote automated reading of meters; more frequent meter reading intervals (every 15 minutes);
- Remote connection and disconnection;
- Two way communication with customer through a Customer Interface Unit;
- Real time visual display of consumption;
- Tamper detection;
- Outage notification;
- Allows for time of use tariffs to promote a shift in electricity from peak to off-peak times;
- Capability to support Load control through interaction with load control units;
A Prepaid Vending Platform;
- A payment interface between Electricity Consumers and the CoT;
  - Key vending channels include;
    - Web portal
    - EFT via banks
    - CIU
    - Kiosks
    - Phone and smart phone applications
    - Retail outlets
    - Spaza Shops
Key Solution Features (4)

A communications platform to send encrypted smart meter data to the back end system;

- Supporting multiple comms options – M2M (GPRS), PLC, RF Mesh, Wi-Max etc depending on suitability and availability in various areas.

Installation of secure meter housing to combat tampering and electricity theft;

- New toughened boxes which will house groups of Smart Meters;
- Electronic locking mechanisms for enclosures – strict access control
- Full status monitoring of enclosures
Key Solution Features (5)

**Network Operations Centre**
- Real time system management
- A control centre for monitoring and alerting the municipality of electricity theft, blackouts, system problems, fraud and tampering;

**Automated System Analytics**
- A system mechanism allowing CoT to enforce the collection of other service charges (e.g. rates) through a vending and credit restriction policy, restricted the full or partial vending of electricity;
Key Solution Features (6)

Customer Interface Unit
• Installed in every residential premise to display:
  • the customer’s credit balance
  • Near real time consumption (15 to 30 minute intervals)

Web Portal
• Providing enhanced consumption and account balance information
• Access to payment portal

Dedicated 24/7 Contact Centre
• Dealing with customer queries, faults, issues etc.
• Dedicated LPU team
Customer Interface Unit

- Installed in every residential premise to display:
  - the customer’s credit balance
  - Near real time consumption (15 to 30 minute intervals)
Web Portal

Remaining balance
R76,914.32

Remaining Estimated
26/04/14 11:33

Account Balance during last month [R]

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount [R]</th>
<th>Cause</th>
<th>Remaining Balance [R]</th>
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</thead>
<tbody>
<tr>
<td>2014-04-16</td>
<td>55,000.00</td>
<td>TopUp. OK</td>
<td>77,015.93</td>
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<tr>
<td>2014-04-08</td>
<td>45,000.00</td>
<td>TopUp. OK</td>
<td>62,015.93</td>
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<tr>
<td>2014-04-03</td>
<td>42,000.00</td>
<td>TopUp. OK</td>
<td>72,015.93</td>
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<tr>
<td>2014-04-01</td>
<td>140,000.00</td>
<td>TopUp. OK</td>
<td>42,015.93</td>
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<td>2014-04-01</td>
<td>-12,141.27</td>
<td>Reconciliation.</td>
<td>-92,794.60</td>
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<tr>
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<td></td>
<td>DemandCharge,Monthly</td>
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<tr>
<td>2014-04-01</td>
<td>135,799.03</td>
<td>Provisional.</td>
<td>-92,794.60</td>
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<tr>
<td></td>
<td></td>
<td>DemandCharge,Monthly</td>
<td></td>
</tr>
<tr>
<td>2014-04-01</td>
<td>1,573.20</td>
<td>FixedCharge.</td>
<td>35,128.37</td>
</tr>
</tbody>
</table>
## Web Portal

### Meter SECDA0

**Last 24 hours**
- OffPeak: 4,625.92 kWh
- OnPeak: 2,945.79 kWh
- Standard: 6,626.31 kWh
- R1,699.45

**Last 7 days**
- OffPeak: 46,357.75 kWh
- OnPeak: 14,709.77 kWh
- Standard: 33,530.37 kWh
- R16,990.98

**Last 30 days**
- OffPeak: 244,380.10 kWh
- OnPeak: 66,532.94 kWh
- Standard: 87,916.99 kWh
- R17,545.10

### Graph: Last month consumption per day (R)

<table>
<thead>
<tr>
<th>Date</th>
<th>OffPeak</th>
<th>OnPeak</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 18</td>
<td>10,000</td>
<td>7,500</td>
<td>5,000</td>
</tr>
<tr>
<td>Mar 21</td>
<td>7,500</td>
<td>5,000</td>
<td>2,500</td>
</tr>
<tr>
<td>Mar 24</td>
<td>5,000</td>
<td>2,500</td>
<td>0</td>
</tr>
<tr>
<td>Mar 27</td>
<td>2,500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mar 30</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mar 31</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Apr 01</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Apr 02</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Apr 03</td>
<td>0</td>
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<td>Apr 04</td>
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<td>Apr 05</td>
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<td>Apr 06</td>
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<td>Apr 07</td>
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<td>Apr 08</td>
<td>0</td>
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<tr>
<td>Apr 09</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Apr 10</td>
<td>0</td>
<td>0</td>
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<td>Apr 11</td>
<td>0</td>
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<tr>
<td>Apr 12</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Apr 13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Apr 14</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- OffPeak
- OnPeak
- Standard

**Total Utilities Management Services (TUMS)**
PROJECT CHALLENGES
Prepaid Smart Metering on this scale is the first of its kind in the world

1. Establishing the financial and legislative framework for success
2. Incomplete and / or inaccurate base data
3. Managing unrelated or spurious claims of technical faults
4. You think you know what the consumer wants – but you don’t !!
5. Under estimation of the time required to conduct project related communications with consumers
6. Off the shelf Industry solutions are not available. Time has to be taken to tailor and configure specific requirements
Benefits to the CoT

1. Improved Service Delivery
   The solution will result in the City’s ability to accelerate capital expenditure and ultimately improve service delivery.

2. Capital Requirement
   No additional leverage or debt commitments for the CoT. Provides flexibility and balance sheet scope for other CAPEX spend.

3. Financial Guarantee
   No financial guarantee required from the CoT.

4. Significant Improvement of the City’s Liquidity Position
   Existing debt is being collected immediately or settlement agreements made.

5. Cash Upfront Basis
   This makes more cash available in the City for growth and development projects.

6. Modernised Infrastructure
   The CoT’s electricity infrastructure will be modernised to create a ‘Smart City’. CoT will benefit from the >R5 bn in infrastructure.
Benefits to the CoT

7. World Class Metering
   Once fully rolled out, the CoT will have a world class smart prepaid metering system.

8. Demand Side Management Capability
   A solution that enables the CoT to comply with demand side management.

9. Avoided Site Visits
   Reduced site visits due to automated meter reading, decreased maintenance costs, remote disconnection/reconnection possibilities.

10. Debt Management
    Prepayment eliminates arrears and provides a mechanism to settle outstanding debt.

11. Cost Savings for the CoT
    Cost to service consumers will reduce through increased self-service capabilities. Meter reading costs will reduce due to remote meter reading.

12. Outage Detection and Control
    System management information and status alarms will allow for more efficient resolution of network failures.
Socio-Economic Impact

- Job creation (inclusive growth)
- Business climate reforms
- Increasing attractiveness
- Livelihood enhancement
- Small business development
- Infrastructure development
- Skills development
- Ease of doing business
- Competitiveness
- Human capital
- Enabling environment
- Sustainable growth
- Shared growth
**Benefits to Consumers**

<table>
<thead>
<tr>
<th>1</th>
<th>Visibility for Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased visibility and awareness of consumption so consumers can track and monitor their consumption in near-real time.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Better Budget Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a result, consumers are able to budget more effectively and manage their expenditure.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Convenience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers can purchase prepaid electricity through a growing range of convenient channels, from any place and at any time.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>No Billing Queries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination of billing queries associated with estimated post-paid systems.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Service Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved service delivery through better response time from the City to outages and system faults.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>If applicable, customers are able to take advantage of Time of Use (ToU) tariffs which offer cheaper off-peak rates.</td>
<td></td>
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</tbody>
</table>
### Benefits to Consumers (2)

<p>| | | |</p>
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<thead>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7</strong></td>
<td>Better Understanding of Energy Consumption Patterns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A full suite of management information from which to conduct detailed energy analysis.</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Power Quality Monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detailed metering information will allow the consumer and CoT to monitor voltage / power quality.</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Energy Efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Near real-time consumption information provided to consumers will allow for better use of electricity.</td>
<td></td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>Consumers will not be financially impacted by the project</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No charge for meter, installation, or replacement. Price of electricity will not increase due to the project.</td>
<td></td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>Reduced Theft and Fraud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detection of theft or non-technical losses will become easier through increased data access. Unmetered consumers can also be identified. Meters have tamper alarms.</td>
<td></td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>Improved Customer Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A dedicated contact centre has been set up for prepaid smart meter customers.</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

- Secures CoT Revenue and liquidity
- Provides flexibility and balance sheet scope for other Capex spend
- Consumers will not be financially impacted by the project
- No rate change (change in tariff) to customer due to the project
- No charge to the customer for new meters
- CoT will benefit from the >R5bn in infrastructure
- Project will result in the modernisation of electricity infrastructure
- Major job creation and skills development including opportunities for local businesses

TRANSFORMING MUNICIPAL SERVICES
DELIVERING SMART METERING WHILE SECURING REVENUE
Thank You

For Further information, please contact TUMS on:

www.tumssa.co.za

Email: info@tumssa.co.za