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Presentation - Topic

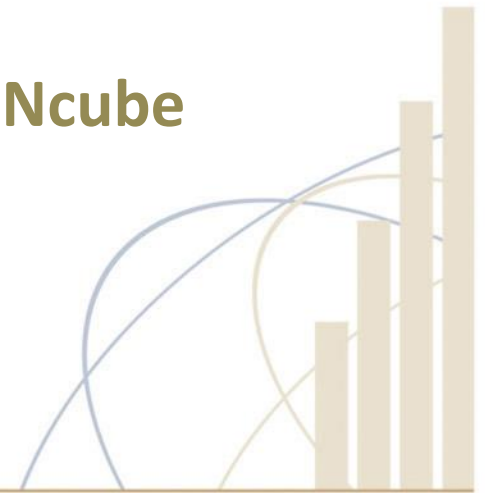


Digital Tools for Energy and Resource Efficiency

Empowering Municipalities and Citizens for a Sustainable Future

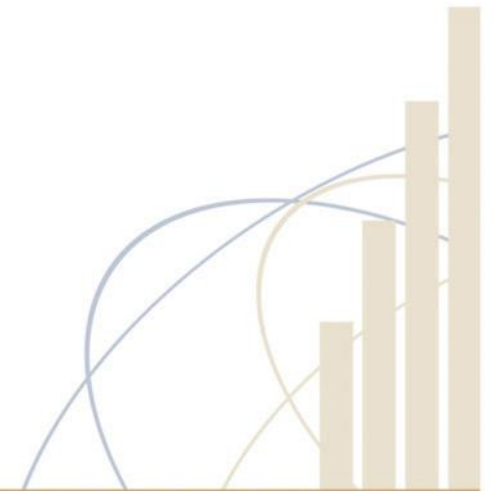
Presented by: Dumisani Mathambo Ncube

Date: 04 June 2025



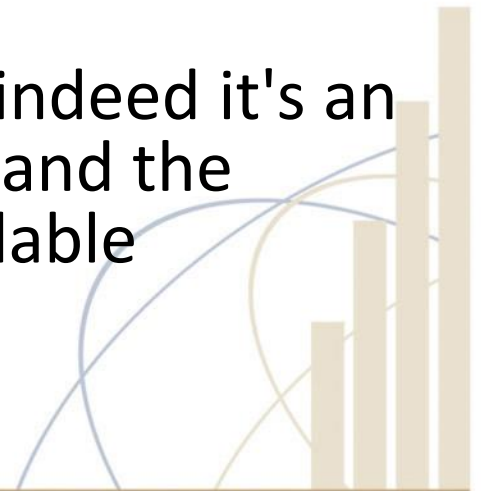
Abbreviations

DWS – Department of Water and Sanitation
NERSA - National Energy Regulator of South Africa
IoT - Internet of Things
GIS - Geographic Information System
SCADA – Supervisory Control and Data Acquisition
BI – Business Intelligence
Qlik - Qliktech
YoY – Year over Year
AI – Artificial Intelligence
ML – Machine Learning
SAWS - South African Water Services
DME – Durable Medical Equipment
NDP – National Development Plan
IUDF – Integrated Urban Development Framework
MTSF – Medium Term Strategic Framework
SPLUMA - Spatial Planning and Land Use Management Act
mSCOA – Municipal Standard Chart Classification
MFMA - Municipal Finance Management Act



Introduction - The Urgency for Action

- Water losses: Up to 41% of municipal water is lost before reaching the consumer (DWS).
- Energy inefficiencies cost municipalities millions annually.
- Citizens lack visibility of how much is wasted or saved.
- No accurate and realistic planning based on needs analysis and availability of resources
- Is Technology part of the solution – Yes indeed it's an enabler but its only as good as the user and the credibility and real time data made available



The Vision - A Transparent Future

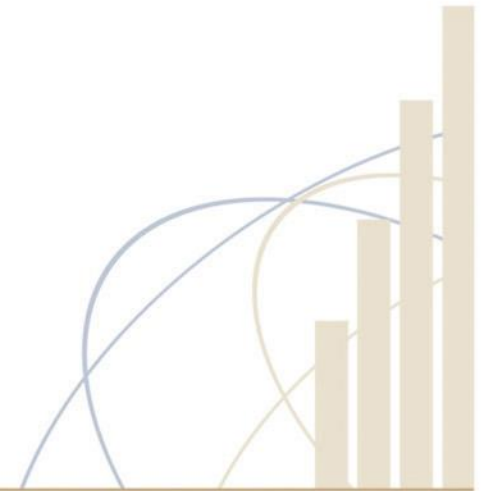
- Community dashboards of total usage and savings.
- Monthly comparisons of water and electricity use.
- Alerts for leaks, powerplant failures, inefficiencies, losses, tariff calculations, forecasting and overuse.
- Everyone contributes, everyone benefits.
- Research, Scenario and What If Analysis
- Customer Portal integrated with other spheres of government

Key areas where Enabling Technologies are Impactful in Local Government

- Service Delivery
- Citizen Engagement
- Operational Efficiency
- Smart City Initiatives
- Data-Driven Decision Making
- Combating Corruption and Enhancing Transparency

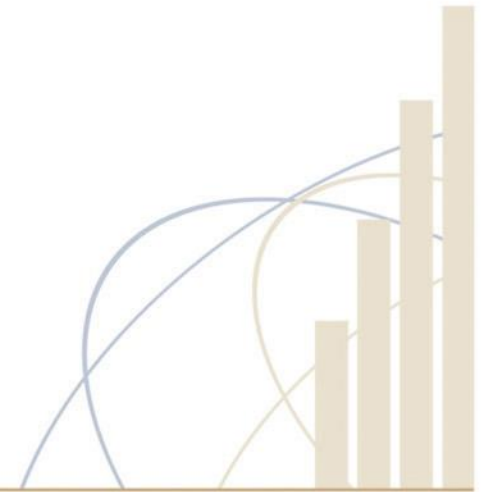
Challenges and Considerations:

- Digital Divide
- Skills Gap
- Data Security and Privacy
- Funding and Infrastructure
- Policy and Regulatory Framework



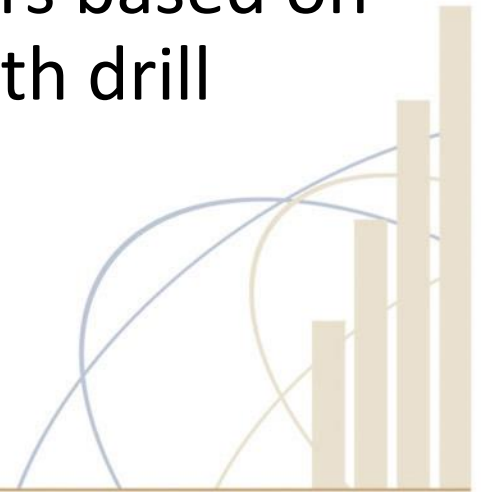
Enabling Technology

- BI solutions with multi-dimensional reporting
- Smart meters, IoT sensors.
- Real-time dashboards and GIS mapping.
- Mobile/web citizen platforms.
- SCADA integration with alerts.
- Smart Grids, Traffic Management Systems
- Public Safety Technologies



Business Intelligence Dashboards

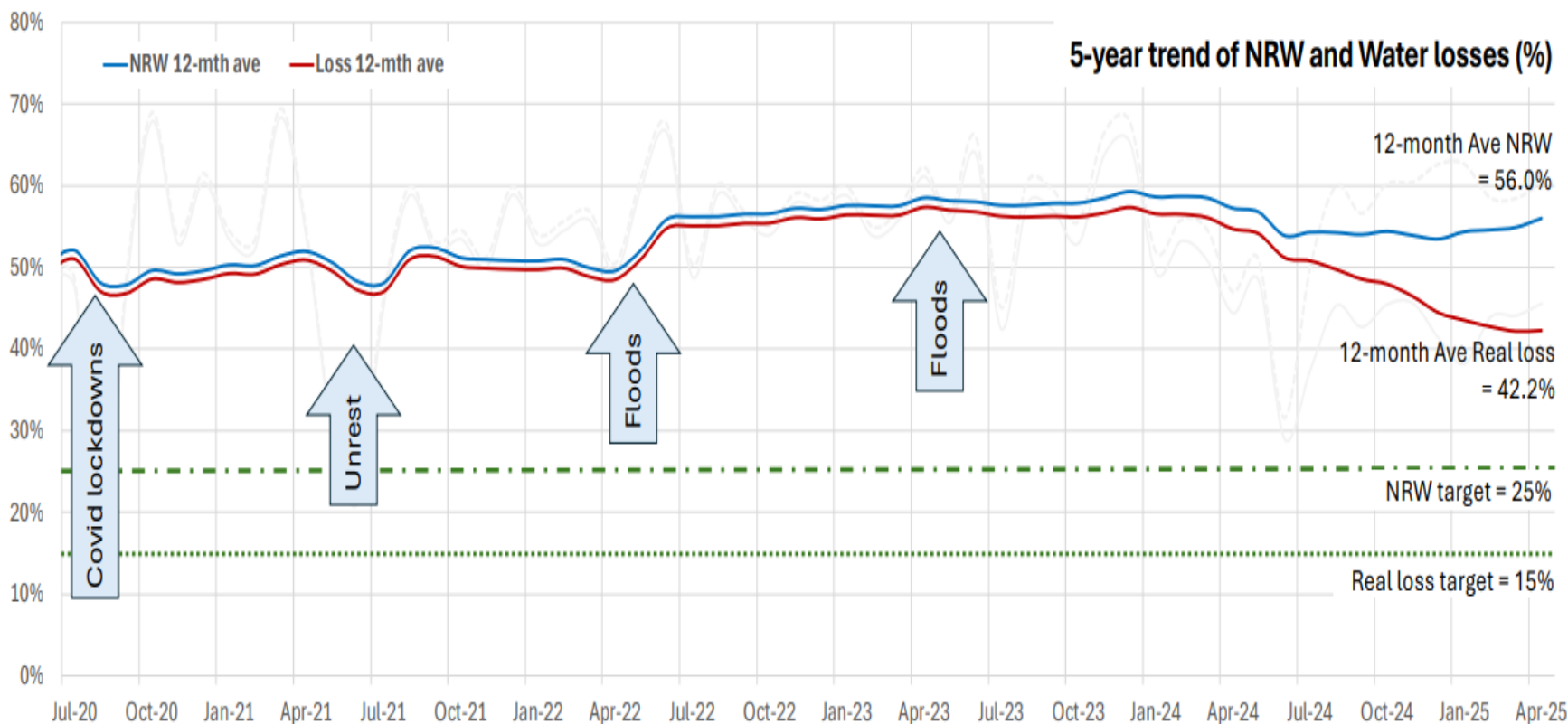
- Tools: Power BI, Qlik, open-source options.
- Visuals: usage trends, hotspots, savings.
- Integration with mSCOA for financial tracking.
- Online platforms such as municipal websites
- Dashboards that are interactive and can be customizable to difference stakeholders based on user needs but form the same data with drill down functionality.



Sample Dashboard - Water Consumption

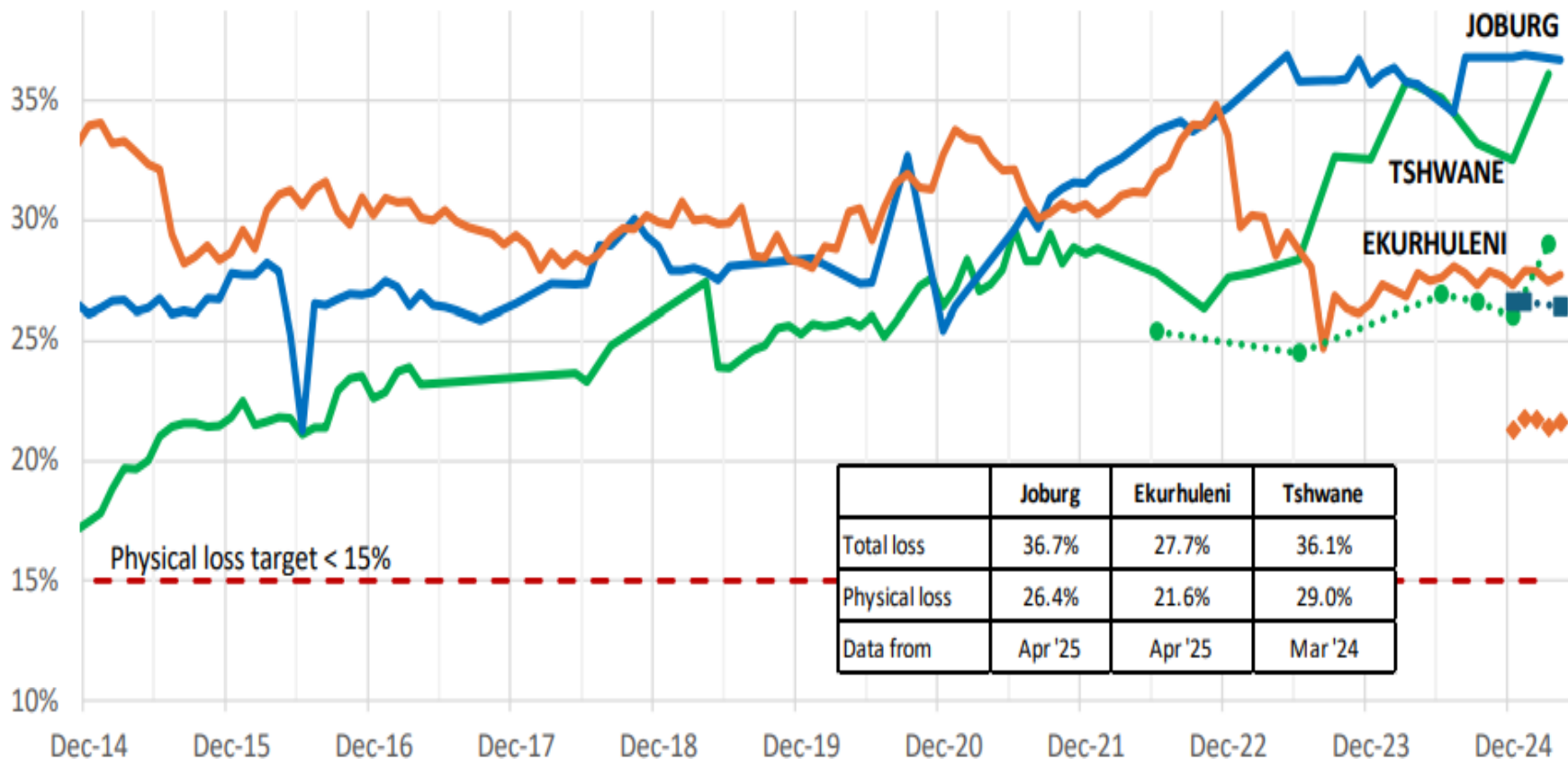
REDUCING LOSS AND NON-REVENUE WATER

Non-Revenue water (NRW) and water losses have been unacceptably high in eThekweni since at least 2020, when compared to targets of 25% for NRW and 15% for real losses in South Africa. High NRW and losses are typically due to poor infrastructure maintenance resulting in increasing burst & leaks, as well as reduced revenue due to meter management shortfalls. NRW also increased during external events such as COVID, political unrest, and repeated flood events.



Sample Dashboard - Water Consumption

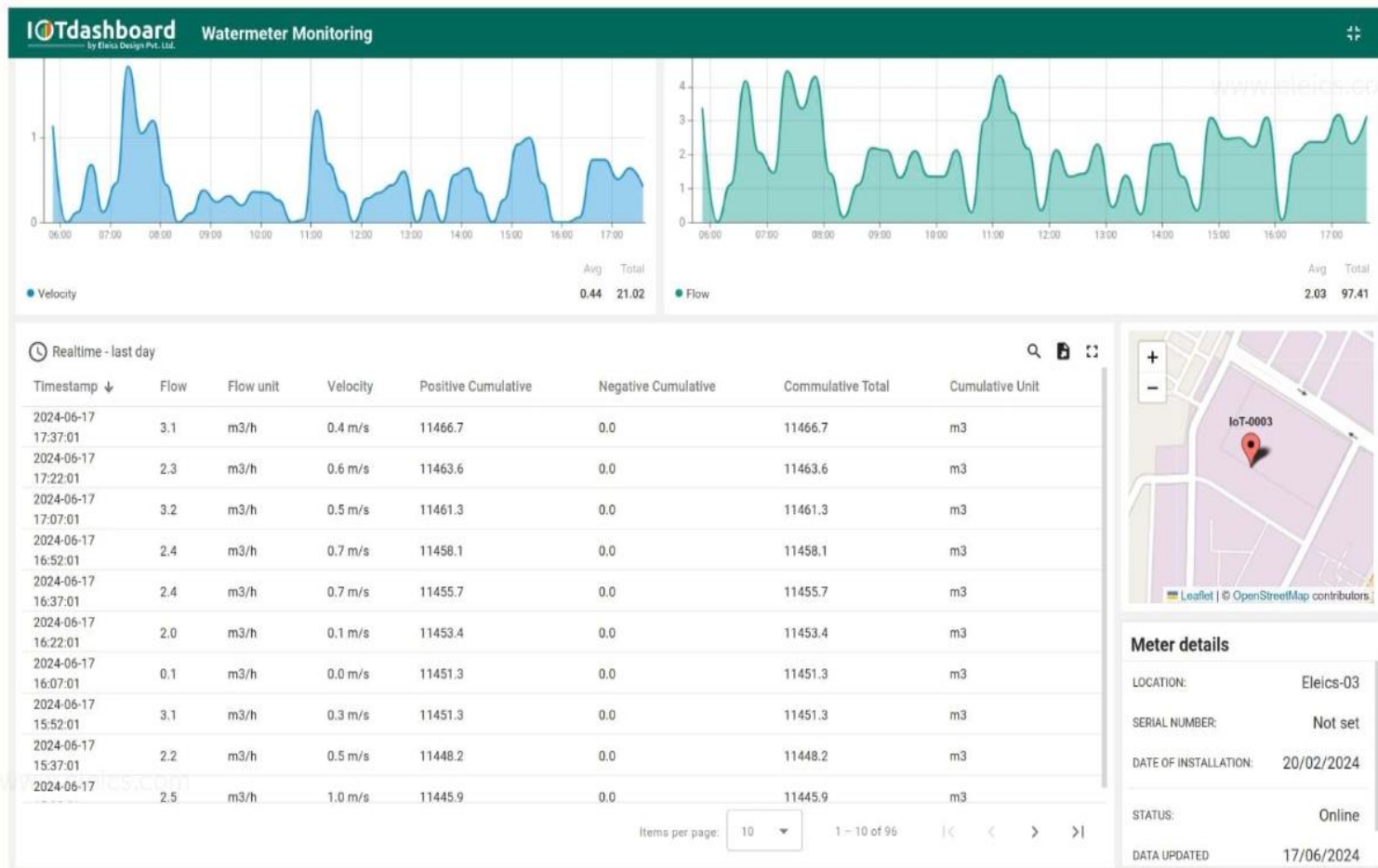
8. TOTAL LOSSES 10-year TREND: This is the volume of water that runs to waste without any user using it as well as water stolen, or under-recorded by water meters. This includes leaks on mains, leaks and overflows on storage infrastructure and on service connections *outside private property boundaries*. The losses shown on the graph include both physical losses and commercial / apparent losses. The target for physical losses is < 15%, and shown below in dotted lines for the last few reporting periods.



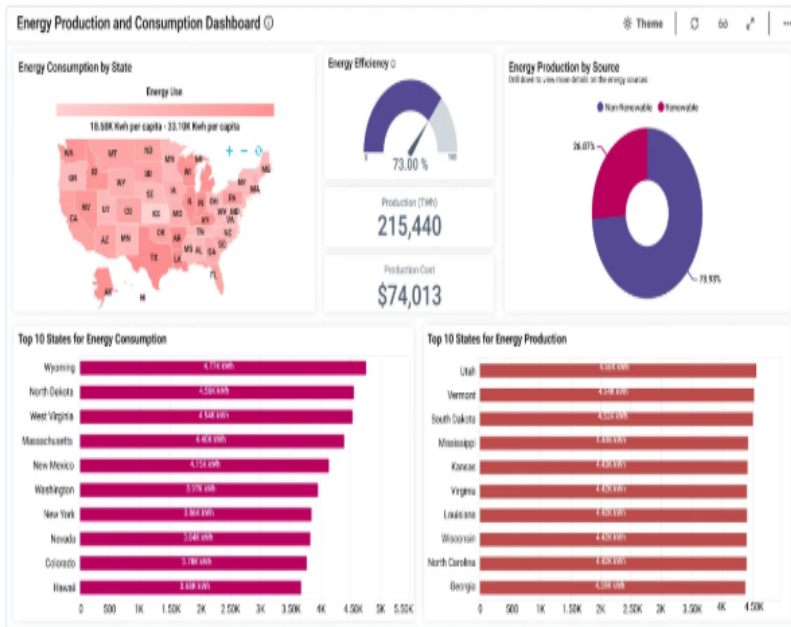
Sample Dashboard - Water Consumption

Water Flow Monitoring

eleics™

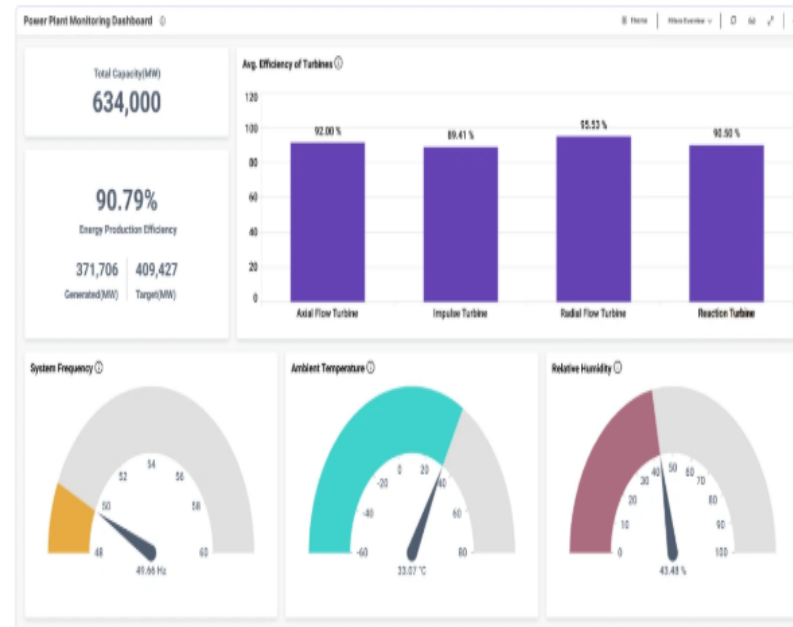


Sample Dashboard - Energy Efficiency



Energy Consumption & Monitoring

Bold BI's energy consumption & monitoring dashboard answers several key questions for managing energy consumption and production...



Power Plant Operations

Bold BI's power plant operations dashboard displays the live production data of a series of power plants. This information is crucial as it...

Sample Dashboard - Energy Efficiency

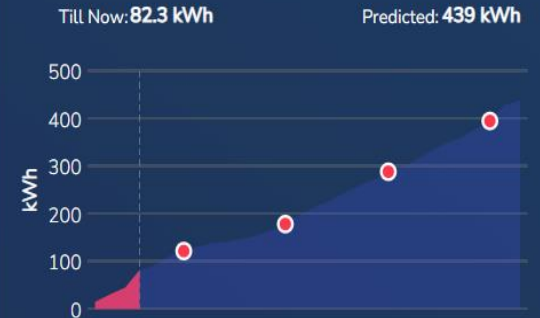
COST PREDICTED



CHANGE IN COST



USAGE ESTIMATE



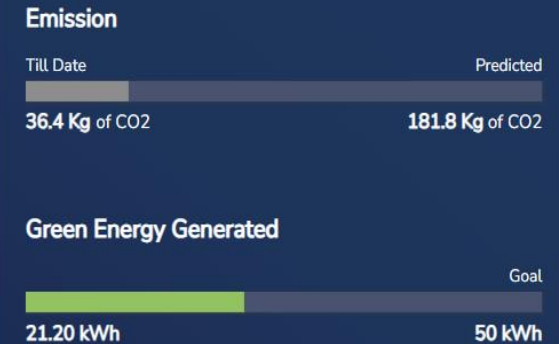
ACTIVE APPLIANCES



ENERGY INTENSITY



CARBON FOOTPRINT

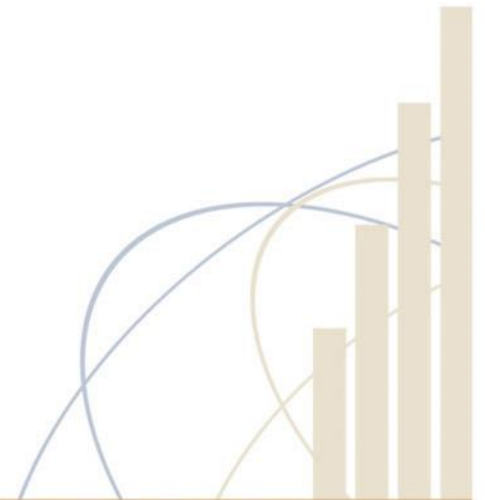


Case Study – Cape Town Water Dashboard

- Live dashboard during 2018 drought.
- Citizens could see dam levels, usage limits, and own consumption.
- Result: 55% reduction in water usage citywide.

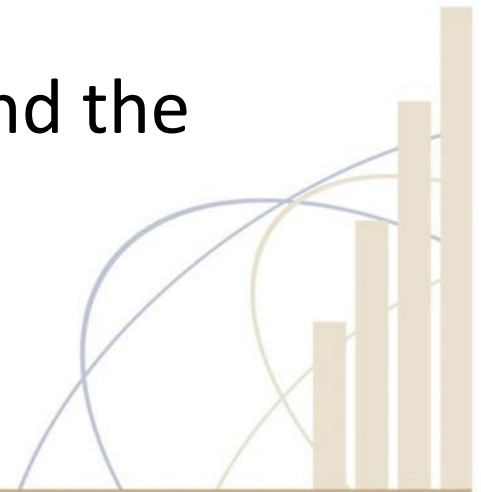
Live Demo Tools

- Open Data Cape Town - Water Dashboard:
<https://odp-cctegis.opendata.arcgis.com/>
- Global Smart Water Platform Examples:
Aquasuite / Sensus / Utilidata.
- Power BI demo embedded dashboard with
dummy municipal data.



Sample Tools to Enhance Efficiency

- Leak and anomaly detection with AI/ML.
- Asset tracking and early fault detection (pumps, pipes, substations).
- Predictive maintenance plans using sensor data.
- Community & customer portals for reporting and awareness.
- Real-time alerts to technical teams and the public.



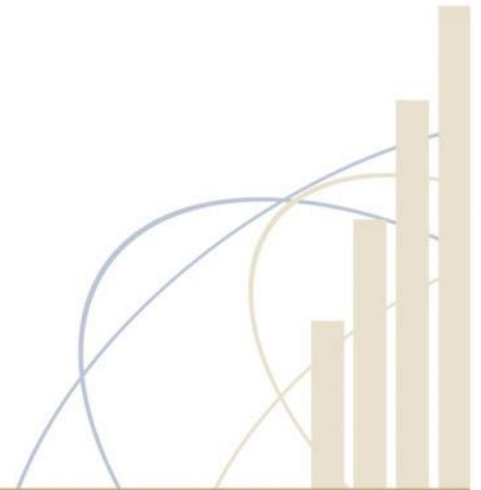
Interconnected Systems and Stakeholders

- Weather service data integration (drought, storm risk).
- Use of historical and seasonal data for demand planning.
- Coordination with Eskom, Water Boards, SAWS.
- Incentives for citizen participation and issue reporting.



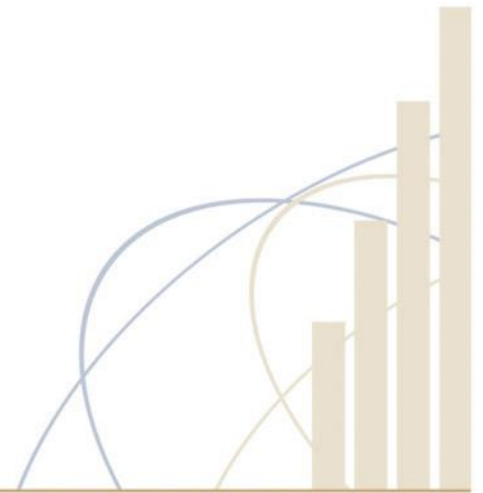
Future Planning and Education

- Use data to guide development of new towns/infrastructure.
- Integrate tech and data into school curriculum.
- Equip next generation with sustainability and tech awareness.



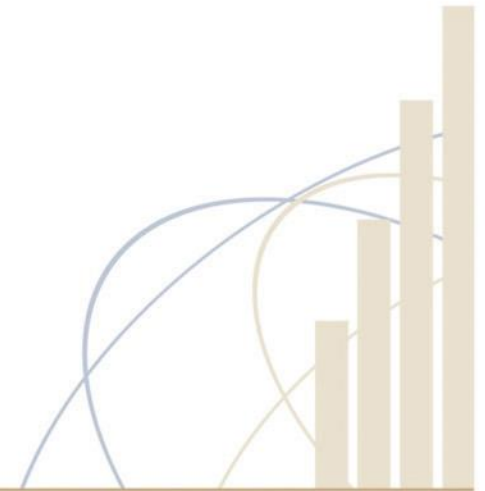
Governance and Security

- Role-based access (citizen vs official).
- Data accuracy and auditability.
- Compliance with POPIA, MFMA, mSCOA.
- Consultation with all key stakeholders is key



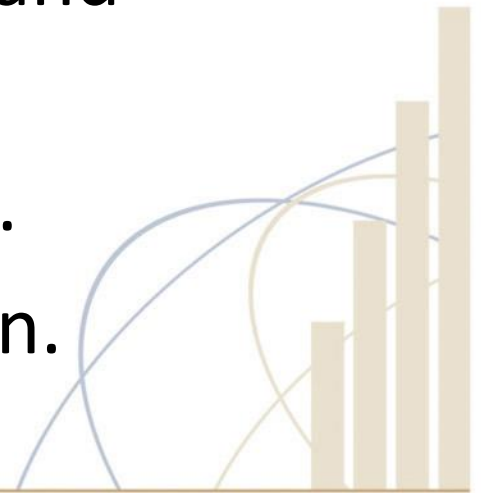
Policy and Strategy Alignment

- National Water Act
- Energy Efficiency Strategy (DME)
- MFMA + mSCOA
- NDP 2030 Green Economy Goals
- IUDF
- MTSF
- SPLUMA



Benefits to Local Government

- Save millions Rands through reduced wastage.
- Better service delivery and cost recovery.
- Improved Tariff Calculation and sourcing of alternative funding sources to plug the gap
- Improved Budgeting, Transacting and Reporting - per funded budget
- Strengthen audits and reduce risk.
- Empower citizens with information.



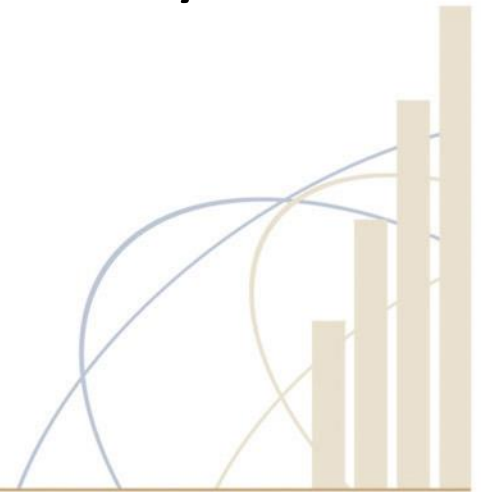
Next Steps for Municipalities

- Plan for it
- Map existing infrastructure and data.
- Conduct Feasibility Studies
- Consultation and have prototypes
- Build cross-functional teams (Finance, ICT, Risk).
- Run a pilot in 1–2 wards e.g. one with most services.
- Seek green/donor funding.
- Have project Cost vs Benefit Analysis to help planning in the future



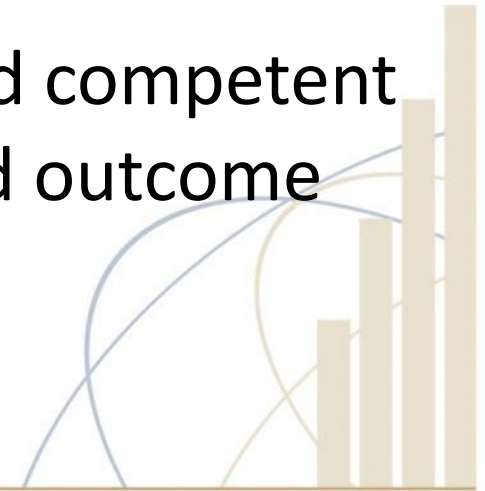
Call To Action

- Empower citizens with data.
- Reduce losses and improve quality of life.
- Build a future where sustainability is measurable and visible.
- Pre and Post Project Planning and Analysis respectively



Summary

- This presentation showed how digital tools can:
 - Drive down energy and water wastage.
 - Empower citizens and officials alike.
 - Align with South African legislative frameworks.
 - Technology still needs the right and competent human skills to achieve the desired outcome



Inspiration

The best time to start is now.

We must act now, using what we have, to protect our future.

Lets change the narrative in local government and show that technology is an enabler to improved service delivery and transparency.

*"Technology, data, and people are powerful on their own
— but transformational when working hand in hand."*

Infographic: Digital Tools for Energy and Resource Efficiency



Purpose

To show how digital tools can help municipalities and citizens improve energy and water efficiency, reduce waste, and promote sustainability.

Challenges

- Up to 41% of municipal water is lost before reaching consumers.
- Energy inefficiencies cost municipalities millions.
- Citizens lack visibility into their consumption and savings.

Vision

- Transparent, community-level dashboards.
- Real-time alerts for leaks and overuse.
- Monthly comparisons and performance tracking.
- Empowered citizens contributing to efficiency.

Infographic: Digital Tools for Energy and Resource Efficiency

Technologies

- Smart meters, IoT sensors, SCADA systems.
- Dashboards (Power BI, Qlik, open-source).
- Mobile/web platforms for citizen engagement.
- Integration with mSCOA for financial tracking.

Case Studies

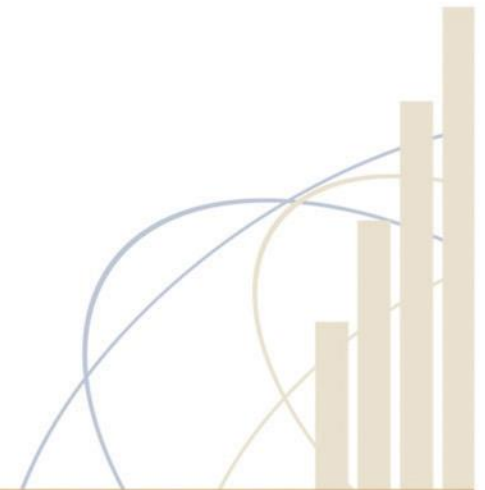
- Cape Town Water Dashboard: Enabled a 55% reduction in water use during the 2018 drought.
- Sample dashboards show usage trends, efficiency scores, and area comparisons.

Advanced Tools

- AI/ML for leak detection and predictive maintenance.
- Asset tracking and early fault detection.
- Real-time alerts and community reporting portals.

Integration

- Coordination with Eskom, Water Boards, SAWS.
- Use of weather and historical data for planning.
- Incentives for citizen participation.



Infographic: Digital Tools for Energy and Resource Efficiency



Education

- Integrate sustainability and tech into school curricula.
- Use data to guide infrastructure development.

Governance

- Role-based access and data auditability.
- Compliance with POPIA, MFMA, mSCOA.
- Alignment with national strategies (NDP 2030, Energy Efficiency Strategy).

Benefits

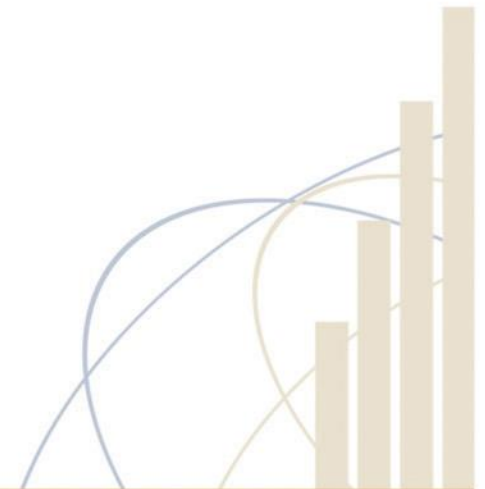
- Cost savings through reduced waste.
- Improved service delivery and risk management.
- Stronger audits and citizen empowerment.

Next Step

- Map current infrastructure and data.
- Form cross-functional teams.
- Pilot in 1–2 wards.

Call To Action

Start now. Use digital tools to make sustainability visible, measurable, and actionable. Empower people and improve governance through technology



We have an important project to improve service delivery assigned to 4 people, namely Everybody, Somebody, Anybody and Nobody. Everybody was asked to do it.

Everybody was thinking Somebody will do it. However, Anybody could have done it. But Nobody did it, Apparently Everybody blamed Somebody when Nobody did what Anybody could have done.

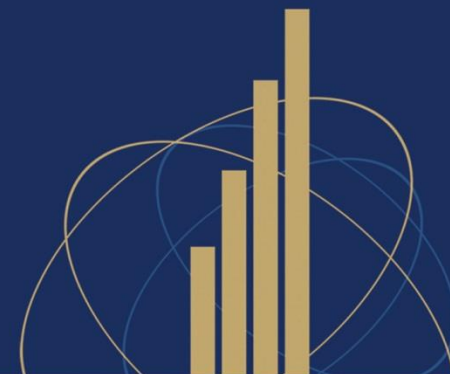
So, to Everybody have you done your part despite Nobody doing their part; for what Anybody could have done. All this to be benefit of Everybody

Questions and Answers





Thank You!



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