



Potable water all the time for all

Non – Revenue Water Reduction Strategy

LILONGWE WATER BOARD

2019 - 2025

September 2021 Updated

List of Abbreviations and Acronyms

AC:	Asbestos Cement
CEO:	Chief Executive Officer
CMT:	Corporate Management Team
DA:	Data Analyst
DCS:	Director of Corporate Service
DE:	Distribution Engineer
DIS:	Director of Infrastructure Service
DMA:	District Metered Area
DoF:	Director of Finance
DPD:	Director of Production and Distribution
GI:	Galvanised Iron
GIS:	Geographical Information System
GPS:	Geographical Position System
ICT:	Information and Communication Technology
IWA:	International Water Association
JICA:	Japan International Cooperation Agency
LWB:	Lilongwe Water Board
NCA:	Never Connected Accounts
NRW:	Non- Revenue Water
NWC:	New Water Connection
PBB:	Program Based Budget
PVC:	Polyvinyl Chloride
SOPS:	Standard Operating Procedures
ZM:	Zone Manager

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Executive Summary

1.0 Introduction

Lilongwe Water Board developed a comprehensive 5-year NRW strategy in April 2019 to be used as a blueprint for NRW. An implementation action plan with a total 85 activities was developed covering the identified key focus areas. The developed 5-year NRW strategy targeted to reduce NRW from 36% in April 2019 to 28% in 2024

2.0 Mid-Term Review of the NRW Reduction Strategy

LWB conducted comprehensive evaluation of the 5-year NRW strategy between July and September 2021. The review established that only 38 activities out of the 85 planned activities in NRW strategy were executed, representing 44% activity implementation progress. Overall, the target NRW ratio has not been achieved during the NRW strategy implementation period between June 2019 and June 2021. NRW moved up from 37.2% in June 2019 to 42% in June 2021 against a target of 35.5% and 30% respectively. The 2019 NRW Strategy evaluation brought to light several issues which provided lessons for the continued implementation of NRW strategy.

3.0 Revised NRW Reduction Strategy: 2019 – 2025 NRW reduction Strategy

To realign the Revised NRW strategy to the 2020-2025 Strategic plan, the strategic objectives and strategic actions have been maintained as new focus areas in the Revised NRW Reduction Strategy. Similarly, the NRW reduction goal has been maintained at 28% by 2025, necessitating the alignment of end period for both plans which has resulted in an extension of the duration of the Revised NRW reduction Strategy by 1 year to 2025. The review resulted in the streamlining of implementation activities to 44 from the initial 85. The detailed descriptions are shown in Appendix 3.

To accelerate the implementation of the revised NRW Reduction Strategy, Implementation will be rolled by a series of 100 day projectized implementation plans; with the initial targeting selected 19no. key high impact activities, requiring minimal physical and economical investment. The initial 100 days NRW reduction plan is provided in Appendix 5.

4.0 Financial Resources

The financial resources required to implement the activities in the Revised NRW Strategy are estimated at MK 43 billion to be financed by LWB's internally generated funds, complimented by loans and grants from development partners. Apart from aligning to LWB's strategic documents such as the Strategic Plan; the NRW Reduction Strategy will also be aligned with annual Program Based Budget.

5.0 Monitoring & Evaluation

The existing institutional framework will be utilised in the implementation of the strategy provisions. NRW section shall continue to be the primarily responsible section for monitoring and evaluating the progress in implementation of the NRW Strategy. The Board's Corporate Planning Division will continue to hold the monitoring and evaluation responsibility of overall NRW division's programs.

Monthly progress review meetings with CMT and implementation units will be conducted to evaluate implementation progress. Additionally, annual progress evaluation reports shall be prepared by the NRW division for submission to Management with strict adherence to the defined evaluation calendar. Using a responsibility assignment (RACI) matrix, the roles of main stakeholders are described. Furthermore, the responsibilities of each participating LWB stakeholder on the NRW reduction strategy's tasks have been defined.

1.0 Introduction

1.1 Background

To harmonise and streamline all Non-Revenue Water (NRW) interventions undertaken by various sections and departments within Lilongwe Water Board (LWB), and to address the previously identified lack of focus employed on NRW management efforts; a comprehensive 5-year NRW strategy was developed in April 2019 to be used as a blueprint for NRW management for LWB.

The 5-year NRW strategy development was inspired by the lessons learned from previously implemented short term and mid-term NRW reductions interventions such as the 2016/2019 NRW strategy and 2019/2020 strategic plan. The strategy was developed using a logic tree or problem tree analysis, where problems affecting each component of NRW were identified, their causes established, and strategic actions developed to address each of the identified problems to reduce or eliminate them thereby facilitate overall NRW reduction goal. The assessment identified the following six key focus areas for NRW interventions to ease implementation and monitoring of activities:

- a) Systems Input
- b) District Metered Areas (DMAs)
- c) Commercial losses
- d) Physical losses
- e) Unbilled authorised consumption
- f) Staff Capacity

An implementation action plan with a total 85 activities was developed covering the six identified key focus areas or components. Implementation was phased in two phases with the first Phase mainly working on resolving NRW measurement attributes such as DMA bulk meters and production meters recalibration or replacements, customer verifications exercises, and DMAs re-establishment for baseline determinations. The second phase covered rolling out the rest of the strategy physical loss and commercial loss intervention action plans, while prioritising DMAs with high NRW volumes and sustaining the NRW levels once reduced. Phase one was planned for year one of implementing the strategy, with phase two taking the remainder of the planned implementation period.

The developed 5-year NRW strategy targeted to reduce NRW from 36% in April 2019 to 28% in 2024, projecting more gains at the beginning of the implementation period, with a decline in the impact towards the end of the program as gains were expected to have stabilized. The targets cascaded to Zone level and were to be further cascaded down to District Metered Area

(DMA) level, for ease of tracking and prioritization of investments. The overall and zonal NRW targets in the NRW strategy in as presented in Figure 1 below

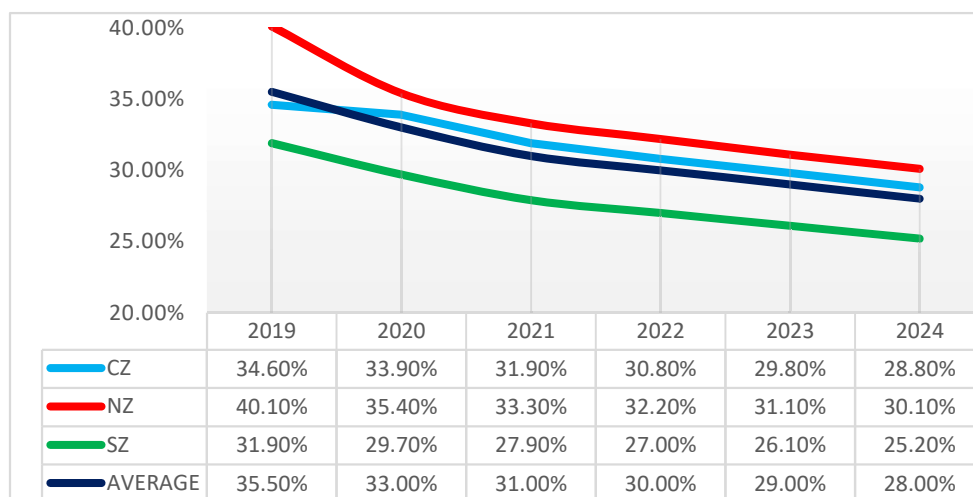


Figure 1: Overall and Zonal target for the 2019 NRW reduction Strategy

Implementation of the NRW strategy was to be steered by the office of the Director of Production and Distribution (DPD), with the NRW division coordinating and monitoring the activities. The Zones, Meter Lab, GIS, and Network sections were the main designated implementing agents of the strategy. External expert technical assistance from LWB’s traditional development partners was anticipated to compliment and capacitate the implementation team.

The budget for first year of implementation of the NRW strategy was tagged at MK 6.7 billion (USD 9 million) which included operational and capital expenditure items. The budget was to be co-financed by LWB and other development partners through NRW reduction projects.

Monthly progress review meetings and annual reviews were planned as part of the NRW strategy monitoring and evaluation activities. The 5-year 2019 NRW Strategy and implementation action plan is as provided in Appendix 1.

2.0 Mid-Term Review of the Non-Revenue Water Reduction Strategy

The 2019 NRW Strategy was subjected a comprehensive evaluation that was conducted between July and September 2021 to assess progress of planned activities and achievement objectives thereof, particularly the achievement of NRW reduction target at mid-term in June 2021.

A preliminary desk progress review was conducted using NRW reports for the assessment period, followed by a series of workshops with relevant LWB’s NRW reduction action team at all levels, including the high- level management team.

The review established that only 38 activities out of the 85 planned activities in NRW strategy were executed, representing 44% activity implementation progress. A total of 42 activities delayed, mainly very key activities under phase one which were also crucial for baseline establishment prior to rolling out of DMA level NRW reduction interventions such as production meters replacement, DMA re-establishment and customer verification exercise.

The covid-19 pandemic affected implementation of most of the activities. Appendix 2 provides a detailed progress evaluation review of all the 85 activities in the NRW Strategy reduction implementation action plan.

2.1 Key achievements and challenges

Key achievements and challenges registered during the implementation of the 2019 5-year NRW strategy at mid-term are as tabulated in Table 1 below.

Table 1:Key Achievements and Challenges faced during implementation of NRW strategy between April 2019 and June 2021

Component	Output	Achieved	Challenges
System Input Volume	Accurate production figures	<ul style="list-style-type: none"> • Bulk meter accuracy tests done in areas registering inconsistencies • 3 Bulk meter replacements done in the CZ • 4 Bulk meters serviced in the CZ. 	<ul style="list-style-type: none"> • Bureaucratic procurement processes
DMA Management	Hydraulically balanced DMAs	<ul style="list-style-type: none"> • Monthly desk reconciliation of Billing and GIS customer data conducted. • 15% of customers included in the billing system with DMA code numbers • Monthly Zonal DMA balance analysis reports prepared 	<ul style="list-style-type: none"> • Customer Meter Validation exercise delayed due to COVID19. • Other DMAs still presenting negative NRW, particularly in CZ due to undocumented interconnections and boundary valves
	Reduction in Bulk meter under registration	<ul style="list-style-type: none"> • Meter policy drafted to guide implementation of routine inspections and standard bulk meter installation. 	<ul style="list-style-type: none"> • Delayed approval of Meter policy which would empower and guide implementation of activities.

Component	Output	Achieved	Challenges
Commercial Losses	Reduced number of illegal connections	<ul style="list-style-type: none"> • Awareness program instituted, including naming and shaming. • 310 cases investigated; 101 cases confirmed • Revisit on previously confirmed illegally connected customers • Improved adherence and monitoring of physical NWC procedure 	<ul style="list-style-type: none"> • Minimal prosecutions of confirmed cases due to COVID19
	Reduce meter inaccuracies to maximum permissible errors	<ul style="list-style-type: none"> • Meter age detail included in Billing 	<ul style="list-style-type: none"> • Faulty and programmed meter replacement not intensified
	Reduce data handling errors	<ul style="list-style-type: none"> • Trainings conducted • Data analysts conduct monthly validation of billing information 	<ul style="list-style-type: none"> • Inability to conduct frequent physical meetings due to impact of covid-19 • Increase in estimated accounts due inaccessible meters
	Eliminate unbilled accounts	<ul style="list-style-type: none"> • NWC process guards hired to enhance the NWC workflow • Conducted campaign for voluntary connection to Billing for unbilled customers 	<ul style="list-style-type: none"> • Billing system inefficiencies • Increase of NCAs
	Reduce estimated accounts to 1% of the total customer base	<ul style="list-style-type: none"> • Enhance contract management for the outsourced meter reading firm • Enhanced analysis for estimated accounts including analysis of estimates from inaccessible meters 	<ul style="list-style-type: none"> • Conflicting policy direction • Intensive Meter replacement exercise failed due to Covid19

Component	Output	Achieved	Challenges
Physical Losses	Consolidated faults data	<ul style="list-style-type: none"> • SCADA under procurement 	<ul style="list-style-type: none"> • Integration between call center faults and staff reported faults not implemented
	Updated inventory management system	<ul style="list-style-type: none"> • 89.7% of all new connections installed Georeferenced and updated in GIS • 100% of all newly pipe installations georeferenced and updated in GIS. 	<ul style="list-style-type: none"> • Some NWC being misallocated in DMAs • Lack of appreciation by other users of need for 100% georeferencing of NWCs
	Reduction of Bursts and leaks	<ul style="list-style-type: none"> • Enhanced burst analysis reports highlighting hot spots and indicative causes • 13 kms of frequently burst and aged pipes replaced through Zones • 49km replaced through LWSP 	<ul style="list-style-type: none"> • Pipe replacement program not fully implemented, especially for aged AC pipes • Pressure management system resulting in Unregulated pressures
	A motivated workforce	<ul style="list-style-type: none"> • Incentive scheme for NRW introduced 	<ul style="list-style-type: none"> • Absence of corporate ownership for NRW reduction initiatives, especially non-technical members
	Availability of repair materials	<ul style="list-style-type: none"> • Additional repair materials and equipment procured through JICA projects. 	<ul style="list-style-type: none"> • Frequent stockouts of fastmoving repair materials
	Reduction of unauthorised valve operations	<ul style="list-style-type: none"> • Developed preventive maintenance program for the zones 	<ul style="list-style-type: none"> • Lack of commitment to actualize the plans.
Unbilled Authorized Consumption	Accurate measurement of unbilled authorized volumes	<ul style="list-style-type: none"> • All active Fire hydrants' consumption under monthly scrutiny through the water balance computations 	<ul style="list-style-type: none"> • Only 58% burst forms filled to calculate volume of water los during repair/flushing of pipes
	Reduction in unbilled consumption volumes	<ul style="list-style-type: none"> • Automatic taps installed in some LWB facilities 	<ul style="list-style-type: none"> • Continuous use of treated water for lawn watering instead of raw water
Staff Capacity	Improved approaches to NRW reduction	<ul style="list-style-type: none"> • Basic training on leak detection conducted • DMA management capacity built at all levels through the LiSCaP project 	<ul style="list-style-type: none"> • Scheduling of some trainings affected by COVID19

2.2 NRW Performance

Overall, the target NRW ratio has not been achieved during the NRW strategy implementation period between June 2019 and June 2021. NRW moved up from 37.2% in June 2019 to 42% in June 2021 against a target of 35.5% and 30% respectively as presented in the Figure 2 and 3 below for both the global LWB and zonal NRW trends. As highlighted above, covid-19 disrupted implementation of most of the key planned activities.

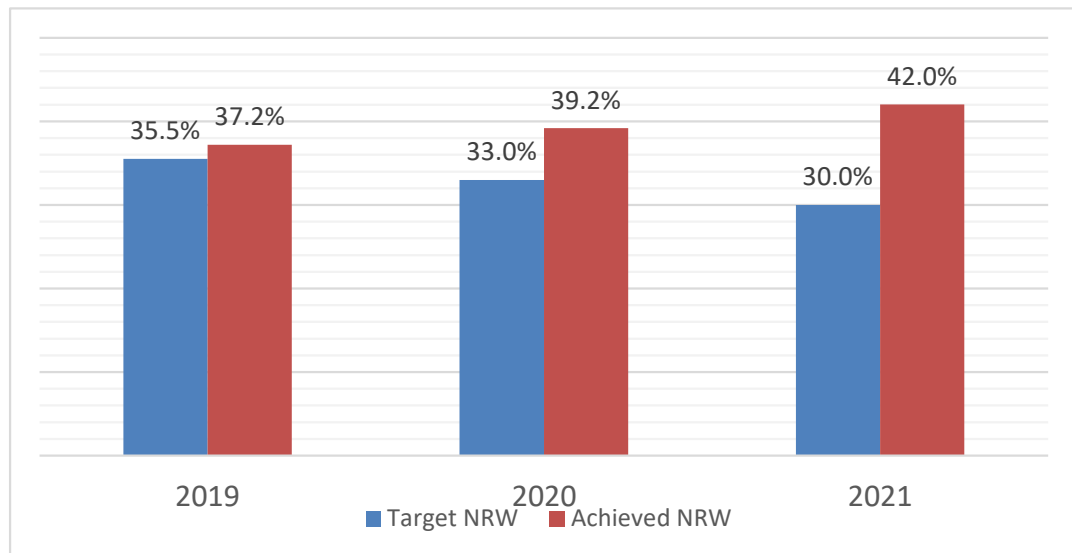


Figure 2: Global NRW Trends post NRW strategy implementation (Target vs Actual)

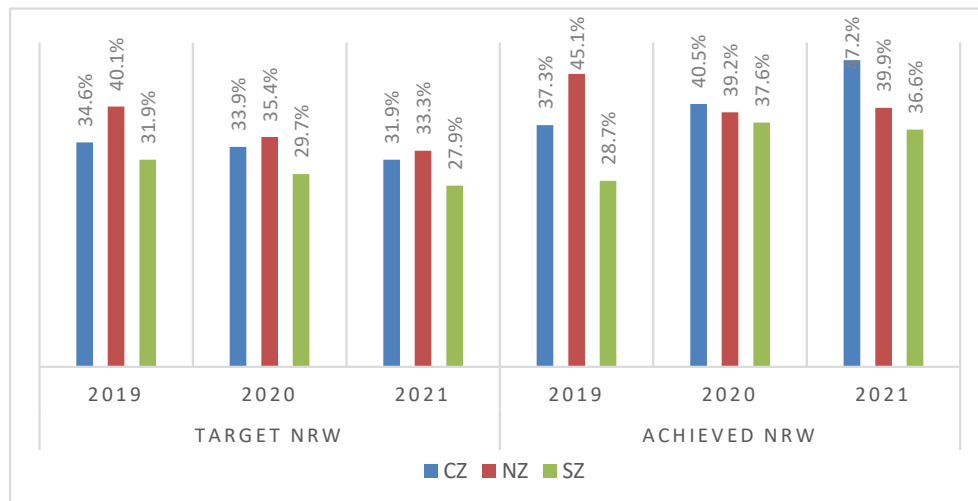


Figure 3: Zonal NRW Trends post NRW strategy implementation (Target vs Actual)

2.3 Lessons Learnt

The 2019 NRW Strategy evaluation brought to light several issues which provided lessons for the continued implementation of NRW strategy as follows;

- Align NRW strategy to the Board’s strategic plan, both in strategic direction as well as time frame.
- Review Strategy activity KPI’s to ensure they meet SMART criteria (Specific, Measurable, Realistic, and attached to a time frame.)
- Clarify and re-organise the institutional setup for implementation of NRW activities, providing clear roles and responsibilities between implementing Sections and the NRW Section, which is principally the planning and monitoring unit.
- Guard against inconsistent application of activities and overtrading, rather adopt a focused implementation approach.
- Improve NRW activity resource planning and allocation to enhance efficiency, i.e., staffing, materials. Reduce reactive approach and adopt proactive approach.
- Develop a clearly defined monitoring and evaluation framework to facilitate regular progress reviews.
- Eliminate existing bureaucracies delaying implementation of NRW reduction activities and achievement of outputs; where said bureaucracies are beyond LWB’s mandate, factor them in during the planning process.
- Provide mitigation measures for unseen events such as pandemics like COVID19 during formulation of strategic activities.
- Enhance awareness programs for the NRW reduction strategy both within and outside LWB.
- High impact but easily implementable activities should be highlighted and prioritized.
- Utilizing existing knowledge built from implementing other NRW reduction projects such DMA management to scale up interventions.

2.4 Strategic Plan 2020-2025

Based on the lessons learnt from the NRW strategy review process, evaluation of running LWB’s strategic documents was conducted, to bring them into alignment with the revised NRW reduction strategy.

The newly developed LWB’s 2020-2025 Strategic Plan which has set out ambitions and commitment to fulfil LWB’s mandate in a sustainable manner while responding to the ever-changing operational environment; was the main strategic document that was reviewed for this purpose.

The 2020-2025 Strategic plan has laid our six strategic focus Themes as follows;

- (1) Reliability of Water Supply
- (2) Non-Revenue Water reduction
- (3) Customer Satisfaction
- (4) Financial Capacity for infrastructure development
- (5) Institutional and Human Capacity Development
- (6) Wastewater Management

Theme Two which covers NRW reduction with a strategic goal to reduce NRW from 40% to 28% sets out the following key objectives and strategies (see Table 2 below); was considered to be the main guiding framework for the Revised NRW Strategy.

Table 2: 2020-2025 Strategic Plan Theme Two (NRW Reduction) Objectives and Strategies

Objective	Strategies
Improve Water Loss Management	Establish and implement routine accuracy tests for production and distribution bulk meters
	Undertake water balance
Establish effective DMA Management practices	Reduce physical water loss in the distribution system
	Reduce commercial losses
	Implementation pressure management
Build staff capacity and customer awareness on NRW management	Conduct staff training and knowledge transfer programs
	Implement customer and staff education programs

3.0 Revised NRW Reduction Strategy: 2019 – 2025 NRW reduction Strategy

To realign the Revised NRW strategy to the new Strategic plan, the strategic objectives and strategic actions laid down in theme two (NRW Reduction) of the 2020-2025 Strategic plan, have been maintained as new focus areas in the Revised NRW Reduction Strategy. Similarly, the NRW reduction goal has been maintained at 28% by 2025, necessitating the alignment of end period for both plans which has resulted in an extension of the duration of the Revised NRW reduction Strategy by 1 year to 2025. This is believed to create synergistic achievement of outputs for the two plans. Figure 4 below presents the revised projected NRW target for the zones and for the LWB overall.

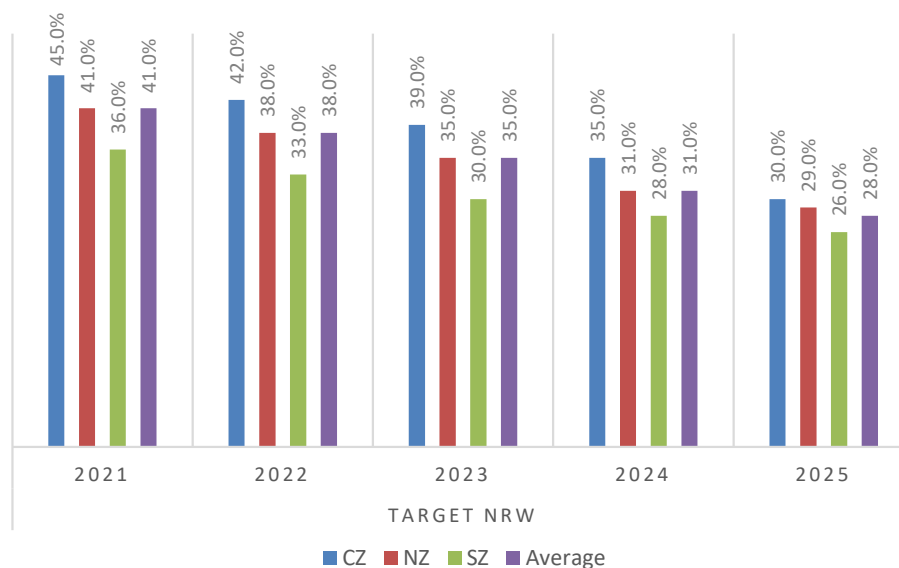


Figure 4: Revised NRW Target for the 2020-2025 NRW Strategy

The review resulted in the streamlining of implementation activities to 44 from the initial 85. Additionally, brief notes which comprehensively detail each of the planned activities, have been developed to facilitate a clear understanding and evaluation of the planned activities. Appendix 4 presents activity brief notes.

The Revised NRW reduction strategy objectives, strategic actions and activities are as outlined in Table 3 below; the detailed descriptions are shown in Appendix 3.

Table 3: 2019-2025 Revised NRW Strategy Objectives, strategies, and activities

Strategies	No	Activities	KPI	Responsible Section
Objective 1: Improve Water Loss Management				
Maintain accuracy of production and distribution bulk meters	1	Replace inaccurate production meters	No. of meters replaced	Production
	2	Conduct annual accuracy test of production meters	No. of accuracy test conducted	Production
	3	Installation of bulk meters	No. of bulk meters installed	PIU
	4	Routine accuracy test of bulk meters for accurate DMA balances	No. of bulk meters tested	Zones
Conduct water balance	5	DMA Re-demarcation and relocation of customers to appropriate DMAs	No. of DMAs verified	PIU/GIS
	6	Implement customer validation audits	No. of Surveys completed	NRW
	7	Reconciliation of customer data between GIS and billing systems	No. of customers in GIS as a percentage of total number of customers in billing system	GIS

Strategies	No	Activities	KPI	Responsible Section
	8	Develop policy and SOPs for customer data management	SOP Developed, Number of refresher trainings conducted	CRM
	9	DMA NRW Management	No. of DMAs applied with NRW reduction countermeasures	Zones/NRW
Objective 2: Establish Effective DMA Management Practice				
Reduce physical water loss in the distribution system	10	Establish a fully equipped and functional site for demonstrating leak detection activities	Establishment of leak detection field	NRW/LiSCaP
	11	Implement active leak detection programs	Reports specific to the activities	NRW
	12	Formulate a quality control inspection checklist for critical materials used for pipe maintenance works and NWCs	Creation of checklist for maintenance and NWC materials	Zones/NRW
	13	Computerizing the leak detection register for easy tracking and monitoring of leakages (SCADA Implementation)	Scada Implemented	PIU / Production
	14	Implementation of invisible leak detection programs (MNF measurements and step tests)	No. of MNF activities	NRW / Zones
	15	Replace/Rehabilitate faulty valves and valve chambers for ease of supply isolation for repairs and prevention of unauthorized valve operation	No. of valve chambers installed	Zones/Project
	16	Stores management guidelines for zone satellite stores	The guideline	Zones
	17	Conduct waste inspection through engagement of temporary staff	No. of waste inspection exercises conducted	Zones / HR
	18	Revamping the Effort Plus Fault management system including synchronization for all reported faults	100% utilization of effort plus system	Zones/ Procurement/IT
	19	Adherence to emergency response standards (Burst isolated within 30 min, Bursts repaired within 6 hours and Leaks maintained within 2 days after reporting)	100% burst isolated within 30 min 100% bursts repaired within 6 hours 100% leaks maintained within 2 days	Zones
	20	Carry out pipe lowering projects	Length of pipe lowered in kms	Zones
	21	Implement a performance-based contract to reduce NRW	PBC Rolled out	NRW / PIU
22	Develop and maintain an accurate pipe replacement program focusing on aged/frequently bursting pipes	Length of pipes replaced	NRW/Asset Management	

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Strategies	No	Activities	KPI	Responsible Section
Reduce commercial losses	23	Conduct illegal connection investigations	No. of suspected illegal connections visited as a percentage of reported cases	NRW
	24	Revisit all previously uprooted illegal connections	No. of re-visits as a percentage of confirmed illegal connection aged over 6 Months	Zones
	25	Establish a police unit specifically for illegal connections	Operation of a police unit specifically for illegal connections	NRW
	26	Refer to corporate lawyer all unpaid illegal connection charges	No. of referalls made	NRW
	27	Promote to use the tip off anonymous program for reporting illegal connections	No. of media adverts	NRW
	28	Eliminate unbilled accounts	No. of billed accounts	NRW
	29	Uproot all long-disconnected accounts (over 6 months)	No. of connections uprooted	Zones
	30	Implement meter replacement programs	No. of meters replaced	Zones
	31	Install washout points for flushing of mains and pipes	No. of washout points installed	Zones
	32	Recruit permanent staff for NWC, disconnections and meter replacement	Functional review	HR
	33	Conduct physical inspections and periodic reports on NWC and disconnections to confirm adherence to SOPs	% of meters inspected out of newly installed connections	Zones
	34	Monitoring of consumption trends of high and low consuming customers	No. of accounts Monitored a percentage of those planned	Zones
	35	Monitoring Consumption for Fire Hydrants	Fire hydrant inventory updated in the billing system	Zones/NRW
Implement pressure management	36	Installation of Data Loggers for Acquisition of Pressure and Flow Data	Total No. of installed data loggers in critical DMAs	Zones
	37	Installation of Pressure Reducing Valves (PRVs) to ensure Better Pressure Management	Total No. of installed PRVs in critical DMAs	PIU
	38	Develop and Implement a Pressure Monitoring Program	A well-formulated and accepted program covering all the DMAs	Network/ Zones/NRW
Objective 3: Build Staff Capacity and Customer Awareness on NRW Management				
Conduct staff training	39	Train meter readers and billing staff on good data handling practices	No. of trainings conducted	NRW/Zones

Strategies	No	Activities	KPI	Responsible Section
and knowledge transfer program	40	Conduct technical capacity building for staff on NRW reduction	No. of programs implemented	NRW
	41	Routine Mentoring of Staff on NRW Concept to Enhance a Spirit of Ownership & Responsibility	No. of NRW talks conducted	NRW
	42	Develop maintenance manuals for safe, effective, and efficient operation and maintenance of the water distribution and transport works	No. of Manual developed	Zones/NRW
Implement customer education program	43	Customer Awareness on NRW Management	No. of campaigns conducted	PR/CR/Zones
	44	Awareness-Raising Activities in Schools	No. of awareness programs	PR/CR

To accelerate the implementation of the revised NRW Reduction Strategy, Implementation will be rolled out through a series of 100 day projectized implementation plans; with the initial targeting selected 19no. key high impact activities, requiring minimal physical and economical investment. The initial 100 days NRW reduction plan is provided in Appendix 5.

4.0 Financial Resources

The financial resources required to implement the activities in the Revised NRW Strategy are estimated at MK 43 billion as tabulated in Table 4 below to be financed by LWB’s internally generated funds, complimented by loans and grants from development partners.

Table 4: Budget estimates for the Revised NRW Strategy

	2021	2022	2023	2024	2025	Estimates	
	MKW	MKW	MKW	MKW	MKW	MKW	USD
NRW	7.7	8.5	8.5	8.5	9.8	43	57

Apart from aligning to LWB’s strategic documents such as the Strategic Plan; the NRW Reduction Strategy will also be aligned with annual Program Based Budget of all relevant implementing sections and departments to enhance the sustainability of the strategy. The NRW section will be coordinating this process during budget preparations to ensure all activities are appropriately and fully allocated in all departments.

5.0 Monitoring & Evaluation

The existing institutional framework will be utilised in the implementation of the strategy provisions. NRW section shall continue to be the primarily responsible section for monitoring and evaluating the progress in implementation of the NRW Strategy. The Board’s Corporate Planning Division will continue to hold the monitoring and evaluation responsibility of overall NRW division’s programs. The Zones, Revenue Accounts, Stores, Projects, and PR are the designated main NRW Reduction Strategy implementing agencies.

Monthly progress review meetings with CMT and implementing units will be conducted to evaluate implementation progress. Additionally, annual progress evaluation reports shall be prepared by the NRW division for submission to Management with strict adherence to the evaluation calendar set out in Figure 5 below using a monitoring and evaluation criteria provided in Appendix 7. While the main strategic thrusts of the NRW Strategy are not expected to change significantly from year to year, some refinements in timeframe and approaches may be necessary in light of internal and external eventualities.

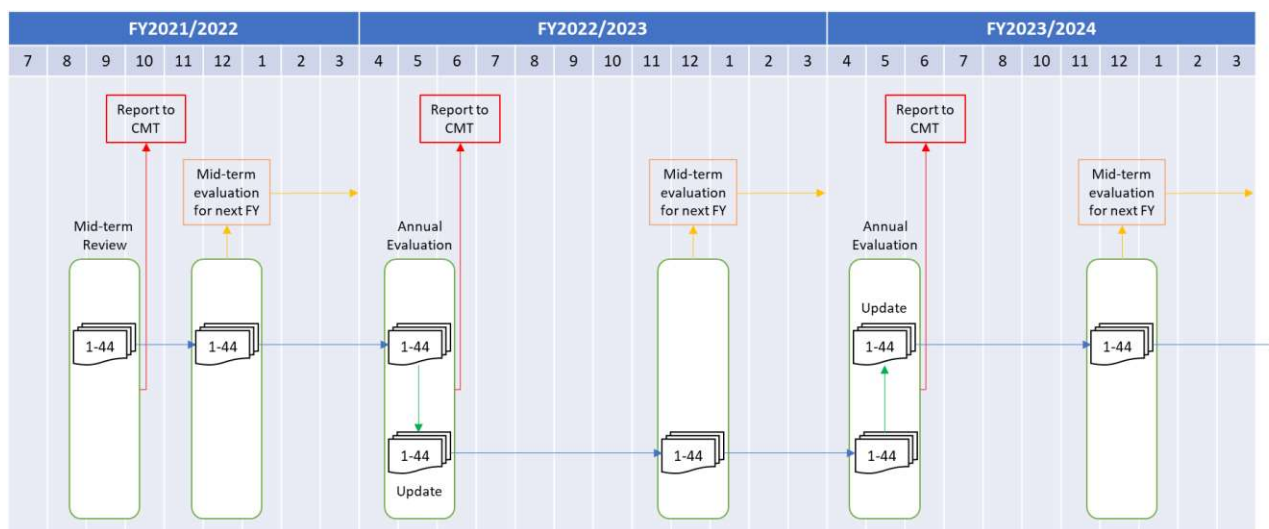


Figure 5: Annual and mid-term NRW Reduction strategy evaluation calendar

Using a responsibility assignment (RACI) matrix described in Table 5 below, the roles of main stakeholders are described in Appendix 6. Moreover, the responsibilities of each participating LWB stakeholder on the NRW reduction strategy’s tasks have been defined in Table 6.

Table 5: Definitions of RACI Matrix

R	Responsible	This role does the work to complete the activity. Only one role is responsible, but other roles can help as needed.
A	Accountable	This role approves the completion of the high-quality deliverable to fulfill the activity. Only one party is accountable for each specific task or deliverable.
C	Consulted	This party is an individual or a group who is consulted to provide opinions or technical expertise to complete an activity or deliverable. They are typically subject-matter experts (SMEs) who are in communication with the people who are responsible for activities.
I	Informed	These parties are notified of progress, often only when a task or deliverable is completed. One-way communication exists with these parties.

Table 6: Roles and Responsibilities of all LWB's sections, Departments or Heads of Departments.

SECTION	RESPONSIBILITIES
CMT	Providing Strategic and Policy direction for NRW reduction Interventions
	Approving NRW reduction plans and projects
	Sourcing funding for NRW reduction projects
	Strategic Monitoring and Evaluation of NRW reduction projects
NRW Management	Planning and Strategy development of NRW activities
	Definition of resources i.e. Budgeting
	Facilitating implementation & Risk management
	Data management
	Capacity building
	Monitoring and Evaluation
	NRW management Reporting
Zones	Implementation of NRW activities
	Acquisition of resources
	Enforcement of by-laws, policies and SOPs
	Quality control
	Data Collection
	Field investigation
	NRW implementation Reporting
Planning (Network, GIS & Asset Management)	Data management, Data analysis, Infrastructure Asset planning (i.e. GIS updating, Hydraulic analyses, Pressure Monitoring, flow measurement services).
	Reporting
Projects	Implementing Infrastructure project management (i.e. reticulation extensions, pipe replacements, construction works)
Public Relations	Stakeholder engagement
	Public Awareness/ social marketing
Administration - Security	Enforcement of by-laws, policies
	Illegal Connection Investigations
	Securing Assets
Administration – Human Resources	Human Resource Recruitments for NRW reduction activities
	Incorporation of NRW activities in all JDs e.g., fault reporting

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SECTION	RESPONSIBILITIES
	Staff Motivation (i.e, incentive programs, disciplinary management, staff welfare management, human resource related provisions e.g. motor vehicles, computers, PPEs and office space)
Procurement	Facilitation of ToRs development for NRW activities
	Procurement of Materials, Fittings and Equipment for NRW reduction interventions
	Assisting contract Management for NRW service providers
Finance (Revenue and Management Accounts)	Provision of financial resources for NRW activities
	Management of Materials, fittings, and equipment for NRW reduction activities (Facilitating procurement and safekeeping)
	Quality control of materials, fittings, and equipment for NRW reduction activities
	Financial appraisals of NRW reduction activities/projects
	Commercial Loss parameters' management (i.e. meter reading and billing)
IT	Development and management of software applications for NRW management e.g. Meter reading and billing systems, GIS etc
	Maintenance of IT Hardware equipment supporting software application
Corporate Planning	Facilitation of Benchmarking exercises with other utilities and relevant key institutions
	Overall monitoring and evaluations (efficiency and effectiveness appraisals)
Internal Audit	Overall internal control and risk monitoring
	Fraud and Illegal connections investigations