



# ANNUAL PERFORMANCE

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## PLAN 2020-2023

EXECUTIVE  
AUTHORITY STATEMENT

Mr Ebrahim Patel  
Minister of Trade, Industry and Competition

The Public Finance Management Act requires that every public entity prepares a Strategic Plan setting out the overall strategy for the 5 year period covering the state's Medium-term Strategic Framework (MTSF). Every year, an Annual Performance Plan (APP) is prepared, which converts the overall strategy to key annual targets. These documents are then provided for approval to the Executive Authority and budgets are aligned to these plans.

The **National Metrology Institute of South Africa (NMISA)** has prepared its **Annual Performance Plan 2020-2023**, which I now submit to Parliament, as required by the legislation.

This is the first **Annual Performance Plan** prepared in the 6th Administration by the **NMISA**. I have requested that all entity Strategic Plans and Annual Performance Plans be aligned to the MTSF, which incorporates the work to develop and implement National Sector Masterplans, as well as the trade reforms, investment and transformation work of the Department.

Once the revised MTSF has been signed off, we will review the Strategic Plan and Annual Performance Plan of the entity and align it accordingly. The Strategic Plan and Annual Performance Plan may further need to be aligned to Government's response to the COVID-19 pandemic, both during the period of the national disaster declared by President Ramaphosa, and thereafter as we adapt to the new economic reality. Should adjustments be made, a revised Plan will be submitted to Parliament.

A handwritten signature in black ink, appearing to read 'Ebrahim Patel', written over a horizontal line.

Mr Ebrahim Patel  
Minister Responsible for Trade, Industry and Competition

It is hereby certified that this Annual Performance Plan:

- Was developed by the management of NMISA under the guidance of the Board and the Board Chair, Ms J Mogadime;
- Takes into account all the relevant policies, legislation and other mandates for which the NMISA is responsible
- Accurately reflects the impact, outcomes and outputs which NMISA will endeavour to achieve given the resources made available in the budget for 2020/21 – 2022/23.

PREPARED AND COMPILED BY NMISA DIRECTORS AND MANAGERS.



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Chief Financial Officer



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APPROVED BY:

Mr Ebrahim Patel  
Minister the DTIC

## ABBREVIATIONS AND ACRONYMS

<b>AFRIMETS</b>	Intra-Africa Metrology System
<b>AMD</b>	Applied Metrology Division
<b>APP</b>	Annual Performance Plan
<b>BIPM</b>	International Bureau of Weights and Measures
<b>CC</b>	Consultative committee
<b>CEO</b>	Chief Executive Officer
<b>CFTA</b>	Continental Free Trade Area
<b>CGPM</b>	General Conference on Weights and Measures
<b>CIPM</b>	International Committee for Weights and Measures
<b>CMC</b>	Calibration and Measurement Capabilities
<b>CRM</b>	Certified Reference Material
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>EHS</b>	Environment, Health and Safety
<b>EXCO</b>	Executive Committee
<b>HCD</b>	Human Capital Development
<b>HR</b>	Human Resources
<b>ICT</b>	Information and Communication Technology
<b>IR</b>	Ionising Radiation
<b>ISO</b>	International Standards Organisation
<b>KCDB</b>	Key Comparison Database
<b>KPI</b>	Key Performance Indicator
<b>LED</b>	Light Emitting Diode
<b>MAT</b>	Materials Characterisation Group
<b>MRA</b>	Mutual Recognition Arrangement
<b>MTEF</b>	Medium Term Expenditure Framework
<b>NLA</b>	National Laboratory Association South Africa
<b>NMI</b>	National Metrology Institute
<b>NMISA</b>	National Metrology Institute of South Africa
<b>NMS</b>	National Measurement Standard
<b>NRCS</b>	National Regulator for Compulsory Specifications

<b>OH&amp;S</b>	Occupational Health and Safety
<b>OIML</b>	International Organisation of Legal Metrology
<b>PEM</b>	Physical and Electrical Metrology
<b>PFMA</b>	Public Finance Management Act
<b>POP</b>	Persistent Organic Pollutant
<b>PPP</b>	Private Public Partnership
<b>PTS</b>	Proficiency Testing Schemes
<b>RIID</b>	Regional, International Relations and Innovation Division
<b>RMO</b>	Regional Metrology Organisation
<b>SA</b>	South Africa
<b>SADC</b>	Southern African Development Community
<b>SADCMET</b>	SADC Cooperation in Measurement Traceability
<b>SANAS</b>	South African National Accreditation System
<b>SANS</b>	South African National Standards
<b>SEM</b>	Scanning Electron Microscope
<b>SHEQ</b>	Safety Health Environment and Quality
<b>SI</b>	International System of Units
<b>SKA</b>	Square Kilometre Array
<b>SME</b>	Small, Medium Enterprises
<b>SMME</b>	Small, Medium and Micro Enterprises
<b>TBT</b>	Technical Barrier to Trade
<b>TC</b>	Technical Committee
<b>the dtic</b>	Department of Trade, Industry & competition
<b>TI</b>	Technical Infrastructure

# LIST OF ABBREVIATIONS/ACRONYMS

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# PART A: NMISA MANDATE



## 1. UPDATES TO THE RELEVANT LEGISLATIVE AND POLICY MANDATES

NMISA was established and is fulfilling its legal mandate under the Measurement Units and Measurement Standards Act, Act no. 18 of 2006.

In accordance with the Act, during 2016, NMISA Gazetted the updated Measurement Units and National Measurement Standards. With the revision of the SI in 2018, NMISA is responsible to update the Measurement Units to comply with the revised SI. The updated Units will be Gazetted in 2020 and an annual review will be implemented to ensure that all international developments in units are appropriately legislated.

Internationally the bodies responsible for Scientific metrology (CIPM) and Legal metrology (OIML), in response to the progression of Trade metrology to Legal metrology, are exploring synergies and ways to cooperate and even amalgamate its activities. Nationally the Trade Metrology Act, Act number 77 of 1973 as amended, was superseded by the Legal Metrology Act, (Act No. 9 of 2014). The Legal Metrology Act provides for the administration and maintenance of legal metrology technical regulations in order to promote fair trade and to protect public health and safety and the environment and to provide for matters connected therewith. Commencement, 1st of August 2014 (Government Gazette 37887, 1 August 2014).

Legal Metrology currently resides as a division within the National Regulatory Compulsory Specifications (NRCS). The NRCS is established in terms of the National Regulator for Compulsory Specifications Act, (Act No. 5 of 2008). The core business of Legal Metrology is measurement instruments used and measurements made in the areas of trade, safety, health and the environment, it focusses on the protection of individuals and society (citizenry), while the core business of NRCS is the administration and maintenance of compulsory specifications and the implementation of a regulatory and compliance systems (conformity assessments) that focus on industry

In its current state, Legal Metrology in South Africa is primarily concerned with measuring instruments used and measurements made with regards to commercial transactions. The core focus of Legal metrology must be expanded to include measurement instruments used and measurements made in the areas of safety, health and the environment. NMISA has extensive metrology laboratories, standards and equipment, together with a solid base of scientific metrology skills, knowledge and capacity to implement Legal Metrology in health, safety and environment measurements.

The dtic has embarked on a revision of the Measurement Act to align it with the latest international and local best practises.

Main issues to be addressed include the role of NMISA to provide measurement services and traceability to government departments, measurement facilities (police forensics, department of health forensic laboratories, department of transport law enforcement agencies, etc.) and the provision of metrology shared services to SOEs. Finally, better alignment is necessary with the Legal Metrology Act.

## 2. UPDATES TO INSTITUTIONAL POLICIES AND STRATEGIES

NMISA is a Type 3A public entity, managed by a chief executive officer (CEO), supported by an executive management team and governed by the NMISA Board. The organisational structure is shown in figure 1. In 2019/20 period the structure at the level of Executive Management was changed to reflect the strategic goals from the Strategic Plan 2019-2024:

- **Strategic goal 1:** Metrology for Regulatory purposes and in support of government laboratories: for compliance and for development of regulations;
- **Strategic goal 2:** Metrology consolidation for SOEs to provide efficient shared services;
- **Strategic goal 3:** Metrology for Industry including assistance to SMEs to provide appropriate services in support of manufacturing, beneficiation and export;
- **Strategic goal 4:** Location of Legal metrology under NMISA to effectively implement the Legal metrology act.

## 3. UPDATES TO RELEVANT COURT RULING

### NMISA supporting law enforcement

The Hendrik's judgement in the Western Cape High Court in September 2011 led to the newly revised SANS 1793: 2013 (The specification for evidential breath analysers). This meant that no evidential breathalysers were calibrated in South Africa since 2011. Based on this review, tests were completed on a new generation breathalyser required by the SANS regulations and NMISA now calibrates the new breathalysers.

### NMISA providing measurement traceability

Regulation No. R. 247, 26 February 1993, under HAZARDOUS SUBSTANCES ACT, No. 15 OF 1973, requires equipment used for monitoring of ionising radiation to be calibrated.



### In support of aviation

More than one airline was grounded by the Civil Aviation Authority recently due to maintenance issues. A decision to halt flights was taken after aviation inspectors found, during an audit, that some of the aircraft serviced by the airline's maintenance organisation were released back to service or cleared as airworthy by unqualified personnel. That qualified as a contravention of the country's aviation regulations. NMISA have been approached by SAA Technical to develop measurement training courses for aviation technicians. NMISA already supports the aviation industry through the Civil Aviation Act no. 13 of 2009 through the provision of traceability contributing to safety and security throughout the civil aviation industry.

### In support for food labelling regulation

According to the new regulations, no manufacturer may make a nutrition claim about their food product unless that food has been analysed in an accredited laboratory and the content of the specific nutrient or nutrients is greater than a specified amount per serving. On 1 March 2010, the Department of Health published new regulations relating to the labelling and advertising of foodstuffs as part of the Foodstuffs, Cosmetics and Disinfectant Act.

### The dismissed speed camera court case

The withdrawal of all criminal proceedings against motorist caught speeding using a specific measuring device in the case of the state vs Zabeer Khan in May 2019.





# PART B: NMISA STRATEGIC FOCUS

## 4 UPDATED SITUATIONAL ANALYSIS

### 4.1 Organisational structure

The role of NMISA is to ensure that measurements performed nationally (and regionally) are accurate and internationally acceptable. This enables trade, component manufacturing, the legal acceptance of measurement results for law enforcement, accurate measurement in environmental monitoring and safety and health care.

NMISA was established under the Measurement Units and Measurement Standards Act, No. 18 of 2006 (The Measurement Act) to provide for the use of measurement units of the International System of Units (SI) and to designate other measurement units for use; to provide for the designation of the national measurement standards (NMS) and to provide for the keeping and maintenance of the NMS. The Governance structure is:

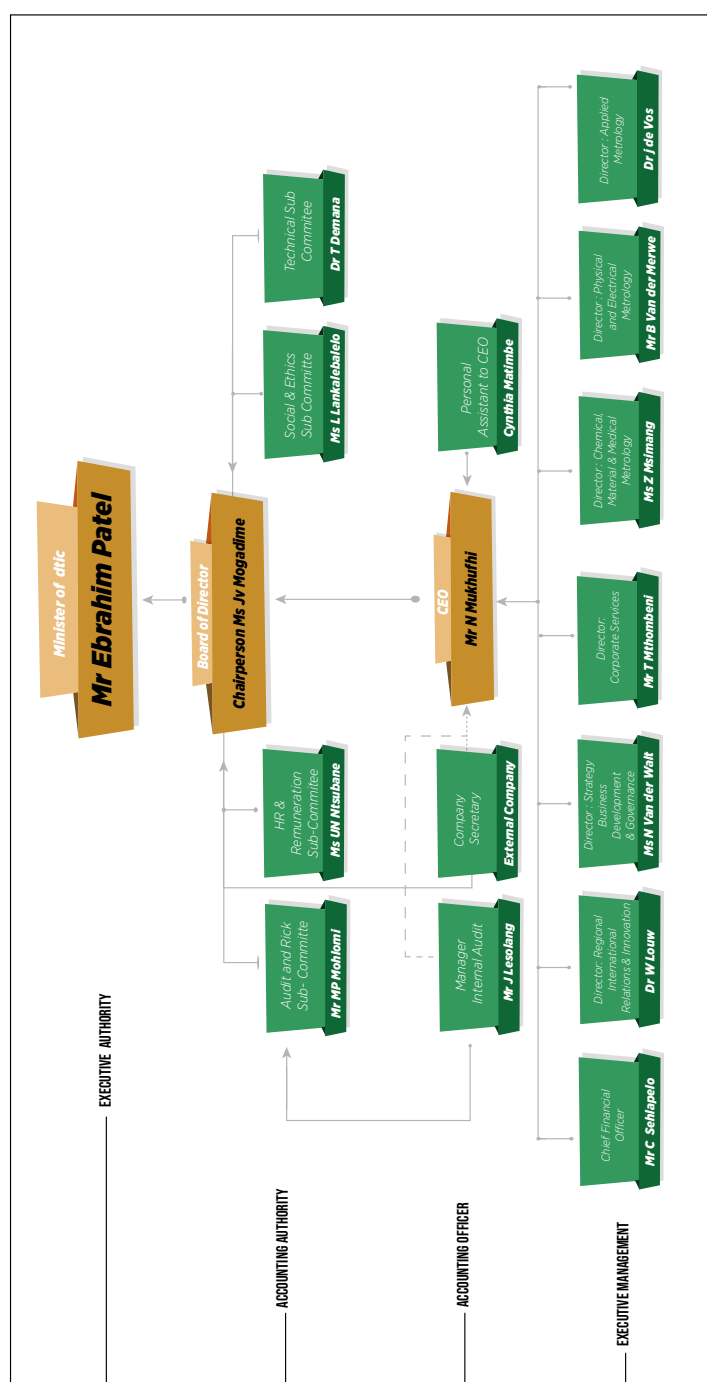


Figure 1.NMISA Governance structure

The NMISA management structure responds to its Strategic goals and structures the organisation in functional areas (Divisions) that ensures the maintenance of the national measurement standards (NMS) and optimises the dissemination to industry through an Applied Metrology division with dedicated centres.

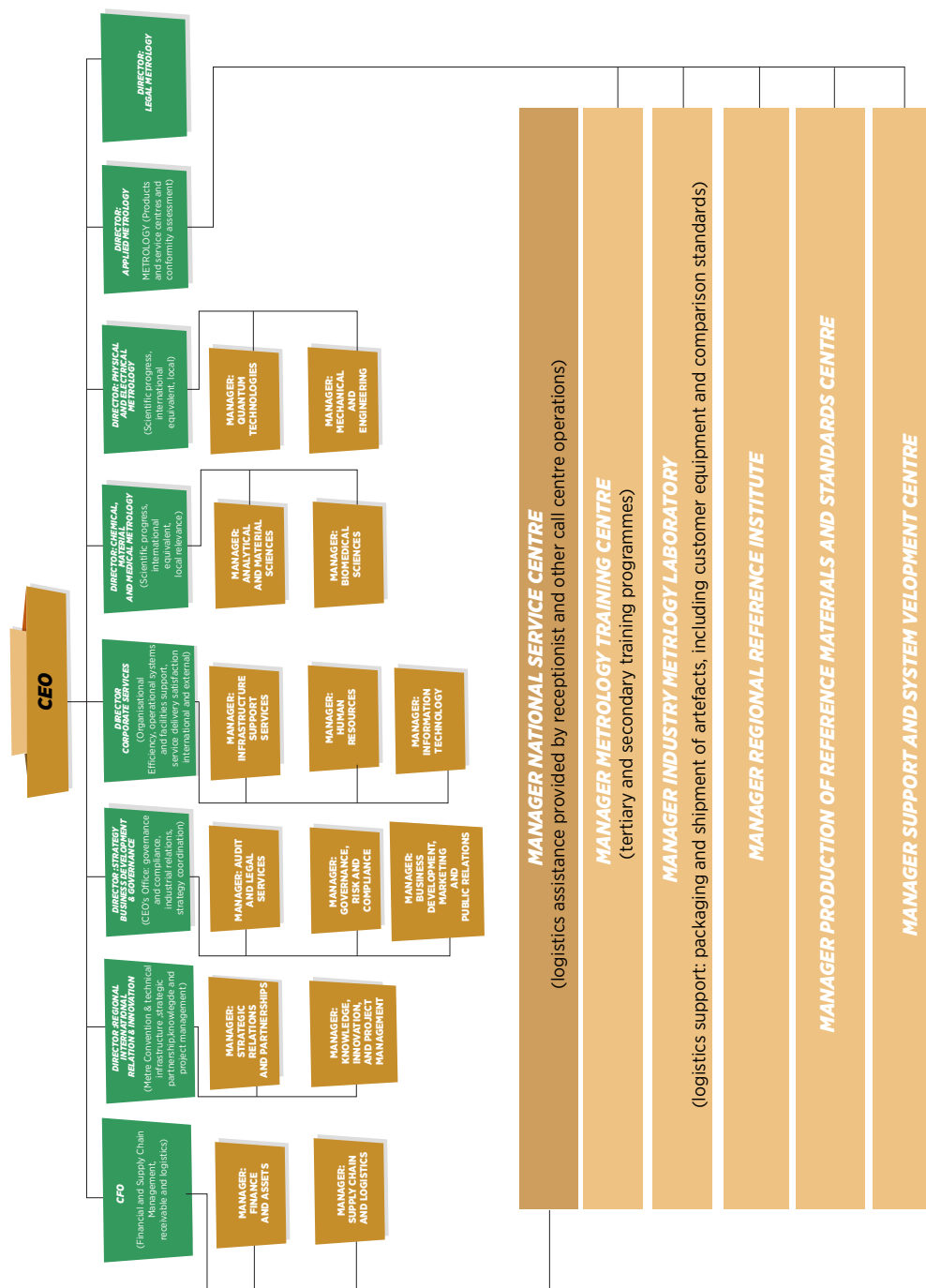


Figure 2.NMISA Technical Organisational structure

NMISA operates its research and development activities in a matrix structure in thematic research programmes, coordinated by a research project office, to deliver outcomes such as improved NMS, certified reference materials and measurement solutions to industry. It also serves to respond to “grand challenges”. The matrix approach also includes projects to establish new services / products in a specific area that includes limited resources from other areas.

This also provides opportunities for staff in the functional areas to pursue career development through assignment to various types of projects within the programmes and allow for easier coordination of student development projects such as the NMISA post-graduate bursary programme.

#### The 7 current Programmes are:

- Revised SI (developing primary realisations of the SI base units in accordance with the 2018 Revised SI)
- Reference Material Programme (in support of food testing, law enforcement, health, etc.)
- Energy Efficiency
- Green Economy
- Manufacturing Competitiveness
- Advanced Measurement Solutions
- Regional Integration

Projects in support of national priorities, are reported under the sector or thematic programme.

Benchmarking at national and international level to establish the required level of NMS and services for the South African and regional economy is also captured per thematic project. The Strategy, Business Development and Governance division provides market and impact information that is required for decision making and ensures legislated reporting to the shareholder.

The dissemination and measurement services are coordinated in dedicated sector-based Centres and strategic partnerships, quality infrastructure interaction, international liaison and regional integration, are conducted in Regional, International liaison and Innovation (RIID).

#### 4.2 Performance delivery environment (external)

The trade of goods and services around the world is the lifeblood of the global economy, and is increasingly important to domestic economic growth, productivity and investment opportunities. For customers to consider trade to be fair and benefit from it, for component manufacturing to be effective and efficient and for effective health care and the protection of the environment, measurements taken in different parts of the world need to be accurate, equivalent to each other, and accepted by each other. Important decisions (economic, environmental, social and medical) are based on measurement results. NMISA contributes to all government key priorities and the National Development Plan (NDP) and has aligned its key programmes to the Re-imagined Industrial Strategy and the goal of the National Industrial Policy Framework to “prevent industrial decline and support the growth and diversification of South Africa’s manufacturing sector”.

NMISA has a very specific role in this context; without a measurement infrastructure it is difficult for the country to manufacture to international specifications and tolerances to ensure the integrity of commodities, locally and for the export market. Competitive manufacturing relies on accurate, internationally comparable measurement that is achieved through the establishment of the “traceability” of the measurement result to the SI or internationally agreed references.

South Africa is a signatory to the Metre Convention, a treaty dating back to 1875. Under this Convention the International Bureau of Weights and Measures (BIPM) was created to act in matters of world metrology, particularly concerning the demand for measurement standards of ever-increasing accuracy, range and diversity, as well as to address the need to demonstrate equivalence between national measurement standards. The SI was also established under the Metre Convention and is overseen by the International Committee for Weights and Measures (CIPM). The whole system is governed by the General Conference on Weights and Measures (CGPM), whose members are the states that signed the Metre Convention.

South Africa adhered to the treaty in 1964 and NMISA in 1999 signed the CIPM Mutual Recognition Arrangement (MRA). The CIPM MRA gives users reliable quantitative information on the comparability of national metrology services and provide the technical basis for wider agreements negotiated for international trade, commerce and regulatory affairs. It is the basis for the international acceptance of national measurement standards and for calibration and measurement capabilities (CMCs) and calibration and analysis certificates issued by NMIs.

As the custodian of the South African NMS, NMISA develops and maintains primary and secondary standards for South Africa and establishes their comparability to other national measurement standards. These standards are disseminated to the South African industry through a range of services and products and in the case of a measurement dispute, reference analyses are provided to ensure conformity.

Regionally NMISA is the main provider of traceability to the SI for Sub-Saharan Africa and in response to the African Continental Free Trade Area, is developing measurement capabilities that would be required nationally and for SADC, in a custom-free trade area.

Nationally NMISA aligned its activities to the Re-imagined Industrial Strategy plan of the 6th Parliament, with a specific focus to support the DTIC’s goal of building mutually beneficial regional and global relations to advance South Africa’s trade, industrial policy and economic development and building the state’s capacity.

A summary of NMISA's contribution to the National medium-term framework and reprioritised areas is below;

Medium Term Strategic Focus (MTSF) Priority	Government's Outcome	Dti's strategic objectives	Nmisa's strategic Objectives	Nmisa's outcomes	NMISA KPI (Refer to page 30-32 of the APP)
Building a capable, ethical and developmental state.	Professional, meritocratic and ethical public administration.	Create a fair regulatory environment that enables investment, trade and enterprise development in an equitable and socially responsible manner.	Metrology consolidation for State-owned entities to provide efficient shared services, Consolidation of Legal Metrology with Scientific metrology.	New and improved National Measurement Standards for primary realisation of units of the Revised SI (Mass, voltage, resistance, temperature) to provide for international equivalence and national confidence in local measurement results  New and improved reference measurement capabilities (Illuminance, gravimetry, energy, dosimetry, radiation therapy, computed tomography, dimensional) to support emerging measurement applications.  Material characterisation for steel and metal fabrication.  Monitoring of greenhouse gasses towards clean air.  Lighting reference standards, measurement and testing capabilities especially for energy saving devices such as LEDs.  Type testing facilities for regulations under the Legal Metrology Act for EHS and Medical measuring devices.	NMISA KPI 2
Economic transformation and job creation.	Creating a conducive environment that enables national priority sectors to support industrialisation, leading to increased exports, employment, and youth- and women owned SMME participation.	Facilitate broad-based economic participation through targeted interventions to achieve more inclusive growth.	Metrology for Industry including assistance to SMEs to provide appropriate services in support of manufacturing, beneficiation and export.	Establishment of a Training Centre with courses provided to SMEs in accurate measurement.  Partnering with the UK, USA and Germany NMIs to provide advanced training to component manufacturers in the automotive, aerospace, medical and environmental fields.  E-learning and Virtual reality-based training modules in accurate measurement  NMISA Regional Reference Institute to assist industry and ready South Africa for increased intra-trade in the AfCFTA.	NMISA KPI 8

Medium Term Strategic Focus (MTSF) Priority	Government's Outcome	Dti's strategic objectives	Nmisa's strategic Objectives	Nmisa's outcomes	NMISA KPI (refer to page 30-32 of the APP)
Education, Skills and health.	Increased access among historically disadvantaged learners to 'niche' subjects such as those focussing on engineering and computing.	Facilitate broad-based economic participation through targeted interventions to achieve more inclusive growth.	NMISA Human Capital Development programme.	Bursaries for increased pipeline of professionals with a focus on Science, Technology, Engineering and Mathematics.  Internships and apprenticeships in applied measurement; host 200 interns and/or in-service trainees over 5 years.  Improved qualification profile.	NMISA KPI 9
A better Africa and world.	Increased intra Africa trade.	Build mutually beneficial regional and global relations to advance South Africa's trade, industrial policy and economic development objectives.	Metrology for regulatory purposes and in support of Government laboratories for compliance and development of regulations, Shortening the traceability Chain for South Africa and the Region.	Africa's first Kibble/watt balance for primary mass realisation to ensure independence of the developed world for mass traceability to the SI.  Reference materials and certified measurement standards for sub-Saharan Africa with a focus on food security and testing of local food matrices for intra and international trade.  Reference Measurements to support the AfCFTA and to retain South Africa's leading position as the largest intra Africa trading partner.	NMISA KPI 1

Table 1



## Revitalisation of Agriculture and Agro-processing Value Chain:

- Determining contaminants in food and beverages in support of food safety and to identify “fake foods”.
- Reference material production facility for Persistent Organic Pollutants (POPS) in fruit and vegetables, mycotoxins in maize and other matrices particular to Sub-Saharan Africa.
- Reference material production facility for Persistent Organic Pollutants (POPS) in fruit and vegetables, mycotoxins in maize and other matrices particular to Sub-Saharan Africa.
- Monitoring dioxins, halogenated flame retardants, pesticides and other contaminants in sediment, soil and water,

## Steel and Metal fabrication:

- A state-of-the art Materials Characterisation facility for accurate surface and bulk measurements of composition, morphology and structural properties of metals and nanomaterials, with a special emphasis on nanoscience/manufacturing and Industry 4.0
- Developing dimensional accuracy evaluation and diagnostic methods for additive manufacturing.

## High tech industries:

- Improve the National Measurement Standards to be on par with the developed world, i.e. at primary standard level, in general support of industrialisation and health services;
- Primary standard for mass (Watt/Kibble balance).
- Primary standard for voltage.
- Primary standard for micro-pressure and low-liquid-flow.
- Standard for ultrasound (medical sonar, etc.)

## Growing the Oceans Economy:

- Underwater acoustics calibration capability to calibrate equipment used to measure distance under water in support of Oceanography, Maritime research, Marine biology, aquaculture etc.
- Reference materials for fish toxins.

## Gas:

- Produce primary gas reference mixtures for gas manufacturers, calibration of emission analyzers and stack emission monitoring.
- Calibrate gas analyses.-
- Perform gas mixture analysis.
- Accurate methods for data usage measurements Digitalisation of the SI units.

## Renewable Energy:

- In support of air monitoring, provide reference measurements to determine sizes of fine to coarse dust particles.
- Primary standard for Resistance measurements (Quantum Hall) in support of the distribution network and diagnostic measurements.
- Produce a prototype solar cell based on silicon nanowire technology for manufacturing in South Africa.
- Assist alternative energies through the provision of measurement standards for smart grids Provide reference measurements for energy
- Efficient lighting to facilitate the full uptake of LED technology by households and industry in South Africa.

## Automotive Industry:

- Maintain dimensional NMS comparable to original manufacturer specifications to effect component manufacturing.
- Provide accurate laser tracker dimensional analysis for large vehicles. Calibrate Coordinate Measurement Machines (CMMs) for component manufacturers and assemblers.

## Clothing, textiles, leather and footwear:

- Provide colour standards and measurements
- Develop and provide dimensional standards and measurements.

## Chemicals and Plastics:

- Provide Inorganic analysis for additives and contaminants.
- Specialised materials characterisation techniques to analyse plastic additives and thin layers.

## **NMISA** also unlocks the potential of SMEs and Co-operatives:

- Virtual Reality based training modules in accurate measurement.
- Training SMEs in accurate measurement and the Quality Infrastructure.
- Providing direct measurement assistance to SMEs with the potential to export.

## SMEs and Co-operatives:

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### Chemicals and Plastics:

- Provide Inorganic analysis for additives and contaminants.
- Specialised materials characterisation techniques to analyse plastic additives and thin layers.

### And in support of Health, Environmental Monitoring, Law enforcement and Customer protection:

- Monitoring greenhouse gasses towards clean air.
- Assessing the purity of raw chemical substances to prevent harmful substances entering products,
- Classification of biodegradable plastics to ensure correct labelling, recycling, etc,
- Ensuring correct dosage when ionising radiation (x-rays, etc.) are used for diagnostics (x-ray imaging) or treatment (irradiation of cancerous tumours),
- Ensuring accurate dosimetry measurement (dosage monitoring) of workers exposed to radiation (miners, hospital x-ray and radiation centres, nuclear power plants, research facilities, etc.),
- Provide and enable government department laboratories to do accurate blood alcohol measurements; accurate speed measurements, reference materials for forensic analysis, etc.

Contribution to the re-imagined industrial strategy, Quality of Life, Manufacturing and Industrial Development, Trade and Commerce, Safety and Security, Energy Saving and Green Energies, Environmental Protection, Food Safety, Information and Telecommunications and regional development is proactively supported by the technical divisions and is guided overall by the **four strategic outcome orientated goals** that support its mandate, mission and vision, and which in a broader sense contributes to the objectives of the **dtic** and the implementation of the National Development Plan.

Technological advances over the past decade are placing stringent demands on metrology. New areas in metrology, such as nanotechnology, optical techniques, quantum-based technologies, material sciences, etc. are developing rapidly and require new they measurement methods and measurement standards. In response, NMISA is investing more funds into research activities and are actively pursuing opportunities for collaboration with their peers to pool resources. NMISA thus engages in research towards the improvement of existing standards and to facilitate the development of new measurement standards to address emerging national needs.



#### 4.2.1 International and Regional

NMISA ensures that the interests of South Africa, SADC and Africa are protected at the highest possible level internationally. The CIPM has established ten Consultative Committees (CCs) to oversee and arrange for the comparison of national measurement standards. The CCs bring together the world's experts in their specified fields as advisers on scientific and technical matters and are pivotal in the arrangement of key comparisons that compare the measurement capabilities and determine the measurement equivalence of national measurement standards. NMISA has full membership to nine of the ten CCs, guest membership of the 10th (Consultative Committee for Units) and membership of the CIPM. NMISA's position has further been strengthened through NMISA holding the Presidency of the CIPM.

Membership of the CCs allows NMISA to give input to strategies and participate in the comparison of NMS and measurement capability at the highest level, i.e. a direct comparison to the NMS of developed countries and upcoming developing countries, that includes all the major trading partners of South (and Southern) Africa. In the absence of membership to a CC and its working groups, NMISA will have to wait for a second round of comparisons in a regional metrology organisation (RMO) such as AFRIMETS, where the "second tier" NMIs compare their standards

As the only NMI in Africa with membership of all the CCs, NMISA provides the link to the international measurement system to Africa and thus plays a leading role in the development of metrology infrastructure in Africa, especially in support of South Africa's immediate neighbours in the SADC. This is crucial for the successful implementation of regional free trade agreements. This role is emphasised in the dtic's strategic goals and the South African contribution towards mutual acceptance of testing results in the region (Regional Integration).

NMISA uses its leadership role in SADC MET and AFRIMETS, the sub-regional and continental RMOs, to ensure that the interests of the country are protected and that trade deals are fair and just.

#### 4.2.2 The Technical Measurement Environment

Participation in international activities at CC and Technical Committee (TC) levels serve to benchmark South Africa's capability to compete in measurement equivalence that directly impacts on our ability to disseminate traceability to the country.

To do this, metrologists must be extremely proficient at measurement science and techniques. It also requires sophisticated techniques, time and money and very good planning to align with the international call for participation and the availability of scientists and resources in the laboratory. This must be balanced with national collaborative projects and research projects that are on-going as part of the performance requirements in each laboratory.

Training and development of young scientists remains critical as the metrology skills are not readily available in the market; especially young black professionals. An integrated training and development plan has been developed to assist each metrologist, whether experienced or new in the field, in improving skills and ensuring a pipeline of young metrologists through the bursary program, training in metrology and internships. These young professionals are provided with skills suited to industry and where possible appointed as metrologists. It is in the ambit of those young professionals to grasp the learning opportunities afforded them.

#### 4.2.3 The National Role

The NMS maintained and disseminated by NMISA underpins and/or supports directly and indirectly the daily activities of South Africa on almost all levels. As one of the dti's Technical Infrastructure (TI) entities, the activities of NMISA are critical to the success of the other TIs. Standardisation, metrology, conformity assessment and accreditation are the key issues in the implementation of free trade agreements between countries/economic trade blocks. NMISA is implementing projects to develop new NMS, services in line with industry and the fulfilment of metrological requirements placed on NMIs towards the implementation of the AfCFTA. NMISA plays a role in providing technical support for many other acts and regulations, ranging from the Occupational Health and Safety Act (Act 85 of 1993) to the Atomic Energy Act (Act 90 of 1967). It serves the more than 1300 accredited laboratories in South Africa and provides measurement and measurement assistance to over 400 industrial companies.

The national significance of NMISA is illustrated as not only the link between the international measurement system and the South African measurement system, but in the vertical integration that allows South Africa to have a credible domestic measurement system to facilitate and ensure trade, commerce, manufacturing, services and consumer and environmental protection.

## 4.3 ORGANISATIONAL DELIVERY ENVIRONMENT (INTERNAL)

### 4.3.1 The Organisation

NMISA manages its Research and Development activities in a crosscutting fashion in 7 programmes;

- Redefinition of the SI (Primary Measurement Standards in Africa)
- Quality of Life
- Reference Materials and the Green Economy
- Energy Efficiency
- Manufacturing Competitiveness
- Advanced Measurement Solutions
- Regional and International Integration

The maintenance of the national measurement standards is performed in two technical Divisions, Chemical, Materials & Medical Metrology, and Physical & Electrical Metrology.

The dissemination activities (products and services) are delivered by the Applied Metrology Division through the centres whose main clients are government laboratories, SOEs and industrial and regional laboratories (refer to figure 2).

The strategic partnerships with organs of the Metre Convention, HEIs, Research institutes, the Technical infrastructure, regional and international institutes and knowledge management, are managed by the Regional, International Partnerships and Innovation Division.

Overall Strategy is coordinated, and market intelligence is provided by a Business Development Division.

The technical activities are further guided and supported by the Finance, Business Development and Corporate Services Divisions.

This is achieved by ensuring a safe working environment; the identification of laboratory and workplace hazards/ aspects and ensuring environmental sustainability, through training of staff in safety awareness; inspections; and compliance with the relevant legislation. The laboratories which can be accredited by SANAS are officially accredited to ISO/IEC 17025 and in the case of chemistry, ISO/IEC 17034 for production of certified reference materials. Accreditation to ISO/IEC 17043 (for conducting proficiency testing schemes) is being attained for the laboratories officially providing PTs. Three laboratories can't be accredited yet due to a lack of national expertise. They declare their competency according to the CIPM MRA rules.

This is achieved by ensuring a safe working environment; the identification of laboratory and workplace hazards/ aspects and ensuring environmental sustainability, through training of staff in safety awareness; inspections; and compliance with the relevant legislation. The laboratories which can be accredited by SANAS are officially accredited to ISO/IEC 17025 and in the case of chemistry, ISO/IEC 17034 for production of certified reference materials. Accreditation to ISO/IEC 17043 (for conducting proficiency testing schemes) is being attained for the laboratories officially providing PTs. Three laboratories can't be accredited yet due to a lack of national expertise. They declare their competency according to the CIPM MRA rules.

### 4.3.2 Technical activities

NMISA has identified the regulatory requirements applicable to its services, operations and products in order to maintain regulatory compliance. NMISA has achieved certification of its occupational health and safety (OH&S) and EHS management system guided by ISO 14001 and OHSAS 18001 which specifies requirements for Environmental management systems (EMS) and an OH&S management system, to enable NMISA to control its OH&S risks/ environmental aspects and improve its OH&S and EMS performance.

#### Calibrations:

Delivering direct traceability to the national measurement standards (NMS), NMISA serves the accredited calibration and testing laboratories by performing calibrations to the highest accuracy (smallest uncertainty). Calibration is also provided directly to industry in cases where there are no accredited calibration laboratories, or the desired accuracy can only be provided by NMISA.

#### Reference measurements and certification of reference materials:

NMISA provides reference measurements and analysis according to its calibration range and services. In addition, NMISA has built capability to value assign chemical samples and gas mixtures for customers, including purity. This capability allows NMISA to produce pure standard CRMs or calibration solutions and Primary Reference Gas Mixtures (PRGMs) that are internationally recognised and accepted.

#### Measurements, testing and analysis:

NMISA offers advanced measurement services to industry. This includes method development for customers to assist with problem solving and performing analysis in support of research projects.

### Training and consultancy:

The expertise residing in the staff of NMISA is an important contribution to the development of a skilled and capable workforce through training in measurement science. NMISA assists SADC and Africa in capacity building by providing consultation services and training to their metrologists and provide a national metrology training academy for South African metrologists and analysts. Special development projects to assist SMEs have been created. NMISA staff is also involved as invited lecturers in graduate courses at numerous universities and is the official partner of the Metrology and Applied Science Research Unit (MeASURE) of the University of Cape Town.

The technical strategic objectives of NMISA can be linked to the strategic thrusts and are delivered by the research programmes.

Research, International and Infrastructure Development (RIID) ensures that NMISA is appropriately linked to the international metrology fraternity, fosters collaboration with other NMIs and source funding from development partners. It coordinates the activities of NMISA in the other Technical Infrastructure institutions and manages the relationship with the sub-regional (SADCMET) and regional (AFRIMETS) metrology organisations.

A photograph of laboratory glassware, including a large Erlenmeyer flask in the foreground and several graduated cylinders in the background, all containing liquids of different colors (yellow, green, blue). The image is slightly blurred and has a warm, yellowish tint.

# PART C: MEASURING OUR PERFORMANCE



## 5 SUB-PROGRAMMES AND PLANS

### 5.1 Research programme contributions

NMISA contributes to government key priorities and the national outcomes and has aligned its key programmes to the IPAP priority sectors and the NSI goals with a special focus on:

- Units, NMS and measurement capabilities (shortening the traceability chain for Africa, revised SI).
- Reference Materials (feed and food safety, African specific matrix CRMs, etc).
- Manufacturing competitiveness (advanced manufacturing, agro-processing and beneficiation).
- Green Economy (environmental monitoring and cleaner production).
- Energy Efficiency (accurate measurement and development of energy saving technologies).
- Quality of Life (medical diagnostics and treatment, law enforcement, environmental health and Safety, etc).
- Advanced Measurement Solutions (in support of national priority programmes such as the SKA, infrastructure development, novel measurement techniques based on Structured light, etc).
- Regional Integration (advancement of conformity assessment, AfCFTA, connection of the national and regional metrology system internationally, etc).

The Programme and AMD outputs for 2020-2023 are summarised below:

Programme	Description	Output
Units and Revised SI	Have primary realisation of 6 of the 7 base SI units.	Kibble (Watt) balance as new primary standard for mass - Primary thermometer to replace the ITS-90 temperature scale once the new definition for the Kelvin is implemented (after 2021). - Maintain 4 units (Ampere, Second, Candela and Metre).
Reference materials	Calibration solutions, primary reference gas mixtures and matrix reference materials for accurate testing of food, feed, environmental monitoring, physical reference standards.	-PRGMs for stack emission and automotive emission -Matrix reference materials for main feed and foodstuffs such as maize, wheat, peanut butter, coffee, tea, etc. -Particle RMs for nano manufacturing and atmospheric monitoring.
Manufacturing competitiveness	Support of the manufacturing industry through the calibration of measuring standards and measurements support of manufactured parts.	-Road traffic speed measurements.
Green Economies	All measurement technologies associated with the green economy drive, green production, environmental monitoring, etc.	-Natural gas primary reference gas mixtures. -Low mole fraction gas mixtures.



Programme	Description	Output
Energy Efficiency	Measurement standards and solutions required by all energy sources as well as for energy saving technologies.	<ul style="list-style-type: none"> <li>-LED reference laboratory.</li> <li>- Measurement capability to accurately realise the defined fixed point of ITS-90. for contact thermometry.</li> </ul>
Quality of Life	Calibration, measurement solutions, testing for medical, health and safety, law enforcement, etc.	<ul style="list-style-type: none"> <li>- Dosimetry in diagnostic radiology.</li> <li>- Radioactivity in Environment.</li> <li>-Calibration of chambers used in nuclear medicine.</li> <li>-Calibration of medical devices.</li> <li>-Medical gas calibration.</li> <li>-PT schemes.</li> <li>-Audit measurements for some medical devices.</li> <li>- Traceability for microbiological testing. through a designated entity or by NMISA.</li> </ul>
Advanced Measurement Solutions	Combines research and development projects where a new measurement technique or system requiring substantial innovation is required to meet scientific or industrial challenges.	<ul style="list-style-type: none"> <li>- Additive manufacturing</li> <li>- African time network</li> <li>- new measurement methods with structured light (Revised SI and applied metrology).</li> </ul>
Applied Metrology Division	Increase impact of NMISA products and services for revenue generation.	<ul style="list-style-type: none"> <li>-Distribution facility for NMISA products.</li> <li>-Contract analysis for government, SOEs, Industry.</li> <li>-Sales of products and services.</li> <li>-Training Centre in Metrology for Africa.</li> <li>-Consultancy to the region.</li> <li>-Provision of traceability to the SI to SADC.</li> <li>-Calibration of African NMI national standards.</li> <li>-Development of Measuring Instruments for developing countries.</li> <li>-A sustainable national audit programme for radiotherapy centres.</li> <li>- Mobile data measurement solutions (systems support centre).</li> </ul>
Regional Integration and Innovation	Links the SA and Regional measurement systems to international measurement system through the participation in the metre convention and its organs, the CIPM and BIPM. This is crucial for a successful CFTA.	<ul style="list-style-type: none"> <li>- Metrology in CFTA and a continental system for the acceptance of measurement results amongst African countries.</li> <li>- Quality system for African NMIs.</li> <li>- Strategic partnerships with HEIs, Research institutes and NMIs.</li> <li>- Collaborations with NMIs.</li> <li>- System for mutual recognition of measurement capabilities of AfCFTA member.</li> </ul>

Table 2

## 5.2 Programme budgets

Research programme budgets and outputs are shown for the MTEF period, i.e. 2020 to 2022. The project details with specific deliverables and dates are available in the Scientrix planning system and the Programme business plans for 2020/21.

## 6 PROGRAMME RESOURCE CONSIDERATIONS

### 2020/21 to 2022/23 budget estimates

NMISA consolidated budget 2020/21-2022/23			
	2021/22 R'000	2021/22 R'000	2022/23 R'000
	5.6% (existing)	5.5% (existing)	5.5% (existing)
<b>Revenue</b>	<b>312 133</b>	<b>329 032</b>	<b>341 841</b>
Transfers received	258 513	272 731	282 838
Rendering of service	35 824	37 615	39 496
Investment income	13 663	14 346	15 035
<b>Expenditure</b>	<b>312 133</b>	<b>329 032</b>	<b>341 841</b>
<i>Administrative and operating</i>			
Expenditure	73 620	77 300	81 009
Employee cost	151 840	162 468	173 841
Repairs and maintenance	9 883	10 377	10 875
Recapitalisation project	75 781	77 828	75 006
Audit fees	1 009	1 059	1 110



### Expenditure Estimates

R thousand	Audited Outcome			Approval budget	Average Growth	Expenditure total/Average%	Medium-term Estimate			Average growth Rate %	Expenditure total/Average%
	2016/17	2017/18	2018/19				2021/21	2021/22	2022/22		
Administration, Keep/Maintain & dissemin	92 641	74 424	76 397	95 358	1,0%	39,3%	101 164	107 283	113 683	6,0%	42,8%
	91 677	149 859	170 881	126 959	11,5%	60,7%	135 188	143 921	153 152	6,5%	57,2%
	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
<b>Total Expense</b>	<b>184 318</b>	<b>224 283</b>	<b>247 278</b>	<b>222 317</b>	<b>6,4 %</b>	<b>100,0%</b>	<b>236 352</b>	<b>251 204</b>	<b>266 835</b>	<b>6,3%</b>	<b>100,0%</b>

## Expenditure Estimates

Statement of financial performance	Budget	Audited Outcome	Budget	Audited Outcome	Budget	Audited Outcome	Budget	Approval Budget	Outcome Budget Average %	Average Growth rate %	Expenditure Average %	Medium Term Estimate			Average Growth Rate%	Expenditure total Average %
R thousand	2016/17		2017/18		2018/19		2019/20		2016/17 -2019/20			2020/21	2021/22	2022/23	2019/20	2022/23
Revenue																
Tax Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-tax Revenue	25 651	28 066	36 010	31 499	40 372	34 731	42 632	51 018	100.4%	22.0%	12.7%	53 824	56 515	59 341	5.2%	17.4%
Sales of goods & Services other than Capital assets of which:	13 151	12 089	20 010	16 365	31 561	21 424	33 328	38 018	89.6%	46.5%	7.7%	35 824	37 615	39 496	1.3 %	11.9 %
Administrative fees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sales by market Establishments	131 51	12 089	20 010	16 365	31 561	21 454	33 328	38 018	89.6%	46.5%	7.7%	35 824	37 615	39 496	1.3%	11.9%
Other sales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other non-tax revenue	12 500	15 977	16 000	15 134	8 811	13 307	9 304	13 000	123.2%	-6.6%	5.0 %	18 000	18 900	19 845	15.1 %	5.5 %
Transfer Received	264 193	264 193	252 803	252 803	232 784	232 784	245 036	245 036	100.0 %	-2.5 %	87.3%	254 379	269 377	278 032	4.3 %	82.6%
Total Revenue	289 844	292 259	288 813	284 302	273 156	267 515	287 668	296 054	100.1%	0.4%	100.0%	308 203	325 902	337 373	4.5%	100.0%

### Expenditure Estimates

Statement of financial performance	Budget	Audited Outcome	Budget	Audited Outcome	Budget	Audited Outcome	Approval Budget	Outcome Budget Average %	Average Growth rate %	Expenditure Average %	Medium Term Estimate	Average Growth Rate%	Expenditure total Average %
R thousand	2016/17		2017/18		2018/19		2019/20	2016/17 -2019/20		2020/21 2021/22 2022/23		2019/20	2022/23
Expenses													
Current Expenses	161 221	184 318	184 262	224 283	204 798	247 278	217 733 222 317	114,3%	6,4%	100,0%	240 463 252 487 265 109	6,0%	100,0%
Compensation of Employee	90 228	101 154	111 302	114 554	122 653	123 365	131 239 141 906	105,6%	11,9%	54,9%	148 983 156 433 164 253	5,0%	62,4%
Good & Services	70 993	59 399	72 960	75 010	82 145	80 693	86 494 80 411	94,5%	10,6%	33,6%	91 480 96 054 100 856	78%	37,6%
Depreciation	-	23 765	-	34 719	-	43 220	-	-	-100%	11,5%	-	-	-
Interest, individual & Rent on land	-	-	-	-	-	-	-	-	-	-	-	-	-
Transfers & Subsidies	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	161 221	184 318	184 262	224 283	204 798	247 278	217 733 222 317	114,3%	6,4%	100,0%	240 463 252 487 265 109	6,0%	100,0%
Surplus/Deficit	128 623	107 941	104 551	60 019	68 358	20 237	69 935 73 737		-11,9%		67 740 73 415 72 264	-0,7%	

## Expenditure Estimates

Financial Position	2016/17		2017/18		2018/19		2019/20		2016/17 - 2019/20		Medium Term Estimate			Average Growth Rate%		Expenditure total Average %
	Budget	Audited Outcome	Budget	Audited Outcome	Budget	Audited Outcome	Budget estimate	Approved Budget	Outcome Budget Average %	Average Growth rate %	Net change total :Average	2020/21	2021/22	2022/23	2019/20	
Carrying Value of Assets of which :	128 624	345 118	104 551	406 163	68 358	445 146	69 935	73 737	341 9%	-40,2%	73,9%	67 740	73 415	72 264	0,7%	100,0%
Acquisition of Asset	(128 183)	( 176 131)	( 101 871)	( 95 229)	(65 176)	( 80 805)	(66 58)	(72 733)	117,5%	-25,5%	-39,5%	(72 593 )	(74 517)	(71 697)	-0,5%	-101,6%
Investment	-	1 640	-	-	-	605	-	-	-	-100%	0,1%	-	-	-	-	-
Inventory	-	370	-	172	-	5 062	-	-	-	-100%	0,2%	-	-	-	-	-
Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accrued Investment interest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Receivable & Payments	-	15 263	-	22 825	-	17 998	-	-	-	-100,0%	2,3%	-	-	-	-	-
Cash & Current Equivalents	-	198 719	-	189 882	-	180 471	-	-	-	-100,0%	23,3%	-	-	-	-	-
Non - Current assets held for sale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Defined benefits-plan assets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Derivatives financial instruments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total Assets</b>	<b>128 624</b>	<b>561 110</b>	<b>104 551</b>	<b>619 042</b>	<b>68 358</b>	<b>649 282</b>	<b>69 935</b>	<b>73 737</b>	<b>512,3%</b>	<b>-49,2%</b>	<b>100,0%</b>	<b>67 740</b>	<b>73 415</b>	<b>72 264</b>	<b>-0,7%</b>	<b>100,0%</b>

Financial Position	Budget	Audited Outcome	Budget	Audited Outcome	Budget	Audited Outcome	Budget estimate	Approval Budget	Out-come Budget Average %	Average Growth rate %	Expenditure Average %	Medium Term Estimate			Average Growth Rate%	Net change/ total: Average (%)
	2016/17		2017/18		2018/19		2019/20		2016/17 -2019/20			2020/21	2021/22	2022/23	2019/20 2022/23	
Accumulated Surplus (deficit)	128 624	525 562	104 551	585 580	68 358	605 818	69 935	73 737	482.1 %	-48.0%	95.4%	67 740	73 415	72 264	-0.7%	100.0%
Capital & Reserves	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capital Reserve fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Borrowings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Finance Lease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accrued Interest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deferred Income	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trade & other payables	-	20 334	-	10 628	-	17 747	-	-	-	100.0%	2.0%	-	-	-	-	-
Benefit payable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capitalised value of pension																
Taxation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Provisions	-	15 214	-	22 834	-	25	-	-	-	-100.0%	2.6%	-	-	-	-	-
Managed fund (e.g poverty alleviation fund)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Derivatives financial instruments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Equity & Liability	128 624	561 110	104 551	619 042	68 358	649 282	69 935	73 737	512.3%	-49.2%	100.0%	67 740	73 415	72 264	-0.7%	100.0%
Contingent Liability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## 7. NMISA PERFORMANCE INDICATORS

NMISA has adopted the balanced scorecard approach to set and measure performance targets. This scorecard addresses the maintenance of the national measurement standards and the administrative support provided to ensure the outputs of the organisation. Four key components are addressed, namely International agreements and participation, stakeholder/ customer (technical), organisational development (learning and growth) and financial and business process perspective.

### National obligations:

NMISA provides for the use of the measurement units of the SI and certain other units, the designation of national measurement standards and units, and for keeping and maintaining the national measurement units and standards. This also includes improving existing NMS and methods and developing new NMS, secondary standards and new reference methods.

### International participation and equivalence:

As part of the Metre Convention system, NMISA ensures international measurement comparability by participating in the activities of the CIPM. This includes active participation in the Consultative Committees and demonstrated measurement capabilities as published in the BIPM Key Comparisons Database (KCDB).

### Internal organisation (learning and growth)perspective:

Internal growth perspective addresses human resources, thereby demonstrating the organisation's capacity to deliver on its mandate by maintaining a skilled, competent and transformed work force.

### Key priorities include:

- Improve core skills and qualifications
- Reduce employee turnover
- Transformation
- Improve job satisfaction
- Improve internal communications in the HR function

### Stakeholder/customer perspective (technical):

Includes scientific and technical outputs, products and services developed to support the South African commerce and industry in a fast-paced global economy.

### Financial and business process perspectives:

The focus is on the financial performance and sustainability of the organisation.

### Key priorities that are addressed include:

- Financial growth and stability are ensured by broadening the revenue mix
- Effective financial controls
- Develop and update policies and procedures
- Improving of internal processes, aligning and integrating systems and processes
- Improving internal communications
- Establishing long-term multi-divisional research programmes
- Implementing systems to manage and protect NMISA's intellectual property

The performance indicators of the balanced scorecard are supported by Divisional Annual Performance/ Business Plans and deliverables. The main activities, in line with the strategy that has been presented, to attain these key performance indicators are summarized below in the tables that follow:

## 7.1 PERFORMANCE INDICATORS AND PERFORMANCE TARGETS PER PROGRAMME

NMISA has aligned its key performance indicators to support the new strategic thrusts for the organisation and the new business model.

### 7.1.1 Programme Performance Indicators 2020/21

Output	Performance Indicator	Actual Performance			Estimated Performance	Medium term targets		
		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2202/23
Outcome: Shorten the Traceability Chain for Africa by maintaining the Units and NMS at an Internationally Recognised level								
.Implementation of the revised International System of Units (SI).	1. Number of SI base units realised	New KPI	New KPI	New KPI	6	6	6	6
	2. Number of new and improved NMS and reference materials and reference methods	18	15	19	20	15	17	19
Linking the National and Regional measurement system Internationally	3. Number of memberships maintained and active participation in the CIPM and its consultative committees	10	10	9	10	10	10	10
	4. Number of ILCs and PTS organ-ised and completed	New KPI	New KPI	New KPI	9	21	16	15
	5.Percentage metrological services covered by CMCs	New KPI	New KPI	New KPI	80%	80%	83%	85%
Outcome : Ensure an Effective Dissemination of the Units and NMS to National and Regional laboratories								
Linking the National and Regional measurement system Internationally	6. Number of accredited laboratories and new laboratory accreditations	20	20	21	25	25	25	25
	7. Number of metrologists trained	146	66	96	100	110	246	261
	8. Number of courses provided including SMEs	17	14	24	18	33	44	46
	9. Number of interns and in-service trainees hosted	20	15	20	15	20	24	23
	10. Income generated	R12 089 000	R20 642 033.47	R22 147 616.13	R38 018 270	R35 824 000	R37 615 000	R39 496 000
	11. Percentage actual expenditure to budget	98%	New KP	98%	98%	98%	98%	98%
Outcome : To provide Metrology for Regulatory Purposes								
	12.Revised Measurement Act to support and contribute to national regulation	New KPI	New KPI	New KPI	Review and revise the measurement Act	Participate in the dti technical infrastructure (TI) review	-	-

Output	Performance Indicator	Actual Performance			Estimated Performance	Medium term targets		
		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Outcome: Metrology Services for Government and State-Owned Enterprises								
Shared Metrology Services for Government Departments and SOEs	13. Number of government departments and SOEs serviced by NMISA	New KPI	New KPI	New KPI	3	2	4	6
	14.Percentage increase in visibility of NMISA	New KPI	New KPI	New KPI	20% increase in visibility	20% increase in visibility	20% increase in visibility	20% increase in visibility
Linking the National and Regional measurement system Internationally	15.Percentage customer satisfaction	98%	Less than 5%	≥95%	≥95%	≥95%	≥95%	≥95%

Table 4

### 7.1.2 Quarterly targets 2020/21

Output	Performance Measure or Indicator	Baseline	Annual Target 2020/21	1st Quarter Milestone	2nd Quarter Milestone	3rd Quarter Milestone	4th Quarter Milestone
<b>Outcome 1: Shorten the Traceability Chain for Africa by maintaining the Units and NMS at an Internationally Recognised level</b>							
Implementation of the Revised International System of Units (SI).	Number of SI base units re-validated	6	Realise 6 Base Units of the SI	Project plans for realisation of 6 base units	Progress reports on realisation of 6 base units	Progress reports on realisation of 6 base units	Six (6) base units realised
	Number of new and improved NMS and Reference Materials and reference methods	20	15	0	0	0	15
Linking the national and regional measurement system Internationally	Number of memberships maintained	10 CCs	Maintain membership of 10 consultative committees	10 maintained	10 maintained	10 maintained	10 maintained
		9	Organise and complete 22 ILCs and Proficiency testing schemes	0	1	3	17
	Percentage of metrological services covered by CMCs (i.e. internationally accepted)	To be determined 31 March 2020	80 % of Metrological Services covered by CMCs	70%	73%	79%	80%

Output	Performance Measure or Indicator	Baseline	Annual Target 2020/21	1st Quarter Milestone	2nd Quarter Milestone	3rd Quarter Milestone	4th Quarter Milestone
<b>Outcome 2: Ensure an Effective Dissemination of the Units and NMS to National and Regional laboratories</b>							
Provide for the Measurement needs of RSA and the region.	Number of accredited laboratories maintained and new laboratory accreditations	25	25 Maintained	25 Maintained	25 Maintained	25 Maintained	25 Maintained
	Number of metrologists trained	100	110 Metrologists Trained	1	0	50	59
		22	33 Courses provided including SMEs	8	9	5	11
	Number of courses provided including SMEs	15 hosted	20 hosted	15 hosted	20 hosted	20 hosted	20 hosted
	Number of Interns and in-service trainees hosted		R35 824 000	R3 832 540	R6 389 810	R7 421 880	R18 179 770
	Actual expenditure to budget	98%	98%	10%	40%	60%	98%
<b>Outcome 3: To provide Metrology for Regulatory Purposes</b>							
Efficient National Regulations	Revised Measurement Act to support and contribute to national regulation	Current Act no 18 of 2006	Participate in the dti Technical Infrastructure (TI) review	Assist the consultant with research to understand the NMISA mandate and reviewing how current legislation, or lack thereof impacts on the efficient execution of its role and function.	Engage with the dti, the consultant and other TI entities to review the role of the TI institutes, and identify gaps and overlaps in the implementation of the legislation.	Update to the Board on the outcomes of the independent review process.	Submission to the Board for endorsement of the (potential) recommended changes to the Act.
<b>Outcome 4: Metrology Services for Government and State-Owned Enterprises</b>							
Shared Metrology Services for Government Departments and SOEs	Service Provider for Government Departments and SOEs	3	2	0	1	0	1
	20% increase in visibility of NMISA	36%	20% increase in visibility of the NMISA in South Africa and the Region	5% increase	5% increase	5% increase	5% increase
	Percentage customer satisfaction	96%	≥95%	≥95%	≥95%	≥95%	≥95%

Table 5

## 8 UPDATED KEY RISKS

OUTCOME	KEY RISK	RISK MITIGATION
Funds for a new NMISA building.	Inability to secure funding from National Treasury for new NMISA building to support mandate.	NMISA is recapitalising the organisation by procuring equipment that would fit the current structure and renovates the rented space.
Regulators and government using NMISA services.	Regulators and government laboratories not using NMISA services.	Revision of the Measurement Act.
Achievement of NMISA strategy	Inability to deliver effectively on the revised direction.	NMISA has implementation plans with clear objectives for the strategy.
The use of NMISA services by government, SOEs to enhance trade.	Lack of uptake by the market, SMMEs and government agencies responsible for trade and business development.	Revision of the Measurement Act.
A sustainable organisation.	Sustainability risk.	NMISA will implement its marketing strategy, NMISA programmes also speak to revenue generation, the revenue targets have been increased.

Table 6

## 9 INFRASTRUCTURE PROJECTS

### Recapitalisation

NMISA's ability to develop new NMS and to maintain and or improve the existing NMS to levels required by industry is under threat from an ageing infrastructure. This includes the NMS as well as the building infrastructure.

The NMS and other standards are continually reviewed to ensure that they still meet the needs of the South African industry through engagement with industry, stakeholders through technical advisory forums and participation in national interest forums. *"Typically, the accuracy required of national measurement standards doubles every ten years."* With doubling requirements, modern metrology laboratories need to be custom built with advanced environmental control; clean power supplies; surgical grade clean rooms and anti-vibration flooring.

Infrastructure should further be designed and planned in such a way that it can be upgraded at regular intervals to meet increasing stringent environmental conditions and to stay abreast of technology developments in measurement sciences.

The result is that the equipment replacement strategy of NMISA needs to take cognisance of not only the replacement of aged equipment, but also that instrumentation procured now may also be obsolete in three to five years.

NMISA is located on the CSIR's Scientia Campus in Pretoria, still occupying the metrology laboratories, as when the CSIR National Metrology laboratory, the forerunner of NMISA, took occupation of the site in the 1960's. With no major building infrastructure investment in its history; NMISA became a tenant of the premises in 2007, the building infrastructure has reached its technical limit of modifications.

In response, NMISA motivated for a recapitalisation of the NMS and new building infrastructure and a project was registered at National Treasury as a PPP Project, the transaction advisor and the project officer were appointed for preparation of a feasibility study towards re-capitalisation. With the assistance of the PPP unit of National Treasury, a feasibility study has been finalised for the best model for the new building infrastructure, and for a sustainable model for the continuous upgrade and maintenance of the NMS.



# PART D: TECHNICAL INDICATOR DESCRIPTIONS

## 10. INDICATOR PROFILES

A summary of Performance Indicators developed for NMISA appears in section 7.1.2 with a more detailed overview in the following sections:

**Table 6. Performance Indicators**

Number	Indicator Description	Outcome
1	Realisation of the SI base Units.	Shorten the Traceability Chain for Africa by maintaining the Units and NMS at an Internationally Recognised level.
2	New and improved national measurement standards and reference materials and methods.	
3	Represent the Region Internationally at the organs of the Metre Convention & other Measurement Treaties.	
4	Number of ILCs and PTS organised.	
5	Calibration and Measurement Capabilities (CMCs) Recognised Internationally.	
6	Activities to support laboratories accredited to ISO 17025, Laboratories accredited to ISO 17034 and laboratory for running PT scheme on the requirements of ISO 17043.	Ensure an Effective Dissemination of the Units and NMS to National and Regional laboratories.
7	Number of Metrologist trained.	
8	Number of Courses presented.	
9	Number of interns and in-service trainees hosted.	
10	Income generated from dissemination activities.	
11	Actual expenditure to Budget .	
12	Update Measurement Act to support and contribute to national regulation	To provide Metrology for Regulatory Purposes.
13	Service Provider for Government Departments and SOEs.	Metrology Services for Government and State-Owned Enterprises.
14	Increase visibility of NMISA.	
15	Percentage customer satisfaction.	



## 10.1 DETAILED INDICATOR DESCRIPTIONS

Indicators were defined according to the *Revised Framework for Strategic Plans and Annual Performance Plans document*, published by National Treasury.

### Technical indicator descriptions

KPI 1: REALISATION OF THE SI BASE UNITS	
Indicator title	<i>Realisation of the SI base units</i>
Definition	Realisation of the 6 base units; 2 primary base units (Length and temperature) and 4 secondary base units (Mass, Time, Candela and Ampere).
Source of data	Plans for the development and/or realisation of the SI, quarterly progress reports on the 6 base units..
Method of calculation / Assessment	Simple count
Means of verification	Plans and reports
Assumptions	Equivalence to international standards, Implementation of the Revised International System of Units (SI)
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Non-cumulative
Reporting cycle	Quarterly
Desired performance	The South African measurement units need to be equivalent internationally
Indicator responsibility	Physical Electrical Metrology division

KPI 2: NEW AND IMPROVED NMS AND REFERENCE MATERIALS AND REFERENCE METHODS	
Indicator title (Output)	<i>New and improved NMS and reference materials and reference methods</i>
Definition	The number of new and improved NMS, reference methods and reference materials developed. NMISA will develop and/or improve National Measurement Standards (NMS)
Source of data	New NMS, improved NMS and/or procedure/method validation report; reference materials, measurements register and validation report/procedure
Method of calculation / Assessment	Simple count
Means of verification	Verification/Validation report, procedures, NMI report, measurement register
Assumptions	Implementation of the Revised International System of Units (SI) including NMISA adhering to legislative requirements
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative year end
Reporting cycle	Quarterly.
Desired performance	Does not necessarily increase from year to year. This indicator is in response to periodic industry requirements for CRMs and reference methods to be developed and for NMS to be improved
Indicator responsibility	Technical divisions

KPI 3: NUMBER OF MEMEBERSHIPS MAINTAINED	
Indicator title (Output)	<i>Number of memberships maintained</i>
Short definition	Maintain membership of, and active participation in the CIPM and its consultative committees. The work done in the related committees feeds into the CIPM MRA.
Source/collection of data	Membership of the Committees and CIPM as listed in the BIPM website; appointment and invitation to the measurement treaties for participation and/or country reports.
Method of calculation	Simple count
Means of verification	Confirmation of NMISA's membership as listed in the BIPM website.
Assumptions	Membership of the 10 CCs and Participation in the CIPM and link to the international system of units.
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Non-cumulative
Reporting cycle	Quarterly
Desired performance	Active participation in international committees to ensure NMISA's adherence to international standards and impact policy decisions.
Indicator responsibility	RIID

KPI 4: NUMBER OF ILCS AND PTS ORGANISED AND COMPLETED	
Indicator title (Output)	<i>Number of ILCs and PTS organised</i>
Short definition	Interlaboratory comparisons (ILCs) or Proficiency Testing Scheme (PTS) Initiated and administered by NMISA. To ensure NMISA is comparable with other NMIs and to assist SADC NMIs to obtain equivalence with South Africa inter-regional trade. To assist National and Regional laboratories in providing confidence in their measurement capabilities. The ILCs and PTS can run over several financial years.
Source/collection of data	Project plans, progress reports and/or final reports (draft A, B and final report).
Method of calculation	Simple count
Means of verification	Submission of Project plans, progress reports and/or draft A, B and final reports.
Assumptions	Accuracy and confidence in measurement results for South Africa and the Region.
Disaggregation	None
Spatial transformation	Detailed plans and reports
Type of indicator	Output
Calculation type	Cumulative
New indicator	Yes
Reporting cycle	Quarterly
Desired performance	To build capability in identified parameters.
Indicator responsibility	Technical divisions

KPI 5: PERCENTAGE METROLOGICAL SERVICES COVERED BY CALIBRATION AND MEASUREMENT CAPABILITIES (CMCS)	
Indicator title (Output)	<i>Percentage of Metrological services covered by Calibration and Measurement Capabilities (CMCs).</i>
Short definition	<p>To determine the percentage of services offered by NMISA that are covered by CMCs in the KCDB.</p> <p>A measurement capability claim that has been reviewed and accepted by international peers, and then published in the BIPM international metrology database (key comparison database appendix C). Provides stakeholders with confidence that a claimed measurement capability which is internationally accepted and internationally equivalent.</p>
Source/collection of data	SHEQ report showing the number of CMCs in Appendix C of the international (BIPM) key comparison database (KCDB), published at <a href="http://www.bipm.org">www.bipm.org</a> , NMISA scopes of accreditation and calibration certificates.
Method of calculation	Number of services linked to the official number of active CMCs published in the KCDB for South Africa as at 31 March (screen print and date); simple calculation .
Means of verification	Certificates issued against services rendered,
Assumptions	Claimed measurement capability which is internationally acceptable and equivalent,
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Capabilities that meet stakeholder needs.
Indicator responsibility	Director RIID together with SHEQ.

KPI 6: NUMBER OF ACCREDITED LABORATORIES AND NEW LABORATORY ACCREDITATIONS	
Indicator title (Output)	<i>Number of accredited laboratories and new laboratory accreditations.</i>
Short definition	Activities to support maintenance of the TQMS at an internationally acceptable level (peer-reviewed quality system), peer review for new accredited QMS. Maintain 25 Accredited laboratories .
Source/collection of data	Confirmation of continued accreditation; or peer review reports or schedule of accreditation or certificate of accreditation.
Method of calculation	Simple count
Means of verification	Certificates, peer review reports or schedule of accreditation.
Assumptions	Quality Assurance requirement for NMISA
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Non-cumulative
Reporting cycle	Quarterly
Desired performance	Maintained Total Quality Management System and maintained schedule of accreditation or self-declared parameters under the CIPM MRA.
Indicator responsibility	SHEQ

KPI 7: NUMBER OF METROLOGISTS TRAINED	
Indicator title (Output)	<i>Number of metrologists trained in accurate measurement.</i>
Short definition	Practical training of metrologists to ensure knowledge transfer to industry, commercial calibration labs and regional NMIs. To develop skills and competencies required to provide essential measurement support to industry, commercial calibration labs and NMIs in the region. Training can be provided at NMISA or other laboratories.
Source/collection of data	NMISA Certificate of Training and an official report.
Method of calculation	Simple count (people)
Means of verification	Certificates/ attendance register
Assumptions	Knowledge transfer to industry and regional NMIs.
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Capacity building for the region as mandated by the measurement act.
Indicator responsibility	Director RIID together with Technical Directors.

KPI 8: NUMBER OF COURSES PROVIDED	
Indicator title (Output)	<i>Number of courses presented to industry, SMEs and other institutes.</i>
Short definition	To develop skills and competencies required to provide essential measurement support to industry, SMEs and other institutes.
Source/collection of data	Official signed attendance list of participants attending the course or workshop given or letter from institute hosting course.
Method of calculation	Simple count (courses)
Means of verification	Attendance register or letters from host institute
Assumptions	Proof of the dissemination of the NMS and usage of Units to industry and the user community at large.
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Increased industry training and SMEs trained in support of the quality infrastructure
Indicator responsibility	Director Applied Metrology and all divisions.



KPI 9: NUMBER OF INTERNS AND IN-SERVICE TRAINEES HOSTED	
Indicator title (Output)	<i>Number of interns and in-service trainees hosted.</i>
Short definition	Number of interns (minimum of six months) and in-service trainees (period as described by the academic institution) hosted. To provide work experience for graduates in line with their studies and improve their employability. To build pipeline of skilled and competent professionals to address current and future skills needs and transform the organisation.
Source/collection of data	Internship contracts, training/work plans, certificates.
Method of calculation	Simple count, (total number of interns and in-service trainees hosted/trained during the financial year) .
Means of verification	Appointment contracts
Assumptions	A skilled, competent and transformed workforce
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Well trained interns who can be placed in NMISA or other organisations.
Indicator responsibility	Human Resources

KPI 10: AMOUNT INCOME GENERATED	
Indicator title (Output)	<i>Income generated through services dissemination activities.</i>
Short definition	Income generated through calibration, services (PTS and reference measurements), sales (CRMs), consultation, research funds and donor projects (REVENUE) excluding interest.
Source/collection of data	A report of income is downloadable from NMISA financial system and provided by Finances .
Method of calculation	Simple count (Revenue in line with GRAP)
Means of verification	Finance report submitted every quarter.
Assumptions	Measurement traceability to industry through calibration, measurement services, analysis, consultation, research grants and donor projects.
Disaggregation	None
Spatial transformation	None
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Meet and exceed annual financial revenue target for sustainability.
Indicator responsibility	EXCO and finance

KPI 11: ACTUAL EXPENDITURE TO BUDGET	
Indicator title (Output)	<i>Actual expenditure to budget.</i>
Short definition	Percent of revenue received, expensed and commitments. Establish financial systems and processes to ensure compliance with regulatory frameworks .
Source/collection of data	Statement of financial performance and other financial reports.
Method of calculation	Actual spending including commitments/ income received.
Means of verification	Finance report
Assumptions	Established systems and processes to ensure compliance with regulatory frameworks (PFMA).
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Full compliance with regulatory frameworks and unqualified audit report.
Indicator responsibility	CFO, together with EXCO

KPI 12: UPDATE OF THE MEASUREMENT ACT	
Indicator title (Output)	<i>Revised Measurement Act to support and contribute to National Regulation.</i>
Short definition	The participation of NMISA in the technical infrastructure review geared towards the revision of the Measurement Act to support regulation.
Purpose/importance	NMISA provides traceability to the international measurement system (the SI) for the protection of the state by ensuring accurate measurements within the Country and Region.
Source of data	Reports and/or minutes of the meetings held.
Method of Calculation / Assessment	Reviewed Measurement Act.
Means of verification	Communication between DTIC and NMISA on progress either via email, minutes or reports, proof of submission to the Board.
Assumptions	The revised Measurement Act will ensure that industry, government and SOEs use the services of NMISA as an entity developed to support the country.
Disaggregation of Beneficiaries (where applicable)	No disaggregation
Spatial Transformation (where applicable)	Not applicable
Reporting Cycle	Quarterly
Desired performance	Amendment of the Measurement Act.
Indicator responsibility	Directors; RIID and SBDG

KPI 13: METROLOGY SERVICE PROVIDER TO GOVERNMENT AND SOES	
Indicator title (Output)	<i>Metrology service provider for government services and state-owned entities.</i>
Short definition	NMISA providing metrology related services to government and/or SOEs.
Source/collection of data	Service level Agreements/contracts, with Government or SOE Customers.
Method of calculation	Simple count
Means of verification	Signed contracts/SLAs
Assumption	Consolidation of metrological services in government and SOEs to save costs
Disaggregation	None
Spatial transformation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Saving government costs by creating effectiveness.
Indicator responsibility	Business Development with all divisions.

KPI 14: INCREASE VISIBILITY OF NMISA	
Indicator title (Output)	<i>Increase visibility of NMISA in South Africa and the region.</i>
Short definition	Increase visibility of NMISA in order to provide traceability within SA and the region by shortening the traceability, ensuring growth in industrialisation, employment within SA and not exporting jobs.
Source/collection of data	Statistical report showing progress throughout the quarters
Method of calculation	Using Advertising Value Equivalence calculations done by a contracted service provider, total amount of print, online and broadcast media not including paid advertising.
Means of verification	Advertising Value Equivalent reports
Assumption	Increased visibility of the organisation
Disaggregation	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Increase visibility by 40% of NMISA to our stakeholder.
Indicator responsibility	Business development

KPI 15: PERCENTAGE CUSTOMER SATISFACTION	
Indicator title (Output)	<i>Percentage customer satisfaction.</i>
Short definition	Percentage of customer complaints against all service jobs. To provide industry with a sense of ownership and confidence in NMISA measurements by providing a superior service. NMISA strives for less than 5%.
Source/collection of data	Report on the review of customer complaints taken from the Quality System (Customer Action Requests-CARs).
Method of calculation	Number of customer complaints per quarter/ total jobs per quarter.
Means of verification	List of invoices/jobs done from finance / number of customer complaints.
Assumption	External client satisfaction
Disaggregation	None
Calculation type	Non-cumulative
Reporting cycle	Quarterly
Desired performance	Zero customer complaints are ideal; any customer complaints received to be timeously addressed and cleared satisfactorily.
Indicator responsibility	SHEQ

## Annexures

### Vision

To be the leading metrology and measurement centre of excellence on the African continent connecting Africa to the World

### Mission

To consistently deliver outstanding innovative and internationally comparable measurement solutions that support regional and international trade, people's quality of life and enable the protection of the environment

### Values

- Quality
- Measurement excellence
- Social responsibility
- Economic prosperity; and
- Good governance





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