

NMISA Strategic Plan 2018 - 2023

Presentation to the Portfolio Committee on Trade and Industry
27 March 2018

Ndwakhulu Mukhufhi: CEO
Calvin Sehlapelo: CFO

We measure, so you can manage

We understand how demanding your day-to-day responsibilities can be. The National Metrology Institute of South Africa (NMISA) ensures that measurements made in South Africa are accurate and comparable to international standards, giving you peace of mind to focus on what's important to you.



'We Measure So You Can Manage'



Section 3A Public Entity

Measurement Units and Measurement Standards Act, No 18 of 2006 (The Measurement Act)



NMISA Maintains measurement equivalence with the global system of measurements as a foundation of all measurements performed in South Africa

Regional Integration Role

Founder

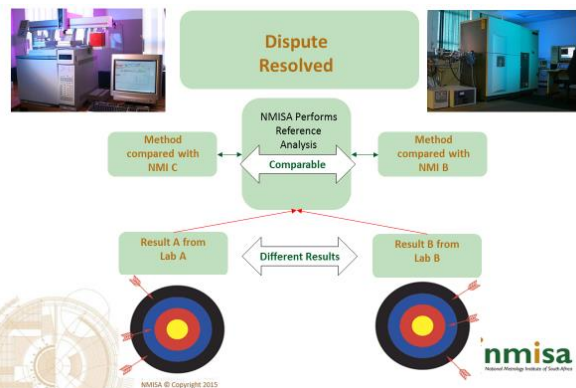
Current Secretariat

90% Of Comparisons

Regional PT Schemes



The NMISA performs reference analysis and in a dispute, in any SA court, its results will be accepted as the most correct value



The NMISA's role in the South African Technical Infrastructure



SABS; Voluntary standards and conformity assessment

- Measurement Specifications for paper standards
- Traceability for testing through:
 - Calibration of testing equipment
 - Certified reference materials for chemical testing

Regulation (NRCS, DoE, DoH, and etc)

- Measurement specifications for regulations
- Calibration of inspection equipment
- Traceability link for prosecution
- Reference analysis

SANAS; Accreditation

- Technical Assessors
- Provide Traceability to accredited labs
- Proficiency Testing Schemes
- Reference analysis



Quality Infrastructure Required
for Trade, EHS, Healthcare and
Law enforcement

Vision and Values

Vision

To be a measurement centre of excellence inspired to consistently deliver outstanding, innovative and international comparable measurement solutions that support the country's trade, people's quality of life and enable the protection of the environment.

Values

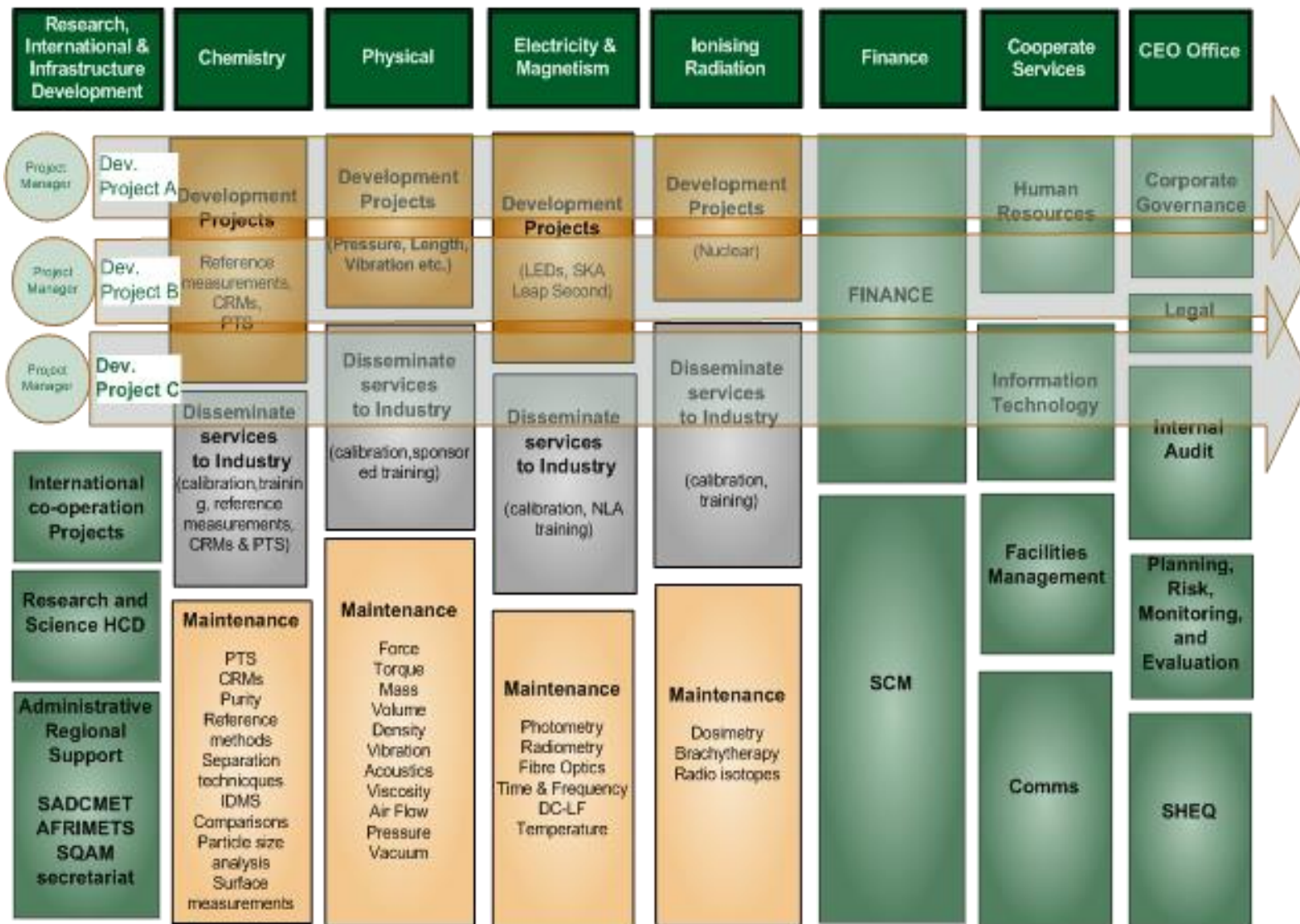
Measurement excellence

Social responsibility

Economic prosperity

Good Governance

Thematic Approach in a Matrix Structure



NMISA Programmes (ShorTCAf)



Reference
Material
Programme

Green
Economies

Manufacturing
Competitiveness

Quality of Life

Energy
Efficiency

Realisation of
the Revised SI

Measurement
Solutions

Commercial
Services

Regional and International Integration



REFERENCE MATERIAL PROGRAMME



&

GREEN ECONOMY MEASUREMENT TOOLS

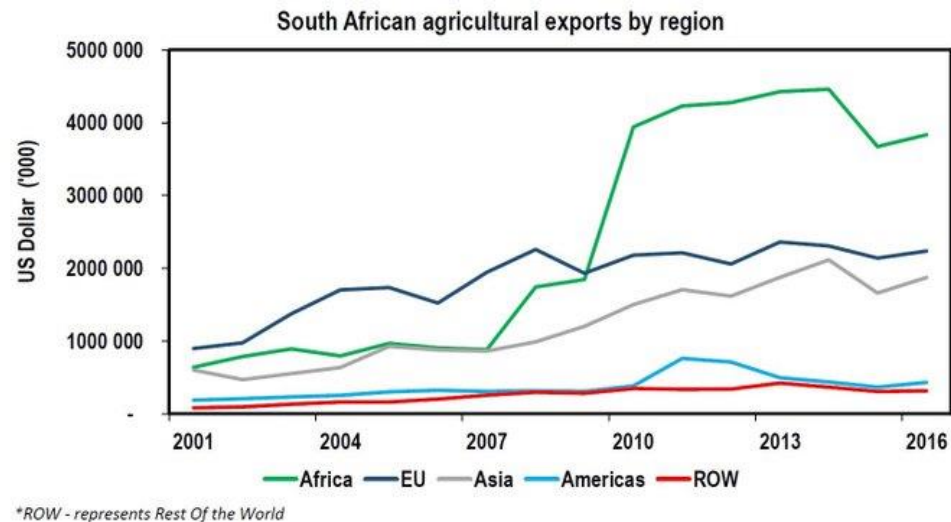


CRM & RMs

Impact/relevance

To provide relevant, fit-for-purpose reference materials that will:

- enable inter-regional trade
- support consumer safety
- support growth strategies and trade agreements: Africa Growth and Opportunity Act (AGOA), SA-EU Development and Cooperation Agreement (TDCA), Trade, Investment and Development Cooperation Agreement (TIDCA), etc.



Enable implementation of SA and regional legislation

- Standardise methods in compliance to international standards (e.g. SANS, ISO, AOAC)
- Provide proficiency testing for testing laboratories (a requirement for SANAS accreditation)
- Enable internationally acceptable measurements in food safety, food quality, forensic law enforcement, beneficiation and environmental monitoring

RMs & measurements



Certified
RMs
(solutions &
matrix)

Traceability, research,
preparation, reference
measurements



Production and
preparation: mixing,
milling,
homogenization,
packaging, storage

Materials
Processing

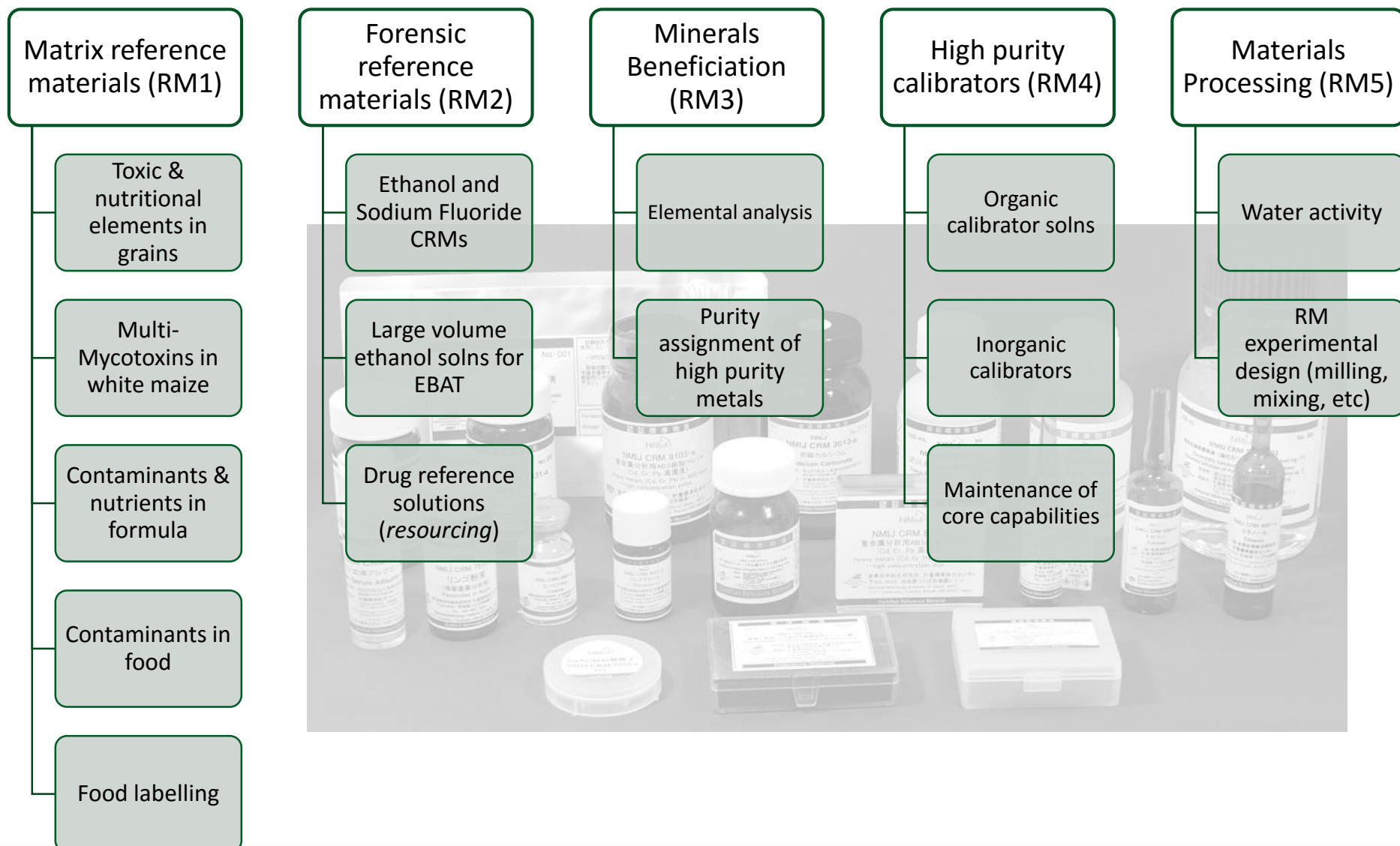


Characteri-
sation
(value
assignment)

Commercialisation
(sale of RMs, PRGMs,
calibration, PTS,
measurement services,
consultancy)



Reference Materials programme



Green economy vision

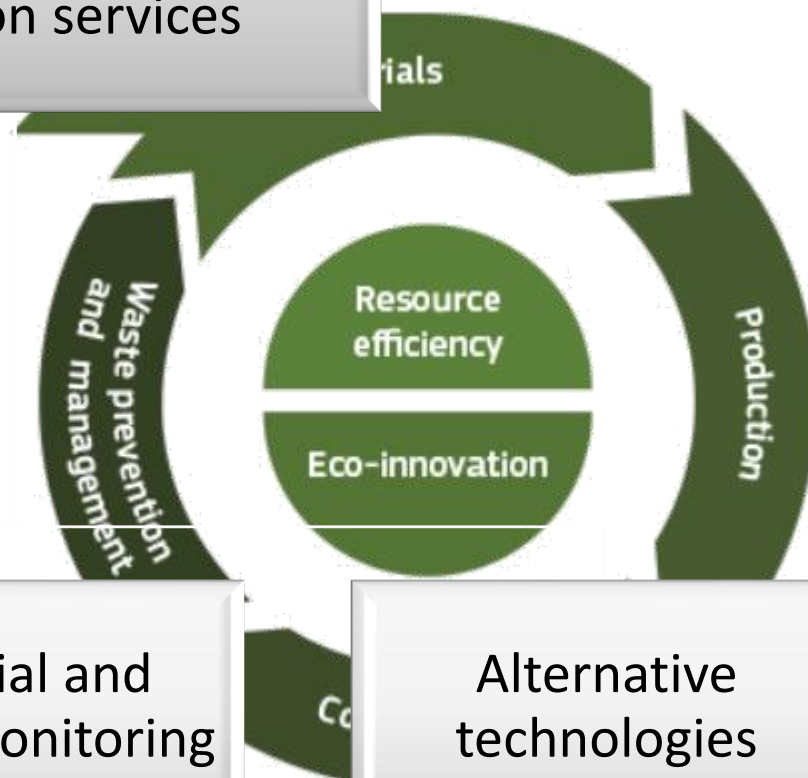
Environmental analytical and
calibration services

Core capabilities
used in value
assignment of CRMs

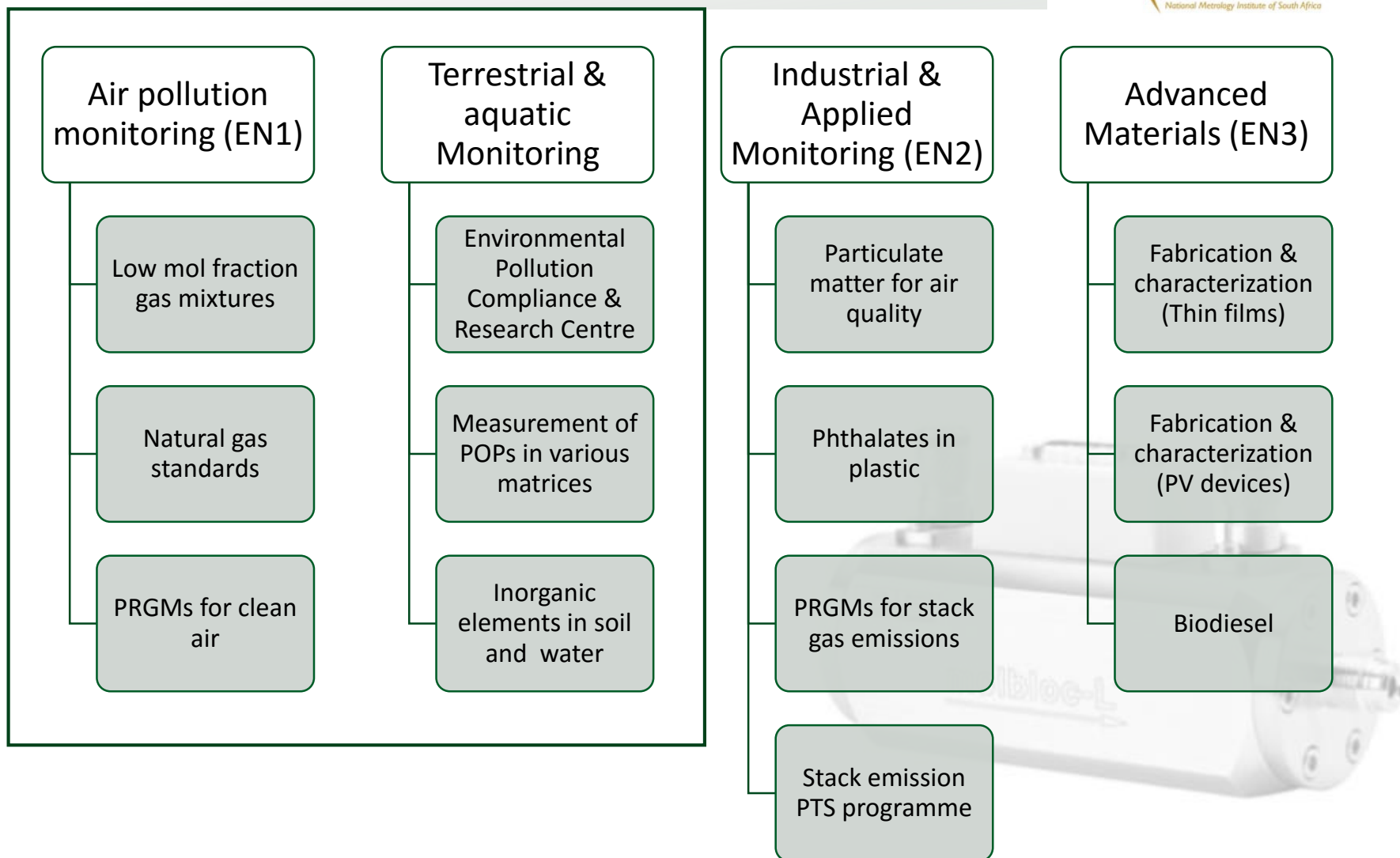
Air, aquatic and
terrestrial
monitoring

Industrial and
applied monitoring

Alternative
technologies



Green Economy Measurement Tools



Projects in other programmes

Realisation of
the mole

X-ray Crystal
Density project
(Avogadro project)
(surface layers)

Quality of Life

Proteomics
(malaria)

Protein, peptide
quantification

Medical gases

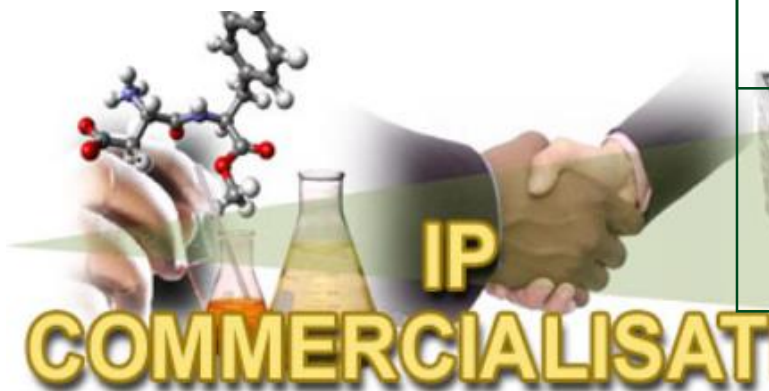
Commercialisation
(links to RM & Green
Economy)

High purity
calibrators (org &
Inorganic)

Matrix and gas RMs

New
characterisation
measurements for
Industry

Bio-sensors & drug
delivery



Services (Revenue)

Calibration

Ozone and stack
gas emission
monitors

Evidential Breath
Alcohol Testing
(EBAT)

Proficiency Testing Schemes

In support of
Forensic
measurements

In support of
pesticide Residue
analysis

In support of air
pollution
monitoring

In support of Water
Testing

Reference measurements, testing & analysis

Reference
measurement
services to industry

Surface and
structure analyses
to industry

Toxic metabolites in
complex matrices
(universities)

Training

Assist SANAS, NLA
with technical
presenters for
training courses

Graduate and post-
graduate academic
courses

Special
development
projects aimed to
assist SMEs

MSc and PhD
bursars/ interns





AFRICA FOOD SAFETY WORKSHOP

Africa Food Safety Workshop to Promote Standards, Reliable Methods of Analysis and Interinstitutional Cooperation, for better Control of Mycotoxins and Related Contaminants

The workshop seeks to contribute to better food safety control systems in Africa while establishing and strengthening networks among food safety stakeholders.

The workshop will incorporate presentations and discussions with international experts on:

- standards and methods of analysis and control of mycotoxins;
- veterinary drugs and pesticide residues;
- food microbiology including linkage to antimicrobial use, residues and resistance;
- food traceability and authenticity

Date: 4-8 June 2018

Venue: Pretoria | South Africa

Contact: FoodSafetyWorkshop@nmisa.org

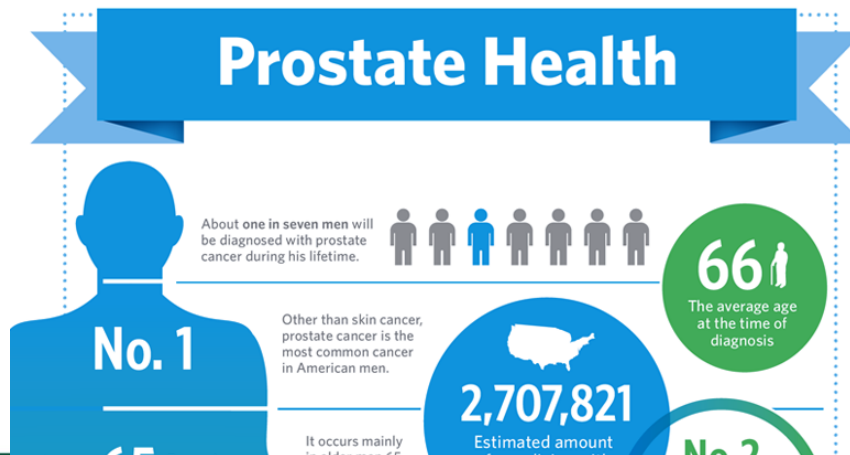
Information on Technical papers and exhibition opportunities to follow





QUALITY OF LIFE

1 in 8
WOMEN
WILL BE DIAGNOSED WITH
Breast Cancer
IN THEIR LIFETIME



Radioactivity Standards and Dosimetry



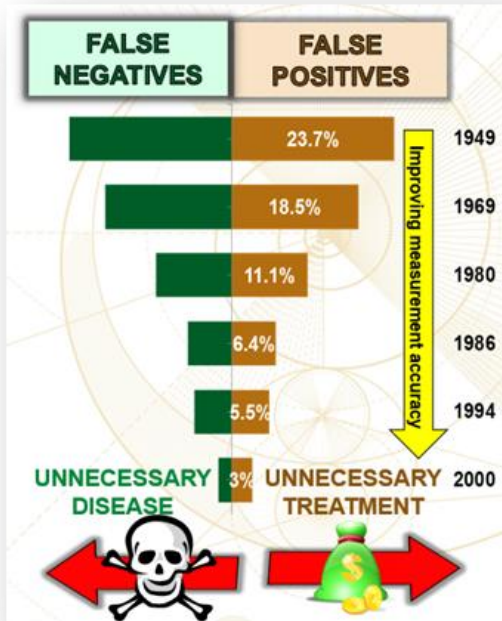
Partnership with the National Nuclear Regulator to establish a radio-analytical laboratory at NMISA to perform independent verification analysis functions



NMISA serves the radionuclide production at iThemba Labs through the calibration of a variety of ionisation chambers and activity measurements of various radionuclides.

iThemba is Designated by the NMISA to represent South Africa in Medium and High energy Neutron Measurements

Current Projects



Primary healthcare

- Temperature
- Flow measurement
- Pressure

Cancer care

- Nuclear medicine
- Dosimetry
- Radiation Therapy Audit

Pharmacology

- Protein, peptide Quantification (human Growth Hormone)
- Malaria infected red blood cells surface proteins (Research student)

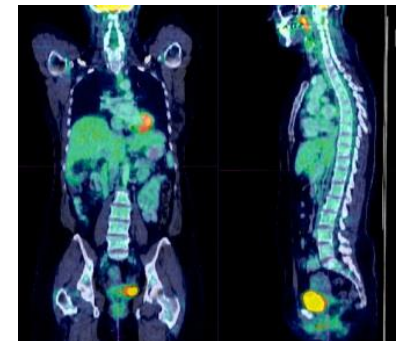
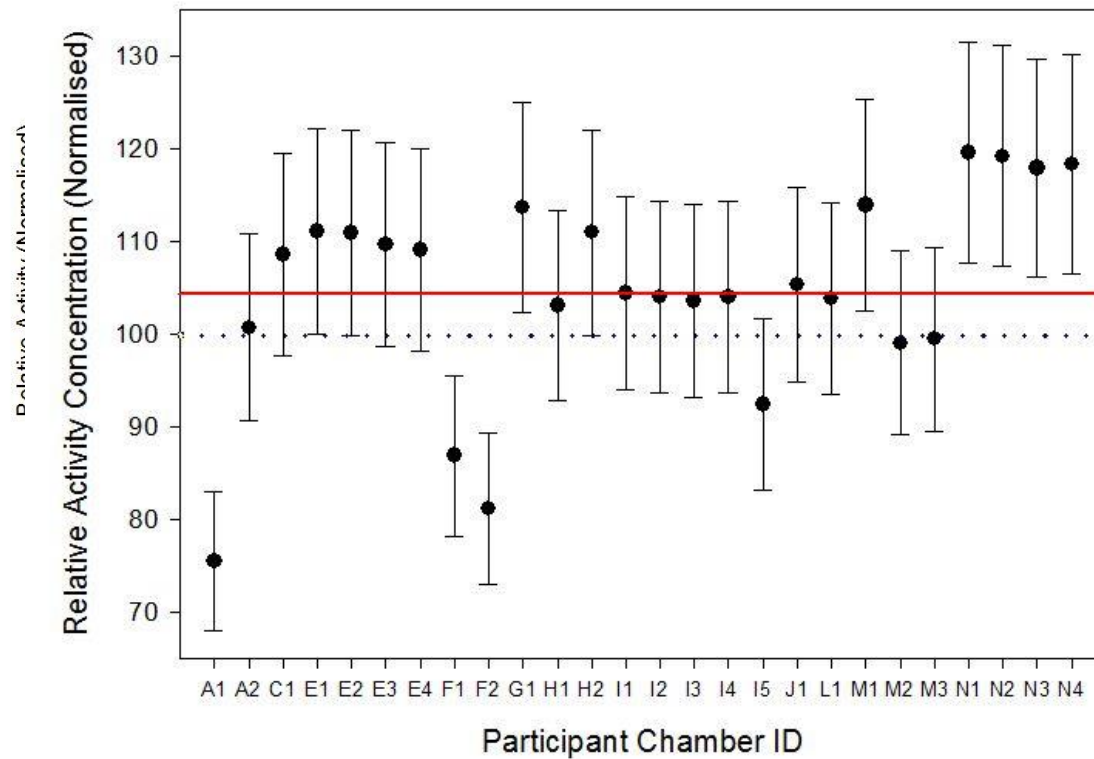
Occupational health and safety

- Radiation protection
- Sound and Force measurements
- Ultraviolet Measurements

Progress: PT Schemes in nuclear medicine

40

Normalised I-131 Activity Concentration
Measurements (Syringe)



Energy Efficiency Programme

The objective of this programme is to research, develop and provide the necessary measurement systems to support the national energy efficiency drive



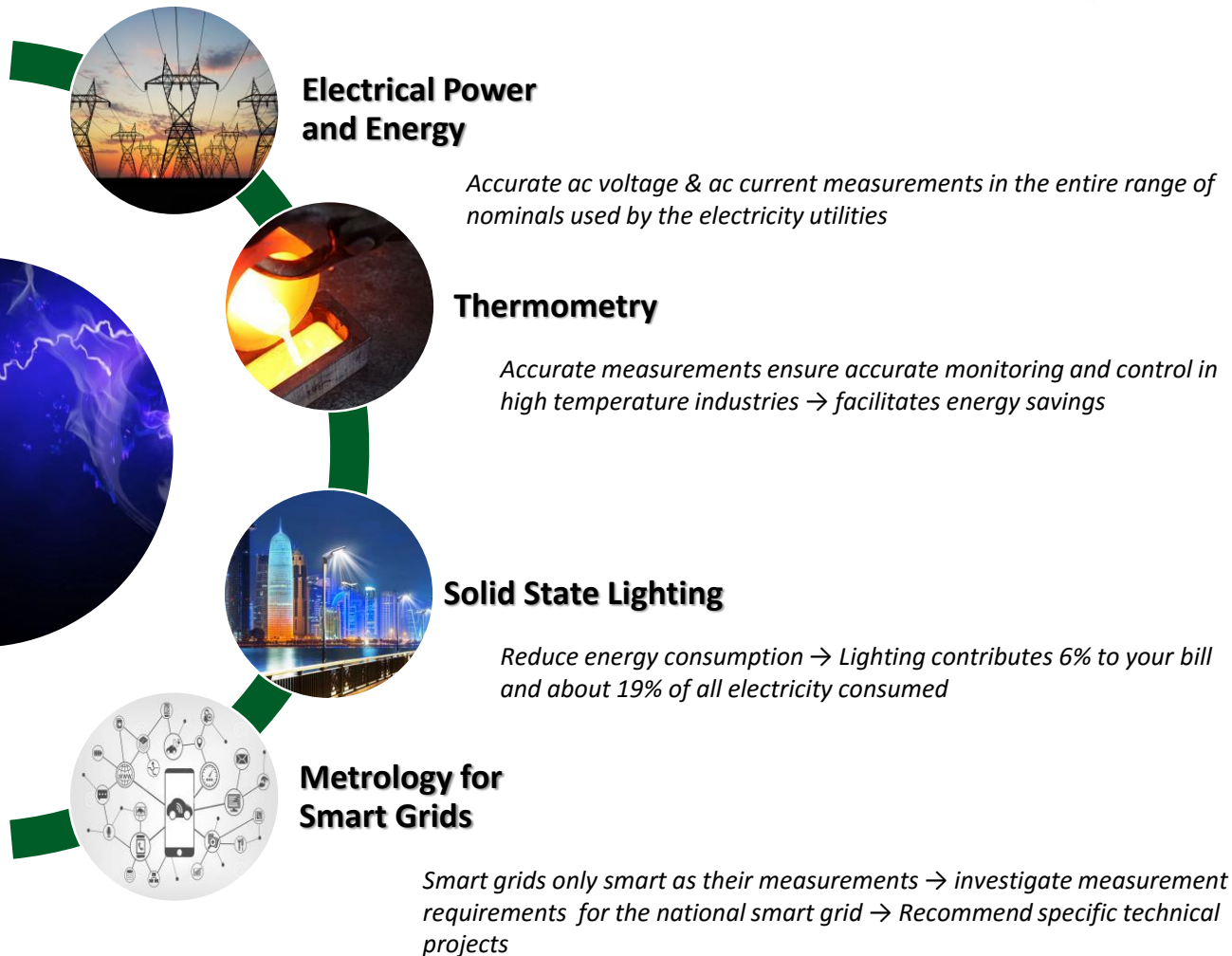
Using less energy to achieve the same or better results reduces costs and pollution, creating a stronger, more competitive economy

Energy efficiency = profits = growth = higher energy use

Growth is good → but it must be sustainable growth

Accurate measurements promote sustainability

Energy Efficiency Projects



Redefinition of the SI

To keep our leadership position in Africa and to create a new Revenue stream for calibration from 2021

NMISA is securing its position as the provider of traceability to the SI for Sub-Saharan Africa

Redefinition of mass

Kibble (Watt) balance

Mechanical power = Electrical power

- $UI = mg$

Redefinition November 2018

Implementation 20 May 2019

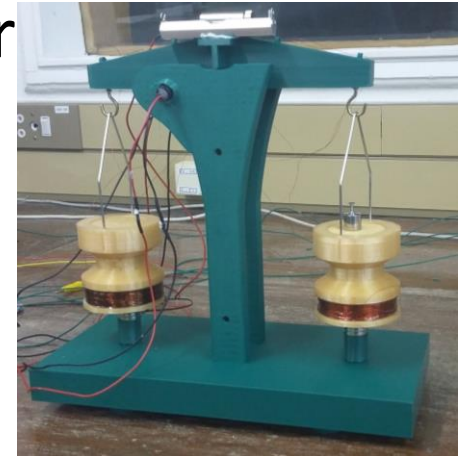
Status

- Co-operation with NMI's
- Test model
- Equal arm balance

Avogadro project

SI-Sphere

- Surface characterisation of outer layer
- Long term stability (influence of handling)
- Develop a new density standard for NMISA

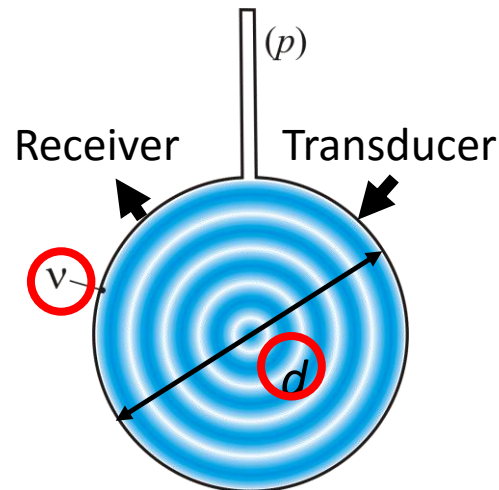


Redefinition of Kelvin

Determination of the Boltzmann constant

Develop gas thermometry as primary reference for temperature

Develop a low temperature scale through acoustic gas thermometer (below 0 °C)



Manufacturing Competitiveness

The programme supports the South Africa manufacturing industry, assisting on making it more competitive and to increase South African exports

The general focus for 2018 onwards is on;

- additive manufacturing,
- automotive component manufacturing,
- rail infrastructure projects, and
- technologies related to Industry 4.0



Development Projects

Capabilities in support of the Legal Metrology Act

- Gas and liquid flow
- Pressure (including vacuum)
- Length (dimensional measurements including 3D measurements)
- Machine Tool Evaluation (evaluation while manufacturing)

Capabilities in support of the Fourth Industrial Revolution

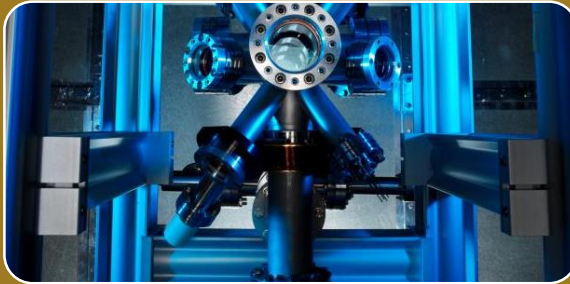
- Robotics
- 3D printing
- Nanometrology
- Materials metrology & Tribology



Advanced Measurement Solutions Programme

The Measurement Solutions Programme combines research and development projects where a new measurement technique or system requiring substantial innovation is required to meet scientific or industrial challenges

Current Projects



Electronic Measurement Solutions:

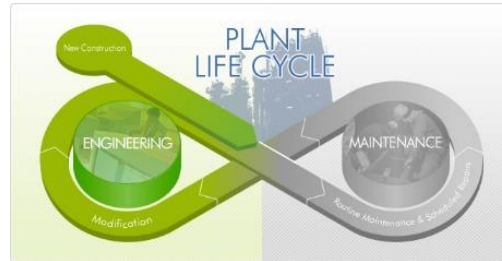
- Reference signals to MeerKAT/SKA
- High accuracy time transfer over fibre optic cable
- Systems engineering design concepts
- Reliable, synchronised clock systems for schools



Mechanical Measurement Solutions:

- Laser pressure balance (piston height and fall rate) monitor
- Upgraded measurement facility for vacuum calibrations
- Establishment of a low pressure calibration capability (0 to 15 kPa)
- Establishment of a Primary Gas Flow Standard
- Hydrostatic weighing
- NMS for sound in water

The NMISA Recapitalisation Project



Housed at the CSIR campus since 1950s, the buildings have reached their technical limit of modification

Feasibility Study completed and submitted to NT for TA1 approval in line with the PPP Manual

- Treasury Approval 1 not granted due to affordability
- **the dti** commits the R 130 m pa for a 25 year period for recap.
- **NMISA adopts an approach of phased in development of campus**
- **Phase 1 in 2018/19 will be the securing of the land for development.**

NMISA APP 2018 – 2021

NMISA CONSOLIDATED BUDGET 2019-2023



	2018/19 R'000	2019/20 R'000	2020/21 R'000	2021/22 R'000	2022/23 R'000
Revenue	273 156	288 453	304 318	321 053	338 711
Transfer received	232 784	245 820	259 340	273 604	288 652
Rendering of services	31 561	33 328	35 161	37 094	39 134
Investment income	8 811	9 304	9 816	10 355	10 925
Expenditure	273 156	288 453	304 318	321 054	338 711
Admin & operating exp	68 558	72 397	76 379	80 580	85 011
Employee cost	122 653	129 522	136 645	144 160	152 088
Repairs and maintenance	8 312	8 777	9 260	9 768	10 307
Recapitalisation project	72 753	76 827	81 053	85 511	90 214
Audit fees	880	929	980	1 034	1 091

BUDGET ANALYSIS

- The spending focus over the 5 year period will be on:
 - providing metrology and advanced measurement assistance to specific industry sectors as identified in IPAP.
 - building capacity in the institution to better fulfil mandate
 - research and development programmes
 - Recapitalisation and modernisation of the NMI infrastructure through the replacement of aged and obsolete equipment
 - Development of a modern NMISA Campus to meet the requirements of advanced technology

TREND ANALYSIS

REVENUE

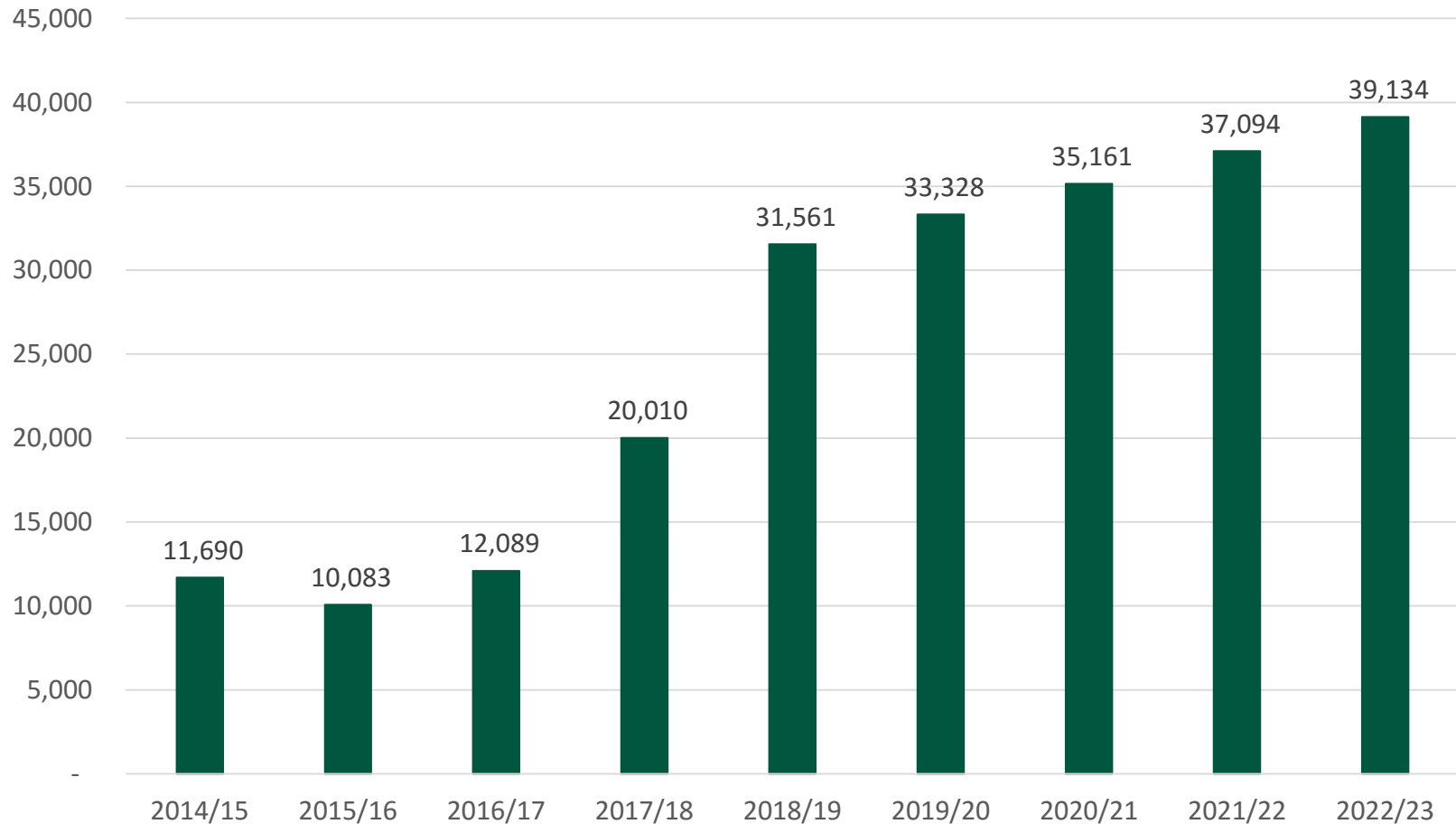
- NMSA's budget is expected to decrease to R273 million in 2018/19 due to a reduction in both the NMS and the recapitalisation grant.
- This has resulted in reduced projected spend on capital expenditure of annual average of 64% compared to 2015/16, 2016/17 and 2017/18,
- To cover the resulting gap from shrinking fiscal purse NMISA has invested in programmes aimed at increasing external revenue from 11m 2014/15 to R31 m in 2018/19.

EXPENDITURE

- Spending on equipment and infrastructure is expected to increase at an average annual rate of 8%.
- Spending on compensation of employees is expected to increase at an average annual rate of 5.6%.
- NMISA's ability to effectively & sustainably deliver on its mandate is depended on the development of its scientists to the highest level thus contributing to the increase in operating expenses (HCD).

INCREASE IN EXTERNAL REVENUE

Rendering of services





We measure what matters

