BITRI

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION

2017/2018 ANNUAL REPORT

2017 2018

-ANNUAL REPORT-

#1640

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MESSAGE *from* THE BOARD CHAIR

I am honoured to share with you the 2017/2018 Botswana Institute for Technology Research and Innovation (BITRI) annual report. I am happy to report that steady progress was made to achieve our mandate to conduct needs-based research and development in the six focus areas. Progress was made on the 7 research programmes that the organisation was involved in. To mention a few, the Seding Version 2, a brighter solar street light, was completed after overcoming numerous challenges. This is the experience the country needs to move forward into a knowledge based economy. We have confidence that our new street lights will do well in the market and reduce the load on the national grid. The lights are assembled at the BITRI Assembly plant in Kanye.

Another flagship project is the Kgalagadi Sand Building Block Technology (KSBB) roll-out in collaboration with the Poverty Eradication Office, which has made significant progress in completing and operationalising five depots in Lehututu, Takatokwane, Goodhope, Pitshane-Molopo and Kasane. We expect to have completed the next five depots by the end of the next reporting period. We are happy to report that this technology will be transferred to the industry as per our Intellectual Property (IP) policy which encourages commercialization of BITRI products.

It is imperative for a research organization such as BITRI to collaborate with other institutions to leverage and augment resources. To that end, BITRI continued to strive to explore and establish collaborations with other institutions

both nationally and internationally. BITRI signed a MoU with the Botswana Innovation Hub which identified areas of collaboration on matters of research, technology transfer and commercialization amongst others. We also entered into an agreement with the University of Botswana with a focus on research collaboration and staff exchange. BITRI also hosted partnership discussions with Cambridge University and the University of Ulster to explore possible areas of research collaboration and our participation in the European Union Global Challenges Research Fund.

Our philosophy of "Technology Solutions from You to Us for You" means that we aim to develop technologies that are relevant to the needs of the people. As such, we continued engaging with our stakeholders in various fora such as Councils, exhibitions and workshops, to share with the public what we are doing and to ensure that we are up to date with their needs by developing relevant technologies.

I thank fellow Board members for providing guidance and strategic direction for the Organization, the BITRI staff for all their hard work in ensuring that the technology needs of the nation become a reality and the rest of the stakeholders for all their comments and support in achieving our mandate.

My sincere appreciation goes to the Government of Botswana for entrusting us with this task and providing funding to ensure we succeed in our assignment.

Thank you

Prof. Sesae F. Mpuchane
Chairperson, Board of Directors.

MESSAGE *from* THE CHIEF EXECUTIVE OFFICER

It is my pleasure to present to you the Botswana Institute for Technology Research and Innovation (BITRI) 2017/2018 annual report. The reporting period was a very exciting and progressive time for BITRI. We were engaged in various projects that we believe will impact and transform the lives of Batswana for the better and enable us to contribute to our Country's vision of "Prosperity for all". To mention a few projects, by the end of the reporting period, our air filtration project had resulted in a prototype of dust and surgical masks. The prototype masks have been produced using our nanofiber materials. The prototype masks are undergoing testing for certification license so that they can go for a country wide pilot deployment.

Various computer applications were also being developed and most them were at beta stage. Of most significant is our Health and Education Informatics Systems. We strive to be at the forefront of technology and as such our Health and Education analytics are focused on redefining the way we approach learning/teaching and health services. Both of our informatics systems are ready for the piloting phase.

On the renewable energy fronts, BITRI seeks to foster the adoption of clean technology through advocacy, research and development and this includes projects in biogas and solar technology. Our goal is to do research that result in development of clean technologies

that is positioned to deliver both prosperity and sustainability for Botswana. Of notable recognition on clean technologies is our collaboration with the United Nations Development Fund (UNDP) through funding from the Global Environment Facility on facilitation and establishment of biogas plants as well as institutional strengthening and capacity development. This project will assist Government in meeting its international obligation of reducing green house gas emission, and also its goal of reducing energy poverty in rural areas through transforming agro-waste into biogas. Furthermore, we just concluded a hindsight research study on "quantifying the financial costs and benefits of renewable energy resources in Botswana electricity system".

The Climate Change Division as well, was working on a project to climate proof the livelihoods of Batswana against climate variability and change. Findings from this research will aid communities and policy makers in navigating the current and future droughts. The Division also contributed to the development of Botswana Drought Management Strategy, a paradigm shift that aims at treating drought as part of management rather than an emergency. In collaboration with London School of Economics, the Climate Change Division has completed the research "The impact of 2015/16 elnino on small medium enterprises" with two outputs; 2 journal articles that will contribute to contemporary knowledge on the impact of climate change on urban centers and also a draft policy brief that will aid policy makers in their decision making. The research projects will therefore contribute to the national goals to eradicate poverty and to have a well-educated and informed nation on the impacts of drought on the socio-economics of Batswana. With this positive outlook on our projects we believe that we are on course and we anticipate to enter into technology transfer and commercialization in 2018/19.

What next with all the innovation that is taking place at BITRI? For us, innovation is more than generating the next big idea, but as per our mandate, it involves how we implement the ideas that make it out of the gate- to the hands of the people (market), and how we build the culture to sustain the creation of those ideas into tangible technology solutions. With that said, this year, we strategically and deliberately focused on innovation commercialization, by developing and implementing the "Innovation Management Framework" (IMF). The first step toward creating a sustained culture of innovation was to lay the groundwork toward building the organizational capability for innovation through the IMF tool that guides us on our R&D strategy and management. The IMF details our strategic pathways towards commercialization of our technology solutions. In order to realise the commercialization of our technologies, all our technologies begun undergoing invention disclosures during this reporting period. Invention disclosure is the first step toward obtaining Intellectual Policy protection. We have now established systems and protocols for proper invention disclosure.

Furthermore, through our IMF, we begun developing sound business plans of each technology that is ready for commercialization, as a determining factor on the route to adopt for commercialization as mandated by both BITRI IP Policy and implementation through IMF. Our business plans focus on how to address and execute on upscaling and growth strategy for each business and solution. We are proud to mention that in the next financial year BITRI will have some of its technologies available in the market.

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BITRI IP Policy and implementation through IMF. Our business plans focus on how to address and execute on upscaling and growth strategy for each business and solution. We are proud to mention that in the next financial year BITRI will have some of its technologies available in the market.

Still on commercialization, when BITRI set up the Centre for Materials Science (CMS), it had in mind to have the Centre as an accredited laboratory. During this reporting period, we begun the documentation process required by the Southern African Development Community Accreditation Service (SADCAS) to obtain ISO17025 accreditation for the CMS. We anticipate to submit the documentation by the next financial year and hope to get accredited which will enhance the confidence of the processes that we are already following in our material analysis and characterization for all sectors both locally and internationally.

In conclusion I wish to thank the Board for their guidance and applaud the BITRI staff for a job well done. I however, wish to encourage the staff to keep up the momentum so that we achieve our mandate. To our collaborators and other stakeholders, all this would not have been possible without your support.

I thank you.

Prof Shedden Masupe PhD, SMIEEE, Pr.Eng
Chief Executive Officer

BOARD *of* DIRECTORS

Dr Martin Kebakile
Board Chairperson
(Resigned 31st May 2017)

Professor Sesae F. Mpuchane
Board Chairperson
(Appointed 1st June 2017)

Dr Ecco D. Maje
Board Vice Chairperson

Mr Baitshepi Tebogo
Board Member

Mr Edwin Elias
Board Member

Mr Mao P. Segage
Board Member

Ms. Keitseng N Monyatsi
Board Member
(Resigned 31st May 2017)

Mr Oganeditse Marata
Board Member

Ms Tekolo Modungwa
Board Member

Ms Mercy Conlon
Board Member

Ronald Tshelametse
Board Member
(Appointed 1st June 2017)

Professor Nelson Torto
CEO Ex-officio Director
(Resigned 17th Aug 2017)

Professor S. Masupe
CEO Ex-officio Director
(Appointed 1st Oct 2017)

Ms Keamogetse Molefhe
BITRI Board Secretary

CORPORATE GOVERNANCE

Corporate Governance Report

The Board of Directors of BITRI is at the apex of the governance structure of BITRI. As the custodian of corporate governance, the Board of Directors remains committed to the highest standards of corporate governance. The Board oversees and guides BITRI's general strategic direction and policy formulation in accordance with the BITRI Constitution and the Companies Act of Botswana. The Board is ultimately accountable to the shareholder, being the Government of Botswana, for all the affairs of BITRI.

Board Composition

The composition of the BITRI Board is regulated by the BITRI Constitution. The Minister of Tertiary Education, Research, Science and Technology is responsible for the appointment of Directors. The Minister appoints persons he considers qualified by reason of their experience and knowledge in research, science, technology and innovation issues. The Board of BITRI is allowed to have not more than ten (10) Directors including the Chief Executive Officer. Directors can be appointed for an initial term of three (3) years. On completion of their first term, Directors are eligible for re-appointment for a further period of two (2) years. The Chairperson of the Board is appointed by the Minister while the Vice Chairperson is appointed by the Directors amongst themselves.

The BITRI Board of Directors has the requisite diversity of expertise and experience necessary for the stewardship and provision of strategic guidance to BITRI.

Board Governance Documentation

The BITRI Constitution is the overarching governing document for BITRI. The Board in accordance with good corporate governance practices, has developed a Board Charter that guides its operations in providing strategic direction to the Management of BITRI. The Board has also developed charters for its respective Committees.

The Board has signed a Shareholder Compact with the Government of Botswana as the shareholder of BITRI. The Shareholder Compact sets out the expectations of each party in relation to the expected outcomes.

Conflict of Interest

The Board continues to maintain annual registers of Directors' interests as part of efforts of effectively managing potential conflicts of interest. In addition, Directors are required to disclose real, potential or apparent conflict of interest in relation to the business being considered at every meeting of the Board and its Committees. Disclosures of any interest are recorded in minutes of the meeting. For the period under review, no interests were declared.

Board Meetings

The BITRI Constitution requires the Board to meet at least once in three (3) months to consider the business of BITRI. In an effort to ensure maximum attendance by the Directors, a

notice of the schedule of Board and Committee meetings was shared with all Directors at the beginning of the period under review. Where the business of BITRI dictates, special meetings are convened to dispense with urgent matters to avoid undue delays.

Specific topics discussed at quarterly Board meetings include overall strategy, annual budgets, management accounts and annual financial statements and the approval of policies. All Board members have access to the advice and services of the Board Secretary.

In terms of the Board Charter, where necessary Directors are allowed to seek independent professional advice at the expense of BITRI provided that prior authorisation is obtained through the set channels.

Delegation of Authority

The BITRI Constitution allows for the Board of Directors to delegate some of its powers, functions or duties to its Committees. Provision is also made for non-board members to be appointed to the Committees in order to augment the skill base of the Committees. In that regard, the Board, through the assistance of the Public Enterprise Evaluation and Procurement Agency, co-opted two experts into the Finance Risk and Audit Committee and the Human Resources Committee.

Notwithstanding the delegation, the Board however remains accountable for the exercise of its delegated authority. For the period under review, the Board delegated its authority to the following Committees:

1. QUALITY AND TECHNOLOGY COMMITTEE

The Quality and Technology Committee is a technical Committee of the Board set up to provide guidance and advice on the development, execution and transfer of Research and Development programmes and outcomes.

The duties of the Quality and Technology Committee include but are not limited to the following:

i. Advising and guiding the organisation on Research and Development policies and strategy;
ii. Resolving issues related to Research and Development which cannot be addressed at Management and /or Operational levels, and make recommendations as required;
iii. Reviewing and approving programme/ project proposals for Research and Development as well as options for technology transfer; and
iv. Monitoring overall progress and impact of Research and Development programmes.

For the period under review the Quality and Technology Committee amongst other things considered updates on research and development strategic objectives and approved various research plans

2. BOARD TENDER COMMITTEE

The Board Tender Committee is set up to adjudicate on issues of procurement as well as disposal of assets. It deals with procurements for values above P1 Million but not exceeding P3 Million. In terms of the BITRI Tender and Procurement Regulations, the Management Procurement Committee deals with procurements for values less than P1 Million while the Board deals with values exceeding P3 Million.

The responsibilities of the Board Tender Committee include amongst others the following:

i. Adjudication, authorisation or recommendation to the Board the award of tenders for requirements of supplies, works and services in accordance with the BITRI Procurement and Tender Regulations;
ii. Ensuring that adequate budgetary provisions exist for proposed procurements;
iii. Approval of the BITRI annual procurement plans; and
iv. Recommendation of the disposal of any land or buildings of the BITRI to the Board.

For the period under review the Board Tender Committee recommended to the Board for award of tenders for the supply of batteries, solar panels, LED printed circuit boards, poles and casings for Seding Lights and a tender for the provision of consultancy services for the implementation of electronic documents, records and archives management system

3. FINANCE, AUDIT AND RISK COMMITTEE

The Finance, Audit and Risk Committee is responsible for reviewing and providing guidance in respect of the policies and practices that relate to the management of the BITRI financial affairs. It is also responsible for the monitoring and oversight of the internal controls and risk management systems.

The Committee's duties are as follows:

i. Annually review the organization's

financial policies and regulations in view of maintaining and improving its financial health;

ii. Reviewing and recommending to the Board a long-term financial plan and annual operating/capital budgets consistent with the policies and strategies of the company;

iii. Oversee the management of organization-wide financial assets, including prudent financial and risk management;

iv. Monitor the independence and effectiveness of the internal audit function and review and evaluate the effectiveness of the organisation's internal control system;

v. Annually meet with external auditors to discuss the results of the audit and any required changes to the financial statements, accounting principles and disclosure practices;

For the period under review the Finance, Audit and Risk Committee recommended to the Board for approval the annual financial statements of BITRI, the management accounts and the internal audit annual plan. The Committee also considered quarterly internal audit reports as well as updates on the BITRI risk register.

4. HUMAN RESOURCE COMMITTEE

The Human Resource Committee assists the Board in ensuring that BITRI has the appropriate human resources policies, practices and procedures in line with its human resources goals and strategic objectives, with a view of attracting, retaining, motivating and developing key skills for the organization. Duties of the Committee include the following:

i. Monitoring, evaluating and making decisions on behalf of the Board with respect to human resources policies and strategic matters for recruiting, developing and motivating BITRI employees;

ii. Reviewing and approving human capital development policies and strategies to attract specific research, science and technology capacity and skills;

iii. Monitoring the leadership and management development plans of BITRI as well as ensuring that there is succession planning; and

iv. Periodically reviewing BITRI's recruitment, development, promotion and retention programmes, workforce composition and the appropriateness of current and future organisational structure.

For the period under review the Committee considered updates on human capital strategic objectives and approved a wide array of human capital policies.

	Board	Human Resources Committee	Finance, Audit & Risk Committee	Board Tender Committee	Quality and Technology Committee
Prof. S. Mpuchane **Chairperson**	5/6	n/a	n/a	n/a	n/a
Dr. E. Maje **Vice Chairperson**	6/6	7/9	n/a	n/a	3/4
Mr. E. Elias **Director and Chairperson of QTC**	4/6	n/a	n/a	2/2	2/4
Mr. M. Segage **Director and Chairperson of FRAC**	3/6	n/a	4/4	1/2	n/a
Ms. M. Conlon **Director and Chairperson of BTC**	2/6	n/a	n/a	1/2	2/4
Ms. T. Modungwa **Director and Chairperson of HRC**	4/6	7/9	n/a	n/a	n/a
Mr. O. Marata **Director**	4/6	9/9	n/a	2/2	n/a
Mr. B. Tebogo **Director**	5/6	n/a	2/4	2/2	n/a
Dr. R. Tshelametse **Director**	6/6	n/a	4/4	n/a	4/4
Prof. S. Masupe **Chief Executive Officer and ex-officio Director**	3/3	3/3	3/3	2/2	3/3
Mr. K. Balopi **Co-opted Member of FRAC**	n/a	n/a	4/4	n/a	n/a
Mr. D. Moloi **Co-opted Member of HRC**	n/a	9/9	n/a	n/a	n/a

Directors Remuneration

The BITRI Constitution provides for the payment of a sitting allowance for Directors. The Directors' sitting allowances are paid in accordance with Government rates. The sitting allowances paid during the year under review were at the following rates per sitting:

Chairperson: P1 575.00
Members: P1 260.00

The BITRI Constitution further provides for the payment of travel, hotel and other expenses of the Directors incurred in attending and returning from meetings of the Board or any Committee of the Board or general meetings of BITRI or in connection with the business of BITRI. The payments are done in accordance with the applicable Government regulations and standards.

Regulatory Compliance

As a company incorporated in terms of the Companies Act, BITRI is under a legal obligation to comply with all statutory requirements set out in the Companies Act. In that regard, the annual return and the audited annual financial statements for BITRI for the period under review have been filed with the Companies Intellectual Property Authority. Directors appointed during the period under review were registered with the Companies Intellectual Property Authority within the statutory timelines in compliance with the Companies Act. For the period under review, BITRI complied with all legal requirements emanating from the Companies Act.


EDAX

ABOUT BITRI

The Botswana Institute for Technology Research and Innovation (BITRI) is a parastatal under the Ministry of Tertiary Education Research Science and Technology, established in 2012 to conduct needs-based research and development in focused areas. The Mandate of BITRI is to identify, develop and/or adapt appropriate technology solutions that provides sustainable innovative solutions through co-creation and collaboration in line with national priorities and needs of Batswana.

BITRI will develop technologies that will as much as possible maximize use of local materials to ensure efficiency and affordability.

BITRI will harness its institutional capacity as well as collaborate with other organizations and institutions. BITRI is situated at Maranyane House in Gaborone, Botswana.

BITRI has other campuses in Gaborone, Kanye and Palapye.

BITRI has five Departments, namely: Technologies; Natural Resources and Materials; Research & Partnerships; Human Capital as well as Finance and Operations.

MISSION

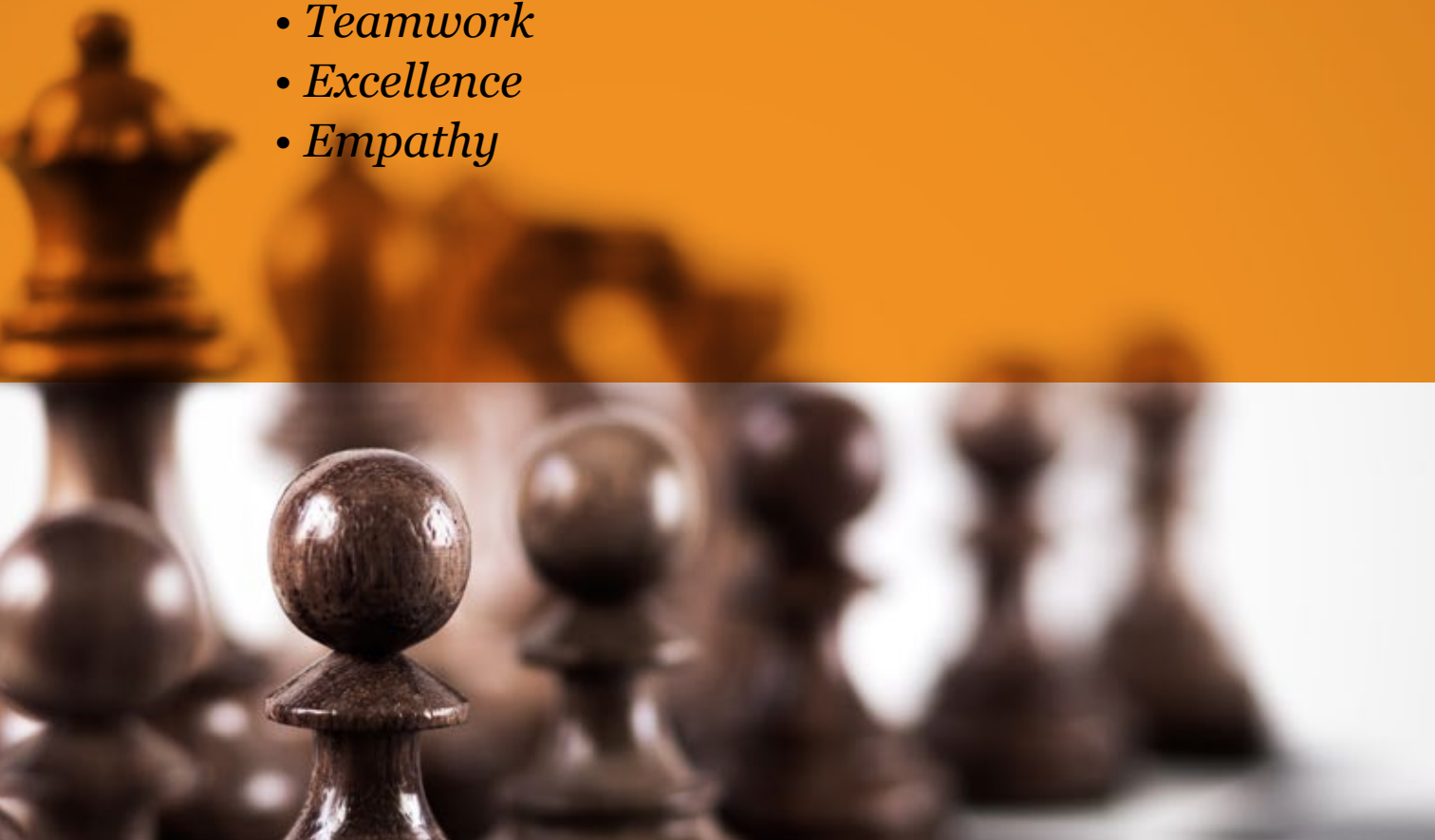
To conduct needs-based technology research that provides sustainable innovative solutions through co-creation and collaboration with local and international stakeholders.

VISION

To be the leading technology solutions provider that transforms lives.

VALUES

- *Teamwork*
- *Excellence*
- *Empathy*



BITRI STRATEGIC INTENT

#1640

#1640 At BITRI, we are focused on three strategic priorities to be achieved by 2020.

1 We are focused on developing One Team / Mission / Goal
6 We will deliver on six technologies
40 We will generate Forty percent of our own revenue

BITRI THEMATIC RESEARCH AREAS

NATURAL RESOURCES AND MATERIALS

- Building Materials
- Climate Change
- Nanomaterials

TECHNOLOGIES

- Electronics and Communications
- Energy
- Information Systems and Technology


nanospider
NS 1WS500U
Elmarco
NANO FOR LIFE

NATURAL RESOURCES AND MATERIALS

BUILDING MATERIALS SCIENCE

The Building Materials Science Division (BMSD) focuses on needs-based research and development (R&D) of new innovative building materials from natural raw materials and industrial by-products or wastes. It also develops technologies for re-cycling conventional building materials, identifies new/innovative uses of the same and modifies conventional building materials to improve their performance. In addition, the Division hand-holds companies, especially start-up companies, that take up the new/innovative building materials developed in-house or are developed by other entities and evaluated by the BMSD as fit-for-purpose. In executing the latter, the BMSD collaborates with key stakeholders such as the Botswana Bureau of Standards (BOBS), Departments of Building & Engineering Services (DBES), Housing, Botswana Housing Corporation (BHC). BMSD also develops algorithms for the selection, specification & quality assurance of materials for given applications, to meet the following requirements:-

i. Cost-effectiveness of both production & application
ii. Environmental friendliness of processes of both production & application
iii. Fitness for purpose
iv. Aesthetic appeal

Project Implementation and Milestones

During the reporting period the Building Materials Science Division executed five projects The following projects were initiated at the beginning of the reporting period.

i. KSBB (Kgalagadi Sand Building Block/Brick) Technology Rollout
ii. Investigation of Effect of Admixtures on Rate of Strength Gain & Durability of KSBB
iii. Towards Accreditation of BMS (Building Materials Science) Laboratory
iv. Investigation of Potential of Local Limestones/Calcretes for Production of PC (Portland Cement) Clinker
v. Investigation of Potential of Potential of Local Clays for Production of Refractories

Staff Complement

The Division opened the 2017/18 reporting period with a staff complement of 25, falling into two categories. Category one comprised seven (7) researchers in the direct employ of BITRI comprising of one Lead Researcher, One senior Researcher and five Associate Researchers. Category 2, was staff indirectly employed by BITRI for the execution of the Economic Stimulus Programme (ESP) driven KSBB Technology Rollout Project comprising of one Project Manager, four Associate Researchers, four Resident Engineers and nine Trainer Artisans.
During the reporting period one Associate Researcher employed by BITRI resigned and one Associate Researcher from category 2 also resigned. In the same period, two Clerks of Works were employed under Category 2.

CLIMATE CHANGE

The Climate Change Division focuses on four of Botswana National Research, Science and Technology Plan 2005, priority areas of research namely agriculture, health, water resources and energy. The specific objectives are to address the four priority areas of research through evidence based research and upscaling of the results as decision support tools and technologies to household and the national level; In this regard, the division carries out user-inspired research that advances decision support process for the agriculture, health, energy and water sectors for a changing climate; Communications and Knowledge management; Convey climate change and extreme weather risk, impacts, opportunities, and solutions clearly, succinctly, and in a way understood unambiguously by the end user; Services: Prototype and develop new methods and products to quantify and exploit climate change opportunities and reduce risks.

Project Implementation and Milestones
During the reporting period the Division had seven projects running as follows;

a. Climate variability and change risk assessment and management: Development of Decision Support Systems for dry land small scale arable farmers in Barolong and Kgalagadi south sub-districts

The aim of this project is to reduce the impact of climate change on small holder arable farmers by strengthening their adaptive capacity for resilient building in the midst of climate change. During the reporting period seasonal planting planning sessions were held at both districts and inputs distributed among the participating farmers. Seven extension officers were capacitated on the use of rippers, planters, and sprayers and 49 hectares out of the 80 hectare planned were ripped by the end of the ploughing season, in February for both districts. In addition 80 rain gauges were placed in all the selected fields to keep record of this season's rainfall amount. Twenty female headed household farmers from Kgalagadi South were trained on postharvest and value addition technologies to facilitate income generation and livelihood diversification, a key aspect under climate change adaptation. Farmers attended a mini agricultural show in Kgalagadi to show case their processing skills learnt at the National Food Technology Research Centre. Following successful ploughing planting for the 2017/18 season, two farm walks were held for both Borolong and Kgalagadi South communities. The field days attracted over 500 participants from different parts of the country including those from SAMA cluster in Masunga.

b. Out-scaling and up-scaling Climate-Smart Agriculture in smallholder farming Masunga: SAMA Cluster

BITRI partnered with the Ministry of Agricultural Development and Food Security (MADFS) and Masunga Community to upscale Climate Smart Agriculture as a strategic priority for the attainment of food security by smallholder farmers in the midst of climate change.

The project focuses on; launching local interactions on the basis of traditional knowledge and adaptation practices; building institutional and technical capacity; addressing longer term issues of climate change through awareness raising; initiating field testing of adaptation options.

During the reporting period the team engagement with traditional leadership on the project and its design, baseline data collection, community adaptation planning and learning journeys for cluster farmers. Training of extension workers on vulnerability

assessment, soil sampling and also pest control equipment use was carried out.

c. Evaluating past droughts, floods, and other climatic clues to inform future climate predictions

This project aims to develop "Botswana Drought Management Strategy" with the Lead Researcher as the lead author of a multi-sector technical team. By the end of the reporting period, a draft Drought Management Strategy was presented at Rural Development Council.

d. Downscaling climate change scenarios to spatial scales relevant for risk management and policy decisions

This project entails developing and adapting various techniques to downscale global climate model projections to sub-country scales. This research involves downscaling climate change scenarios to district, sub-district and area levels in order to aid in policy making, climate change risk assessments and management as well as development of adaptation options for climate change and extreme weather events. By the end of the reporting period analysis of the downscaled outputs continued whereas downscaling of EIN15 reanalysis data using the RegCM model at a 25km resolution had been paused. The downscaling was paused to allow the IT team to increase disk space to allow for storage of outputs from the simulations as well as further data downloads. Downloading of mid-term climate projections (2040-2070) for the HadGEM2-ES model had also been paused for the same reason. Collaboration efforts with the SADC Climate Service Centre continued to be pursued for use of their available infrastructure.

e. The economic impact of El Nino related drought on small and medium enterprises in greater Gaborone area

The project was done in collaboration with London School of Economics (LSE) and funded by the Department for International Development, UK. It aimed to assess the impacts of and responses to extreme drought associated with the 2015-16 El Nino on Small and Medium Enterprises (SME) in the Greater Gaborone Area, particularly how they are affected by water supply disruption. Insights of water managers and SME responses allowed for generation of recommendations on preparedness and responses that will contribute to increased resilience to future El Niño events.

By the end of the reporting period, the project was completed and a policy brief was being developed to recommend best practices of climate proofing SMEs as an input to the country's drought management strategy. In addition two journal articles; "Business experience of floods and drought-related water and electricity supply disruption in three cities in sub-Saharan Africa during the 2015/2016 El Niño" has been published in Global Sustainability and also, "Hydrological Response and Complex Impact Pathways of the 2015/2016 ElNiño in Eastern and Southern Africa" published in Earth's Future.

f. Hedging dryland crop income against climatic risks: Optimal options under a changing climate

The crop insurance project aims to develop hedging strategies for farmers to protect their crop income during years of drought. Thus the outcome of this project will be a tool that government can consider in order to support commercial farmers in an

effort to reduce the threat to food security. Insurance companies and/or government can also use this tool as a basis for setting up insurance policies for dryland farming. By the end of the reporting period the first phase of the project which included the study of weather patterns and how they relate to crop yield was carried out and completed. The revision of the draft report that suggests options for risk mitigation to help improve the Agricultural Credit Guarantee Scheme was underway. The report argues for a crop-specific and semi self-financing approach to determine contribution of the parties and Government subsidies. The report will be shared with the Ministry of Finance and Economic Development, who are the main stakeholder in terms of administering the scheme.

g. Improving availability, access and use of climate information: rainfall Measurement through Mobile Networks

The aim of the project is to measure rainfall using microwave signal attenuation. The microwave signals are transmitted between cell phone towers for mobile communication. Areas used in the study are Gantsi and Werda. This is a collaborative project between the Climate Change Division at BITRI and Botswana Telecommunications Corporation who provide signal monitoring data and technical expertise. By the end of the reporting period, phase 2 of the project that entails upscaling it to evaluate in the 300 BTCL towers had commenced.

Staff

By the end of the reporting period the Division had a staff complement of nine comprising of one Lead Researcher, one Senior Researcher, six Associate Researchers and one Post-Doctoral Researcher.

NANOMATERIALS

The Nanomaterials Division is mandated to perform research that make use of nanotechnology and other technologies to develop products that address the needs of Batswana and also elevate the research and technology landscape of Botswana globally. In developing products, the abundant natural resources and materials in Botswana will be used as a way to add value. The Nanomaterials Division operates in three defined project focus areas; namely Diagnostics, Filtration (Air and Water Filtration) and Mineral Beneficiation (Specialty Chemicals). Research in these three focus areas are underpinned by the availability of state-of-the-art instruments and equipment that are housed at the Centre for Material Science (CMS).

The Division has a multidisciplinary team made up of chemists, physicist, biologists and a chemical engineer.

a. Diagnostics

Diagnostics had three projects running during the reporting period. All three projects are aimed at developing point-of-use lateral flow test strip for detecting viruses in cattle that signify either Foot and Mouth Disease (FMD) or Lumpy Skin Disease (LSD) or Beef Measles Disease (BMD). Of the three cattle diseases test strips, the FMD virus strip is the most advanced in its development, as there is a prototype undergoing validation; while experiments to develop test strips for LSD virus and BMD virus are currently at laboratory stage.

The BITRI FMD project started in 2016, in partnership with the Canadian Food Inspection Agency (CFIA), the Botswana Vaccine Institute (BVI) the Botswana National Veterinary Laboratory (NVL). The validation exercise for the BITRI FMD test strip for antibodies to non-structural proteins involved collection of non-infected and infected samples. The infected samples were collected from Ghana in May 2017 while FMD free samples were collected from green zones in Botswana. Following data collection and analysis of these samples, a validation meeting was organised in Kasane in October 2017 to seek comments and suggestions on the performance of the BITRI NSP FMD virus test strip from experts in selected African Veterinary laboratories and the Canadian Food Inspection Agency (CFIA) partners. The general comments by these experts on the performance of the test strip was that it was doing well but there was need for additional experiments to be performed in order to complete the validation of the strip before it goes for approval by the World Organization for Animal Health (OIE).

Current diagnosis of Lumpy skin disease is mainly through collection of clinical specimen like biopsies (fresh and fixed) from lesions and sending to laboratories. The approach to developing a pen-side lateral flow devise as an LSD diagnostic kit, involves transforming recombinant vectors that can be used to express proteins which will act as antigens on the test line of the Lateral Flow Immunoassay. The project is at a stage where recombinant plasmids have been successfully transformed into Agrobacterium tumefaciens. The BMD virus project only started laboratory experiments in the last quarter of the reporting period.

b. Air Filtration

During the reporting period, further experiments were performed to perfect the

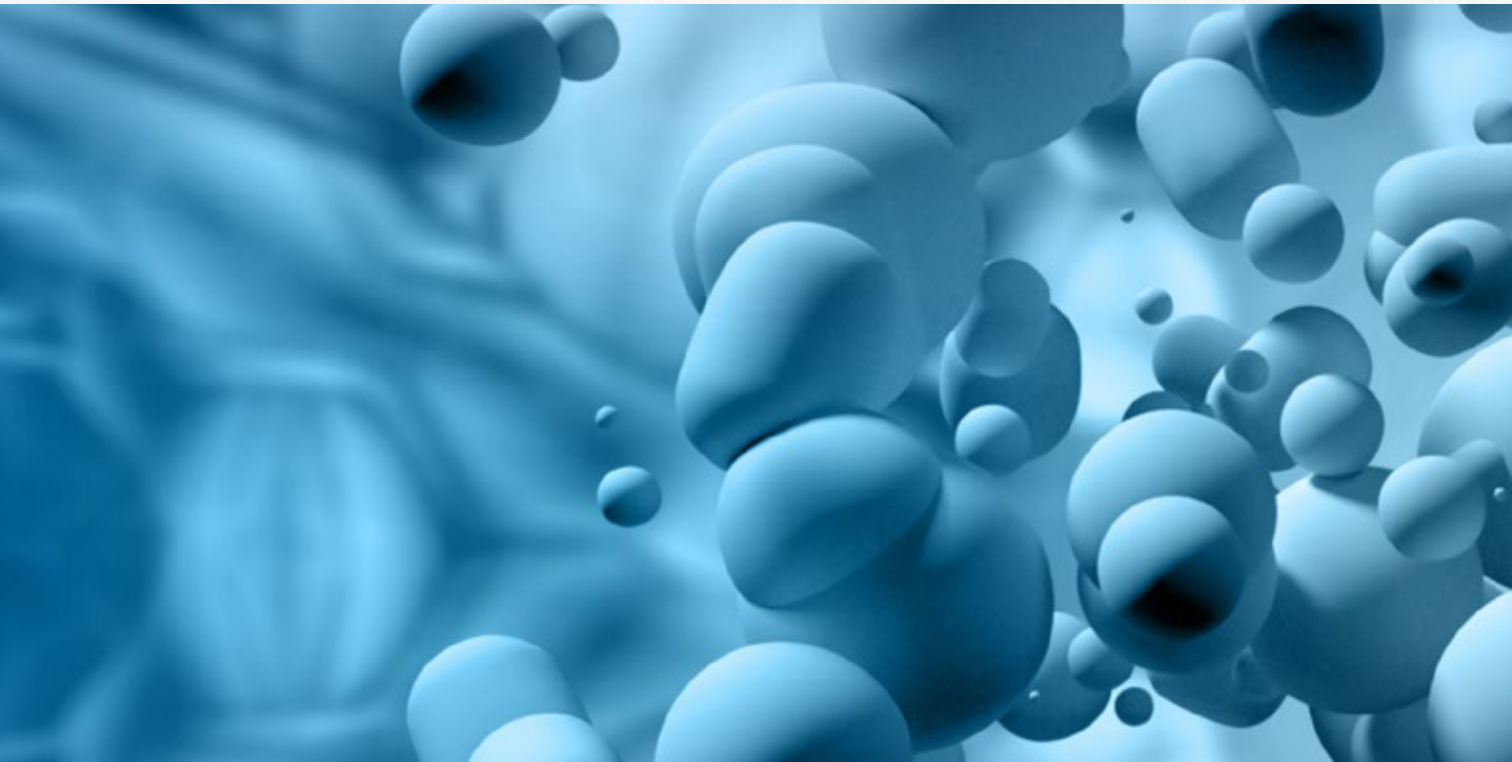
BITRI Filtering Facepiece 1 (FFP1), Filtering Facepiece 2 (FFP2) and Filtering Facepiece 3 (FFP3) nanofibre filters. The team was at a stage where they could make up to 35 meters of nanofiber filter material using one of the pilot scale electrospinning equipment. Using the BITRI nanofiber filter materials, in collaboration with Greenline Technologies, a South African dust mask manufacturing company, FFP1 and FFP2 face mask prototypes were made. These conformed to the South African Bureau of Standards (SABS); which is subscribed to by the Botswana Bureau of Standards (BOBS). The team is currently seeking approval for the BITRI FFP1 and FFP2 face masks from the above- mentioned standards authorities in order to test the face masks in the field. This will be the final phase of validating these face mask prototypes.

c. Water Filtration

Three main types filter blocks, namely nanofibre filters from nylon, ceramic filters from clay and carbon are being developed for water purification. The nanofibre filter cartridge design is a collaborative effort with the BITRI Design team and Central University of Technology in Bloemfontein, South Africa; whilst the ceramic filter design is the work of the BITRI design team and the SKEG group in Cape Town, South Africa. The nanofiber and the ceramic filters already have prototypes, while the carbon filter development is at advanced stage where the BITRI design team is working to build a prototype. All three filters are to be used in 20 Litre bucket set up. The team is also developing new filters from flyash and cellulose extracted from drought resistant local plants.

d. Specialty Chemicals

The specialty chemicals group installed a gasification plant in the 3rd quarter of the reporting period that converts coal to valuable products. This allowed the group to start its coal beneficiation (i.e. coal to liquids (CTL) research in the 4th quarter. Together



with reactors that were acquired in 2016, the group started developing processes that use the reactors to convert synthesis gas from the gasification plant to methanol.

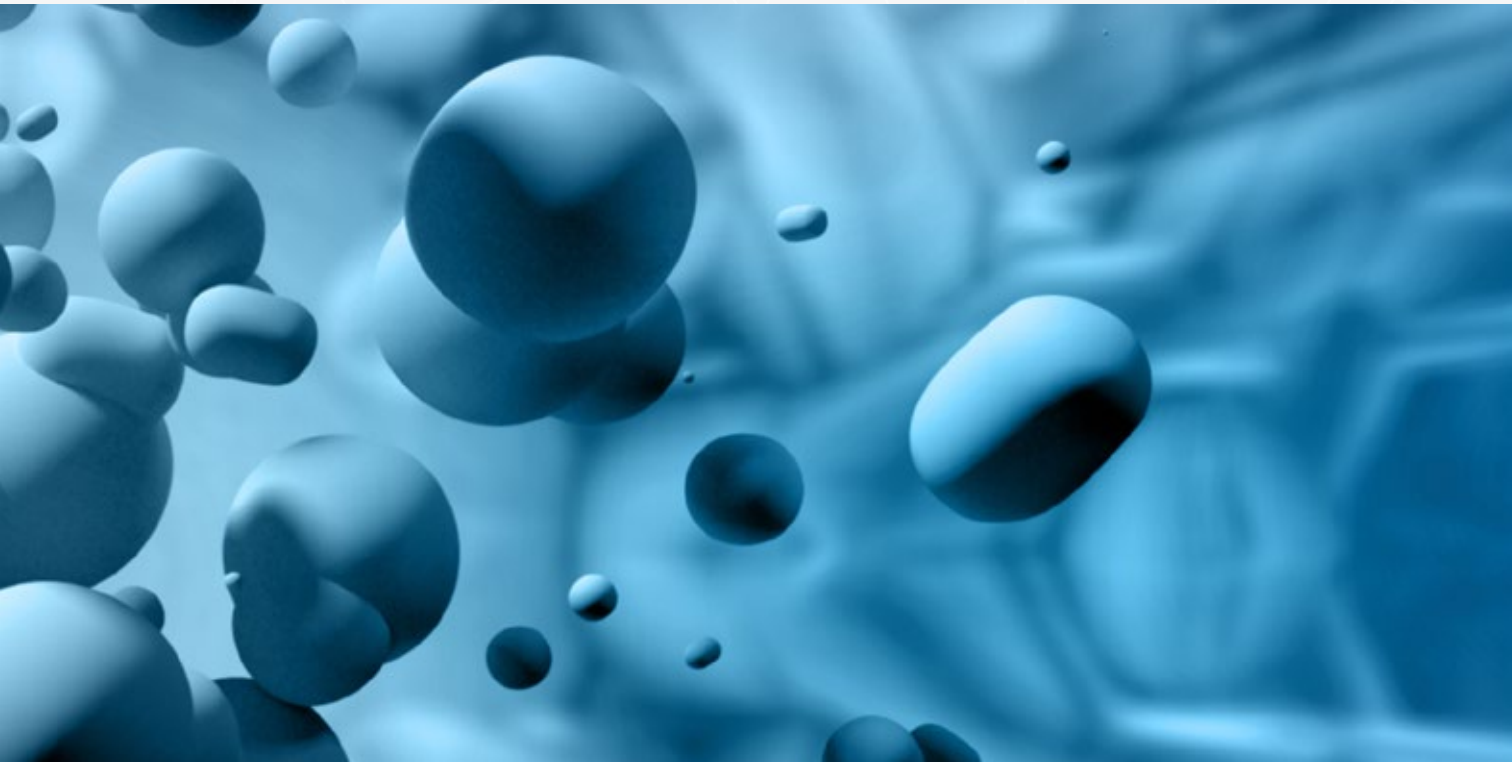
The Specialty Chemicals group has also developed a process that can selectively extract nickel and copper from copper-nickel matte obtained from BCL. The copper extracted can be used to prepare copper and copper oxide nanoparticles as part of further value-addition project of the copper extracted from the BCL matte.

e. Centre for Material Science

The official opening of the Centre for Material Science (CMS) took place on July 13th, 2017 by the then Minister of Tertiary Education, Research, Science and Technology, Dr Alfred Madigele. The CMS embarked on an accreditation exercise that started in September 2017 and should be completed in 18 months. This would enable the Centre to service the mining industry to analyse their samples. Even without accreditation, the CMS offered analytical services to external clients some of whom are; The University of Botswana, Botswana University of Science and Technology, Envesys Services, Multimedia University of Kenya and Vaal University of Technology in South Africa. The CMS also provide crucial analytical service for researchers at the Nanomaterials and Building Material Science Division, with its state-of-the-art instruments and equipment and will continue to do so for years to come.

Staff

By the end of the reporting period the division had a staff complement of 32 comprising of 1 Lead Researcher, four Senior Researchers, one Senior Instrument Specialist, 12 Researchers, one Instrument Specialist, eight Associate Researchers, two Associate Instrument Specialists and three Interns.



TECHNOLOGIES

ELECTRONICS AND COMMUNICATIONS

The Electronics and Communications division focuses on research and development in two main focus areas; Consumer Electronics and Smart Systems. Under consumer electronics the division addresses different needs from smart lighting systems, multimedia gadgets/ systems, and niche technological breakthroughs that universally address bottlenecks in achieving superior control electronic systems (at material and/or system level). Smart systems is where the division innovates and develops especially in the area of wireless communication systems, by developing agile, low power consumption communication protocols for Wireless Sensor Networks (WSNs) for various economic sectors. The division targets niche technological breakthroughs in WSNs that universally address bottlenecks for advancing these fields, at an international level.

Project Implementation

i. Seding v2 (Full Bright at 2000+ lumens and 3000+ lumens)

The 3000+ lumens of Seding v2 is the one that has found a market breakthrough as it is brighter. The product(s) are currently in production and have been for the past financial year. It is envisaged that by May 2018, 191 lights will be installed in the Moshupa areas, batch of 20s have been ordered by the Poverty Eradication Office for installation in various constituencies around the country 50 to Boteti, 50 to Tonota and 29 to Ministry of Defense. Production is at around 100 lights per week. The Seding v2 3000+ managed to attain IP 55. The first 5 speaks to air and dust, and it is 5 if these can marginally enter the casing, with 6 reserved for complete sealing which was never the target (i.e. 5 is top as per design objectives). The second 5 speaks to moisture issues, it is 5 if minimal moisture can enter the case, and 6 is completely sealed. It is possible to improve the sealing such that it is rated IP 56, but then again all electronics are completely sealed against moisture through conformal spraying. The Light was submitted to BOBS and it operated even under high moisture and dusty test conditions.

ii. Solar Powered Sensor Control Module for WSN Applications

The need to power sensors in a field, without routine replacement of batteries is essential for completely autonomous systems. Currently it is thermal and vibration energy systems integrated to the sensor itself that are gaining much attention, where the aim is to have a fully capable sensor deployed in the area of interest. In some application the need for power is more to the extent that vibration and thermal energy harvesting (among others) does not suffice. It is for this reason that E&C invested a lot of effort in the design of a mobile-phone sized solar powered control module for various sensors in the field (they usually have the same power requirements, and thus the device has standard power output ports that meet the needs of these sensors). This module will

address the deployment issues of E&C's water quality and sanitation monitoring system and the deployment of various sensors to be integrated to the up-and-running WSN communication platform with BITRI server access. Only the design was derived in 2017/18, and in 2018/19 the device will be tested practically from prototypes and using various sensors. Its success speaks to the enabling of various sensors in most fields, internationally.

iii. Seding v3+

This incorporates smart enhancements to the Seding v2 electronics. Functions such as cluster based dim/bright operation, wireless data logging of key parameters of the light while still installed (i.e. no need for cherry picker to reach the light and measure, but only wireless device communication to access the battery, panel, LED, and other control signal readings to examine health of the light over a given period). By the end of the reporting period the designs were being fine-tuned with stress testing in the lab prior to batch site testing and eventual production in 2018/19 financial year.

The Division had a staff complement of nine, comprising of one Lead Researcher and 8 Associate Researchers.

ENERGY

The Energy Division focuses on needs based research, development and adoption of Energy technologies (renewable and non– renewable) for Botswana. In addition to research and development, the Division also offers training and consultancy on energy related technologies.

Project Implementation and Milestones

During the reporting period the projects undertaken were as follows:

i. Solar Traffic Lights

During the reporting period, the design of the two solar PV traffic light junctions was finalised. The design included both the AC and the DC junctions. Under the AC junction, Solar PV was to be converted to AC and power the junction with utility power as back up. The AC junction was designed such that when the battery storage failed the utility power will take over. As for the case of the DC junction, Solar PV with battery storage was designed to power the junction without any grid power. With the design finalised and the sites prepared for the installations in collaboration with the relevant stakeholders and partners in the project, the physical implementation of the project was to be carried out by September 2018.

ii. Load Management Device (LMD)

This project started in 2015 aims at addressing the unnecessary use of electricity, damage to sensitive appliances due to power surge caused by power cuts and inconvenience caused by power cuts as far as gadget charging is concerned. By the end of the reporting period the LMD was continually being tested under real test conditions (i.e. house applications) and as such continuous and further enhancement of the device was done. The enhancement of the device included powering the device from the utility power instead of Solar PV. Solar PV powering of the device proved to be unstable therefore rendering the device unstable. The algorithm of the device was also enhanced to enable the power usage of the household. The testing and fine tuning of the LMD device was to be finalised by the 2018/19 financial year, after which the piloting will be done at a larger scale. Further other enhancements of the device includes the compatibility of the device, which will cover issues of the casing and the look of the device.

iii. Quantifying The Financial Costs And Benefits Of Renewable Energy Resources In Botswana's Electricity System

The aim of the project is to investigate the actual financial costs and benefits of the existing renewable energy resources (mostly Solar PV) in Botswana from actual production data (hindsight analysis). The goal is to derive the financial benefits from the calculated impact which existing renewable energy resources have on the existing conventional generation fleet. The hindsight part of the project which was done in collaboration with CSIR was carried out during the 2017/18 financial year which included collection of data (generation data 2015 -2017), refining of the data and data analysis. In quantification of the financial costs of RE in Botswana, it was concluded from the studies that though the RE in Botswana's electrical system (1.3 MW in phakalane) looks small it results in fuel saving. The presentation of the results of the HINDSIGHT studies was to be presented to the stakeholders by July 2018. The presentation was to be followed by

a documented report of the Studies by August 2018. The second part of the project, Foresight analysis is to kick start during the 2018/19 reporting period.

iv. Energy Efficient Cook Stoves

The goal of this project is to design a stove which will be able to perform better than the traditional way of cooking and to design a system that will be better in terms of efficiency as compared to many of the efficient cook stoves in the market. During the reporting period the single and double burner energy efficient cook stoves were fine-tuned and tested. The cook stoves were presented to local government as the main initiator of the project. By the end of the reporting period BITRI was still awaiting for feedback from them on whether to go ahead and pilot the cook stove. In addition, a funding proposal was submitted to EEP as an attempt to source funding for the piloting of the cook stoves. In parallel with the above, a concept note has been developed for a hybrid energy efficient cook stove which is to be further developed during the 2018/19 reporting period.

v. Solar Testing Platform

This project intends to set-up a world class accredited Solar Thermal Testing Facility (STTF) in accordance with ISO/IEC 17025. The facility will be affiliated to the National Certification Program, coordinated by the Botswana Bureau of Standards (BOBS). The setting of the solar thermal testing facility progressed during the reporting period. The specification based on the solar thermal standards, equipment selection and training on the equipment was done. The equipment for the testing facility was procured from SWT in Germany and was expected by June 2018, following which the system will be installed and commissioned by July, 2018. Testing, research and development on solar thermal components is expected to step up with the availability of the testing facility during the 2018/19 financial year.

vi. Biogas Project

The Botswana National Development Plan 2010-2016 accords priority to transforming agro-waste into biogas. This GEF-financed, UNDP-implemented project will assist the Government of Botswana in meeting this priority through three project components:

(i) institutional strengthening and capacity development;
(ii) the facilitation and establishment of biogas plants;
(iii) Setting-up of utilisation and knowledge platforms.

The outcomes of the project will include the implementation of effective waste-management policies and guidelines with operational regulations; capacity to design and develop biogas projects in South-Eastern Botswana; the first best-practice public-private partnership established; reduction in greenhouse gas emissions (direct and indirect) of 1.65 million tCO2e; and increased incomes through the use of small-scale biogas and bio-fertilizer, especially for women. Currently the project is designing small scale digesters which will be shared with project beneficiaries for the rollout of small scale digesters within the project area. The project has also developed a research agenda which will be used to guide the research which has to be undertaken on the technology. As for medium scale digesters the project is working with Botswana Meat Commission (BMC) on the business case for the Commission to construct a medium scale digester which will be used to generate electricity within the facility.

The project has also engaged Water Utilities Corporation (WUC) on strengthening their capacity to monitor and enforce trade effluent agreements. In addition the project is working with Botswana Bureau of Standards (BOBS) on developing standards for the biogas project so that in future both the construction of digesters and the gas produced are monitored within the agreed standards.

Staff

By the end of the reporting period the Division had a staff complement of seven comprising of one Senior Researcher, and six Associate Researchers. In addition to the seven, there are 3 more staff members specifically for the implementation of the Biogas project which include the Project Manager, Project Engineer and the Finance and Administration officer.

INFORMATION SYSTEMS AND TECHNOLOGY DIVISION

Information Systems and Technology Division focuses on research and development to provide technology solutions and next generation products in nine priority areas of Health, Education/Learning, Tourism, Agriculture, Transportation, Security & Forensics, Entertainment, Communication Infrastructures, and Energy.

Project Implementation and Milestones

i. Mobile Tutoring System for Botswana

This project is part of the 'Education Informatics System for Botswana. The Mobile Tutoring System for Botswana part of the project is about mobile application which drills pupils on their subjects and simulates examination. The project focuses on developing a mobile tutoring system for secondary schools. It will address issues of flexible and low cost access to tutoring material.

By the end of the reporting period, the 'shell' application was completed in the 2016/2017 reporting period and what remained was to upload content. However by the end of the reporting period there were difficulties in obtaining content and, for the purpose of Pilot testing and evaluating the application, the Division moved to procure Mathematics examination questions for the application.

ii. Web-based Tutoring Application

This project is part of the 'Education Informatics System for Botswana, The project is about desktop based application which drills pupils on their subjects and simulates examination: The project is a replica of the mobile application on a web-based platform albeit with enhanced capabilities such as student/teacher/parent/headmaster report generation. It was envisaged that certain analytical functionalities will later be added. By the end of the reporting period reports modules/capability were to be added and content uploaded. The Division was working with Kagiso Secondary School (KSSS) for content generation, formatting and structuring. KSSS had pledged a lab for BITRI to use for education technologies in general. The envisaged date of completion was October 2017. The Laboratory at KSSS has since been installed with twenty (20) low cost computers, office furniture and internet connectivity via TVWS technology. IST has moved to procure Mathematics examination questions from training/tutoring organizations for purposes of pilot testing and application evaluation.

iii. Remote Patient Monitoring

This project is part of Health informatics system for Botswana and it focuses on remote monitoring of Non Communicable Diseases including Hyper Tension, cardiac arrest and Diabetes. By the end of the reporting period the project team was engaged in requirement gathering, design and development and security testing. The project was delayed due to human resource constraints. During the reporting period the BETA version of the system was completed; enhancements due to feedback from internal quality testing were also completed. The system was being prepared for evaluation by medical doctors in the private and government sectors prior to pilot testing at Scottish Livingston Hospital and associated clinics.

iv. Notification Platform for Animal Disease Outbreaks

Animal diseases and crop-related conditions outbreaks have the tendency to spread and affect a large number of the population of animals and crops alike. Botswana relies heavily on farming and beef exports and, any form of platform to inform authorities of any possible outbreaks is desirable, thus this projects addresses this problem. By the end of the reporting period the team was engaged in re-focusing the notification platform to be generic animal diseases and other crop related conditions & possibly Interface with existing ones. The envisaged date of completion was November 2017. By the end of the reporting period the application had been re-aligned for both animal and crop-related diseases culminating in the completion of the BEA version of the App. Delays had been experienced due to unavailability of Veterinary Services personnel to clarify requirements for further enhancements prior to pilot running. Going forward, the division was working hard to constitute a collaborative team between BITRI and VET Services in order to finalize the application

Television White Space

This project is in collaboration with the Council for Scientific and Industrial Research (CSIR) of South Africa. The project which focused on building the TVWS Experimental Network that will be used by BITRI in the long term to conduct research on dynamic spectrum access and sharing on the TVWS frequencies was completed during the reporting period. Additionally an instance of Botswana TVWS data-base premised on Geo-location will be developed. By the end of the reporting period the Network deployment was to be completed. Delays were experienced in network deployment. There were also IP issues to be resolved as the network is deployed on BOFINET infrastructure. Network monitoring and testing was still to be done. The National Geo-Location Spectrum database was to be completed in June 2017.

Staff

By the end of the reporting period the Division had a staff complement of 13 comprising of one Lead Researcher, one Senior Researcher, one Researcher and nine Associate Researchers. In addition the Division hosted 40 interns under the Associates @BITRI programme.

RESEARCH AND PARTNERSHIPS DEPARTMENT

The Research and Partnerships Division (R&P) has responsibility for ensuring that BITRI Research policies and guidelines promote a high quality research environment and govern good research practice. R&P supports BITRI researchers to obtain local and international partners, administer grants and contracts, manage the knowledge needs and assists with the technology transfer and commercialization of our technology solutions to our research and business partners. In addition, the division is also responsible for ensuring that BITRI's brand is marketed and the excellent technology research and impact in society and the economy is communicated. Divisions under the Department are Communications and Partnerships, Knowledge Commons and Technology Transfer.

1. COMMUNICATIONS AND PARTNERSHIPS

a. Public Seminars: BITRI held two seminars during the reporting period.

The aim of the seminars were to share and exchange research ideas on topics of current relevance to BITRI mandate in contributing to Botswana's socio-economic development.

b. *Stakeholder Engagement and Consultations*

As a way of engaging with various stakeholders, and further present an update on the technologies being developed, BITRI briefed two District Development Committees being the Palapye District Development Committee as well as the South East District Development Committee in April and May 2017 respectively. In addition three Councils were briefed being the Moshupa Sub District Council, Francistown City full Council and Chobe District full Council. They were all briefed on BITRI mandate, projects and services. These stakeholders are considered to be some of the most important as they are potential end users of BITRI technologies. They are also in position to commission BITRI to provide technological solutions to problems faced as well as provide reliable and competent feedback to BITRI on its technologies. In addition BITRI hosted a business Dinner in Francistown to brief the Francistown business community on technologies being developed and the technology transfer initiatives.

Exhibitions: As a way of further engaging stakeholders and creating awareness about BITRI technologies being developed exhibitions were held at the Northern Trade Fair in Francistown, Ghanzi District Show and Intellectual Property day at Dkar. BITRI also also exhibited at the Palapye Cultural Festival where the aim was to promote the indigenous games portal. BITRI exhibited the Kgalagadi Sand Building Block Technology and mortar at the Builder's and & Construction Expo in October in Gaborone. The objective was to showcase KSBB production cycle and a stub wall in which a newly developed manufactured-sand-based mortar was used. BITRI also exhibiting at the Global Expo from the in October at Fairgrounds in Gaborone. The aim of the exhibitions was to showcase BITRI products and services as well as provide a platform where organizations and individuals can understand the mandate of BITRI and to promote a platform for partnerships and collaborations. Another exhibition of note was at the Poverty Eradication International Conference titled ***"Leave no one behind: the fight against poverty, exclusion and inequality"***. The conference was held in March at the Gaborone International Convention Centre.

His Honour, the then Vice President Mr Mokgweetsi Masisi officially opened the 9th International Conference of the African Materials Research Society organized by BITRI at the Gaborone International Conference Center in Gaborone from December 11-14. The aim of the conference was to allow the scientific and research communities to build knowledge, foster relationships and promote action for further understanding and collaborations in the broad fields associated with materials science and technology. The conference theme was **"Addressing Africa's Challenges Through Materials Development".** Eight symposium themes that constituted the conference reflected both the needs of the global research community, as well as the needs that are specific to Africa. The conference was well attended with over 400 delegates.

In the international arena BITRI exhibited at the Science Forum South Africa in Pretoria, to promote BITRI research work, products and create a platform for networking and collaborations. The former Minister of Tertiary Education Research Science and Technology Dr Alfred Madigele and the BITRI CEO Prof. Shedden Masupe were also present at the Forum.

c. *Communication Strategy*

In an effort to coordinate and enhance communication as well as ensure consistency of messages about BITRI, the Communications Strategy was finalized and approved by the Board.

d. *The Centre for Material Science Official Opening*

The Centre for Material Science was officially opened on 13 July 2017 by the then Minister of Tertiary Education Research Science and Technology Dr Alfred Madigele. Accompanying the Minister was the Assistant Minister Mr Fidelis Molao. One of the objectives of the event was to open our doors to stakeholders so that they see what there is to offer at BITRI. Most of the services that will be availed through the CMS would ordinarily be sourced outside Botswana, often at very high costs because of a lack of such a facility anywhere in the country.

e. *Science Awareness*

In an effort to promote Science Technology Engineering and Mathematics (STEM) BITRI opened its laboratories to students to enable them to see what entails the life of Scientists. When visiting the pupils were given a brief overview of BITRI before being taken on a conducted tour of the Laboratories. Five schools visited BITRI during the reporting period.

2. TECHNOLOGY TRANSFER OFFICE

The Technology Transfer Office was established in March 2015. The functions of the Office include, among others, implementation of the BITRI Intellectual Property Policy, advising on appropriate protection strategies for BITRI research outputs/technologies as well as providing guidance and ensuring compliance with both the national and foreign intellectual property laws where BITRI technologies are protected and commercialized. Capacity building amongst BITRI employees in the area of intellectual property and research management also forms part of the mandate of the Technology Transfer Office.

i. *Preliminary Agreements*

Over fifteen preliminary research agreements such as Non-Disclosure Agreements, Memoranda of Understanding, Memoranda of Agreement, and collaborative research agreements were signed between BITRI and its Research and Development partners during the reporting period.

ii. *Acquisition and Maintenance of Intellectual Property Rights*

BITRI is gradually building up its intellectual property rights portfolio. It has one patent on the Kgalagadi Sand Building Block technology and two registered trademarks namely Signcoach(R) an application bridging the communicating gap between members of the public and the deaf. Seding(R) is another registered trademark distinguishing BITRI adapted solar street lights from similar lights supplied by other enterprises.

iii. *Capacity Building*

Ten BITRI employees benefited from the World Intellectual Property Organization (WIPO) Academy scholarships to study intellectual property and research and development related courses online. Out of them only two are non – Researchers. One of the Researchers completed the Advanced Course on Patent Information Search and Analysis. This is expected to enable him to identify relevant technologies that can be adapted to meet the critical needs of the people of Botswana as per the mandate of BITRI.

3. KNOWLEDGE COMMONS

The Knowledge Commons (KC) is a unit within the Research and Partnerships department, responsible for the management of Knowledge and Information. It is currently staffed by one professional and an intern. During the reporting period the key events that the KC undertook were mainly in the relation to research capacity building. In July 2017 the KC hosted a workshop on Grant Proposal Writing aimed at improving researcher's capacity to write effective proposals for funding. BITRI encourages its staff to look for funding as a way of augmenting the funds from government and drive its #1640 strategic intent. The intent states that BITRI shall raise 40% during the 5 year strategic period to augment government funding. Furthermore, as part of the drive to 40% self-funding by BITRI, the KC has the responsibility of identifying funding opportunities that the research community can tap into for additional funding.

In August the KC organized a hosted a motivational talk for young scientists in commemoration of the World Youth Day. Further, KC hosted a seminar in commemoration of the World Water Day in February 2018, this was done in collaboration with the University Of Botswana Faculty of Science. The seminar being held for the second year received good reviews especially in the sense that it was a collaborative effort that brought together various organizations in the academic, government, private and parastatals working on water research to discuss pertinent issues relating to the state of water in Botswana. BITRI is now part of the Open Data Open Science (ODOS) Committee, which is working towards advocacy for the recognition of the importance of Open Data in Botswana. The ODOS Committee also forms the Local Organizing Committee for the International Data Week which will be held in Botswana in November 2018. This collaborative effort brings together organization around the issue of open data, which is currently a hot topic around the world. ODOS organized and hosted a well-attended national forum on Open Data in October 2017.

CHIEF EXECUTIVE'S OFFICE

INTERNAL AUDIT

The Internal Audit Unit operates as per the terms of reference stipulated in the Internal Audit Charter which was approved by the Board on the 28th October 2016. Its function is to provide an independent, objective assurance, and consulting service designed to add value and improve the operations of the Botswana Institute for Technology, Research and Innovation (BITRI). The Division reports administratively to the Chief Executive Officer (CEO) and functionally to the Board through the Finance, Risk and Audit Committee (FRAC).

The Division reports to the Finance, Risk and Audit (FRA) Committee on quarterly basis on significant issues identified and acts as the main internal independent assurance provider as it provides objective and independent assurance to Management and the Board about risk management, control and governance processes. The Annual Audit Plan is approved by the Board and it ensures that all research organs are adequately considered in the plan based on the risk profile assessed.

Three audits were conducted as per the Plan during the year under review to provide assurance on the efficiency and effectiveness of internal controls. Follow ups were made on the implementation of audit recommendation to ensure that the recommendations were implemented within the timelines as agreed with the Board. However, there were a few issues which remain outstanding for a while due to the delay in the transfer of properties to BITRI from the legacy Institutions (BOTEC and RIPCO (B) and the review and mapping of BITRI Procurement Policy, among others.

Risk Management:

The internal audit function is also responsible for facilitating the risk management and reporting process. The objective of risk management is to create value for stakeholders, improve on decision making and enabling the achievement of strategic objectives and maintaining positive reputation among BITRI stakeholders. The risks were assessed across operational, financial and strategic risk categories. The Board is responsible for the overall governance of the risk and it is assisted by the FRA Committee. During the Financial year 2017/18, the Board was monitoring 12 Organisational risks. There was a consistent high level of residual risks because most of them needed funds to be implemented and therefore, they could still have adverse effects on BITRI operations should these risks materialise. These included securing funds for the risk policy and fire detection/suppression equipment for the laboratories among others.

Therefore, at the end of the financial year the Board resolved that Internal Audit should facilitate the development of the Risk Framework and policy as part of the 2018/19 Annual Plan. This will inform the risk register in place to define the roles, responsibilities and accountabilities for managing, reporting and escalating risks and other matters throughout the institution. The Framework and Policy will incorporates the oversight, management and assurance of risk management.

STRATEGY OFFICE

The strategy office is responsible for the formulation and management of the organizational strategy and the Performance Management System. During the reporting period the unit ensured that operating annual performance plans were developed. This process resulted in the development of the 2017/18 Corporate Annual Performance Plan as well as eleven divisional plans. These plans were then reviewed quarterly to measure performance. The plans and performance reports were shared with various stakeholders such as the Board and the Ministry of Tertiary Education, Research Science and Technology.

Implementation of Performance Management System

During the reporting period BITRI adopted a Performance Management System (PMS) that linked the performance of its workforce with organisational success by focusing on the achievement of the strategic objectives of the Institution. The strategic focus of PMS is to monitor, measure and enhance the performance of staff as individuals as well as a team. The BITRI PMS is based on the principles of high performance, objectivity, flexibility as well as self-management. After the development of the 2017/18 annual performance plan, the cascading process was done to ensure that employee performance contracts were aligned to the plans. These awareness sessions were done in April and September 2017. 90% of employees took part in the performance contract signing and review processes. The scores of the performance appraisals will ultimately determine employment status, progression, promotion or recognition by the organisation. The PMS will also be used to identify learning and developmental needs for employees.

Values Management Framework

The BITRI organizational values architecture consists of three core values each with four key behavioural indicators which aligns with the BITRI culture definition. These are Teamwork, Excellence and Empathy. All employees were assessed on these organisational values as part of the performance review process. The PMS also gauged the extent to which employees espoused and abide by these values. This is to ensure an environment that promotes a high-performance culture and contributes to attainment of BITRI's objectives.

The values narrative is as follows:

Teamwork

We operate and innovate through teamwork and although we expect individual expertise the team performance takes priority. The value of innovation through teamwork includes behavior such as valuing contribution, accepting diversity, pro-active approach, collaboration and co-creation.

Excellence

We expect and encourage unquestionable technical and operational excellence in planning, executing, monitoring and continuously improving everything we do and never to embarrass any colleague, client or partner by sub-standard work or effort

Empathy

We interact, operate and generate solutions which optimally balances the interest of all impacted parties including our customers, the impact of the solutions on our customers, the environment, our colleagues, and the mutual beneficial nature of our partnerships at all times

HUMAN CAPITAL DEPARTMENT

The Human Capital Department is mandated to manage direct, coordinate and supervise the provision of human resource management and development services for BITRI to enable it to implement the overall organisational strategy and to lead the provision of cost effective office support services.

Investment in Developing People

BITRI's priority was to invest in developing staff in the 2017/18 reporting period and hence a Training Plan was developed and implemented. BITRI had employees attend a number of seminars, workshops and courses aimed at providing employees with broader personal development opportunities and improve their knowledge, skills and competencies to contribute to the achievement of the mandate of BITRI. In the research field where skills are relatively in short supply, BITRI is committed to enhancing local skills through provision of technical and management training but was compelled to recruit expertise from around the world. Since its inception, BITRI has prioritised training of employees, and for the period under review BITRI has sent employees for workshops, conferences and short courses to equip them with necessary skills that will enable them to excel in their duties. Some of the training attended include: Brand Creation Ventures, Cooking Skills Foundation Programme, E-Learning Conference, Grant Proposal Writing, Provisioning SQL Server Database, Administering a SQL 2016 Database, International Administrators & Support Staff Forum, Mastering Emotional Intelligence Skills for Excellent Leadership, Brain Based Coaching Certificate, Operational Risk Management Training, Accounts Receivables and Accounts Payable Training, Electronic Data & Records Management Training, Business Writing Skills, Advanced Protocol & Events Management,

Implementing High Performance in Purchasing and Supply Chain Advanced Business writing skills, Advanced Office Management and Effective Administration Skills, RESILIA - Torque technical computer training, Corporate Governance and Design thinking.

Onboarding of Staff

The Induction Policy is in place; therefore, all new employees continue to be inducted in line with the Induction Programme. BITRI ensures that all newly appointed staff receive appropriate induction, initial training and the necessary support to meet early job demands. The induction process is necessary to facilitate the transition of new employees into the working environment and to enable them to respond effectively to new responsibilities. New employees joining the organisation are extensively briefed about BITRI, orientated and initiated into how BITRI operates in terms of culture and values.

Staff Welfare

BITRI places a very high premium on its human capital. The Financial Year 2017/2018 has seen BITRI continuing with the existing Staff Welfare Programmes that include: 100% Medical Aid contribution by the organisation, Group Life Assurance, Free Gym Facilities, negotiated Bank Schemes and Funeral Scheme. Arrangements were made for various companies to make presentations to staff on areas such as financial literacy. During the reporting period BITRI recognised Botswana Public Employees Union (BOPEU) as the bargaining agent for BITRI members of staff. There has been engagement between BITRI and BOPEU to finalise the Collective Labour Agreement (CLA) between the two parties. By the end of the reporting period this process was ongoing. The Human Capital Department also ensured that there was provision of cost effective office support servicers to provide a conducive environment for employees to deliver on their mandate. These include procurement of office furniture, fleet management, provision of staff housing, security and cleaning services. The organisation believes that the success of its business is linked to the motivation and success of its employees. BITRI adheres to employee rights and upholds employee rights as per the BITRI Terms and Conditions of Employment and as enshrined in the Botswana Labour legislations. BITRI pursues employment practices which are designed to attract, retain and develop talent to ensure that it retains employees who are highly motivated. The Executive Management in conjunction with the Human Capital Department takes responsibility for employment matters and has established suitable policies and guidelines.

Recruitment of Talent

The Human Capital Department continued to ensure that BITRI used competency-based interviews to recruit the best caliber of employees to deliver BITRI mandate. All vacant position were advertised internally and externally our adverts were clear on what was required. BITRI Human Capital Department uses Sage modules that are fully computerized to improve turnaround time for recruitment and selection and to ensure that the recruitment process attracts and selects best candidates into BITRI.

Retention of Staff

The Retention Policy was developed and approved by the Board of Directors. BITRI maintains that it is more cost effective to invest in retention of staff than it is to rehire, retrain and realign new staff members. It is therefore critical that BITRI endeavour to accomplish retention of staff by creating and promoting a positive culture, develop skills of employees and keeping employees motivated. Attempts have been made to develop a culture of offering constructive feedback, good benefits, career pathing and meaningful compensation as ways of keeping employees satisfied and therefore happy to continue working for BITRI. A Staff Climate Survey was carried out and all identified staff concerns from the Staff Climate Survey continue to be addressed. The Staff Welfare Committee successfully arranged for the Staff End of Year Get Together in December 2017.

Achievements

The BITRI staff complement increased from 151 to 167 due to the recruitment and selection drive. BITRI was able to retain most of its employees and there were four (4) resignations which was 2.4% of the total establishment.

BITRI developed policies to guide the achievement of the BITRI mandate such as, Human Capital Strategy; Recruitment and Selection Policy; Training and Development Policy; Retention Policy; Fleet Management Policy; Induction Polic; Housing Policy; Succession Policy. BITRI was also able to implement the Performance Management System.

Challenges

Challenges faced during the period include shortage of highly skilled human capital, especially at levels of Senior Researcher, difficulties in securing both Residence and Work Permits for expatriate employees, Shortage of transport since BITRI fleet inherited from legacy institutions is no longer capable of meeting the demands of current staff, thus affecting the completion of projects on time. There has been budgetary constraints and therefore the organisation was unable to procure more vehicles.

FINANCE AND OPERATIONS

The Finance and Administration Department ensures the efficiency to support the organization as a whole to focus on its core business and thus attain its targets through the provision of finance and administrative services includes development and execution of the organizations' budget; maintenance of official accounting records; procurement of and contracting for goods and services. It is made up of Finance, Facilities, Procurement & Cafeteria.

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION

Financial Statements
31 March 2018

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
COMPANY LIMITED BY GUARANTEE - CO2012/8667
GENERAL INFORMATION

MEMBERS OF THE BOARD

Dr. Martin Kebakile	(Board Chairperson)	Resigned 31 May 2017
Prof. Sasae Mpuchane	(Board Chairperson)	Appointed 01 June 2017
Prof. Shedden Masupe	(Chief Executive Officer)	Appointed 01 October 2017
Ms. Keitseng Monyatsi	(Board Member)	Resigned 31 May 2017
Mr. Edwin Elias	(Board Member)	
Mr. Mao Segage	(Board Member)	
Ms. Mercy Conlon	(Board Member)	
Dr. Ditshupo Ecco Maje	(Board Member)	
Ms Tekolo Modungwa	(Board Member)	
Mr. Oganeditse Marata	(Board Member)	
Mr. Baitshepi Tebogo	(Board Member)	
Dr. Ronald Tshelametsi	(Board Member)	Appointed 01 June 2017

BOARD SECRETARY

Keamogetse Molefhe

NATURE OF BUSINESS

Botswana Institute for Technology Research and Innovation is a research and development company. The focus areas are natural resources and materials, energy, ICT and electronics.

PLACE OF BUSINESS

Maranyane House
Plot 50654
Machel Drive
Gaborone

BANKERS

Barclays Bank of Botswana Limited
First National Bank Botswana Limited

AUDITOR

Ernst & Young
2nd Floor Letshego Place
Khama Cresent
P. O. Box 41015
Gaborone

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
FINANCIAL STATEMENTS
31 MARCH 2018

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BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
DIRECTORS' RESPONSIBILITY STATEMENT AND APPROVAL OF THE FINANCIAL STATEMENTS
31 MARCH 2018

The Directors are responsible for the preparation and fair presentation of the financial statements of Botswana Institute for Technology Research and Innovation ("BITRI"), comprising the statement of financial position as at 31 March 2018, and the statements of comprehensive income, changes in funds and cash flows for the year then ended, and the notes to the financial statements, which include a summary of significant accounting policies and other explanatory notes in accordance with International Financial Reporting Standards ("IFRS").

The Directors are required to maintain adequate accounting records and are responsible for the content and integrity of and related financial information included in this report. It is their responsibility to ensure that the financial statements fairly present the state of affairs of BITRI as at the end of the financial year and the results of its operations and cash flows for the year then ended, in conformity with IFRS. The independent auditors are engaged to express an independent opinion on the financial statements and their unmodified opinion is presented on pages 57-58.

The Directors are responsible for the preparation and fair presentation of these financial statements in accordance with IFRS and for such internal control as the Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

The financial statements are prepared in accordance with IFRS and are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgments and estimates. The Directors' responsibility also includes maintaining adequate accounting records and an effective system of risk management.

The Directors acknowledge that they are ultimately responsible for the system of internal financial control established by BITRI and place considerable importance on maintaining a strong control environment. To enable the directors to meet these responsibilities, the board of directors sets standards for internal control aimed at reducing the risk of error or loss in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout BITRI and all employees are required to maintain the highest ethical standards in ensuring BITRI's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in BITRI is on identifying, assessing, managing and monitoring all known forms of risk across BITRI. While operating risk cannot be fully eliminated, BITRI endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The Directors have made an assessment of BITRI's ability to continue as a going concern and there is no reason to believe the organisation will not be a going concern in the year ahead.

The Directors are of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the financial statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement or loss.

Directors' approval of the financial statements

The financial statements set out on pages 59 -83 which have been prepared on the going concern basis, were approved by the Board of Directors on 27th September 2018 and are signed on its behalf by:

DIRECTOR

DIRECTOR

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF THE BOARD OF DIRECTORS OF BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION

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Building a better working world

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Registration No: 10829
VAT No: P03625401112
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Independent Auditor's Report
To the Board of Directors of Botswana Institute for Technology Research and Innovation

Report on the Audit of the Financial Statements

Opinion
We have audited the financial statements of Botswana Institute for Technology Research and Innovation set out on pages 6 to 24 which comprise the statement of financial position as at 31 March 2018, and the statement of comprehensive income, statement of changes in reserves and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the financial statements give a true and fair view of the financial position of Botswana Institute for Technology Research and Innovation as at 31 March 2018, and its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards and the requirements of the Companies Act Cap 42:01.

Basis of Opinion
We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Company in accordance with the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants (IESBA Code) and other independence requirements applicable to performing the audit of Botswana Institute for Technology Research and Innovation. We have fulfilled our other ethical responsibilities in accordance with the IESBA Code, and in accordance with other ethical requirements applicable to performing the audit of Botswana Institute for Technology Research and Innovation. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters
Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the financial statements of the current period. We have determined that there are no such matters to report.

Other Information
The Board of Directors is responsible for the other information. The other information comprises the Board of Director's Responsibility Statement and approval of financial statements. The other information does not include the financial statements and our auditor's report thereon.
Our opinion on the financial statements does not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.
In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Board of Director's for the Financial Statements
The Board of Directors is responsible for the preparation and fair presentation of the financial statements in accordance with International Financial Reporting Standards and the requirements of the Companies Act Cap 42:01, and for such internal control as the Board of Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.
Those charged with governance are responsible for overseeing the company's financial reporting processes.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF THE BOARD OF DIRECTORS OF BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION (CONTINUED)

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Auditor's Responsibilities for the Audit of the Financial Statements
Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with ISAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors.

- Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Ernst & Young 16/10/2018

Ernst & Young
Practising member: Bakani Ndwapi
Partner
Membership number: 19980026
Certified Auditor
Gaborone

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
STATEMENT OF COMPREHENSIVE INCOME
FOR THE YEAR ENDED 31 MARCH 2018

	Notes	2018 P	2017 P
INCOME			
Revenue grant	2	105,011,732	88,176,176
Interest income	3	59,063	155,349
Other income	4	1,687,235	1,423,228
Total income		106,758,030	89,754,753
EXPENSES			
Staff costs		61,796,379	55,300,607
Other operating costs		41,350,553	37,423,156
Total expenses		103,146,932	92,723,763
Surplus and total comprehensive surplus for the year	**5**	**3,611,098**	**(2,969,010)**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
STATEMENT OF FINANCIAL POSITION
FOR THE YEAR ENDED 31 MARCH 2018

	Notes	2018 P	2017 P
Assets			
Non-current assets			
Property, plant and equipment	7	183,285,171	174,831,851
Current Assets			
Inventories	8	10,542,927	1,558,395
Trade and other receivables	9	1,469,099	1,043,713
Cash and cash equivalents	10	59,186,943	69,357,747
		71,198,969	71,959,855
TOTAL ASSETS		**254,484,140**	**246,791,706**
Funds and Liabilities			
Funds			
Accumulated surplus		6,724,279	3,113,181
Non-current liabilities			
Capital grant	11	112,283,405	101,765,150
Deferred revenue grant	12	69,223,085	71,204,668
		181,506,490	172,969,818
Current liabilities			
Bank overdraft	10		-
Deferred revenue grant	12	1,778,669	1,862,022
Project funds	13	48,698,881	58,042,183
Trade and other payables	14	4,360,457	3,080,117
Provisions	15	11,415,364	7,724,385
		66,253,371	70,708,707
TOTAL FUNDS AND LIABILITIES		**254,484,138**	**246,791,706**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
STATEMENT OF CHANGES IN FUNDS
FOR THE YEAR ENDED 31 MARCH 2018

	Accumulated Surplus P
Balance as at 1 April 2016	**6,082,191**
Total Comprehensive deficit for the year	(2,969,010)
Balance as at 31 March 2017	**3,113,181**
Total Comprehensive surplus for the year	3,611,098
Balance as at 31 March 2018	**6,724,279**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED 31 MARCH 2018

	Notes	2018 P	2017 P
CASH FLOWS FROM OPERATING ACTIVITIES			
Surplus / (Deficit) for the year		3,611,098	(2,969,010)
Adjustment for:			
Depreciation of property, plant and equipment	7	15,462,251	11,102,373
Interest received	3	(59,063)	(155,349)
(Profit)/ loss on disposal of property, plant and equipment		-	(144,860)
Cash inflow/(outflow) from operations before working capital changes		19,014,286	7,833,154
Decrease/(Increase) in inventories		(8,984,532)	850,893
Decrease/ (increase) in trade and other receivables		(425,386)	2,253,056
Increase/(decrease) in trade and other payables		1,280,341	220,388
Increase/(decrease) in provisions		3,690,979	1,483,678
Increase in capital grants		10,518,255	50,277,903
(Decrease) in the deferred revenue grant		(2,064,936)	(1,939,456)
(Decrease)/ Increase in project funds		(9,343,302)	(35,840,411)
Net cash (used in)/generated from operating activities		(13,685,705)	25,139,205
CASH FLOWS FROM INVESTING ACTIVITIES			
Interest received	3	59,063	155,349
Purchase of property, plant and equipment		(24,429,731)	(52,530,405)
disposal of property, plant and equipment		514,159	1,470,561
Net cash used in investing activities		(23,856,510)	(50,904,495)
NET (DECREASE)/ INCREASE IN CASH AND CASH EQUIVALENTS		(10,170,805)	(25,765,290)
CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR		69,354,747	95,123,037
CASH AND CASH EQUIVALENTS AT END OF YEAR	**10**	**59,183,942**	**69,357,747**
Represented by:			
Cash in the bank		59,180,944	69,354,747
Bank on hand		2,999	3,000
		59,183,943	**69,357,747**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES
31 MARCH 2018

General Information

Botswana Institute for Technology Research and Innovation "BITRI" is a research and development entity whose primary role is to research and develop in focused areas of national interest, deliver high standard technology solutions that maximize the beneficiation of local resources through both institutional and collaborative programs and effectively and affordably address current and anticipated needs for sustainable socio-economic development.

Basis of Preparation

The financial statements of BITRI have been prepared in accordance with the International Financial Reporting Standards ("IFRS"). The financial statements have been prepared under the historical cost convention with the exception of certain assets and liabilities at fair value through profit or loss.

Items included in these financial statements are measured using the currency that best reflects the primary economic environment in which BITRI operates - the functional currency.

The financial statements are presented in Botswana Pula, which is the BITRI's functional and presentation currency.

New and Revised International Financial Reporting Standards

New and revised Standards and Interpretations in issue but not yet effective

At the date of authorisation of these financial statements, the following Standards and Interpretations, which are applicable to BITRI, were issued but were not yet effective:

New/Revised International Financial Reporting Standards	Effective Date
IFRS 9 Financial Instruments	1 January 2018
IFRS 15 (new) - Revenue from Contracts with Customers	1 January 2018
IFRS 16 (New) Leases	1 January 2019

The Directors have not yet assessed the potential impact of the adoption of the above new and revised standards and interpretations. This assessment will be performed as the standards become effective.

Summary Of Principal Accounting Policies

The principal accounting policies adopted are set out below and are consistent, in all material respects, with those adopted in the previous year.

Cash and Cash Equivalents

Cash and cash equivalents are carried in the statement of financial position at cost. For the purposes of the cash flow statement cash and cash equivalents comprise of cash on hand and demand deposits, and other highly liquid investments that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value.

Government Grants

Government grants are not recognised until there is reasonable assurance that BITRI will comply with conditions attaching to them and that the grants will be received.

Government grants whose primary condition is that BITRI should purchase, construct or otherwise acquire non-current assets are recognised as capital grants in the statement of financial position and transferred to profit or loss on a systematic and rational basis over the useful lives of related assets.

Government grants are recognised as revenue over the periods necessary to match them with the costs for which they are intended to compensate, on a systematic basis. Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to BITRI with no future related costs are recognised in profit or loss in the period in which they become receivable.

Revenue Recognition

Interest from short-term deposits and investments is recognized on a time-proportion basis using the effective interest approach. Revenue from services is exclusive of Value Added Tax (VAT) and discounts granted and is recognised in the statement of comprehensive income when the service has been rendered and the following conditions have been satisfied:

a) The amount of revenue can be measured reliably;
b) The stage of completion of the transaction at the statement of financial position date can be measured reliably;
c) It is probable that the economic benefits associated with the transaction will flow to BITRI.

Revenue from fees charged for services is based on the stage of provision of service determined with reference to the services performed by the end of the year. When a receivable is impaired, BITRI reduces the carrying amount to its recoverable amount.

Plant and Equipment

Plant and equipment is stated at cost less accumulated depreciation and accumulated impairment losses except for buildings, which were donated to the Institute, which were capitalised at their valuation amount in 2014. An equivalent amount was recognised in the deferred revenue grant.

The cost of an item of plant and equipment is recognised as an asset when it is probable that future economic benefits associated with the item will flow to BITRI and the cost of the item can be measured reliably.

Costs include costs incurred initially to acquire or construct an item of plant and equipment and costs incurred subsequently to add to the asset. If a replacement cost is recognised in the carrying amount of an item of plant and equipment, the carrying amount of the replaced part is derecognised.

Depreciation is charged so as to write off the depreciable value of the assets over their estimated useful lives down to their residual values, using the straight-line method. The estimated useful lives, residual values and depreciation methods are reviewed at each year end, with the effect of any changes in estimate accounted for on a prospective basis.

The following methods were used during the year to depreciate plant and equipment to estimated residual values:

Buildings	2%
Laboratory equipment	10%
Furniture and fittings	14%
Office equipment	14%
Motor vehicles	20%
Computer equipment	25%
Cell phones	50%
Plant and machinery	10%

An asset's carrying amount is written down immediately to its recoverable amount if the asset's carrying amount is greater than its estimated recoverable amount.

Gains and losses on disposals are determined by comparing proceeds with the carrying amount and are recognised within 'Other Income' in the statement of comprehensive income.

Employee Retirement Benefits

BITRI's employees are engaged on a contract basis and they are entitled to their gratuities at the time preferable to them i.e. monthly, annually or at the end of their contracts. This decision was taken by the Board of Directors at its sitting of the 26 June 2015 where it was resolved that employees be allowed to choose how they prefer to have their gratuity paid over the tenure of their contracts of employment.

Employee entitlements to annual leave, gratuities, bonuses, medical aid, housing benefits, kilometre allowances, telephone allowances, retention allowances and severance benefits are recognised when they accrue to employees and an accrual is made for the estimated liability as a result of services rendered by the employee up to the statement of financial position date. Provision is made in respect of these benefits on an annual basis and included in the operating results.

Foreign Currency Translations

In preparing the financial statements, transactions in currencies other than the BITRI's functional currency (foreign currencies) are recognised at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Non-monetary items carried at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Foreign exchange gains and losses resulting from the settlement of foreign currency transactions and from the translation of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of comprehensive income.

Trade And Other Receivables

Trade receivables are amounts due from procuring entities for services performed by BITRI in the ordinary course of operation. If collection is expected in one year or less (or in the normal operating cycle of the operation if longer), they are classified as current assets. If not, they are presented as non-current assets. Other receivables include advances made to employees.

Trade and other receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method, less provision for impairment.

A provision for impairment of trade receivables is established when there is objective evidence that BITRI will not be able to collect all amounts due according to the original terms of receivables. Significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy or financial reorganisation, and default or delinquency in payments (more than 30 days overdue) are considered indicators that the trade receivable is impaired.

The amount of the provision is the difference between the carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate. The carrying amount of the asset is reduced through the use of an allowable account, and the amount of the loss is recognised in the statement of comprehensive income within 'administration expenses'. When a trade receivable is uncollectable, it is written off against the allowable account for trade receivables. Subsequent recoveries of the amounts previously written off are credited against 'administration expenses' in the statement of comprehensive income.

Project Funds

Project funds relate to funding received for specific projects. These are deferred and included in current liabilities as projects funds. The related expenditure is netted off against the project funds received. Over expenditure which is not recoverable from the donors is recognised as expenditure in the profit or loss of the Institute.

Impairment Of Assets

At the end of each reporting period BITRI reviews the carrying amount of its assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where it is not possible to estimate the recoverable amount of an individual asset, BITRI estimates the recoverable amount of the cash-generating unit to which the asset belongs.

Where an impairment loss subsequently reverses, the carrying amount of the asset (cash-generating-unit) is increased to the revised estimate of its recoverable amount. This is done so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised in prior years. A reversal of an impairment loss is recognised in the statement of comprehensive income.

Provisions

Provisions are recognised when BITRI has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation, and the amount has been reliably estimated. Provisions are not recognised for future operating losses.
Where there are a number of similar obligations, the likelihood that an outflow will be required in settlement is determined by considering the class of obligations as a whole. A provision is recognised even if the likelihood of an outflow with respect to any one item included in the same class of obligations may be small.
Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects the current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to passage of time is recognised as interest expense.

Trade Payables

Trade payables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method. The effective interest method is as described below under 'Financial Instruments'.

Leases

Leases in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are charged to the statement of total comprehensive income on a straight-line basis over the period of the lease.

Borrowings

Interest-bearing bank loans and overdrafts are recorded at the proceeds received, net of direct transaction costs. Finance charges, including amortisation of direct transaction costs, are charged to the statement of comprehensive income using the effective interest rate method. Tranches of borrowings and overdrafts which mature on a regular basis are classified as current or non-current liabilities based on the maturity of the facility so long as the committed facility exceeds the drawn debt.

Inventories

Inventories are stated at the lower of cost and net realisable value. Cost is determined using the weighted average costing method.

Financial Risk Management

BITRI's activities expose it to various financial risks, which under the review period have been analysed, evaluated, accepted as tolerable; and hence no derivative instruments have been used to hedge the financial risks. BITRI's aim is to achieve an appropriate balance between risk and return and minimise potential adverse effects on BITRI's financial performance.

BITRI's risk management policies are designed to identify and analyse these risks, to set appropriate risk limits and controls, and to monitor the risks and adherence to limits by means of reliable and up-to-date information systems. BITRI regularly reviews its risk management policies and systems to reflect changes in markets, products and emerging best practice.

Financial Instruments

BITRI classifies financial instruments, or their component parts, on initial recognition as a financial asset, a financial liability or an equity instrument in accordance with the substance of the contractual arrangement.

Financial assets and financial liabilities are recognised on the BITRI's statement of financial position when BITRI becomes a party to the contractual provisions of the instrument.

Financial assets and financial liabilities are initially measured at fair value. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition.

Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognised immediately in profit or loss.

FINANCIAL ASSETS

Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as loans and receivables. Loans and receivables are measured at amortised cost using the effective interest method, less any impairment. Interest income is recognised by applying the effective interest rate, except for short-term receivables when the recognition of interest would be immaterial.

FINANCIAL ASSETS (CONTINUED)

Cash and cash equivalents

Cash and cash equivalents are carried in the statement of financial position at amortised cost. For the purpose of the statement of cash flows, cash and cash equivalents comprise cash on hand and at bank and funds on deposits.

Impairment of financial assets

'Loans and receivables' are assessed for indicator of impairment at each statement of financial date. Financial assets are impaired where there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been impacted.

For 'Loans and receivables' objective evidence of impairment could include:

- significant financial difficulty of the issuer or counterparty; or
- default or delinquency in interest or principal payments; or
- it becoming probable that the consumer will enter bankruptcy or financial re-organisation.

For financial assets carried at amortised cost, the amount of the impairment is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest. The effective interest method is as described below.

If in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed through profit or loss to the extent that the carrying amount of the investment at the date the impairment is reversed does not exceed what the amortised cost would have been had the impairment not been recognised.

De-recognition of financial assets

BITRI de-recognises a financial asset only when the contractual right to the cash flows from the asset expire; or it transfers the financial asset substantially all the risks and rewards of ownership of the asset to another entity.

If BITRI neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, BITRI recognises its retained interest in the asset and an associated liability for amounts it may have to pay. If BITRI retains substantially all the risks and rewards of ownership of a transferred financial asset, BITRI continues to recognise the financial asset and also recognises a collateralised borrowing for the proceeds received.

FINANCIAL LIABILITIES

Financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. Financial liabilities are subsequently measured at amortised cost using the effective interest method (as described below), with interest expense recognised on an effective yield basis. BITRI's financial liabilities are classified as 'other financial liabilities'.

FINANCIAL LIABILITIES (CONTINUED)

De-recognition of financial liabilities

BITRI derecognises financial liabilities when, and only when, the BITRI's obligations are discharged, cancelled or they expire. The difference between the carrying amount of the financial liability derecognised and the consideration paid and payable is recognised in profit or loss.

Effective interest method

The effective interest method is a method of calculating the amortised cost of a financial instrument and of allocating interest income or expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts or payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial instrument, or, where appropriate, a shorter period, to the net carrying amount on initial recognition.

Critical Accounting Estimates and Judgements

The preparation of financial statements in conformity with IFRS requires the use of certain critical accounting estimates. It also requires management to exercise its judgment in the process of applying BITRI's accounting policies. These areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to BITRI's financial statements are disclosed.

Estimates and judgments are continually evaluated based on historical experience and other factors, including expectations of events that are believed to be reasonable under the circumstances.

The estimates and underlying assumptions are reviewed on an on-going basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

KEY SOURCES OF ESTIMATION UNCERTAINTY

The most significant estimates and assumptions made in the preparation of these financial statements are as follows:

- the calculation of bad debts provision;
- the assessment of impairments and the calculation of the recoverable amount of assets;
- the determination of useful lives and residual values of items of plant and equipment; and
- the calculation of any provision for guarantees, claims, litigation and other legal matters.

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
NOTES TO THE FINANCIAL STATEMENTS
31 MARCH 2018

1. Nature of Business

Botswana Institute for Technology Research and Innovation is an entity with a registration number CO2012/8667. The primary objective is to conduct needs based research and development in focused areas of national interest and deliver high standard technology solutions that maximise the beneficiation of local resources through both institutional and collaborative programmes.

	2018 P	2017 P
2. REVENUE GRANT		
Grants received	89,549,479	87,310,740
Transfer from Deferred revenue grant (note 12)	1,787,017	1,880,922
Amortisation of Capital grants (note 11)	13,675,236	6,646,737
Transfer from recurrent grant (note 11)	-	(7,993,046)
Transfer from deferred revenue grant - disposal of property, plant and equipment	-	58,524
Transfer from capital grant - disposal of property, plant and equipment	-	272,299.00
	105,011,732	**88,176,176**
3. INTEREST INCOME		
Bank deposits	59,063	155,349
4. OTHER INCOME		
Gain on disposal of property, plant and equipment	-	144,860
Sundry income	610,742	314,166
Rental income	1,076,493	964,202
	1,687,235	1,423,228
5. (DEFICIT)/SURPLUS FOR THE YEAR		
In addition to the amounts disclosed in Notes 1, 2, 3 and 4 above, the (deficit) / surplus for the year is stated after taking into account the following:		
Auditors' remuneration		
- current year provision	194,728	200,000
- prior year underprovision	160,312	83,360
Depreciation of property, plant and equipment	15,462,251	11,102,373
Key management's remuneration	6,082,722	5,792,511
6. TAXATION		
Under the provisions of the Income Tax Act (Chapter 52:01) Second Schedule, the Institute is exempted from income tax"		

7. PROPERTY, PLANT AND EQUIPMENT	Buildings	Leasehold Improvements	Plant and Machinery	Computers
COST	P	P	P	P
At 1 April 2016	78,133,133	973,381	2,672,219	6,332,030
Additions	3,377,922	-	576,170	2,909,191
Disposals	-	(973,381)	-	(143,521)
At 31 March 2017	**81,511,055**	**-**	**3,248,389**	**9,097,700**
Additions	999,516		416,333	3,591,977
Disposals				(480,661)
At 31 March 2018	82,510,571	-	3,664,722	12,209,016
ACCUMULATED DEPRECIATION				
At 31 March 2016	2,057,246	-	269,212	1,241,971
Charge during the year	1,575,928	-	284,939	2,184,666
Disposals	-	-	-	(104,282)
At 31 March 2017	3,633,174	-	554,151	3,322,355
Charge during the year	1,649,494		340,371	2,834,487
Disposals				(231,552)
At 31 March 2018	5,282,668	-	894,522	5,925,290
Net book value				
31 March 2016	76,075,888	973,381	2,403,007	5,090,059
Net book value				
31 March 2017	77,877,882	-	2,694,238	5,775,345
Net book value				
31 March 2018	77,227,903	-	2,770,200	6,283,727

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)
31 MARCH 2018

Software	Furniture & Fittings	Laboratory Equipment	Cell phones	Motor Vehicles	Total
P	P	P	P	P	P
2,367,399	1,949,878	43,380,220	18,297	4,670,549	140,497,107
478,784	3,846,940	40,268,322	-	1,073,076	52,530,405
-	-	-	(14,398)	(479,755)	(1,611,055)
2,846,183	**5,796,818**	**83,648,542**	**3,899**	**5,263,870**	**191,416,457**
1,132,459	490,643	16,190,163		1,608,639	24,429,730
			(3,899)	(509,404)	(993,963)
3,978,642	6,287,461	99,838,705	-	6,363,105	214,852,224
274,156	188,890	920,344	17,382	798,387	5,767,588
741,015	671,269	4,712,895	-	931,671	11,102,373
-	-	-	(13,678)	(167,394)	(285,354)
1,015,171	860,159	5,633,239	3,704	1,562,664	16,584,607
918,274	831,679	7,671,689		1,216,257	15,462,251
			(3,704)	(244,548)	(479,804)
1,933,445	1,691,838	13,304,928	-	2,534,373	31,567,054
2,093,243	1,760,988	42,459,876	915	3,872,162	134,729,519
1,831,012	4,936,659	78,015,303	195	3,701,206	174,831,850
2,045,197	4,595,623	86,533,777	-	3,828,732	183,285,171

	2018 P	2017 P
8. INVENTORIES		
Work in progress	10,542,927	1,558,395

Work in progress relates to the Seding Lights project which had not been completed at year end. No inventories are encumbered or pledged as security.

9. TRADE AND OTHER RECEIVABLES		
Trade receivables	752,675	333,599
Staff advances	10,898	20,660
Prepayments	73,428	252,765
Other receivables	632,098	436,689
	1,469,098	1,043,713

Trade receivables comprise rental income billed to Estate Construction which had not been paid. Management considers these amounts to be recoverable based on past performance.

10. CASH AND CASH EQUIVALENTS		
Call account	59,135,533	69,325,035
Current account	19,531	17,240
Credit card account	28,880	12,472
Petty cash	2,999	3,000
	59,186,943	69,357,747

11. CAPITAL GRANT

Balance at beginning of year	101 765 150	51 487 248
Addition to property, plant & equipment	24 429 731	49 203 892
Transfer from recurrent grant - current + prior years	-	7 993 046
Amortisation of capital grant - depreciation of property, plant and equipment	(13 675 236)	(6 646 737)
Net book value of disposed property, plant and equipment	(236 240)	(272 299)
Balance at end of year	112 283 405	101 765 150

12. DEFERRED REVENUE GRANTS

Balance at beginning of year	73,066,690	75,006,146
Revenue grants received during the year	-	-
Transfer to statement of comprehensive income (note 2)	(1,787,017)	(1,880,932)
Netbook value of disposal of property, plant and equipment	(277,919)	(58,524)
Balance at end of year	71,001,754	73,066,690
Current	1,778,669	1,862,022
Non-Current	69,223,085	71,204,668
	71,001,755	73,066,690

The deferred revenue arises as a result of the residential and commercial properties and motor vehicles which were received from the Government of Botswana in December 2014. The current portion is the amount to be amortised to the income statement in the next financial year.

13. PROJECT FUNDS	**1 April 2017 Total**	**Income P**	**Capital grant P**
Cumulative:			
2018			
HQ Building	2,896,727	-	(164,204)
Laboratory Equipment	11,587	-	(3,923,067)
Satellite Offices set up (ICT Associates Programme)	1,715,513	6,161,230	(2,155,999)
KSBB	12,447,722	8,212,377	(703,187)
Climate Change	1,550,324	1,564,210	(200,928)
Coal to Liquid	717,295	1,104,500	(5,560,941)
Seding Lights	35,756,846	21,165,500	(980,138)
Science in Society Project	28	-	-
Water Filtration	78,090	235,000	(68,068)
Diagnostics	46,767	2,726,000	(152,006)
Air filtration	558,556	235,000	(35,840)
Television white space (TVWS)	219,762	1,001,770	-
Design & Prototyping	252,453	1,551,000	(513,697)
Energy Management	196,174	650,000	-
Renewable Energy Technologies	833,276	4,708,000	(233,476)
Software & Mobile Applications	7,445	2,378,000	(1,181,683)
Smart Systems Technologies	158,118	855,000	(3,487,463)
Laboratory Equipment (Building Material Science)	595,500	-	(690,296)
IT solutions	-	5,170,000	(912,481)
Total Development Grants	**58,042,184**	**57,717,587**	**(20,963,474)**
2017			
HQ Building	4,318,443	-	(1,231,251)
Laboratory Equipment	30,903,548	-	(31,221,383)
Satellite Offices set up	6,654,972	-	(651,628)
KSBB	23,818,242	10,639,484	(1,368,184)
Climate Change	1,574,054	1,950,288	(1,168,694)
Coal to Liquid	1,569,157	-	(230,311)
Seding lights	18,481,550	23,926,000	(1,097,619)
Science in Society Project	464,128	-	-
Water Filtration	444,302	-	(170,132)
Diagnostics	629,995	1,960,000	(1,102,587)
Air filtration	596,676	-	(12,163)
Television white space (TVWS)	1,925,870	-	(1,187,236)
Design Equipment	1,355,000	100,000	(2,620,958)
Energy Management	324,102	0	0
Renewable Energy Technologies	822,554	-	(331,374)
Software & Mobile Applications	-	-	(173,997)
Smart Systems Technologies	-	100,000	(1,127,028)
Laboratory Equipment (Building Material Science)		1,752,498	(1,156,998)
	93,882,594	**40,428,270**	**(44,851,543)**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)
31 MARCH 2018

Transfer to capital Work in progress P	Capital Expenditure P	Operating Expenditure P	Impairment P	Transfer to other projects P	31 March 2018 Balance P
(150,062)		(178,348)	-	-	2,404,113
-		(67,156)	-	-	(3,978,636)
-		(4,447,582)	-	-	1,273,162
(12,423,825)		(7,386,011)	-	-	147,076
-		(1,052,125)	-	-	1,861,481
-		(405,215)	-	-	(4,144,361)
-		(10,176,587)	-	-	45,765,621
-		-	-	-	28
-		(448,623)	-	-	(203,601)
-		(2,213,374)	-	-	407,387
-		(285,776)	-	-	471,940
(125,189)		(353,037)	-	-	743,306
-		(271,242)	-	-	1,018,514
-		(101,530)	-	-	744,644
(2,490,679)		(261,697)	-	-	2,555,424
-		(1,917,752)	-	-	(713,990)
-		(846,591)	-	-	(3,320,936)
-		-	-	-	(94,796)
(383,616)		(111,399)	-	-	3,762,504
(15,573,371)	**-**	**(30,524,045)**	**-**	**-**	**48,698,881**
(366,085)	-	175,620			2,896,727
(2,291,667)	-	(1,378,911)	-	4,000,000	11,587
-	-	(4,287,830)	-	-	1,715,514
(5,525,121)	-	(5,116,699)	-	(10,000,000)	12,447,722
-	-	(805,324)	-	-	1,550,324
(25,277)	-	(596,274)	-	-	717,295
-	-	(6,039,086)	-	486,000	35,756,845
-	-	(479,100)	-	15,000	28
-	-	(896,080)	-	700,000	78,090
-	-	(1,440,641)	-	-	46,767
-	-	(25,957)	-	-	558,556
-	-	(518,872)	-	-	219,762
-	-	(681,590)	-	2,100,000	252,452
-	-	(127,928)	-	-	196,174
-	-	(156,904)	-	499,000	833,276
-	-	(118,558)	-	300,000	7,445
-	-	(714,854)	-	1,900,000	158,118
-	-	-	-	-	595,500
(8,208,150)	**-**	**(23,208,988)**	**-**	**-**	**58,042,183**

13. PROJECT FUNDS (CONTINUED)	Total Income P	Total Transfer to capital grant P	Purchase of inventories P
Cumulative:			
2018			
HQ Building	15,600,000	(7,072,421)	(2,337,907)
Laboratory Equipment	78,418,750	(72,592,752)	(7,899,349)
Satellite Offices set up (ICT Associates Programme)	21,207,230	(4,694,203)	-
KSBB	40,698,157	(2,871,601)	(20,172,981)
Climate Change	5,291,242	(1,369,622)	-
Coal to Liquid	5,124,500	(7,867,237)	(240,412)
Seding Lights	68,463,364	(2,458,037)	-
Science in Society Project	515,000	-	-
Water Filtration	1,795,000	(344,302)	-
Diagnostics	5,956,000	(1,254,593)	-
Air filtration	995,000	(48,003)	-
Dynamic Spectrum wireless broadband network on television white space (TVWS)	3,001,770	(1,187,236)	(125,189)
Design & Prototyping	5,106,000	(3,134,654)	-
Energy Management	1,125,000	-	-
Renewable Energy Technologies	6,072,250	(564,850)	(2,490,679)
Software & Mobile Applications	2,678,000	(1,355,680)	-
Smart Systems Technologies	2,855,000	(4,614,491)	-
Laboratory Equipment (KSBB)	1,752,498	(1,847,294)	-
IT solutions	5,170,000	(912,481)	(383,616)
Total Development Grants	**271,824,762**	**(114,189,457)**	**(33,650,133)**
Cumulative:			
2017			
HQ Building	15,600,000	(6,908,217)	(2,187,845)
Laboratory Equipment	78,418,750	(68,669,685)	(7,899,349)
Satellite Offices set up	15,046,000	(2,538,204)	-
KSBB	32,485,780	(2,168,414)	(7,749,156)
Climate Change	3,727,032	(1,168,694)	-
Coal to Liquid	4,020,000	(2,306,296)	(240,412)
Seding lights	47,297,864	(1,477,899)	-
Science in Society Project	515,000	-	-
Water Filtration	1,560,000	(276,234)	-
Diagnostics	3,230,000	(1,102,587)	-
Air filtration	760,000	(12,163)	-
Television white space(TVWS)	2,000,000	(1,187,236)	-
Design Equipment	3,555,000	(2,620,957)	-
Energy Management	475,000	-	-
Renewable Energy Technologies	1,364,250	(331,374)	-
Software & Mobile Applications	300,000	(173,997)	-
Smart Systems Technologies	2,000,000	(1,127,028)	-
Laboratory Equipment (KSBB)	1,752,498	(1,156,998)	-
	214,107,174	**(93,225,983)**	**(18,076,762)**

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)
31 MARCH 2018

Capital Expenditure P	Total Expenditure P	Total Impairment P	Transfer to other projects P	31 March 2017 Balance P
	(3,785,559)	-	-	2,404,113
(83,093)	(1,822,192)	-	-	(3,978,636)
(97,935)	(13,671,275)	-	(1,470,655)	1,273,162
(576,721)	(17,209,063)	279,285	-	147,076
(25,875)	(2,034,264)	-	-	1,861,481
-	(1,248,796)	87,584	-	(4,144,361)
-	(21,710,361)	-	1,470,655	45,765,621
	(514,972)	-	-	28
-	(1,654,299)	-	-	(203,601)
-	(4,294,020)	-	-	407,387
	(475,057)	-	-	471,940
		-	-	-
	(946,039)	-	-	743,306
	(952,832)	-	-	1,018,514
	(380,356)	-	-	744,644
	(461,297)	-	-	2,555,424
	(2,036,310)	-	-	(713,990)
	(1,561,445)	-	-	(3,320,936)
	-	-	-	(94,796)
	(111,399)			3,762,505
(783,624)	**(74,869,536)**	**366,869**	**-**	**48,698,881**

	(3,607,211)	0	0	2,896,727
(83,093)	(1,755,036)	-	-	11,587
(97,935)	(9,223,693)	-	(1,470,655)	1,715,513
(576,721)	(9,823,052)	279,285	-	12,447,722
(25,875)	(982,139)	-	-	1,550,324
-	(843,581)	87,584	-	717,295
-	(11,533,774)	-	1,470,655	35,756,846
-	(514,972)	-	-	28
-	(1,205,676)	-	-	78,090
-	(2,080,646)	-	-	46,767
-	(189,281)	-	-	558,556
-	(593,002)	-	-	219,762
-	(681,590)	-	-	252,453
-	(278,826)	-	-	196,174
-	(199,600)	-	-	833,276
-	(118,558)	-	-	7,445
-	(714,854)	-	-	158,118
-	-	-	-	595,500
(783,624)	**(44,345,491)**	**366,869**	**-**	**58,042,183**

	2018 P	2017 P
14. TRADE AND OTHER PAYABLES		
Trade payables	2 063 996	1 696 263
Staff accruals	4 257	10 035
Other payables and accruals	2 292 204	1 373 819
	4 360 457	3 080 117

15. PROVISIONS	Leave Provision P	Gratuity Provision P	Total P
Balance at beginning of year	3 096 502	4 627 883	7 724 385
Additional provision raised	3 244 081	6 378 052	9 622 133
Payments	(661 225)	(5 269 929)	(5 931 154)
Balance at end of year	5 679 358	5 736 006	11 415 364

16. FINANCIAL INSTRUMENTS	2018 P	2017 P
Categories of financial instruments		
Financial assets		
Loans and receivables (including bank balances and cash)	71 188 071	71 939 195
Financial liabilities		
Other financial liabilities	15 775 820	10 804 502
Interest received on loans and receivables	59 063	155 349

Capital risk management

The capital of the Institute comprises accumulated funds and project funds. Management actively manages capital to ensure that the Institute remains a going concern in the foreseeable future.

Currency risk

The Institute is not exposed to movements in the foreign currency as they have no bank balances in foreign currency nor receivables denominated in foreign currency. There is no active foreign currency risk management process adopted by the Institute mainly because expenditure is incurred in Botswana Pula currency.

16. FINANCIAL INSTRUMENTS (CONTINUED)

Interest rate risk

Financial instruments that are sensitive to interest rate risk are bank balances on call whose interest rates are linked to the prime lending rate. If interest rates were 1% higher while all other variables were held constant the surplus for the year would increase by P591,355 (2017: P693,250) opposite effect. At end of the reporting period the following balances were held in call accounts with reputable financial institutions.

	2018 P	2017 P
Interest bearing financial assets	59 135 533	69 325 035

Liquidity risk

The Institute is funded in advance every quarter by the Government of Botswana. The Government of Botswana is committed to this arrangement due to the Institute's national significance.

Credit risk

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the Institute.

18. RELATED PARTY TRANSACTIONS

Remuneration of key management personnel

Key management personnel are individuals with significant influence in the day to day operations of the Institute. The management considers the Chief Executive Officer, Executive Director - Technologies, Executive Director - Natural Resources & Materials, Director - Research & Partnerships, Director - Finance & Operations and Director - Human Capital to be the only members of key management personnel remunerated by the Institute

	2018 P	2017 P
Short term benefits	6,082,722	5,792,511

19. CONTINGENT LIABILITIES

There are no contingent liabilities in the current financial year.

20. EVENTS AFTER THE REPORTING DATE

The Board of Directors are not aware of any matters or circumstances arising since the end of the financial year, not otherwise dealt with in these financial statements that would have a significant effect on the operations of the Institute or the result of its operations.

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION
DETAILED INCOME STATEMENT
31 MARCH 2018

	2018 P	2017 P
INCOME		
Revenue grant	105,011,732	88 176 176
Interest income	59,063	155 349
Other income	610,742	314 166
Rental income	1,076,493	964 202
Gain on disposal of property, plant and equipment		144 860
	106,758,030	89 754 753
EXPENDITURE		
Advertising	1,317,689	1 241 308
Auditor's remuneration - current year provision	355,040	283 360
Bank charges	176,968	112 795
Board fees	308,932	90 905
Cleaning	937,913	957 964
Computer expenses	763,850	661 383
Consultancy fees	694,118	1 524 962
Depreciation of property, plant and equipment - Operational assets	4,990,619	4 581 957
Depreciation of property, plant and equipment held under capital grant	10,471,632	6 520 294
Directors' remuneration (allocation to Institute)	6,082,722	5 792 511
Insurance	1,321,561	819 741
Internet rentals and service	982,317	1 155 858
Legal fees	0	158 494
Miscellaneous expenses	218,004	6 651
Medical aid	2,312,248	1 771 942
Motor vehicle expenses	372,752	476 878
Office refreshments	681,452	636 853
Postage	21,143	43 385
Printing and stationery	264,068	508 484
Recruitment expenses	242,634	141 811
Rent and utilities	1,952,754	1 775 303
Repairs, maintenance and renovations	2,684,986	3 690 976
Security	1,822,886	1 658 453
Social activities	636,161	617 969
Staff costs	53,401,409	47 736 154
Subscriptions	1,507,845	1 297 064
Subsistence and perdium	1,577,953	1 709 462
Telephone expenses	914,362	995 273
Training	196,498	372 111
Travel	1,194,110	1 388 158
Uniform	9,225	47 816
Consumables and workshop supplies	740,141	1 268 905
Workshop and seminars	2,781,892	2 678 583
Asset Replacement - Recurrent	1,211,048	-
	103,146,932	92,723,763
OPERATING (DEFICIT)/SURPLUS FOR THE YEAR	3,611,098	(2 969 010)

BITRI

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION

MISSION

To conduct needs-based technology research that provides sustainable innovative solutions through co-creation and collaboration with local and international stakeholders.

TECHNOLOGY SOLUTIONS FROM YOU TO US FOR YOU

VISION

To be the leading technology solutions provider that transforms lives.

VALUES

Teamwork

We operate and innovate through teamwork, and although we expect individual expertise, the team performance takes priority. The value of innovation through teamwork includes behaviours such as valuing contribution, accepting diversity, pro-active approach, collaboration and co-creation.

Excellence

We expect and encourage unquestionable technical and operational excellence in planning, executing, monitoring and continuously improving everything we do.

Empathy

We interact, operate and generate solutions that optimally balance the interest of all stakeholders.

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