CSIR SHAREHOLDER'S COMPACT

Cycle commencing 1 April 2016

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

CSIR
our future through science

CSIR Shareholder's Compact

Cycle Commencing 1 April 2016

March 2016

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Acronyms

dti	Department of Trade and Industry
AISI	Aerospace Industry Support Initiative
Al	Aliminium
B-BBEE	Broad-Based Black Economic Empowerment
BCC	Bio-composites Centre of Competence
BIDC	Biomanufacturing Industry Development Centre
CEO	Chief Executive Officer
CHPC	Centre for High Performance Computing
CUT	Central University of Technology
DIFR	Disabling Injury Frequency Rate
DST	Department of Science and Technology
ERM	Enterprise Risk Management
GDP	Gross Domestic Product
HCD	Human Capital Development
HEIs	Higher Education Institutions
IAS	Internal Audit Service
ICT	Information and Communication Technology
IIPF	Industry Innovation Partnerships Programme
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
IT	Information Technology
KPIs	Key Performance Indicators
L&V	Licensing and Ventures
MTEF	Medium Term Expenditure Framework

MTSF	Medium Term Strategic Framework
NDP	National Development Plan
NFTN	National Foundry Technology Network
NICIS	National Integrated Cyberinfrastructure System
NMMU	Nelson Mandela Metropolitan University
OEMs	Original Equipment Manufacturers
PFMA	Public Finance Management Act
PICC	Presidential Infrastructure Coordinating Commission
PPE	Plant, Property and Equipment
R&D	Research and Development
RD&I	Research, Development and Innovation
RTO	Research and Technology Organisation
SAAF	South African Air Force
SANDF	South African National Defence Force
SANReN	South African National Research Network
SAPS	South African Police Service
SET	Science, Engineering and Technology
SIPs	Strategic Integrated Projects
SMEs	Small and Medium Enterprises
SMMEs	Small, Medium and Micro Enterprises
SOC	State Owned Corporation

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Overview of Shareholder's Compact

The Shareholder's Compact is the performance agreement between the CSIR and the Department of Science and Technology (DST). It consists of the text of the Compact itself (Chapter 2) and a series of supporting appendices covering the following aspects:

- Strategic planning documents:
  - The long-term CSIR Strategic Plan (Appendix A);
  - The CSIR Annual Performance Plan (Appendix B);
  - Additional Indicators (Appendix C).
- Documents setting out the governance structures and risk management strategies of the CSIR:
  - The CSIR governance structure (Appendix D);
  - The CSIR Board terms of reference (Appendix E);
  - The Risk Management Plan (Appendix F);
  - The Risk Assessment Methodology (Appendix G);
  - The Fraud Prevention Plan (Appendix H);
  - The Materiality / Significance Framework (Appendix I).
- The CSIR's Financial Plan (Appendix J) and Public Finance Management Act (PFMA) Exemptions (Appendix K).

Shareholder's Compact

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SHAREHOLDER'S COMPACT

FOR THE CYCLE COMMENCING 1 APRIL 2016

MADE AND ENTERED INTO BY AND BETWEEN:

THE MINISTER OF SCIENCE AND TECHNOLOGY

Ms Naledi Pandor, in her capacity as Executive Authority of the CSIR, being the responsible Cabinet member (hereinafter referred to as "the Executive Authority")

and

THE CSIR BOARD

herein represented by Prof. Thokozani Majozi, the Chairperson of the Board, who duly represents the CSIR by virtue of being appointed Chairperson of the CSIR Board on 12 December 2014 by the Minister of Science and Technology

(hereinafter referred to as "the Accounting Authority")

(The parties are hereinafter collectively referred to as "the Parties")

WHEREAS:

The Parties wish to conclude a Shareholder's Compact in order to underscore a constructive working relationship between them, clarify mutual expectations that are to be satisfied, articulate the CSIR's role in support of the effective functioning of the National System of Innovation and establish a framework of good corporate governance;

Chapter 29.2 of the Treasury Regulations issued under the PFMA furthermore requires the Accounting Authority of a Schedule 3B public entity to annually conclude a Shareholder's Compact with its Executive Authority; and

The CSIR Board is the organisation's Accounting Authority and the Minister of Science and Technology is its Executive Authority as Cabinet member responsible for the CSIR;

The Parties have negotiated and reached agreement on the contents of the Shareholder's Compact and wish to record the same in writing;

NOW THEREFORE THE PARTIES HEREBY AGREE AS FOLLOWS:

1. **GLOSSARY OF TERMS**

   In this Shareholder's Compact the following words and/or phrases shall have the following meanings:

   1.1 **Accounting Authority** shall mean the CSIR Board as established in terms of section 7 of the Scientific Research Council Act;

   1.2 The **Corporate Plan**, as embodied in Annexures A to J to this Shareholder's Compact, with

   - Annexure A being the CSIR Strategic Plan;
   - Annexure B being the CSIR Annual Plan for the 2016/17 financial year;
   - Annexure C being the Proposed Additional KPIs for 2017/18;
   - Annexure F being the CSIR's Risk Management Plan;
   - Annexure G being the CSIR's Risk Assessment Methodology;
   - Annexure H being the CSIR's Fraud Prevention Plan;
   - Annexure I being the Materiality Framework; and
   - Annexure J being the Financial Plan (consisting in turn of the Budget and Cashflow for 2016/17; the Group Three Year Financial Plan and the 3-year borrowing plan).

   1.3 **Annexure E** shall mean Annexure E to this Shareholder's Compact, being the Accounting Authority's Formal Terms of Reference;

1.4 **Annexure K** shall mean Annexure K to this Shareholder's Compact, being documentary proof of the exemptions granted in favour of the CSIR in terms of the PFMA;

1.5 **Annual Budget** shall mean the CSIR's annual budget as embodied in Annexures A, B and J;

1.6 **Balanced Scorecard Framework** shall mean the Executive Authority's framework for evaluating the performance of science, engineering and technology institutes described in the DST publication entitled "Reviewing the SETI scorecards" dated May 2003;

1.7 **Basic Conditions of Employment Act** shall mean Act No 75 of 1997;

1.8 **B-BBEE Codes** shall mean the Broad-Based Black Economic Empowerment Codes as published in the Government Gazette from time to time;

1.9 **Employment Equity Act** shall mean Act No 55 of 1988;

1.10 **Effective Date** shall mean the effective date of this Shareholder's Compact, which shall be 1 April 2016;

1.11 **Executive Authority** shall mean the Minister of Science and Technology;

1.12 **KPIs** shall mean the performance measures described in the Corporate Plan, against which the performance of the CSIR shall be evaluated;

1.13 **Labour Relations Act** shall mean Act No 66 of 1995;

1.14 **Materiality Framework** shall mean the materiality framework as envisaged by Clauses 7.3 and 14. below and as recorded in Annexure I;

1.15 **Parties** shall mean the Executive Authority and the Accounting Authority respectively;

1.16 **PFMA** shall mean Acts No 1 and 29 of 1999;

1.17 **Shareholder's Compact** shall mean this document and all annexures thereto;

1.18 **Scientific Research Council Act** shall mean the CSIR's enabling legislation, namely Act No 46 of 1988, as amended by Act No 71 of 1990;

1.19 **Skills Development Act** shall mean Act No 97 of 1998;

1.20 **Treasury Regulations** shall mean the Regulations issued in terms of section 76 of the PFMA.

2. THE SHAREHOLDER'S COMPACT

2.1 This Shareholder's Compact represents the agreement between the Executive Authority of the CSIR, being the Minister of Science and Technology, and the Accounting Authority

of the CSIR, being the CSIR Board, herein represented by the Chairperson of the Board, by virtue of being appointed Chairperson of the CSIR Board on 12 December 2014 by the Minister of Science and Technology. It is a reflection of the expectations of each of the Parties, expressed in terms of outcomes and outputs that need to be achieved during the financial year starting on 1 April 2016.

2.2 This Shareholder's Compact shall operate as from the Effective Date and will be reviewed by the Parties at the end of the financial year ending on 31 March 2017.

3. LEGAL REQUIREMENT AND PRIMARY RELATIONSHIP BETWEEN THE SIGNATORIES

3.1 Chapter 29 of the Treasury Regulations impose the following legal requirements on the Accounting Authority of a Schedule 3B public entity, such as the CSIR, and its Executive Authority in terms of the conclusion of a Shareholder's Compact:

> "*29.2 Shareholder's compact*
>
> *29.2.1 The accounting authority for a public entity listed in Schedule 2, 3B or 3D must, in consultation with its executive authority, annually conclude a shareholder's compact.*
>
> *29.2.2 The shareholder's compact must document the mandated key performance measures and indicators to be attained by the public entity as agreed between the accounting authority and the executive authority.*"

3.2 The CSIR's Accounting Authority therefore hereby concludes this Shareholder's Compact with its Executive Authority.

4. FRAMEWORK FOR SHAREHOLDER'S COMPACT

4.1 In terms of Section 3 of its enabling legislation, namely the Scientific Research Council Act, the mandate of the CSIR is as follows: *"The objects of the CSIR are, through directed and particularly multidisciplinary research and technological innovation, to foster, in the national interest, and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors and thereby to contribute to the improvement of the quality of life of the people of the Republic; and to perform any other functions that may be assigned to the CSIR by or under this Act."*.

4.2 The Shareholder's Compact

This Shareholder's Compact is concluded between the CSIR's Accounting Authority and its Executive Authority pursuant to the provisions of the Treasury Regulations referred to

under clause 3.1 above. The CSIR's strategic objectives are outlined in the Corporate Plan, which also incorporates the outcomes, strategic business initiatives and key performance measures and indicators; the CSIR Strategic Plan and the CSIR Annual Plan for the 2016/17 planning cycle; the CSIR's Risk Management Plan; the CSIR's Fraud Prevention Plan; the Materiality Framework; the Budget and Cashflow for 2016/17; the Group three year financial plan and the organisation's 3 year borrowing plan. The Accounting Authority undertakes to oversee the implementation of the said elements of the Corporate Plan.

5. INTERNAL TRANSFORMATION

Transformation plans and policies

The Corporate Plan of the CSIR deals with, in Appendix A, matters relating to, amongst others, transformation. In giving effect to the Corporate Plan, the Accounting Authority will ensure full compliance by the CSIR to all applicable legislation, such as, but not limited to, the Employment Equity Act, the Skills Development Act, the Labour Relations Act, the Basic Conditions of Employment Act, the Broad-Based Black Economic Empowerment (B-BBEE) Codes and the like.

6. THE ROLE AND POWERS OF THE ACCOUNTING AUTHORITY

6.1 In terms of Section 7 of the Scientific Research Council Act, the affairs of the CSIR *"shall be managed by a Board, which shall determine the policy and objectives of the CSIR and shall exercise control generally over performance of its functions, the exercise of its powers and the execution of its duties by the CSIR."* In order to further give effect to its mandate, the Accounting Authority has adopted formal Terms of Reference to govern its own activities, which is attached hereto as Annexure E and to which the members thereof fully subscribe.

6.2 In terms of Section 56 of the PFMA, the Accounting Authority has delegated in writing certain of the powers entrusted or delegated to it to officials in the CSIR. To this end, the Accounting Authority has also adopted an approval framework which governs the authorisation process in the CSIR. It deals with, amongst others, the development of strategic plans, development of operational plans and budgets, appointment of staff, approval of salaries and acquisition and disposal of assets. It also defines authority levels in relation to organisational positions.

6.3 The Materiality Framework for reporting losses through criminal conduct and irregular, fruitless and wasteful expenditure, as well as for significant transactions as envisaged by Sections 55 (2) and 54 (2) of the PFMA is, in addition, in place and is included as Annexure I attached hereto.

7. UNDERTAKINGS BY THE ACCOUNTING AUTHORITY OF THE PUBLIC ENTITY

7.1 The Accounting Authority undertakes to act in total accordance with the approved Corporate Plan attached hereto.

7.2 In the event that it is envisaged that the Accounting Authority will not be able to fully execute the plans as embodied in Annexure A, it will promptly and in writing inform the Executive Authority accordingly, through the Office of the Director-General of Science and Technology, to seek its advice prior to making decisions or taking action.

7.3 The Accounting Authority confirms that it will fully comply with the provisions of Sections 50 and 51 of the PFMA, as more fully dealt with in Annexures F, H and I attached hereto, as well as with the reporting requirements as embodied in the PFMA and the relevant Treasury Regulations.

7.4 The Accounting Authority undertakes to ensure that the CSIR at all relevant times complies with its statutory mandate as encapsulated in Section 3 of the Scientific Research Council Act.

8. UNDERTAKINGS BY THE EXECUTIVE AUTHORITY AS SHAREHOLDER

8.1 The Executive Authority, where required, through, or assisted by the Accounting Authority, undertakes to allow the Chief Executive Officer (CEO) of the CSIR to attend to the operational aspects and business of the enterprise as has been approved in the Corporate Plan through ensuring the following:

8.1.1 Issuing of instructions and requests for information with sufficient prior notice and response times;

8.1.2 Not to renege on written guarantees and undertakings given;

8.1.3 Not to cause delays in critical decisions required;

8.1.4 To provide the organisation with strategic direction and control; and

8.1.5 To fully comply with the relevant provisions of the PFMA as well as the Treasury Regulations insofar as the same relates to it in terms of the relationship between the Parties.

8.2 The Executive Authority undertakes to honour the exemption granted to the CSIR from section 54 (2) of the PFMA by its previous Executive Authority, namely the Minister of Trade and Industry, as well as – insofar as it may be applicable to the relationship between the Parties – the exemption granted to the CSIR from the provisions of Regulation 16 of the Treasury Regulations by National Treasury. Copies of the letters under which these exemptions are granted are attached hereto as Annexure K.

9. GOVERNANCE

9.1 The Accounting Authority recognises that systems of good corporate governance should be in place and be reviewed continuously to ensure that they are at all times sound and consistent with world-class standards, and that they are and remain relevant to the business of the CSIR. Apart from complying with the provisions of the Scientific Research Council Act, the PFMA as well as the Treasury Regulations issued thereunder, and all other applicable legislation, the Accounting Authority shall therefore ensure compliance with all major recommendations of the Code of Corporate Practices and Conduct as set out in the King III Report on Corporate Governance and the Protocol for Corporate Governance in the Public Sector (1997).

9.2 The Accounting Authority will strive to ensure that the CSIR upholds and sets in place review mechanisms and protocols to ensure that reports and publications, including public comment made by employees of the CSIR, are based on sound scientific analysis, and do not bring the institution into disrepute.

10. KPIs LINKED TO THE BALANCED SCORECARD FRAMEWORK

The Key Performance Indicators (KPIs) have been summarised according to the categories of the Balanced Scorecard Framework of the DST and to reflect the strategic objectives of the CSIR. The three categories and their associated strategic objectives are:

SO1 **Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development.** This strategic objective is achieved through the selection and implementation of a range of R&D programmes.

SO2 **Build and transform human capital.** The CSIR's scientific and technical contributions are only possible through the skills and capabilities of our scientific staff (which we refer to as our Science, Engineering and Technology (SET) base). The ongoing development, renewal and transformation of the SET base is therefore of critical importance for the organisation. In addition the CSIR is an important part of the national system of innovation, and through the development and training of our scientific base contributes to the national imperative to develop human capital and to the ongoing transformation of our society.

SO3 **Maintain a sustainable and well-governed organisation.** Without a financially sustainable and well-governed organisation our ability to, over the long-term, contribute to national development through our scientific and technological work would be severely compromised. The CSIR is therefore committed to maintaining our record of good governance and to continue to operate in a sustainable manner.

The strategic objectives are explained in greater detail in Annexures A and B.

Our KPIs provide an understanding of performance in terms of inputs, outputs, efficiencies, and to some extent provide lead indicators of the outcomes and impact that are required for the CSIR to fulfill its mandate. The KPIs provide a basket of measures that reflect various aspects of organisational performance.

The KPIs (see Appendix A.8 for a detailed description of each KPI) are:

Learning and Growth

- **Publication equivalents**: *Publication equivalents consists of peer-reviewed journal articles, peer-reviewed conference papers, peer-reviewed book chapters and books. The quantity and quality of peer-reviewed research publications is a measure of the CSIR's research quality, capabilities and outputs. The impact of research publications is a contribution to the knowledge base.*
- **Journal articles published**: *Peer-reviewed research publications are a measure of the CSIR's research quality, capabilities and outputs. The impact of research publications is a contribution to the knowledge base.*
- **New technology demonstrators**: *A technology demonstrator is an intermediate research output and is a critical step on the path to the deployment and transfer our the technology, either through through licensing or the establishment of a spin-out company.*
- **New patents**: *Patents provide a lead indicator of impact through commercialisation, and serves to protect the valuable Intellectual Property (IP) created by CSIR scientists.*
- **Contract Research and Development (R&D) income**: *Contract R&D income is income earned and recognised on contracts with external parties. This measure indicates the value placed by stakeholders, customers and funding agencies on the research and development and services provided by the CSIR.*
- **Royalty and License income**: *Royalty and licence income is an indicator of successful technology transfer and commercialisation.*

Human Resources and Transformation

- **Total size of SET base**: *SET staff include staff on Researcher, Research and Development, Technical and Project Management career ladders, research managers, post-docs, studentships, interns and staff in fixed positions who primarily work on Research, Development and Innovation (RD&I) projects. Bursars and vacation workers are excluded. SET staff is a measure of the CSIR's capacity to deliver on RD&I projects.*
- **Number of SET base who are black:** *This, and the subsequent three indicators, refer to the proportion of black and female South African citizens in the SET base.*

These measures indicate the level of demographic transformation within the RD&I capacity of the organisation.

- **Percentage of SET base who are black**
- **Number of SET base who are female**
- **Percentage of SET base who are female**
- **Number of SET base with a PhD**: *This, and the subsequent indicator, provide a measure of the quality of our SET capacity*
- **Percentage of SET base who have a PhD**

Financial, Investment and Organisational

- **Total income**: *Total income is the income earned for a financial year. It reflects the ability of the CSIR to ensure financial sustainability. Growth in total income is also a proxy indicator for growth in the outcomes and impact achieved by the CSIR.*
- **Investment in Plant, Property and Equipment (PPE)**: *This is the amount invested in CSIR and government grant funded property, plant and equipment for a financial year and measures our investment in developing and maintaining world-class R&D facilities and equipment.*
- **Net profit**: *Profit for a financial year is calculated as total operating income, less total operating expenditure, plus net finance income. Net profit is a key indicator of financial sustainability and the ability of the organisation to manage its expenses according to the affordability determined by income levels.*
- **B-BBEE status**: *The CSIR B-BBEE policy seeks to support socio-economic transformation of society, within and outside the CSIR, by changing the demographic profile of meaningful and productive participation in the country's economic activity. The CSIR's assessment of its B-BBEE status is based on the Broad-Based Black Economic Empowerment Amendment Act, 2013 (Act No. 46 of 2013). All targets and definitions are derived from the Codes of Good Practice as published by the Department of Trade and Industry. The CSIR will aim to retain our current level 2 qualification while monitoring the effect of the changes in regulations that take effect in the 2016/17 financial year.*
- **Disabling Injury Frequency Rate (DIFR)**: *A disabling injury is defined as an injury, including occupational illnesses, arising out of and during the course of employment which results in the loss of one or more working days other than the date of accident. This indicator measures the quality of the health and safety management in the organization.*

The target values for the set of KPIs is given in Table 2.1.

	KPI	Target for 2015/16	Forecast for 2015/16	Target for 2016/17
Scientific & Technical	Publication Equivalents	490	490	490
	Journal articles published	300	300	300
	New Technology Demonstrators	$\geq$ 30	$\geq$ 40	$\geq$ 30
	New Patents*	$\geq$ 15	24	$\geq$ 15
	Contract R&D Income (Rm)	1786	1789	1914
	Royalty & License Income (Rm)	7.4	6.2	2.9
Learning & Growth	Total size of SET Base	1850	1980	2100
	Number of SET Base who are Black	1050	1160	1260
	Percentage of SET Base who are Black	57%	59%	60%
	Number of SET Base who are Female	630	690	755
	Percentage of SET Base who are Female	34%	35%	37%
	Number of SET Base with a PhD	330	350	375
	Percentage of SET Base with a PhD	18%	18%	18%
Financial & Governance	Total Income (Rm)	2450	2445	2611
	PPE Investment (Rm)	113	243	103
	Net Profit (Rm)	54	54	58
	B-BBEE Rating♯	Level 2	Level 2	Level 2
	DIFR	$\leq$ 0.3	$\leq$ 0.3	$\leq$0.3

*The number of patents awarded in any year are highly variable since they are dependant on the internal processes of patent-granting authorities. Our aim is to maintain a minimum of 15 patents per year.

♯The CSIR will attempt to retain its Level 2 status while the effects of the change in regulations (which come into effect from the 2016/17 financial year) are assessed.

Table 2.1: CSIR Key Performance Indicators: 2016/17

11. REPORTING

11.1 The Accounting Authority will report on the achievement of its KPIs quarterly based on PFMA requirements.

11.2 A detailed KPI report approved by the Accounting Authority will be submitted to the Executive Authority annually on or before 31 July of each year in respect of the immediately preceding financial year. The format of such reporting will be based on the CSIR's KPIs linked to the categories of the Balanced Scorecard Framework.

11.3 The Accounting Authority will meet all the external audit requirements, the results of which will be made available to the Executive Authority, the external auditor of the CSIR being the Auditor-General, who is responsible for independently auditing and reporting on the financial statements of the CSIR.

12. EXTRA-ORDINARY REPORTING

The Accounting Authority will, at its discretion, report to the Executive Authority on matters of strategic importance and/or operational issues that fall outside the agreed framework of this Shareholder's Compact and the PFMA as agreed from time to time during its Board meetings.

13. SUPPORTING DOCUMENTATION

13.1 Supporting documentation to this Shareholder's Compact is to be found in the following supporting documents are attached hereto:

13.1.1 CSIR Strategic Plan as embodied in Annexure A attached hereto,

13.1.2 CSIR Annual Plan for the 2016/17 as embodied in Annexure B attached hereto,

13.1.3 Risk Management Plan as embodied in Annexure F attached hereto,

13.1.4 The CSIR Risk Assessment Methodology as embodied in Annexure G attached hereto,

13.1.5 Fraud Prevention Plan, as embodied in Annexure H attached hereto,

13.1.6 Materiality Framework, as embodied in Annexure I attached hereto,

13.1.7 Financial Plan as embodied in Annexure J attached hereto.

14. PENALTIES AND REWARDS

14.1 The Accounting Authority, in terms of the provisions of Section 12 of the Scientific Research Council Act, shall determine the remuneration payable to employees of the CSIR, and, in addition, shall approve the payment of allowances, subsidies and benefits, including performance bonuses.

14.2 It is recorded by the Parties that the Executive Authority shall have the necessary discretion to remove any member of the Accounting Authority who has failed to honour the undertakings embodied in this Shareholder's Compact, or who otherwise acted in breach of his/her fiduciary duties, or who has contravened the provisions of any applicable legislation, such as – but not limited to – the PFMA.

15. GOVERNING LAW AND DISPUTE RESOLUTION

15.1 This Shareholder's Compact shall be governed by and construed in accordance with the laws of the Republic of South Africa.

15.2 In the event of any dispute arising from this Shareholder's Compact, the Parties shall make every effort to settle such dispute amicably.

15.3 Should the dispute remain unresolved for a period of 30 (thirty) days, the said dispute or difference shall be adjudicated upon by a competent third party agreed upon by the Parties, unless otherwise agreed between the Parties by means of Arbitration, Mediation or other agreement.

15.4 Should the parties not be able to agree upon a competent third party as contemplated in clause 15.3, the dispute will be adjudicated by a competent court with jurisdiction to hear the matter.

16. NOTICES

16.1 The Parties choose as their domicilium addresses for purposes of this Shareholder's Compact the following physical addresses:

16.1.1 The Accounting Authority: Care of the Office of the CEO of the CSIR Building 3 CSIR Campus Meiring Naudé Road BRUMMERIA Pretoria 0184

16.1.2 The Executive Authority: DST Building 53 CSIR Campus Meiring Naudé Road BRUMMERIA Pretoria 0184

16.2 Each Party shall be entitled from time to time, by written notice to the other, to vary its domicilium to any other address within the Republic of South Africa which is not a post office box or poste restante.

16.3 Any notice given by one party to the other ("the addressee") which:

16.3.1 is delivered by hand during the normal business hours of the addressee at the addressee's domicilium for the time being shall be presumed, until the contrary is proved, to have been received by the addressee at the time of delivery;

16.3.2 is posted by pre-paid registered post from an address within the Republic of South Africa to the addressee at the addressee's domicilium for the time being shall be

presumed, until the contrary is proved, to have been received by the addressee on the 4th (fourth) day after the date of posting;

16.3.3 is transmitted by telefax or e-mail shall be deemed (in the absence of proof to the contrary) to have been received within 1 (one) hour of transmission where it is transmitted during normal business hours of the receiving instrument and within 2 (two) hours of the commencement of the following business day where it is transmitted outside those business hours.

17. **WHOLE AGREEMENT**

This document together with the annexures thereto constitutes the whole of the agreement between the Parties. No instructions, agreements, representations or warranties between the Parties, other than those set out herein, are binding on the Parties.

18. **VARIATIONS**

No variation or modification of any provision of this Shareholder's Compact or consent to deviate therefrom or waiver in terms thereof shall be valid, unless such variation or modification or waiver has been reduced to writing and has been signed by both Parties, and such variation, modification, consent or waiver shall be valid only for a specific case and only for the purpose for which and extent to which it was made or given.

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CSIR
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THE CSIR SHAREHOLDER'S COMPACT

Agreed to and signed in Pretoria on 29/02/ 2016.

Prof. Thokozani Majozi, the Chairperson of the Board, who duly represents the CSIR's Accounting Authority by virtue of being appointed Chairperson of the CSIR Board on 12 December 2014 by the Minister of Science and Technology, hereby confirms that he will take a personal interest in the carrying out of the terms of this Shareholder's Compact and in cascading the spirit of the agreement reached thereby through the ranks at the CSIR.

Prof. Thokozani Majozi

On behalf of the CSIR's Accounting Authority

Agreed to and signed in CAPE TOWN on 1 MARCH 2016.

The Ministry of Science and Technology approves of, and looks forward to the successful implementation of, the undertakings embodied in the Shareholder's Compact and its Annexures. The Ministry accepts that, although the detail of the Shareholder's Compact may change due to variations and changes in the market and in society, that the spirit thereof will remain unchanged.

Mrs Naledi Pandor, Minister of Science and Technology

G.N.M. Pandor

As the CSIR's Executive Authority

A

CSIR Strategic Plan

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A.1 Executive Summary

The CSIR is mandated to contribute to the improved quality of life of people in South Africa. Meeting this mandate requires that the CSIR responds to the triple challenge of unemployment, inequality and poverty that faces South Africa. The national government intends to address these challenges through a broad range of programmes, guided by the National Development Plan (NDP) and further articulated through Governments Programme of Action (including the 9-Point Plan and sector-specific initiatives). The sections below will provide a summary of the NDP and the key policy frameworks that guide the national response, as well as identifying the key CSIR interventions in support of these actions.

The CSIR strategic plan responds to national priorities in line with its mandate. Our strategic decisions on research, development and innovation are driven by government priorities, industrial and societal needs, and scientific and technical trends.

The existence of a vibrant economy and a capable state is a pre-requisite for any sustainable solution to South Africa's developmental priorities. The work of the CSIR is therefore aimed both at supporting industrial development as well as enhancing the capabilities of government in the areas of service delivery, policy development and information management.

The CSIR Strategic Framework sets out the logical steps through which we take our inputs (people, processes and facilities) and undertake a set of activities (research and research management) to produce outputs (academic publications, reports and technologies). These outputs will then lead to a series of outcomes (scientific and technological development) that will ultimately result in an improved quality of life for all South Africans.

The CSIR has set the following three high-level strategic objectives in order to meet its mandate:

SO1 **Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development.** This strategic objective is achieved through the selection and implementation of a range of R&D programmes.

SO2 **Build and transform human capital.** The CSIR's scientific and technical contributions are only possible through the skills and capabilities of our scientific staff (which we refer to as our SET base). The ongoing development, renewal and transformation of the SET base is therefore of critical importance for the organisation. In addition the CSIR is an important part of the national system of innovation, and through the development and training of our scientific base contributes to the national imperative to develop human capital and to the ongoing transformation of our society.

SO3 **Maintain a sustainable and well-governed organisation.** Without a financially sustainable and well-governed organisation our ability to, over the long-term, contribute to national development through our scientific and technological work would be severely

compromised. The CSIR is therefore committed to maintaining our record of good governance and to continue to operate in a sustainable manner.

The NDP offers a long-term perspective on South Africa's development by clearly articulating a desired destination and identifying the role different sectors of society need to play in reaching that goal.

As a long-term strategic plan, it serves four broad objectives:

- Provides a set of overarching goals that we need to achieve by 2030;
- Builds consensus on the key obstacles to achieving these goals, and what needs to be done to overcome those obstacles;
- Provides a shared long-term strategic framework within which more detailed planning can take place; and
- Creates a basis for making choices about how best to use limited resources.

The CSIR's R&D programme speaks to seven of the 11 focus areas identified in the NDP:

- Economy and Employment;
- Building a Capable State;
- Economic and Social Infrastructure;
- Transition to a Low-Carbon Economy;
- Transforming Human Settlements;
- Improving Health; and
- Building Safer Communities.

The CSIR research agenda (as detailed below) within each of these areas of intervention is also influenced by The DST National R&D Strategy and the DST Ten-Year Innovation Plan.

Economy and Employment

The CSIR is well-positioned to play a key role in the national effort at re-industrialization through a range of key capabilities that are aligned to national priorities, ranging from the beneficiation of key strategic minerals of abundance, through to the aerospace and defense sectors. The CSIR's responses range from the immediate (improving the efficiency of production processes, supporting local economic development through localisation programmes) to the medium-term (the development of automation solutions for industrial processes, technologies for the beneficiation of local mineral resources, nano-manufacturing and agro-processing

technologies) as well as interventions that may only pay off in the longer-term (the development of large-scale engineering capabilities, industries based on bio-therapeutic manufacture and the development of enterprises using digital media technologies).

The key intervention areas and objectives are outlined below.

Intervention	Long-term Objective
EE1 – Titanium Beneficiation	Develop key technology building blocks for the establishment of a SA Titanium metal industry
EE2 – Aliminium (Al) Beneficiation	The development of Al processing technologies and new Alalloys and Al metal matrix composites (AlMMCs) to revitalise the Alindustry.
EE3 – Mechatronic Manufacturing	Develop a suite of advanced mechatronics machines for manufacturing and mining applications, as part of an industrial automation platform
EE4 – Polymer nanocomposites	Develop advanced materials targeting specific applications, together with the processing technologies that will be required to manufacture them on an industrial scale.
EE5 – Additive Manufacturing	Development of additive manufacturing platforms to create new manufacturing processes for the aerospace and other sectors
EE6 – Enterprise Creation and Development	Assist local and provincial government with the development and implementation of sector and local economic development strategies, with the creation of enterprises and with the transfer of technology.
EE7 – Technology Localisation	Support of the long-term industrialisation and industrial diversification of the economy in prioritised industrial sectors through technology localisation. This includes programmes such as the Aerospace Industry Support Initiative (AISI), the Bio-composites Centre of Competence (BCC) and the National Foundry Technology Network (NFTN).
EE8 – Digital Opportunities	Our aim is to develop an innovative Micro Enterprise Media Engine platform with content ingestion, programme scheduling and timed playout service for virtual television stations.
EE9 – Support for the National Bio-Economy Strategy	Increase the conversion of bioscience R&D into commercialised products and technologies
EE10 – Laser-based Engineering	The development and transfer of laser-based surface engineering and refurbishment applications that will support the refurbishment and maintenance of existing equipment, plant, and infrastructure requirements of the South African industry.
EE11 – National Large Scale Engineering Capability	Establish a Complex-Product Lifecycle Management initiative/demonstration centre for industry which will target all engineering disciplines through the integration of critical cross-functional activities.
EE12 – Resource Efficiency: National Cleaner Production Centre-South Africa	The NCPC-SA promotes the efficient utilisation of resources through the provision of relevant training programmes for industry.
EE13 – Mining	We will focus on the development of processes that will address the current challenges facing in the mining sector – increasing productivity and reducing costs whilst ensuring no harm to mine employees as well as to the surrounding environment.

Table A.1: Economy and Employment: Interventions and Objectives

Capable State

Our interventions in this area will focus on service delivery and its associated issues. The main problems we are attempting to address are:

- A lack of organisational capacity to support service delivery. This lack of capacity may take various forms, including the absence of co-ordinating or implementing agencies, or the shortage of specific technical or programme management skills.
- The absence of an integrated decision support capability at all levels of government responsible for service delivery. This absence may lead to poor decisions with respect to the planning in service delivery interventions.
- The poor diffusion/uptake of potential technology-based service-delivery solutions. There are instances where potentially appropriate and effective technical solutions to service delivery problems have been developed but are not being implemented.

Intervention	Long-term Objective
CS1 – Incubation of national capabilities to support service delivery	Incubate service delivery capabilities in two domains.
CS2 – An integrated and multi-sectoral decision support centre	The establishment of a centre that will, in collaboration with universities and developmental agencies, improve provide decision support services to government departments, local government, and state-owned companies.
CS3 – The large-scale deployment of technologies that support service delivery	Establish a dedicated capability to assess and deliver Incubate service delivery capabilities in two domains.

Table A.2: Capable State: Interventions and Objectives

Economic and Social Infrastructure

To achieve sustainable and inclusive growth by 2030, South Africa needs to invest in a strong network of economic infrastructure designed to support the country's medium- and long-term objectives. There is a clear need to maintain and upgrade our existing infrastructure, and to develop the technologies that will form the basis for the infrastructure of the future. South Africa's economic growth and its ability to provide basic services to its people will be fatally undermined if there is no concerted effort to maintain and re-build our transport, water, energy and Information and Communication Technology (ICT) infrastructure.

The CSIR is coordinating two of the Strategic Integrated Projects (SIPs) ("Higher Education Infrastructure" and "Expanding access to Communication Technology") and is providing specialist support (including, for example, in the form of environmental impact assessments) to a number of other SIPs. Our interventions in support of economic and social infrastructure takes two forms – the development of policies and the design of technological solutions.

Intervention	Long-term Objective
ES1 – Water Infrastructure	Develop water resource decision-support frameworks, norms and standards for water and sanitation services; and technology solutions for water treatment and infrastructure management.
ESI2 – Energy Infrastructure	Develop technologies that support the maintenance of the energy infrastructure.
ESI3 – Transport Infrastructure	Improve the quality of road engineering by developing better materials; design and construction methods; and maintenance and performance monitoring standards
ESI4 – Building Design	Improve the design, maintenance and efficiency of buildings by developing design guidelines for public buildings; developing new building materials and construction methodologies
ESI5 – Coastal Infrastructure	The development of methods and guidelines for the optimum design of ports and coastal structures, as well as for the planning and operations of ports.
ESI6 – ICT Infrastructure	Address the lack of quality data, analysis and tools on South African broadband network infrastructures and spectrum, and to inform the policy, decision-making, design and coordination of broadband development and spectrum usage.

Table A.3: Economic and Social Infrastructure: Interventions and Objectives

Transition to a Low-Carbon Economy

Our long-term goal is to support South Africa's transition to a low-carbon, resilient economy and a just society. The CSIR is working on improving the measurement and management of our natural resources, improving our ability to understand the long-term effects of climate change and hence to assist government with the formulation of mitigation and adaptation strategies. The CSIR is also supporting the development of a green economy more generally.

Intervention	Long-term Objective
LC1 – Climate Change	The development of models and systems for predicting climate futures, and associated applications which define the impact of climate change in selected sectors.
LC2 – Green Economy Solutions	Unlocking growth from the bio-economy and waste-economy sectors.
LC3 – Ecosystem Services	Development of a new generation of models, tools, maps and frameworks to improve the understanding and to enhance the design and management of multifunctional landscapes
LC4 – Renewable Energy	Technologies and processes to increase the share of renewable energies in South Africa's overall energy consumption

Table A.4: Transition to a Low-Carbon Economy: Interventions and Objectives

Building Safer Communities

The CSIR interventions focus on supporting the acquisition and integration of technology by our security forces, the development of systems for the effective sharing of information across different components of the security forces, the continuous improvement of South African Air Force air capability, the protection of air and naval assets against guided weapons, the support of specialised, highly mobile combat ready forces, the development of national surveillance capabilities, and protection against cyber-security threats.

Intervention	Long-term Objective
SS1 – Holistic and integrated approach to national security	Address safety and security risks by means of a new holistic integrated approach taking into account how economic and social factors influence safety and security.
SS2 – Security sector capability development	Assist national institutions in the safety and security sector with technology and engineering systems support in order to deliver on their strategic objectives.
SS3 – Multi-agency command, coordination, and control	Support the development of an all-inclusive command, coordination and control solution for multi-agency operation, including the interoperability of systems and data, business processes and systems.
SS4 – South African National Defence Force (SANDF) Air Operations capability	Support the continuous improvement of the mission effectiveness and efficiency of South African Air Force (SAAF) Air capability. This requires integration of complex systems such as aircraft, weapons, surveillance sensors and pods into a capability with high integrity, safety, and performance, and with low life cycle cost.
SS5 – SANDF Landwards Capability	Support the SANDF by developing technologies for supporting a specialised, highly mobile combat capability, including providing high levels of protection against threats such as road side bombs, explosively formed projectiles and improvised explosive devices without reducing mobility.
SS6 – SANDF Platform Protection	Increase the survivability of SAAF and SA Navy platforms against optical (including infra-red) and radar-guided weapons.
SS7 – National Surveillance and Situational Awareness	Identify technology solutions to address potential deficiencies in the national surveillance capability, including maritime environment surveillance, environmental asset protection, peace support operations and border safeguarding.
SS8 – National Cyber Security Capability	Contribute to the implementation of the national cyber-security policy by developing a national capability to respond to large-scale cyber threat incidents.
SS9 – Unmanned Defence Systems	Support the strategic, operational and tactical potential of unmanned systems.

Table A.5: Building Safer Communities: Interventions and Objectives

Improving Health

The CSIR's work in support of health ranges from technical support to the National Health

Insurance initiative (particularly with respect to the security, use and transfer of health-related data), the development of interconnected and inter-operable point-of-care devices, the use of technology in support of diagnostic functions, the development of vaccines using bio-therapeutic manufacturing methods, and the development of new methods to understand, manage and diagnose disease mechanisms at the cellular and molecular level.

Intervention	Long-term Objective
IH1 – E-Health	Develop a standards framework for interoperability of eHealth systems, and establish a national regime for implementation of interoperability standards.
IH2 – Health Technology	Develop a portfolio of medical devices, sensors and information systems to provide Point-of-Care assistance for foetal health, cardiovascular diseases, blood screening, and medical visualisation and analysis
IH3 – Burden of Disease	Provide low cost and tailored protein expression, protein characterisation and pilot manufacturing services in human and animal health for therapeutic proteins, vaccines and adjuvants, and develop cutting-edge knowledge based science in gene engineering, cellular biology and pharmaceuticals chemistry that supports the development of innovative pharmaceutical products.

Table A.6: Improving Health: Interventions and Objectives

Transforming Human Settlements

The CSIR is supporting metropolitan areas and municipalities with spatial planning, the management of infrastructure and the long-term transition to greener and smarter economies.

Fast-growing cities are not performing optimally often due to ineffective spatial layout and management. In addition, there is a lack of capability and tools in government as well as evidence-based decision-making support, resulting in poor planning, design and management, decision making and spatial prioritisation of interventions (i.e. housing, infrastructure investment, risk mitigation, social support, economic development interventions, etc.). A major need exists to timeously plan and prioritise infrastructure investment with an understanding of impact on development priorities and long term implications. In addition, the performance of the built environment system in South Africa is suboptimal due to a number of factors including the legacy of apartheid.

Intervention	Long-term Objective
THS1 – Urban Modelling	Further develop the UrbanSim modelling system for modelling the growth of cities and regions to inform infrastructure investment decisions.

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Intervention	Long-term Objective
THS2 – Spatial Prioritisation Policy	Develop policies on the spatial prioritisation of infrastructure investment, and develop an enhanced spatio-temporal capability for advanced spatial planning.

Table A.7: Transforming Human Settlements: Interventions and Objectives

The R&D work of the CSIR is supported by a number of enabling conditions and processes. These include support for technology transfer, strategic partnerships with State Owned Corporations (SOCs), developmental agencies, the private sector and other Research and Technology Organisations (RTOs).

A.2 The CSIR's Mandate

The CSIR was established on 5 October 1945 by an Act of Parliament. The Act under which the CSIR now operates, the Scientific Research Council Act 46 of 1988, stipulates the following mandate:

> The objects of the CSIR are, through directed and particularly multidisciplinary research and technological innovation, to foster, in the national interest and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic, and to perform any other functions that may be assigned to the CSIR by or under this Act.
> *Extract from Scientific Research Council Act 46 of 1988*

Meeting this mandate requires that the CSIR responds to the major challenges facing South Africa – unemployment, inequality and poverty. The national government intends to address these challenges through a broad range of programmes, guided by the NDP and further articulated through the 9-Point Plan and sector-specific initiatives.

Scientific R&D will play a critical role in supporting the short-, medium- and long-term growth of the economy. In the short-term we need to develop and deploy technologies that improve the efficiency, and hence competitiveness, of existing enterprises; in the medium to long-term we need to develop the industries and sectors (based for example on the use of new technologies or the beneficiation of local resources) that will grow the economy, as well as understanding and mitigating the risks to long-term growth due climate change and the mismanagement of our natural resources.

While sustained economic growth will almost certainly address the issues of unemployment and poverty, dealing with the threat of inequality will require a strong and capable state. The

CSIR sees its role as providing the scientific and technological innovations that will improve the ability of the state to efficiently deliver basic services (such as health, education, social security, access to energy and shelter) to all South Africans, hence combating both material inequality as well as inequality of access to basic services.

A.2.1 CSIR Strategic Framework

An overview of the **CSIR Strategic Framework** is provided in Figure A.1. The framework sets out the logical steps through which we take our inputs (people, processes and facilities) and undertake a set of activities (research and research management) to produce outputs (academic publications, reports and technologies). These outputs will then lead to a series of outcomes (scientific and technological development) that will ultimately result in an improved quality of life for all South Africans.

The key inputs are the skills (including scientific as well as managerial and support skills) of CSIR employees; the supporting environment consisting of research and other facilities; the financial resources provided by the State and other partners and clients; and the governance processes.

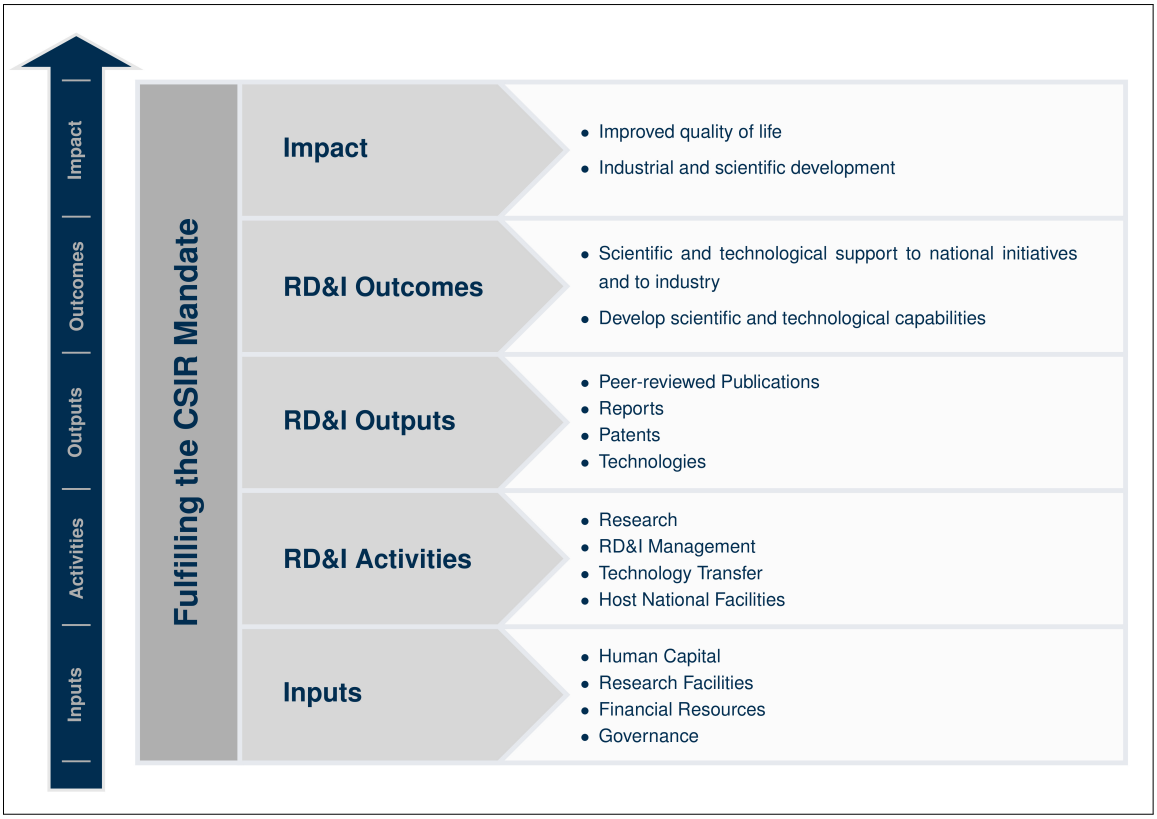

Figure A.1: CSIR Strategic Framework

Each of these inputs has a particular role to play:

- Human capital is essential for delivering science and technology solutions, and for delivering the support process required by a large and complex organisation.

- Access to research facilities (including laboratories, libraries and communications facilities) are essential for conducting scientific and technological research.
- Financial resources are required both to maintain our facilities, and to attract and retain the best scientific talent.
- A financially sustainable and well-governed organisation ensures that the focus can remain on the delivery of our scientific mission.

The activities are, of course, related to the *technological research and innovation* specified in the CSIR mandate. These include the actual research, development and innovation activities, the management of the research process, the transfer of technological solutions to implementing partners, and the hosting of national facilities.

Our **RD&I outputs** (which form a significant component of our KPIs) include academic outputs such as peer-reviewed articles, conference papers and books; technical reports and solutions for our clients; the demonstration of technologies and patents on the technologies we develop.

The **RD&I outcomes** are scientific and technological support to both industry and the State, and the development of scientific and technological capabilities that will underpin our longer-term economic development.

Finally, the **impact** of our work should be visible both in the improved quality of life of all South Africans as well as the level of scientific and industrial development of South Africa.

A.2.2 CSIR Business Model

The CSIR obtains approximately one-third of its operational budget from National Treasury in the form of a Parliamentary Grant. This grant is used to maintain the infrastructure of the CSIR, including our buildings and property; our research equipment and laboratories; and to support R&D in areas which other sources of funding are not yet available. The remainder of our income is derived from contract income for R&D services. Although portions of this income are in the form of long-term contracts a substantial proportion of contract income is short-term in nature. Our ability to develop long-term plans are therefore contingent on our expectations about the nature and volume of these income flows, and are thus susceptible to external factors. These external factors could include fluctuations in the economy itself, changes in strategy or policy by our partners and the presence or absence of competing providers. Our commitment to financial sustainability may therefore, in some cases, lead to conflicts with our R&D strategy, and therefore result in deviations from that envisaged strategy.

A.3 Linking the CSIR Mandate to National Priorities

The practical application of the CSIR Mandate is guided by a range of policy documents, chief amongst which is the NDP which sets out the long-term developmental framework for the

nation. This long-term vision is then supported by more immediate policies, which include the 9-Point-Plan and the DST Strategic Plan: 2015–2020.

A.3.1 The National Development Plan – Vision 2030

The NDP offers a long-term perspective on South Africa's development by clearly articulating a desired destination and identifying the role different sectors of society need to play in reaching that goal.

As a long-term strategic plan, it serves four broad objectives:

- Provides a set of overarching goals that we need to achieve by 2030;
- Builds consensus on the key obstacles to achieving these goals, and what needs to be done to overcome those obstacles;
- Provides a shared long-term strategic framework within which more detailed planning can take place;
- Creates a basis for making choices about how best to use limited resources.

The CSIR's R&D programme speaks to seven of the 11 focus areas identified in the NDP:

- Economy and Employment,
- Building a Capable State,
- Economic and Social Infrastructure,
- Transition to a Low-Carbon Economy,
- Transforming Human Settlements,
- Improving Health, and
- Building Safer Communities.

In Section A.5 we set out in detail the linkages between our proposed R&D interventions and the aims of the NDP.

A.3.2 DST Strategic Plan: 2015–2020

The recently developed and adopted DST Strategic Plan 2015-20 notes a three-phase process envisaged by the NDP, leading up to 2030, of the rising contribution and blossoming importance of innovation to growing the South African economy.

- Phase one, 20142019 – Use knowledge to increase economic efficiency;
- Phase two, 20202025 – Use knowledge to enhance industrialisation;
- Phase three, 20252030 – A knowledge-based economy.

The DST Strategic plan articulates its contribution to the NDP goals and Medium Term Strategic Framework (MTSF) objectives as follows:

- Utilization of knowledge and innovation for:
  - New industrial development and economic diversification,
  - Commercialisation of ideas,
  - Improved SME competitiveness,
  - Inclusive social development.
- Expansion and transformation of research capacity through Human Capital Development (HCD) and the provision of R&D infrastructure.
- Deepening bilateral engagement with the rest of the African continent.
- Building youth support, by itself of through it agencies.
- Continuous engagement with the public.

The CSIR contributes to all of the DST's strategic objectives in the following CSIR strategic objectives and key initiatives:

Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development. This strategic objective is achieved through the selection and implementation of a range of R&D programmes. This strategic objectives contributes to the use of knowledge and innovation for socio-economic development and transformation. In particular the CSIR supports interventions aimed directly at improving the competitiveness of businesses (particularly Small, Medium and Micro Enterprises (SMMEs)) through technology interventions (see Section A.5.1 for details), interventions that support government's ability to efficiently deliver services (see Section A.5.2 for details), and support the growth and maintenance of our economic and social infrastructure (see Section A.5.3). These interventions will, if successful, contribute to the attainment of the following DST proxy impact indicators:

- Additional revenue of R 500 million from businesses receiving support from DST-funded instruments;
- Performance of 10,000 SMMEs improved through technology interventions;
- Decision-support that improves the delivery of at least 10 government departments;

- Improved standard of living for at least 500,000 people and/or 12 communities.

Build and transform human capital. The CSIR's scientific and technical contributions are only possible through the skills and capabilities of our scientific staff - our SET base). The ongoing development, renewal and transformation of the SET base is therefore of critical importance for the organisation. In addition the CSIR is an important part of the national system of innovation, and through the development and training of our scientific base contributes to the national imperative to develop human capital and to the ongoing transformation of our society. The strategic objective of the CSIR directly addresses the DST's second and fourth strategic objectives, focussed on human capital development and transformation, and building support for youth, respectively.

The CSIR Africa Strategy The CSIR is currently revising and updating its Africa Strategy, which contributes to the DST's strategic objective of deepening bilateral engagement in the rest of the African continent.

Public Engagement The CSIR has a robust Strategic Communications portfolio, which identifies and manages stakeholder communication issues with the aim of contributing towards the realisation and achievement of the CSIR's strategic priorities (see Section A.6.6 for further details). This contributes to the DST objective of continuous engagement with the public.

A.3.3 Nine-Point Plan

The national government has devised a Nine-Point plan aimed at boosting economic growth and creating employment, as outlined the State President's 2015 State of the Nation Address.

The Nine-Point Plan is part of government's annual programme of action, and is linked to the NDP's priority outcome in the medium to long term. The CSIR's R&D programme contributes to the Nine-Point Plan in various ways, and some examples are outline below:

1. **Resolving the energy challenge** Renewable energy and the development of technologies and processes to increase the share of renewable energies in South Africa's overall energy consumption. The CSIR support includes interventions around energy infrastructure and the development of technologies that support the maintenance of energy infrastructure (see LC4 and ES12 in Section A.5.

2. **Revitalising agriculture and the agro-processing value chain.** Our interventions include support for the Bio-economy Strategy by increasing the conversion of bioscience R&D into commercialised products and technologies, including bio-processing technologies and processes (see EE9 in Section A.5).

3. **Advancing beneficiation or adding value to the mineral wealth.** Our interventions include activities around Titanium and Aluminium beneficiation and beneficiating polymer nanocomposites. (See EE1, EE2 and EE4 in Section A.5).

4. **More effective implementation of a higher Industrial Policy Action Plan (IPAP).** Our interventions include support for Technology Localisation (including programmes like the AISI and the NFTN. (See EE7 in Section A.5).

5. **Encouraging private-sector investment** The CSIR participates in the Industry Innovation Partnerships Programme (IIPF), in partnership with the DST, which seeks to attract private-sector investment in translating R&D outputs to commercial products by providing specialised prototyping, piloting and upscaling infrastructure to bridge the gap between the lab and the market. Examples include the Biomanufacturing Industry Development Centre (BIDC), the Biorefinery Facility, National Nanotechnology Upscaling Facility, and the Photonics Prototyping Facility.

6. **Moderating workplace conflict.** No direct contribution

7. **Unlocking the potential of SMMEs, cooperatives, townships and rural enterprises.** Our work with enterprise creation and development assists local and provincial government with the development and implementation of sector and local economic development strategies, with the creation of enterprises and with the transfer of technology (see EE6 in Section A.5).

8. **State reform and boosting the role of state-owned companies, information and communications technology infrastructure or broadband roll-out, water, sanitation and transport infrastructure.** Our interventions linked to the creation of digital opportunities, the development of ICT infrastructure, water infrastructure, our partnerships with Transnet and Eskom all support this goal. (See EE8, ESI3, ES16 and ES1 in Section A.5 for details).

9. **Operation Phakisa which is aimed at growing the ocean economy and other sectors including Mining.** Our interventions include the development of processes that will address the current challenges facing the mining sector, the development and maintenance of our coastal infrastructure, the deployment of ecosystem services aimed at our oceans and coast, and the development of a new generation of models, tools, maps and frameworks to improve the understanding and to enhance the design and management of multifunctional landscapes. (See EE13, ES15 and LC3 in Section A.5)

A.4 CSIR Strategic Objectives and Measurement Framework

A.4.1 CSIR Strategic Objectives

The CSIR has set the following three high-level strategic objectives in order to meet its mandate:

SO1 Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development. This strategic objective is achieved through

the selection and implementation of a range of R&D programmes. See Section A.5 for details.

SO2 Build and transform human capital. The CSIR's scientific and technical contributions are only possible through the skills and capabilities of our scientific staff (which we refer to as our SET base). The ongoing development, renewal and transformation of the SET base is therefore of critical importance for the organisation. In addition the CSIR is an important part of the national system of innovation, and through the development and training of our scientific base contributes to the national imperative to develop human capital and to the ongoing transformation of our society.

SO3 Maintain a sustainable and well-governed organisation. Without a financially sustainable and well-governed organisation our ability to, over the long-term, contribute to national development through our scientific and technological work would be severely compromised. The CSIR is therefore committed to maintaining our record of good governance and to continue to operate in a sustainable manner.

Our measurement framework seeks to monitor our short-term progress towards meeting these strategic objectives as well as assessing whether the long-term substance of these aims are being achieved. The two components of our measurement framework are:

1. A set of *annual* performance indicators across the three strategic objectives. These form part of our Annual Performance Plan and we will, on a quarterly basis, report on progress towards meeting these targets. In addition to setting targets for the upcoming financial year we also set five-year targets for these indicators.
2. A set of longer-term measures that focus more clearly on the outcomes and, potentially, the impacts of our efforts across the three strategic focus areas. These data required to support these measures may be collected on an irregular or ad hoc basic.

These two sets are complimentary parts of a system that seeks to understand whether we are meeting our strategic objectives – in the short-term to ensure that we are making progress, and in the long-term to verify that we are heading in the right direction.

A.4.2 Short-Term Indicators

The detailed short-term indicators and targets are given in Section A.7.

SO1 Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development. The KPIs that are linked to this strategic objective measure some of the outputs that are produced by our R&D programmes. These include peer-reviewed publications, patents, technology demonstrators, the income earned from R&D performed on behalf of other parties, and the income earned

from royalties or the licensing of CSIR technologies. The KPIs do not attempt to cover the detailed (annual) targets or milestones of the many individual R&D programmes – these are captured, reported on and monitored through the detailed operational plans produced by each R&D programme.

These indicators attempt to capture the quality and relevance of the R&D work we perform.

SO2 Build and transform human capital. The KPIs that are linked to this strategic objective include the overall size of the SET base, the number and percentage of that base that have doctoral level qualifications, and the number and percentage of the SET base that are Black and Female South Africans respectively.

SO3 Maintain a sustainable and well-governed organisation. The KPIs we use to measure our progress towards this strategic objective include the total income obtained by the organisation and the surplus that we are able to generate; the level of investment we make in order to maintain our infrastructure; our B-BBEE status; and our safety record.

A.4.3 Additional Indicators

The CSIR will, during the 2016/17 financial year, develop and test an additional set of performance indicators to further refine the level at which we measure our performance. Our intent is to ensure that the indicators are well-defined, that the targets are set appropriately, and that the evidence for the indicators will meet the standards set by the Auditor-General. If these conditions are met the intention is to include these indicators in the 2017/18 Shareholder's Compact.

These proposed indicators are:

1. The proportion of Black South African and Female South African researchers at the Principal and Chief Research levels[1]. Currently 12% of Principal Researchers and 7% of Chief Researchers are Black South Africans. The comparable figures for female South Africans are 17% and 20% respectively.
2. The number of SMMEs receiving technical assistance from the CSIR.

A.4.4 Long-Term Measures

The CSIR is in the process of formalising a set of long-term measures that will assist us in determining the effects of the outcomes associated with our interventions.

SO1 Conduct high-quality and relevant research and technological innovation to foster industrial and scientific development.

The measures for this strategic objective include:

- The detailed outcome and impact indicators for our R&D programme – the current set of indicators are contained in the exposition of our R&D programme in Section A.5.
- The extent to which the strategic R&D choices made by the CSIR are aligned with, and responsive to, national developmental priorities.
- The quality of the R&D work performed by the CSIR.

SO2 Build and transform human capital.

We want to, over the longer-term[2], measure our contribution to building and transforming human capital.

The possible measures for this strategic objective include:

- The existence, implementation and resourcing of clear strategies to support the building of human capital.
- Proportion of staff members (by demographic group and gender) who have improved their qualifications.
- Number of degrees obtained by students supported by the CSIR.

SO3 Maintain a sustainable and well-governed organisation.

The indicators for this strategic objective include the following:

[1] These are the two most senior levels on the CSIR research/engineering career ladders, and are comparable to Associate-Professor and Professor levels at universities.

[2] It is prudent to measure this sort of contribution over a relatively long period to smooth out short-term fluctuations – data of this sort is likely to be noisy and we should avoid over-reacting to or misinterpreting short-term movements

- The extent to which our infrastructure is maintained at a level conducive to performing high-quality R&D?
- The extent to which our R&D services (and the business model supporting the delivery of those services) are properly positioned to ensure the long-term financial viability of the CSIR?

The longer-term measures will, in the main, be collected and analysed as part of organisational reviews conducted at two-to-three year intervals.

A.5 Research and Development Objectives

A.5.1 Economy and Employment

Achieving full employment, decent work and sustainable livelihoods is the only way to improve living standards and ensure a dignified existence for all South Africans. Rising employment, productivity and incomes are the surest long-term solution to reducing inequality. Similarly, active steps to broaden opportunities for people will make a significant impact on both the level of inequality and the efficiency of the economy. This will be achieved by expanding the economy to absorb labour and improving the ability of South Africa's people and institutions to respond to opportunities and challenges.

South Africa has recently experienced a decline in industrial activity, and the manufacturing sector has been particularly hard-hit. At a time when manufacturing should be driving development in South Africa, the sector is in a perilous state, with its contribution to Gross Domestic Product (GDP) dropping from 24% in the early 1980s to less than 13% today.

The contribution of the manufacturing sector to overall employment fell from 14.6% in the first quarter of 2008 to 11.5% by the third quarter of 2014 and amounted to a substantial loss of some 370,000 employment opportunities.

The IPAP lists the challenges facing the domestic manufacturing sector as increasing global competition, weak demand in key external markets, substantial cost pressures, the unstable supply and high cost of electricity, exchange rate volatility, skills constraints, high administered prices (especially rail freight and port charges for value added products) and industrial action.

IPAP also highlights that South Africa remains mainly a producer and exporter of primary commodities and an importer of value-added manufactured products. South Africa's export sector came under increased pressure during the course of 2014, caused mainly by falling commodity prices, labour unrest and reduced global demand. To the limited extent that domestic value-added exports exist, they are highly concentrated in a few sectors.

IPAP is focused on eight critical programmes, three of which directly involve industrialisation:

1. **Infrastructure-driven industrialisation** is concerned with building the public infrastructure programme, with stronger support for local manufacturing and economic infrastructure.

2. **Resource-driven industrialisation** is focused on leveraging SA's mineral resources for greater levels of downstream beneficiation and value addition.

3. **Advanced manufacturing-driven industrialisation** has a special focus on lead companies which can compete in export markets, and is characterised by strong public sector support allied to strong stakeholder engagement, particularly with global Original Equipment Manufacturers (OEMs).

Advanced manufacturing has been globally recognised as critically important to reverse deindustrialisation and to create decent, well-paying jobs. Competitive advantage is increasingly dependent on combining new knowledge and improved technologies (the so-called specialised and advanced factors of production) rather than the traditional factors of production like labour, materials and energy.

It is estimated that advanced manufacturing can add R 540 billion to SA's GDP and create 1.5 million new jobs by 2030. Advanced manufacturing sectors in which SA is considered to have competitive advantage are listed as automobiles, transportation equipment, electrical equipment and parts, and chemicals. IPAP makes specific reference to the need to grow the aerospace and defence sector and aims to strengthen the sovereign local manufacturing industry with strong spill overs to related civilian sectors.

The South African photonics industry comprises a well-developed defence optronics component and some smaller medical, optronic, optic and laser display businesses. There is significant potential for diversification and expansion. Skilled and experienced expertise to exploit this potential is limited. Several universities are contributing skilled manpower and research in laser physics and some, notably the Central University of Technology (CUT), are developing capabilities in additive manufacturing.

In this context the CSIR is well-positioned to play a key role in the national effort at re-industrialization through a range of key capabilities that are aligned to national priorities, ranging from the beneficiation of key strategic minerals of abundance, through to the aerospace and defense sectors. The key problems that the CSIR seeks to address are outlined below, together with the proposed approaches, all aimed at achieving long-term impact as described by the related objectives specified.

EE1 Titanium Beneficiation

A complete beneficiation value chain for the abundant Titanium bearing minerals mined in SA is lacking. There are clear benefits to developing and commercialising a primary Ti metal production process as well as downstream Ti processing technologies for the production of various Ti products.

Our aim is to develop key technology building blocks to beneficiate Ti metal with the focus on the direct reduction of TiCl4 to Ti powder and developing technologies to produce high value Ti products for stimulating a local downstream manufacturing industry. The

successful demonstration of these technologies at pilot scale is, in the short term, a critical success factor for these technologies.

EE2 Aluminium Beneficiation

There is a need for new Al product and processing technologies to improve the competitiveness of this key sector.

Our long-term aim is the development of selected Al processing technologies and new Al alloys and Al metal matrix composites (AlMMCs) to revitalise the Al industry.

EE3 Mechatronic Manufacturing

There is limited local development of new products and manufacturing technologies which improve industry competiveness, particularly in the areas of manufacturing productivity and quality, and mining productivity and safety.

Our aim is to develop a suite of advanced mechatronics machines for manufacturing and mining applications, as part of an industrial automation platform. These machines include a robotic hanger for conveyor belt Idlers; a concrete floor levelling machine; pedestrian detection technologies for mines; and a haul truck tyre changing robot.

EE4 Polymer nanocomposites

These materials have not been developed and produced in SA to any significant degree. The development of an industry based on polymer nanocomposites requires an in-depth understanding of the properties of such materials at the nano, micro and macro levels; the ability to engineer such material properties to meet demanding end user requirements; and the development of manufacturing processes on an industrial scale.

Our aim is to develop advanced materials targeting specific applications, together with the processing technologies that will be required to manufacture them on an industrial scale. The focus is on materials derived from local natural resources in the fields of polymer nanocomposites; clays and synthetic clays; advanced composites; natural fibre products and functional polymers. A special focus is on proving (at pilot scale) the feasibility of manufacturing such materials in industry.

EE5 Additive Manufacturing

There is a need to develop additive manufacturing platforms to create new manufacturing processes for the aerospace industry and other sectors.

The CSIR has led the application of lasers in South African industry and is partnering with industry to develop novel additive manufacturing technologies, particularly the use of high power lasers for the deposition of Titanium and steel alloys. Our aim is to develop a platform for additive manufacturing of aerospace structural components using our world-leading technology. This will provide an opportunity for South Africa to beneficiate its substantial Titanium reserves and to create a significant export capability.

EE6 Enterprise creation and development

There is a lack of credible expertise to develop and implement technology-based eco-

nomic development strategies, assess and package economic development opportunities, and to create and develop technology-based enterprises.

Our aim is to assist local and provincial governments with the development and implementation of sector and local economic development strategies, with the creation of enterprises and with the transfer of technology. This will include the design and establishment of enterprise support programmes such as incubators and supplier development programmes, and the capacitation of industrial parks and estates.

EE7 Technology Localisation

There is a lack of supplier/enterprise development in support of localisation.

Our aim is to develop and implement programmes to facilitate and stimulate enterprise development and growth in support of technology localisation. This includes programmes such as the AISI, the BCC and the NFTN.

EE8 Digital Opportunities

We need to utilise our IT technologies and infrastructure to create economic opportunities in wireless applications and the commercialisation of software technologies.

Our aim is to develop an innovative Micro Enterprise Media Engine (MEME) platform with content ingestion, programme scheduling and timed play-out service for virtual television stations. This will create an open massively scalable mobile IPTV system that integrates public internet based media content scheduling and broadcasting capabilities without viewer stream break-up, with improved low-rate rural network performance.

EE9 Support for the National Bio-Economy Strategy

Diversification of the South African economy is an important pillar for inclusive economic growth. There is a need to convert the high-quality biosciences R&D in South Africa into commercialised products and technologies.

The CSIR will apply its unique knowledge, technologies and infrastructure in bio- and agro-manufacturing product and process development to:

- Commercialise CSIR-developed technologies from competitive expression system and natural product technology platforms through spin-out companies.
- Expand the BIDC model both nationally and regionally to support both SMEs and industry in establishing cutting edge industries in the bio-economy sector.
- Establish automated high-throughput technologies (high throughput screening, high throughput extraction, high throughput purification) to identify natural compounds and fractions from plant diversity for use in the pharmaceutical, cosmetic and food industries.
- Modify the model developed for creating sustainable Agri-parks in the Eastern Cape and roll this out to other communities across South Africa.
- Develop nutrient-dense food products using relevant food processing technologies to address food-related challenges in urban and rural communities.

EE10 Laser-based Engineering

The CSIR and its partners are developing a range of refurbishment technologies that can be applied in the manufacturing and power generation sectors. Some of these are already available as routine services, but many are still under development with a vast array of potential future applications. Refurbishment technologies support industry competitiveness through reducing down time in production and extending service life of (often ageing) capital equipment and high value components.

Our aim is to accelerate the development of qualified processes for the rapid and affordable repair and maintenance of turbine components. We will also continue with development work on

- Novel lasers to enhance the capabilities and efficiency in laser-enabled manufacturing;
- Novel laser-enabled manufacturing technologies to be identified through a techno-economic feasibility analysis; and
- Laser shock peening; a novel technology for reducing residual stresses in the manufacturing of aerospace and other precision engineering products.

EE11 National Large Scale Engineering Capability

South Africa has a lack of large scale engineering capabilities required for participating in key complex industries such as airliner design and manufacture, electricity power plant design and building, large ship design and building, telecommunication satellite design and manufacture, and many other existing global industries and future industries, for local and export opportunities.

Our intent is to establish a Complex-Product Lifecycle Management initiative/demonstration centre for industry which will target all engineering disciplines through the integration of critical cross-functional activities. This will support the development of large-scale engineering capabilities required for participating in complex industries.

EE12 Resource Efficiency – National Cleaner Production Centre-South Africa

One of the central challenges constraining South Africa's development is the resource-intensive nature of our economy.

The NCPC-SA promotes the efficient utilisation of resources through the provision of relevant training programmes for industry.

EE13 Mining

The strategic R&D activities within Mining and Mineral Resources area are aligned to the Mining R&D strategy of the DST.

Our aim is to focus on the development of processes that will address the current challenges facing in the mining sector – increasing productivity and reducing costs whilst ensuring no harm to mine employees as well as to the surrounding environment. The issue of safety in mines will include work on seismicity and excavation stability for current operations as well as the transition to modernised (mechanised) mining. This will

be further supported by the development of geophysical tools to assist in delineating the rockmass and reserves ahead of the current mining.

A.5.2 Capable State

If we are to address the twin challenges of poverty and inequality, a state is needed that is capable of playing a transformative and developmental role. This requires well run and effectively coordinated state institutions staffed by skilled public servants who are committed to the public good and capable of delivering consistently high-quality services for all South Africans, while prioritising the nation's developmental objectives. This will enable people from all sections of society to have confidence in the state, which in turn will reinforce the state's effectiveness.

Our interventions in this area will focus on service delivery and its associated issues. There are a number of initiatives that deal with the development of policy, but these will be dealt with under the specific intervention areas involved.

The main problems we are attempting to address are:

1. A lack of organisational capacity to support service delivery. This lack of capacity may take various forms, including the absence of co-ordinating or implementing agencies, or the shortage of specific technical or programme management skills.
2. The absence of an integrated decision support capability at all levels of government responsible for service delivery. This absence may lead to poor decisions with respect to the planning in service delivery interventions.
3. The poor diffusion/uptake of potential technology-based service-delivery solutions. There are instances where potentially appropriate and effective technical solutions to service delivery problems have been developed but are not being implemented.

Our interventions in response to these problems are as follows:

CS1 Incubation of national capabilities to support service delivery
By working with national institutions such as COGTA and MISA, and building on our existing expertise in immovable asset management and our work with specific municipalities, we intend to incubate service delivery capabilities in two domains. Potential intervention areas include health, education and water treatment facilities.

CS2 An integrated and multi-sectoral decision support centre
This centre will, in collaboration with universities and developmental agencies, provide decision support services to amongst others government departments, local government, and state-owned companies. The centre will have capabilities that deal with the collection, transmission, collation, storage, and analysis of applicable data sets, as well as the decision support frameworks that transforms this data into useful inputs for decision makers. Such a centre will enable a range of actors to make more coherent and better-informed decisions within their domains.

CS3 The large-scale deployment of technologies that support service delivery

There are a variety of avenues through which CSIR technologies can be deployed, including licensing and the creation of start-up companies. These may not be naturally suited to the service delivery arena, and in such cases we need the dedicated capability that is able to assess the potential effectiveness of the technology and, together with other developmental agencies, identify mechanisms through which these technologies can be deployed at scale.

A.5.3 Economic and Social Infrastructure

To achieve sustainable and inclusive growth by 2030, South Africa needs to invest in a strong network of economic infrastructure designed to support the country's medium- and long-term objectives. Achieving this vision is possible if there is targeted development of transport, energy, water resources, and ICT networks. The Presidential Infrastructure Coordinating Commission (PICC) has been established to co-ordinate the long-term delivery of infrastructure. The PICC currently manages a portfolio of approximately R 800 billion and has established 18 SIPs to support infrastructure delivery.

There is a clear need to maintain and upgrade South Africa's existing infrastructure, and to develop the technologies that will form the basis for the infrastructure of the future. South Africa's economic growth and its ability to provide basic services to its people will be fatally undermined if there is no concerted effort to maintain and re-build our transport, water, energy and ICT infrastructure.

The CSIR is coordinating two of the SIPs ("Higher Education Infrastructure" and "Expanding access to Communication Technology") and is providing specialist support (including, for example, in the form of environmental impact assessments) to a number of other SIPs. Our interventions in support of economic and social infrastructure takes two forms – the development of policies and the design of technological solutions.

ESI1 Water Infrastructure

South Africa is defined as a water scarce country. Both water availability and water quality are major challenges, particularly due to climate change, pollution, industrial effluent, acid mine drainage and salinisation caused by irrigation. More than 10% of South Africans still do not have access to potable water. Water infrastructure in South Africa is rated of poor quality by SAICE leading to major losses and water quality problems.

Our aim is to:

- Develop coherent water resource decision-support frameworks, and address gaps in assessments, technologies, tools and techniques. These include integrated hydrogeological decision-support tools and water risk assessment measures to promote and improve the health of freshwater ecosystems.

- Develop a portfolio of solutions for water treatment and the detection of contaminants. Specific solutions include rapid pathogen detection technology; novel adsorbents for water treatment; and sea and freshwater buoys to monitor water quality.
- Develop guidelines for norms and standards for water and sanitation services.
- Develop portfolio solutions for smart and efficient water infrastructure management. This includes the integration of a range of technologies to enable the continuous monitoring, diagnosis, control and optimisation of the water distribution network.

ESI2 Energy Infrastructure

Our aim is to develop technologies that support the maintenance of our energy infrastructure. These include:

- A Sulfur Hexafluoride[3] gas leak detection system for use by the power industry in SA.
- The development of a fully integrated radiometric infra-red and ultra-violet, high definition multi-spectral inspection system with associated image processing and analytics capability.
- The development of new materials-based technologies for energy storage and conversion systems, and demonstrating and proving such technologies at pilot scale to enable new industrial activity. Specific areas of focus will be Maganese battery cathode materials; fuel cells; metal organic frameworks and scaling up cathode material production.
- Natural gas – Energy technologies, processes and policies centred on natural gas as an energy source, including gas markets, gas storage and gas power generation.
- Smarter Grids – Technologies and processes for efficient markets for bidirectional power flows.
- Mobility – Technologies for applying renewables in electric and gas-driven vehicles and trains.
- Market Design and Policy-making – Develop in-house capabilities for driving market designs and policy-making.

ESI3 Transport Infrastructure

The transport infrastructure and operations system is a critical component of SA's socio-economic activity and also provides significant, direct benefit to communities through improved access and mobility. The national problem is sub-optimal performance of the transport system, structurally as well as operationally, due to the deterioration of road and rail infrastructure and systems; a lack of expertise in construction, maintenance and management techniques for roads; a sub-optimal public transport system and sub-optimal rural access road infrastructure.

Our aim is to:

[3] Sulfur Hexafluoride (SF_6) is a gaseous dielectric for high voltage power applications and has been used extensively in high voltage circuit breakers and other switch gear employed by the power industry.

- Develop guidelines for the design and management of low-volume access roads.
- Test the use of roller compacted concrete and ultra-thin reinforced concrete surfacing for roads.
- Demonstrate the use of a microfiller as bitumen extender – this will double the fatigue life of asphalt materials whilst saving on cost.
- Demonstrate advanced, large block paving systems utilising waste materials for rapid construction of road surfaces.
- Develop the next generation version of the Traffic Stream Simulator (HVS) that can simulate a mixed traffic stream at high speed for road pavement testing.
- Develop performance-based specifications for smart trucks – this will allow for the design of trucks outside of the normal specification to improve road safety and increase the payload thus saving up to 15% of transport cost.
- The development and licensing of road management systems to local authorities.
- The development and implementation of pothole scanning systems.
- The field testing of a locomotive diagnostic and conditioned based monitoring system (in partnership with Transet).
- The finalisation of a field research platform for rail line defect monitoring (in partnership with Transet).

ESI4 Building Design

The over-arching problem in this domain is the sub-optimal functional performance of buildings as well as a lack of maintenance. Many buildings are currently not performing optimally both in terms of functional performance as well as in terms of resource usage. This is usually associated with poor design and low or no maintenance of such buildings. In addition, there is significant pressure to reduce the cost of, and reduce the delivery time of, new public buildings.

Our aim is to:

- Develop guidelines for the design and operation of public buildings, particularly schools and health facilities, to ensure optimal functional performance;
- Investigate new building materials that are stronger, with a lower carbon footprint; and
- Demonstrate and develop guidelines for new construction methodologies that will ensure more cost-effective and energy-efficient delivery of new buildings.

ESI5 Coastal Infrastructure

A number of ports are not performing optimally in terms of structure as well as functionally, leading to increased costs, delays and decreased safety.

Our aim is to:

- Use the coastal modelling platform to improve the design, operation and management of all our ports.
- Develop an automated system for coastal structure scanning consisting of a laser scanner that provides 3D LIDAR scanning of breakwater and port infrastructure as well as dredging levels.
- Develop tools for real time sediment movement monitoring to assess erosion of beach profiles and accretion of sediment.
- Develop models for hydrodynamic, sediment and wave modelling in coastal zones to support the efforts to improve management of coastal and marine resources.
- Deliver operational support to ports and port-city interfaces through the development of long-term conceptual model/s of interactions between social-ecological systems, the ecosystem services they generate, ecological infrastructure, human wellbeing, equity and poverty.
- Develop an online Oceans and Coasts Information Management System to allow for real-time accessibility of information and data for informed decision-making and planning.

ESI6 ICT Infrastructure

The national priority with respect to broadband infrastructure is a seamless information and communications infrastructure will be universally available and accessible at a cost and quality that is at least equal to South Africa's main peers and competitors. There are a number of key national challenges (including the capacity and cost of our networks) that need to be addressed in order to reach the stated objectives of the NDP with regard to communication infrastructure.

Our aim is to address the lack of quality data, analysis and tools on South African broadband network infrastructures and spectrum, and to inform the policy, decision-making, design and coordination of broadband development and spectrum usage. In particular we will:

- Continue to host the National Integrated Cyberinfrastructure System (NICIS).
- Develop dynamic spectrum assignment and management tools to enable automated spectrum assignment and hence increase the efficient utilisation and management of networks.
- Develop advanced networks and services models, including Software Defined Networking and Network Functions Virtualisation solutions to enable low cost implementation and efficient management of shared broadband infrastructure.
- Develop tools to collect, store, process, design and analyse data on broadband network infrastructure to enable better planning and monitoring of the extensions of the broadband infrastructure, as well as to lower the cost of provisioning of broadband services.

A.5.4 Transition to a Low-Carbon Economy

By 2030, South Africa's transition to a low-carbon, resilient economy and just society is well under way. Having undertaken the difficult steps to adjust, all sectors of society are actively engaged in building a competitive, resource-efficient and inclusive future, and the country is starting to reap the benefits of this transition. South Africa has reduced its dependency on carbon, natural resources and energy, while balancing this transition with its objectives of increasing employment and reducing inequality. Development initiatives, especially in rural communities, are increasingly resilient to the impact of climate change, with mutual benefits between sustainable development and low-carbon growth quickly identified and exploited. The state has significantly strengthened its capacity to manage the ongoing internalisation of environmental costs, and to respond to the increasingly severe impacts of climate change.

The CSIR is working on improving the measurement and management of our natural resources, improving our ability to understand the long-term effects of climate change and hence to assist government with the formulation of mitigation and adaptation strategies. The CSIR is also supporting the development of a green economy more generally.

LC1 Climate Change

In order to mitigate and adapt to climate change we need to predict climate futures at various temporal and spatial scales. We also need to develop applications which define the impact of climate and climate change in selected sectors.

Our intent is to:

- Develop the Variable Resolution Earth System Model (VRESM) for projecting climate futures.
- Develop application models in the fields of agriculture, human health, air quality, and stream-flow / dam-levels.
- Continue to develop the observation platform and basic research to enhance domain expertise in the ocean-atmosphere-terrestrial environments.

LC2 Green Economy Solutions

There is a shortage of effective tools for embedding sustainability into development planning and a need for new knowledge and technologies to unlock the green economy development opportunities evident in the biomass and waste sectors.

Our intent is to:

- Generate knowledge and create tools to effectively integrate sustainability into development policy, assessment, planning and management for SA's transition to a Green Economy.
- Provide new scientific evidence and decision support tools for unlocking green economy growth from the solid waste sector.
- Develop a forest and waste biomass biorefinery R&D platform developing technologies and directed chemical engineering, chemistry, and biology capabilities enabling green economy development

- Implement the National Waste RDI Roadmap.

LC3 Ecosystem Services

The high-level national challenge for South Africa is to protect our natural resources to ensure environmental sustainability and to develop the ability to continuously predict, monitor and assess risks to economic infrastructure and resources that are spread over very large areas. Our aim is to improve the national capability to monitor, evaluate, report and predict over the very wide land and sea surfaces that make up the South African territory. To this end we will develop advanced spatial data infrastructure technologies and open geospatial standards to enable integrated large area information and awareness systems based on processing of diverse satellite and in-situ data.

Our intent is to:

- Develop automated landcover classification and change detection tools using novel machine learning algorithms.
- Enhance disaster management decision making and mitigation by developing multi-hazard terminal information products.
- Develop an integrated Oceans and Coasts information and awareness system based on processing of diverse satellite data.
- Develop an automated land surface deformation monitoring system.

LC4 Renewable Energy

Investigate technologies and policies to support the increased use of renewable energy in South Africa's power system.

A.5.5 Building Safer Communities

In 2030, people living in South Africa feel safe and have no fear of crime. They are safe at home, at school, at work and they enjoy an active community life free of fear. Women can walk freely in the streets and children can play safely outside. The police service is a well resourced professional institution staffed by highly skilled officers who value their work, serve the community, safeguard live s and property without discrimination, protect the peaceful against violence and respect the rights of all to equality and justice.

The CSIR interventions in this area focus on supporting the acquisition and integration of technology by our security forces, the development of systems for the effective sharing of information across different components of the security forces, the continuous improvement of South African Air Force air capability, the protection of air and naval assets against guided weapons, the support of specialised, highly mobile combat ready forces, the development of national surveillance capabilities, and protection against cyber-security threats.

The most significant impact on the CSIR mission in this domain is its changing role in the South African Defence Safety and Security Industry. The CSIR's primary partner has traditionally been the DoD, but there has been a growth in partnerships with the SAPS and the in recent

years. Strategic level partnership agreements are in place with the DoD, SAPS, and DTPS that provides a strategic framework for engagement and provides not only a strong platform ensuring long term sustainability of a relevant technology capability, but a mixture of both R&D and growing operational requirements are emerging. The relationship with Armscor, although not formalised, is continuously being managed and grown with a close working relationship existing with a number of senior managers.

The **Defence Review** of the Military Strategy of the SANDF emphasise the necessity for a Defence Research and Development capability. The Defence Review, as the core of the National Defence Policy, places important responsibilities and expectations on the CSIR which is considered to be "strategically essential" for the protection of national interests. These responsibilities also bring with them new opportunities for the CSIR to carry out its broader mandate.

The CSIR is singled out as being the primary provider of SET support in the area of electronics (including radar, electronic warfare, information warfare, command and control), aeronautics, landwards capabilities and special operations.

SS1 Holistic and integrated approach to national security

There is a lack of an integrated national level operating concept across different government departments and other stakeholders and role players, for addressing cross-functional and multidisciplinary issues.

The aim is to address safety and security risks by means of a new holistic integrated approach taking into account how economic and social factors influence safety and security. This will create a shared understanding and analysis of the safety and security problem, and develop an integrated national level operating concept across different government departments.

SS2 Security sector capability development

National institutions in the safety and security sector lack full set of capabilities for delivering on their strategic objectives. There are insufficient methodologies for safety and security operational concept definition, capability definition, experimentation, capability development and implementation. There are insufficient methodologies, architecture principles, and architecture frameworks for developing the technology, information and process elements underpinning the organizational capabilities required. Many of these capabilities require complex technology support for establishment and sustainability.

Our aim is to assist national institutions in the safety and security sector with technology and engineering systems support in order to deliver on their strategic objectives

SS3 Multi-agency command, coordination, and control

There is a lack of all-inclusive command, coordination and control solutions for multi-agency operations such as border safeguarding, combating rhino poaching, disaster response, major event security and others. This includes interoperability of systems

and data, business processes and systems for joint planning, creating shared situational awareness amongst agencies, and multi-agency tasking and control.

Our intent is to support the development of an all-inclusive command, co-ordination and control solution for multi-agency operations, including the interoperability of systems and data, business processes and systems

SS4 SANDF Air Operations capability

There is a need for continuous improvement of mission effectiveness and efficiency of SAAF Air capability.

Our intent is to support the continuous improvement of the mission effectiveness and efficiency of South African Air Force (SAAF) Air capability. This requires integration of complex systems such as aircraft, weapons, surveillance sensors and pods into a capability with high integrity, safety, and performance, and with low life cycle cost

SS5 SANDF Landwards Capability

There is a lack of technologies for supporting a specialised, highly mobile combat capability able to rapidly deploy to remote areas for specific preventative and intervention operations. This includes providing high levels of protection against threats without reducing mobility in a wide range of terrains. Deployments include Operations Other Than War that requires effective non-lethal weapons technologies.

Our aim is to support the SANDF by developing technologies for supporting a specialised, highly mobile combat capability, including providing high levels of protection against threats such as road side bombs, explosively formed projectiles and improvised explosive devices without reducing mobility.

SS6 SANDF Platform Protection

There are significant engineering requirements for the design, maintenance and protection of Maritime, Airborne, and Landwards operational platforms.

Our aim is to develop engineering solutions that increase the survivability of SAAF and SA Navy platforms against optical (including infra-red) and radar-guided weapons.

SS7 National Surveillance and Situational Awareness

There are major deficiencies in the national surveillance capability, and in some cases no existing technology solutions to support the increased ability to detect, track, classify, and identify objects of interest at a distance in different environments.

Some of the required capabilities are:

- Maritime Environment Surveillance (Anti-piracy);
- Environmental Asset Protection (poachers, illegal fishers);
- Peace support operations (personnel, vehicles, weapons);
- Border safeguarding;
- Conventional warfare;

- Combating crime; and
- Intelligence gathering – Strategic/Tactical Intelligence comprehension.

SS8 National Cyber Security Capability

Cyber vulnerabilities exist on a national, institutional, and personal level, while cyber threats are growing in sophistication. These threats must be countered now and in the future, through a range of measures including hardening of critical infrastructure, supporting institutions in hardening their systems and developing mitigation capabilities, and developing a national capability to respond to large scale cyber security incidents. This must facilitate continued operational effectiveness on national and organizational level while under severe cyber-attack.

Our intent is to establish a national cyber-security research centre that will integrate the various aspects of cyber-security research at the CSIR, thereby contributing to the implementation of the national cyber-security policy and supporting the national ability to respond to large-scale cyber threat incidents.

SS9 Unmanned Defence Systems

There are many opportunities to use unmanned systems to avoid putting people in harm's way and to overcome human limitations in safety and security operations.

Our aim is to increase operational effectiveness and to provide military advantage through the smart acquisition/development and deployment of unmanned systems.

A.5.6 Improving Health

The vision is that, in 2030, South Africa has a life expectancy rate of at least 70 years for men and women. The generation of under-20s is largely free of HIV. The quadruple burden of disease has been radically reduced compared to the two previous decades, with an infant mortality rate of less than 20 deaths per thousand live births and an under-five mortality rate of less than 30 per thousand. There has been a significant shift in equity, efficiency, effectiveness and quality of health care provision. Universal coverage is available. The risks posed by the social determinants of disease and adverse ecological factors have been reduced significantly.

The CSIR's work in support of health ranges from technical support to the National Health Insurance initiative (particularly with respect to the security, use and transfer of health-related data), the development of interconnected and inter-operable point-of-care devices (such as Cellnostics or Umbiflow), the use of technology in support of diagnostic functions, the development of vaccines using bio-therapeutic manufacturing methods, and the development of new methods to understand, manage and diagnose disease mechanisms at the cellular and molecular level.

IH1 E-Health

The development of a standards framework for interoperability of eHealth systems, and the establishment of a national regime for implementation of interoperability standards. This will include the establishment of the foundational national infrastructure required

for interoperability of eHealth systems (e.g. national patient registration and identification system, national clinical repositories, security and audit services, health information orchestration and exchange). This will result in a seamless, secure and trustworthy integration and exchange of health information/data across devices, systems, components and business processes.

IH2 Point-of-Care Medical Devices

Develop a portfolio of medical devices, sensors and information systems to provide PoC assistance, comprising screening technologies for foetal health and cardiovascular diseases; biosensors; PoC blood screening; medical visualisation and analytical tools, and national medical databases. A special focus will be to implement the Cellnostics business model and investigate the creation of a medical device and diagnostic incubator for industry.

IH3 Burden of Disease

The CSIR will provide low cost and tailored protein expression, protein characterisation and pilot manufacturing services in human and animal health for therapeutic proteins, vaccines and adjuvants. We will also develop cutting edge knowledge based science in gene engineering, cellular biology and pharmaceuticals chemistry that supports the development of innovative products by multinational pharmaceutical companies.

The programmes supported under this initiative include:

- Develop and transfer protein expression products through novel methodologies such as biopharming.
- Establish a multidisciplinary platform that develops point-of-care (PoC) diagnostics tools for human and animal health.
- Support the Biomedical Translational Research Initiative (BTRI) to advance cutting edge gene-based therapies, treatments, diagnostics, training, education, and lead to job creation in South Africa, initially in collaboration with the University of Cape Town.

A.5.7 Transforming Human Settlements

By 2050, South Africa will no longer have: poverty traps in rural areas and urban townships; workers isolated on the periphery of cities; inner cities controlled by slumlords and crime; sterile suburbs with homes surrounded by high walls and electric fences; households spending 30 percent or more of their time, energy and money on daily commuting; decaying infrastructure with power blackouts, undrinkable water, potholes and blocked sewers; violent protests; gridlocked roads and unreliable public transport; new public housing in barren urban landscapes; new private investment creating exclusive enclaves for the rich; fearful immigrant communities living in confined spaces; or rural communities dying as local production collapses.

The CSIR is supporting metropolitan areas and municipalities in a number of areas, including spatial planning, the management of infrastructure and the long-term transition to greener and smarter economies.

Fast-growing cities are not performing optimally often due to ineffective spatial layout and management. In addition, there is a lack of capability and tools in government as well as evidence-based decision-making support, resulting in poor planning, design and management, decision making and spatial prioritisation of interventions (i.e. housing, infrastructure investment, risk mitigation, social support, economic development interventions, etc.). A major need exists to timeously plan and prioritise infrastructure investment with an understanding of impact on development priorities and long term implications. In addition, the performance of the built environment system in South Africa is suboptimal due to a number of factors including the legacy of apartheid. All sectors, as well as spheres of government, responsible for planning and decision making which result in the spatial prioritisation of interventions (i.e. housing, infrastructure investment, risk mitigation, social support, economic development interventions, etc.) need to understand the current and future spatial outcomes of the systems that drive the movement of people and economic activity in order to make informed decisions about the planning and design of regions, cities, towns and neighbourhoods.

THS1 Urban Modelling

Our aim is to further develop the UrbanSim modelling system for modelling the growth of cities and regions to inform infrastructure investment decisions.

THS2 Spatial Prioritisation Policy

We will develop policies on the spatial prioritisation of infrastructure investment, and develop an enhanced spatio-temporal capability for advanced spatial planning.

A.6 Enabling Conditions and Processes

A.6.1 Knowledge Transfer

The CSIR plays a significant role in national development, enabling socio-economic transformation of society, by creating opportunities for entrepreneurs and private firms to meaningfully and productively participate in economic activity through the licensing and commercialisation of CSIR technologies and intellectual property. The overall strategic objective of the Licensing and Ventures (L&V) Office is to support the impact by the CSIR by strengthening and increasing technology transfer activities in the organisation.

The overall strategic objective of the L&V Office is to facilitate increased impact by the CSIR through strengthening and increasing thetechnology transfer activities in the organisation by:

- Providing support and advice with respect to market research, IP management, commercialisation and technology transfer activities;
- Building networks with relevant stakeholders and funding organisations and linking opportunities with funding;

- Creating a technology transfer policy environment conducive to innovation; and
- Increasing the awareness of technology transfer opportunities and providing capacity building interventions.

A.6.2 Strategic Partnerships

Strengthened stakeholder relationships are necessary to grow the impact of the CSIR's work. Our stakeholder engagement approach allows us to prioritise our stakeholders, partners and clients, and enables a longer-term strategic, rather than transactional, view of addressing national priorities and stakeholder needs with key partners. A business development framework has been developed to support CSIR strategic objectives, provide a structured approach to scanning the environment; identifying priority challenges, initiatives and the relevant partners to work with; developing the appropriate value propositions to execute effective programmes; and successfully communicating the impact of our work.

The CSIR has set the following strategic goals in this area:

- Develop a deep understanding of the current and future environment;
- Develop strategic partnerships/ alliances with key actors in the identified priority sectors;
- Develop clearly articulated integrated CSIR value propositions, supported by relevant RD&I programmes for targeted stakeholders in priority sectors and clusters across the full value chain
- Make it easier to do business with the CSIR; and
- Profile the CSIR as a key institution for creating national and international impact.

The CSIR's current relationships with Government Departments, state owned companies, local and international private sector partners as well RTOs and HEIs were reviewed to reflect evolving strategic priorities to improve their effectiveness. Parallel to this process, long term programmes are being developed with HEI partners who have already shown commitment to developing joint programmes in areas of importance to the CSIR. Work has also been initiated on an Africa strategy, which will be pursued further in the coming financial year.

Strategic partnerships between the CSIR and key stakeholders in the private and public sectors, including SOCs, develop structured RD&I initiatives that draw on the science and technology competences of multiple CSIR units and centres.

The CSIR approach to strategic partnerships harnesses the CSIR's multidisciplinary capabilities in supporting national imperatives and service delivery objectives of government departments. The CSIR is giving priority to strategic relationships with the departments of Health, Water Affairs, Environmental Affairs, Home Affairs, Performance Monitoring and Evaluation, among others.

SOCs in South Africa play a critical role in industrial growth, infrastructure development and job creation. Large integrated projects predicated on the CSIR's multidisciplinary value proposition are under development for and in partnership with SOCs. In this regard, the CSIR is prioritising programmes with Transnet and Eskom. Notably, the CSIR is investing significantly in developing new R&D capabilities to support the collaboration with Transnet as well as other SOCs.

The CSIR has recognised that significant scope exists to improve its efforts in serving the private sector. In addition to the contribution reflected by income derived from the private sector, many government-funded initiatives, such as the Titanium Centre of Competence, are in direct support of the private sector and have potential for substantial impact.

In the funding domain, the CSIR has put in place strategic partnerships with the IDC and the Development Bank of South Africa to enhance CSIR support to the private sector. Specific areas of cooperation have been identified for each partnership, and strategic and technical engagements are aimed at scoping initiatives for joint collaboration and national impact.

In addressing national challenges, the CSIR aims to cooperate with and complement other players in the national system of innovation. The CSIR partners with RTOs and Higher Education Institutions (HEIs) to undertake research and development that contributes to economic growth and addresses the development challenges of South Africa. Through collaboration, the CSIR builds networks that contribute to the strengthening of its own science and technology base, as well as that of South Africa.

The partnerships reflect the CSIR's mandate, which provides for research and technological innovation in collaboration with partners, and are guided by the organisation's research priorities.

The CSIR's Parliamentary Office supports the CSIR in achieving its mandate by enabling and maintaining relationships and profiling the CSIR with key portfolios in Parliament and the National Executive.

The Parliamentary Office takes leadership in facilitating the CSIR's engagement with parliament for accountability purposes such as the presentation of operational plans and annual reports. In addition to these formal interactions with Parliament and the National Executive, ongoing stakeholder conversations and engagement opportunities receive priority attention. The office, along with the CSIR legal team, plays an important role in communicating legislative and policy developments. The Parliamentary Office positions the CSIR as a trusted advisor/partner on scientific and technical matters to Parliament and the National Executive, as appropriate, and facilitates the participation of CSIR experts who provide technical inputs into initiatives brought before Parliament.

A.6.3 Human Capital Development

The HCD Strategy identifies the following objectives and key performance indicators for transformation:

- An increase in the ratio of scientists, researchers and technical staff particularly at post graduate level;
- An increase in the ratio of women, black and young researchers with strong support to ensure the establishment of their careers;
- Improvement in the qualification profile of the CSIR, specifically the proportion of staff with masters and doctorate degrees;
- Expansion of the CSIR SET base through a focused recruitment and educational campaign aimed at grooming well-qualified researchers, technical and other support staff; and
- Contribution to national HCD through training and deployment of significant numbers of new graduates to the South African economy.

The organization will continue to enhance various programmes, such as the Young Researchers Programme and Post Doc / Studentship Programme, in order to deliver on above objectives, In additional, a targeted approach of developing black science and technology leaders will be adopted.

Development of a diverse pool of science leaders

Science leadership and management excellence drives the culture and the success of all aspects of an R&D organisation. The development of a cohort of diverse leaders that are able to lead and manage within a science, research and development environment is critical to the success of the CSIR. The required competencies and skills for leaders to succeed in the CSIR are best developed within a learning framework that provides a series of fit for purpose development and training opportunities that are planned for over a period of time. The CSIR will develop a fully funded science and leadership development programme specifically directed at fast tracking South African black and women scientists for science leadership roles.

Strategic recruitment of Senior Scientists and Engineers

The CSIR has noticed increased attempts by other research and technology institutions at attracting our senior scientists and engineers. The organization has adopted a more strategic response to this challenge that is beneficial to the national system of innovation, instead of adopting a "counter-offer" approach. A needs assessment has been conducted that identifies required resources at Chief and Principal Researcher level necessary to execute CSIR's

research and development strategy and play a significant role in the development of CSIR researchers. The organization will embark on a strategic recruitment drive nationally and internationally for these skills, specifically focusing on attracting Africans in the diaspora. Attraction of these science leaders will create capacity for mentorship/coaching of young scientists identified as future science leaders in line with a strategy to develop a pool of black and women science leaders.

A.6.4 Financial Management

The CSIR Finance department provides financial services to enable the implementation of all strategic initiatives, and supports internal operating units with financial administration and governance to allow them to focus on their core R&D objectives. The Finance function assists the organisation to be a well governed and managed entity by providing specialised services such as treasury, statutory reporting and system administration.

This area also supports the organisation with the identification and management of risk by ensuring that financial risks are managed within acceptable limits and ensuring compliance with the relevant financial legislation, and CSIR financial policies and procedures.

Finance also engages in the management of relationships with key stakeholders to ensure an informed mutual understanding of the financial business environment, business processes and solutions, changes to legislation and the impact thereof on the organisation. Part of this entails involvement in the processing of customer and supplier contracts, where there is evaluation of all financial risks and providing advice on the optimal mitigating steps to be taken in order to ensure that our commitments can be honoured. Furthermore, there administrative support provided for standardised processes aligned with legislative requirements and CSIR policy and procedures in order to assist in optimising resources and mitigating financial risks.

Other routine but key functions of the Finance function include the management of the payroll of the CSIR, the financial administration of payments for employee development, the management of insured employee benefits.

A.6.5 Facilities Management

In order for the CSIR to effectively implement its R&D strategy it requires the appropriate physical environment within which to do this work. This environment includes the housing of R&D facilities and equipment. The aim of the facilities management function is to provide the CSIR with an enabling environment through:

- The provision of an appropriate physical working environment;
- The creation of a healthy, safe and secure working environment;
- The provision of support to the CSIR in implementing Quality Management Systems.

In order to deliver on its mandate the facilities management function is required to provide the CSIR with an enabling environment through the provision of an appropriate physical working environment. In this context, the physical working environment includes both the CSIR's built environment as well as the natural environment at all its sites. This translates to a CSIR that has fit for purpose facilities, infrastructure and associated services.

Furthermore, the CSIR is committed and dedicated to providing its employees, tenants, contractors and visitors with a healthy, safe and secure work environment. It is therefore, important that CSIR continues to integrate appropriate health, safety and security management practices into all its operations. This translates to a CSIR that has a healthy workforce and has a safe and secure working environment.

This function also provides the organisation with the necessary guidance and support to implement Quality Management Systems into its normal business practices. Its medium term vision remains the development of a robust, relevant and effective ISO 9001 quality management system underpinned by functional technologies. This translates to the CSIR implementing and maintaining the ISO 9001 Quality Management System in identified areas.

A.6.6 Communication

In order for the CSIR to succeed in conveying the relevance and impact of its work to any audience we need to improve our ability to communicate science – in particular we have to move from conveying information, to conveying meaning and facilitating understanding.

From a CSIR communications perspective it requires an improvement in the copy that is produced (writing has to, where possible, stripped of dense scientific jargon), an ability to tailoring the message for different audiences and channels, and generating more information about the CSIR's work (to cover that many stories that are not being told). These aspects will be prioritised in the next period. The CSIR's strategic objectives in this area are to:

- Communicate the current and future value of the CSIR through targeted messages aimed at a range of stakeholders; and
- Facilitate a shared vision and understanding of the CSIR's role among internal stakeholders.

The Strategic Communications portfolio identifies and manages stakeholder communication issues with the aim of contributing towards the realisation and achievement of the CSIR's strategic priorities.

The CSIR has enjoyed mostly positive media coverage in the past two years. The organisation works on some of the most strategic areas of national and international importance such as alternative energy generation and storage, a sustainable natural environment, and cybersecurity. Strategic partnerships with relevant media organisations will be pursued and implemented

to promote the CSIR's work in the aforementioned sectors and other breakthroughs or milestones in the organisation's R&D portfolio.

Media partnerships that will receive priority include those with the South African Broadcasting Corporation (radio, television and online), eTV and eNews (television and online), CNBC Africa (television, online and print), Primedia (radio and out-of-home), regional and community media, both electronic and print. Partnerships with Brand South Africa and Proudly South African will also be strengthened.

The CSIR's multimedia awareness campaign in 2015 reached more than 10 million South Africans and significantly increased the awareness of the CSIR. The CSIR will implement the further phase of the "Ideas that Work" campaign to sustain the CSIR brand in the public domain. The second phase of the campaign will involve the production of long-format videos showcasing the impact of the CSIR in industry development, education and community development and will be used in predominantly digital or online media such as website, YouTube and FaceBook.

The CSIR will continue to produce promotional materials that are relevant and suitable for all its stakeholders. These promotion materials (including ScienceScope) will be produced in appropriate format and language(s) in accordance with the organisation's language policy, to facilitate easy access and understanding.

A.6.7 Governance

The main areas that will continue to be addressed to sustain and enhance the CSIR's corporate citizenship are:

- Contributions to B-BBEE based on the Department of Trade and Industry (**dti**) codes of good practice; and
- Maintenance and enhancement of environment, health and safety performance;

The CSIR has achieved a Level 2 B-BBEE status and will endeavour to maintain the same level under the new set of codes as gazetted in October 2013. Although good performance has been achieved in the past five years, there will be greater focus on transformation and creating an environment that attracts people with disability to the organisation. The focus in 2016/17 will be on continuing the CSIR transformation strategy that addresses identified gaps in this area. A strategy is in place to promote greater participation of small enterprises with credible B-BBEE credentials in the CSIR procurement supply chain. The CSIR has incorporated B-BBEE requirements in its IP and Technology Transfer Strategy, including providing greater access to B-BBEE players to its technologies and innovations. The CSIR has already achieved a preferential procurement spend of 70%, but will continue on this road to achieve the required 80% preferential procurement spend as stipulated in the new set of codes as published on 11 October 2013.

The CSIR has achieved a good safety and health record, and will continue to manage its occupational safety and health risks, and to maintain OHSAS 18001 certification. As part of continuous improvement, there will be more focus on enhancing a safety culture throughout the organisation by incorporating safety issues in CSIR's good laboratory practice guidelines and benchmarking the organisation's performance against similar organisations.

The CSIR endeavours to create an environment where its employees can attain their full potential. This commitment, including a commitment to employee well-being, has led to the establishment of the CSIR Employee Well-being Programme, which provides a range of support mechanisms to encourage well-being. In developing a comprehensive and holistic approach, the CSIR Employee Well-being Programme will further develop its response to needs in a variety of areas including physical, emotional, social, financial and professional.

A.6.8 Risk Management

The CSIR's risk management plan is provided in Annexure F. The CSIR takes a broad view of risk management, and the risk management plan addresses risks in the areas of:

- Research: Shortage of skilled staff in the market; falsifying and poor research output; obsolete research equipment;
- Business: Decrease in public sector funding; contracting risks; exposure to global market and foreign exchange;
- Operational: Loss of institutional memory; business interruption due to power failures;
- Fraud: Financial fraud/misappropriation of assets and inappropriate contracting; and
- Environment, health and safety: Compliance to relevant regulations.

A consolidated risk register has been prepared and is available for review.

The organisation's Fraud Prevention Plan presented in Annexure H is key to the mitigation of risk. In addition, the Materiality Framework (Annexure I) identifies significant risks that need to be addressed through appropriate controls. The major risks that may have significant bearing on the organisation and the execution of its plan as well as key and high level controls to mitigate these are monitored on an ongoing basis. Discussions on these are held by the Executive committee and reported to the Audit and Risk committee.

A.7 KPI Targets

	KPI	Target: 2015/16	Forecast: 2015/16	Target: 2016/17	Target: 2020/21
Scientific & Technical	Publication Equivalents	490	490	490	550
	Journal articles published	300	300	300	350
	New Technology Demonstrators	$\geq$ 30	$\geq$ 40	$\geq$ 30	$\geq$ 40
	New Patents	$\geq$ 15	24	$\geq$ 15	$\geq$ 15
	Contract R&D Income (Rm)	1786	1789	1914	2330
	Royalty & License Income (Rm)	7.4	6.2	2.9	8.5
Learning & Growth	Total size of SET Base	1850	1980	2100	2330
	Number of SET Base who are Black	1050	1160	1260	1525
	Percentage of SET Base who are Black	57%	59%	60%	61%
	Number of SET Base who are Female	630	690	755	950
	Percentage of SET Base who are Female	34%	35%	37%	38%
	Number of SET Base with a PhD	330	350	375	450
	Percentage of SET Base with a PhD	18%	18%	18%	19%
Financial & Governance	Total Income (Rm)	2450	2445	2611	3200
	Investment in Property, Plant & Equipment (Rm)	113	243	103	150
	Net Profit (Rm)	54	54	58	70
	BBBEE Rating	Level 2	Level 2	Level 2	Level 2
	DIFR	$\leq$ 0.3	$\leq$ 0.3	$\leq$ 0.3	$\leq$ 0.3

Table A.8: CSIR Key Performance Indicators: 2016/17 and 2020/21

A.8 KPI Descriptions

KPIs provide an understanding of performance in terms of inputs, outputs, efficiencies, and to some extent provide lead indicators of the outcomes and impact that are required for the CSIR to fulfill its mandate. The question of whether the CSIR is achieving its strategic objectives related to achieving outcomes and impact cannot be achieved by KPI assessment, and requires a process of programme evaluation as described in the National Evaluation Policy Framework. The strategic objectives provided in the CSIR strategic plan make specific statements on planned outcomes that will serve as the basis for future evaluation of performance in this regard.

CSIR KPIs provide a basket of measures that reflect various aspects of organisational performance. The targets that are set reflect, in the context of limited resources, a strategic choice about the areas in which greatest impact can be achieved. The financial indicators are all somewhat related and a harsh economic climate could lead to missed targets in total income, contract R&D income, private sector and international income, net profit and investment in property plant and equipment.

Publication Equivalents

Indicator Title	Publication Equivalents
Definition	Publication equivalents consists of peer-reviewed journal articles, peer-reviewed conference papers, peer-reviewed book chapters and books.
Purpose	The quantity and quality of peer-reviewed research publications is a measure of the CSIR's research quality, capabilities and outputs. The impact of research publications is a contribution to the knowledge base.
Desired performance	The current CSIR output will be at least maintained in the medium term.
Performance assessment	The CSIR considers a performance above 95% of the target as acceptable. Performance in excess of the target is a positive result. Publication equivalents are part of a portfolio of scientific and technological outputs. Recent experience has indicated that increased focus on technology transfer and impact reduces the publication output and the CSIR may therefore reduce the desired output rate to align with the strategy of increasing impact. Organisational performance should be judged in across the portfolio of outputs.
Data source	Data is entered into the CSIR TOdB which provides the information for reporting
Data responsibility	CSIR Information Services
Method of calculation	The number of publication equivalents is calculated by assigning a value of one to each peer-reviewed article, a value of 0.5 to each conference paper or book chapter, and a value of n to each book (where n is the maximum of 1 and the integer part of the length of the book divided by 60).

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Indicator Title	Publication Equivalents
Data limitations	Authors submit publications for inclusion in TOdB via WorkFlow. There may be under-reporting. The CSIR approach is documented in "CSIR guideline on the allocation of publication equivalents and accreditation of journals" (GWDMS Pta General 185556)
Type of indicator	Output

Journal Articles

Indicator Title	Journal Articles
Definition	Article published in an accredited journal
Purpose	The quantity and quality of peer-reviewed research publications is a measure of the CSIR's research quality, capabilities and outputs. The impact of research publications is a contribution to the knowledge base.
Desired performance	The current CSIR output will be at least maintained in the medium term.
Performance assessment	The CSIR considers a performance above 95% of the target as acceptable. Performance in excess of the target is a positive result. Journal articles are part of a portfolio of scientific and technological outputs. Recent experience indicates that an increased focus on technology transfer and impact may reduce the publication output. The CSIR may therefore reduce the desired output rate to align with the strategy of increasing impact. Organisational performance should be judged across the portfolio of outputs.
Data source	Data is entered into the CSIR Technical Outputs Database (TOdB) which provides the information for reporting
Data responsibility	CSIR Information Services
Method of calculation	Count of publications published in the calendar year ending in the financial year.
Data limitations	Authors submit publications in accredited journals for inclusion in TOdB via WorkFlow. There may be under-reporting. The CSIR approach is documented in *"CSIR guideline on the allocation of publication equivalents and accreditation of journals"* (GWDMS Pta General 185556).
Type of indicator	Output

Technology Demonstrators

Indicator Title	Technology Demonstrators
Definition	A technology demonstrator is: • An intermediate output of a research and development project or an intermediate output derived from existing knowledge gained from research and/or practical experience; • An intermediate output with the potential to be developed further into technology packages that can be transferred to various markets for socio-economic impacts; • An output at a Technology Readiness Level (TRL) maturity level 6 or beyond, indicating that it has at least been tested in a relevant environment; and • An output that performs and compares favourably to existing technologies / products / processes.
Purpose	Technology demonstrators provide a lead indicator of potential outcomes and impact that will be achieved through technology transfer by deploying the technology or commercialisation through licensing or spin-out of the technology.
Desired performance	The CSIR considers a performance above 85% of the target as acceptable. Performance in excess of the target is a positive result. The CSIR has been improving the definition of this indicator and the process of evaluation to ensure that it provides a meaningful indicator of potential technology transfer. The definition has been made more stringent in than in 2013 through elevating the minimum TRL to level 6. Increased stringency in criteria puts downward pressure on output. The CSIR sets a target of 24 technology demonstrators per year. This target will be re-assessed when the definition and process are stabilised.
Performance assessment	Technology demonstrators are part of a portfolio of scientific and technological outputs that are produced from the same capacity platform. Organisational performance should be judged in respect of the performance across the portfolio of outputs.
Data source	Technology demonstrators are submitted by units for adjudication by the Technology Demonstrator Evaluation Panel. The panel uses the CSIR Technology Demonstrator Evaluation Framework as the guideline for evaluating submissions. This framework is based on international standards/trends in the field of technology demonstrator evaluation and assessment of the maturity of technologies. The framework provides: • Technology Demonstrator Evaluation criteria; • Guidelines for submissions; • Guidelines for appointment of the panel; • Guidelines for appealing the decision of the panel and • Guidelines for management of Technology Demonstrator evaluation activities.
Data responsibility	CSIR R&D Office
Method of calculation	Count of technology demonstrators approved by the Technology Demonstrator Evaluation Panel using the Technology Evaluation Framework.
Data limitations	The revision of the definition and evaluation process precludes meaningful trend analysis and establishment of a baseline from which to project future performance targets.
Type of indicator	Output

Patents

Indicator Title	Patents
Definition	Patents granted by a national authority in countries with an examining office.
Purpose	Patents provide a lead indicator of impact through commercialisation. The patents granted in multiple countries reflect the potential market size for and value of the technology.
Desired performance	Patent prosecution and maintenance are very costly. The decisions of whether to patent, where to patent and in how many countries to file applications are driven by the requirements of a carefully considered commercialisation plan in each instance, including factors such as competition, market size and strength of the intellectual property. The CSIR regards a patent application for the purposes of achieving a KPI target, rather than to support a commercialisation plan, as an inappropriate response to a performance measure. The CSIR target is to achieve at least 15 granted patents annually, recognising that this target may be exceeded substantially in some years owing to awards in multiple countries.
Performance assessment	The CSIR considers a performance above 80% of the target as acceptable. Performance in excess of the target is a positive result and patents granted in multiple countries may lead to a result substantially greater than the target. The time taken for a patent to be granted after filing is unpredictable and can range from one to eight or even more years. The unpredictability arises from the processes within the examining offices and the possibility of one or more office actions, each of which leads to further correspondence with the relevant patent office and consequently delays in obtaining grant. Different patent offices also have different processing times, and processing time depends on factors such as how many pending applications they have at any point in time. Therefore, the number of pending CSIR patent applications in any given year does not provide a reasonable baseline for establishing a precise target for subsequent years. Patents are part of a portfolio of scientific and technological outputs that are produced from the same capacity platform. Organisational performance should be judged in respect of the performance across the portfolio of outputs.
Data source	Correspondence from the patent attorneys and supporting documentation from the relevant patent offices.
Data responsibility	CSIR Licensing and Ventures Office
Method of calculation	Count of patents where there is proof in writing from a patent attorney and/or patent office that the patents concerned have been granted in the financial year. For patents granted in multiple countries, each country filing counts as a separate patent. Only co-owned patents or patents in the name of the CSIR are counted.
Data limitations	South Africa and many African countries do not have patent examining offices. Therefore patents filed in these countries are not counted for this KPI. However, technologies with specific South African and African application may be patented in the relevant countries. There is a possibility of occasional under-reporting arising from receipt of correspondence from patent offices after the annual performance figures have been audited and finalised.
Type of indicator	Output

Contract R&D Income

Indicator Title	Contract R&D Income
Definition	Contract R&D income is income earned and recognised on contracts with external parties and includes ring-fenced allocations from DST for specific initiatives managed through memorandums of agreement.
Purpose	Contract R&D income indicates the value placed by stakeholders, customers and funding agencies on the research and development and services provided by the CSIR. Growth in contract R&D income reflects growth in the outcomes and impact achieved by the CSIR.
Desired performance	The CSIR annual target is the figure for contact R&D in the annual budget. The CSIR aims to achieve or exceed the target.
Performance assessment	Performance on financial KPIs needs to be assessed in the context of the prevailing economic climate. The CSIR considers a performance above 95% of the target as acceptable. Exceeding the budget target is a successful result and is not the consequence of an inappropriate target.
Data source	The information for the financial KPIs is obtained from the CSIR financial systems.
Data responsibility	CSIR Finances
Method of calculation	The CSIR annual trial balance from the financial system is updated for audit adjustments and the final figures are incorporated in the CSIR annual financial statements. The annual financial statements are audited and the KPI results are derived from these audited annual financial statements.
Data limitations	Income is declared by the project leaders based on the progress against the contractual deliverables and cost to completion. There are processes in place to ensure that project leaders are accountable for declaration of income.
Type of indicator	Output

Royalty and Licence Income

Indicator Title	Royalty and Licence Income
Definition	Royalties and licence income are derived from the licensing of formally-protected IP.
Purpose	Royalty and licence income is an indicator of successful technology transfer and commercialisation.
Desired performance	The CSIR annual target is the figure for royalty and licence income in the annual budget, which the CSIR aims to achieve or exceed. The CSIR medium to long term target is to earn royalty and licence income equivalent to 1% of total income.

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Indicator Title	Royalty and Licence Income
Performance assessment	Performance on financial KPIs needs to be assessed in the context of the prevailing economic climate. The CSIR considers a performance above 90% of the target as acceptable. Exceeding the budget target is a successful result and is not the consequence of an inappropriate target.
Data source	Royalty and licence income is invoiced using a specific account, which reflects the income appropriately on unit and CSIR income statements. The information for the financial KPIs is obtained from the CSIR financial systems.
Data responsibility	CSIR Finances
Method of calculation	The CSIR annual trial balance from the financial system is updated for audit adjustments and the final figures are incorporated in the CSIR annual financial statements. The annual financial statements are audited and the KPI results are derived from these audited annual financial statements.
Data limitations	Income is declared when the CSIR is entitled to receive the royalty and / or licence income
Type of indicator	Output

SET base: Total SET staff

Indicator Title	SET base: Total SET staff
Definition	SET staff include staff on Researcher, Research and Development, Technical and Project Management career ladders, Research Managers, post-doctoral students, studentships, interns and staff in fixed positions who primarily work on RD&I projects. Bursars and vacation workers are excluded. Counts include all nationalities, not only South Africans.
Purpose	SET staff is a measure of the CSIR's capacity to deliver on RD&I projects.
Desired performance	Targets for SET staff are set to ensure the capacity is in place to deliver on the CSIR strategic objectives, assuming that commensurate funding is secured.
Performance assessment	Performance in terms of the number of SET staff is influenced by financial considerations and should be assessed in the context of financial performance. The CSIR considers a performance above 95% of the target as acceptable. Exceeding the target is a successful result and is not the result of an inappropriate target.
Data source	KPI information is extracted from PeopleSoft through an automated process.
Data responsibility	CSIR Human Resources
Method of calculation	Head count of SET staff at the end of the financial year.
Data limitations	Human Resources ensures the correct classification of staff in PeopleSoft
Type of indicator	Output / Efficiency

% of the SET base who are black and female, respectively

Indicator Title	% of the SET base who are black and female, respectively
Definition	Proportion of black and female South African citizens in the SET base. Black includes Asian, Coloured, and African.
Purpose	These measures indicate the degree of demographic transformation within the RD&I capacity of the organisation.
Desired performance	Targets are set based on projections of transformation planned in all units. The long term objective is to mirror national demographics. The CSIR aims to achieve or exceed the annual targets.
Performance assessment	Performance is influenced by the growth in SET staff numbers and may be negatively affected if the target number of SET staff is not achieved. The CSIR considers a performance within 2 percentage points of the target as acceptable. Exceeding the target is a successful result and is not the result of an inappropriate target
Data source	KPI information is extracted from PeopleSoft through an automated process.
Data responsibility	CSIR Human Resources
Method of calculation	Percentages of black staff and female staff of total SET staff at the end of the financial year.
Data limitations	Human Resources ensures the correct classification of staff in PeopleSoft
Type of indicator	Equity

Number of staff with doctorates

Indicator Title	Number of staff with doctorates
Definition	Number of staff in the SET base who have a doctoral level qualification, also expressed as a percentage of SET staff.
Purpose	The qualification profile is an indicator of the quality of SET capacity
Desired performance	Targets are set based on the projected growth of the SET base, CSIR unit projections and the organisational desire to grow the proportion of doctoral level staff in the SET base to exceed 20% in the medium term. The CSIR aims to achieve or exceed the annual targets.
Performance assessment	Performance is influenced by the growth in SET staff numbers and may be negatively affected if the target number of SET staff is not achieved. The CSIR considers a performance above 95% of the target as acceptable. Exceeding the target is a successful result and is not the result of an inappropriate target
Data source	KPI information is extracted from PeopleSoft through an automated process.
Data responsibility	CSIR Human Resources
Method of calculation	Count of the number of SET staff with doctoral level qualifications at the end of the financial year.

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Indicator Title	Number of staff with doctorates
Data limitations	Human Resources ensures the validity of data in PeopleSoft and that evidence of the qualification is on file
Type of indicator	Input

Investment in property, plant and equipment

Indicator Title	Investment in property, plant and equipment
Definition	The amount invested in CSIR and government grant funded property, plant and equipment for a financial year.
Purpose	The CSIR needs to develop and maintain world-class facilities and equipment to provide the quality of RD&I that is expected of it. This indicator provides a measure of the CSIR investment in research infrastructure.
Desired performance	The CSIR annual target is based on 4% of total income, which the CSIR aims to achieve or exceed
Performance assessment	Performance on financial KPIs needs to be assessed in the context of the prevailing economic climate. Investment in property, plant and equipment will be deliberately curtailed if total income and margin targets are perceived to be at risk. The CSIR considers a performance above 95% of the target as acceptable. The budget target may be exceeded substantially, arising from additional grant funding. This is a successful result and is not the consequence of an inappropriate target.
Data source	The information for the financial KPIs is obtained from the CSIR financial systems.
Data responsibility	CSIR Finances
Method of calculation	Value of investment in property, plant and equipment is the amount of CSIR and grant additions for the year. This information is obtained from reports in the fixed assets system as well as the CSIR trial balance. Reconciliation is done to analyse the movement in the property, plant and equipment balance and to break this down between additions, disposals and depreciation. This breakdown is also disclosed in the year-end annual financial statements.
Data limitations	Nil
Type of indicator	Input

Total income

Indicator Title	Total income
Definition	Total income is the income earned for a financial year and includes revenue declared on R&D contracts (contract R&D income), income derived from Licences and Royalties, and Parliamentary Grant received through the Science Vote.
Purpose	Total income reflects the ability of the CSIR to ensure financial sustainability. Growth in total income indicates growth in the outcomes and impact achieved by the CSIR
Desired performance	The CSIR annual target is the figure for total income in the annual budget, which the CSIR aims to achieve or exceed. Future targets are set to ensure growth in excess of inflation.
Performance assessment	Performance on financial KPIs needs to be assessed in the context of the prevailing economic climate. The CSIR considers a performance above 95% of the target as acceptable. Exceeding the budget target is a successful result and is not the consequence of an inappropriate target.
Data source	The information for the financial KPIs is obtained from the CSIR financial systems.
Data responsibility	CSIR Finances
Method of calculation	The CSIR annual trial balance from the financial system is updated for audit adjustments and the final figures are incorporated in the CSIR annual financial statements. The annual financial statements are audited and the KPI results are derived from these audited annual financial statements.
Data limitations	Nil
Type of indicator	Output

Net Profit

Indicator Title	Net Profit
Definition	Profit for a financial year which is calculated as Total operating income; less total operating expenditure (including the performance bonus accrual); plus net finance income
Purpose	Net profit is a key indicator of financial sustainability and the ability of the organisation to manage its expenses according to the affordability determined by income levels.
Desired performance	The CSIR annual target is the figure for net profit in the annual budget, based on 3% of the sum of contract R&D income and royalty and licence income. The CSIR aims to achieve or exceed the net profit target.
Performance assessment	Performance on financial KPIs needs to be assessed in the context of the prevailing economic climate. The CSIR considers a performance above 95% of the target as acceptable. Exceeding the budget target is a successful result and is not the consequence of an inappropriate target.
Data source	The information for the financial KPIs is obtained from the CSIR financial systems.
Data responsibility	CSIR Finances

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Indicator Title	Net Profit
Method of calculation	The CSIR annual trial balance from the financial system is updated for audit adjustments and the final figures are incorporated in the CSIR annual financial statements. The annual financial statements are audited and the KPI results are derived from these audited annual financial statements.
Data limitations	Nil
Type of indicator	Output

B-BBEE rating

Indicator Title	B-BBEE rating
Definition	The CSIR's assessment of its B-BBEE status is based on the Broad-Based Black Economic Empowerment Amendment Act, 2013 (Act No. 46 of 2013). All targets and definitions are derived from the Codes of Good Practice as published by the Department of Trade and Industry.
Purpose	The CSIR B-BBEE policy seeks to support socio-economic transformation of society, within and outside the CSIR, by changing the demographic profile of meaningful and productive participation in the country's economic activity.
Desired performance	The CSIR will aim to retain our current level 2 qualification while monitoring the effect of the changes in regulations that take effect in the 2016/17 financial year.
Performance assessment	The CSIR would not consider failure to reach a target owing to amended Codes of Good Practice targets as a negative result. Improving on the target is a successful result.
Data source	There are multiple sources of information from which the CSIR assessment is compiled and verified by external audit.
Data responsibility	CSIR Management Services
Method of calculation	B-BBEE rating is based on a certificate that is issued after an external auditing process. The B-BBEE certificate indicates the CSIR's status with regards to a number of measurements as indicated in the B-BBEE Codes of Good Practice.
Data limitations	The external audit ensures there is no subjectivity in the B-BBEE assessment.
Type of indicator	Equity

DIFR

Indicator Title	DIFR
Definition	A disabling injury is defined as an injury, including occupational illnesses, arising out of and during the course of employment which results in the loss of one or more working days other than the date of accident.
Purpose	Health and safety management in the organization
Desired performance	The CSIR aims to have zero disabling injuries, with a DIFR of less than 0.3
Performance assessment	DIFR less than 0.3 is a positive achievement.
Data source	Monthly Headcount figures are obtained from the Human Resources Business Information System. Disabling injury figures are obtained from the Medical Centre after being certified by the Risk Management Office as work related.
Data responsibility	CSIR Management Services
Method of calculation	DIFR is defined as the number of disabling injuries per employee hours worked, multiplied by a factor of 200,000
Data limitations	Nil
Type of indicator	Output

B

Annual Plan 2016/17

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The CSIR Annual Plan is structured around our three strategic objectives – the delivery of our R&D programme, the growth and transformation of our human capital, and the maintenance of a well-run and sustainable organisation.

In the sections below we will, for each of these interventions, include the detailed 2016/17 objectives linked to the strategic objectives identified in Appendix A, Section A.5.

B.1 Research and Development Objectives: 2016/17

B.1.1 Economy and Employment

Long-term Objective	2016/17 Objectives
EE1 – Titanium Beneficiation	
Develop key technology building blocks for the establishment of a SA Titanium metal industry	– Fully documented technology data pack for Ti powder production Process for transfer to industry. – Technical feasibility assessment for the direct production of Ti-Vanadium alloy (Ti64V). – Established technology platform capable of producing complex Titanium castings. – Technology Demonstrator for Fibre Metal Laminate UAV component. – Development and characterisation of Ti Direct Powder Rolling (Ti sheets) technology. – Development and validation of at least two Ti Metal Injection Moulding technologies. – Feasibility studies and recommendations for the establishment of Nano TiO2 upscaling facility and other technologies.
EE2 – Aluminium Beneficiation	
The development of Al processing technologies and new Al alloys and Al metal matrix composites (AIMMCs) to revitalise the Al industry.	– Permanent mould Casting (Tilt Casting) – Investigate new die materials and die design for improved die life and yield. – Investment casting – Establish molten metal bath cooling capability and demonstrate on complex thin walled components using high strength Al alloys which are difficult to cast. – Produce high pressure die cast tensile samples of Al metal matrix nano composites to establish database of tensile properties and produce prototype continuous fibre AlMMC tubes. – Demonstrate Al-Li and Al-Sc alloying capability by producing 5-10 kg batches of alloy and casting ingots for small scale extrusion and rolling research.

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Long-term Objective	2016/17 Objectives
EE3 – Mechatronic Manufacturing	
Develop a suite of advanced mechatronics machines for manufacturing and mining applications, as part of an industrial automation platform	– Testing, validation and optimization of wheel changing system based on performance in real life conditions. Development of pre-production prototype. – Testing and validation of pedestrian detection technologies inside actual mining environment – Prototype development and testing of robotic changer for conveyor belt Idlers. – Optimization of concrete grinding prototype by adding path automation and self-correction navigation.
EE4 – Polymer nanocomposites	
Our aim is to develop advanced materials targeting specific applications, together with the processing technologies that will be required to manufacture them on an industrial scale.	– PP based nanocomposite with SA clay for barrier properties. – Production of semi-industrial properties of polymer nanocomposites with scale up plant. – Development of specialized polymer nanocomposite and nano-emulsion products. – Technical support for the upscaling process of insulation product for commercializing partner. – Optimization of sandwich panels as per sector specification. – Optimization of advanced composite material development. – Development of functional polymers.
EE5 – Additive Manufacturing	
Development of additive manufacturing platforms to create new manufacturing processes for the aerospace and other sectors	– Ongoing development of the Aeroswift platform. – Develop closer links with the Aerospace Industry Support Initiative.
EE6 – Enterprise Creation and Development	
Assist local and provincial government with the development and implementation of sector and local economic development strategies, with the creation of enterprises and with the transfer of technology.	– Two sector and economic development strategies designed. – Two sector and economic development strategies implemented. – Sixteen techno-feasibility studies completed. – Twenty technology-based enterprises established. – Ten technologies transferred to industry. – Training of ten economic development practitioners.

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Long-term Objective	2016/17 Objectives
EE7 – Technology Localisation	
Support of the long-term industrialisation and industrial diversification of the economy in prioritised industrial sectors through technology localisation. This includes programmes such as the AISI, the BCC and the NFTN.	– Ongoing implementation of specific programme business plans as per agreements with the funders/stakeholders. – Fifty technology interventions to support the development of local suppliers – Twenty manufacturing systems developed to address competitiveness challenges. – Inclusion of the Supplier Development Incentive Scheme to support the development of sub-tier SMME manufacturing base through higher tier systems integrators and manufacturers in the aerospace industry.
EE8 – Digital Opportunities	
Our aim is to develop an innovative Micro Enterprise Media Engine platform with content ingestion, programme scheduling and timed play-out service for virtual television stations.	– Software development of the programme creation and scheduling interface in the Media Production Server (MPS). – Development of the Media Time Scheduling Server (MTSS) and the M2M interface with the MPS. – Integration of the mobile IPTV workflow process into the film school curriculum.
EE9 – Support for the National Bio-Economy Strategy	
Increase the conversion of bioscience R&D into commercialised products and technologies	– Develop commercialised technologies/products for at least 4 companies. – Commercialise products/technologies developed in previous year. – Complete at least 2 technologies and products and test them in the market. – Demonstrate secretion based expression technology. – Secure funding for implementation of cGMP facilities. – Secure funding for expansion of BIDC programme. – Strengthen the capacity of the farmers, SMME to develop competitive products that can be absorbed by the market. – Work with industry to expand the markets by producing good quality products. – Identify high value crops to be processed and packaged for niche markets. – Identify appropriate agro processing technologies for farmers that can add value to their local produce.

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Long-term Objective	2016/17 Objectives
EE10 – Laser-based Engineering	
The development and transfer of laser-based surface engineering and refurbishment applications that will support the refurbishment and maintenance of existing equipment, plant, and infrastructure requirements of the South African industry.	– Development of refurbishment technology packages for Transnet Engineering to effect life extension of high value components – Development of qualified laser refurbishment procedures for high value components for Eskom – Feasibility study into the use of differently shaped laser beams for surface engineering applications in order to improve process efficiency – Development of laser-shock peening for industrial applications
EE11 – National Large Scale Engineering Capability	
Establish a Complex-Product Lifecycle Management initiative/demonstration centre for industry which will target all engineering disciplines through the integration of critical cross-functional activities.	– Establish National Industrial Support Initiative for industry. – Implement and configure the selected PLM software systems; – Establish a capability to illustrate / demonstrate the successful use of CPLM in complex multi-disciplinary engineering projects. – Establish a training platform for engineering staff already employed in industry.
EE12 – Resource Efficiency – National Cleaner Production Centre-South Africa	
The NCPC-SA promotes the efficient utilisation of resources through the provision of relevant training programmes for industry.	– Conduct 180 assessments (water, energy, waste and materials) to identify, evaluate and recommend implementable RECP cost saving options – Achieve a 10% increase in savings by increasing uptake (including SMEs) by upscaling of tools available to a larger group of companies
EE13 – Mining	
We will focus on the development of processes that will address the current challenges facing in the mining sector – increasing productivity and reducing costs whilst ensuring no harm to mine employees as well as to the surrounding environment.	– Commence with facility upgrades to research laboratories managed within the CSIR Occupational Health and Safety Mining programme – DST Commercialisation and CoE programme successfully established – Participate in, and contribute to, Mining Phakisa.

Table B.1: Economy and Employment: 2016/17 Objectives

B.1.2 Capable State

Long-term Objective	2016/17 Objectives
CS1 – Incubation of national capabilities to support service delivery	
Incubate service delivery capabilities in two domains.	– Identify potential areas for intervention. – Identify partners and conduct initial feasibility study.
CS2 – An integrated and multi-sectoral decision support centre	
The establishment of a centre that will, in collaboration with universities and developmental agencies, improve provide decision support services to government departments, local government, and state-owned companies.	– Develop business plan and capability requirements for the centre. – Integrate CSIR decision-support capabilities.
CS3 – The large-scale deployment of technologies that support service delivery	
Establish a dedicated capability to assess and deliver Incubate service delivery capabilities in two domains.	– Interventions in nine municipalities, linked to water quality infrastructure. – Develop business plan and capability requirements for expansion of this service to all municipalities.

Table B.2: Capable State: 2016/17 Objectives

B.1.3 Economic and Social Infrastructure

Long-term Objective	2016/17 Objectives
ES1 – Water Infrastructure	
Develop water resource decision-support frameworks, norms and standards for water and sanitation services; and technology solutions for water treatment.	– Development of a platform for smart water infrastructure. – Identify and address the gaps in the current hydrogeogical modelling and integrated water assessment framework – Develop a full scheme of scientific methods for the setting of appropriate resource-directed water risk assessments. – A pilot demonstration of the phycoremediation technology at a municipal site. – The development of a framework for integrated water reporting. – Testing of adsorbents on-site over prolonged period in collaboration with industry partner. – Optimization of rapid pathogen detection prototype to reduce analysis time and accuracy. – WQMS pilot to be extended to the outlets of commercial entities and factories. Pilot for a specific area in South Africa. – Pilot deployment of buoys in the sea to test, evaluate and optimize the systems. – Development of localized buoy for to be deployed around the coastal area. Buoys will use remote monitoring tolls to provide real time updates. – Support six municipalities with "green-drop and blue-drop" certification

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Long-term Objective	2016/17 Objectives
ESI2 – Energy Infrastructure	
Develop technologies that support the maintenance of the energy infrastructure.	– Development of electronics platform and the integration into a multi-spectral inspection system to provide high definition visual channel capability. – Integration of radiometric UV functionality. – Development of experimental SF6 gas detection system and experimental field trials of technologies. – Synthesis and characterization of Pd-based catalysts for alkaline fuel cells & electrolysers. – Alkaline anion-exchange membrane development. – Preparation of catalysts using electrochemical atomic layer deposition (ECALE). – Development of large membrane electrode assemblies and optimisation of fuel cell conditions – Optimisation of hydrogen storage materials and procedures, and carrier decomposition. – Design criteria and material selection for composite cylinders. – Synthesis and characterization of high-capacity electrode materials for lithium and sodium ion batteries. – Design of full lithium ion batteries using CSIR materials. – Prototype of lithium and sodium ion batteries (Coin cell type). – Preparation and characterisation of Mn-based supercapacitor materials. – Participation in the development of the Carbon Capture and Storage (CCS) R&D strategy. – Contribute to establishment and hosting of a National Centre for Clean Coal/Energy Technology.

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Long-term Objective	2016/17 Objectives
ESI3 – Transport Infrastructure	
Improve the quality of road engineering by developing better materials; design and construction methods; and maintenance and performance monitoring standards	– Specification of requirements for guided wave ultrasound research platform, development of prototype rail defect monitoring system for field installation / research and theoretical research into defect detection with guided wave ultrasound. – Pothole scanner licensed to Jetpatcher and further development of system to improve performance. – Field testing of Road management system and further optimization of system. – Building of a prototype system for locomotive diagnostic and conditioned based monitoring system. – Establishment of Road Research Centres in Mozambique and Tanzania. – DCP-DN design method for low-volume roads. – Implementation of technologies associated with the Gravel Road Test Kit in Tanzania. – Guideline for block paving systems, – Roadmap for implementation of Smart Roads. – Finalisation of three national guidelines/specifications for bituminous materials. – Protocol for the assessment of the long-term performance of road surfacing systems. – Blueprints for HVS Mk VII. – New combined passenger and freight transport flow model.
ESI4 – Building Design	
Improve the design, maintenance and efficiency of buildings by developing design guidelines for public buildings; developing new building materials and construction methodologies	– RD&I roadmaps for the establishment of a smart building programme. – IBT 2 Toolkit developed. – High-strength cement blend prototype. – Establish a platform for evaluation and development of innovative building technologies (IBTs) and construction methods in order to facilitate uptake of IBTs into the South African construction industry.

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Long-term Objective	2016/17 Objectives
ESI5 – Coastal Infrastructure	
The development of methods and guidelines for the optimum design of ports and coastal structures, as well as for the planning and operations of ports.	– Ongoing development of accurate methods for port and coastal structure performance modelling and simulation, resulting in a CoastCAM technology demonstrator – Further development of the underwater 3D imaging technology to increase speed of operation and functionality by identifying and trialing upgrades to the digital system embedded in the arrays. – Investigation of the 3D imaging base technologies for synthetic aperture sonar and underwater communications applications.
ESI6 – ICT Infrastructure	
Address the lack of quality data, analysis and tools on South African broadband network infrastructures and spectrum, and to inform the policy, decision-making, design and coordination of broadband development and spectrum usage.	– Position on TV white space regulatory framework adopted by the African Telecommunications Union. – Development of enhanced geo-location spectrum database with Intelligent Spectrum Channel Allocation and support to white space devices. – The development of commercialization and business models for licensing of geo-location spectrum database for TV white spaces. – The demonstration of co-existence of Broadband and broadcasting in the L-band – "Sharing model and spectrum auto-assignment" prototype module for digital dividend spectrum. – Prototype TV white space/Wi-Fi mesh network with hybrid TV white space/Wi-Fi mesh routing algorithm. – Demonstration of lightpath-on-demand service with SANREN. – Final research roadmap on software defined networks published. – The development and evaluation of a low-cost programmable network interface unit for monitoring of network performance parameters. – Design a speech-to-speech translation system to enable multilingual communication between government and citizens.

Table B.3: Economic and Social Infrastructure: 2016/17 Objectives

B.1.4 Transition to a Low-Carbon Economy

Long-term Objective	2016/17 Objectives
LC1 – Climate Change	
The development of models and systems for predicting climate futures, and associated applications which define the impact of climate change in selected sectors.	– Validate the CABLE (terrestrial) and NEMO-PISCES (ocean) outputs at a local spatial scale. – Validation of the Integrated Assessment Model. – Development of Air Flow, Stream Flow, Dam Level and Agricultural models.
LC2 – Green Economy Solutions	
Unlocking growth from the bio-economy and waste-economy sectors.	– Development of the National Waste Pricing Strategy – an analysis of national incentive instruments and models focused on domestic waste reduction, recycling and reuse – Publication on best practice valuation methodology – Publication showcasing state-of-the-art sustainability assessment methodology – Public and Private sector partnerships developing sustainability planning, reporting and monitoring tools – Guideline on rural green economy growth opportunities through agriculture in South Africa – Pilot technical report for assessing the feasibility of crop based green economy development on previously mined land – New partnerships for piloting green economy development on post mining landscapes – An analysis on cooperatives as effective model for recycling programmes – Refined national domestic waste data informing waste recycling, reuse and minimisation opportunities – Upgrading of facilities and equipment to establish a state of art biorefinery R&D facility

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Long-term Objective	2016/17 Objectives
LC3 – Ecosystem Services	
Development of a new generation of models, tools, maps and frameworks to improve the understanding and to enhance the design and management of multifunctional landscapes	– Expand the land cover monitoring system to a natural resource monitoring system that uses the same system backbone to drive various monitoring and reporting needs for essential environmental indicators. – Surface Deformation: Develop and implement the automated features extraction of deformations in mining areas. – Multi Hazard: Refine the architecture and improve the system based on user feedback. – Oceans and Coasts: Develop R&D roadmap of Decision Support Tools.
LC4 – Renewable Energy	
Technologies and processes to increase the share of renewable energies in South Africas overall energy consumption	– Complete high-renewable simulations studies. – Determine high-level optimal mix of different market generators and energy-storage solutions on CSIR campus. – Commission second phase of ground-mounted PV installations on CSIR campus. – Complete EIA for a 4-5 MW biogas plant to supply CSIR campus grid, identify potential feedstocks and suppliers, and prepare concept designs for integration of CO2 end-uses into biogas plant. – Commission study to scope PV-testing facility, and establish partnerships for testing in different climates. – Establish joint research collaboration with Energy Centre of e Thekwini.

Table B.4: Transition to a Low-Carbon Economy: 2016/17 Objectives

B.1.5 Building Safer Communities

Long-term Objective	2016/17 Objectives
SS1 – Holistic and integrated approach to national security	
Address safety and security risks by means of a new holistic integrated approach taking into account how economic and social factors influence safety and security.	– Development of region wildlife risk model. – Develop an integrated national level operating concept across different government departments and other stakeholders, for addressing cross-organisational and multidisciplinary capabilities for Combatting Rhino Poaching. – Assess National Safety and Security Risks. – Extend network of experts covering the needed specialities. – Build foresight capacity.
SS2 – Security sector capability development	
Assist national institutions in the safety and security sector with technology and engineering systems support in order to deliver on their strategic objectives	– Establish the state of enterprise engineering and architecture in the target organisations. – Assessment of existing EA and EE methodologies used in safety and security institutions. – Assessment of the practical implementation and adoption of the capabilities (regarding tools, processes/methods and people) in these institutions. – Establish relationships with existing government EA custodians and practitioners with respect to the approved Government Wide Enterprise Architecture. – Improve partnership with LEADing Practice (focus on defence and safety clusters), safety and security institutions and investigate further partnerships. – Internal and external workshops with client environments in the integrated capability management domain to define and understand the strategic level problems.

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Long-term Objective	2016/17 Objectives
SS3 – Multi-agency command, coordination, and control	
Support the development of an all-inclusive command, coordination and control solution for multi-agency operation, including the interoperability of systems and data, business processes and systems	– More mature, implemented command and control architectures, revisions to existing architectures (e.g. Cmore physical architecture for scaleability). – Incorporate lessons learned into a generic multi-agency command and control architecture framework. – Develop a command and control systems hierarchy, from platform (and individual operator/soldier) up to multi-agency. – Develop a command and control architecture framework that spans all levels of the systems hierarchy, with common data models, open interfaces and standards. – Predictive models based on observed patterns, feeding predictions back into command and control applications as part of decision aids to commanders.
SS4 – SANDF Air Operations capability	
Support the continuous improvement of the mission effectiveness and efficiency of SAAF Air capability. This requires integration of complex systems such as aircraft, weapons, surveillance sensors and pods into a capability with high integrity, safety, and performance, and with low life cycle cost.	– Development of air intervention concept of operations and necessary simulation entities. – Ongoing development and validation of numerical and experimental tool sets for weapons integration. – Ongoing development of non-destructive testing methods for composites and metallic structures for assessment of structural integrity of SAAF fleet. – Ongoing development of turbomachinery modelling technologies including internal flow modelling and validation, combustion modelling and intake modelling for plume ingestion studies on weapons integration.

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Long-term Objective	2016/17 Objectives
SS5 – SANDF Landwards Capability	
Support the SANDF by developing technologies for supporting a specialised, highly mobile combat capability, including providing high levels of protection against threats such as road side bombs, explosively formed projectiles and improvised explosive devices without reducing mobility	– Develop landward operations simulation tools and processes for technology effectiveness drivers. – Develop integrated landward technology (and technology interface) requirements for other contributing DERI role players. – Develop sensor fusion algorithms specifically for terrain mapping. – Develop vehicle mobility models using software tools. – Develop an open architecture for interoperability of UAVs. – Develop modelling and simulation tools and processes for conventional and unconventional threat protection. – Develop passive, active and reactive protection technologies (for vehicles, e.g signature management and for personnel, e.g. camouflage) for current and future threats. – Understand human body trauma, injury mechanisms and predictability. – Characterisation of new materials for protection technologies. – Develop threat detection technologies. Maintain the Landward Detonics, Ballistic & Explosive Laboratory to support protection technology concepts. – Establishment of an IED threat baseline assessment. – Development of weapon/threat end effects and effectiveness models (incl. energetic materials). – Developing, characterising and simulating non-lethal weapons.
SS6 – SANDF Platform Protection	
Increase the survivability of SAAF and SA Navy platforms against optical (including infra-red) and radar-guided weapons	– Continue to characterise new IR threats as opportunities for exploitation arise, updating the threat models and advising on appropriate countermeasures. – Continue to characterise the IR signature of aircraft though simulation and measurements, and advising on optimal placement of countermeasures. – Develop models for the influence of atmospheric conditions on counter measure performance. Verify and validate models by means of measurement. – Develop a pointing system to assist in directed counter measure designation. Incorporate counter measure models into the overall missile/aircraft engagement simulation. – Continuous development and update on operating procedures to improve survivability. – Develop software for integrating IR and RF modelling for improved survivability prediction. – Develop tools for assessment of confidence in survivability prediction

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Long-term Objective	2016/17 Objectives
SS7 – National Surveillance and Situational Awareness	
Identify technology solutions to address potential deficiencies in the national surveillance capability, including maritime environment surveillance, environmental asset protection, peace support operations and border safeguarding	– Design, develop and test sensor networks for specific applications. – Image enhancement through computational imaging – Design, develop and test target detection, recognition and tracking algorithms. – Mount and integrate lightweight sensors on elevated platforms for better situational awareness. Develop mechanical motion simulators. Test and evaluate motion simulators. – Understand the scene background including atmosphere, sea surface and land. Develop models for reflections from the background. Develop background mitigation techniques. – Evaluate existing doctrine and procedures for deploying sensor networks. Advise on optimal doctrine to increase effectiveness. – Develop technology for effective management of data from various sensors. Determine fusion and display strategies for effective commander display. Develop test and evaluation multi-sensor information presentation in the field with real commanders. – Develop specification and evaluation requirements for Earth Observation sensors for forensic investigations and evidence purposes. Develop image processing and calibration algorithms for improved image and video quality. – Develop technology for processing of multispectral and hyperspectral data from UAVs and satellite sensors. Improved remote sensing for Identification of intruder/unwanted plants. Apply multispectral and hyperspectral techniques to camouflage detection and counter-camouflage. Develop procedures for satellite sensor calibration and validation of satellite data. – Develop techniques to evaluate camouflage effectiveness in various spectral bands. Develop and evaluate counter camouflage techniques.

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Long-term Objective	2016/17 Objectives
SS8 – National Cyber Security Capability	
Contribute to the implementation of the national cyber-security policy by developing a national capability to respond to large-scale cyber threat incidents.	– Continued modelling of cyber vulnerability aspects of systems for decision making. – Continued critical cyber infrastructure identification Investigate methods for hardening different aspects of the national infrastructure. – Social cyber vulnerability awareness program development – Cyber forensics techniques: Cybercrime identification and investigation capabilities, intelligence, detection, evidence gathering and tamper proofing capabilities as well as case management. – Refine the fingerprint core algorithms for adoption in application areas. – Investigate new fingerprint scanner technology. – Test security of smart card systems, using the phased portion of the Smart Card Test and Compliance Lab. – Investigate methods to securely store biometric template data. – Develop new network intrusion detection algorithms.
SS9 – Unmanned Defence Systems	
Support the strategic, operational and tactical potential of unmanned systems.	– Develop tools for the development of operating concepts and user needs for future system acquisitions. – Ongoing development of critical infrastructure, people and procedures for airborne unmanned system design, sub-system evaluation and system integration (engine test rig, propeller test rig, servo test rigs, recovery systems, control systems, power systems, sensors, etc.) – Novel control system technology for stand-off weapons Novel sensor technologies including synthetic aperture radar and bi-static synthetic aperture radar for airborne systems. – Ongoing development of control system technology for airborne unmanned systems and novel control technologies for future missile systems. – Ongoing development of small, autonomous 2m hand launched UAV for sub-system and in-field experimentation. – Ongoing development of 6m wing span, autonomous UAV for subsystems research and development and in-field experimentation. – Ongoing development of mission simulators for airborne UAVs. – Ongoing development of novel 1000 N Gas Turbine

Table B.5: Building Safer Communities: 2016/17 Objectives

B.1.6 Improving Health

Long-term Objective	2016/17 Objectives
IH1 – E-Health	
Develop a standards framework for interoperability of eHealth systems, and establish a national regime for implementation of interoperability standards.	– Assessment of all hospital information systems as selected by the National Department of Health against functional requirements and adherence to the Health Normative Standards Framework (HNSF). – Further development on the Health Patient Registration System (HPRS). – Establish HPRS integration to the National Population Register to facilitate synchronisation of patient details with HPRS. – Support the NDoH, and the provinces with rollout of HPRS. – Develop and implement the Health Information Exchange (standards based). Provide for hosting of integrated health data.
IH2 – Health Technology	
Develop a portfolio of medical devices, sensors and information systems to provide Point-of-Care assistance for foetal health, cardiovascular diseases, blood screening, and medical visualisation and analysis	– Finalization of pre-production prototype and incubation of Cellnostics start-up. – Prototype development of MA biosensor and device. – Testing of MA TB diagnostic device in collaboration with UP. – 2 Prototype development of Nano gas sensor. – Extend Tshwane COPC study on Umbiflow to 3-4 additional clinics, continuing patient data collection, seek roll out to health districts in additional provinces, local licensing for commercialisation. – Cardioflow: Finalisation of algorithm development and validation, prototype development. – Testing of formulated drug prior to clinical trials. – Medical Devices Strategy development and business Plan for Medical Device Incubator/Accelerator.

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Long-term Objective	2016/17 Objectives
IH3 – Burden of Disease	
Provide low cost and tailored protein expression, protein characterisation and pilot manufacturing services in human and animal health for therapeutic proteins, vaccines and adjuvants, and develop cutting-edge knowledge based science in gene engineering, cellular biology and pharmaceuticals chemistry that supports the development of innovative pharmaceutical products.	– Prototype biomarkers identified and further annotation of our compound libraries. – Utilise the Array printing technology for additional Health applications in partnership with Persomics. – Contribute to the identification a focused library against Malaria and screen more compounds. – Expand the High-Throughput Screening and bioassays groups to focus on bioassay development, validation and providing routine bioassays for natural based compounds. – Establish a multidisciplinary platform that develops bio-analytical tools for point-of-care (PoC) diagnostics for human and animal related disease detection. – Operationalise the BTRI: Infrastructure established at UCT. All projects defined and progressing. Industry Partnerships formed and commercialisation model defined and in place. Long term strategic plan developed and approved. – Precision medicine cancer intervention: start collecting patient organoids, apply genome sequencing, expression profiling and sensitivity to known drugs. Establish a database linking genetic and transcriptional information to drug responsiveness and identify at least one commercial opportunity for technology transfer. – Generation of induced Pluripotent Stem Cells (iPSCs) lines that are specifically engineered with genetic backgrounds. Established lines that can be used in drug screening, cell banking, disease-in-a-dish models and development of novel therapeutics as part of a platform for stem cells closely linked to the medical centre.

Table B.6: Improving Health: 2016/17 Objectives

B.1.7 Transforming Human Settlements

Long-term Objective	2016/17 Objectives
THS1 – Urban Modelling	
Further develop the UrbanSim modelling system for modelling the growth of cities and regions to inform infrastructure investment decisions.	– UrbanSim: Continue with the implementation of the platform in Gauteng Metros. – Inter-settlement, migration and land use models: Continue with development, testing and implementation implementation of the models: Implement at least one pilot study with HSRC. – Applied analysis to support informal housing demand modelling in one metro. – Web-based toolkit for spatial and/or temporal data analysis.
THS2 – Spatial Prioritisation Policy	
Develop policies on the spatial prioritisation of infrastructure investment, and develop an enhanced spatio-temporal capability for advanced spatial planning.	– Development of national guidelines on human settlement design. Commence with the development of SA urban innovation knowledge hub. Draft "Red Book" national guideline completed.

Table B.7: Transforming Human Settlements: 2016/17 Objectives

B.2 Financial Sustainability

The financial budget indicates that the CSIR will remain financially sustainable and continue as a going concern. All financial resources are invested in line with the CSIRs mandate.

The budget is prepared taking into account the current economic climate in South African and the growth projections issued by the South African Reserve Bank. The international macroeconomic environment does influence the CSIR since a large percentage of international income is secured from countries with oil-dependant economies.

Conservative balance sheet practices, including working capital and cashflow management, will continue to allow CSIR to leverage its investment in scientific equipment and infrastructure. The continued growth of income streams and securing of strategic business partnerships with key clients remain important in the forthcoming financial year. The growth in international income is important to retain the Rand hedge this affords the CSIR.

B.2.1 Growth

The CSIR has budgeted for an increase in total operating revenue of 7% (see Table J.7). Contract R&D income and baseline grant funding increase on a comparative basis by 7.0% and 6.9% respectively.

Income from the South African public sector, South African private sector and international contract income is budgeted to increase by 6.3%, 11.9% and 19.7% respectively.

Included in contract R&D income from the South African public sector is the Cyber Infrastructure ring fenced allocation from the DST. These contracts have historically being reflected as such and are included as part of public sector income for comparative purposes.

B.2.2 Expenditure

Total expenditure is budgeted to increase by 5.4%, with employee remuneration costs, operating expenses and depreciation budgeted to increase/(decrease) by 7.9%, 6.9% and (28.8)% respectively. All Shared Services and support portfolios have been held to a 4% budgeted increase in total cost.

The increase in employee related costs is due to the annual salary increase, career ladder adjustments and the planned increase in research capacity.

Operating expenditure is budgeted to increase by slightly more than projected inflation. This is in part due to: the increase in variable costs related to the budgeted 7% increase in contract income; increased foreign currency denominated costs due to the weak Rand; and energy price increases. These will be ameliorated by ongoing cost containment measures and reducing the amount of electricity purchased from Tshwane with the continued roll-out of the energy autonomous campus project.

The reduction in depreciation is due to reduced grant funding being allocated to PPE investments and utilisation of CSIR reserves. The carrying value of PPE will therefore be depreciated over the useful life of the asset as opposed to the carrying value of the asset being reduced by the grant funding utilised.

B.2.3 Royalty income and other income

Royalty income is budgeted at R 2.8 million. Royalties for the CSIR group of companies is expected to amount to R 5.8 million. Included in the 2015/16 forecast is other income of R 30 million – this relates to net foreign exchange gains due to the recent depreciation of the Rand against major currencies. The CSIR takes a neutral view on the currency movements going forward and as such has not budgeted for a foreign exchange gain or loss.

The DST and the CSIR Board has approved the sale of the CSIR Port Elizabeth site to the Nelson Mandela Metropolitan University (NMMU). As the finalisation of any sale is still subject to final contract negotiations with NMMU and the timing thereof remains uncertain, the CSIR has not included a potential gain on the disposal of the site in the budget at this stage.

B.2.4 Financial sustainability

The 2016/17 budget indicates a net profit of R 57.5 million, an increase of 6.7% aligned to the increase in R&D contract income. Investment income is expected to amount to R 39.9 million.

Table J.7 provides the high-level CSIR statement of comprehensive income reflecting the forecast for 2015/16 and the budget for 2016/17. A statement of comprehensive income for the Medium Term Expenditure Framework (MTEF) period is provided in Appendix J.1.

	Forecast 2015/16 (R'000)	**Budget** 2016/17 (R'000)
Total Operating Revenue	**2,444,773**	**2,611,489**
Contract R&D Income	**1,788,888**	**1,913,777**
Public – South Africa*	1,337,958	1,422,103
Private – South Africa	162,351	181,711
International	200,334	239,840
Parliamentary Grant – Ring-fenced*	88,245	70,123
Parliamentary Grant	**649,704**	**694,827**
Royalty income	6,181	2,885
Other income / (expenditure)	30,016	–
Total Expenditure	**2,412,050**	**2,541,394**
Employees' remuneration	1,374,099	1,482,734
Operating expenses	894,624	956,589
Depreciation	143,327	102,072
Operating Profit before Investment Income	**62,739**	**70,095**
Investment Income	36,690	39,974
Net profit before non-guaranteed employees' remuneration (Performance bonus)	**99,429**	**110,069**
Non-guaranteed employees remuneration (Performance bonus)	45,577	52,569
Net profit	**53,852**	**57,500**

*Included in contract R&D income from the South African Public sector is the Cyber Infrastructure ring fenced allocation for SANReN and the CHPC.

Table B.8: Statement of Comprehensive Income – 2015/16

Category	**2016/17 funding R'000**	**2017/18 funding R'000**	**2018/19 funding R'000**
Baseline Parliamentary Grant	**694,827**	**729,359**	**771,661**
Parliamentary Grant	668,336	701,464	742,149
National Laser Centre	26,491	27,895	29,512
Ring fenced allocation	**258,321**	**272,060**	**287,190**
Laser Loan Programme	7,778	8,189	8,664
African Laser Centre	4,249	4,474	4,733
Implementation: ICT R&D Strategy	58,096	61,175	64,724
Cyber Infrastructure	188,198	198,222	209,069
Total	**953,148**	**1,001,419**	**1,058,851**

Table B.9: Medium Term Expenditure Framework allocation to the CSIR (excl VAT)

B.2.5 Statement of financial position

A CSIR statement of the financial position for the MTEF period is provided in Appendix J.2. Table B.10 provides a summary projected balance sheet.

One needs to consider the budgeted cash balance of R 785 million in conjunction with the current liabilities of R 1 billion. The current ratio (current assets/current liabilities) is expected to remain slightly greater than 1.1.

	Forecast 2015/16 (R'000)	Budget 2016/17 (R'000)
ASSETS		
Non-Current assets	**800,064**	**844,464**
Property, plant and equipment	784,347	813,397
Interest in Joint Ventures and Associates	1,364	11,364
Interest in subsidiaries	7,649	2,999
Investment	6,704	16,704
Current Assets	**1,125,501**	**1,154,075**
Trade and other receivables	239,737	262,509
Inventory and contracts in progress	102,589	106,856
Cash and cash equivalents	783,175	784,710
TOTAL ASSETS	**1,925,565**	**1,998,539**
EQUITY AND LIABILITIES		
Reserves	**923,324**	**980,824**
Retained earnings	923,324	980,824
Non-current liabilities	**10,108**	**12,655**
Post-retirement medical benefits	10,108	12,655
Current liabilities	**992,133**	**1,005,060**
Advances received	589,454	550,039
Trade and other payables	402,679	455,021
TOTAL EQUITY AND LIABILITIES	**1,925,565**	**1,998,539**

Table B.10: Projected CSIR statement of financial position

B.2.6 Investment in property, plant and equipment

The level of investment in property, plant and equipment for the 2016/17 financial year is budgeted to be R 102.9 million.

Notwithstanding the fact that an item is included in property, plant and equipment budget, the investment remains subject to approval as per the Approval Framework of the CSIR and additional considerations such as strategic alignment, return on investment and available cashflow.

B.2.7 CSIR subsidiaries

Details of CSIR subsidiaries and associates are provided in Appendix J. The subsidiaries account for a marginal portion of the total Group's budget. The 2016/17 budget for the CSIR Group reflects a contribution of R 3 million to revenue with a net profit of R 2.3 million.

The CSIR will consider deregistering Technovent (Pty) Ltd after the sale of the its minority shareholding in Uvirco (Pty) Ltd and repayment of proceeds against the loan account due to the CSIR. Technifin (Pty) Ltd is available to hold investments, when it is prudent to hold a shareholding through a subsidiary of the CSIR. Recent investments in Persomics AB and anticipated investments in Resyn (Pty) Ltd and Terranexus (Pty) Ltd will be held by the CSIR.

The CSIR and the University of Pretoria (UP) have agreed to wind-up the Sera group structure and the surplus cash will be repaid to CSIR and UP.

A number of patents held within the Technifin (Pty) Ltd patent portfolio will be expiring in the near future. Technifin is budgeting to receive license fees of R 3 million in 2016/17.

The CSIR and its subsidiaries do not pay dividends and accordingly have a zero dividend policy.

The three year borrowing plan is provided in Appendix J.3.

B.3 Annual Targets: 2016/17 & 2018/19

	KPI	Target: 2015/16	Forecast: 2015/16	Target: 2016/17	Target: 2018/19
Scientific & Technical	Publication Equivalents	490	490	490	520
	Journal articles published	300	300	300	330
	New Technology Demonstrators	$\geq$ 30	$\geq$ 40	$\geq$ 30	$\geq$ 35
	New Patents	$\geq$ 15	24	$\geq$ 15	$\geq$ 15
	Contract R&D (Rm)	1786	1789	1914	2211
	Royalty & License Income (Rm)	7.4	6.2	2.9	7.9
Learning & Growth	Total size of SET Base	1850	1980	2100	2210
	Number of SET Base who are Black	1050	1160	1260	1380
	Percentage of SET Base who are Black	57%	59%	60%	60%
	Number of SET Base who are Female	630	690	755	925
	Percentage of SET Base who are Female	34%	35%	37%	38%
	Number of SET Base with a PhD	330	350	375	400
	Percentage of SET Base with a PhD	18%	18%	18%	18%
Financial & Governance	Total Income (Rm)	2450	2445	2611	2911
	Investment in Property, Plant & Equipment (Rm)	113	243	103	118
	Net Profit (Rm)	54	54	58	67
	BBBEE Rating	Level 2	Level 2	Level 2	Level 2
	DIFR	$\leq$ 0.3	$\leq$ 0.3	$\leq$ 0.3	$\leq$ 0.3

Table B.11: CSIR Annual Targets: 2016/17 & 2018/19

B.4 Annual and Quarterly Targets: 2016/17

	KPI	2015/16 Target	Q1 Target	Q2 Target	Q3 Target
Scientific & Technical	Publication Equivalents	490	110	220	360
	Journal articles published	300	70	140	280
	New Technology Demonstrators	$\geq$ 30	0	0	0
	New Patents	$\geq$ 15	3	7	11
	Contract R&D Income (Rm)	1914	380	848	1283
	Royalty & License Income (Rm)	2.9	0.6	0.9	1.4
Learning & Growth	Total size of SET Base	2100	2000	2040	2080
	Number of SET Base who are Black	1260	1180	1200	1240
	Percentage of SET Base who are Black	60%	59%	59%	60%
	Number of SET Base who are Female	755	700	720	740
	Percentage of SET Base who are Female	37%	35%	35%	36%
	Number of SET Base with a PhD	375	355	365	370
	Percentage of SET Base with a PhD	18%	18%	18%	18%
Financial & Governance	Total Income (Rm)	2611	513	1159	1749
	PPE Investment (Rm)	103	18	46	79
	Net Profit (Rm)	58	(11)	20	(11)
	BBBEE Rating	Level 2	Level 2	Level 2	Level 2
	DIFR	$\leq$ 0.3	$\leq$ 0.3	$\leq$0.3	$\leq$0.3

Table B.12: CSIR Quarterly Targets: 2015/16

C

Additional Indicators

The CSIR will, during the 2016/17 financial year, develop and test an additional set of performance indicators to further refine the level at which we measure our performance. Our intent is to ensure that the indicators are well-defined, that the targets are set appropriately, and that the evidence for the indicators will meet the standards set by the Auditor-General. If these conditions are met the intention is to include these indicators in the 2017/18 Shareholder's Compact.

These proposed additional indicators are:

1. The proportion of Black South African and Female South African researchers at the Principal and Chief Research levels[1]. Currently 12% of Principal Researchers and 7% of Chief Researchers are Black South Africans. The comparable figures for female South Africans are 17% and 20% respectively.
2. The number of SMMEs receiving technical assistance from the CSIR.

[1] These are the two most senior levels on the CSIR research/engineering career ladders, and are comparable to Associate-Professor and Professor levels at universities.

	KPI	Target for 2016/17	Target for 2017/18
Scientific & Technical	Publication Equivalents	490	510
	Journal articles published	300	320
	New Technology Demonstrators	$\geq$ 30	$\geq$ 35
	New Patents	$\geq$ 15	$\geq$ 15
	Contract R&D Income (Rm)	1914	2030
	Royalty & License Income (Rm)	2.9	5.0
	Number of SMMEs receiving technical assistance	–	–
Learning & Growth	Total size of SET Base	2100	2160
	Number of SET Base who are Black	1260	1310
	Percentage of SET Base who are Black	60%	60%
	Number of SET Base who are Female	755	810
	Percentage of SET Base who are Female	37%	37%
	Percentage of Chief Researchers who are Black	–	–
	Percentage of Chief Researchers who are Female	–	–
	Percentage of Principal Researchers who are Black	–	–
	Percentage of Principal Researchers who are Female	–	–
	Number of SET Base with a PhD	375	385
	Percentage of SET Base with a PhD	18%	18%
Financial & Governance	Total Income (Rm)	2611	2770
	PPE Investment (Rm)	103	110
	Net Profit (Rm)	58	63
	B-BBEE Rating	Level 2	Level 2
	DIFR	$\leq$ 0.3	$\leq$ 0.3

Table C.1: CSIR Proposed KPIs: 2017/18

D

Governance Structure 2016/17

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The Executive Authority of the CSIR is the Minister of Science and Technology. The Accounting Authority of the CSIR is the CSIR Board, duly appointed by the Minister. The Practice Note issued by National Treasury dealing with the Submission of Corporate Plans requires the inclusion of the following in the Corporate Plan:

- The composition of the Board of Directors and its subcommittees;
- The members of the Executive Management team.

D.1 CSIR Board

The members of the CSIR Board are:

- Prof T. Majozi (Chairperson)
- Dr S. Sibisi (CEO)
- Adv. G Badela
- Ms P. Baleni
- Dr P. Goyns
- Dr A. Llobell
- Dr R. Masango
- Ms M. Maseko
- Mr J. Netshitenzhe
- Ms A. Noah
- Prof M. Phakeng

The Board has three sub-committees – Research, Development and Innovation; Audit and Risk; and Human Resources and Remuneration. The members of these committees are as follows:

Research, Development and Innovation

Prof M. Phakeng (Chair)
Dr P. Goyns
Dr A. Llobell
Dr R. Masango
Mr J. Netshitenzhe

Audit and Risk

Ms A. Noah (Chair)
Adv. G BadelaMs P. Baleni
Ms M. Maseko

Human Resources and Remuneration

Adv. G Badela (Chair)
Ms P. Baleni
Dr P. Goyns
Mr J. Netshitenzhe

Additional details on each board member is provided in Table D.1.

D.2 Executive Management

The members of the CSIR Executive Management Team are:

- Dr S. Sibisi (CEO)
- Mr C. Sturdy (Chief Financial Officer)
- Mr R. Zondo (Group Executive: Shared Services)
- Dr R. Chikwamba (Group Executive: Strategic Alliances and Communication)
- Dr M. Motuku (Group Executive: Research and Development)
- Mr L. Cloete (Group Executive: Operations)
- Ms G. Huma (Group Executive: Human Capital)

Additional information on each member of the Executive Management Team is given in Table D.2.

Age	Sex	Race	Qualification	Years	Position on other Boards
Prof T. Majozi (Chairperson)					
44	Male	Black	*University of Manchester Institute of Science and Technology* PhD (Process Integration) *University of Natal* M.Sc (Engineering) B.Sc (Chemical Engineering)	1	*Director* A1 Consulting Engineers CC Zyblue Pty Ltd
Dr S. Sibisi (Chief Executive Officer)					
61	Male	Black	*Imperial College, London* B.Sc (Physics) *Cambridge University* PhD (Applied Mathematics)	13	*Non-Executive Director* Liberty Group Mapungubwe Institute *Director* Sibusiso Sibisi Family Trust *Council Member* National Advisory Council on Innovation St John's College
Dr R Masango					
41	Female	Black	*Pennsylvania State University* PhD (Nuclear Engineering) M.Sc (Nuclear Engineering) *Lyceum College* Diploma in Project Management *Cape Peninsula Univ. of Tech.* B. Tech Degree (Chemical Engineering)	1	*Executive Director* Mzansi Energy Solutions and Innovations (Pty) Ltd (Mzesi) *Director* Mzesi Water & Construction Mzesi Energy Mzesi Academy Yonga Energy *Non-Executive Director* ArioGenix Face to Face Redhorn Holdings
Prof M. Phakeng					
50	Female	Black	*University of the Witwatersrand* PhD (Mathematics Education) M.Ed (Mathematics Education) B.Ed (Mathematics Education) *University of Bophuthatswana* B.A (Ed) (Mathematics)	1	*Trustee* FirstRand Foundation
Ms A Noah					
49	Female	Black	*University of Cape Town* B.Sc (Electrical Engineering) *International Management Centre* MBA *University of the Witwatersrand* Executive Development Programme	1	*Chairperson* Energy Access Partnership *Board Member* The SA National Energy Association Rotek Roschon

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Age	Sex	Race	Qualification	Years	Position on other Boards
Dr PH Goyns					
42	Male	White	*University of the Witwatersrand* PhD (Energy Studies) M.Sc (Mechanical Engineering) B.Sc (Mechanical Engineering)	5	None
Dr A Llobell					
61	Male	White	*University of Sevilla* PhD (Biology) M. Sc (Biological Sciences)	1	*Chief Executive Officer* BioGold International *Managing Director* Biogold Network EM, SA *Director* Bio Innovation (Pty) Ltd: *Shareholder* ANB Investments (Pty) Ltd Zies LC, S.I Bio Innovation (Pty) Ltd:
Ms P Baleni					
49	Female	Black	*University of the Witwatersrand* B.Proc LLB	1	*Chairperson* MERSETA *Council Member* Wits University Council *Board Member* IIASA NMO (RSA)
Ms M Maseko					
40	Female	Black	*University of South Africa* B Compt (Hons) CA (SA)	1	*Director* Leruo Corporate Consulting *Member* Independent Regulatory Board of Auditors SA Institute of Chartered Accountants *Partner* PSTM CAs
Adv G Badela					
58	Male	Black	*Leningrad Polytechnic Institute* M.Sc (Electromechanical Engineering) *University of Johannesburg* M.Sc (Engineering Management) *Brunel University* M.Sc (Packaging Technology) *University of South Africa* LLB *Gordon Institute of Business Science* MBA	5	*Director* Metrobus (Johannesburg) Denel Amagcisa Integrated Solutions AMAGCISA Holdings Badela Brothers ENRICO *Shares* Amagcisa Integrated Solutions, MTN, Media 24, Vodacom, SAAB AB, GIJIMA, Growth Point, Discovery, SAICOL, Wescoal, Comair, PEU Group

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Age	Sex	Race	Qualification	Years	Position on other Boards
Mr J Netshitenzhe					
60	Male	Black	*University of London* M.Sc (Financial Economics) Post-graduate Diploma (Economic Principles) *Institute of Social Sciences, Moscow* Diploma (Political Science)	1	*Executive Director* Mapungubwe Institute of Strategic Reflection *Director* Nedbank Group Nedbank Life Healthcare Group Lushote Trading (Fledgling) Topaz Sky Trading 316 (Fledgling) Betascape (Dormant) *Member* African National Congress NEC Camel Rock Trading 434 (Dormant) Centre for Education in Economics and Finance Africa

Table D.1: CSIR Board

Age	Sex	Race	Qualification	Years	Position on other Boards
Mr C Sturdy, Chief Financial Officer					
42	Male	White	*University of Pretoria* BCom (Hons) Accounting Science CA (SA)	13	*Director* Technovent (Pty) Ltd Technifin (Pty) Ltd Both are wholly owned subsidiaries of the CSIR
Mr R Zondo, Group Executive: Shared Services					
47	Male	Black	*University of Pretoria* MSc (Project Management) *Durban University of Technology* M.Tech (Biotechnology) NHD (Quality Assurance) *University of Zululand* B.Sc (Hons) (Biochemistry) *University of South Africa* BCom Law	13	None

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Age	Sex	Race	Qualification	Years	Position on other Boards
Dr R Chikwamba, Group Executive: Strategic Alliances & Strategic Communication					
47	Female	Black	*University of Queensland* M.Sc (Agricultural studies) *Iowa State University* PhD (Genetics) *Gordon Institute of Business Science* MBA	11	*Member* Academy of Science of South Africa Global Governing Board, ICRISAT *Advisory Board* Institute for Science and Technology Education, UNISA *Chair of Advisory Board* Applied Center for Climate & Earth System Science
Dr M Motuku, Group Executive: Research and Development					
50	Male	Black	*University of Alabama, Birmingham* PhD (Materials Engineering) M.Sc (Materials Engineering) *Tuskegee University* B.Sc (Mechanical Engineering) B.Sc (Physics) *James Park College, SA* Engineering Trade Certificate/Artisan *Shikoane Matlala Technical College* N6, National Technical Certificate	4	*Council Member* Southern African Institute of Mining & Metallurgy *Board Member* DST/National Research Foundation Centre of Excellence in Strong Materials, Witwatersrand University *Director* Boundary Estate Home Owners Association
Mr L Cloete, Group Executive: Operations					
49	Male	White	*University of Pretoria* M.Eng (Electronics) B.Eng (Electronics)	25	*Member* National Broadband Advisory Council University of Pretoria Computer Science Advisory Board French South African Institute of Technology Advisory Board *Chairperson* The mLab SA Board
Ms G Huma, Group Executive: Human Capital					
49	Female	Black	*University of Pretoria* BA Hons (Psychology) *North West University* BA (Psychology and History) *Hebron College of Education* Diploma in Education	1	None

Table D.2: CSIR Executive Management

E

CSIR Board Terms of Reference

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E.1 Introduction

The CSIR Board Terms of Reference sets out the functions and responsibilities of the Board, along with certain matters relevant to the operations of the Board. These include the provisions of the Scientific Research Council Act No 46 of 1988, the PFMA, Act No 1 of 1999 and King III report on Corporate Governance.

In accordance with the provisions of section 7 (1) of the Scientific Research Council Act, *"the affairs of the CSIR shall be managed by a board, which shall determine the policy and objectives of the CSIR and shall exercise control generally over the performance of its functions, the exercise of its powers and the execution of its duties by the CSIR."*

The Board operates in accordance with a set of corporate governance policies which take into account relevant best practice recommendations, including the King III Code.

E.2 Status of the Board

The Board is appointed in terms of the Scientific Research Council Act and comprises of independent non executive members and the Chief Executive Officer of the CSIR. The overall purpose of independence is to ensure that members do not have a relationship where there are, or are perceived to be, matters which could interfere with a member's objectivity.

E.3 Composition of the Board

E.3.1 Membership of the Board

Members of the Board, including the Chairperson shall be persons who have achieved distinctions in science or industry or who have special knowledge or experience in relation to some aspect of the CSIR's functions.

The Chairperson must have the ability to preside over meetings and to direct the discussion constructively. The need for independence applies particularly to the Chairperson.

The members of the Board shall be appointed by the Minister and shall consist of:

- A Chairperson, appointed by the Minister in consultation with the Board;
- Not fewer than five, but not more than nine other members; and
- The CSIR CEO, who shall serve on the Board by virtue of his office.

If the Chairperson is absent from a specific meeting, the members present shall elect a Chairperson from the members present to act as Chairperson of that meeting.

A member of the Board, excluding the CSIR CEO, shall hold office for a period not exceeding four years from the date of appointment, but shall be eligible for reappointment subject to a maximum of two consecutive terms.

E.3.2 Board Secretariat

The CSIR's Executive Management Board is responsible for making available the services of a Board Secretary.

E.4 Responsibilities and duties of the Board

E.4.1 Responsibilities of the Board

Key responsibilities of the Board include:

- Setting the CSIR's values and standards of conduct and ensuring that these are adhered to, in the interest of stakeholders, employees, customers, suppliers and communities in which it operates and generally, safe guarding the reputation of the CSIR;
- Providing leadership of the CSIR within a framework of prudent and effective controls which enable risk to be assessed and managed;
- Setting the CSIR's directions, strategies and financial objectives and ensuring that the necessary resources are in place for the CSIR to meet its objectives;
- Always acting in the best interests of the CSIR and treating confidential matters as such;
- Ensuring that the performance of CSIR Executive Management and the Board itself (and Committees) is assessed and monitored annually;
- Ensuring that the business of the CSIR remains a going concern. The Board should record the facts and assumptions on which it relies to conclude that the business will continue as a going concern in the financial year ahead and, if it is decided that it will not, indicate which steps the Board should take to remedy the situation; and
- Oversee information technology governance.

E.4.2 Duties relating to members

Members should:

- Ensure that they have sufficient time to devote to the execution of their duties;
- Be informed about the financial, social and political milieu within which the CSIR operates;
- Never permit a conflict of duties and interest to occur and disclose potential conflicts of interest at the earliest opportunity;
- Act independently;
- Exercise utmost good faith, honesty and integrity in all dealings with or on behalf of the CSIR;
- Exercise care and skill which can reasonably be expected of persons of their expertise; and
- Always act in the best interests of the CSIR and treat confidential information as such.

E.4.3 Appointment of Board Committees

The Board Committees are an aid to assist the Board and its members in discharging their duties and responsibilities.

The Board may nominate one or more Committees, which may, subject to the Board's instructions, perform those functions of the Board that the Board may determine. Such Committees shall consist of members of the Board.

The Board shall not be absolved from any functions performed by any of the Committees. Delegating authority to the Committees or Executive Management does not mitigate or dissipate the discharge by the board of its duties and responsibilities.

E.4.4 Appointment of the CEO of the CSIR

The Board shall, in consultation with the Executive Authority of the CSIR, appoint the Chief Executive Officer of the CSIR, who shall be responsible for the management of the affairs of the CSIR and shall report on those affairs to the Board as may be required.

E.4.5 Duties emanating from the PFMA

- Section 50 that deals with the fiduciary duties of accounting authorities in Public Entities.
- Section 51 that deals with the general responsibilities of accounting authorities.
- Section 55 that deals with the annual report and financial statements.

For ease of reference, a copy of the above sections (Appendix E.11) is herewith attached.

E.5 Conflict of Interest

Board Members may not place themselves in a position in which their personal interests conflict, or may possibly conflict, with their duty to act in the best interests of the CSIR. This gives rise to the following duties, namely:

- The duty to act bona fide in the interests of the CSIR;
- The duty not to compete improperly with the CSIR; and
- The duty to disclose direct or indirect personal or private interests, as envisaged by the provisions of Section 50 (3) (a) of the PFMA, which shall duly be minuted at a Board Meeting.

E.6 Access to Information

The Board is entitled to full access to the information required to discharge its duties, including access to the CSIR Executive Management Board.

E.7 Meetings of the Board

The Board will hold at least one meeting per quarter and shall hold special meetings whenever else necessary to consider pertinent and urgent matters. There should be disclosure in the CSIR Annual Report of the number of Board meetings held in the year and details of attendance of each member.

The Board should ensure that it receives relevant non-financial information going beyond assessing the financial and quantitative performance of the CSIR, and should look at other qualitative performance factors that involve broader stakeholder interests.

The quorum for a Board meeting shall be the majority of its members.

A decision of the Board shall be taken by resolution of the majority of the members present at any meeting of the Board and, in the event of an equality of votes on any matter, the person presiding at the meeting in question shall have a casting vote in addition to his deliberative vote as a member of the Board.

E.8 Responsibility for the Agenda and the issue of the Minutes

The Board Secretary is responsible for arranging the meetings of the Board, and gathering and distributing agenda papers.

Complete agenda papers must be distributed at least 7 days prior to the date of the meeting.

Any member of the Board who is going to attend a Board meeting must request the Board Secretary to add such items as he or she deems necessary to the agenda a minimum of two days prior to the meeting.

Draft minutes of the meeting are prepared for review by the members of the Board within 14 days of the date of the meeting. Copies of the revised minutes must be distributed to those who were present at the meeting and other relevant parties.

The minutes shall be signed by the Chairperson as evidence of approval.

E.9 Delegation of Authority

The matters specifically reserved for the Board under the Delegation of Authority include decisions about the CSIR strategic and operational plans, budget, annual financial statements, succession planning of the CSIR CEO and members of the Executive Management Board, remuneration, policies (and other aspects as contained in the approval framework), as well as matters involving amounts over specified limits (which vary depending on the nature of the transaction).

The Board reserves to itself all matters with the potential to have a material impact on the reputation of the CSIR.

E.10 General

The Board (and individual members) may obtain independent professional advice if it (or the member) considers it necessary.

E.11 Extracts from PFMA number 1/1990

E.11.1 Fiduciary duties of accounting authorities

50. (1) The accounting authority for a public entity must

(a) exercise the duty of utmost care to ensure reasonable protection of the assets and records of the public entity;

(b) act with fidelity, honesty, integrity and in the best interests of the public entity in managing the financial affairs of the public entity;

(c) on request, disclose to the executive authority responsible for that public entity or the legislature to which the public entity is accountable, all material facts, including those reasonably discoverable, which in any way may influence the decisions or actions of the executive authority or that legislature; and

(d) seek, within the sphere of influence of that accounting authority, to prevent any prejudice to the financial interests of the state.

(2) A member of an accounting authority or, if the accounting authority is not a board or other body, the individual who is the accounting authority, may not

(a) act in a way that is inconsistent with the responsibilities assigned to an accounting authority in terms of this Act; or

(b) use the position or privileges of, or confidential information obtained as, accounting authority or a member of an accounting authority, for personal gain or to improperly benefit another person.

(3) A member of an accounting authority must

(a) disclose to the accounting authority any direct or indirect personal or private business interest that that member or any spouse, partner or close family member may have in any matter before the accounting authority; and

(b) withdraw from the proceedings of the accounting authority when that matter is considered, unless the accounting authority decides that the member's direct or indirect interest in the matter is trivial or irrelevant.

E.11.2 General responsibilities of accounting authorities

51. (1) An accounting authority for a public entity

(a) must ensure that that public entity has and maintains

(i) effective, efficient and transparent systems of financial and risk management and internal control;

(ii) a system of internal audit under the control and direction of an audit committee complying with and operating in accordance with regulations and instructions prescribed in terms of sections 76 and 77; and

(iii) an appropriate procurement and provisioning system which is fair, equitable, transparent, competitive and cost-effective;

(iv) a system for properly evaluating all major capital projects prior to a final decision on the project;

(b) must take effective and appropriate steps to

(i) collect all revenue due to the public entity concerned; and

(ii) prevent irregular expenditure, fruitless and wasteful expenditure, losses resulting from criminal conduct, and expenditure not complying with the operational policies of the public entity; and

(iii) manage available working capital efficiently and economically;

(c) is responsible for the management, including the safeguarding, of the assets and for the management of the revenue, expenditure and liabilities of the public entity;

(d) must comply with any tax, levy, duty, pension and audit commitments as required by legislation;

(e) must take effective and appropriate disciplinary steps against any employee of the public entity who

(i) contravenes or fails to comply with a provision of this Act;

(ii) commits an act which undermines the financial management and internal control system of the public entity; or

(iii) makes or permits an irregular expenditure or a fruitless and wasteful expenditure;

(f) is responsible for the submission by the public entity of all reports, returns, notices and other information to Parliament, and to the relevant executive authority or treasury, as may be required by this Act;

(g) must promptly inform the National Treasury on any new entity which that public entity intends to establish or in the establishment of which it takes the initiative, and allow the National Treasury a reasonable time to submit its decision prior to formal establishment; and

(h) must comply, and ensure compliance by the public entity, with the provisions of this Act and any other legislation applicable to the public entity.

(2) If an accounting authority is unable to comply with any of the responsibilities determined for an accounting authority in this Part, the accounting authority must promptly report the inability, together with reasons, to the relevant executive authority and treasury.

E.11.3 Annual report and financial statements

55. (1) The accounting authority for a public entity

(a) must keep full and proper records of the financial affairs of the public entity;

(b) prepare financial statements for each financial year in accordance with generally accepted accounting practice, unless the Accounting Standards Board approves the application of generally recognised accounting practice for that public entity;

(c) must submit those financial statements within two months after the end of the financial year

(i) to the auditors of the public entity for auditing; and

(ii) if it is a business enterprise or other public entity under the ownership control of the national government, to the treasury; and

(d) must submit within five months of the end of a financial year to the treasury, to the executive authority responsible for that public entity and , if the Auditor-General did not perform the audit of the financial statements, to the Auditor-General –

(i) an annual report on the activities of that public entity during that financial year;

(ii) the financial statements for that financial year after the statements have been audited; and

(iii) the report of the auditors on those statements.

(2) The annual report and financial statements referred to in subsection (1) (d) must

(a) fairly present the state of affairs of the public entity, its business, its financial results, its performance against predetermined objectives and its financial position as at the end of the financial year concerned;

(b) include particulars of

(i) any material losses through criminal conduct and any irregular expenditure and fruitless and wasteful expenditure that occurred during the financial year;

(ii) any criminal or disciplinary steps taken as a consequence of such losses or irregular expenditure or fruitless and wasteful expenditure;

(iii) losses recovered or written off,

(iv) any financial assistance received from the state and commitments made by the state on its behalf; and

(v) any other matters that may be prescribed; and

(c) include the financial statements of any subsidiaries.

(3) An accounting authority must submit the report and statements referred to in subsection (1) (d), for tabling in Parliament, to the relevant executive authority through the accounting officer of a department designated by the executive authority.

(4) The treasury may direct that, instead of a separate report, the audited financial statements of a Schedule 3 public entity which is not a government business enterprise must be incorporated in those of a department designated by the treasury.

F

Risk Management Plan

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F.1 Introduction

The underlying premise of Enterprise Risk Management (ERM) is that every entity exists to provide value for its stakeholders. All entities face uncertainty and the challenge for management is to determine how much uncertainty to accept as it strives to grow stakeholder value. ERM deals with risks and opportunities affecting value creation or preservation and is defined as follows:

> *"Enterprise Risk Management is a process, effected by the Board, Executive Management and personnel, applied in strategy setting and across the operations of the enterprise, designed to identify potential events that may affect the entity, and manage associated risk to be within acceptable levels, to provide reasonable assurance regarding the achievement of entity objectives."*

Uncertainty presents both risk and opportunity, with the potential to erode or enhance value. ERM enables the organisation to effectively deal with uncertainty and associated risk and opportunity, enhancing the capacity to build value.

Value is maximised when management sets objectives to achieve an optimal balance between growth and related risks, and effectively deploys resources in pursuit of the entity's objectives.

The CSIR has classified the top risks into the following broad categories:

- Systemic risks.
- Strategic risks.
- Operational risks.

Systemic risks originate from macro-economic and national challenges affecting the National System of Innovation and National Government Business Enterprise space in which the CSIR operates.

Strategic risks directly impact on the ability of the CSIR to deliver on its mandate.

Operational risks include financial, legal and compliance risks and are those risks affecting the systems, people and processes through which the CSIR operates.

This document is intended to provide a risk management framework to the organisation. It describes CSIR's risk management:

- Objectives;
- Benefits;

- Principles;
- Responsibilities; and
- Guidelines.

F.2 Background to Enterprise Risk Management

It is acknowledged that the new style of risk management in the King III Code of Corporate Governance (King III) and the PFMA addresses a much wider spectrum of risk than in the past. In addition, the corporate governance drivers behind risk management today require new ways of reporting and monitoring CSIR's risk exposures.

This document is based on current recognised business practices and standards and corporate governance principles.

It is important to note that the Risk Management Plan is, of necessity, an evolving document. The contents of the plan reflect the current risk management requirements of CSIR. The document is reviewed and updated annually by the Audit and Risk Committee (The Committee) of the CSIR Board.

F.3 Risk Management Statement

The CSIR is committed to a process of risk management that is aligned to the principles of the King III Report and the PFMA. It is expected that all operating units and centres, operations and processes are subject to the Risk Management Plan.

The CSIR is a diverse and multidisciplinary entity. There are several operating units and centres working at managing risk exposures.

Different risk related or assurance provider functions will align their various goals and reporting processes into one cohesive and structured framework. All of CSIR's business, financial, technological, legal and operational risk exposures, whether they are insurable or not, will be identified, assessed, and appropriately managed.

All risk management efforts will be focused on supporting CSIR's objectives. Equally, they must ensure compliance with relevant legislation, and fulfill the expectations of employees, communities and other stakeholders in terms of corporate governance.

Effective risk management is imperative to the CSIR. The realisation of CSIR's business plan depends on being able to take calculated risks in a way that does not jeopardise the direct interests of stakeholders. Sound management of risk will enable CSIR to anticipate and respond to changes in our business environment, as well as take informed decisions under conditions of uncertainty.

All employees have a role in risk management as envisaged in Section 57 of the PFMA.

F.4 Objectives of ERM

The objectives of this plan are to assist the CSIR make informed choices which:

- Provide a level of assurance that current significant risks are effectively managed;
- Improve business performance by assisting and improving decision making and planning;
- Promote a more innovative, less risk averse culture in which the taking of calculated risks in pursuit of opportunities to benefit the organisation is encouraged; and
- Provide a sound basis for integrated risk management and internal control as components of good corporate governance.

F.5 Benefits of ERM

The benefits of ERM to the CSIR include:

- **Aligning risk and strategy** – The CSIR considers the current and emerging risks in evaluating the strategy, setting related objectives and developing mitigating mechanisms.
- **Enhancing risk response decisions** – ERM provides the rigour for the CSIR to identify alternative risk responses – risk avoidance, reduction, sharing, transfer and acceptance.
- **Reducing operational surprises and losses** – The CSIR gains enhanced capability to identify potential events and establish responses thereby reducing surprises and associated costs.
- **Identifying and managing multiple and cross-enterprise risks** – The CSIR faces a myriad of risks affecting different parts of the organisation and ERM facilitates effective responses to the interrelated impacts and enhances an integrated response to multiple risks.
- **Seizing opportunities** – By considering a full range of potential events, the organisation is positioned to identify and proactively realise opportunities.
- **Improving deployment of resources** – Risk information allows the organisation to effectively assess overall funding requirements and enhance funding allocation.
- **Increasing probability of achieving objectives** – ERM helps the CSIR achieve its performance targets and assists with the prevention of loss of resources. Controls and risk interventions will be chosen on the basis that they increase the likelihood that the CSIR will fulfill its intentions / commitments to its stakeholders.

F.6 Principles of ERM

The principles contained in this plan are applied at all levels within the CSIR.

The CSIR's risk management plan is applied to all operational aspects of the organisation and will consider external strategic risks arising from or related to our partners in projects, government departments, the public and other external stakeholders, as well as wholly internal risks.

The CSIR's positive approach to risk management means that the CSIR not only looks at the risk of things going wrong, but also the impact of not taking opportunities or not capitalising on CSIR strengths.

All risk management activities are aligned to CSIR values and principles, objectives and organisational priorities and aims to protect and enhance the reputation and standing of the organisation.

Risk analysis forms part of organisational strategic planning, business planning, investment and project appraisal procedures. Risk management is founded on a risk-based approach to internal control, which is embedded in day-to-day operations of the organisation.

The CSIR's risk management approach informs and directs organisational work to gain confidence on the reliability of CSIR risk control strategies and therefore provide assurance. Managers and staff at all levels have a responsibility to identify, evaluate, manage and report risks.

Risk Management in the CSIR is proactive and reasoned. Strategic and operational risks are identified, objectively assessed, and actively managed. In determining appropriate controls, the cost of controls and the impact of risk occurring is balanced with the benefits of reducing risk.

The CSIR also recognises that some risks can be managed by transferring them to a third party, for example by insurance.

F.7 Legislative requirements

The PFMA and related Treasury Regulations assign extensive responsibilities to the CSIR. These include:

- Ensuring that the CSIR has and maintains effective, efficient and transparent systems of financial and risk management and internal controls; and
- Ensuring that risk assessments are conducted regularly to determine emerging risks and that these are adequately mitigated.

A risk management strategy, which must include a Fraud Prevention Plan must be used to direct the internal audit effort and priority and to determine the skills of managers and staff to improve controls and to manage these risks.

F.8 CSIR Risk Management Model

The objective of risk management is to ensure a proactive identification, understanding and assessment of risks, including activities undertaken that yield risks which could impact on business objectives. This is executed through various risk management and governance mechanisms and risk management oversight bodies. These include:

- Independent board sub-committees;
- Risk management in all key operations throughout the CSIR;
- Risk Office facilitates, coordinates and monitors effective risk management;
- Assurance from Internal Audit Services on the control environment; and
- External audit assurance on CSIR financials.

The CSIR employs a holistic and integrated approach to managing risk within the organisation.

F.8.1 Risk management roles and responsibilities in the CSIR:

The risk management roles and responsibilities within CSIR are distributed as follows:

1. **Operating Units/Centres/Portfolios**
    - Identify, evaluate, mitigate and monitor risks;
    - Ensure adequate resourcing;
    - Implement business unit plans and processes;
    - Perform self-assessments;
    - Provide input / information / assistance in the development of strategy, policy and all other risk activities; and
    - Ensure and foster a risk-aware culture.
2. **Risk Office**
    - Develop and implement a coordinated and uniform risk management system across the organisation;
    - Facilitate the development of organisational risk management plan and standards;
    - Assist in providing a consolidated view on risks across the CSIR and management thereof – risk reporting;

- Facilitate awareness and entrenchment of risk management within the organisation; and
- Ensure appropriate corrective actions are implemented on all audit findings made by Internal Audit Service (IAS) and other auditing bodies.

3. **Internal Audit Service**

- Provide objective assurance to the Board on the effectiveness of risk management process;
- Highlight any additional risks that result from their audit;
- Review the management of key risks.

4. **Executive Management**

- Hold Unit Management accountable;
- Provide leadership and guidance;
- Ensure the control environment supports risk management; and
- Oversee management of risks.

5. **CSIR Board**

- Provide oversight role;
- Approve the risk management plan;
- Approve the fraud prevention plan;
- Approve organisational policies, Conditions of Service, Approval Framework and Shareholder's Compact;
- Provide assurance to stakeholders; and
- Accountable for the CSIR's overall governance of risk.

G

CSIR Risk Assessment Methodology

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G.1 Accountability and Responsibility Guidelines

CSIR management are responsible for the identification of major risks, as well as for forming its own opinion on the effectiveness of the process. Executive Management is accountable to the Board for designing, implementing and monitoring the process of risk management and integrating it into the day-to-day activities of the entity.

Management ensure that appropriate systems are in place to manage the identified risks, measure the impact and to proactively manage it, so that the CSIR's assets and reputation are suitably protected.

Internal Audit Services are responsible for providing assurance to the Audit and Risk Committee (The Committee) of the Board on the effectiveness of the control environment in identifying and addressing risks.

The Committee will be responsible for addressing the corporate governance requirements of risk management and monitoring the CSIR's performance in ensuring controls are in place to prevent or mitigate risks. The Committee will elevate significant risks to the Board together with recommendations to the Board on how to address serious risk issues.

The Board and Executive Management ensure that there is future-looking orientation included in the consideration of risk.

G.2 Reporting Requirements

G.2.1 Internal reporting processes for risk information.

A tiered structure of risk reporting is followed and includes:

- Each Operating Unit/Centre develops a risk register and reports its top risks as part of the business planning process.
- Management considers the inputs from the bottom-up approach and together with strategic considerations report the top risks to the Committee of the Board.

G.2.2 Normal management reporting processes

Normal management processes, such as monthly management accounts and Safety Health Environment and Quality (SHEQ) meetings that address risk and control issues on a regular basis.

G.2.3 Incident reports will be generated for material losses

This is an internal management function. The destination of incident reports will be determined by the nature of the loss, but losses that originate from risks contained in the risk registers should always be elevated to higher levels of management. Variance reports are incorporated into routine management reporting processes.

G.3 Risk Assessments

On a regular basis, the CSIR will undertake a thorough reassessment of its risks.

There are many different processes and methodologies in use by which risks can be identified i.e. risk workshops, interviews, questionnaires and surveys, research, control and risk assessments.

At a minimum a risk assessment should result in:

- Identification of relevant risks which threaten the achievement of objectives; and
- The prioritisation of risks, which often necessitates estimating the timing, magnitude and probability of risk occurrence.

The first part of carrying out a structured risk assessment is to profile the key aspects of the CSIR. This will highlight dependencies, critical parts of the business and start to pinpoint vulnerabilities.

The deliverable of steps G.3.1 to G.3.7 will result in a business/dependency profile of the CSIR and its related activities.

The remaining parts of the risk assessment process will identify threats and risks to all of the elements identified above.

G.3.1 Profile the context

The risk assessment processes begin with the profiling of the CSIR's context. Consideration is given to:

- Business environment;
- Key resources;
- Key stakeholders;
- Service portfolios;
- Key suppliers; and

- Market's driving forces.

G.3.2 Profile the objectives of the Operating unit/Centre

The profile of the individual Operating Unit/Centre objectives should take into consideration:

- Revenue and expenditure targets;
- Customer objectives and targets;
- Socio economic targets; and
- Other business objectives.

G.3.3 Profile the stakeholders of the CSIR

Stakeholders include the following:

- Executive Authority;
- Community;
- Customers;
- Business;
- Government;
- Employees;
- Preferred suppliers; and
- Professional bodies.

G.3.4 Profile the CSIR's value creation processes

The manner in which economic value is generated by the CSIR must be understood. This contributes to the understanding of potential risk in the CSIR.

G.3.5 Identify and profile the CSIR's key assets and performance drivers

The key assets and performance drivers should be profiled and should include amongst others:

- Critical success factors;
- Customer satisfaction;

- Core competencies; and
- Competitive strengths and weaknesses.

G.3.6 Map the CSIR's strategy

The future direction and intent of the CSIR must be understood.

G.3.7 Profile the key processes

The drivers of research and development and delivery on the CSIR mandate must be identified and interpreted. For example:

- The processes that generate revenue must be profiled.
- Incoming actions such as recruitment, purchasing and procurement must be identified.
- Outgoing processes such as public relations, investments and branding should be profiled.
- Inherent and cyclical processes such as budgeting, information systems and staffing matters must be incorporated into the CSIR risk profile.

G.3.8 Identify potential sources of risk associated with the CSIR's profile

The risk assessment process must identify the potential sources of risk associated with the profile of the CSIR. The CSIR will follow a top-down approach together with giving consideration to the bottom-up inputs received from the business planning process. The process has a future orientation as well as examining the facts of today's business profile.

G.3.9 Assess the impact of risk across the CSIR

Risks do not normally exist in isolation. They usually have a potential knock-on effect on other functions, processes and risk categories. These cause-and-effect relationships must be identified and understood.

G.3.10 Identify any influencing factors that may contribute to or shape the risk profile

Having identified a key risk exposure (e.g. increasing competition, lack of funding) the risk assessment must identify the factors that influence and shape the risk (e.g. barriers to entry). Every key risk will have influencing factors or variables, others may relate to timing and cyclical factors (e.g. national elections).

G.3.11 Evaluate recent and imminent internal changes as possible sources of risk

Recent changes in the CSIR may be a source of present risk. The nature of the changes may relate to the launch of programmes or services. Major changes in the CSIR's organisational structure may change the dynamics of risk.

G.3.12 Identify external changes and identify associated risks

Risk assessment processes not only focus on existing dynamics prevailing in the CSIR. Near-future changes must also be included in the process. Anticipated changes that are self-generating will be easily identifiable, such as investments or launching of new capital projects. Certain changes in government, outside of the CSIR's control can also be anticipated such as regulatory changes.

G.3.13 Identify the potential root causes of risk events

The purpose of identifying potential root causes is to give direction to risk intervention measures.

G.3.14 Identify the key controls currently implemented for the identified risks

The existing controls implemented for identified risks must be documented. The term control should not be construed only as a financial term. It is now the commonly accepted term to describe any mitigating measure for any particular type of risk.

G.3.15 Identify perceived shortcomings in current measures to mitigate impact of risks

Management then evaluate the appropriateness of current controls. Observation and judgment is often sufficient to identify shortcomings in control measures, and the level of desired control effectiveness can be expressed.

Operational risks lend themselves more to a more rigorous process of evaluating control effectiveness.

G.3.16 Calculate the probability of risk events (Pre-control)

This is the probability that the identified risk / threat will occur within a specified period of time (between 1 and 3 years) on the basis that the organisation have no specific / focused controls in place to address the risk / threat. The probability of occurrence is assessed for every identified risk.

The CSIR has developed a series of assessment guideline tables (see Section G.5). A realistic evaluation of risk probability is essential, because it guides the allocation of resources in the CSIR. When deciding upon a probability factor from the table, the following guidelines are considered:

- Consider how many similar incidents have occurred in the CSIR;
- Consider, and research if necessary, how many similar incidents have occurred at similar entities; and
- Consider the effectiveness of the existing preventative controls for the risk.

G.3.17 Calculate the potential impact of the identified risk scenarios (Pre-control)

This is the potential magnitude of the impact on the CSIR's operations should the risk / threat actually occur. This is assessed on the basis that the organisation has no specific / focused controls in place to address the risk / threat (therefore before any controls).

The consequences of risk are not only characterised in financial terms. Consideration must be given to various scales of impact that are relevant according to the prevalent categories of risk. These may include the scales for reputation damage, personal injuries and fatalities, media coverage, and operational impact.

Refer to Table G.2 in Section G.5.

G.3.18 Rank the risks in order of priority (Inherent risk)

Inherent risk is the risk to the CSIR in the absence of any actions the organisation might take to alter either the risk's likelihood or impact. Inherent risk is the product of the impact of a risk and the probability of that risk occurring before the implementation of any direct controls.

The ranking of risks provides the organisation with some perspective of priorities. This should assist in the allocation resources in the operations. Management may choose to raise the profile of certain risks for other reasons. This may be justified because of non-financial influences such as media implications, social responsibilities or regulatory pressures. The ranking of risks are shaped by strategic and business objectives.

G.3.19 Consider perceived control effectiveness

Controls are the activities / policies / procedures/ processes / functions / departments / physical controls that the organisation has in place to manage the strategic and significant risks. These actions may reduce the likelihood of occurrence of a potential risk, the impact of such

a risk, or both. Management then assesses the control effectiveness based on their understanding of the control environment currently in place at the CSIR.

G.3.20 Assess the residual risk status

Residual risk reflects the risk remaining after intended actions to mitigate an inherent risk have been effectively implemented.

G.4 Control Requirements

Every risk will have a number of controls, mitigations or interventions that have been designed to contain the potential impact or likelihood of the risk. These controls need to be identified and evaluated. They will form the basis of an assurance plan and will be tested by the internal audit process.

The following aspects of the control environment should be considered:

- Verify and evaluate the controls currently in place for key risks;
- Evaluate the strategic mitigations in place for key risks;
- Identify and evaluate the post-event measures in place for response to risk;
- Review the financial risk protection measures in place to respond to the consequences of risk events;
- Verify the levels of compliance with regulatory requirements;
- Take decisions on the acceptability of identified risks and controls.

G.5 Risk Assessment Guideline Tables

The following tables are to assist the organisation in assessing the potential impact that a risk exposure may have to the CSIR.

Table G.1 below is to be used to assist in quantifying the probability of a specific risk occurring in the CSIR.

Level	Description	Rating
Almost Certain	It is expected that the event will occur in most circumstances.	5
Likely	The event will probably occur in most circumstances.	4
Possible	The event may possibly occur in some circumstances.	3
Unlikely	It is not expected that the event will occur.	2
Rare	The event may occur only in exceptional circumstances.	1

Table G.1: Likelihood Table

Level	Rating	Description	Financial	Business Continuity	Legal and compliance	Human Resource	Image and reputation
Catastrophic	5	A disaster or event that will lead to the lasting negative consequences.	– Exceeds the approved budget by more than 20%. – Loss of income (50% or more).	Business interruption exceeds one month.	– Non compliance to the CSIR mandate as per the Scientific Research Council Act. – Found guilty of breaches of the majority of applicable legislation (e.g. Occupational Health and Safety Act) and standards (e.g. ICT). – Non compliance with research ethics.	– Loss of key staff (say more than 30%). – Cannot obtain necessary skills in the market.	Strained stakeholder relations with no remedial action possible.
Major	4	A serious event that will have extensive negative consequences over the long term.	– Exceeds the approved budget by more than 10%. – Loss of income (30% or more).	– Business interruption between 2-3 weeks.	Found guilty of breaches of policies and procedures (e.g. Confidentiality agreements).	– Loss of key staff (say more than 25%) – Can obtain limited skills from the market.	Strained stakeholder relations with limited remedial action possible.
Moderate	3	An event that will have extensive negative consequences in the short term.	– Exceeds the approved budget by 5%. – Loss of income (20% or more).	Business interruption between 1-2 weeks.	Breach of external standards and guidelines.	– Loss of key staff (say more than 20%) – Can obtain sufficient skills in the market.	Strained stakeholder relations with remedial action possible with expectation of positive outcomes.
Minor	2	An event that can be sustained under normal operating conditions.	Exceeds the approved budget by 3%.	Business interruption one week.	Breach of internal policies and guidelines.	– Loss of key staff (say more than 15% but less than 20%). – Minimal problem in obtaining skills from the market.	Strained stakeholder relations with remedial action possible resulting in guaranteed positive outcomes.
Insignificant	1	An event that will have no or limited impact on the CSIR.	Exceeds the approved budget by 1%.	Business interruption 3 days.	Insignificant breaches of policies and guidelines.	– Loss of key staff (say more than 15% but less than 5%) – No problem obtaining skills from the market.	Minor stakeholder relations with remedial action resulting in positive outcomes.

Table G.2: Impact Table

LIKELIHOOD	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Almost Certain 5	Medium 5	Medium 10	High 15	Critical 20	Critical 25
Likely 4	Low 4	Medium 8	High 12	High 16	Critical 20
Possible 3	Low 3	Medium 6	Medium 9	High 12	High 15
Unlikely 2	Low 2	Low 4	Medium 6	Medium 8	Medium 10
Rare 1	Low 1	Low 2	Low 3	Low 4	Medium 5

IMPACT

Table G.3: Inherent Risk Matrix

G.5.1 Qualitative assessment of perceived control effectiveness

The table below is to be used to assist the organisation in quantifying the perceived effectiveness of controls to mitigate or reduce the impact of specific risks on the CSIR.

Level	Description	Rating
Unacceptable	Very few or no measures and controls are in place to mitigate the risk. Measures and controls should be implemented or improved as a matter of urgency. Make do solutions, trust in processes and internal control is low to moderate.	5
Inadequate	Controls and measures in place do not adequately mitigate the risk and should be improved substantially. Control weakness exposed through review processes, occurrences of disruption.	4
Average	Measures and controls are in place but only partly mitigate the risk and should be improved. Management not confident	3
Good	Measures and controls are in place to mitigate the risk but could be improved.	2
Excellent	All measures and controls have as far as practically possible been implemented and tested on a consistent basis to mitigate the risk.	1

Table G.4: Controls Assessment Rating

RESIDUAL RISK MAP						
VERY HIGH	25	25	50	75	100	125
	20	20	40	60	80	100
HIGH	16	16	32	48	64	90
	15	15	30	45	60	75
	12	12	24	36	48	60
	10	10	20	30	40	50
	9	9	18	27	36	45
MEDIUM	8	8	16	24	32	40
	6	6	12	18	24	30
	5	5	10	15	20	25
LOW	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		EXCELLENT	GOOD	AVERAGE	INADEQUATE	UNACCEP-TABLE
		CONTROLS ASSESSMENT RATING				

Table G.5: Residual Risk Map

RISK ACCEPTANCE CRITERIA AND CORRESPONDING ACTION					
Risk Index	Risk Magnitude	Risk Acceptance	Action	Responsibility	Oversight
75 – 125	Critical	Unacceptable	– Urgent and immediate action required – Risk response to be prepared	OU Director/ Centre Manager/ Group Manager/ EXCO	CSIR Executive and the Board
40 – 64	High	Unacceptable	– Immediate action required – Risk response to be prepared	OU Director/ Competency Area Manager	EXCO/ Portfolio Manager
18 – 36	Medium	Acceptable	– Action required – Risk response to be prepared	Project leader	Competency Area Manager
1 – 16	Low	Acceptable	No action required	Project leader	Competency Area Manager

Table G.6: Risk Acceptance Criteria

H

Fraud Prevention Plan

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H.1 Definition of Terms

"Corruption" Directly or indirectly accepting or agreeing to accept any gratification from another person for his or her benefit or of others; and giving or agreeing to give any other person any gratification in order to influence that person directly or indirectly to exercise his powers, duties or legal obligations, whether for the benefit of that other person, or for the benefit of another person.

"Fraud" The unlawful and intentional making of a misrepresentation, resulting in actual or potential disadvantage to another individual or group.

"Theft" The unlawful and intentional misappropriation of anothers property, or property which is in his/her lawful possession, with the intention of depriving the owner of his/her rights permanently.

H.2 Executive Summary

The CSIR's Fraud Prevention Plan focuses on the timeous identification and prevention of fraud, corruption and theft.

The CSIR's planning for fraud prevention includes the development, implementation and monitoring of appropriate policies, processes and procedures, and ensuring appropriate allocation of responsibilities. This plan also makes provision for a communication and education programme aimed at encouraging employees and other stakeholders to report instances of fraud, corruption and theft. Planning is aligned with applicable legislation such as the PFMA.

The elements of fraud prevention are:

- Defining the required control environment;
- Assessment of the effectiveness of controls;
- Ongoing risk assessment;
- Risk response;
- Communication; and
- Consequence management.

Fraud prevention is a business imperative, and a shared responsibility between management and employees. The primary responsibility for awareness, enforcement, and investigation of incidents rests with Management, Risk Assurance Office, Internal Audit Services, Finance and Legal Services teams.

The fraud prevention plan forms part of the Shareholders Compact to be approved by the CSIR Board.

H.3 Fraud Risk Areas

In the CSIR context, fraud could potentially manifest itself in the following areas:

H.3.1 Research

Use of research facilities and Intellectual Property for one's own benefit; and Falsifying research outputs (scientific dishonesty).

H.3.2 Systems

Where a process/system exists which is prone to abuse by employees, the public or other stakeholders, for example:

- Inadequate pre-screening of candidate employees;
- Procurement fraud such as collusion between CSIR employees and suppliers;
- Deliberate non-compliance with prevailing CSIR policies and procedures; and
- Non-compliance with the approval framework.

H.3.3 Finances

Where individuals or entities have fraudulently obtained money from CSIR, for example:

- Suppliers invoicing for work not done, or over invoicing;
- Unauthorised transfer of funds from CSIR bank accounts; and
- Submission of fictitious subsistence and travel claims by employees.

H.3.4 PPE and Resources

Where equipment is utilised for personal benefit or stolen, for example:

- Theft of PPE;
- Theft or unauthorised use, or leakage, of confidential information;
- Theft of intellectual property; and
- Misuse and abuse of PPE.

H.3.5 Other

Activities undertaken by employees, which may be contrary to established policies, or fall below established ethical standards, for example:

- Related party transactions;
- Conflicts of interest;
- Nepotism;
- Non-disclosure of private business interests; and
- Omitting or refusing to report or act upon reports of fraud.

H.4 Principles Governing Fraud Prevention

The CSIR adheres to the principles of good corporate governance, which requires the conducting of business in an efficient, effective and transparent manner. This calls for commitment to fighting fraudulent and corrupt behaviour at all levels within the organisation.

The main principles upon which the fraud prevention plan of the CSIR is based are the following:

- Creating a corporate culture which is ethical, fair and intolerant to fraud;
- Deterrence of fraud;
- Investigating any detected fraud;
- Taking appropriate action in the event of fraud, e.g. disciplinary action, recovery of losses and prosecution; and
- Applying sanctions, such as blacklisting of suppliers/service providers guilty of corrupt practices.

This plan applies to all allegations, attempts and incidents of fraud impacting or having the potential to impact the CSIR.

All employees and management must comply with the spirit and content of the plan.

A person who holds a "position of authority" should report any suspected corrupt activity and/or an offence of theft/ fraud to the police as per the requirements of the Prevention of Corrupt Activities Act.

H.5 Elements of Fraud Prevention

The main objective of the Plan is to raise awareness about potential fraud and corruption, and to put fraud response and prevention strategies in place.

The components of the Fraud Prevention Plan are the following:

- Creation of fraud and corruption awareness amongst employees and relevant stakeholders through communication and education;
- Communication concerning the organisation's policies, procedures, rules, regulations and other prescripts (including the PFMA and supporting Treasury Regulations);
- Publicising of the disciplinary code and procedure;
- Implementation of sound internal controls to prevent and detect fraud and corruption;

- Implementation of an effective internal audit function;
- Institute an effective fraud and corruption investigating capacity;
- Ongoing risk assessments;
- Management structures to ensure effective implementation and maintenance of the Fraud Prevention Plan;
- A "zero tolerance" policy to fraud and corruption, including a fraud and corruption response plan, and take comprehensive steps for the proper resolution of reported and detected incidents, and allegations of fraud and corruption;
- Implement a confidential fraud and corruption reporting system;
- Install physical and information security management; and
- Provide for ongoing maintenance and review of the Fraud Prevention Plan.

H.5.1 Approach to Fraud Prevention

The approach to fraud prevention in CSIR entails the following:

- Defining the control environment
  - Audit and Risk Committee oversight;
  - Code of conduct/ research ethics/ disciplinary code; and
  - Prevention and response plan.
- Information sharing and ongoing communication

H.5.2 Fraud Risk identification and Response

Ongoing risk assessment

CSIR acknowledges that it faces diverse fraud risks from both internal and external sources. In order to comply with the requirements of the PFMA and Treasury Regulations, CSIR conducts risk assessments on an ongoing basis. Fraud awareness forms part of the prevention strategy. The Audit and Risk Committee, in performing its duties, ensures that adequate controls are in place to prevent and detect fraud.

Consideration of fraud schemes and scenarios

The identification of fraud risks include consideration of typical fraud schemes and scenarios that CSIR may be exposed to; and CSIR continually monitors and takes stock of fraud schemes to which it is exposed and develops mitigating actions to deter and prevent such schemes.

Ongoing identification of fraud risk controls

The CSIR continually develops specific anti-fraud controls and action plans for risks identified. The ongoing rationale for controlling fraud encompasses:

- Identifying and taking preventative measures to reduce exposure to specific fraud schemes;
- Identifying key individuals and participants;
- Eliminating the opportunity to commit fraud emanating from internal control weaknesses;
- Evaluating the design and operating effectiveness and efficiency of controls during the course of audits;
- Implementing basic internal controls that assist in the mitigation of identified fraud risks, including, though not limited to:
- Adequate approval of transactions as prescribed in the approval framework;
- Implementation of security measures designed to ensure that access to assets and information is restricted to authorised employees;
- Arithmetic and accounting controls, which include checking arithmetical accuracy of records, the maintenance and checking of totals, monthly reconciliation of control accounts, and accounting for whereabouts of documents;
- Supervision of day to day transactions and checking these; and
- Adequate segregation of duties.

Evaluate operational effectiveness and efficiency

The effectiveness and efficiency of controls are evaluated through the monitoring of fraud risk factors and indicators, and fraud auditing.

H.5.3 Timely Detection and Response

Incident reporting

Employees and/or external parties may be faced with the dilemma of not knowing what they should do or where to report suspected fraud. The first step is for the employee to approach their immediate manager. If a member of management is the subject of the complaint, the HRM, Legal and/or CSIR Internal Audit Services should be informed. The external parties may approach the CSIR Internal Audit Services.

How will allegations of fraud be dealt with?

For issues raised by employees or members of the public, the action taken will depend on the nature of the concern. The matters raised are screened and evaluated and may subsequently:

- Be investigated internally by CSIR Internal Audit Services;
- Be investigated by an independent forensic service provider (where necessary);
- Be referred to a law enforcement agency;
- Any fraud committed by an employee or any other person is pursued by way of an investigation. Appropriate action will be taken, which may include:
  - In the case of employees, taking disciplinary action within a reasonable period of time after the incident has been investigated;
  - Instituting civil action to recover losses; and
  - Initiating criminal prosecution by reporting the matter to the South African Police Service (SAPS).
- When fraud is reported, the first response is to conduct a high-level assessment of the information that is provided and involves the following steps:
  -
  - Seriousness of the allegation;
  - Authentication of the allegation;
  - Consideration of the source of information;
  - Preliminary investigation and consulting with appropriate managers within CSIR regarding the allegation;
  - Ensuring that the investigation is conducted within a reasonable time period;
  - Detailed investigation, if necessary, based on the outcomes of the preliminary investigation;

  - If the allegation is found to be valid, disciplinary proceedings are instituted, investigated, heard and disposed of, in accordance with the disciplinary code and the PFMA;
  - Ensuring that disciplinary proceedings are carried out in accordance with the CoS;
  - Reporting to the Auditor-General, National Treasury and the Executive Authority in terms of the PFMA. The report is to include a schedule of:
    * The manner, form and circumstances of the allegation;
    * The particulars of the misconduct and the nature of the disciplinary steps and/or criminal charges laid;
    * Matters relating to the investigation; and
    * The circumstances and outcomes of any disciplinary hearing and/or criminal charges.

- During the detailed investigation, simultaneous loss and risk mitigation steps are implemented. This includes:
  - Suspending the perpetrator to limit further financial losses, prevent destruction of evidence and interference with witnesses;
  - Removal of the asset at hand/ subject to vulnerability from custodian;
  - Suspension of access to information systems (where necessary);
  - Withdrawal of approval rights (where applicable); and
  - Addressing the control weakness to prevent the fraud from continuing or recurring.

Recovery of losses

Managers are required to ensure that losses or damages suffered by the CSIR, as a result of reported acts committed or omitted by an employee, management or any other person, are recovered from such person if found liable for the same.

Feedback to reporters of fraud

Upon receiving an allegation of fraud the following actions will be taken by CSIR Internal Audit Services in collaboration with Legal Services/ HRMs:

- Acknowledge receipt of the allegation;
- Indicate how the matter will be dealt with;
- Give an estimate of how long it will take to provide a final response; and
- Give feedback on the outcome of the investigation.

Confidentiality

All information relating to fraud that is received and investigated is treated confidentially. The progress of investigations is handled in a confidential manner and is not disclosed or discussed with any person(s) other than those who have a legitimate right to such information on a "need to know basis". This is important in order to avoid harming the reputation of a suspected person who may subsequently be found innocent of fraudulent conduct.

Protection of the Whistleblower

Whistle blowing is encouraged. This can be done directly to CSIR Internal Audit Services/ Legal Services/ HRM's or an employee's immediate manager.

Whistle blowers are protected in terms of the applicable legislation (Protected Disclosure Act).

H.5.4 Control Environment

Oversight by the Audit and Risk Committee

CSIR's Audit and Risk Committee significantly influences the fraud control environment, particularly by overseeing the "tone at the top". This is done in the discharge of its duties in terms of the PFMA and Treasury regulations.

The Audit and Risk Committee systematically oversees, and periodically reviews the internal controls established by the management of CSIR. Oversight extends to:

- Enterprise risk and fraud risk management;
- The potential for management to override controls or exercise other inappropriate influence over the financial reporting process;
- Mechanisms for employees to report concerns;
- Receipt and review of periodic reports describing the nature, status and eventual resolution of alleged or suspected fraud;
- An internal audit plan that addresses fraud risk, and a mechanism to ensure that internal audit can express any concerns about management's commitment to appropriate internal controls, or to report suspicions or allegations of fraud;
- Involvement of other experts, such as legal and human resources, as needed to investigate any alleged or suspected wrongdoing;
- Review of accounting principles, policies, and reasonableness of significant estimates used by the CSIR;

- Review of significant non-routine transactions (if any) entered into by management and employees; and
- Functional reporting by internal and external auditors to the Audit and Risk Committee.

Research ethics and code of business conduct

The CSIR subscribes to good business practises, as dealt with in the code of ethics.

Management must be held accountable for complying with, and implementing, CSIR's systems, policies and procedures for preventing fraud, theft and corruption. This is addressed in job descriptions, delegations of authority, declaration of conflicts of interest, agreed work plans, performance contracts, and annual appraisals.

Trading partners e.g. suppliers, contractors, consultants and former employees

Goods and services are procured in accordance with the approved procurement policies and procedures.

Other control environment considerations

CSIR has a number of systems, policies, procedures, acts and regulations designed to ensure compliance with specific laws and basic internal controls.

All employees and relevant stakeholders are expected to comply with the applicable policies and procedures. A fundamental risk in this area is the lack of knowledge, awareness, effective communication and training relating to prevailing systems, policies and procedures in place at CSIR.

Non-compliance with policies and procedures is a risk which is addressed by developing clearly defined communication to create awareness of all policies and procedures. All employees acknowledge in writing that they have read policies and procedures on appointment.

Regular communiqués are circulated regarding policies and procedures.

A structured monitoring mechanism has been developed for keeping a proper record of the policies and procedures that are updated, and of new policies and procedures that are being developed in order to set clear targets and monitor progress.

Discipline

The disciplinary code and procedures prescribes appropriate steps to be taken in addressing disciplinary matters. The respective HRM, Legal and CSIR Internal Audit Services depart-

ments support the CSIR in instituting and completing disciplinary action in cases of fraud and corruption.

The consistent and efficient application of disciplinary measures is an integral component of effective fraud prevention and will be achieved by:

- Creating awareness amongst employees of conduct that is forbidden in terms of the code of conduct and disciplinary code;
- Ongoing training of managers in the application of disciplinary measures;
- Speedy finalisation of investigations and hearings; and
- Regular monitoring and review of the application of discipline with the objective of improving weaknesses identified.

Policies and procedures

Appropriate policies and procedures are necessary to ensure effective internal controls to mitigate fraud risks. The effectiveness of the existing policies and procedures is also tested during the course of audits, and shortcomings are addressed.

Physical Security

CSIR has implemented physical security controls which have been updated and continually refined, including the following:

- Visitors reporting to reception;
- Access control in the form of access cards for employees and other tenants;
- Proper management of issuing of access cards; and
- Use of security services.

H.5.5 Information and Communication

Information Security

Large volumes of information are stored on computers. If improperly managed, sensitive data could end up in the hands of unauthorised individuals. Physical and logical access controls over the computer systems continually seek to achieve the following:

- Striking the right balance between allowing access to information to enable efficient operations, and denying inappropriate access to ensure that information is not compromised;

- Implementing preventative controls to limit access to unauthorised persons; and
- Implementing detective controls to determine whether unauthorised access is being attempted or unusual patterns of activity are occurring.
- CSIR has a computer usage policy to manage information security. CSIR ensures that all employees are sensitised on a regular basis to the fraud risks associated with information security and the utilisation of computer resources, and ensures that controls are developed to limit the risk of manipulation of computerised data;
- Regular communiqués are sent to employees pointing out security policies, with particular emphasis on e-mail, telephone and internet usage, and the implications of abusing these and other computer related facilities. Where employees are found to have infringed on prevailing policy in this regard, disciplinary action is taken; and
- Regular reviews of information and computer security are also conducted by CSIR. Weaknesses identified during these reviews are addressed and policies updated accordingly.

Change management

Creating awareness

This is the cornerstone of the Plan and comprises two areas, namely:

- Education; and
- Communication.

A Fraud Prevention Plan Awareness Programme approved by CSIR Executive Management is in place. The main principles that form the basis of the awareness program are:

- Facilitating a culture which takes pride in a high standard of ethics; and
- Training and education regarding ethics, and CSIR's stance on prevention, combating, detection and investigation of fraud and corruption.

Education

- Formal awareness presentations are conducted for employees of CSIR through the PFMA roadshow.

Communication

- The objective of communication is to further create awareness amongst employees, the public and other stakeholders of the Fraud Prevention Plan, in order to inculcate a culture where all stakeholders strive to contribute towards the eradication of corruption and fraud;
- To ensure that there is no uncertainty amongst employees, suppliers and clients about the policies and procedures that shape CSIR's approach to fraud as being one of 'zero tolerance'. This includes making appropriate attachments to offers of employment and the inclusion of appropriate items in induction and training programmes;
- Signing of declarations of commitment by all employees to the CoS and applicable policies and procedures;
- Publishing the transgressions and the consequences thereof in the Annual Report when these exceed the set materiality levels; and
- Communication will use a variety of mediums, including but not limited to:
- Email communiques and circulars;
- Posters;
- Pamphlets and flyers; and
- Publishing the Fraud Prevention Plan on the CSIR website

Monitoring

- A system is in place to facilitate the consolidation of all allegations of fraud and corruption. This enhances the management of fraud risk and threats that could be overlooked in the absence of such a system;
  - A centralised register is kept for purposes of:
  - Recording all allegations;
  - Tracking progress on allegations with the relevant managers; and
  - Facilitating the early identification of systemic weaknesses/risks, and inform managers and employees of these.
- Providing feedback to employees and whistle blowers on the management and progress of allegations.

H.6 Conclusion

The CSIR has taken a proactive approach towards managing fraud risk in the organisation. It has adopted a zero tolerance approach towards fraud, theft and corruption and has taken the necessary measures to ensure the risks are managed effectively.

I

Materiality / Significance Framework

I.1 Executive Summary

In terms of Treasury Regulations for government departments, trading entities, constitutional institutions and public entities, issued in terms of the PFMA, 1999, the CSIR must have a materiality framework of acceptable levels of materiality and significance within the organisation.

The CSIR's reputation, built over more than half a century, depends on the nature of every business transaction conducted by every employee on a daily basis. It is built on an implicit set of values, which inspires our employees to maintain the highest ethical standards in all their dealings with our clients and stakeholders, as well as their relationships within the CSIR.

The CSIR is committed to a policy of fair dealing and integrity in conducting its business. This commitment is based on a fundamental belief in honest, fair and legal conduct in all business activities. We expect all our employees to share this commitment to high moral, ethical and legal standards.

Ethics involve the ability to distinguish right from wrong and a commitment to do what is right. Values are core beliefs, which create individual attitudes. Although individual values may differ, this does not imply a choice about behaving ethically in the business environment of the CSIR. Our Code of Conduct, as well as the Constitution of South Africa and the national laws and regulations, prescribe legal conduct that embodies values based on ethical principles, while respecting cultural diversity.

I.2 Treasury Regulation 28.1.5

"For purposes of "material" [sections 50(1), 55(2) and 66(1) of the Act] and "significant" [section 54(2) of the Act], the accounting authority must develop and agree a framework of acceptable levels of materiality and significance with the relevant executive authority in consultation with the external auditors."

(THE CSIR HAS HOWEVER BEEN EXEMPTED FROM SECTION 54 (2) AND THIS SCHEDULE DOES NOT INCLUDE THIS SUBSECTION.)

		Material
Section 50 (1)	(1) The accounting authority for a public entity must –	
	(a) exercise the duty of utmost care to ensure reasonable protection of the assets and records of the public entity;	Significant audit findings that could negatively impact on the CSIR's operations and the attainment of strategic goals.
	(b) act with fidelity, honesty, integrity and in the best interest of the public entity in managing the financial affairs of the public entity;	The CSIR sets high standards on fidelity, honesty and integrity. The best interest of the public entity is always relevant in fulfilling its mandate and in the execution of the Shareholders Compact. Any acts of dishonesty, infidelity and that are not in the best interests (from a research, financial and reputation perspective) and of the CSIR are viewed in a serious manner.
	(c) on request, disclose to the executive authority responsible for that public entity or the legislature to which the public entity is accountable, all material facts, including those reasonably discoverable, which in any way influence the decision or actions of the executive authority or that legislature; and	The CSIR is committed to disclose any relevant information to its stakeholders. Materiality can only be determined if the nature of the information is known.
	(d) seek within the sphere of influence of that accounting authority, to prevent any prejudice to the financial interests of the state.	The CSIR employs an ongoing enterprise risk management system as well as controls that are aimed at prevention/mitigation of any prejudice to the financial interest of the entity. Lack of the required governance processes, lack of due diligence in conducting business, and fruitless and wasteful expenditure are inherently regarded as material.

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		Material
Section 55 (2)	(2) The annual report and financial statements referred to by PFMA Subsection 55 (1)(d) must –	
	(a) fairly present the state of affairs of the public entity, its business, its financial results, its performance against predetermined objectives and its financial position as at the end of the financial year concerned;	As per guidelines issued by National Treasury: Significance/materiality is calculated as 0.75% of revenue, which amounts to R 19 500 000.
	(b) include particulars of –	
	(i) any material losses through criminal conduct and any irregular expenditure and fruitless and wasteful expenditure that occurred during the financial year;	R 1 000 000. All cases are unique and will thus be treated as such. These will be subject to internal audit reviews.
	(ii) any criminal or disciplinary steps taken as a consequence of such losses or irregular expenditure or fruitless and wasteful expenditure;	R 1 000 000. All cases are unique and will thus be treated as such. Issues that inform steps to be taken are: • The level of responsibility and position of the person involved; • The affected core business/support/operational; and • The impact on other areas of operation of the CSIR. • These will be subject to internal audit reviews.
	(iii) any losses recovered or written off;	R 1 000 000 (excluding losses incurred through normal operating activities)
	(iv) any financial assistance received from the state and commitments made by the state on its behalf; and	Will disclose as prescribed.
	(v) any other matters that may be prescribed; and	Will disclose as prescribed.

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		Material
	(c) include the financial statements of any subsidiaries	All subsidiaries are consolidated.
Section 66 (1)	(1) An institution to which this Act applies may not borrow money or issue a guarantee, indemnity or security, or enter into any other transaction that binds or may bind that institution or the Revenue Fund to any future financial commitment, unless such borrowing, guarantee, indemnity, security or other transaction – (a) is authorised by this Act; and (b) in the case of public entities, is also authorised by other legislation not in conflict with this Act; and (c) in the case of loans by a province or a provincial government business enterprise under the ownership control of a provincial executive, is within the limits as set in terms of the Borrowing Powers of Provincial Governments Act, 1996 (Act No 48 of 1996).	The CSIR complies with this requirement.

J

Financial Plan

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J.1 CSIR Budget and Parliamentary Grant Cashflow 2016/17

J.1.1 CSIR Statements of Comprehensive Income over the MTEF period

	Forecast 2015/16 (R'000)	**Budget** 2016/17 (R'000)	**Budget** 2017/18 (R'000)	**Budget** 2018/19 (R'000)
Total Operating Revenue	**2,444,773**	**2,611,489**	**2,795,686**	**2,990,225**
Contract R&D Income	**1,788,888**	**1,913,777**	**2,059,453**	**2,210,672**
Public – South Africa	1,337,958	1,422,103	1,531,605	1,644,943
Private – South Africa	162,351	181,711	195,703	210,185
International	200,334	239,840	258,308	277,423
Parliamentary Grant – Ring-fenced	88,245	70,123	73,838	78,121
Parliamentary Grant	**649,704**	**694,827**	**729,358**	**771,661**
Royalty income	**6,181**	**2,885**	**6,875**	**7,892**
Other income	**30,016**	–	–	–
Total Expenditure	**2,412,050**	**2,541,394**	**2,716,750**	**2,900,148**
Employees' remuneration	1,374,099	1,482,734	1,585,042	1,694,410
Operating expenses	894,624	956,589	1,022,594	1,093,153
Depreciation	143,327	102,072	109,113	112,585
Operating Profit before Investment Income	**62,739**	**70,095**	**78,937**	**90,077**
Investment Income	**36,690**	**39,974**	**41,173**	**42,408**
Net profit before non-guaranteed employees' remuneration (Performance bonus)	**99,429**	**110,069**	**120,110**	**132,485**
Non-guaranteed employees remuneration (Performance bonus)	45,577	52,569	58,120	65,928
Net profit	**53,852**	**57,500**	**61,990**	**66,557**

Table J.1: Statement of Comprehensive Income – MTEF Period

J.1.2 CSIR Statements of Financial Position over the MTEF period

	Forecast March 2016 (R'000)	**Budget** March 2017 (R'000)	**Budget** March 2018 (R'000)	**Budget** March 2019 (R'000)
ASSETS				
Non-Current Assets	**800,064**	**844,464**	**877,958**	**912,440**
Property, Plant and Equipment	784,347	813,397	843,755	875,887
Interest in Joint Ventures and Associates	1,364	11,364	14,500	16,850
Interest in Subsidiaries	7,649	2,999	2,999	2,999
Investment	6,704	16,704	16,704	16,704
Current Assets	**1,125,501**	**1,154,075**	**1,180,041**	**1,218,400**
Trade and other receivables	239,737	262,509	280,013	299,624
Inventory and contracts in progress	102,589	106,856	110,426	118,156
Cash and cash equivalents	783,175	784,710	789,602	800,620
TOTAL ASSETS	**1,925,565**	**1,998,539**	**2,057,999**	**2,130,840**
EQUITY AND LIABILITIES				
Reserves	**923,324**	**980,824**	**1,042,814**	**1,109,371**
Retained Earnings	923,324	980,824	1,042,814	1,109,371
Non-current liabilities	**10,108**	**12,655**	**13,793**	**14,759**
Post-retirement medical benefits	10,108	12,655	13,793	14,759
Current liabilities	**992,133**	**1,005,060**	**1,001,392**	**1,006,710**
Advances received	589,454	550,039	537,460	529,232
Trade and other payables	402,679	455,021	463,932	477,478
TOTAL EQUITY AND LIABILITIES	**1,925,565**	**1,998,539**	**2,057,999**	**2,130,840**

Table J.2: Statement of Financial Position over the MTEF Period

J.1.3 CSIR Cash Flow Statement

	March 2017 R'000
Cashflow from operating activities	
Cash receipts from external customers	1,889,622
Parliamentary Grant income	694,827
Cash paid to suppliers and employees	(2,504,619)
Cash generated from operating activities	**79,831**
Net finance income	39,974
Net cash from operating activities	**119,805**
Cashflow from investing activities	
Increase in investments	(15,350)
Acquisition of property, plant and equipment	(102,920)
Net cash utilised in investing activities	**(118,270)**
Cashflow from financing activities	
Increase in long-term liabilities	–
Net cash generated from financing activities	–
Net increase in cash and cash equivalents	**1,535**
Cash and cash equivalents at beginning of the year	**783,175**
Cash and cash equivalents at end of the year	**784,710**

Table J.3: CSIR Cash-Flow Statement

J.1.4 Twelve Month Cash Flow Projection for Parliamentary Grant: 2016/17 (including VAT)

R'000	Total	April	July	Oct	Jan
	1,086,589	271,647	271,647	271,647	271,647
Baseline	761,903				
National laser Centre	30,200				
Laser Loan Programme	8,866				
African Laser Centre	4,844				
Implementation: ICT R&D Roadmap	66,230				
Cyber Infrastructure	214,546				

Table J.4: Cash-Flow For Parliamentary Grant

J.1.5 PPE Budget Summary

Category	2016/17 (R'000)
Buildings	21,300
R&D equipment	44,947
Computer,Information Technology (IT) and office equipment	33,518
Furniture and fittings	2,995
Vehicles	200
Total	**102,920**

Table J.5: PPE Budget Summary

Notwithstanding the fact that an item is included in the above budgeted amount, the investment in PPE remains subject to approval as per the Approval Framework of the CSIR and additional considerations such as strategic alignment, return on investment and available cashflow

J.2 CSIR Group 3 Year Financial Plan

J.2.1 Subsidiaries and Associate Companies

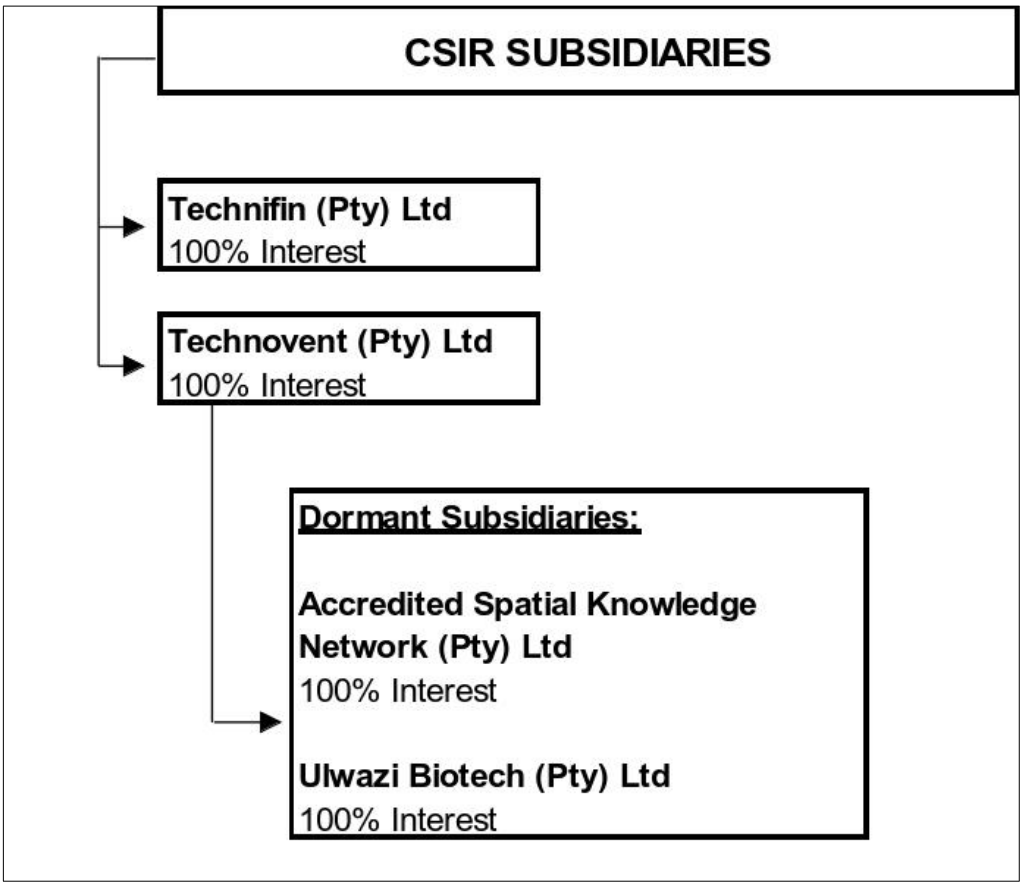
	Total	Technifin	Technovent	SERA	Ellipsoid
Incorporated		SA	SA	SA	SA
% Holding		100%	100%	100%	100%
	Annual Budget R'000				
Total Income	**3,379**	**3,300**	**9**	**–**	**70**
Contract R&D income	–	–	–	–	–
Royalty Income	3,000	3,000	–	–	–
Finance Income	379	300	9	–	70
Other Income	–	–	–	–	–
Expenses	**1,074**	**1,050**	**2**	**–**	**22**
Operating Expenses	1,074	1,050	2	–	22
Employees Remuneration	–	–	–	–	–
Depreciation/Amortisation	–	–	–	–	–
Net Profit	**2,305**	**2,250**	**7**	**–**	**48**

Table J.6: CSIR Subsidiaries and Associated Companies: Income and Expenditure 2016/17

The CSIR subsidiary companies have duly appointed Boards. The subsidiary companies are audited by the Auditor-General.

The subsidiary companies have a zero dividend policy.

J.2.2 CSIR Subsidiary Companies



J.2.3 CSIR Group Statements of Comprehensive Income

	Forecast 2015/16 (R'000)	**Budget** 2016/17 (R'000)	**Budget** 2017/18 (R'000)	**Budget** 2018/19 (R'000)
Total Operating Revenue	**2,463,532**	**2,614,489**	**2,795,686**	**2,990,225**
Contract R&D Income	**1,807,647**	**1,913,777**	**2,059,453**	**2,210,672**
Public – South Africa	1,337,958	1,422,103	1,531,605	1,644,943
Private – South Africa	181,110	181,711	195,703	210,185
International	200,334	239,840	258,308	277,423
Parliamentary Grant – Ring-fenced	88,245	70,123	73,838	78,121
Parliamentary Grant	**649,704**	**694,827**	**729,358**	**771,661**
Royalty income	**6,181**	**5,885**	**6,875**	**7,892**
Other income	**31,390**	–	–	–
Total Expenditure	**2,430,724**	**2,542,467**	**2,717,008**	**2,900,422**
Employees' remuneration	1,378,144	1,482,734	1,585,042	1,694,410
Operating expenses	908,858	957,633	1,022,852	1,093,426
Depreciation	143,722	102,071	109,113	112,585
Operating Profit before Investment Income	**64,198**	**72,021**	**78,679**	**89,803**
Investment Income	**37,215**	**30,353**	**41,493**	**42,748**
Net profit before non-guaranteed employees' remuneration (Performance bonus)	**101,413**	**112,374**	**120,172**	**132,551**
Non-guaranteed employees remuneration (Performance bonus)	45,577	52,569	58,120	65,928
Net profit	**53,836**	**59,805**	**62,052**	**66,623**

Table J.7: Group Statement of Comprehensive Income – MTEF Period

J.2.4 CSIR Group Statements of Financial Position

	Forecast March 2016 (R'000)	**Budget** March 2017 (R'000)	**Budget** March 2018 (R'000)	**Budget** March 2019 (R'000)
ASSETS				
Non-Current Assets	**792,438**	**841,488**	**874,982**	**909,464**
Property, Plant and Equipment	784,370	813,420	843,778	875,910
Interest in Joint Ventures and Associates	1,364	11,364	14,500	16,850
Interest in Subsidiaries	–	–	–	–
Investment	6,704	16,704	16,704	16,704
Current Assets	**1,133,602**	**1,163,176**	**1,188,142**	**1,226,501**
Trade and other receivables	239,737	262,509	280,013	299,624
Inventory and contracts in progress	102,589	106,856	110,426	118,156
Cash and cash equivalents	791,138	793,673	797,565	808,563
TOTAL ASSETS	**1,926,040**	**2,004,664**	**2,063,124**	**2,135,965**
EQUITY AND LIABILITIES				
Reserves	**934,983**	**994,788**	**1,056,840**	**1,123,463**
Retained Earnings	934,983	994,788	1,056,840	1,123,463
Non-current liabilities	**10,108**	**12,655**	**13,793**	**14,759**
Post-retirement medical benefits	10,108	12,655	13,793	14,759
Current liabilities	**980,489**	**997,221**	**992,491**	**997,743**
Advances received	589,454	550,039	537,460	529,232
Trade and other payables	391,495	447,182	455,031	468,511
TOTAL EQUITY AND LIABILITIES	**1,926,040**	**2,004,664**	**2,063,124**	**2,135,965**

Table J.8: Group Statement of Financial Position over the MTEF Period

J.2.5 CSIR Group Cash Flow

	March 2017 R'000
Cashflow from operating activities	
Cash receipts from external customers	1,892,622
Parliamentary Grant income	694,827
Cash paid to suppliers and employees	(2,506,998)
Cash generated from operating activities	**80,452**
Net finance income	40,353
Net cash from operating activities	**120,805**
Cashflow from investing activities	
Increase in investments	(15,350)
Acquisition of property, plant and equipment	(102,920)
Net cash utilised in investing activities	**(118,270)**
Cashflow from financing activities	
Increase in long-term liabilities	–
Net cash generated from financing activities	–
Net increase in cash and cash equivalents	**2,535**
Cash and cash equivalents at beginning of the year	**791,138**
Cash and cash equivalents at end of the year	**793,673**

Table J.9: CSIR Group Cash-Flow Statement

J.3 5 Year Borrowing Plan

MINISTRY
SCIENCE AND TECHNOLOGY
REPUBLIC OF SOUTH AFRICA

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Prof Thokozani Majozi
Chairperson
Council for Scientific and Industrial Research
P O Box 395
PRETORIA
0001

Email:thokozani.majozi@wits.ac.za

Dear Prof Majozi

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH: APPROVAL OF THE 2015/16 – 2019/20 BORROWING LIMITS IN TERMS OF SECTION 66(3) (B) OF THE PUBLIC FINANCE MANAGEMENT ACT

In terms of section 66 (3) (b) of the Public Finance Management Act (PFMA), 1999 (Act No.1 of 1999) as amended, a Schedule 3B public entity may only borrow money, or issue guarantees, indemnities or securities if so authorised by notice in the Government Gazette by the Minister of Finance.

The purpose of this letter is to inform you that I have, with concurrence of the Minister of Finance approved the proposed borrowing limits for the CSIR for the five-year period 2015/16 2019/20 . The borrowing limits are approved as outlined below.

Borrowing instrument	**Year ended 31 March**				
	2016	**2017**	**2018**	**2019**	**2020**
	Amounts in R'000				
Performance Bond	20 000	20 000	23 000	25 000	25 000
Bid Bonds	3 000	3 000	4 000	4 000	5 000
Payment Guarantee	6 000	8 000	11 000	15 000	20 000
Advance Payment Guarantee	30 000	35 000	38 000	45 000	50 000
Total Annual Limit	**59 000**	**66 000**	**76 000**	**89 000**	**100 000**

The approval is granted on condition that, the CSIR should report anually to my Department and the National Treasury on utilisation of the borrowing plans and progress made toward implementation of projects secured through these borrowings.

Yours sincerely

G.N.M. Pandor

MRS GNM PANDOR, MP
MINISTER OFSCIENCE AND TECHNOLOGY
DATE: 15-5-2015

Cc Dr Sibisi
CEO: CSIR
PO Box 395
PRETORIA
0001
Fax: 012 841 3549

MINISTER: FINANCE
REPUBLIC OF SOUTH AFRICA

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Ref. M3/15/25 (186/15)

Ms GNM Pandor, MP
Minister of Science and Technology
Private Bag X727
PRETORIA
0001

Dear Minister Pandor

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR) 2015/2016-2019/2020 BORROWING PLAN: REQUEST FOR THE IMPLEMENTATION OF SECTION 66(3)(b) OF THE PUBLIC FINANCE MANAGEMENT ACT (PFMA)

I refer to your letter dated 29th January 2015 regarding the abovementioned request.

I concur with your approval of the CSIR's request in terms of section 66(3)(b) of the PFMA. The guarantee amounts in terms of the application, for the five year period 2015/16 to 2019/20, are as follows:

- R59 million for the 2015/16 financial year;
- R66 million for the 2016/17 financial year;
- R76 million for the 2017/18 financial year;
- R89 million for the 2018/19 financial year; and
- R100 million for the 2019/20 financial year.

This concurrence is given on condition that the CSIR report to the National Treasury and the Department of Science and Technology, on an annual basis, on the utilisation of the guarantee limits and the progress on the implementation of projects secured through the guarantees.

I trust that the above is in order.

Kind regards

NHLANHLA M NENE, MP
MINISTER OF FINANCE
Date: 21/4/2015

K

PFMA Exemptions

MINISTRY OF TRADE AND INDUSTRY

UMNYANGO WEZOHWEBO NEZIMBONI • MINISTERIE VAN HANDEL EN NYWERHEID
LEFAPHA LA TSA DIKGWEBO LE MADIRELO

Ref: ISM 3/1/2/3

Minister T Manuel, MP
Department of Finance
Private Bag X115
PRETORIA
0001

Dear Trevor

THE PUBLIC FINANCE MANAGEMENT ACT, ACTS NO. 1 & 29 OF 1999
RE -LISTING OF CSIR.

I address this letter to you in my capacity as the Executive Authority of the CSIR as per the Public Management (PFMA), Act 1 of 1999, that recently came into operation and in terms of which you are the responsible Minister.

My office has been approached by the CSIR with various requests pertaining to the aforesaid legislation and I understand that you have likewise received the same, as contained in previous correspondence from the CSIR, and more specifically their latest letter dated 3 July 2000, addressed to both our offices.

I confirm that, as its Executive Authority, I support the CSIR's approach, and herewith recommend the following:

i) that the CSIR be re-listed by you in terms of Section 47 (1) (b), so that it will be moved from a Schedule 3 A Public Entity to a 3 B Public Entity.

ii) in terms of the provisions of Section 54 (4) of the PFM Act, I have with the information at my disposal, and given the nature of the CSIR's activities, decided to support the exemption of CSIR from compliance with the provisions of Section 54 (2). In reaching this decision, I have also given consideration to the composition of the CSIR Board as Accounting Authority thereof for purposes of the PFM Act, the members of whom have all been appointed by myself in accordance with the CSIR Act. Act 46 06 of 1988.

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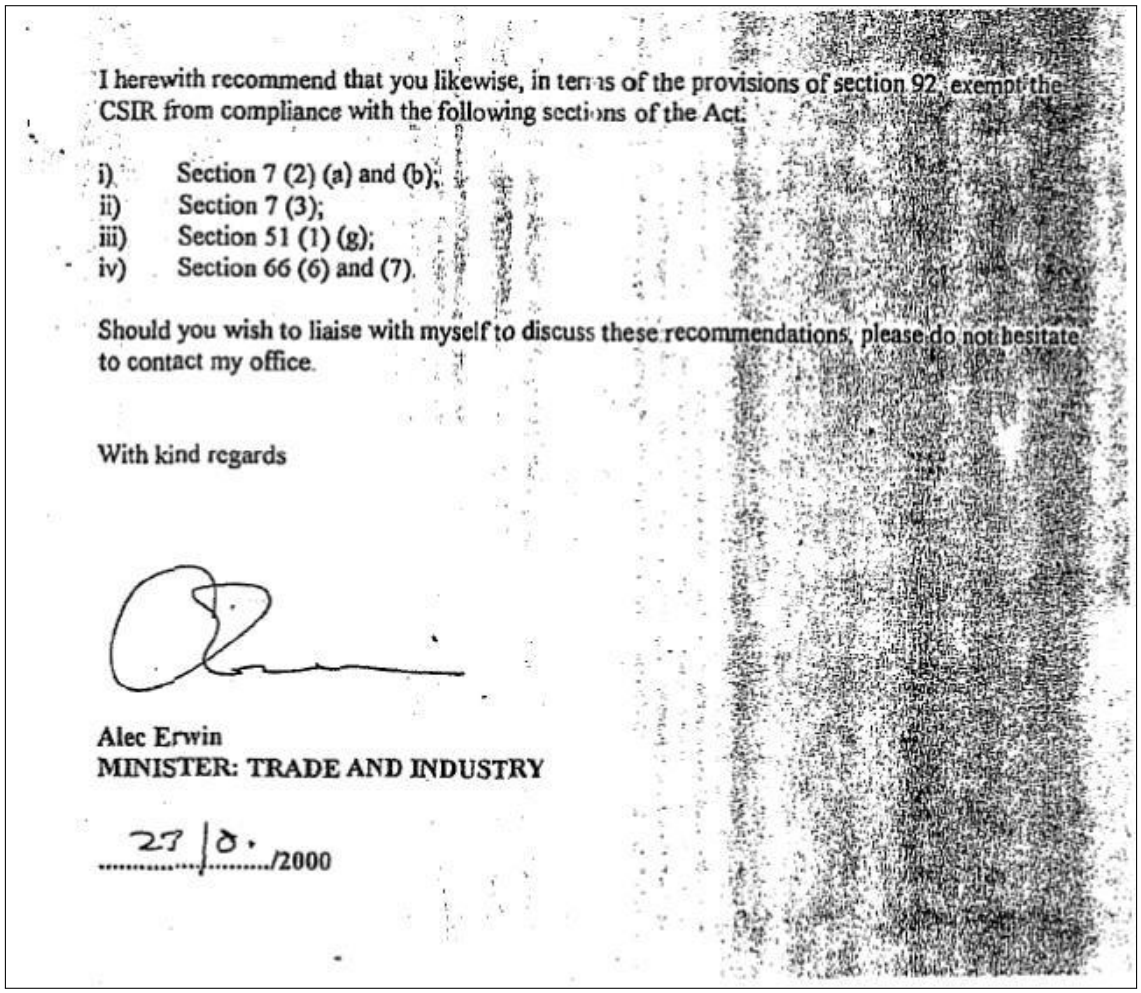
PRIVATE BAG X274 PRETORIA 0001
TEL: (012) 322-7677/8/9 FAX: (012) 322-7[illegible]



I herewith recommend that you likewise, in terms of the provisions of section 92, exempt the CSIR from compliance with the following sections of the Act:

i) Section 7 (2) (a) and (b);
ii) Section 7 (3);
iii) Section 51 (1) (g);
iv) Section 66 (6) and (7).

Should you wish to liaise with myself to discuss these recommendations, please do not hesitate to contact my office.

With kind regards

Alec Erwin
MINISTER: TRADE AND INDUSTRY

27/8/2000

MINISTRY: TRADE AND INDUSTRY
REPUBLIC OF SOUTH AFRICA
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Dr G Garrett
President
Council for Scientific and Industrial Research
P O Box 395
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0001

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Dear Geoff

2000 -10- 02

PUBLIC FINANCE MANAGEMENT ACT

With reference to numerous discussions between the CSIR staff and officials of this Department, you are hereby advised that, after careful consideration, and due to the nature of the activities undertaken by the CSIR the latter is hereby with retrospective effect from 1 April 2000 exempted from Section 54(2)of the Public Finance Management Act.

I trust that this exemption will assist the CSIR to achieve its goals.

With kind regards

Alec Erwin, MP
MINISTER IF TRADE AND INDUSTRY

GESERTIFISEER 'N WARE AFSKRIF
VAN DIE OORSPRONKLIKE
CERTIFIED A TRUE COPY OF THE ORIGINAL
E.H LOMBARD
KOMMISSARIS VAN EDE / COMMISSIONER OF OATHS
EX OFFICIO
REGSADVISEUR / LEGAL ADVISOR
WNNR/CSIR
PRETORIA
30/5/2006

No. 504

8 June 2001

PUBLIC FINANCE MANAGEMENT ACT, 1999
RE-CLASSIFICATION OF PUBLIC ENTITIES

I, TREVOR ANDREW MANUEL, MINISTER OF FINANCE, acting in terms of Section 48 of the Public Finance Management Act, 1999 (Act No 1 of 1999), hereby determine the re-classification of public entities as indicated in the schedule below. The classification will be immediately effective.

MINISTER OF FINANCE
Date: 23 05 01

SCHEDULE

Mintek	From Schedule 3A	To Schedule 3B
CSIR	From Schedule 3A	To Schedule 3B
SABS	From Schedule 3A	To Schedule 3B

MINISTER: FINANCE
REPUBLIC OF SOUTH AFRICA

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Ref. M3/4/3/1 (684/14)

Mr DA Hanekom, MP
Minister of Science and Technology
Private Bag X727
PRETORIA
0001

Dear Derreck,

EXEMPTION FROM THE NATIONAL TREASURY REGULATION 16 FOR THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR)

The National Treasury received a letter dated 14 October 2013 from the Department of Science and Technology requesting exemption from Treasury Regulation 16 on behalf of the CSIR.

I hereby confirm that the granting of a right to private parties for usage of the Intellectual Property of the CSIR, falls within the definition of Public Private Partnership (PPP) under Regulation 16 of the Public Finance Management Act, 1999 (Act 1 of 1999), (PFMA) ("Regulation 16").

Although granting of the right by the CSIR to private parties for usage of CSIR Intellectual Property falls within the definition of Public Private Partnership (PPP) under Regulation 16, we believe that it is appropriate to exempt the CSIR from the application of Treasury Regulation 16 for a period of 10 (ten) years as requested from the signature date. The exemption is subject to the institution submitting an annual report in a format and date to be communicated to the Department.

In accordance with Regulation 16.10 of the PFMA, the CSIR is hereby exempted from the provisions of Treasury Regulation 16. However, this exemption does not preclude the CSIR from complying with the provisions of the PFMA or section 217 of the Constitution of the Republic of South Africa.

Kind regards

Pravin

PRAVIN J GORDHAN
MINISTER OF FINANCE
Date: 25-4-2014

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