

2. REPORT OF THE PORTFOLIO COMMITTEE ON HIGHER EDUCATION, SCIENCE AND INNOVATION ON BUDGET VOTE 35: SCIENCE AND INNOVATION (2022/23), DATED 13 MAY 2022.

The Portfolio Committee on Higher Education, Science and Innovation, having considered Budget Vote 35: Science and Innovation, the revised 2020-2025 Strategic Plans and 2022/23 Annual Performance Plans of the Department of Science and Innovation and selected entities, reports as follows:

1. INTRODUCTION

The Constitution of the Republic of South Africa, 1996 and the Rules of Parliament mandates the Portfolio Committee on Higher Education, Science and Innovation (hereafter, the Committee) to oversee the activities and performance of the Department of Science and Innovation (hereafter, the Department or DSI) and the entities that report to it. Hence, the Committee annually reviews whether the Department and entities' performance plans are aligned to national strategic objectives and the appropriated budget.

The Department, National Advisory Council on Innovation (NACI) and the Technology Innovation Agency (TIA) briefed the Committee on 22 April 2022. The Academy of Science of South Africa (ASSAf), South African Council for Natural Scientific Professions (SACNASP) and the South African National Space Agency (SANSA) briefed the Committee on 6 May 2022. These briefings provided the Committee with an overview of the strategic context within which the Department and these entities function, their achievements against strategic objectives, the 2022/23 performance indicators and their concomitant targets and the 2022/23 budget allocations.

2. STRATEGIC OVERVIEW OF THE DEPARTMENT OF SCIENCE AND INNOVATION

2.1. National Development Plan and the 2019-2024 Medium Term Strategic Framework

The National Development Plan (NDP) characterises science, technology and innovation (STI) as crucial for development since countries that have effectively alleviated poverty by growing their economies, have done so by investing in and developing strong STI environments and capabilities. Hence, the NDP states that South Africa's National System of Innovation (NSI) needs to be expanded as well as be more effective

and, therefore, be aligned with the sectors that will realise the country's growth objectives. This requires that:

- South Africa invests more in research and development (R&D);
- The STI institutional arrangement improves the link between innovation and the productive needs of industry;
- Government should collaborate with the private sector to raise the level of research, development and innovation (RDI) in companies; and
- Public investments in research infrastructure should be focussed on and fulfil the needs of a modern economy.

The NDP proposes a phased approach to embed the contribution of STI to economic growth. The first phase (2012-2017) focused on intensifying R&D spending and emphasising opportunities linked to existing and emerging industries. The second phase (2018-2023) is focused on laying the foundations for more intensive improvements in productivity, where innovation across state, business and social sectors starts to become pervasive. The third phase (2024-2030) will focus on consolidating the gains of the second phase with greater emphasis on innovation, improved productivity, more intensive pursuit of a knowledge economy and better exploitation of comparative and competitive advantages in an integrated continent.

The 2019-2024 Medium Term Strategic Framework (MTSF), representing the second five-year phase of implementation for the NDP, aims to address the national challenges through three pillars; namely, achieving a more capable state; driving a strong and inclusive economy; and building and strengthening the capabilities of South Africans. These three pillars underpin the seven priorities of the 2019-2024 MTSF. Although the apex priorities are all interrelated, the Department's focus and commitments are mainly on Priority 2 (Economic transformation and job creation) and Priority 3 (Education, skills and health).

2.2. 2019 White Paper on Science, Technology and Innovation

The 2019 White Paper on Science, Technology and Innovation now sets the current long-term policy direction for the NSI and seeks to ensure an increasing role for STI to accelerate inclusive economic growth, increase the competitiveness of the economy and improve the livelihoods of South Africa's citizens.

The 2019 White Paper hinges on three high-level goals; namely to, take advantage of opportunities presented by megatrends and technological change; expand policy approaches that have worked and propose new approaches, where necessary; and promote a more inclusive economy at all levels. These goals are underpinned by the following objectives:

- Adopt a whole-of-government/society approach to innovation;
- Instil a culture of valuing STI, and integrate STI into government planning and budgeting at the highest levels;
- Create an enabling and inclusive governance environment;
- Create a more innovation-enabling environment;
- Increase and transform NSI human capabilities;
- Expand and transform the research system;
- Expand and transform the institutional landscape; and
- Increase funding and funding efficiencies.

The 2021-2031 STI Decadal Plan will serve as the implementation plan for the 2019 White Paper. Cabinet approved the Draft STI Decadal Plan on 24 March 2021. To realise the potential contribution of innovation to South Africa's socio-economic ambitions, the Decadal Plan prioritises a suite of systemic enablers such as (i) increased funding, (ii) joint programming and coordination, (iii) high level and technical skills for the economy, (iv) transdisciplinary knowledge creation, (v) increased linkages between government and business, and (vi) improved monitoring and evaluation. The Department hopes to finalise the Decadal Plan by mid-year 2022.

2.3. Economic Reconstruction and Recovery Plan

The COVID-19 pandemic presents an opportunity to address long-term structural deficiencies in the South African economy and place the economy on a new path to growth and job creation. The South African Economic Reconstruction and Recovery Plan (ERRP) aims to forge this new growth path, which will rely on the massive rollout of infrastructure; a new paradigm for energy; an employment stimulus to create jobs and support livelihoods; renewed support to grow South African businesses; and fast-track reform measures for a competitive and inclusive economy.

Science, technology and innovation is central to building this new economy, and the Department through its six 2020-2025 Strategic Outcomes comprehensively supports the priority areas of the ERRP. In this regard, continued long-term investment in RDI in South Africa over the years will be leveraged to contribute to economic reconstruction and recovery in three areas. Namely:

- RDI to revitalise and modernise existing industries/sectors;
- RDI that creates new sources of growth and stimulates R&D-led industrial development; and
- RDI in support of a capable and developmental state.

The key sectors that will be supported, mainly through supporting sector master plans, include agriculture, mining and minerals beneficiation, and manufacturing.

2.4. 2020-2025 Strategic Plan of the Department of Science and Innovation

The Department, building on the successes of the previous 5-year period and to ensure that the NSI expands its positive impact on reducing poverty, inequality and unemployment as envisioned by the 2019 White Paper, identified six Strategic Outcomes for the period 2020-2025. The Department tabled a revised 2020-2025 Strategic Plan that is underpinned and informed by the prevailing policy and environmental context that includes the key interventions advanced by the Decadal Plan, the revised 2019-2024 MTSF, the continued need to support the national response to COVID-19, the Department's contribution to the ERRP, and the confirmed and projected cuts to fiscal resources announced by National Treasury. As a result, the Department's overall number of 5-year targets was reduced from 24 to 20.

The 2020-2025 five-year targets that *fall away* are:

Outcome 3: Increased knowledge generation and innovation output

- Percentage increase in patent applications and design applications filed from publicly financed R&D, where targets were set for both patents (50% increase on a baseline of 799 patents) and designs (60% increase on a baseline of 30 designs).

Outcome 6: Innovation in support of a capable and development state

- Increase in the number of use cases of decision support systems (75 use cases on a baseline of 41). Decision support systems include methodologies, models and tools to support evidence-informed decision-making.
- Evidence informed integration of innovation in service delivery (five (5), new indicator). Evidence informed integration of innovation in service delivery draws from demonstrator projects and science-for-policy initiatives. The evidence is key in providing approaches/models to harness innovation in service delivery and as such, can facilitate and support policy changes, service delivery implementation models, etc.

Table 1: The 2020-2025 five-year targets that were amended are:

Outcome	Original Indicator	Original 5-year Target	Revised Indicator	Revised 5-year Target
Outcome 4: Knowledge utilisation for economic development in (a) revitalising existing industries	Percentage increase in SMMEs/co-ops whose performance has improved or who have secured new opportunities through support provided by the DSI and entities	5% increase (175 in number) on an unverified estimate of 3 500	Percentage investment in SMMEs/co-operatives/ start-ups to secure new opportunities through support provided by the DSI and its entities	3% increase (84 in number) on a verified estimate of 2 800
	Percentage increase in the commercialisation of granted intellectual property (IP) rights from publicly financed R&D	100% increase on a baseline of 28	Number of new commercialised disclosures from publicly financed research and development	75 and listed as a new indicator; hence, no baseline is available. This target has increased since 100% of 28 is 56.
Outcome 5: Knowledge utilisation for inclusive development	Grassroots innovations whose commercialisation has been facilitated by the support/access of the multi-tiered support package provided by the DSI and its entities	500, from a baseline of 100	Number of grassroots innovations whose commercialisation has been facilitated by the support/access of the multi-tiered support package provided by the DSI and its entities	Reduced to 180 from a baseline of 100
	Publicly financed IP made available in support of grassroots innovators	50 and listed as a new indicator; hence, no baseline is available	Number of grassroots innovators provided access to publicly financed IP (innovative solutions	Increased to 250 and listed as a new indicator; hence, no baseline is available

Outcome	Original Indicator	Original 5-year Target	Revised Indicator	Revised 5-year Target
			and/or patents, rights, and designs) by the DSI	

Hence, the revised six Strategic Outcomes are:

Outcome 1: A transformed, inclusive, responsive and coherent NSI

The four outcome indicators against which performance will be measured are:

- i) Number of formalised partnerships between different category actors of the NSI that advance Decadal Plan priorities;
- ii) Number of missions introduced and adopted by Cabinet that crowd in resources and capabilities across the NSI;
- iii) Percentage of STI investment support by government, domestic business, non-governmental sector and foreign/international sources that advances gross expenditure on R&D (GERD) towards 1.1% of GDP; and
- iv) Number of approved strategies that give effect to the agreed dimensions of transformation to be effected in the NSI.

Outcome 2: Human capabilities and skills for the economy and for development

The five outcome indicators against which performance will be measured are:

- i) Number of Department-funded PhDs graduating annually as a contribution to the NDP target of 100 PhDs per million population by 2030;
- ii) Number of artisans and technicians absorbed into the economy in sectors where the Department has active programmes;
- iii) Percentage of women and black researchers in South Africa's research workforce;
- iv) Percentage of PhD-qualified staff in higher education research and academic workforce; and
- v) Improved knowledge about science among the public.

Outcome 3: Increase knowledge generation and innovation output

The two outcome indicators against which performance will be measured are:

- i) Percentage of South Africa's share of global publication outputs; and

- ii) Percentage of prototypes, technology demonstrators and pilot plants that advance industrialisation through innovation.

Outcome 4: Knowledge utilisation for economic development in (a) revitalising existing industries and (b) stimulating R&D-led industrial development

The four outcome indicators against which performance will be measured are:

- i) Rand value of RDI investment attracted to support RDI needs identified through the sectoral masterplans process;
- ii) Percentage investment in Small, Medium and Micros Enterprises (SMMEs), Co-operatives or Start-ups to secure new opportunities through support provided by the Department and its entities;
- iii) Number of new commercialised disclosures from publicly financed research and development R&D; and
- iv) Number of new R&D-led industrial development opportunities initiated by the Department.

Outcome 5: Knowledge utilisation for inclusive development

The two outcome indicators against which performance will be measured are:

- i) Number of grassroots innovations whose commercialisation has been facilitated by the support/access of the multi-tiered support package provided by the Department and its entities; and
- ii) Number of publicly financed IP made available (accessible) in support of grassroots innovators.

Outcome 6: Innovation in support of a capable and development state

The two outcome indicators against which performance will be measured are:

- i) Number of demonstrators that have successfully introduced a new way of delivering a service; and
- ii) Number of districts/metropolitan municipalities supported with technology-based applications as part of the District Development Model for Service Delivery Improvement.

3. VOTE 35: SCIENCE AND INNOVATION (2022/23)

In his weekly newsletter in January 2022, the President stated that science and technology have a key role to play in the country's economic recovery; in attracting greater levels of investment; and in contributing to skills, knowledge and technology transfer to capacitate the country's workforce. The President further stated that investment in STI to revitalise and modernise existing industries, as well as create new sources of growth

and stimulate industrialisation is therefore being prioritised. In the 2022 State of the Nation Address (SONA), the President stated that the overriding priorities of 2021 remain. These are (i) overcoming the coronavirus pandemic, (ii) the massive rollout of infrastructure, (iii) a substantial increase in local production, (iv) an employment stimulus to create jobs and support livelihoods and (v) the rapid expansion of energy generation capacity. In relation to the challenges facing the country, STI is central to finding solutions to most of these and the President enumerated a number of examples. For instance, the strides made through the Hydrogen South Africa Strategy to position the country within the global hydrogen economy; the development of local capability in vaccine and ventilator production; and the technical expertise developed in agro-processing and renewable energy.

The 2022/23 consolidated government expenditure for innovation, science and technology is R18.1 billion (R17.3 billion in 2021/22, revised estimate), which is 1% of the total Medium Term Expenditure Framework (MTEF) allocation and 8% of the consolidated economic development expenditure of R227.1 billion.

Over the medium-term, the Department will focus on developing human capital, ensuring the effective use of publicly funded intellectual property, implementing the national space strategy, and implementing the national integrated cyberinfrastructure system (NICIS). The Department's allocation, over the medium term, is expected to increase at an average annual rate of 2.4%, from R9 billion in 2021/22 to R9.7 billion in 2024/25. Transfers to entities account for an estimated 93.7% (R26.3 billion) of the Department's expenditure over the MTEF period. The Department's second-largest cost driver is compensation of employees, where spending is set to increase at an average annual rate of 1%, from R363.3 million in 2021/22 to R374.5 million in 2024/25.

The Research and Development Tax Incentive will be extended in its current form until 31 December 2023 to allow for certainty and planning while National Treasury continues its stakeholder engagement process during 2022 on the future continuation of the incentive. The extension and potential amendments are included in the 2022 Taxation Laws Amendment Bill.

3.1. 2022/23 Budget Allocation to Vote 35: Science and Innovation

The Department's 2022/23 budget allocation increases nominally by R127.7 million from R9 billion in the 2021/22 financial year to **R9.1 billion** (Table 2). This represents, when adjusted for inflation, a real *decrease*

of **2.95%** (real increase of 17.8% realised in 2021/22). In terms of economic classification, the apportionment of the Department's 2022/23 budget allocation of R9.1 billion remains the same as in previous years. Hence, the budget allocation comprises Current payments of R577.6 million (6.3% of total allocation and R569.3 million in 2021/22), Transfers and subsidies of R8.6 billion (94.5% of total allocation and R8.4 billion in 2021/22), and Payments for capital assets of R3 million (0.03% of total allocation and unchanged from 2021/22).

Notable changes in the 2022/23 budget allocation to Transfers and subsidies include:

Transfers and subsidies to Departmental agencies and accounts (current payments):

- The allocation for Innovation projects research increases from R402.4 million to R519.4 million.
- The allocation for Space science research from the Economic Competitiveness and Support Package (ECSP) decreases from R63.3 million to R33.3 million.
- The allocation to various institutions for Astronomy R&D increases from R25.6 million to R41.7 million.
- The allocation to various institutions for Strategic science platforms for R&D increases from R170.2 million to R241.3 million.
- The allocation to various institutions for Innovative R&D decreases from R77.2 million to R49.6 million.
- The allocation to various institutions for Environmental innovation decreases from R87.7 million to R34.2 million.

Transfers and subsidies to Departmental agencies and accounts (capital payments):

- The allocation to various institutions for Infrastructure projects for R&D increases from R758.3 million to R861.6 million.
- The allocation to the National Research Foundation (NRF): Square Kilometre Array Capital contribution to research decreases from R1 billion to R830.2 million.

Transfers and subsidies to Non-profit institutions (current payments):

- The allocation to various institutions for Health innovation research decreases from R87.5 million to R54.9 million.

Table 2: Budget summary of the Department of Science and Innovation

Programme	2021/22 Adjusted appropriation (R' million)	2022/23 Budget allocation (R' million)	Percentage of total budget	Nominal percentage change in 2021/22	Real percentage change in 2022/23 (inflation- adjusted)	Number of performance targets
1. Administration	334.7	335.1	3.7	0.1	-4.2	5
2. Technology Innovation	1 705.3	1 784.1	19.5	4.6	0.1	18
3. International Cooperation and Resources	144.4	149.9	1.6	3.8	-0.7	9
4. Research, Development and Support	4 995.6	5 105.0	55.9	2.2	-2.2	14
5. Socioeconomic Innovation Partnerships	1 825.6	1 759.2	19.3	-3.6	-7.8	10
Total	9 005.6	9 133.3	100%	1.4%	-2.95%	56

The Department's budget funds five programmes, namely:

- Programme 1 – Administration
- Programme 2 – Technology Innovation
- Programme 3 – International Cooperation and Resources
- Programme 4 – Research, Development and Support
- Programme 5 – Socio-economic Innovation Partnerships

These programmes fulfil the Department's mandate of realising the full potential of STI in social and economic development. The percentage budget allocation to the Programmes remains essentially the same as in previous financial years and Programmes 2, 4 and 5 that are responsible for the Transfers to the Department's entities, receive 94.7% of the Department's total budget allocation.

For 2022/23, the Department has translated its planned performance into 56 performance indicators and targets.

3.1.1. Programme 1: Administration

Programme 1 provides strategic leadership, management and support services to the Department and is responsible for five of the Department's 2022/23 performance targets. Programme 1 supports two of the six departmental outcomes, namely, a transformed, inclusive, responsive and coherent NSI, and innovation in support of a capable and developmental state. It has four sub-programmes; namely, Ministry, Institutional Planning and Support (IPS), Corporate Services (CS) and Office Accommodation.

Programme 1's R335.1 million represents, when adjusted for inflation, a real decrease of 4.2%. The allocation will mainly be spent on salaries (R172.7 million) and on Goods and services (R143.7). The sub-programmes, IPS and CS, being responsible for strategic and operational planning, management, monitoring and evaluation, receive the bulk of Programme's 1 allocation. Notable budget allocations under Goods and services include R15.9 million for Consultants, and R36.8 million for Travel and subsistence. Programme 1 administers and funds the operations of NACI and transfers R15.7 million to Non-profit institutions for Institutional and programme support research.

The Department has a total staff establishment of 382, with 114 staff members holding a Master's degree and 22 staff members holding a PhD degree. As at 30 September 2021, the Department had a vacancy rate of 23.3%, of which 17.4% is at the senior management level. The Department aims to have 94% of all approved and funded prioritised posts filled by 31 March 2023. Approximately 53% of the Department's staff is employed in Programme 1.

Because of the policy shift proposed by the STI White Paper and Decadal Plan, as well as the high vacancy rate, the Department is advancing a structural review of the current 2014 approved organisational structure over the medium term.

3.1.2. Programme 2: Technology Innovation

Programme 2 enables R&D in space science and technology (S&T), energy security, the bioeconomy, and in the areas of nanotechnology, robotics, photonics and indigenous knowledge systems (IKS), and promotes the realisation of commercial products, processes and services from these R&D initiatives. In addition, through the implementation of enabling policies and interventions along the entire innovation value chain, promotes the protection and utilisation of IP, technology transfer and technology commercialisation. It is responsible for 18 of the Department's 2022/23 performance targets. Programme 2 supports five of the six

departmental outcomes, namely, (i) A transformed, inclusive, responsive and coherent NSI; (ii) Human capabilities and skills for the economy and for development; (iii) Increased knowledge generation and innovation output; (iv) Knowledge utilisation for economic development in (a) revitalising existing industries and (b) stimulating R&D-led industrial development; and (v) Knowledge utilisation for inclusive development. Programme 2 has five sub-programmes and one specialised service delivery unit (SSDU). These are Space Science, Hydrogen and Energy, Bioinnovation, Innovation Priorities and Instruments (IPI), the Office of the Deputy Director-General (DDG), and the National Intellectual Property Management Office (NIPMO).

Programme 2 receives R1.78 billion of the Department's total allocation. The IPI sub-programme that supports and strengthens the policy initiatives that aim to create and sustain an enabling environment for innovation, technology development and the commercialisation of products from publicly funded R&D, continues to receive the largest share of Programme 2's budget. In addition, it is the only sub-programme to receive a real increase to its allocation, growing in real terms by 9.4% (46.7% real increase in 2021/22 and 35.3% in 2020/21 before the two budget adjustments). The allocations to the Space Science and NIPMO sub-programmes decrease, with Space Science receiving R69.7 million less than in 2021/22.

Approximately 96% (R1.7 billion) of Programme 2's budget is allocated to Transfers and subsidies, with the TIA and SANSA receiving R458.4 million (R447.7 million in 2021/22) and R162.4 million (R202.2 million in 2021/22), respectively. Space science research is also allocated R33.3 million from the Economic Competitiveness and Support Package (ECSP). The stated emphasis on innovation reflects in a transfer to Departmental agencies: Various institutions for *Innovation projects research* amounting to R1.6 billion over the medium term, with the 2022/23 allocation being R519.4 million; a significant increase from the 2020/21 allocation of R125 million and a further significant increase from the 2019/20 allocation of R14.9 million.

Strategic policy initiatives that will receive specific attention over the medium term include continuing the work to establish the Innovation Fund, which will support the commercialisation of locally developed IP. In addition, the Intellectual Property Rights from Publicly Financed Research and Development Act (IPR Act) will be amended.

New performance indicators introduced from 2022/23 include:

- 15 University of Technology (UoT) and Technical and Vocational Education and Training (TVET) college graduates offered experiential learning opportunities in the energy sector by 31 March 2023.
- 40 unemployed youth supported under the Technology Top 100 (TT100) Learnership/Internship Programme by 31 March 2023.
- 1 000 youth engaged through outreach, awareness and training programmes in space science by 31 March 2023.

3.1.3. Programme 3: International Cooperation and Resources

Programme 3 supports South Africa's foreign policy through science diplomacy. Hence, it develops, promotes and manages international relationships, opportunities and S&T agreements that both strengthen the NSI and enable an exchange of knowledge, capacity and resources between South Africa and its international partners, with a focus on supporting STI capacity building in Africa. It is responsible for nine of the Department's 2022/23 performance targets. Programme 3 has four sub-programmes; namely, Multilateral Cooperation and Africa, International Resources, Overseas Bilateral Cooperation and the Office of the DDG.

Programme 3 receives R149.9 million of the Department's total allocation and the percentage distribution of the allocation between sub-programmes stays the same as in previous financial years. The allocation to Multilateral Cooperation and Africa increases in real terms by 7%. Whereas, the other sub-programmes all receive below inflation increases. Transfers and subsidies amount to R76.4 (R74.5 million in 2021/22), comprising R17.1 million for the NRF, who manages Bilateral cooperation for global science development agreements on behalf of the Department; R48.6 million for Non-profit institutions for Global science: International multilateral agreements and R10.8 million for Global science: African multilateral agreements. The latter two transfers to Non-profit institutions have increased significantly from 2020/21 levels, where International multilaterals received approximately R5.1 million and African multilaterals received R200 000.

3.1.4. Programme 4: Research, Development and Support

Programme 4 seeks to provide an enabling environment for research and knowledge production that promotes the strategic development of basic sciences and priority science areas through science promotion, human capital development and the provision of research infrastructure and relevant research support, in

pursuit of South Africa's transition to a knowledge economy. It is responsible for 14 of the Department's 2022/23 performance targets. Programme 4 has five sub-programmes; namely, Human Capital and Science Promotions, Science Missions, Basic Science and Infrastructure, Astronomy and the Office of the DDG.

Programme 4 is allocated R5.1 billion of the Department's total allocation. The increase in Programme 4's budget, once adjusted for inflation, represents a real decrease of 2.2%. The significant increase in the allocation to Basic Science and Infrastructure is driven largely by the ongoing development of the NICIS that will enable the successful and sustainable implementation of national projects such as MeerKAT and the Square Kilometre Array. To this end, R3.7 billion is allocated over the medium term to this sub-programme.

In terms of economic classification, Transfers and subsidies constitute 98.9% (R5 billion) of Programme 4's total budget with ASSAf, the NRF and the Council for Scientific and Industrial Research (CSIR) receiving R33.8 million, R3.5 billion and R281.8 million, respectively. Of concern, is the decrease in allocation, from R1 billion to R833.7 million to the Astronomy sub-programme. The Committee learnt in January 2022 during its oversight visit to the Northern Cape that the Square Kilometre Array has an approximate R2 billion funding shortfall over the medium-term.

Strategic initiatives that will receive specific attention include developing a policy framework for the establishment of a South African Research Cloud in line with the National Open Science Policy; implementing the new Transformation and Postgraduate Funding Policies; implementing the reporting framework on postgraduate support across all DSI programmes; undertaking a consultative process for the development of an Astro-Tourism Strategy; and reviewing the astronomy institutional landscape with a view to establishing an Astronomy Institute.

New performance indicators introduced from 2022/23 include:

- 300 emerging researchers awarded research grants as reflected in the NRF project reports by 31 March 2023.
- 200 black and female emerging researchers awarded research grants as reflected in the NRF project reports by 31 March 2023.

3.1.5. Programme 5: Socio-Economic Innovation Partnerships

Programme 5 seeks to enhance the growth and development priorities of government through targeted STI interventions and the development of strategic partnerships with all levels of government, industry, research institutions and communities. It is responsible for 10 of the Department's 2022/23 performance targets. Programme 5 has five sub-programmes; namely, Sector Innovation and Green Economy, Innovation for Inclusive Development, Science and Technology Investment, Technology Localisation, Beneficiation and Advanced Manufacturing, and the Office of the DDG.

Programme 5 receives R1.76 billion of the Department's total budget allocation, and is the only Programme that receives less than its 2021/22 allocation, which decreases by 7.8% in real terms. The allocation to all the sub-programmes decreases. This is due to the withdrawal of the funding from the ECSP. Approximately 96.8% (R1.7 billion) of Programme 5's budget is allocated to Transfers and subsidies, with the Human Sciences Research Council (HSRC) and CSIR receiving R336.7 million and R1.07 billion, respectively.

4. ENTITIES OF THE DEPARTMENT OF SCIENCE AND INNOVATION

The entities are funded through a Parliamentary grant, specific project and/or contract funds, or from income generated from research and commissioned projects, or from income generated from royalty, publishing, membership, registration and/or facility fees. The Parliamentary grant (also called the baseline allocation) is the guaranteed, annual allocation from the Department to its entities.

4.1. Academy of Science of South Africa (ASSAf)

4.1.1. Mandate and Strategic Focus

The Academy of Science of South Africa, the country's official national academy of science, was established through the ASSAf Act (No. 67 of 2001). ASSAf represents the country in the international community of science academies. The Academy has a dual mandate; namely, to promote outstanding achievement in all fields of scientific enquiry and to honour distinguished scholars through election to Membership of the Academy; and to undertake studies on matters of public interest to provide evidence-based scientific advice to government and other stakeholders.

ASSAf's 2020-2025 Strategic Plan seeks to advance the following three core national thematic priority areas:

- Policy for science - Advancing the objectives of the 2019 White Paper on Science, Technology and Innovation (STI) and the 2019-2024 Medium Term Strategic Framework (MTSF) in support of the DSI's mandate;
- Science for policy - Promoting the advancement of evidence-based research related to national priorities, including the deliverables of the Sustainable Development Goals (SDGs); and
- Science for society - Science engagement and science communication.

4.1.2. Organisational environment

ASSAf is governed by a Council, comprising 12 elected members and a thirteenth member appointed by the Minister of Higher Education, Science and Innovation as a representative of the National Advisory Council on Innovation (NACI), and presently has two advisors.

As a Membership-based organisation, the critical intellectual resources of the Academy reside in its Membership, which presently comprises of 633 Members (33% black and 29% female). Members and Council are supported in their science-advisory role by the fulltime staff of the ASSAf Secretariat, which currently numbers 29 individuals (62% black and 69% female) under the leadership of Prof Himla Soodyall as the Executive Officer (EO).

ASSAf is the host of the following organisations:

The World Academy of Sciences Sub-Saharan Africa Regional Partner (TWAS SAREP): ASSAf will continue to host TWAS SAREP to strengthen cooperation within Africa.

Organization for Women in Science in the Developing World (OWSD) South Africa National Chapter (OWSD SA): ASSAf has hosted the OWSD SA National Chapter since 2009. With budgetary cuts, ASSAf is unable to provide the services of its staff to support the operational activities of OWSD. The ASSAf EO, in an official communication sent on 16 September 2021, communicated this decision to their Executive.

South African Young Academy of Science (SAYAS): SAYAS celebrated its 10th anniversary in August 2021 and ASSAf continues to provide secretariat assistance and funding to support their activities. Where

possible, ASSAf ensures collaboration with SAYAS and includes their members in Working Groups and Standing Committees. Since July 2021, ASSAf is also providing secretariat support to SAGE (the Scientific Advisory Group on Emergencies).

South African Academy of Engineering (SAAE): Office space and support services are provided to the SAAE at no cost.

ASSAf's work is organised across four programmes; namely, the Science Advisory Programme (SAP), Scholarly Publishing Programme (SPP), Liaison Programme (LP), and the Administration and Governance Programme (AGP). Operations and resources are organised and conducted by the Administration and Governance Programme, which involves administrative, financial, human resources, communications and IT services, while ensuring support to Council and compliance to the Public Finance Management Act (PFMA) regulations. The objectives of the other three operational programmes are:

Science Advisory Programme (SAP) - aims to assist ASSAf in the fulfilment of its science advisory role in support of policy regarding key challenges facing the nation. A variety of relevant consensus studies is undertaken. Studies generally fall into broad categories related to: health, education, climate change, energy, the science-policy nexus, biosafety and biosecurity, poverty reduction, scholarly publishing and open science. In addition to evidence-based studies on various issues, ASSAf undertakes policy commentaries, proceedings, other reports, policymakers' booklets, and produces authoritative statements when appropriate.

Scholarly Publishing Programme (SPP) – the goal is to enhance national capacity to produce and publish research and to increase the quality and visibility of South African research publications. To achieve this goal, the SPP is responsible for the peer review of South African scholarly journals, the implementation of the open access platform for scholarly journals, the hosting of a National Scholarly Editors' Forum and a National Scholarly Book Publishers' Forum. A major thrust of this programme is the production and dissemination of the Academy's flagship journal, the South African Journal of Science (SAJS), and the science magazine, Quest.

Liaison Programme (LP) - ASSAf has a good record of accomplishment in establishing and strengthening strategic partnerships and engagements with key stakeholders and organisations in the country, regionally and internationally. Its primary purpose is also to promote and recognise excellence and scholarly

achievement, strengthening and enhancing international scientific linkages, and advancing engagement with key policymakers in government, including parliament and relevant national scientific organisations.

It must be noted that ASSAf continues to be accommodated in rented premises in Persequor Park, Lynnwood, Pretoria, the lease for which was renewed for an additional year in January 2022. The purchase or construction of a building remains a crucial imperative for ASSAf to become a physical landmark of scientific excellence as well as to avoid escalating rental costs and to cater for future expansion. A permanent Academy home is essential, given ASSAf's prestige, both nationally and internationally.

4.1.3. Performance

During 2020-25, ASSAf operationalises its activities around six strategic objectives that are outcome and output driven. These, as well as the number of performance targets for the 2022/23 financial year, are:

- **Outcome 1:** Independent, authoritative, and influential scientific advice (two performance targets)
- **Outcome 2:** Science engagement (four performance targets)
- **Outcome 3:** Mobilising knowledge (four performance targets)
- **Outcome 4:** Facilitating partnerships (one performance target)
- **Outcome 5:** Scholarship support (four performance targets)
- **Outcome 6:** Supporting transformation within the Science Advisory Programme (SAP), Scholarly Publishing Programme (SPP) and Liaison Programme (LP) – (two performance targets)

Encompassing the work across the four programmes are the key objectives of Transformation, Scholarship Support, and Science Engagement and Communication. The performance targets across the six strategic outcomes total 17 for the 2022/23 financial year.

4.1.4. Resources

Historically, ASSAf has been able to secure external funding to supplement its baseline income in support of some of its activities. However, the negative national and global economic outlook and the impact of

COVID-19 have placed high levels of uncertainty on the possibility of securing external funding. ASSAf's projected total revenue for 2022/23 is R36.2 million (R44 million in 2021/22). For the 2022 Medium Term Expenditure Framework (MTEF), the parliamentary grant (or baseline allocation) constitutes the main source of ASSAf funding at R33.8 million in 2022/23, R34 million in 2023/24 and R35.3 million in 2024/25. ASSAf's budget is apportioned across its activities as follows; where Governance is allocated R12.8 million (35%), Science engagement and partnerships is allocated R7.2 million (20%), Science advice is allocated R4.8 million (13%), and Scholarship support and transformation is allocated R11.4 million (32%).

4.1.5. Institutional Reviews

ASSAf's **second** Institutional Review for the period 2015 to 2020 is in progress. The synthesis report will provide an evaluation of the performance of ASSAf in terms of its mandate and its strategic objectives. Furthermore, views on possible gaps not addressed by the Academy in terms of the ASSAf Act within the National System of Innovation (NSI) will be highlighted and recommendations will be made regarding the future strategic direction and operational execution of the ASSAf mandate.

The **previous** ASSAf Institutional Review together with ongoing internal monitoring and evaluation of ASSAf's performance in achieving its objectives had shown that the following four areas deserve special attention by ASSAf. In its 2020-25 Strategic Plan, ASSAf listed some of the interventions to address these findings.

Increasing Membership engagement

Finding: Membership is fundamental in enabling ASSAf to achieve its purpose. The Membership needs to be actively engaged in the activities of ASSAf and have a say in what it does and how it is governed. It is noted that participation of the Membership is waning, and rigorous effort needs to go into creating a sense of belonging and a strong community spirit of dynamic and active Members who engage and share what they know. The Membership of ASSAf should reflect the various roles that it plays and should represent all areas of science and a broad range of Institutions. With respect to the latter, some disciplines are not well represented among the Membership and there is an uneven distribution of Members at institutions across the country with very few Members at historically disadvantaged universities.

Intervention/response: ASSAf has campaigned rigorously within its Membership, university research offices, Deputy-Vice Chancellors for Research, Faculty Deans, university communications departments, the

National Research Foundation (NRF) Centres of Excellence, South African Research Chairs, and other entities to nominate suitable candidates who satisfy the criteria for Membership. Effort will also be made to ensure ASSAf is more Membership-driven and that the Membership has an enabling environment to promote scholarship, learning and innovation.

Becoming more focused on objective and trustworthy evidence-based research addressing national and global priorities using the unique status of the academy

Finding: ASSAf, through its Membership, plays important value-adding roles in the evidence-based policymaking environment by facilitating interactions and dialogues between scientists and policymakers.

Intervention/response: While basing ASSAf's activities on its independence and within the scientific expertise of its Membership and other maintain its credibility and integrity.

Harnessing advocacy strategies on behalf of scientists and raising the profile of science in policymaking

Finding: There is a need for ASSAf to engage more actively in science advocacy work.

Intervention/response: ASSAf will apply itself to two policy-related categories of science advocacy: Policy for science and Science for policy. Policy for science will advocate on behalf of scientists', initiatives that promote the professional development of scientists to the promotion of enabling science infrastructure. Science for policy, on the other hand, seeks to inform policymakers about the relevant science on an issue they are considering and raising the profile of evidence-based policymaking.

Creating an enabling working environment which includes harnessing staff potential, building on skill sets that will take us into the technological era, and mobilising financial resources for activities

Finding: The overall success of ASSAf will depend, largely, on strengthened and skilled human resources that are fit for purpose, and adequate financial resources.

Intervention/response: ASSAf wishes to be viewed as a desirable place to work and will ensure its existing staff is motivated and have access to professional development opportunities. To ensure that the organisation remains sustainable, ASSAf will diversify its financial sources and develop a strong fundraising campaign.

4.2. National Advisory Council on Innovation (NACI)

4.2.1. Mandate and Strategic Focus

The National Council on Innovation Act (No. 55 of 1997) mandates NACI to advise the Minister of Higher Education, Science, and Innovation and, through the Minister, the Cabinet, on the role and contribution of science, mathematics, innovation, and technology, including indigenous technologies, in promoting and achieving national objectives. The ultimate aim of NACI's work is to improve and sustain the quality of life of all South Africans, develop human resources for science and technology, build the economy, and strengthen the country's competitiveness in the international arena.

The 2019 STI White Paper proposes the following for NACI:

- NACI will be reconfigured to act as the national STI monitoring and evaluation (M&E) institution, charged with analysing STI information and undertaking work to inform government planning on STI. NACI will convene a high-level forum to develop a framework of indicators to monitor South Africa's NSI performance.
- Government recognises that to support the Inter-Ministerial Committee on STI (IMC) in carrying out its mandate, ongoing stakeholder engagement is required in addition to an STI Plenary. NACI will be strengthened to facilitate such engagements, e.g. following up on matters discussed at the STI Plenary. Policy reports from relevant NSI institutions and think tanks, e.g. ASSAf, HSRC and the DSI-NRF Centres of Excellence, will also be used.
- The IMC will require expert studies, and up-to-date performance and environmental information to support its decisions. To advise the IMC, a strengthened NACI will undertake such studies.
- Knowledge management systems will be needed to enhance the analysis of NSI performance and support evaluation work that informs strategies. In this, NACI will draw on the work of existing specialist centres that collect STI-related information. Existing institutional arrangements for data collection (e.g. innovation and R&D surveys) will be maintained and strengthened and, where necessary, expanded.
- The Department, working with NACI, has developed a public STI investment framework to support the commitment of public resources for STI by the Ministerial STI Structure. NACI's role will be to undertake foresight studies and provide an independent STI M&E function (including regular analysis of public STI spending). The framework is based on an analysis of STI funding requirements in line with strategic and sovereign priorities, as well as consultation across government through an interdepartmental STI Budget Committee at the level of Director-General, including national and provincial governments with significant STI mandates. NACI will work with the Department, DPME

and National Treasury to ensure that the framework information is actionable and comparable in informing the management and funding of NSI initiatives.

The process to give effect to these proposals also provides an opportunity to address continuing problems at NACI, such as its structural location, secretariat capacity and efficacy as identified by various reviews, and to reposition NACI so that it can play a catalytic system-wide role in providing STI advice for sustainable socio-economic development in South Africa. NACI will therefore need to be reconfigured to carry out the functions set out in the 2019 STI White Paper. To implement these, the government will need to initiate a process to amend the NACI legislation. NACI will also conduct an international benchmarking with NACI type bodies, the outcome of which feeds into the reconfiguration of the system's institutional landscape and amendments to the NACI legislation.

The 2020-25 Strategic Plan of NACI identifies the following strategic outcomes:

- To learn from previous experience to improve efficacy and ensure evidence-based, informed, ***confidential***, and timely policy advice to the Minister of Higher Education, Science and Innovation and, through the Minister, the Cabinet.
Performance: NACI will produce and engage on three STI draft advice.
- To contribute to the building of NSI monitoring, evaluation, and learning capability, to assess the health of the NSI and its contribution to sustainable and inclusive development.
Performance: NACI will finalise three NSI M&E reports; ensure the ongoing maintenance and implementation of the National STI Information Portal (NSTIIP), and produce the Foresight Exercise Institutionalisation Plan.
- To contribute to the building of a well-coordinated, responsive, and effective NSI by exploring and proposing solutions to the long-standing STI policy questions of coordination, prioritisation, financing, size and shape, human resources, and knowledge production and diffusion.
Performance: NACI will update and implement a communication plan.
- To transform NACI into a smart, efficient, and learning organisation. This goal is intended to address current internal operational inefficiencies; enhance quality, turnaround times, knowledge management

and communication; and exploit the benefits of digitisation. Skills, knowledge and competency development will be critical.

Performance: NACI will implement the corporate governance system, and store all recorded meetings and transcripts in the knowledge management system.

4.2.2. Resources

To implement its advisory work programme, the NACI Secretariat supports the NACI Council. The Secretariat comprises 11 members, including the Acting Chief Executive Officer (CEO). In the 2021/22 financial year, two people were employed on fixed-term contracts to assist the team with their workload.

NACI is funded and administered within Programme 1 of the Department and its 2022/23 expenditure estimates for the total budget of R15.4 million, comprises R7.3 million for the compensation of employees and R8.1 million for goods and services.

4.3. South African Council for Natural Scientific Professions (SACNASP)

4.3.1. Mandate and Strategic Focus

The Natural Scientific Professions (NSP) Act (No. 27 of 2003) provides for the establishment of the South African Council for Natural Scientific Professions (SACNASP) and legislates the registration of professional natural scientists and technologists, and scientists- and technologists-in-training. The 2003 Act, which mandates compulsory registration, replaced the Natural Scientific Professions Act of 1993, which recommended voluntary registration. The key reasons for registering natural scientists are:

- These professionals provide a service to the public, and the public have a right to be protected from malpractice; and
- The profession should be protected by ensuring that acceptable standards of training, and proper conduct, are maintained.

Within the provisions of the 2003 NSP Act, some of SACNASP's key functions are to:

- Register natural scientists and voluntary associations, and formulate the necessary administrative systems (applications process, maintain register, determine fees) attendant to this function;
- Institute systems to protect the public and ensure the improvement of the standards of services provided by registered natural scientists;
- Advise Cabinet on any matter relating to the natural scientific professions;
- In consultation with the Council on Higher Education (CHE) and the South African Qualifications Authority (SAQA), ensure maintenance of acceptable standards of training;
- Undertake and encourage research related to natural scientific professions; and
- Ensure safe and responsible practice (towards the public and the environment) by registered natural scientists.

The Draft Amendment Bill to repeal and replace the current NSP Act is currently going through the necessary legislative processes. The latest version of the Bill, as approved by Council, was submitted to the DSI on 9 September 2021.

SACNASP will focus on the following areas as captured in its strategic objectives:

- ***To proactively advise government and relevant stakeholders on the contributions and role of the Natural Scientific Professions in South Africa.***

The focus here will be on tracking unemployed natural science graduates to gain insight into areas where the state can intervene and this report was presented to the DSI in September 2021. A third report titled, “*The skills and competencies required for the future natural scientists*” will assist government to align education to the requirements needed by scientists in the future. Other areas that need attention include the impact of big data, 4IR and the COVID-19 pandemic on natural science in South Africa. It is crucial that SACNASP investigates the greater involvement of natural scientists in the District Development Model and that it advises key stakeholders accordingly.

- ***To enforce high professional and ethical standards for the natural scientific workforce.***

SACNASP should ensure that it has an effective system to register and regulate natural science professionals in all sectors of the economy, including State-Owned Enterprises (SOEs). This will enhance SACNASP’s mandate regarding its regulatory function, reduce corruption, improve accountability and ethical practice and better protect the public.

- ***To promote the natural science professions and science engagement in South Africa.***

It is crucial for SACNASP to focus on public awareness campaigns and the active involvement of natural scientists and their Voluntary Associations (VAs) to offer specialist advice to district municipalities and local communities.

- ***To promote the professional development and transformation of the natural science sector in South Africa.***

SACNASP will achieve this strategic objective by creating an environment for lifelong learning for professionals. It will also emphasise transforming the natural science sector to increase the participation of designated groups and contribute to education qualifications and learning pathways for natural scientists.

- ***To foster a culture of good corporate governance.***

SACNASP will ensure compliance with legislative and policy frameworks by developing and implementing robust systems, identifying and managing all risks and internal controls, and offering training/awareness events for VAs and scientists in this area.

4.3.2. Organisational environment

The Minister of Higher Education, Science and Innovation inaugurated the new Council of SACNASP on 2 September 2021. Elected Chairperson, Prof Khathutshelo Agree Nephawe and Deputy Chairperson, Prof Vanessa Steenkamp lead the Council. The Council has been elected for a four-year term of office with effect from 1 September 2021 to 31 August 2025 in accordance with the NSP Act.

In terms of staff, 22 of the 25 staff members are female and the majority are from designated groups. Attracting skilled personnel remains a challenge for SACNASP and the Council needs to strengthen its staff complement with key skills in registration, regulation and marketing to realise its mandate and aspirations fully.

4.3.3. Performance

SACNASP's 2022/23 performance against its five strategic objectives is encapsulated in seven outcomes, namely:

- **Outcome 1:** Provide reports on relevant government policy matters – one performance target
- **Outcome 2:** Register and regulate natural science professionals – three performance targets
- **Outcome 3:** Facilitate public awareness to address national priorities by conducting awareness and engagement initiatives - one performance target
- **Outcome 4:** Create an environment for lifelong learning of professionals by implementing and facilitating an efficient and effective lifelong learning programme - one performance target
- **Outcome 5:** Transformation of the natural science sector by developing and implementing programmes to encourage participation of designated groups – two performance targets
- **Outcome 6:** Contribute to education qualifications and learning pathways for natural scientists by evaluating and endorsing higher education institutions programmes in natural science - one performance target
- **Outcome 7:** Comply with legislative and policy framework - one performance target

To assist natural scientists in their careers from student to retirement, SACNASP has developed three programmes; namely, the:

- Continuous Professional Development Programme that allows scientist to record their annual field-specific activities on the SACNASP website,
- Candidate Mentoring Programme where potential professional scientists are coupled with a mentor who will guide them from Candidate to Professional scientist, and
- Administrative Student Enrolment Programme that, at no cost, enrolls natural science students at higher education institutions on the SACNASP database to provide field-specific and general courses to these students to assist them in their studies.

4.3.4. Resources

SACNASP's key expenditure areas relate to registration, regulation and outreach activities, while it derives income from application and registration fees. In terms of income, the economic downturn over the last two years has resulted in some job losses in the scientific community. SACNASP has continued to experience

issues with registered scientists struggling to meet their annual obligation to pay registration fees. The non-payment of annual registration fees is of concern, since these fees are SACNASP's principal source of income.

SACNASP's projected income for 2022/23 from registration fees is approximately R20 million. Other income of R1.4 million and project funding from the DSI of R10 million supplement this. Project funding from the DSI was first allocated in 2019 over a three-year period until 2022 and amounted, in total, to R14.9 million. For 2022/23, the funding from the DSI, which has roughly been doubled, will continue to be used for the following projects:

- Promoting the Continuing Professional Development programme to enhance professional skills and knowledge;
- Maintenance and support of information and technology (IT);
- Implementation of the Candidate Mentoring Programme for young natural science graduates; and
- Regulation of the natural science profession.

4.3.5. Institutional Review

SACNASP has embarked on its first Institutional Review covering the period 2017 to 2021. This will be conducted in the 2022/23 financial year. A draft Terms of Reference (ToRs) has been compiled as the first step in this process. SACNASP has budgeted R789 000 for this process. The timeframe for the review is as follows:

Indicator	Target
Compilation and approval of ToRs	March 2022
Approval of ToRs by the DSI	April 2022
Compilation and approval of the Implementation Plan	July 2022
Establishment of the Review Panel	July 2022
Review Panel briefing by panel chair and SACNASP leadership	July 2022
Review Panel meeting and interviews	Q2/Q3 2022/23
Compilation of the Review Report	Q3 2022/23
Draft report submission and discussion by Council	Q4 2022/23
Final report and recommendations by March 2023	Q4 2022/23

4.4. South African National Space Agency (SANSA)

4.4.1. Mandate and Strategic Focus

The legislative mandate is premised on two primary Acts; namely, the Space Affairs Act (No. 84 of 1993) and the South African National Space Agency (SANSA) Act (No. 36 of 2008). The former, an instrument of the Department of Trade, Industry and Competition, caters for the regulatory/policy context for the South African space programme; whereas the latter, an instrument of the DSI, enables the establishment of SANSA as an implementing agency for the South African space programme. The National Space Strategy and the South African Earth Observation Systems (SAEOS) Strategy provide directives that directly inform the operationalisation of the South African space programme, inclusive of the role that SANSA should play.

The high standard of living in developed countries is largely attributed to the adoption and application of space-based technologies. This convenient lifestyle is supported by the instant access to information and space-based applications, such as the Global Positioning System (GPS) and global television coverage. While some of these products and services have helped to serve the social, economic, and environmental needs of the country, South Africa does not possess all the requisite capacity to address effectively all of the needs of the country. However, efforts are underway to build an indigenous space capability that will fully service the needs of the country and continent, and SANSA is central to these developments.

During the first eight years of SANSA's operations, its Annual Performance and Strategic Plans were aligned to the budgetary allocations made to it for both its internal business operations and broader support to the local space sector. This approach regarding budgetary allocations imposed limitations on SANSA's scope of initiatives.

With its revised 2020-2025 Strategic Plan, SANSA seeks to chart a new trajectory that will ensure that the South African space sector is able to develop and compete globally, while responding to the critical needs of its user community, primarily represented by all spheres of government. Hence, SANSA's key strategic priorities include:

- **Priority 1:** Develop a suite of space application products and services that directly respond to user needs and enable industry.

- **Priority 2:** The building of core space infrastructure, both ground and space based, that will enable the delivery of essential space services.
- **Priority 3:** The generation of space relevant knowledge that supports the developmental agenda.
- **Priority 4:** The development of requisite human capacity that is needed for the implementation of key space initiatives.
- **Priority 5:** The positioning of SANSA as a key enabler of government's policy imperatives.

4.4.2. Organisational environment

At the end of the 2020/21 financial year, SANSA had 193 employees in permanent employment, which grew to 203 by the end of March 2022. The vacancy rate at the end of the 2020/21 financial year was 32% and, while new positions have been approved and recruitment is underway, budgetary constraints to fill the vacant positions remain a concern. In addition to the permanent staff complement, SANSA has 36 non-permanent employees in its employ.

Over the period between 2011 and 2021, the percentage of the permanent staff complement that are males has declined from 61.1% to 56%, while the number of females has increased from 38.2% to 43.5%. The biggest underrepresentation of females is in the professional and skilled categories. This is due to the national challenge of insufficient specialised skills amongst employable females within the Science, Engineering and Technology (SET) job categories. Employment equity will remain at the forefront of SANSA's recruitment approach in the 2022/23 financial year, in line with available funding.

SANSA's Chief Executive Officer (CEO), Dr Valanthan Munsami, resigned in early 2022 and Ms Andiswa Mlisa, Managing Director: Earth Observation will act as CEO for the next six months (from March 2022).

4.4.3. Performance

SANSA has identified six key outcomes in its revised 2020-2025 Strategic Plan to move towards stimulating a capable and globally competitive South African space sector and these will be central to the implementation of the 2022/23 APP:

- **Outcome 1:** Increased space relevant knowledge that supports the developmental agenda – one performance target.
- **Outcome 2:** Stimulated and growing, inclusive space sector – one performance target.
- **Outcome 3:** Increased human capacity for the implementation of key space initiatives – two performance targets.
- **Outcome 4:** SANSA positioned as a key enabler for the implementation of government's space-related policies – five performance targets.
- **Outcome 5:** Enabling infrastructure developed and upgraded to support the space sector value chain – five performance targets.
- **Outcome 6:** Increased participation of the national space programme in the regional and global space market – three performance targets.

SANSA's work is structured across the following programmes:

Programme 1: Administration: provides management, administrative and technical support across all operating units. This facilitates operational efficiency and cost-effective management, aligned with sound governance principles and the seamless integration and collaboration between SANSA programmes.

Programme 2: Earth Observation [EO]: is responsible for the collection, processing, archiving and distribution of Earth observation data, value-added data products and services for societal benefit. SANSA maintains an Earth observation portfolio of sensors, provides an R&D platform, conducts satellite image processing and correction, and supports human capital development and science engagement in Earth observation that will be positioned for uptake in South Africa through the SAEOS initiative and in Africa through the African Group on Earth Observations (AfriGEO) initiative.

Programme 3: Space Science [SS]: leads multidisciplinary space science research and applications. Key functions include fundamental and applied space science research; the support of space facilitated science through data acquisition; the coordination and administration of scientific data; and the provision of space weather and magnetic technology products and services on a commercial and private basis. The programme also provides leadership in postgraduate student training, as well as providing science engagement, public engagement, and learner and educator support with STEM subjects.

Programme 4: Space Operations [SO]: is responsible for the acquisition of satellite data for the Earth Observation Programme and the provision of ground segment support. Through this programme, SANSA conducts various space operations, including launch and early-orbit support, in-orbit testing, satellite lifecycle support and satellite mission control for national and international space industry clients and governments.

Programme 5: Space Engineering [SE]: provides systems engineering and project management expertise and drives a satellite build programme in South Africa in partnership with primary contractors, R&D institutions, and private sector partners. The programme conducts satellite and subsystems analysis, leads the technical side of space programme project management, supports human capital development in space engineering and facilitates private space industry partnerships.

There are currently two thematic focus areas that are missing from SANSA's portfolio of activities; namely, satellite telecommunications and Global Navigation Satellite Services (GNSS). The revised 2020-2025 Strategic Plan attempts to establish programmes related to these thematic focus areas within SANSA and these are included under SANSA's aspirations that seek to chart a new trajectory, within its existing mandate, that will ensure that the South African space sector is able to develop and compete globally. Failure to adopt and implement these aspirations (additional activities), which are subject to the appropriate levels of funding being committed or secured, will result in the further stagnation of the local space sector. Consequently, the ability of the space sector to respond to the national and continental needs will remain suboptimal, thus affecting the quality of support provided for key decision-making platforms.

4.4.4. Resources

SANSA's projected budget for 2022/23 is R327 million, which is significantly less than the R558 million realised in 2021/22. A contributive factor to this decline in funding is that the allocation for Space science research from the Economic Competitiveness and Support Package (ECSP) decreases from R63.3 million to R33.3 million. The parliamentary grant amounts to R162.4 million (R202.2 million in 2021/22). External revenue will increase by 13% (R8.8 million) largely due to a 20% growth in foreign exchange income.

Should SANSA manage to secure the required funding for strategic projects, such as the Space Infrastructure Hub (SIH)¹ together with additional funds for the operationalisation of the Space Weather Centre, such funds will cater for project resources, including the required human resources. A key challenge encountered during the planning phase is that resources currently remain stretched, as the parliamentary grant is not adequate for project planning and implementation given that it primarily covers the Agency's operational costs.

Planned infrastructure projects for 2022/23 include:

Nº	PROJECT NAME	PROGRAMME	DESCRIPTION	OUTPUTS	START DATE	COMPLETION DATE	TOTAL ESTIMATED COST	CURRENT YEAR EXPENDITURE
1	Space Weather Services Project	Space Science	The building and equipping of a 24/7 operational space weather centre	A new Space Weather Centre building	1 April 2021	30 September 2022	R 20 million	R 8.8 million
2	Guest House accommodation	Space Science	The increase in accommodation on the Hermanus site	A new 4-bedroom guesthouse on the Hermanus campus	1 April 2021	30 October 2022	R4.8 million	R 0
3	Extension to Student Accommodation	Space Science	The building of a new wing on the existing student accommodation block	Increased capacity for student development	1 January 2022	31 December 2022	R 5 million	R 5 million
4	New 3.7 Antenna for Earth Observation Data	Space Operations	S&X band antenna	EO data for SA	1 October 2021	30 June 2022	R10 million	-
5	AIT Facility	Space Engineering	Development and upgrade of AIT facility	Infrastructure for the Industry	1 April 2021	31 March 2023	R72 million	R35 million
6	CDF Facility	Space Engineering	Development of a Concurrent Design Facility	Infrastructure for the Industry and the agency for mission planning	1 April 2020	31 March 2023	R18.16 million	R10.45 million

4.4.5. Institutional Review

In terms of the DSI Policy on Governance Standards for Science, Engineering and Technology Institutions (SETIs), institutional reviews of SETIs must be conducted every three to five years. This, however, has not

¹ The SIH is an ambitious and first of its kind National Space Programme for South Africa and Phase-1 will be implemented in the period up to 2025. The focus of this period is the specification, manufacture and launch of at least three spacecraft in support of the user requirement for the space value chain. The expected period to complete the manufacture of the spacecraft is eighteen months.

been the case for SANSA as it initiated its first institutional review since inception during the 2021/22 financial year, covering a ten-year period from 2011/12 to 2020/21.

The retrospective institutional review seeks to determine the relevance, efficiency, and effectiveness of SANSA and the progress made since its inception towards achieving its objectives and mandate as provided for in the SANSA Act. It further seeks to ascertain the strategic positioning of SANSA's programmes, taking into consideration the evolving global space landscape and whether SANSA is positioned optimally within this landscape. The prospective outlook, on the other hand, will provide recommendations to enhance the performance of SANSA and its future orientation.

As at the end of the third quarter of the 2021/22 financial period, SANSA, with support from the NRF, had concluded the appointment of the International Review Panel, with expertise in the areas of Earth Observation, Space Science, Space Operations and Satellite Engineering. The next steps, undertaken in the final quarter of the 2021/22 financial year, included panel engagements with identified key stakeholders, site visits (where feasible) and the reporting of evaluation outcomes and recommendations to SANSA's governance structures.

The Panel delivered the Institutional Review Draft Report Presentation to the management of both SANSA and the NRF on 29 March 2022. This presentation paved the way for the preparation of SANSA's management response, the submission of the final report to the SANSA Board and DSI, and project closure in the first quarter of the 2022/23 financial period.

4.5. Technology Innovation Agency (TIA)

4.5.1. Mandate and Strategic Focus

The Technology Innovation Agency was established through the TIA Act (No. 26 of 2008) and mandated to translate a greater proportion of publicly funded research into commercial technology products and services. Hence, TIA was established to promote the development and utilisation, in the public interest, of discoveries, inventions, innovations and improvements. The objective of TIA is to support the state in stimulating and intensifying technological innovation to improve economic growth and the quality of life for all South Africans.

The Technology Innovation Agency's 2020-2025 Strategic Plan seeks to reposition TIA within the NSI and rests on three pillars. Firstly, it seeks to direct a greater proportion of its resources towards the translation and commercialisation of publicly financed IP emanating from higher education institutions and science councils. Secondly, there is a specific focus on implementing the Bio-economy Strategy, thereby deriving greater socio-economic value from South Africa's unique biological resources, historical biotechnology investments and bio-based capabilities. Thirdly, TIA aims to foster an enabling environment for innovation, with a specific focus on driving transformation and ensuring inclusion through the provision of SET and enterprise development services. These three pillars are the basis of TIA's three outcomes over the five-year period:

- **Outcome 1:** Commercialised innovations
- **Outcome 2:** Delivering on the Bio-economy Strategy
- **Outcome 3:** SMMEs supported through strategically informed and regionally distributed Technology Stations

TIA has the following functions:

- Administration – responsible for six performance targets
- Commercialised Innovations Division – responsible for five performance targets
- Bio-economy Division – responsible for three performance targets
- Innovation Enabling Division – responsible for four performance targets

The Technology Innovation Agency estimates that its budget for 2022/23 will be R649.8 million, which comprises the Parliamentary grant of R458.4 million.

4.5.2. Institutional Review

The TIA Institutional Review commenced in November 2020 and the draft review report is due end-April 2022. The four-year term of office of the Technology TIA Board expired on 31 May 2021. The Minister extended the term of office by six months, until 31 October 2021. The Minister appointed the new Board with effect from 1 November 2021 to 31 October 2025 in accordance with section 5(1) of the Act. However, the Minister appointed the minimum number (seven) of members including the Chairperson of the Board

(Ms Modise) due to the TIA institutional review that was underway at that time. The Minister will appoint the full Board after the institutional review is finalised. The ongoing review processes has also delayed the appointment of a permanent CEO.

4.5.3. Historical issues

- TIA's financial sustainability remains a concern where an ideal budget for innovation project disbursements (as previously expressed by TIA) would be around R1 billion. The level of the current budget restricts TIA's risk appetite and by extension, the sectors in which it operates.
- TIA's Stakeholder satisfaction rate is very low due to internal operational inefficiencies and lack of responsiveness. With the 2022/23 APP, TIA sets out targets for turnaround times on three categories of investment decisions and has instituted a range of measures in an effort to improve efficiencies.
- TIA's translation mandate has not been fully exploited, with a low commercialisation rate and lack of strategic positioning in the NSI.
- Operationally, TIA has not been fully fit-for-purpose and has struggled to attract and retain the human capacity it needs to fulfil optimally its mandate.
- TIA has not successfully expanded its national footprint, and its investments are skewed towards the three most economically active provinces.

5. COMMITTEE OBSERVATIONS

In concluding its deliberations on Budget Vote 35: Science and Innovation, the Committee commended the Department and the entities for the work they do and for formulating coherent strategies and performance plans. Especially commendable, was that the deliverables that are enumerated in the Annual Performance Plans of the Department and the entities, comprehensively address what the President has outlined as national priorities. Furthermore, the Committee noted the following:

- 5.1.** The continued decline in funding (in real terms) for the DSI and its entities was of concern to the Committee because of the evident financial sustainability challenges and the negative impact this may have, not only on research and innovation output, but on the transformation of the STI sector as a whole.

- 5.2.** Throughout its engagements with the Department and entities, the Committee emphasised the need for greater and faster transformation to ensure inclusivity in the STI sector. The Committee notes that the transformation of the STI sector in terms of human capacity, organisational composition and the R&D focus areas requires deliberate, well considered, and adequately resourced interventions.
- 5.3.** Although, not at the pace that the Committee anticipated, the development and on-going discussions with its entities around the Department's Transformation Framework is acknowledged. The development of an inclusive research sector across all career levels and the future sustainability of the research cohort was a further area highlighted by the Committee.
- 5.4.** Crucial to the transformation of the human capacity in the STI sector, is the creation and continued growth of a pipeline of students pursuing careers in science, mathematics and engineering. Discussion around curricula involving the Departments of Basic Education, Higher Education and Training as well as Science and Innovation, is necessary to assess and input on how this contributes to what is required for the STI system, as well as the skills needed for the economy.
- 5.5.** The Committee notes that STI drive most daily activities. However, the Committee found that the work undertaken by the Department and its entities is not well communicated and in many instances completely unknown. Hence, the Committee is of the view that there is a lack of public science awareness, promotion and engagement.
- 5.6.** The Committee emphasised the use of indigenous languages as an important tool for building inclusion when it comes to promoting science and innovation, and getting ordinary people to understand and participate in science programmes.
- 5.7.** The Committee acknowledged the progress made with the implementation of the Protection, Promotion, Development and Management of Indigenous Knowledge Act and the development of its regulations, and further welcomed the official launch of the on-line Indigenous Knowledge Registration System.
- 5.8.** The Committee noted that the confirmed and projected cuts to fiscal resources announced by National Treasury has led to the Department tabling a revised 2020-2025 Strategic Plan and the amendment of certain performance indicators and targets.
- 5.9.** Notwithstanding the financial limitations, the Committee noted that the Department with its entities have shown that they can achieve a significant percentage of their performance

targets, as well as ensuring that they adhere to legislative prescripts in managing the allocations received from the public grant. However, of concern is that performance delivery has been structured around the budgets that were allocated and not according to all the responsibilities that they are mandated to fulfil. Another concern is that despite the acknowledged dearth of funding for STI, there is still a small degree of underexpenditure across programmes and projects.

- 5.10.** The Committee concluded that the STI mandate, which seeks to facilitate inclusive economic growth and socio-economic development, promote environmental sustainability, improve service delivery and government decision making and enhance the efficacy of institutions, cannot be fully implemented at the current levels of funding.
- 5.11.** The Committee noted that the successful implementation of the interventions of the Decadal Plan is premised on the collective action and financing of these interventions by all spheres of government.
- 5.12.** The Committee noted the progress made in relation to aligning the Department and entities' annual performance plans with that of the Decadal Plan.
- 5.13.** The Committee acknowledges the importance of intergovernmental coordination and partnerships that are instrumental in ensuring that the work done by the Department and the entities is used and implemented. Hence, the Committee welcomes the on-going internal consultations, particularly around funding responsibilities, which is now possible through the Decadal Plan and the establishment of the inter-Ministerial STI Committee.
- 5.14.** The Committee further notes that enhanced coordination is also necessary at Parliamentary level among the various Portfolio and Select Committees in instances where science and innovation is transversal.
- 5.15.** The Committee recognised its own role in facilitating an inter-committee meeting at Parliamentary level to discuss the role of innovation in the post COVID-19 economic recovery, as presented by the Department to Cabinet. The hope is that this will mobilise those Committees to ensure that the STI budgets of their portfolio departments are earmarked for research.
- 5.16.** The Committee acknowledged the important contributions the Department and its entities made and continue to make in combatting and mitigating the impact of the COVID-19 pandemic and the further importance of ongoing and adequate funding for such efforts to prepare for and react to future crises.

- 5.17. The Committee sought clarity as to the support provided by the Department in relation to the KwaZulu-Natal flood disaster. The concern was that, despite the support and advice provided by the Department, SANSA and others, the Committee found that the Department was not visible enough. The Committee's view was that the Department assumes a more prominent and leading role in this regard.
- 5.18. The Committee noted that the Research and Development Tax Incentive will end in October 2022 and is hopeful that National Treasury will retain the incentive after its review.
- 5.19. Noting the continued decline in business expenditure on R&D, the Committee stressed for continued engagement to ensure that expenditure on R&D by the private sector increases.
- 5.20. The Committee, in engaging with the National Advisory Council on Innovation, Technology Innovation Agency, South African National Space Agency, Academy of Science of South Africa and the South African Council for Natural Scientific Professions, noted that they are constrained by a lack of adequate resources.
- 5.21. The Committee noted the high number of vacancies and the number of posts in which officials were appointed in an "acting" capacity at these entities.
- 5.22. The Committee noted the on-going internal review processes by the entities in an attempt to better align them with strategic national priorities as encapsulated in the Decadal Plan.
- 5.23. The Committee noted the legislative amendments necessary to improve the operation and functions of the National Advisory Council on Innovation, Academy of Science of South Africa and the South African Council for Natural Scientific Professions.
- 5.24. The Committee also noted that the Intellectual Property Rights from Publicly Financed Research and Development Act was being amended.

6. COMMITTEE RECOMMENDATIONS

The Portfolio Committee on Higher Education, Science and Innovation, having considered Budget Vote 35: Science and Innovation, recommends that:

- 6.1. The Minister and the Department prioritise discussions with other government departments with STI-intensive mandates, as per the Cabinet approval of the Decadal Plan, and that the Committee is updated on the progress in this regard.
- 6.2. The Department ensures that a STI Plenary is hosted this year.

- 6.3. The Department and its entities, in collaboration with other government departments, intensify efforts on crosscutting matters, especially when it comes to issues relating to addressing the social economic needs of society.
- 6.4. The Department in its work, promotes the transformation agenda that encapsulates economic and sustainable development, but at its core, emphasises STI for inclusive development.
- 6.5. The Department engages the Department of Arts and Culture to assist with making their promotional material available in all official languages.
- 6.6. The Department explores mechanisms to broaden their science communication and outreach activities so that more people are aware of the work of the Department and its entities.
- 6.7. The Department and entities use the available funds responsibly and efficiently and avoid underspending.
- 6.8. The Minister continues to engage National Treasury, the private sector and international partners for increased funding for the sector.
- 6.9. The Minister continues to engage National Treasury around the procurement regulations that hinder science entities securing contracts from the public sector.
- 6.10. The Departments of Higher Education and Training, and Science and Innovation continue their efforts of aligning the work of the two departments in an effort to ensure better coordination and output.
- 6.11. The Minister and the Department prioritise filling key vacancies in the Department and at affected entities to ensure effective delivery of its mandate.
- 6.12. The Committee, aware of the complexity of measuring and reporting on the impact of investment in science, recommends that the Department continues to explore mechanisms to better report on the impact of science and technology.

Report to be considered.