

# CSIR Annual Report 2020/21

Presentation to the  
Parliamentary Portfolio  
Committee on Higher  
Education, Science and  
Technology

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Friday, 12 November 2021



**science & innovation**

Department:  
Science and Innovation  
**REPUBLIC OF SOUTH AFRICA**



# Overview of the 2020/21 financial year



This year's performance demonstrates a positive reflection of the decision to reposition the CSIR as an industry-focused institution.

The CSIR has performed well on making every effort to deliver on its agreements and rising to meet the challenges brought on by the Covid-19 pandemic.

We increased collaborations and partnerships to help maximise our cross-disciplinary expertise, accelerate innovation and develop technological solutions.

The organisation maintained a continued long-standing unqualified audit status.

Transformation and increasing our SET base is a priority and we have seen encouraging progress in these areas.

Our research programmes are guided by various government strategies and frameworks, and the SA Economic Reconstruction and Recovery Plan, post-Covid-19, will remain high on the CSIR's agenda.

# Presentation outline



**CSIR mandate and strategic focus**

**Key performance indicators**

**Human capital highlights**

**Financial sustainability and good governance**

**Research, development and innovation highlights**



# CSIR MANDATE AND STRATEGIC FOCUS



## CSIR MANDATE

“The objects of the CSIR are, through **directed** and **particularly multi-disciplinary 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.”

**(Scientific Research Council Act 46 of 1988, amended by Act 27 of 2014)**



# Vision and mission



## VISION

**We are accelerators of socio-economic prosperity in South Africa through leading innovation**



## MISSION

**Collaboratively innovating and localising technologies while providing knowledge solutions for the inclusive and sustainable advancement of industry and society**





## Excellence

We excel at R&D and industrial **innovation** solutions that address South Africa's challenges. We are unashamedly **passionate** about the **impact** we make and pursue **excellence** in every facet of CSIR life.

## People-centred

We **care** about people – our impact through innovation aims to **improve lives**. We respect each other's **diversity**, and uphold the **dignity** of every person, regardless of **culture or belief system**. We treat our **stakeholders** the way we like to be treated.

## Integrity

We value integrity – in ourselves and in others. We are **honest** and **fair** in how we work and how we engage the world around us. We respect the trust that our colleagues and our stakeholders place in us and commit to ethical decision-making, delivery and governance.

## Collaboration

We are keen to learn from one another and **collaborate** across the organisation and with external partners, to ensure our work has the best chance to **innovate** a better future for South Africans.

# The CSIR strategic intent



## GROWTH

Refers to inclusive and dual growth for the country and the CSIR. The CSIR will use its capabilities in e.g skilled human capital and infrastructure to assist in growing the economy; but will also grow to become a world-class organisation.



## IMPACT

Focuses on the commercialisation of our technologies and innovations for industrial development, as well as technology and knowledge transfer that enable a capable state.



## SUSTAINABILITY

Focuses on CSIR-developed technologies that lead to the advancement and sustainability of SA enterprises and the financial sustainability of the organisation in a resource-constrained environment.



## RELEVANCE

Addresses the CSIR's role in driving the relevance of innovation in inclusive sustainable industrial development and the creation of a capable state.



# Strategic objectives



**Conduct research and development of transformative technologies and accelerate their diffusion.**



**Improve the competitiveness of high-impact industries to support South Africa's re-industrialisation by collaboratively developing, localising and implementing technology.**



**Drive socioeconomic transformation through RD&I that supports the development of a capable state.**



**Build and transform human capital and infrastructure.**



**Diversify income and maintain financial sustainability and good governance.**

# The pillars of the CSIR Strategy

## Positioned to drive SA's industrialisation



### Industry advancement clusters



#### Advanced Agri & Food

Innovate to strengthen primary production, agro-processing and advance rural economies



#### FUTURE PRODUCTION Chemicals

Establish state-of-the-art (bio)-chemistry to drive local pharmaceutical and the broader chemical industries



#### NextGen Health

Develop technologies to drive improved health outcomes and patient-centric healthcare delivery



#### FUTURE PRODUCTION Manufacturing

Strengthen manufacturing value chain to enhance Industry Competitiveness



#### FUTURE PRODUCTION Mining

Support the growth and revitalisation of the mining industry



#### Defence & Security

Build resilient defence and security capabilities to strengthen national security technology capacity



### Industry and society enabling clusters



#### SMART Places

Effect smarter resource use, sustainable economic growth and smart infrastructure and service developments



#### SMART Mobility

Enable South Africa to have an efficient, effective and integrated logistics sector



#### NextGen Enterprises & Institutions

Support the digitalisation of government, public institutions and private sectors



The clusters are technology industry convergences that represent the CSIR's strategic focus. They have been selected based on national priorities, potential for socioeconomic impact and the fourth industrial revolution.



# KEY PERFORMANCE INDICATORS

# Conduct RD&I, localise transformative technologies and accelerate their diffusion



KPI	2020/21 Target	2020/21 Actual	Comments
<b>KPI 1:</b> Publication equivalents	278	406.5	Achieved
<b>KPI 2:</b> New priority patent applications filed	3	5	Achieved
<b>KPI 3:</b> New patents granted	10	26	Achieved
<b>KPI 4:</b> New technology demonstrators	38	48	Achieved
<b>KPI 5:</b> Number of technology licence agreements signed	17	3	Not Achieved

# Collaboratively improve the competitiveness of high-impact industries to support SA's re-industrialisation



KPI	2020/21 Target	2020/21 Actual	Comments
<b>KPI 6:</b> Number of localised technologies	10	5	Not achieved as a result of Covid-19 impact
<b>KPI 7:</b> Number of joint technology development agreements being implemented for industry	20	25	Achieved
<b>KPI 8:</b> Number of SMMEs supported	68	96	Achieved

# Drive socioeconomic transformation through RD&I that supports the development of a capable state



Key performance indicator	2020/21 Target	2020/21 Actual	Comments
<b>KPI 9:</b> Number of reports contributing to national policy development	17	21	Achieved
<b>KPI 10:</b> Number of standards delivered or contributed in support of the state	9	11	Achieved
<b>KPI 11:</b> Number of projects implemented to increase the capability of the state	36	44	Achieved



# Build and transform human capital and infrastructure



Key performance indicator	2020/21 Target	2020/21 Actual	Comments
<b>KPI 12:</b> Total SET staff	1 410	<b>1 474</b>	Achieved
<b>KPI 13:</b> Percentage of black SET staff	63%	<b>66.5%</b>	Achieved
<b>KPI 14:</b> Percentage of female SET staff	37%	<b>36.4%</b>	Achieved (within threshold)
<b>KPI 15:</b> Percentage of SET staff with a PhD	22%	<b>20.9%</b>	Achieved (within threshold)
<b>KPI 16:</b> Total Chief Researchers	12	<b>15</b>	Achieved
<b>KPI 17:</b> Percentage of black chief researchers	25%	<b>20%</b>	Achieved
<b>KPI 18:</b> Percentage of female chief researchers	17%	<b>20%</b>	Achieved

# Build and transform human capital and infrastructure



Key performance indicator	2020/21 Target	2020/21 Actual	Comments
<b>KPI 19:</b> Total Principal Researchers	184	179	Achieved
<b>KPI 20:</b> Percentage of black principal researchers	37%	30.7%	Intense competition for SET skills in the market
<b>KPI 21:</b> Percentage of female principal researchers	20%	19%	Achieved
<b>KPI 22:</b> Number of exchange programmes with industry	11	8	Secondments were affected by Covid-19 and resultant lockdowns
<b>KPI 23:</b> PPE Investment (Rm)*	55	89.4	Achieved

# Diversify income, maintain financial sustainability and good governance



Key performance indicator	2020/21 Target	2020/21 Actual	Comments
<b>KPI 24:</b> Total income (Rm)	2 709	<b>2 569</b>	Effects of the Covid-19 pandemic
<b>KPI 25:</b> Net profit (Rm)	-83.4	<b>96</b>	Better than expected - Achieved
<b>KPI 26:</b> SA Public sector income (% Total Income)	58.5%	<b>56%</b>	In line with CSIR Strategy when seen in light of KPI 27 - Achieved
<b>KPI 27:</b> SA Private sector income (% Total Income)	9.6%	<b>13%</b>	Better than expected - Achieved

# Diversify income, maintain financial sustainability and good governance



Key performance indicator	2020/21 Target	2020/21 Actual	Comments
<b>KPI 28:</b> International contract income (% Total Income)	5.9%	5%	Not Achieved
<b>KPI 29:</b> B-BBEE Rating*	3	2	Achieved
<b>KPI 30:</b> Recordable incident rate*	2	0.53	Achieved
<b>KPI 31:</b> Audit opinion	Unqualified audit opinion	Unqualified audit opinion	Achieved

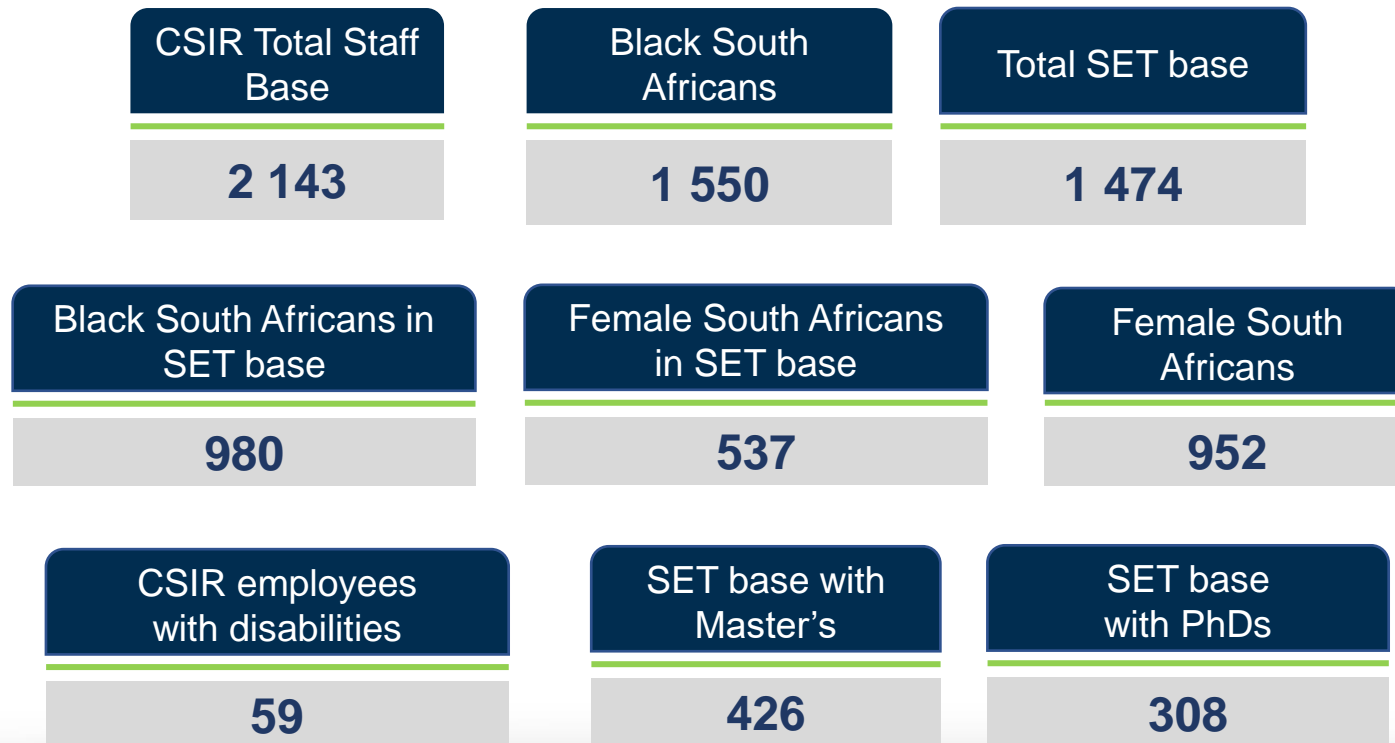


# BUILD AND TRANSFORM HUMAN CAPITAL

# Build and transform human capital



- The CSIR has supported the academic development and transformation of its staff, both in the SET and support bases.
- In 2020, 47 staff members obtained their Master's or Doctorates in line with the organisation's value of excellence.





# Build and transform human capital



Strategic Initiative	Focus and impact
Bursary Programmes	<ul style="list-style-type: none"><li>Targeted at undergraduate and postgraduate students to increase the pool of highly qualified individuals in STEM fields.</li><li>CSIR partnership with DSI, NRF and SETAs.</li><li><b>587 students sponsored.</b></li></ul>
Graduates-in-Training Programme	<ul style="list-style-type: none"><li>Holistic development of recent graduates to attain professional registration in their areas of expertise.</li><li>Currently there are <b>58 graduates on board</b> who are mentored by CSIR experts.</li><li>Those appointed in permanent positions are <b>15</b>.</li></ul>
Workplace-based learning programmes	<ul style="list-style-type: none"><li>Develop a Learning Factory to facilitate the development of skills through WIL, Learnerships, Candidacy.</li><li>There are currently <b>41 interns supported</b> within the CSIR.</li><li>CSIR and SETAs partnership.</li></ul>

# Build and transform human capital



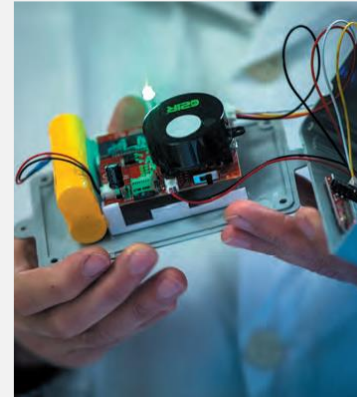
Strategic Initiative	Focus and impact
Youth Employment Service Initiative	<ul style="list-style-type: none"><li>• Develop and impart skills, as well as create job opportunities for unemployed youth.</li><li>• The CSIR is the first SOE to participate in this programme and <b>has 54 youth on board</b> that provide STEM services to SMMEs, schools and municipalities.</li></ul>
Accelerated Researcher Development Programme	<ul style="list-style-type: none"><li>• Develop a pool of African SA chief researchers to become internationally recognised experts in their field of research.</li><li>• The CSIR has invested in <b>10 researchers, (50% females)</b> to equip and qualify as Chief researchers in the next 5 years.</li></ul>
Leadership and Management Development Programme	<ul style="list-style-type: none"><li>• Training of junior, middle and senior leaders in key competencies that will assist the organisation to deliver on its strategy and values.</li></ul>



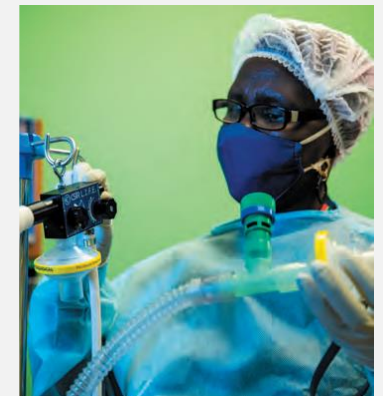
# RESEARCH, DEVELOPMENT AND INNOVATION HIGHLIGHTS



# CSIR response to Covid-19



- Co-developed Covid-19 test kits with CapeBio.
- Created additive manufacturing components - moulds, face shield parts and hospital infrastructure and products for diverse fields.
- Installed more than 40 monitors to check airborne transmission risk in public health facilities in SA.
- The National Ventilator Project - 100% local manufacture.
- The Electronic Vaccination Data System - owned by the NDoH and developed (in part) by the CSIR.
- Covid-19 testing labs in support of the National Health Laboratory Service.
- Information and Decision Support Centre.



# Conduct R&D of transformative technologies and accelerate their diffusion



## Novel CSIR fingerprint system tested in forensic mortuary



- A CSIR-developed fingerprint system is being tested at the Bronkhorstspuit Forensic Mortuary to acquire fingerprints of corpses.
- The technology enables the acquisition of both internal and surface fingerprints simultaneously to get an accurate print to match against a database.
- It's beneficial to SAPS forensic mortuaries to conduct queries against the local criminal record centre database for identification of unidentified victims or perpetrators of crime.

## CSIR co-develops composite material for Africa's largest steel pipe manufacturer



- Africa's largest steel pipe manufacturer, Hall Longmore, imports a special polymer to coat their pipes using fluidised bed technology.
- Exchange rate fluctuations have made it difficult to budget for their projects.
- Hall Longmore contracted the CSIR to develop a material that could be locally produced and replace the imported material.
- The coating trials were successful and the client has started production at a third party's premises.

# Improve the competitiveness of high-impact industries to support SA's re-industrialisation



## Precision agriculture information system (PAIS)



- The CSIR is piloting a Digital Geospatial information system called Precision Agriculture Information System (PAIS)
- PAIS is being developed in a Google Engine cloud environment
- It uses machine learning algorithms and AI to translate remote sensing imageries captured on board drones and satellites into maps and statistics of soil and crop growth parameters on a near-real-time basis.
- The value-added products available at farm-scale provide information on nutrient stress levels and on disease/pest infestation at various stages of the crop growth.

## Agroprocessing cannabis



- The CSIR is supporting the development of the cannabis industry by investigating down-stream processing – extraction without hazardous solvents, and options to benefit smallholder farmers and enterprises.
- Fibre processing facility business plan developed in partnership with Coega IDZ for dtic and National Treasury consideration
- Successful cannabinoid-based products are at lab scale.
- Ready for piloting and testing.



# Drive socioeconomic transformation through RD&I that supports the development of a capable state



## Smart surveillance for safer correctional facilities



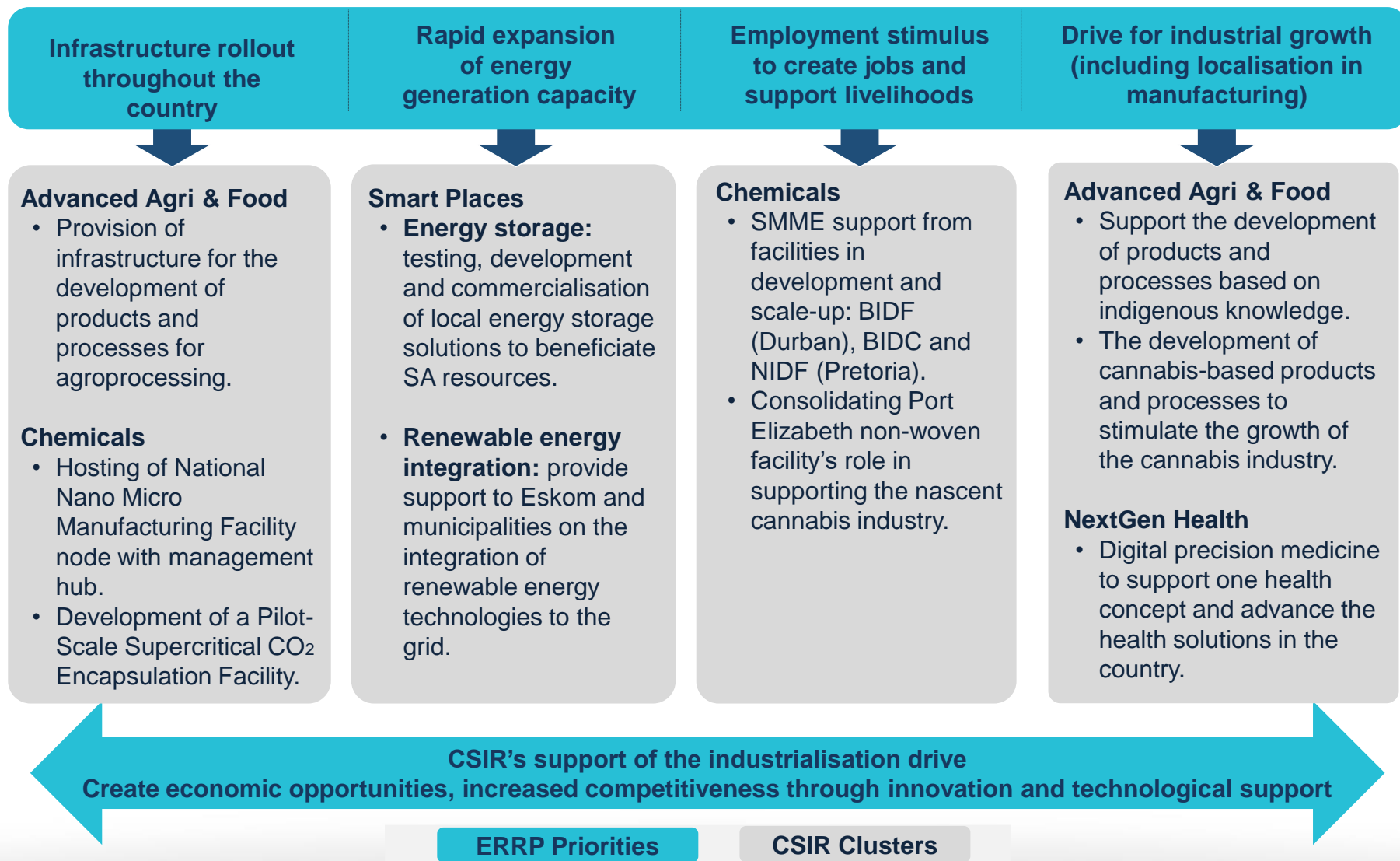
- The CSIR has piloted a new camera-based imaging and alerting system for wide-area surveillance and intrusion detection at a Department of Correctional Services facility in the Eastern Cape.
- The CSIR, together with a private company specialising in perimeter intrusion technologies, developed a system featuring movement detection, using radar and video images from day-and-night cameras.
- An attempted intrusion was detected at the facility and the reaction teams thwarted the trespassing. No further theft incidents occurred during the period that the system was deployed.

## Providing affordable broadband for SA townships and rural areas



- The CSIR is implementing wireless network infrastructure for affordable broadband Internet connectivity in the neediest communities around the country through SMMEs owned by women, youth and the disabled.
- The project is implemented by the CSIR and funded by the UNDP, through the government of Japan. The Foreign, Commonwealth and Development Office of the UK government has also come on board.
- Phase 1 was rolled out in the Eastern Cape, KwaZulu-Natal, Free State and the Western Cape.
- Phase 2 of the project will see 10 more SMMEs being funded to install low-cost Internet in their respective communities.

# CSIR alignment to the SA Economic Reconstruction and Recovery Plan post Covid-19





## Investment in infrastructure



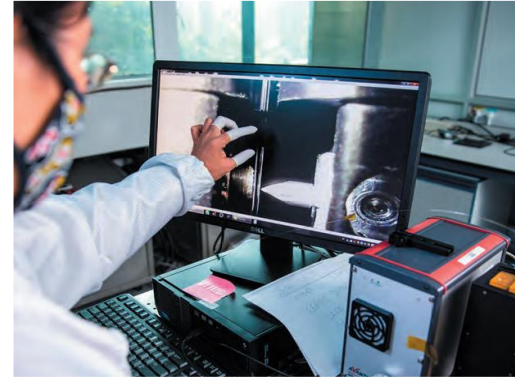
**The Learning Factory**



**Pharmaceutical Innovation Platform**



**The Advanced Design and  
Manufacturing Innovation Centre**



**Photonics Prototype Facility**

# A sample of CSIR strategic partnerships



**SIEMENS**

**Black  
Umbrellas\***

**HENSOLDT**  
*Detect and Protect.*



**Deloitte.**



Republic of South Africa



**3sixty**  
GLOBAL SOLUTIONS GROUP



**WAITRO**

**Eskom**



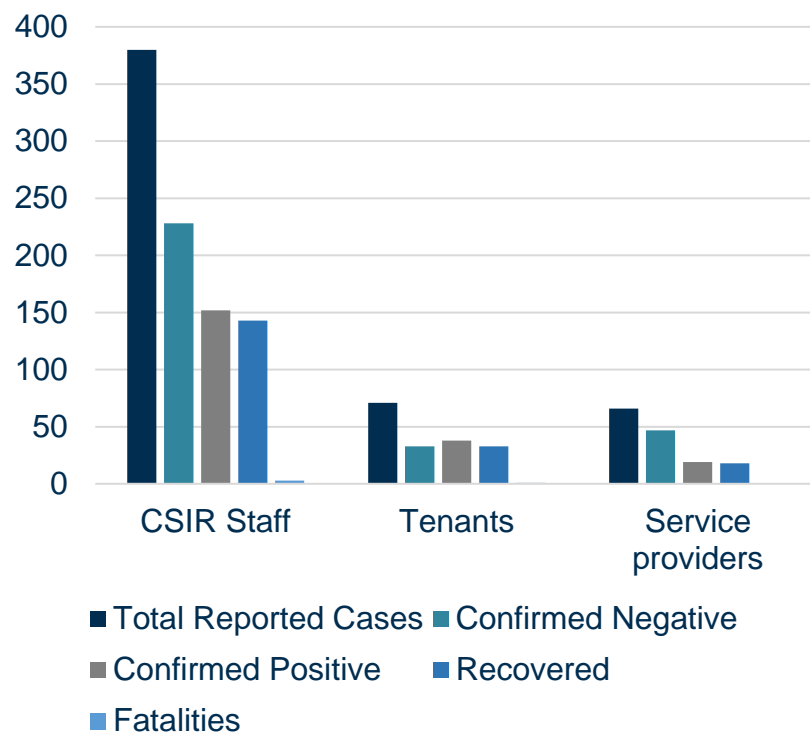


# CSIR employee support and interventions during Covid-19



- The CSIR upheld its people-centred value and provided employees with support, through various interventions, to cope with the Covid-19 pandemic.
- We ensured that the active workstations in all our regions were properly prepared in line with the mitigation measures defined by the area-specific risk assessment. Mitigations included a wide variety of measures such as appropriate PPE and physical engineering interventions.
- Covid-19 protocols were regularly reviewed for compliance and efficacy across the different lockdown levels and communicated with staff through a vigorous awareness and communication campaign.
- CSIR employees were provided access to free testing and diagnostic support via the CSIR clinic.
- The CSIR clinic maintained contact and support with all CSIR employees infected with Covid-19 and, during the most recent 3rd wave, supplied access to oxygen supply to enable more effective management of the condition at home.
- The organisation introduced a flexible work from home arrangement that aligns with the prevailing Covid-19 risks. Furthermore, we are embedding the policy and procedures that will allow for similar future flexibility as part of the employee value proposition.
- Through the CSIR Wellness Office, we continue to host regular webinars and online support group sessions to help employees deal with the psychosocial challenges associated with the Covid-19 pandemic.

## Covid-19 Tracker



# THANK YOU

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Touching lives through innovation