CSIR Annual and Strategic Plan

Presentation to the
Parliamentary Portfolio Committee
on Science and Technology

by

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Outline

1. Background to the CSIR
2. CSIR Strategic Objectives
3. CSIR KPIs: 2015/16 and 2019/20
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.

Strategic Objectives

① Scientific and technological research in support of national development objectives

② Financial sustainability and good governance

③ Build and transform human capital
The most critical challenges facing South Africa are the levels of poverty, inequality and unemployment.

“No political democracy can survive and flourish if the mass of our people remain in poverty . . . Attacking poverty and deprivation must therefore be the first priority of a democratic government”

Reconstruction and Development Programme: 1994
Collaboration with other public research institutions
Partnerships in National System of Innovation

- Industry
- State-owned enterprises
- Development agencies
- Private research agencies
- Tertiary education institutions
- Government departments
R&D Strategic Objectives

Core Technologies | Materials | Sensors | Photonics | Robotics | Modelling
Almost every anti-malarial drug currently in use is ineffective in certain populations due to increased drug resistance.

The CSIR is collaborating with universities to develop a new generation of drugs to permanently disrupt the life-cycle of the malaria parasite. A number of compounds have been found that can be taken to the next stage of the drug development pipeline.
Contribute to greater **food security** and **combat malnutrition** by exploiting indigenous and naturalised plants

- Identify natural food ingredients to prevent nutrition-related diseases
- Conduct intervention and efficacy studies on selected ingredients
- Continue to develop *Nutrigenomics* in collaboration with industry
Biotechnology SMMEs will continue to be given access to world-class biomanufacturing facilities and research expertise at the Biomanufacturing Industry Development Centre.

These SMMEs are granted access to ready-to-use biomanufacturing facilities, and are assisted by CSIR scientists and engineers. Products developed range from cosmetics incorporating natural extracts to porridges that incorporate beneficial natural ingredients and cell culture reagents.
The development of laser-based surface engineering and refurbishment applications to support SA industry

The CSIR will continue to significantly increase the service life of valuable components used in steelmaking using high-powered lasers. The process has been licenced for international distribution.

The laser refurbishment procedures used to extend the life of turbine blades for Eskimo will be accredited and expanded.
The CSIR supports the SA Navy in their mission to expand their anti-piracy deployment capabilities. The Davit system, when fitted on to a frigate, allows a smaller boat carrying a reaction force to be dispatched while the frigate is in motion.
The CSIR continues to contribute to the implementation of the national cyber security policy by developing a national capability to respond to cyber threats.

The CSIR will establish a cyber security evaluation laboratory for the development, testing and analysis of security threats. We will also assess the social awareness of cyber threats and its impact on the safe use of cyber systems.
The CSIR continues to improve the performance of the transport system by developing better materials and construction methods, improving transport planning, and designing improved systems for transport management and infrastructure maintenance.
A strategic partnership with Transnet: The development of subsystems of a locally-manufactured locomotive that will be able to withstand the harsh and diverse African operational and environmental conditions.
The CSIR is contributing to the remediation of mining sites by identifying crops that can be successfully grown on mining dunes. We have shown that crops like peanuts and certain Eucalyptus clones can be successfully grown on mined dunes in the Richards Bay area.
The CSIR is predicting the effects of changes in climate at local scales, and developing tools that will assist in mitigating and adapting to these changes.

We are investigating the use of wave gliders to assist with surveys of fish stock levels along the South African coastline.

By combining existing land and ocean climate models the CSIR will produce an integrated climate model for Southern Africa.
The CSIR is part of a national initiative to develop the technology to support a hydrogen economy. The use of hydrogen to deliver energy for cars, portable devices and buildings is seen as one of the key steps to reduce emissions of greenhouse gases. We will continue to work on the design and performance testing of hydrogen storage materials.
Renewed investment into research on new materials for lithium-ion batteries over the past four years is beginning to pay dividends. Current CSIR research efforts are centred on the production of manganese-based materials for use in mobile devices. We will also focus on the large-scale production of battery materials using patented microwave-assisted techniques.
Maintain an unqualified audit
Risk Management and Fraud Prevention plans in place
Comply with relevant international quality standards
Maintain B-BBEE level 2 status
Continued focus on safety
Build & Transform Human Capital

- Increase the size of our Science, Engineering and Technology (SET) base
- Transforming our SET base – increasing the number and percentage of black and female researchers
## KPI Targets: Relevant R&D

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2014/15 Forecast</th>
<th>2015/16 Target</th>
<th>2019/20 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Articles</td>
<td>290</td>
<td>300</td>
<td>340</td>
</tr>
<tr>
<td>Publication Equivalents</td>
<td>470</td>
<td>490</td>
<td>550</td>
</tr>
<tr>
<td>New Technology Demonstrators</td>
<td>30</td>
<td>≥ 30</td>
<td>≥ 40</td>
</tr>
<tr>
<td>New Patents Granted</td>
<td>15</td>
<td>≥ 15</td>
<td>≥ 15</td>
</tr>
<tr>
<td>Contract R&amp;D Income</td>
<td>R 1,630 m</td>
<td>R 1,786 m</td>
<td>R 2,200 m</td>
</tr>
<tr>
<td>Royalty &amp; Licence Income</td>
<td>R 5.8 m</td>
<td>R 7.4 m</td>
<td>R 11.0 m</td>
</tr>
</tbody>
</table>
## KPI Targets: Build and transform human capital

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2014/15 Forecast</th>
<th>2015/16 Target</th>
<th>2019/20 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Size of SET Base</td>
<td>1810</td>
<td>1850</td>
<td>1950</td>
</tr>
<tr>
<td>No. of Black SET Staff</td>
<td>990</td>
<td>1000</td>
<td>1100</td>
</tr>
<tr>
<td>% of SET Base who are Black</td>
<td>52%</td>
<td>54%</td>
<td>56%</td>
</tr>
<tr>
<td>No. of Female SET Staff</td>
<td>561</td>
<td>630</td>
<td>670</td>
</tr>
<tr>
<td>% of SET Base who are Female</td>
<td>32%</td>
<td>34%</td>
<td>35%</td>
</tr>
<tr>
<td>No. of SET Staff with Doctorates</td>
<td>320</td>
<td>330</td>
<td>400</td>
</tr>
<tr>
<td>% of SET Base with Doctorates</td>
<td>18.2%</td>
<td>18%</td>
<td>21%</td>
</tr>
</tbody>
</table>
## KPI Targets: Good governance and sustainability

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2014/15 Forecast</th>
<th>2015/16 Target</th>
<th>2019/20 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment in PPE</td>
<td>R 150 m</td>
<td>R 113 m</td>
<td>R 150 m</td>
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<tr>
<td>Total Income</td>
<td>R 2360 m</td>
<td>R 2546 m</td>
<td>R 3200 m</td>
</tr>
<tr>
<td>Net Profit</td>
<td>R 49 m</td>
<td>R 54 m</td>
<td>R 65 m</td>
</tr>
<tr>
<td>B-BBEE Rating</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 2</td>
</tr>
<tr>
<td>Disabling Injury Frequency Rate</td>
<td>&lt; 0.3</td>
<td>&lt; 0.3</td>
<td>&lt; 0.3</td>
</tr>
</tbody>
</table>
Thank You
KPI Targets: Trends for SET Staff

- **14/15 Expected:** 1810
- **15/16 Target:** 1850
- **19/20 Target:** 1950

Bar chart showing the number of SET Staff over the financial years from 06/07 to 19/20.
KPI Targets: Trends for PhDs

- **14/15 Expected:** 320
- **15/16 Target:** 330
- **19/20 Target:** 400

Financial Year

SET Staff with PhDs

- 06/07
- 07/08
- 08/09
- 09/10
- 10/11
- 11/12
- 12/13
- 13/14
- 14/15
- 15/16
- 19/20

28
KPI Targets: Trends for Peer-Reviewed Articles

- **14/15 Expected**: 290
- **15/16 Target**: 300
- **19/20 Target**: 340

Peer Reviewed Articles

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>06/07</th>
<th>07/08</th>
<th>08/09</th>
<th>09/10</th>
<th>10/11</th>
<th>11/12</th>
<th>12/13</th>
<th>13/14</th>
<th>14/15</th>
<th>15/16</th>
<th>19/20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
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</tbody>
</table>
KPI Targets: Trends for Total Income

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Total Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/07</td>
<td>R 1.0 bn</td>
</tr>
<tr>
<td>07/08</td>
<td>R 1.5 bn</td>
</tr>
<tr>
<td>08/09</td>
<td>R 2.0 bn</td>
</tr>
<tr>
<td>09/10</td>
<td>R 2.5 bn</td>
</tr>
<tr>
<td>10/11</td>
<td>R 3.0 bn</td>
</tr>
<tr>
<td>11/12</td>
<td>R 3.5 bn</td>
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<tr>
<td>12/13</td>
<td></td>
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<tr>
<td>13/14</td>
<td></td>
</tr>
<tr>
<td>14/15 Expected:</td>
<td>R 2.35 bn</td>
</tr>
<tr>
<td>15/16 Target:</td>
<td>R 2.54 bn</td>
</tr>
<tr>
<td>19/20 Target:</td>
<td>R 3.20 bn</td>
</tr>
</tbody>
</table>
KPI Targets: Trends for R&D Income

14/15 Expected: R 1630 m
15/16 Target: R 1786 m
19/20 Target: R 2200 m