

CSIR Annual Strategic Plan 2008/09

Briefing presentation by:
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Presented to:
Parliamentary Portfolio Committee on Science
and Technology

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Presentation outline

- About the CSIR
 - ➔ Mandate, Role in the National System of Innovation (NSI)
 - ➔ External context, national initiatives
- Strategic priorities -
 - ➔ Current performance
 - ➔ Building and transforming human capital
 - ➔ Strengthening the Science, Engineering and Technology (SET) base and performing relevant R&D
 - ➔ Transferring technology and skilled human capital
 - ➔ Maintaining financial sustainability and good governance
- Concluding remarks



The CSIR Mandate

“The objects of the CSIR are, through directed and particularly multidisciplinary research and technological innovation, to foster, in the national interest and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic ...”

(Scientific Research Council Act 46 of 1988, amended by Act 71 of 1990)

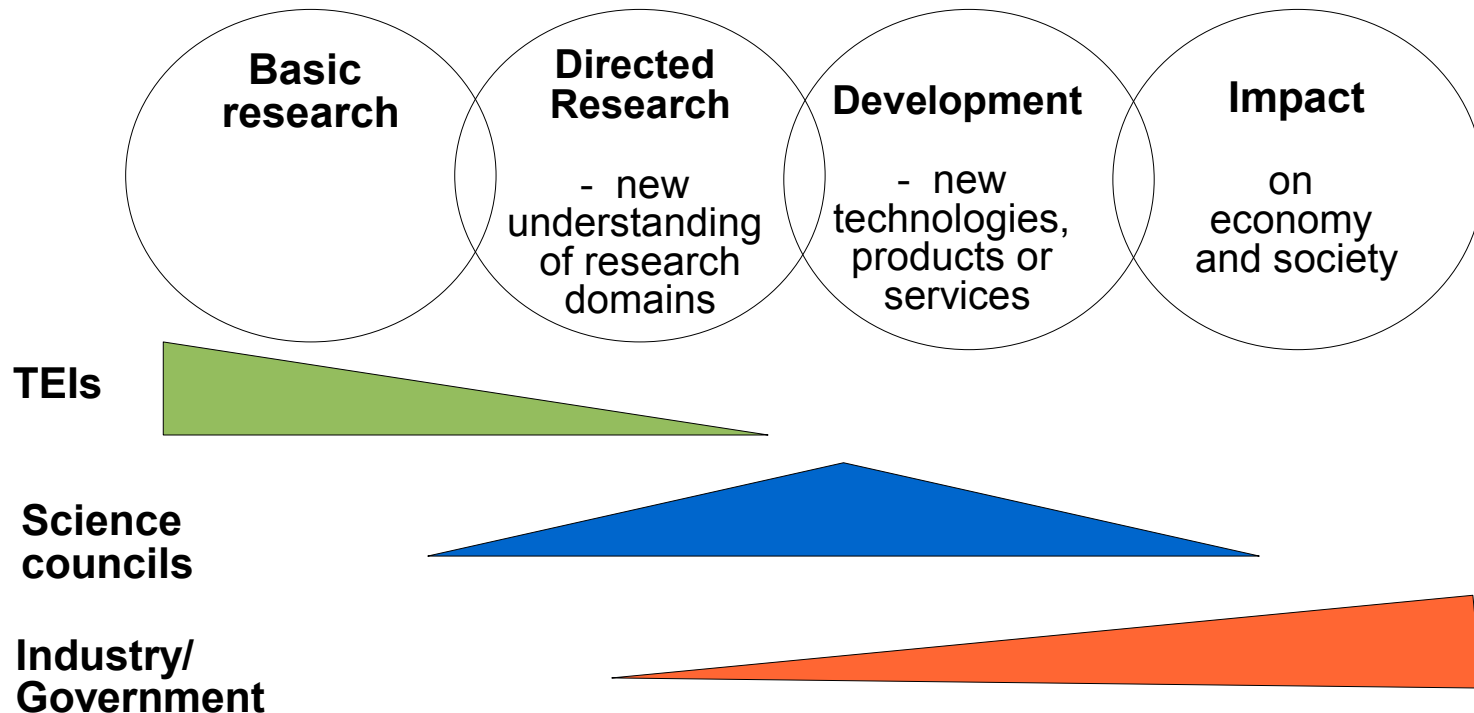
Directed and multidisciplinary research

Technological innovation

Industrial and scientific development

Improvement of quality of life

As a science council, the CSIR has a particular role within the NSI



The CSIR spans the research and innovation value chain but its role is differentiated from universities and commercial R&D

External context



- OECD survey
- R&D expenditure approaching 1% of GDP
- DST “grand challenges” -
 - ➔ Farmer to pharma
 - ➔ Space science and technology
 - ➔ Energy security
 - ➔ Global climate change science
 - ➔ Human and social dynamics
- Establishment of TIA
- Impact of possible establishment of a Defence Evaluation Research Institute and South African Space Agency

The CSIR participates in and supports a number of national strategies and initiatives, including...

- ASGISA
- NEPAD
- Crime Prevention Strategy
- Information and Communications Technology (ICT)
- Nanotechnology
- Space Strategy
- Advanced Manufacturing Technology Strategy & National Industrial Policy Action Plan
- Biotechnology and Biodiversity Strategies
- Infrastructure: Transport, logistics, housing, spatial development
- Energy initiatives
- Environment: Climate Change, water



National project: Mercury in water



- Establishment of large-scale reference laboratory to develop local capacity in mercury sampling and analysis
- Tests to determine uptake of toxic form of mercury in phytoplankton that can accumulate up the food chain

Scientists at Black River, Western Cape

Water, sediment, fish and invertebrates from all 19 Water Management Areas tested

R&D is undertaken in units, national centres, implementation units and emerging research areas

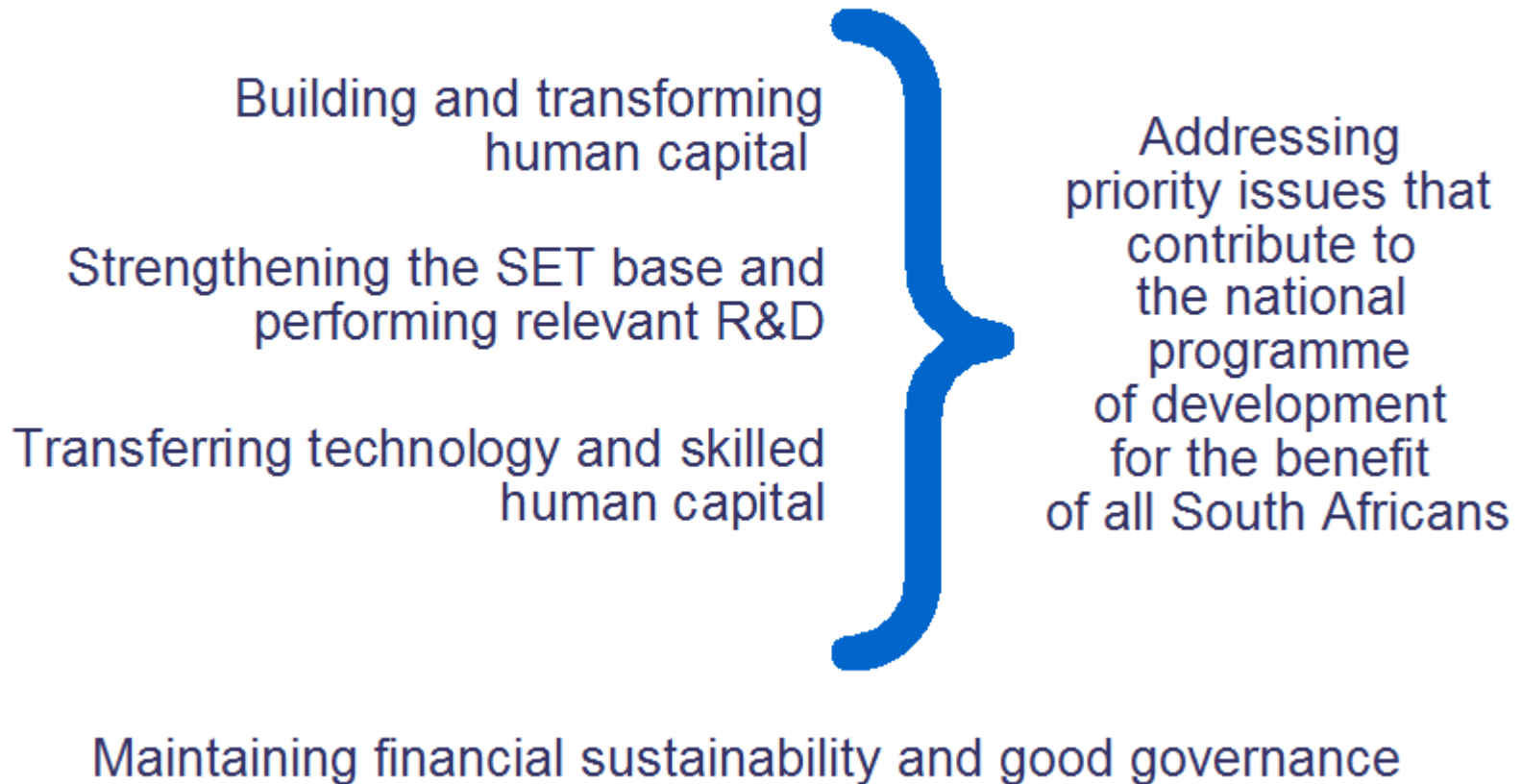
Operating Units	Biosciences Built Environment Defence, Peace, Safety and Security Materials Science and Manufacturing Information & Communication Technology Modelling and Digital Science (New) Natural Resources and the Environment
National Centres	National Laser Centre Satellite Applications Centre
Implementation Units	Consulting and Analytical Services Social Good Implementation Unit
Emerging Research Areas	Synthetic Biology Mobile Intelligent Autonomous Systems Nanoscience

National Centre for Nano-structured Materials launched in 2007



- One of the first two such innovation centres in SA
- Design, modelling, synthesis, characterisation and fabrication of new and novel nano-structured materials
- Postgraduates brought to work under experienced researchers
- Accessed by researchers locally and abroad

The CSIR's strategic priorities – driven by the mandate - remain consistent over time



Current performance (past year)

Building and transforming human capital

Strengthening the SET base and performing relevant R&D

- Human Capital Development (HCD) strategy in place
- 18% growth in number of staff with Master's or PhDs
 - of this...
 - 48% increase in black staff and
 - 18% increase in females
- 31% increase in peer-reviewed publications (total of 288)
- 50% of contract R&D projects are multi year, large scale
- Maintaining strong network of research alliances

Current performance (past year)

Transferring
technology and skilled
human capital

Maintaining financial
sustainability
and good governance

- IP and technology transfer strategy now in place – **key focus area in future**
- Consistent positive financial performance
- Unqualified audit report in 2007

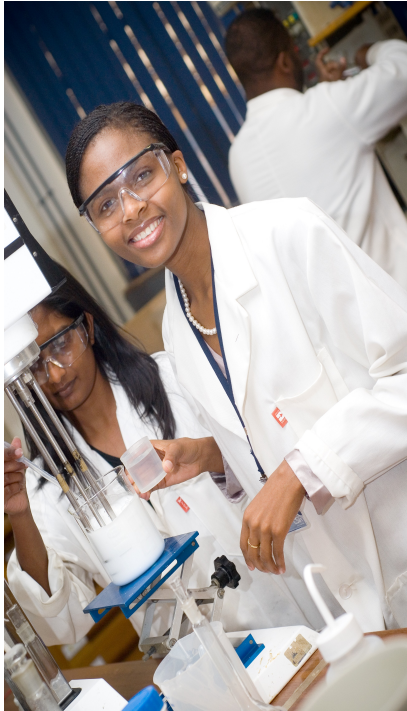
Strategic Plan for 2008/09:

Building and Transforming Human Capital

New HCD strategy leads to significant programmes

Programme	Target for 2008/09
School-level intervention	40
Bursaries (BSc and Honours)	40
Studentships (Master's and PhD)	150
Internships (experiential learning)	100
Postdoctoral programme (specialist fields)	30
Research Professionals development programme (PDI focus)	40
Sabbaticals/exchanges	10
Management and leadership development (SET leadership)	40
TOTAL	450

Growth and transformation of SET skills base



Staff category	2006/7	2007/8	2008/9	2010/11	Projected 3-year change
Total staff	2 248	2 282	2 468	2 702	9.4%
SET base	1 490	1 527	1 694	1 906	12.5%
Number of staff with Master's and PhDs	639	668	692	806	30.8%
% of staff in SET base	66%	67%	69%	71%	1.6%
% of black staff in SET base	49%	52%	55%	60%	8.9%
% of females in SET base	32%	32%	32%	36%	13%

Strategic Plan for 2008/09:

**Strengthening the SET base &
performing relevant R&D**

Balance and focus in the research portfolio



- Good progress in knowledge-generating work
- Renewed emphasis on knowledge application
- Expected outcomes: demonstrators, patents, technology transfer – and greater impact in society
- Continual renewal of the SET base, pursue emerging areas of S&T
- Ongoing alignment of research portfolio with organisational priorities and national imperatives

Next-generation energy sources:

5 kW hydrogen fuel cell

Prototype applications in vehicles, cell phones, homes, computers, home appliances and industrial machinery

Supporting sustainable human settlement

- Pilot projects for DST to introduce sustainable building technologies to 'Breaking New Ground' (BNG) housing
 - 600 units in Kleinmond and 2 000 in Buffalo City.
 - Incl. thin concrete roads and pre-fabrication of construction elements (e.g. roof, bathrooms and electrical wiring) to ensure quality control
- Node established at the CSIR for integrated research into
 - hybrid solar thermal power for renewable and distributed energy generation
 - ecological water and waste treatment
 - advanced construction materials and technologies,
 - green and healthy building and settlement design, and
 - Smart modelling, simulation and control systems to optimise energy and water usage

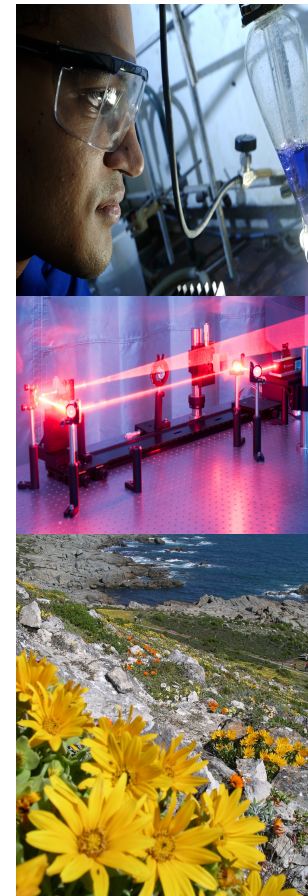
SET-based investment themes

Domain	SET Themes
Biosciences	<ul style="list-style-type: none"> • Drug Delivery and Development • Biotechnology Product Development • Synthetic Biology
Built Environment	<ul style="list-style-type: none"> • Urban and building planning, analysis and design • Infrastructure engineering and construction • Infrastructure operations, modelling and logistics • Rural infrastructure and services • Climate change mitigation in the built environment
Defence, Peace, Safety and Security	<ul style="list-style-type: none"> • Radar and Electronic Warfare • Aeronautical Systems • Landwards Sciences • Systems Modelling • Optronic Sensor Systems
ICT	<ul style="list-style-type: none"> • Information Society Applications, Technologies, Strategy



SET-based investment themes (cont)

Domain	SET Themes
Materials Science and Manufacturing	<ul style="list-style-type: none"> • Advanced Materials • Manufacturing science and technology • Sensor science and technology • Energy and Processes
Modelling and Digital Science	<ul style="list-style-type: none"> • Mobile Intelligent Autonomous Systems • Digital Intelligence • Information Security • Mathematical Modelling
National Laser Centre	<ul style="list-style-type: none"> • Laser Physics and Technology • Laser Materials Processing Theme • Photonics Initiative
Natural Resources and the Environment	<ul style="list-style-type: none"> • Land, water and marine ecosystems • Mineral resources • Forestry resources • Environmental assessment and management • Climate change



The CSIR continuously explores new areas of research of future importance

Nanomaterials	National Centre for Nano-structured Materials
Bio-engineering technologies/bio-mechatronics	Synthetic Biology ERA
Artificial Intelligence	Mobile Intelligence Autonomous Systems ERA
Opto-electronics / photonics	Photonics Centre of Competence
Pharma and nutrigenomics	Through Biosciences Unit
Technology for people with disabilities	Through Meraka
Human Language Technologies	Through Meraka
Modelling, prediction and optimisation technologies	Modelling and Digital Science Unit



Working with DST on Cyberinfrastructure



- Integral to world-class science and technology
- Centre for High Performance Computing (CHPC) launched
- Hosts IBM Blue Gene
- SANReN (South African National Research Network)
 - ➔ key pillar of DST-driven national cyberinfrastructure initiative.
 - ➔ Major research institutions connected by the end of 2008
- Analyse and model complex systems with significant data sets

The CSIR maintains extensive networks

- Alliances and partnerships include -
 - ➔ Most SA Universities
 - ➔ Science councils such as Mintek, MRC, ARC, HSRC
 - ➔ Internationally: Active participation in research alliances with Universities, science councils, R&D departments of large companies such as Airbus, Boeing

Such partnerships strengthen relationships within the National System of Innovation and provide excellent opportunities for building capacity

R&D links SA industry to international value chain of next-generation aircraft



CSIR's natural fibres centre in Port Elizabeth is one of top four such facilities in the world

- Research into new technologies and processes in computational fluid dynamics for Airbus
- Utilises CHPC
- Part of research and technology partnership with SA launched with DST and the dti in 2006
- Natural fibre-reinforced composites developed for potential use in aircraft interiors
- Working with Boeing on establishment of titanium industry value chain
- Potential for new patents

Strategic Plan for 2008/09:

**Transferring technology and skilled
human capital**

R&D outcomes for market and society

- IP and technology transfer strategy formally approved
- IP portfolio to be expanded
- Technology demonstrators should lead to new, high-impact areas of investment
- Levels and quality of contract R&D with the public, private and international sectors increased and improved through strategic alliances
- industry development efforts increased
- Social impact considered in selection and evaluation of investment
- Capacity of Social Good Implementation Unit increased

R&D

Technology, knowledge, people transfer

Market

Technology, knowledge, people transfer

Society

IP management and technology transfer



Outcome	2007/8 forecast	2008/9 target
New invention disclosures	36	47
New PCT applications	8	12
New national patents granted	9	15
Number of new start-up companies	4	8
New technology packages available for transfer	23	26

- Process under way to identify strategic IP clusters in the CSIR
- CSIR is engaging with the DST on establishment of the TIA

Traditional African remedies scientifically validated



- New pharmaceutical active ingredients identified in herbal remedies
- Currently working in areas such as malaria, HIV, cancer, mosquito repellency, asthma and allergies, arthritis, anti-inflammatory treatments, wound healing
- Opportunity created for
 - community-based agroprocessing businesses
 - patents
- MoU and benefit-sharing agreement in place with Traditional Healers Committee and South African San Council

The CSIR has a range of technology transfer mechanisms



- IP licensing
- Start-up companies
- Consulting and analytical Services
- Contribution to socio-economic development

Available under licensing:

CoroCam provides video images of the UV discharges that indicate high-voltage leakage problems.

Example: World-class technology for peace and safety



- “Fortress on wheels” developed and manufactured in partnership with industry
- Stimulated security industry and led to job creation
- Utilised in cash-in-transit industry as well as in peace-keeping missions
- In the order of 270 vehicles deployed – no cash theft or loss of life as yet
- CSIR development costs recovered through royalties

Industry development initiatives are linked to the CSIR private sector strategy



- Includes:
 - ➔ IP Management and Technology Transfer strategy
 - ➔ Aerospace Industry Support Initiative
 - ➔ Continuation of Light Metals Development Network
 - ➔ FabLab roll-outs as part of Advanced Manufacturing Technology Strategy
 - ➔ Establishment of Textile and Clothing Centre of Excellence
 - ➔ Fourth Annual State of Logistics survey
- Special emphasis placed on building strategic relationships with State-owned Enterprises and major companies such as Sasol, Murray and Roberts

Strategic Plan for 2008/09:

**Maintaining financial sustainability and
good governance**

Income statement

Item	2007/08 forecast R'000	2008/09 budget R'000
Total Operating Revenue	1 255 112	1 330 061
Contract R&D income	673 292	755 986
Baseline Parliamentary Grant	445 046	470 054
Ring-fenced Parliamentary Grant funding	128 258	96 032
Royalties	8 516	7 989
Total Expenditure	1 231 464	1 305 944
Net margin before Investment Income and Performance bonuses	23 648	24 117

Capital Investment

Investment category	Planned amount, R'000
Scientific infrastructure and building alterations	R97 100
Scientific equipment	R136 400
Total	R233 500

The CSIR has a track record of operational efficiency and good governance



- Aim to maintain unqualified audit
- Risk management plan
- Fraud Prevention Plan
- Materiality/significant framework in place
- Maintain/expand accreditation such as to ISO 9001 and ISO 14001
- Corporate Citizenship:
 - ➔ Achieve level 3 BBBEE contributor in 2008/09
 - ➔ Reduce energy consumption
 - ➔ Employee Wellness Programme in place

In closing

South Africa faces a number of challenges – e.g. skills development, poverty alleviation, job creation, communicable diseases, combating crime, community infrastructure, SME support, integrated planning, energy security, access to ICT, industrial policy action plan, etc.

(APEX priorities 2008)

The CSIR remains committed to addressing priority issues that contribute to the national programme of development for the benefit of all South Africans

Shaping a better future through science

Thank you



Governance: Typical Key Performance Indicators (KPIs)

Key Performance Indicators	2006/7	2007/8	2008/9	2010/11	Projected 4-year change
Number of staff with PhD level qualifications	237	250	281	329	31.60%
Publication equivalents	220	288	310	356	23.60%
Number of collaborative research projects in TEIs	-	61	70	91	49.20%
Value of contract R&D formally recognised as supporting national strategies	R 274.3 m	R 304.1 m	R 331.3 m	R 387.1 m	27.20%
New National Patents granted	-	9	15	22	144.00%
Value of Contract R&D	-	R 673.2 m	R 755.9 m	R 899.0 m	33.50%
BBEEE rating	Developed and formally adopted	Level 4 contributor	Level 3 Contributor	Level 2 Contributor	2 levels improvement
Number of significant findings on external audit report	None	None	None	None	Unqualified audit maintained

KPI Table

Strategic Focus Area	Key Performance Indicator	Budget 2007/8	Forecast 2007/8	Budget 2008/9	Target 2010/11
Human Capital development	% core Parliamentary Grant (PG) investment in Masters and PhD studies	-	15 %	16%	16%
	No. permanent CSIR staff studying towards Masters or PhD degrees	188	225	215	192
	Number of studentships supported	93	134	150	208
Human Resource Management	Total size of SET base (number) and % of total	-	1 527 (67%)	1 694 (69%)	1 906 (71%)
	% of SET base who are black	49.0%	51%	55%	56%
	% of SET base who are female	35.0%	32%	32%	36%
	Number of staff with PhD level qualifications	242	250	281	329
SET resource allocation	Review of Parliamentary Grant, including portfolio analysis	Research Advisory Panels (RAPs) completed portfolio review of investment in all units	Research Advisory Panels (RAPs) completed portfolio review of investment in all units	Parliamentary Grant Funding deployment conforming fully to objectives of CSIR S+T Strategy	Parliamentary Grant Funding deployment conforming fully to objectives of CSIR S+T Strategy
	Value of capital investment, Rm	R 150.6 m	R 108.9 m	R136.4 m	R 107.4 m
R&D outputs	Publication equivalents	259	288	310	356
Strategic R&D alliances	Number of collaborative R&D activities with a value exceeding R1m	55	58	51	61
	Number of collaborative research projects with TEIs	-	61	70	91
Contract R&D	Value of contract R&D formally recognised as supporting national strategies and % of contract R&D	R273.5 m	R304.1 m	R331.3 m	R387.1 m
	Customer satisfaction	75%	84%	75%	75%

KPI Table cont.

Strategic Focus Area	Key Performance Indicator	Budget 2007/8	Forecast 2007/8	Budget 2008/9	Target 2010/11
Contract R&D	Value of contract R&D formally recognised as supporting national strategies and % of contract R&D	R273.5 m	R304.1 m	R331.3 m	R387.1 m
	Customer satisfaction	75%	84%	75%	75%
R&D outcomes	New national patents granted	11	9	15	22
	Royalty and license income: <ul style="list-style-type: none"> • CSIR • CSIR Group 	R 8.4 m R 8.5 m	R 8.5 m R 9.8 m	R 7.9 m R 16.9 m	R 9.6 m R 20.0 m
Financial sustainability	Total income, Rm	R 1 281.5 m	R 1 246.5 m	R 1 321.1 m	R 1 519.9 m
	Value of contract R&D, Rm	R 666.9 m	R 673.2 m	R 755.9 m	R 899.0 m
	Net margin, Rm (before performance bonus adjustments and non-operating adjustments)	R 34.6 m	R 59.8 m	R 52.2 m	R 53.0 m
Good Corporate Governance and Citizenship	BBEEE rating	Level 4 Contributor	Level 4 Contributor	Level 3 Contributor	Level 2 Contributor
	Number of significant findings on external audit report	None	None	None	None
	Energy Efficiency	Achieve 1.2% reduction in energy consumption on previous year	Achieve 1.2% reduction in energy consumption on previous year	Achieve 1.2% reduction in energy consumption on previous year	Achieve 1.2% reduction in energy consumption on previous year
	Environmental stewardship	Maintain ISO14001 accreditation	Maintain ISO14001 accreditation	Maintain ISO14001 accreditation	Maintain ISO14001 accreditation
	Disabling Injury Frequency Rate (DIFR)	<0.5 disabling injuries	<0.5 disabling injuries	<0.5 disabling injuries	<0.5 disabling injuries

Income Statement

	Actual	Forecast	Budget
	2006/2007	2007/2008	2008/2009
R'000			
Total Operating Revenue	1 129 564	1 255 112	1 330 061
Contract R&D Income	653 855	673 292	755 985
Public Sector	406 726	432 583	485 527
Private Sector	139 425	135 635	155 457
International Sector	107 703	105 074	115 001
Parliamentary Grant	456 242	573 304	566 087
Parliamentary Grant - Baseline	423 854	445 046	470 054
Parliamentary Grant - Ring-fenced		128 258	96 033
Parliamentary Grant - National Metrology Laboratory	32 388	0	0
Royalty Income	10 808	8 516	7 989
Other Income	8 659		
Total Expenditure	1 098 925	1 231 464	1 305 944
Employees' Remuneration	550 286	629 415	715 134
Operating Expenses	483 887	542 280	516 537
Depreciation and Amortisation	64 752	59 769	74 273
Operating Margin before Investment Income	30 639	23 648	24 117
Investment Income	25 538	36 232	28 146
Net Margin before Non-Operating Adjustments and Performance Bonus	56 177	59 880	52 263
Non-Operating Adjustments	2 146		
Performance Bonus Provision	36 679	37 126	31 358
Net Margin for the Year	21 644	22 754	20 905