

Vote 31

Science and Technology

Budget summary

R million	2009/10				2010/11	2011/12
	Total to be appropriated	Current payments	Transfers and subsidies	Payments for capital assets	Total	Total
MTEF allocation						
Administration	171.3	166.7	1.0	3.5	177.1	186.6
Research, Development and Innovation	1 142.9	43.5	1 099.1	0.2	1 315.5	1 383.2
International Co-operation and Resources	131.3	51.9	79.1	0.3	137.8	146.6
Human Capital and Knowledge Systems	1 598.0	29.1	1 568.9	0.1	1 795.8	2 018.1
Socioeconomic Partnerships	1 190.7	43.6	1 146.7	0.4	1 281.9	1 363.3
Total expenditure estimates	4 234.1	334.8	3 894.8	4.5	4 708.1	5 097.8
Executive authority	Minister of Science and Technology					
Accounting officer	Director-General of Science and Technology					
Website address	www.dst.gov.za					

Aim

The aim of the Department of Science and Technology is to realise the full potential of science and technology in social and economic development, through the development of human resources, research and innovation.

Programme purposes

Programme 1: Administration

Purpose: Conduct the overall management of the department. Ensure that the organisations funded by the department comply with good corporate governance practices and that their activities are aligned with the strategic focus of the national system of innovation. Monitor and evaluate the performance of the science councils.

Programme 2: Research, Development and Innovation

Purpose: Provide policy leadership in long term and cross-cutting research and innovation in the national system of innovation. Play a key role in developing strategic new areas of focus for research and innovation in South Africa.

Programme 3: International Cooperation and Resources

Purpose: Develop and monitor bilateral and multilateral relationships and agreements in science and technology to strengthen the national system of innovation and enable a flow of knowledge, capacity and resources into South Africa and Africa.

Programme 4: Human Capital and Knowledge Systems

Purpose: Develop and implement national programmes to produce knowledge and develop human capital and the associated infrastructure, equipment and public research services.

Programme 5: Socioeconomic Partnerships

Purpose: Serve as a strategic partner within government and with industry, contributing to South Africa's transition to a knowledge economy.

Strategic overview: 2005/06 – 2011/12

The main focus of the Department of Science and Technology is on implementing the national research and development strategy. The strategy is implemented through an integrated approach that includes human resource development, knowledge generation, investment in science and technology infrastructure, and the strategic management of the public science and technology system.

Strategic and operational priorities

10-year innovation plan

In 2007, Cabinet approved the department's 10-year innovation plan. The plan provides strategic leadership and direction for modern science and technology in support of South Africa's socioeconomic goals, while remaining at the cutting edge of human and scientific endeavour and technological advancement. It aims to help drive South Africa's transformation towards a knowledge based economy, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour. The plan's success will be measured by the extent to which science, technology and innovation play a role in improving productivity, economic growth and socioeconomic development.

The plan's framework provides the structure for the department to achieve its strategic goals, which are: to develop the innovation capacity of the science system; to develop appropriate human capital for research, development and innovation; and to position South Africa as a strategic international research, development and innovation partner and destination to enable the flow of knowledge and resources into the country.

A 10-year infrastructure plan is also being developed to guide investment in world class research, development and innovation infrastructure to improve the performance of the national system of innovation. The national system of innovation is a cluster or network of interacting public and private organisations focused on nurturing and developing science and technology in South Africa. The 10-year innovation plan also gives strategic guidance to all of these organisations.

Towards a knowledge driven economy

The department will continue to build on South Africa's existing science, technology and innovation resources to close the gap with countries that have been identified as knowledge driven economies. South Africa's historical dependence on resources and lack of proper intellectual property protection mechanisms has resulted in a failure to commercialise the results of scientific research and the inadequate production of knowledge workers capable of building a globally competitive economy. To counter this, the department will make a range of interventions, including: establishing the Technology Innovation Agency, expected to be launched in 2009; introducing legislation on intellectual property rights from publicly financed research and development; establishing the South African National Space Agency, expected to be launched by December 2009; and implementing the strategy on science, technology and engineering human capital development.

Regional and international cooperation

Regional and international cooperation continues to play a role in advancing science and technology through shared learning. Strategies include leading South Africa's engagement in the United Nations (UN) family of science organisations and maximising South African participation in major summits and international conventions, South-South partnerships, and international research programmes such as the European Union's (EU) framework programme of research.

Research and development

In 2005/06, the research development survey (a sample collection of data from public and private research and innovation institutions) showed that South Africa's gross expenditure on research and development for that year was just over R14.1 billion, which amounted to 0.92 per cent of GDP. The 2006/07 research and development survey reflected an increase to R16.5 billion for that year (0.95 per cent of GDP). The target is to achieve research and development expenditure in the national system of innovation of 1 per cent of GDP by 2008/09.

Infrastructure investment

In September 2006, South Africa and Australia were short listed as suitable sites to host the Square Kilometre Array radio telescope. The announcement of the successful bidding country is expected before the end of 2011. Both countries are building demonstration telescopes to develop the technology and optimise alignment with scientific research expectations. The South African demonstration telescope, the MeerKAT, will be constructed in two phases, and is expected to be fully assembled by 2012. As part of the development of the MeerKAT, South Africa has started a process to preserve the ideal radio astronomy conditions offered by the Karoo area, establish or upgrade infrastructure, and develop expertise in engineering and research.

The main purpose of the Centre for High Performance Computing, launched in May 2007, is to provide researchers with the computing power they need for sophisticated research and innovation. A primary node has been established in Cape Town. The second node will be established in Gauteng, following a feasibility study by the Department of Science and Technology and the Centre for High Performance Computing.

The first phase of the physical infrastructure for the South African National Research Network, a high speed network dedicated to research traffic and research into research networking and broadband infrastructures, reached a significant milestone when the first four research infrastructure sites went live in Johannesburg in March 2008. Other sites are currently being connected.

The South African Strategic Forum for Research Infrastructure will establish and maintain a database of records of South African research and development infrastructure. The national equipment programme supports research through acquiring state-of-the-art equipment for researchers and scientists to encourage innovative and competitive science. The national research information management system was launched in February 2008. This system will capture statistical information on government expenditure on research and development activities by universities and research institutions.

Managing the science and technology base

The 2004 governance framework for science and technology sets out key elements for proper management of the science and technology base. Having taken major steps to improve the funding of science and technology in the public sector, government has set up a comprehensive database to monitor scientific and technological activities. A review of how departments use funding for science to manage scientific and technological activities was initiated and will be published as an annual national science and technology expenditure report.

Selected performance and operations indicators

Table 31.1 Science and Technology

Indicator	Programme	Past			Current 2008/09	Projections		
		2005/06	2006/07	2007/08		2009/10	2010/11	2011/12
Number of new technology based companies established as a result of products developed through research and development programmes	Research, Development and Innovation	2	5	8	12	15	20	30
Number of new patent applications resulting from publicly funded research	Research, Development and Innovation	–	–	–	30	40	50	65
Number of intellectual property transactions leading to commercialisation of technologies in South Africa each year	Research, Development and Innovation	–	–	–	10	15	17	25
Total number of space related technology services launched by South African based companies	Research, Development and Innovation	1	3	4	5	9	13	15

Table 31.1 Science and Technology (continued)

Indicator	Programme	Past			Current	Projections		
		2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Total number of alternative energy technologies demonstrated and entering the local market	Research, Development and Innovation	1	3	5	6	9	14	18
Total number of technology commercialisation partnerships entered into with the private sector, including foreign direct investment	Research, Development and Innovation	–	–	–	1	5	7	10
Amount obtained from foreign sources for research and development each year	International Cooperation and Resources	R54m	R70m	R94.1m	R189m	R230m	R280m	R330m
Number of learners who attended the science week programme each year	Human Capital and Knowledge Systems	172 895	204 950	175 905	190 000	200 000	220 000	250 000
Number of honours and masters students on the innovative bursary programme each year	Human Capital and Knowledge Systems	–	–	280	415	470	550	281
Number of interns supported at science councils and higher education institutions each year	Human Capital and Knowledge Systems	–	49	68	100	300	320	340
Total number of centres of excellence established	Human Capital and Knowledge Systems	7	7	7	8	8	8	9
Total number of research chairs established at science councils and higher education institutions	Human Capital and Knowledge Systems	–	21	72	72	72	72	100
Number of PhDs and postdoctoral fellowships supported at science councils and higher education institutions each year	Human Capital and Knowledge Systems	–	113	107	155	180	200	258
Total number of joint science and technology projects initiated between the Department of Science and Technology and other departments	Socioeconomic Partnerships	–	2	6	10	10	12	12
Total number of flagship projects (including centres of competence) supporting strategic areas of research and development	Socioeconomic Partnerships	3	6	11	13	13	14	14
Number of companies provided with a technology assistance package to facilitate successful participation in infrastructure public procurement processes each year	Socioeconomic Partnerships and Research, Development and Innovation	–	–	–	–	24	24	24
Total number of institutions implementing the research information management system	Socioeconomic Partnerships	–	–	3	3	8	16	22

Expenditure estimates

Table 31.2 Science and Technology

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09		2009/10	2010/11	2011/12
R million								
1. Administration	107.3	226.0	119.2	115.1	115.1	171.3	177.1	186.6
2. Research, Development and Innovation	333.5	396.0	525.3	863.1	863.1	1 142.9	1 315.5	1 383.2
3. International Co-operation and Resources	77.6	124.3	99.4	130.8	130.8	131.3	137.8	146.6
4. Human Capital and Knowledge Systems	639.0	876.1	1 272.9	1 452.8	1 452.8	1 598.0	1 795.8	2 018.1
5. Socioeconomic Partnerships	883.8	990.6	1 110.4	1 159.9	1 159.9	1 190.7	1 281.9	1 363.3
Total	2 041.3	2 613.0	3 127.3	3 721.7	3 721.7	4 234.1	4 708.1	5 097.8
Change to 2008 Budget estimate				17.7	17.7	37.1	158.8	275.6

Table 31.2 Science and Technology (continued)

R million	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09		2009/10	2010/11	2011/12
Economic classification								
Current payments	173.5	174.0	211.0	242.9	242.9	334.8	351.4	370.4
Compensation of employees	65.1	83.7	104.1	135.9	135.9	192.8	204.2	215.9
Goods and services	108.3	90.2	106.8	107.0	107.0	142.0	147.3	154.5
of which:								
Administrative fees	2.3	1.0	1.2	5.8	5.8	0.6	0.7	0.7
Advertising	2.2	1.5	2.1	7.4	7.4	5.6	5.7	6.0
Assets less than R5 000	0.2	0.2	0.2	0.6	0.6	0.4	0.4	0.4
Audit costs: External	0.9	0.5	0.8	–	–	1.4	1.4	1.5
Bursaries (employees)	0.8	0.5	0.8	0.5	0.5	1.5	1.5	1.6
Catering: Departmental activities	1.0	0.7	1.2	1.3	1.3	2.5	2.6	2.8
Communication	6.5	5.6	7.0	5.2	5.2	7.9	8.2	8.6
Computer services	2.4	1.8	2.2	4.8	4.8	4.5	4.6	4.8
Consultants and professional services: Business and advisory services	0.3	0.2	0.3	9.1	9.1	20.5	21.3	22.3
Consultants and professional services: Legal costs	–	–	–	0.9	0.9	–	–	–
Contractors	2.2	1.4	1.8	0.6	0.6	5.4	5.5	5.7
Agency and support / outsourced services	35.8	30.2	33.8	27.3	27.3	23.1	24.2	25.4
Entertainment	0.4	0.9	0.9	1.5	1.5	1.1	1.2	1.2
Inventory: Materials and supplies	2.2	1.3	1.9	–	–	–	–	–
Inventory: Other consumables	0.0	0.0	0.0	0.7	0.7	–	–	–
Inventory: Stationery and printing	4.6	4.0	4.9	3.6	3.6	5.6	5.8	6.1
Lease payments	6.9	4.3	6.3	1.2	1.2	6.5	6.6	7.0
Owned and leasehold property expenditure	–	–	–	–	–	3.9	4.0	4.2
Travel and subsistence	30.7	27.7	31.7	28.0	28.0	37.0	38.4	40.3
Training and development	1.8	1.4	1.7	1.7	1.7	3.2	3.3	3.5
Operating expenditure	3.3	2.7	3.6	2.7	2.7	5.4	5.5	5.8
Venues and facilities	3.4	3.9	4.0	3.8	3.8	5.9	6.2	6.5
Financial transactions in assets and liabilities	0.0	0.1	0.1	–	–	–	–	–
Transfers and subsidies	1 865.1	2 293.4	2 908.4	3 476.7	3 476.7	3 894.8	4 353.4	4 724.0
Provinces and municipalities	0.2	0.1	–	–	–	–	–	–
Departmental agencies and accounts	809.2	1 160.2	1 516.9	1 910.6	1 910.6	2 033.7	2 304.1	2 542.6
Universities and technikons	32.3	46.0	45.8	18.3	18.3	–	–	–
Public corporations and private enterprises	597.0	740.7	1 023.2	879.1	879.1	581.1	614.0	650.6
Non-profit institutions	425.8	345.5	322.2	668.3	668.3	1 280.1	1 435.3	1 530.8
Households	0.6	1.0	0.2	0.4	0.4	–	–	–
Payments for capital assets	2.7	145.6	7.9	2.1	2.1	4.5	3.2	3.4
Buildings and other fixed structures	–	133.2	–	–	–	–	–	–
Machinery and equipment	2.7	12.4	7.9	2.1	2.1	4.5	3.2	3.4
Total	2 041.3	2 613.0	3 127.3	3 721.7	3 721.7	4 234.1	4 708.1	5 097.8

Expenditure trends

Expenditure increases at an average annual rate of 16.5 per cent between 2005/06 and 2011/12, rising from R2 billion in 2005/06 to R5.1 billion in 2011/12. Expenditure increases at an annual average rate of 22.2 per cent from 2005/06 to 2008/09 due to substantial additional allocations for projects in the *Research, Development and Innovation* programme, human capital development initiatives, and increases in funding for organisations such as the South African Research Network and the National Research Foundation in the *Human Capital and Knowledge Systems* programme and the Council for Scientific and Industrial Research and the Human Sciences Research Council in the *Socioeconomic Partnerships* programme.

From 2008/09 to 2011/12, spending continues to grow at an average annual rate of 11.1 per cent as a result of additional allocations of R471.5 million. R200 million of this is for human capital development through the

research chairs initiative and postgraduate bursaries (through the National Research Foundation), and R80 million for the new innovation planning and instruments programme. The rest is for inflation related adjustments in compensation of employees, capital assets and capital transfers.

Transfers make up the bulk of expenditure, amounting to R3.9 billion in 2009/10 or 92.9 per cent of the total budget.

Savings of R25.9 million in 2009/10, R37.2 million in 2010/11 and R40.4 million in 2011/12 have been identified in goods and services and in transfer payments to public entities.

Science and technology activities

Summary of expenditure on science and technology activities funded by the Department of Science and Technology

R thousand	2006/07	2007/08	2008/09	2009/2010	2010/2011	2011/2012
Scientific and technological services	405 777	614 828	571 338	599 988	635 987	665 878
Scientific and technical education and training	24 482	35 300	49 828	61 548	65 241	68 307
Scientific and technological innovation	1 830 266	2 279 254	2 781 818	3 159 576	3 349 152	3 506 561
Total science and technology activities	2 260 525	2 929 382	3 402 984	3 821 112	4 050 380	4 240 746

Public institutions that undertake scientific and technology activities and report to the Department of Science and Technology

R thousand	2006/07	2007/08	2008/09	2009/2010	2010/2011	2011/2012
National Advisory Council on Innovation	9 132	9 757	10 351	11 949	12 666	13 261
Academy of Science of South Africa	3 000	3 400	3 820	4 243	4 234	4 442
Africa Institute of South Africa	28 879	26 530	27 830	27 122	28 749	30 100
Human Science Research Council	119 873	115 949	160 706	157 858	167 329	175 193
National Research Foundation	586 671	648 394	680 832	680 396	721 220	755 117
Council for Scientific and Industrial research	483 194	507 352	534 749	561 487	595 176	623 149
South African National Energy Research Institute	40 000	42 000	44 268	–	–	–
Total	1 270 749	1 353 382	1 462 556	1 443 055	1 529 374	1 601 262

Departmental receipts

The department's receipts include miscellaneous items such as debt repayments and recovered private telephone costs. The receipts for the medium term are expected to increase marginally.

Table 31.3 Departmental receipts

R thousand	Audited outcome			Adjusted estimate	Revised estimate	Medium-term receipts estimate		
	2005/06	2006/07	2007/08	2008/09		2009/10	2010/11	2011/12
Departmental receipts	229	1 029	219	106	106	107	111	112
Sales of goods and services produced by department	43	301	24	25	25	25	26	26
Interest, dividends and rent on land	–	–	6	6	6	6	7	7
Sales of capital assets	–	57	110	–	–	–	–	–
Financial transactions in assets and liabilities	186	671	79	75	75	76	78	79
Total	229	1 029	219	106	106	107	111	112

Programme 1: Administration

Administration ensures that the organisations funded by the department are aligned with the strategic focus of the national system of innovation. It also monitors and evaluates the performance of the science councils. The *Property Management* subprogramme administers the property management funds and activities.

Expenditure estimates

Table 31.4 Administration

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
R million							
Minister ¹	0.9	1.0	1.1	1.6	1.7	1.8	1.9
Deputy Minister ¹	0.8	0.9	0.9	1.3	1.4	1.5	1.6
Management	12.4	13.3	11.3	15.2	50.2	53.0	55.8
Corporate Services	88.3	206.4	97.7	89.1	105.1	106.9	112.7
Governance	2.4	2.6	3.8	4.7	9.5	10.1	10.6
Property Management	2.5	1.9	4.3	3.1	3.3	3.8	4.0
Total	107.3	226.0	119.2	115.1	171.3	177.1	186.6
Change to 2008 Budget estimate				(0.2)	37.5	32.8	33.7

1. From 2008/09, the current payments relating to the total remuneration package of political office bearers are shown, before this only salary and car allowances are included. Administrative and other subprogramme expenditure may in addition include payments for capital as well as transfers and subsidies.

Economic classification

Current payments	102.9	79.3	108.8	110.2	166.7	173.9	183.3
Compensation of employees	31.7	37.5	47.4	63.0	94.4	99.9	105.6
Goods and services	71.1	41.8	61.3	47.1	72.3	74.0	77.7
of which:							
Administrative fees	1.0	0.6	0.8	5.8	0.3	0.3	0.3
Advertising	1.4	0.8	1.2	6.1	4.9	5.0	5.2
Audit costs: External	0.9	0.5	0.8	—	1.4	1.4	1.5
Bursaries (employees)	0.7	0.4	0.6	0.5	1.5	1.5	1.6
Catering: Departmental activities	0.4	0.2	0.3	0.3	1.0	1.1	1.1
Communication	4.3	2.5	3.7	2.3	4.2	4.3	4.5
Computer services	1.5	0.9	1.3	4.2	4.2	4.3	4.5
Consultants and professional services:	0.3	0.2	0.3	0.2	8.7	9.0	9.4
Business and advisory services							
Contractors	2.1	1.2	1.8	0.6	5.0	5.0	5.3
Agency and support / outsourced services	29.0	17.0	25.0	11.1	4.0	4.1	4.3
Entertainment	0.3	0.2	0.2	0.3	0.5	0.5	0.5
Inventory: Materials and supplies	2.1	1.3	1.9	—	—	—	—
Inventory: Other consumables	0.0	0.0	0.0	0.6	—	—	—
Inventory: Stationery and printing	3.1	1.8	2.6	1.1	3.0	3.1	3.3
Lease payments	6.4	3.7	5.5	0.6	5.4	5.5	5.8
Owned and leasehold property expenditure	—	—	—	—	3.9	4.0	4.2
Travel and subsistence	12.5	7.4	10.8	9.0	16.3	16.7	17.6
Training and development	1.5	0.9	1.3	1.6	3.2	3.3	3.5
Operating expenditure	2.2	1.3	1.9	1.8	3.1	3.2	3.3
Venues and facilities	0.9	0.5	0.8	0.6	1.2	1.2	1.3
Financial transactions in assets and liabilities	0.0	0.1	0.1	—	—	—	—
Transfers and subsidies	2.9	2.6	3.5	3.4	1.0	1.0	1.0
Provinces and municipalities	0.1	0.0	—	—	—	—	—
Departmental agencies and accounts	0.4	—	—	—	—	—	—
Universities and technikons	—	—	0.4	—	—	—	—
Public corporations and private enterprises	0.0	—	—	—	—	—	—
Non-profit institutions	2.3	2.1	3.0	3.2	1.0	1.0	1.0
Households	0.1	0.5	0.1	0.2	—	—	—
Payments for capital assets	1.5	144.1	6.8	1.5	3.5	2.2	2.3
Buildings and other fixed structures	—	133.2	—	—	—	—	—
Machinery and equipment	1.5	10.9	6.8	1.5	3.5	2.2	2.3
Total	107.3	226.0	119.2	115.1	171.3	177.1	186.6

Details of selected transfers and subsidies

Non-profit institutions							
Current	2.3	2.1	3.0	3.2	1.0	1.0	1.0
Institutional and programme support	—	—	0.6	0.9	1.0	1.0	1.0
Technology Top 100	2.3	2.1	2.4	2.3	—	—	—

Expenditure trends

Expenditure increases from R107.3 million in 2005/06 to R115.1 million in 2008/09 at an average annual rate of 2.3 per cent. The marginal growth in this period is related to the decrease in expenditure on agency and outsourced services, which decreases from R29 million in 2005/06 to R11.1 million in 2008/09 at an average annual rate of 27.4 per cent, and the decrease in expenditure on lease payments and travel and subsistence. The decrease in growth in the goods and services budget has been off set by the increase in expenditure in compensation of employees, which grew at an average annual rate of 25.7 per cent from R31.7 million in 2005/06 to R63 million in 2008/09.

Spending is anticipated to increase to R186.6 million in 2011/12, at an average annual rate of 17.5 per cent over the MTEF period. Growth is due to increases in compensation of employees and associated goods and services and travel and subsistence because the department's staff complement is expected to increase from 375 to approximately 569 over the medium term.

Programme 2: Research, Development and Innovation

- *Space Science* focuses on creating the necessary strategic and institutional regimes for creating and developing a viable space programme and earth observation system. This includes large scale astronomy facilities in the Northern Cape, and other national space initiatives aimed at harnessing the benefits of space science and technology for socioeconomic growth and sustainable development. The name of this subprogramme has been shortened from *Space Science, Engineering and Technology*.
- *Hydrogen and Energy* provides policy leadership in long term and cross-cutting research, development and innovation in the energy sector. The subprogramme plays a key role in developing a sustainable and globally competitive South African energy knowledge base and industry that will ensure broader socioeconomic benefits for the country from the nascent global hydrogen economy.
- *Biotechnology and Health* provides policy leadership for the development of a world class bioeconomy in South Africa. This will be achieved through the innovation instruments that provide financial, intellectual property and innovation management support.
- *Innovation Planning and Instruments* drives strategic interventions that will enable South Africa to translate a greater proportion of its scientific knowledge outputs into commercial technology products and services. This is achieved through the design and creation of policy and institutional structures that facilitate technology development and its progression into national and international markets.

Funding for all these subprogrammes is allocated on the basis of approved business plans and service level agreements between the department and the relevant entities. Following structure changes, the *National Advisory Council on Innovation* subprogramme has been moved to the *Administration* programme.

Objectives and measures

- Promote technology commercialisation by protecting and commercialising intellectual property to increase the number of South African technology based companies by establishing and operationalising the Technology Innovation Agency, centres of competence, the National Intellectual Property Management Office and the South African National Space Agency by March 2009.
- Position South Africa to host the Square Kilometre Array project by constructing the demonstration telescope MeerKAT by 2012.
- Ensure that South Africa's manufacturing sector benefits from supply opportunities from the South Africa Square Kilometre Array bid by developing a strategic framework for innovation and manufacturing by 2010.
- Support the creation of a viable space industry in South Africa by establishing a space agency by December 2009.

- Reduce the disease burden in South Africa by:
 - establishing 4 centres of competence for research and development on tuberculosis, malaria, HIV and AIDS and improved medical devices in 2009/10
 - producing at least 2 new products and services per year from 2010.
- Support the successful commercialisation of the Joule electric vehicle by demonstrating at least 2 new alternative energy technologies in 2009 in partnership with the Department of Trade and Industry.

Service delivery and spending focus

The 2008 national space strategy aims to strengthen better decision making by integrating space based and ground based information systems and to use space science and technology to develop applications for providing geospatial, telecommunications, and timing and positioning products and services. An interim space agency office was established at the Council for Scientific and Industrial Research in 2008. The 2008 Astronomy Geographic Advantage Bill aims to preserve the South African geographic advantage (climate and clear skies) for astronomy research infrastructure. A micro satellite, SumbandilaSAT, will be launched in 2009.

The 2008 hydrogen and fuel cell technologies research, development and innovation strategy aims to stimulate the development of platinum group metals based industries to supply the future global hydrogen economy. Platinum group metals are key catalytic materials in producing hydrogen and converting hydrogen to electricity. A working prototype of South Africa's electric vehicle, the Joule, was launched in Cape Town and exhibited at the Paris motor show in October 2008.

The Technology Innovation Agency Act (2008) provides for an agency that will give both financial and non-financial support to technology commercialisation in South Africa. The Intellectual Property Rights on Publicly Financed Research and Development Act (2008) provides for the more effective use of intellectual property derived from publicly financed research and development, and establishes the National Intellectual Property Management Office, the Intellectual Property Fund, and offices of technology transfer at public research institutions.

Expenditure estimates

Table 31.5 Research, Development and Innovation

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
R million							
Space Science	153.8	204.2	296.2	341.4	574.3	638.4	688.2
Hydrogen and Energy	21.0	9.6	29.3	286.3	149.9	134.3	142.9
Biotechnology and Health	158.1	178.1	194.2	229.0	259.2	314.5	292.0
Innovation Planning and Instruments	0.7	4.0	5.7	6.4	159.6	228.3	260.1
Total	333.5	396.0	525.3	863.1	1 142.9	1 315.5	1 383.2
Change to 2008 Budget estimate				1.0	15.7	100.6	95.4

Economic classification

Current payments	11.5	13.5	16.1	35.0	43.5	46.0	48.4
Compensation of employees	4.8	5.8	8.8	11.6	20.8	22.1	23.3
Goods and services	6.7	7.7	7.2	23.4	22.7	23.9	25.0
of which:							
Communication	0.4	0.5	0.5	0.4	0.8	0.8	0.8
Consultants and professional services: Business and advisory services	–	–	–	4.6	2.0	2.1	2.2
Consultants and professional services: Legal costs	–	–	–	0.1	–	–	–
Agency and support / outsourced services	0.8	1.0	0.9	12.8	14.0	14.7	15.4
Inventory: Stationery and printing	0.3	0.3	0.3	0.6	0.7	0.8	0.8
Travel and subsistence	3.4	4.0	3.7	3.5	4.1	4.3	4.5
Operating expenditure	0.0	0.1	0.1	0.6	0.1	0.1	0.1
Venues and facilities	0.5	0.6	0.5	0.2	0.2	0.2	0.2

Table 31.5 Research, Development and Innovation (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Transfers and subsidies	321.5	382.0	508.9	827.9	1 099.1	1 269.3	1 334.6
Provinces and municipalities	0.0	0.0	–	–	–	–	–
Departmental agencies and accounts	42.1	151.0	303.0	375.4	218.1	259.6	274.6
Universities and technikons	20.9	27.3	14.8	10.1	–	–	–
Public corporations and private enterprises	0.1	30.3	46.7	21.6	–	–	–
Non-profit institutions	258.0	173.2	144.4	420.8	881.0	1 009.7	1 060.0
Households	0.2	0.3	0.0	0.1	–	–	–
Payments for capital assets	0.6	0.4	0.4	0.2	0.2	0.2	0.2
Machinery and equipment	0.6	0.4	0.4	0.2	0.2	0.2	0.2
Total	333.5	396.0	525.3	863.1	1 142.9	1 315.5	1 383.2
Details of selected transfers and subsidies							
Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	41.1	150.9	222.9	210.4	218.1	259.6	274.6
Biotechnology strategy	–	–	37.5	–	–	–	–
HIV and AIDS prevention and treatment technologies	20.0	–	8.1	16.6	17.2	18.2	19.3
Innovation Fund	–	131.3	141.8	140.0	151.2	189.5	200.9
International Centre for Genetic Engineering and Biotechnology	–	–	10.0	–	9.9	9.9	9.9
Energy Grand Challenge	–	–	–	23.3	39.7	42.0	44.5
Space science	13.1	0.2	–	5.0	–	–	–
Square Kilometre Array	8.0	19.4	25.5	25.5	–	–	–
Capital	–	–	80.0	165.0	–	–	–
Square Kilometre Array	–	–	80.0	165.0	–	–	–
Universities and technikons							
Current	20.2	17.2	8.9	10.0	–	–	–
Health innovation	–	5.3	0.2	–	–	–	–
Hydrogen strategy	–	6.0	6.0	–	–	–	–
International Centre for Genetic Engineering and Biotechnology	–	–	–	10.0	–	–	–
Space science	20.2	5.8	2.7	–	–	–	–
Capital	–	9.3	5.9	–	–	–	–
Hydrogen strategy	–	–	3.0	–	–	–	–
Space science	–	9.3	2.9	–	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	–	21.5	23.1	7.5	–	–	–
Hydrogen strategy	–	4.0	4.7	5.0	–	–	–
Innovation projects	–	3.2	–	–	–	–	–
Innovation projects	–	–	4.6	–	–	–	–
Space science	–	14.4	13.8	2.4	–	–	–
Biotechnology strategy	–	–	–	0.1	–	–	–
Capital	–	8.7	21.1	14.1	–	–	–
Hydrogen strategy	–	–	4.0	–	–	–	–
Space science	–	8.7	17.1	14.1	–	–	–
Non-profit institutions							
Current	256.2	170.3	141.4	280.1	310.1	374.3	377.3
Biofuels	–	–	–	5.0	5.0	5.0	5.3
Biotechnology strategy	154.7	148.1	124.2	175.4	180.0	231.6	205.3
Health innovation	–	4.0	6.2	18.5	36.0	37.9	39.7
HIV and AIDS prevention and treatment technologies	–	15.0	–	–	–	–	–
Hydrogen strategy	–	–	9.9	38.6	51.2	28.6	30.4
Innovation Fund	101.6	–	–	–	–	–	–
Innovation projects	–	–	–	–	–	30.0	50.0
Space science	–	3.2	1.0	21.7	25.9	28.5	33.4
Square Kilometre Array	–	–	–	–	12.0	12.6	13.2
Energy Grand Challenge	–	–	–	21.0	–	–	–

Table 31.5 Research, Development and Innovation (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capital	–	2.0	3.0	140.7	570.9	635.4	682.7
Hydrogen strategy	–	–	3.0	40.5	44.2	48.4	51.9
Space science	–	2.0	–	0.9	36.4	51.4	55.2
Square Kilometre Array	–	–	–	99.3	490.3	535.7	575.6

Expenditure trends

Expenditure increased from R333.5 million in 2005/06 to R863.1 million in 2008/09 at an average annual rate of 37.3 per cent. The programme budget is dominated by current and capital transfers and subsidies to departmental agencies and non-profit institutions, which increase at an average annual rate of 37.1 per cent from R321.5 million in 2005/06 to R827.9 million in 2008/09. The increases are due to additional allocations for research projects and programmes that were funded at a much larger scale than before, and the introduction of the Square Kilometre Array.

Over the medium term, the programme's budget grows at an average annual rate of 17 per cent to R1.4 billion in 2011/12. Increased expenditure is due to implementing the 10-year innovation plan, and includes an additional R80 million allocated to the *Innovation Planning and Instruments* subprogramme. Spending in the *Space Science* subprogramme also grows significantly, rising to R688 million in 2011/12 to fund the establishment of the National Space Agency.

Programme 3: International Co-operation and Resources

- *Multilateral Cooperation and Africa* advances and facilitates South Africa's participation in strategic bilateral agreements and multilateral organisations on science, technology and innovation to strengthen the national system of innovation and to achieve shared economic and social development in the region and the continent. The name of this subprogramme has changed from *Multilaterals and Africa*.
- *International Resources* accesses funding from international donors, and human capital and knowledge, hosts global research infrastructure in South Africa, and promotes access to international research facilities for the benefit of the national system of innovation through bilateral agreements.
- *Overseas Bilateral Cooperation* promotes and facilitates collaborative activities and leverages resources in support of the national system of innovation from countries outside Africa, with a specific focus on developing a knowledge driven economy. Through the new international cooperation strategy, these relationships will be realigned to address the challenges and associated cross-cutting areas set out in the 10-year innovation plan and the national research and development strategy. The name of this subprogramme has changed from *Bilateral Cooperation*.

Funding for all three subprogrammes is allocated equally for salaries and associated personnel costs, and for transfers to public entities on the basis of approved business plans.

Objectives and measures

- Increase international funding for science and technology in South Africa by increasing international research funding, foreign investment and donor support, mostly through bilateral and multilateral agreements, from R189 million in 2008/09 to R352 million in 2011/12.
- Improve strategically aligned bilateral cooperation by initiating 60 new joint projects with international partners by March 2010.
- Increase and strengthen South African participation in multilateral organisations and forums by establishing 2 new global projects by March 2010 to support the department's 10-year innovation plan.
- Increase and strengthen cooperation in Africa by establishing 5 new bilateral projects or programmes by March 2010.

- Ensure the functioning of the 3 main African Initiatives for Capacity Development projects (training, research and knowledge brokerage) by implementing 5 pilot projects by March 2010.

Service delivery and spending focus

Joint research projects have been completed with several partners in 2008/09, including those within the India-Brazil-South Africa framework, in areas such as energy, space, ICT, biotechnology, advanced manufacturing and robotics. Flagship projects falling in this joint research projects category include Biota South, aimed at capacity development in mapping biodiversity, and Inkaba Ye Afrika, a multidisciplinary project that surveys a cone shaped sector of the earth from core to space.

South Africa's participation in the Organisation for Economic Cooperation and Development's committee for scientific and technological policy resulted in the finalisation of the peer review of the national system of innovation. South Africa won the bid to host the third component of the International Centre for Genetic Engineering and Biotechnology in Cape Town from 2007. The centre will provide research facilities for biotechnology in health related research activities and projects to combat diseases such as HIV and AIDS, hepatitis, rotavirus diarrhoea infections in children, malaria, tuberculosis and dengue fever. South Africa was awarded membership of the International Institute of Applied Systems Analysis, associate membership in the European Molecular Biology Conference, and executive membership of the Supporting Entrepreneurs for Sustainable Development during 2007/08.

Regional cooperation resulted in the signing of a Southern African Development Community (SADC) protocol on science, technology and innovation in August 2008, the establishment of a SADC science, technology and innovation desk in Gaborone, Botswana, and the appointment of a SADC representative at the United Nations Commission on Science and Technology for Development from January 2009.

The European Union allocated €30 million to address poverty, underdevelopment and marginalisation through scientific, engineering and innovation interventions. The Department of Science and Technology also signed agreements on the South Africa-Finland ICT knowledge partnership programme and the Finnish-Southern African partnership programme to strengthen the Southern Africa network for biosciences, thus enabling the network to advance life sciences research and development mainly in biodiversity, biotechnology and indigenous knowledge systems and technology.

Expenditure estimates

Table 31.6 International Cooperation and Resources

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
R million							
Multilateral Cooperation and Africa	57.5	68.9	73.3	59.4	56.3	59.4	63.2
International Resources	9.5	27.3	10.0	39.2	50.5	52.6	56.3
Overseas Bilateral Cooperation	10.6	28.2	16.1	32.2	24.4	25.8	27.1
Total	77.6	124.3	99.4	130.8	131.3	137.8	146.6
Change to 2008 Budget estimate				1.5	(1.1)	(1.6)	(1.1)

Table 31.6 International Cooperation and Resources (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Economic classification							
Current payments	31.8	42.0	40.1	43.5	51.9	54.8	57.7
Compensation of employees	13.4	17.4	19.8	25.2	27.8	29.4	31.1
Goods and services	18.4	24.6	20.3	18.3	24.1	25.3	26.5
<i>of which:</i>							
Administrative fees	1.1	0.2	0.1	0.0	0.1	0.1	0.1
Catering: Departmental activities	0.4	0.2	0.6	0.6	0.6	0.6	0.6
Communication	0.8	1.3	1.4	1.3	1.3	1.3	1.4
Computer services	0.4	0.3	0.3	0.3	–	–	–
Consultants and professional services: Business and advisory services	–	–	–	–	0.8	0.8	0.8
Agency and support / outsourced services	2.9	8.0	3.3	1.8	4.1	4.3	4.5
Entertainment	–	0.6	0.6	0.8	0.5	0.5	0.6
Inventory: Stationery and printing	0.5	1.0	0.9	1.3	0.6	0.6	0.7
Travel and subsistence	9.8	9.8	9.9	8.5	10.1	10.6	11.1
Operating expenditure	0.3	0.5	0.7	0.2	1.5	1.6	1.7
Venues and facilities	1.5	2.2	2.0	2.9	3.9	4.1	4.3
Transfers and subsidies	45.4	81.8	59.0	87.2	79.1	82.7	88.6
Provinces and municipalities	0.0	0.0	–	–	–	–	–
Departmental agencies and accounts	25.3	29.6	27.3	30.8	29.3	30.6	32.4
Universities and technikons	1.9	3.2	4.5	1.4	–	–	–
Public corporations and private enterprises	10.2	28.7	22.7	21.1	–	–	–
Non-profit institutions	8.0	20.2	4.4	33.8	49.9	52.1	56.2
Households	0.0	0.2	0.0	0.0	–	–	–
Payments for capital assets	0.5	0.5	0.3	0.2	0.3	0.3	0.3
Machinery and equipment	0.5	0.5	0.3	0.2	0.3	0.3	0.3
Total	77.6	124.3	99.4	130.8	131.3	137.8	146.6

Details of selected transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	25.2	29.6	27.3	30.8	29.3	30.6	32.4
Africa Institute of South Africa	19.0	25.0	26.5	30.5	29.3	30.6	32.4
Global science: Bilateral cooperation	–	–	0.6	–	–	–	–
Global science: International resources	–	–	0.2	0.3	–	–	–
Global science: Multilaterals and Africa	6.2	4.6	–	–	–	–	–
Universities and technikons							
Current	1.9	3.2	4.5	1.4	–	–	–
Global science: International resources	–	–	3.0	1.4	–	–	–
Global science: Multilaterals and Africa	1.9	3.2	1.5	–	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	10.2	28.7	22.7	21.1	–	–	–
Global science: Bilateral cooperation	–	–	0.5	6.6	–	–	–
Global science: International resources	–	–	16.6	8.1	–	–	–
Global science: Multilaterals and Africa	10.2	28.7	5.6	6.4	–	–	–
Non-profit institutions							
Current	8.0	20.2	4.4	33.8	49.9	52.1	56.2
Global science: Bilateral Cooperation	–	–	3.4	8.5	9.0	9.5	9.9
Global science: International resources	–	–	0.2	18.5	30.5	31.5	34.1
Global science: Multilaterals and Africa	8.0	20.2	0.8	6.8	10.4	11.2	12.2

Expenditure trends

Between 2005/06 and 2011/12, expenditure increased from R77.6 million to R146.6 million at an average annual rate of 11.2 per cent. Most of this growth occurred between 2005/06 and 2008/09, driven largely by an average annual increase of 60.3 per cent in the *International Resources* subprogramme and 44.9 per cent in the *Overseas Bilateral Cooperation* subprogramme. This was due to additional allocations to support multilateral and bilateral cooperation, especially the department's expanded involvement in the New Economic Partnership for Africa's Development's African science and technology programme. Between 2008/09 and 2011/12, expenditure grows at a slower average annual rate of 3.9 per cent as the department aims to benefit from cross-border flows of knowledge, innovation, capacity and resources through increased international cooperation.

Programme 4: Human Capital and Knowledge Systems

- *Human Capital and Science Platforms* formulates and implements programmes that address the availability of human capital for science, technology and innovation. It ensures the production of new knowledge to build South Africa's knowledge resources. Funding is provided to institutions, such as the National Research Foundation, and programmes, such as human resource development and research chairs, on the basis of agreed business plans.
- *Indigenous Knowledge Systems* focuses on developing indigenous knowledge and integrating it into the national system of innovation by developing and integrating policy and undertaking strategic projects through the national indigenous knowledge systems office. Funding is largely for compensation of employees and associated goods and services expenditure.
- *Emerging Research Areas and Infrastructure* steers the advancement of novel and cross-cutting research areas and the establishment of world class research infrastructure in the national system of innovation. Funding is provided to institutions and programmes, such as the South African Research Network and the frontier science and technology programme, on the basis of approved business plans.

Objectives and measures

- Build human capital for research, development and innovation by developing an innovation enabling skills strategy to be approved by Cabinet by September 2009.
- Increase the number of researchers and the rate of knowledge production by placing 210 research chairs in the national system of innovation by 2010/11.
- Promote investment in human capital and knowledge production by:
 - increasing the number of centres of excellence from the current 7 to 9 by 2010
 - producing 3 000 science, engineering and technology PhDs a year by 2018.
- Provide a working research network by completing phase I of the South African National Research Network by adding Tshwane University of Technology to the existing connections.
- Improve the quality of research and redress imbalances by putting cutting edge equipment in at least 80 per cent of historically disadvantaged institutions by 2018.
- Foster industrial innovation and develop human capital in each of the identified platforms by identifying and supporting at least 2 emerging research areas by 2018.
- Promote the protection and development of indigenous knowledge systems by establishing a national bioprospecting platform, 2 research chairs, a national network of indigenous knowledge systems databases, 2 provincial nodes, and a bachelor's degree in indigenous knowledge systems by 2010.

Service delivery and spending focus

The research chairs initiative had awarded 72 research chairs in key areas aligned to government strategies by December 2008. Innovation bursaries were awarded to 280 postgraduate degree students in 2007 and 321 in 2008. In 2008, 86 per cent of these bursaries went to black students (83 per cent in 2007) and 56 per cent to female students (55 per cent in 2007). In 2008, 43 per cent of the bursaries were awarded in engineering and

related fields. The innovation programme supported 54 postdoctoral fellows at various national system of innovation institutions.

The 7 existing centres of excellence continue to encourage cross-disciplinary and cross-institutional collaboration. 313 postgraduates have been trained in these centres, and 218 articles were published in peer reviewed journals by the end of 2007/08. The implementation of the youth into science strategy resulted in 125 unemployed science, engineering and technology graduates being deployed as volunteers at 22 centres countrywide.

The bursary funding for innovation competency students did not achieve the planned targets. 7 bursaries were awarded against a target of 30. Further bursaries will be awarded once a new, agreed curriculum is introduced by the Da Vinci Institute in 2010. The national indigenous knowledge systems office initiated 4 bioprospecting and product development flagship projects on traditional medicines, cosmeceuticals, nutraceuticals and ceramics, and registered a bachelor of indigenous knowledge systems degree with the South African Qualification Authority.

Expenditure estimates

Table 31.7 Human Capital and Knowledge Systems

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
R million							
Human Capital and Science Platforms	631.4	751.9	943.6	1 061.2	1 117.7	1 280.1	1 458.4
Indigenous Knowledge Systems	5.3	8.4	10.5	11.9	25.2	27.2	29.1
Emerging Research Areas and Infrastructure	2.3	115.8	318.7	379.8	455.1	488.5	530.6
Total	639.0	876.1	1 272.9	1 452.8	1 598.0	1 795.8	2 018.1
Change to 2008 Budget estimate				2.6	(17.7)	25.3	141.3

Economic classification

Current payments	16.5	17.9	21.4	23.9	29.1	30.8	32.5
Compensation of employees	9.7	10.2	11.9	16.0	20.9	22.2	23.5
Goods and services	6.8	7.7	9.5	7.9	8.1	8.6	9.0
<i>of which:</i>							
Administrative fees	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Advertising	0.2	0.2	0.3	0.8	0.1	0.1	0.1
Assets less than R5 000	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Bursaries (employees)	0.0	0.0	0.0	–	–	–	–
Catering: Departmental activities	0.1	0.1	0.1	0.1	0.4	0.4	0.5
Communication	0.5	0.5	0.7	0.6	0.7	0.8	0.8
Computer services	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Consultants and professional services: Business and advisory services	–	–	–	–	0.6	0.6	0.7
Consultants and professional services: Legal costs	–	–	–	0.7	–	–	–
Contractors	0.0	0.0	0.0	0.0	0.2	0.2	0.2
Agency and support / outsourced services	1.5	1.7	2.0	0.8	0.5	0.5	0.6
Entertainment	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Inventory: Other consumables	–	–	–	0.0	–	–	–
Inventory: Stationery and printing	0.6	0.6	0.8	0.4	1.0	1.1	1.1
Lease payments	0.1	0.1	0.2	0.0	0.2	0.2	0.2
Travel and subsistence	2.8	3.2	3.9	4.0	3.5	3.7	3.9
Training and development	0.0	0.0	0.0	–	–	–	–
Operating expenditure	0.6	0.6	0.8	0.1	0.5	0.6	0.6
Venues and facilities	0.4	0.4	0.5	–	0.2	0.2	0.2

Table 31.7 Human Capital and Knowledge Systems (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Transfers and subsidies	622.5	857.9	1 251.5	1 428.8	1 568.9	1 765.0	1 985.4
Provinces and municipalities	0.0	0.0	–	–	–	–	–
Departmental agencies and accounts	564.0	774.9	936.1	1 105.8	1 276.2	1 456.3	1 644.2
Universities and technikons	4.8	6.5	8.3	3.3	–	–	–
Public corporations and private enterprises	22.7	47.1	259.9	229.0	–	–	–
Non-profit institutions	30.6	29.3	47.2	90.6	292.6	308.6	341.3
Households	0.3	0.0	0.0	0.1	–	–	–
Payments for capital assets	0.0	0.3	0.1	0.2	0.1	0.1	0.1
Machinery and equipment	0.0	0.3	0.1	0.2	0.1	0.1	0.1
Total	639.0	876.1	1 272.9	1 452.8	1 598.0	1 795.8	2 018.1

Details of selected transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	553.0	724.9	886.1	965.2	979.6	1 136.1	1 301.8
Frontier science and technology	8.9	35.0	20.5	–	–	–	–
Human resources development	12.6	55.0	169.4	260.2	281.2	377.6	489.1
Indigenous knowledge system	–	2.5	1.6	–	–	–	–
Learnerships	–	–	–	6.6	6.7	7.1	7.8
National Research Foundation	516.9	596.7	657.7	683.4	691.7	751.4	804.9
Science and youth	–	2.5	2.6	–	–	–	–
Science themes	14.6	33.3	34.3	14.9	–	–	–
Capital	11.0	50.0	50.0	140.6	296.6	320.2	342.3
Equipment placement	11.0	–	–	–	–	–	–
Research and development infrastructure	–	50.0	50.0	51.6	203.1	221.4	237.6
South African National Research Network	–	–	–	89.0	93.5	98.8	104.7
Universities and technikons							
Current	4.8	6.5	8.3	3.3	–	–	–
Frontier science and technology	3.4	0.7	–	–	–	–	–
Human resources development	–	1.0	6.4	–	–	–	–
Indigenous knowledge system	–	0.2	1.2	–	–	–	–
Science and youth	0.7	1.3	0.4	3.3	–	–	–
Science themes	0.7	3.4	0.0	–	–	–	–
Women in science	–	–	0.3	–	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	22.7	5.1	97.9	3.9	–	–	–
Frontier science and technology	12.4	0.4	83.0	–	–	–	–
Human resources development	–	–	9.6	3.5	–	–	–
Indigenous knowledge system	–	–	0.5	0.4	–	–	–
Learnerships	3.1	4.4	3.1	–	–	–	–
Science themes	7.3	0.3	1.7	–	–	–	–
Capital	–	42.0	162.0	225.2	–	–	–
Frontier science and technology	–	20.0	–	136.2	–	–	–
South African National Research Network	–	22.0	162.0	–	–	–	–
Research and development infrastructure	–	–	–	89.0	–	–	–

Table 31.7 Human Capital and Knowledge Systems (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Non-profit institutions							
Current	30.6	29.3	47.2	82.3	261.3	268.7	297.0
Academies	2.5	3.0	3.4	5.6	9.9	10.6	11.2
Centre for High Performance Computing	–	–	–	–	61.3	70.4	80.1
Emerging research areas	–	–	–	–	59.8	51.6	57.1
Frontier science and technology	3.7	5.3	–	–	–	–	–
Human resources development	–	–	10.5	–	–	–	–
Indigenous knowledge systems	3.5	0.8	1.0	4.4	15.9	17.4	18.7
Learnerships	1.9	–	–	–	–	–	–
Science and youth	15.9	16.4	25.0	42.3	52.3	55.9	61.3
Science themes	3.1	3.8	7.3	29.6	59.0	59.6	65.3
Women in science	–	–	–	0.5	0.4	0.4	0.5
Technology Top 100	–	–	–	–	2.6	2.7	2.9
Capital	–	–	–	8.4	31.3	40.0	44.2
Frontier science and technology	–	–	–	8.4	–	–	–
National nanotechnology centres	–	–	–	–	29.9	38.3	42.4
Centre for High Performance Computing	–	–	–	–	1.4	1.6	1.8

Expenditure trends

Expenditure increased at an average annual rate of 21.1 per cent from R639 million in 2005/06 to R2 billion in 2011/12. Expenditure has grown substantially in the past three years, increasing by approximately R200 million per year at an average annual rate of 31.5 per cent. This is driven by increased expenditure in the *Human Capital and Science Platforms* and *Emerging Research Areas and Infrastructure* subprogrammes in the form of transfers, particularly to the National Research Foundation and the South African Research Network. Over the medium term, the budget grows at a steady average annual rate of 11.6 per cent. This is driven by additional funding of R50 million for postgraduate bursaries and R150 million to the National Research Foundation for the research chair initiative.

Programme 5: Socioeconomic Partnerships

- *Science and Technology for Economic Impact* aims to realise government's strategic economic growth and sector development objectives through four major interventions or technology missions: ICT; advanced manufacturing; resource based industries; and climate change challenges.
- *Science and Technology for Social Impact* aims to introduce and promote innovative technology and management competencies to support the creation of sustainable job and wealth opportunities in poor municipal areas by focusing on sustainability and contributing to human settlement issues. The activities require interdepartmental cooperation and partnerships with science councils for extending scientific research and technology applications to address identified priorities in different sectors, as well as the millennium development goals. The subprogramme develops new innovations and technology based solutions to promote an integrated approach to service delivery and enhance capabilities in implementing community infrastructure projects.
- *Science and Technology Investment* leads and supports the development of science and technology indicators, monitors national science and technology expenditure and planning, and implements section 11D of the Income Tax Act (1962), which involves administering reporting by private companies on research and development claims against the tax allowance.

Funding for all three subprogrammes is dominated by transfers to a range of research and innovation entities and institutions, allocated on the strength of approved business plans.

Objectives and measures

- Develop new industries in ICT products and services, metals beneficiation, chemicals production and smart materials by initiating 1 research and development led intervention for each by 2009.
- Support the development of poverty alleviation and sustainable livelihoods policy and strategy by doing evidence based research on 3 priority topics by 2009.
- Contribute to improving government decision making on science and technology as productive investments by producing 2 evaluation reports on public funding for science and technology activities by December 2009.
- Increase the value of public sector procurement contracts accessed by local technology intensive companies through a focused technology localisation effort which provides assistance to at least 25 companies per year.

Service delivery and spending focus

The wireless mesh network project was taken to the next level by developing 3 large scale demonstrators. The global change science plan, which provides a clear indication of the key science and research work required to address the global climate change challenge, was finalised.

Building on the sector specific research and development studies conducted in 2007/08 and 2008/09, the department continued to support other government departments to develop their sector based research and development plans. This resulted in the approval of the national agricultural research and development strategy in 2008 and improved coordination and information sharing with other departments that have science and technology mandates.

The improved tax incentive to encourage spending on research and development received its first application in November 2007. The department focused on creating broad public awareness about the incentive and its requirements.

The department continues to monitor indicators for science, technology and innovation. In 2008/09, the national survey on research and experimental development was completed. The department facilitated the development of an integrated planning and development model, which includes a toolkit for integrated planning with an e-based planning platform. The model is aimed at improving the implementation of integrated community infrastructure, including housing, sanitation, transport, and the delivery of community services such as water, electricity, schools and clinics.

The digital doorway initiative is a computer based education platform for the youth. Over 200 instruments containing Wikipedia and over 10 000 books have been provided across South Africa, mainly in public libraries, community centres and schools. The instruments allow wireless communication and can run on solar power, enabling installation in remote rural areas. This is a joint initiative with the Council for Scientific and Industrial Research.

Expenditure estimates

Table 31.8 Socioeconomic Partnerships

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
R million							
Science and Technology for Economic Impact	715.0	769.0	851.5	865.2	896.7	963.6	1 025.7
Science and Technology for Social Impact	166.1	216.0	254.1	271.9	270.0	291.8	309.6
Science and Technology Investment	2.7	5.5	4.8	22.7	24.0	26.5	28.1
Total	883.8	990.6	1 110.4	1 159.9	1 190.7	1 281.9	1 363.3
Change to 2008 Budget estimate				12.9	2.6	1.6	6.3

Table 31.8 Socioeconomic Partnerships (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Economic classification							
Current payments	10.9	21.2	24.6	30.3	43.6	46.0	48.5
Compensation of employees	5.6	12.9	16.1	20.1	28.8	30.5	32.3
Goods and services	5.3	8.4	8.5	10.2	14.7	15.5	16.2
<i>of which:</i>							
Communication	0.5	0.8	0.8	0.6	1.0	1.0	1.1
Computer services	0.2	0.4	0.4	0.2	0.1	0.1	0.1
Consultants and professional services: Business and advisory services	–	–	–	4.3	8.4	8.8	9.2
Agency and support / outsourced services	1.6	2.6	2.6	0.8	0.4	0.5	0.5
Lease payments	0.1	0.1	0.2	0.2	0.4	0.5	0.5
Travel and subsistence	2.1	3.4	3.4	3.0	3.0	3.1	3.3
Venues and facilities	0.1	0.2	0.2	0.1	0.5	0.5	0.5
Transfers and subsidies	872.8	969.0	1 085.4	1 129.4	1 146.7	1 235.5	1 314.4
Provinces and municipalities	0.0	0.0	–	–	–	–	–
Departmental agencies and accounts	177.2	204.7	250.5	398.7	510.1	557.6	591.4
Universities and technikons	4.7	8.9	17.8	3.5	–	–	–
Public corporations and private enterprises	563.9	634.6	693.9	607.3	581.1	614.0	650.6
Non-profit institutions	126.9	120.8	123.2	119.9	55.6	63.8	72.3
Households	0.0	0.0	0.0	–	–	–	–
Payments for capital assets	0.1	0.3	0.3	0.2	0.4	0.4	0.4
Machinery and equipment	0.1	0.3	0.3	0.2	0.4	0.4	0.4
Total	883.8	990.6	1 110.4	1 159.9	1 190.7	1 281.9	1 363.3
Details of selected transfers and subsidies							
Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	177.2	204.7	250.5	398.7	510.1	557.6	591.4
Advanced manufacturing technology strategy	–	–	–	48.0	47.7	51.5	54.6
Centres of excellence	20.0	–	–	–	–	–	–
Global change science and technology	–	–	–	17.0	22.8	31.7	33.6
Human and social development dynamics	–	–	–	26.5	23.3	38.1	40.6
Human Science Research Council	104.3	121.5	155.9	163.9	157.6	165.0	175.0
Information communication technology	–	13.0	16.0	–	–	–	–
Leveraging services strategy	–	1.7	–	–	–	–	–
Local manufacturing capacity	–	–	–	16.8	25.7	28.2	29.9
Local systems of innovation	–	–	–	1.5	7.8	8.6	9.1
National public assets	43.0	43.0	43.0	–	–	–	–
Natural resources and public assets	–	–	–	30.2	55.3	58.5	62.0
Quality of life nuclear technologies	–	–	–	5.0	5.0	5.9	6.3
Research information management system	–	–	–	14.0	9.9	5.9	6.3
Resource based industries	0.7	–	–	16.3	34.9	36.9	39.1
Science and technology indicators	–	–	–	3.0	4.0	9.9	10.5
South African National Energy Research Institute	–	–	–	–	–	–	–
South African research chairs initiative for human sciences	–	–	–	18.5	21.3	18.3	19.4
Technology for poverty alleviation	1.5	6.2	24.0	17.7	25.6	28.1	29.8
Technology for sustainable livelihoods	1.4	–	0.3	20.4	32.9	32.5	34.4
Technology planning and diffusion	6.5	19.3	11.3	–	–	–	–
Tshumisano Trust	–	–	–	–	36.4	38.6	40.9

Table 31.8 Socioeconomic Partnerships (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Universities and technikons							
Current	4.7	8.9	17.8	3.5	–	–	–
Biofuels	–	–	1.5	–	–	–	–
Information communication technology	0.3	–	–	–	–	–	–
Leveraging services strategy	–	0.6	–	–	–	–	–
South African National Energy Research Institute	0.5	–	–	–	–	–	–
Technology for poverty alleviation	1.5	–	9.0	–	–	–	–
Technology for sustainable livelihoods	2.4	8.3	7.3	3.1	–	–	–
Local systems of innovation	–	–	–	0.4	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	563.9	634.6	693.9	607.3	581.1	614.0	650.6
Advanced manufacturing technology strategy	41.5	41.8	47.7	–	–	–	–
Biofuels	–	–	3.0	–	–	–	–
Council for Scientific and Industrial Research	431.6	483.2	517.4	554.7	581.1	614.0	650.6
Council for Scientific and Industrial Research: National Laser Centre	18.0	–	–	–	–	–	–
Information communication technology	13.7	14.2	54.2	24.6	–	–	–
Resource based industries	15.1	24.2	22.2	13.4	–	–	–
Technology for poverty alleviation	7.9	20.1	–	6.0	–	–	–
Technology for sustainable livelihoods	31.1	44.7	45.0	8.7	–	–	–
Technology planning and diffusion	5.0	6.4	4.4	–	–	–	–
Non-profit institutions							
Current	126.9	120.8	123.2	119.9	55.6	63.8	72.3
Advanced manufacturing technology strategy	–	10.0	10.0	–	–	–	–
Biofuels	–	–	–	–	–	–	–
Information communication technology	–	–	–	45.3	55.6	63.8	72.3
Leveraging services strategy	–	0.6	–	–	–	–	–
National Energy Corporation of South Africa: Fluoro chemicals	20.0	–	–	–	–	–	–
Resource based industries	4.4	5.5	5.4	3.5	–	–	–
South African National Energy Research Institute	19.5	40.0	42.0	–	–	–	–
Technology for poverty alleviation	2.0	9.0	7.0	–	–	–	–
Technology for sustainable livelihoods	12.2	–	0.4	–	–	–	–
Technology planning and diffusion	68.8	55.7	22.5	–	–	–	–
Tshumisano Trust	–	–	36.0	36.6	–	–	–
Local manufacturing capacity	–	–	–	6.8	–	–	–
Natural resources and public assets	–	–	–	22.7	–	–	–
Local systems of innovation	–	–	–	5.0	–	–	–

Expenditure trends

Expenditure increased from R883.8 million in 2005/06 to R1.4 billion in 2011/12, an average annual increase of 7.5 per cent. This growth is more evident in the *Science and Technology for Economic Impact* subprogramme, which accounts for 75.3 per cent of programme expenditure in 2009/10, signifying the strategic importance of supporting government's objective of poverty alleviation through creating sustainable job and wealth opportunities in poor municipal areas.

The programme has not received any additional funds for the medium term, resulting in an average annual growth rate of 5.5 per cent between 2008/09 and 2011/12.

Public entities

Council for Scientific and Industrial Research

Strategic overview: 2005/06 – 2011/12

Through directed and multidisciplinary research and technological innovation, the Council for Scientific and Industrial Research aims to foster industrial and scientific development. Established under the Scientific Research Council Act (1988), the council plays a particular role in the national system of innovation. It conducts activities across the research and innovation value chain, with a focus on directed research and development. The main purpose of the council is to use science, engineering and technology to make a difference to the wellbeing of South Africans by providing technology solutions to current social and industrial challenges.

The Council's 2005 revised organisational strategy is based on the following key strategic objectives: building and transforming human capital; strengthening the science, education and technology base; performing relevant research and development; and transferring technology and skilled human capital.

The council conducts multidisciplinary research on energy, health, the built environment, the natural environment, mining, defence, public safety, manufacturing, space and ICT. These research themes cut across its organisational units.

Selected performance and operations indicators

Table 31.9 Council for Scientific and Industrial Research

Indicator	Programme	Past			Current	Projections		
		2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Total number of permanent staff studying towards masters or PhD degrees	Human capital development	–	–	90	95	115	130	150
Total number of bursaries granted for university study	Human capital development	–	–	134	150	178	208	238
Percentage of science, engineering and technology workers who are black	Human resource management	–	49%	52%	53%	55%	56%	56%
Total number of staff with PhD qualifications	Human resource management	197	237	234	240	255	270	285
Number of publications by staff each year	Science and technology outputs	177	220	343	346	366	386	406
Value of contract research and development formally recognised as supporting national strategies	Contract research and development	–	R274.3m	R373.5m	R375m	R400m	R 430.0 m	R455m
Number of new international patents granted	Research and development outcomes	4	12	21	15	18	22	18

Service delivery and spending focus

Research projects are under way to develop construction technologies for affordable, sustainable, high quality housing for middle to low income earners. The council is a key partner in a special project of the Western Cape Ministry of Housing for constructing 611 40 m², one-bedroomed houses in Kleinmond.

The council has embarked on a research programme to improve the performance of South Africa's road networks by developing a new advanced road pavement design platform for materials design, road pavement structural design and accelerated pavement testing. This scientific approach to pavement design will lead to the construction of more durable roads with lower maintenance costs.

In partnership with various local and provincial governments, universities and other organisations, the council is involved in developing strategies for crime prevention.

The council's satellite technology has been applied successfully to provide input for decision making in a number of strategic areas, such as agro-environment, food security, ocean resources, water management,

disaster management and mitigation, housing development, utilities and infrastructure planning, mining safety and national safety and security. In partnership with ESKOM, the council has developed a fire alert system which uses satellite imagery to spot fires that have the potential to damage the electricity distribution network.

The council's health research has led to the development of a herbal extract for the treatment of mild asthma, colds, influenza and sinus problems. The results have pointed to the mode of action through which this traditional remedy acts, and are the first scientific evidence that validates the traditional use of the plant for treating asthma.

Multidisciplinary research is conducted to support the effective management of water resources, including in virology, parasitology, bacteriology, biotoxicity, chemistry and health risk assessment.

The council also provides a host of specialised, recurring consulting services to the private and public sector, including on forensic fire investigation, mine rope testing, specialised chemical and analytical services and environmental analysis.

Expenditure estimates

Table 31.10 Council for Scientific and Industrial Research: Activity information

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Defence, peace, safety and security	156.1	172.9	217.2	246.4	250.7	270.9	295.3
Materials science and manufacturing	114.3	131.2	146.4	162.5	165.4	178.7	194.8
Biosciences	93.5	97.8	126.7	131.5	133.8	144.6	157.6
Natural resources and the environment	207.0	188.0	181.2	193.9	197.3	213.2	232.4
Built environment	130.6	110.6	126.5	145.4	148.0	159.9	174.3
Other activities	278.8	460.3	445.2	561.8	567.5	599.2	624.2
Total expense	980.2	1 160.7	1 243.3	1 441.5	1 462.8	1 566.5	1 678.5

Table 31.11 Council for Scientific and Industrial Research: Financial information

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Statement of financial performance							
Revenue							
Non-tax revenue	616.7	726.8	868.5	951.7	980.1	1 056.9	1 138.5
Sale of goods and services other than capital assets	581.6	660.6	776.9	877.7	917.8	1 000.2	1 087.2
of which:							
Research revenue	581.6	660.6	776.9	877.7	917.8	1 000.2	1 087.2
Other non-tax revenue	35.1	66.2	91.6	74.0	62.2	56.7	51.3
Transfers received	421.6	460.4	429.0	520.9	515.7	544.7	577.1
Total revenue	1 038.3	1 187.2	1 297.5	1 472.6	1 495.8	1 601.5	1 715.6
Expenses							
Current expense	980.2	1 160.6	1 243.4	1 441.5	1 462.8	1 566.5	1 678.5
Compensation of employees	541.8	592.8	628.3	725.6	784.7	843.1	905.5
Goods and services	380.8	510.7	580.6	640.8	593.2	630.5	670.8
Depreciation	40.2	50.7	28.1	75.1	84.9	92.9	102.2
Interest, dividends and rent on land	17.4	6.4	6.4	–	–	–	–
Total expenses	980.2	1 160.7	1 243.3	1 441.5	1 462.8	1 566.5	1 678.5
Surplus / (Deficit)	58.1	26.5	54.3	31.1	33.0	35.0	37.1
Statement of financial position							
Carrying value of assets	300.1	219.1	225.4	345.5	349.6	363.7	379.3
of which: Acquisition of assets	119.7	66.4	41.8	195.1	89.0	107.1	117.8
Investments	17.8	200.0	–	–	–	–	–
Inventory	46.9	43.2	61.7	58.0	42.7	58.5	64.4
Receivables and prepayments	160.0	146.9	267.1	209.1	237.6	268.1	299.4
Cash and cash equivalents	294.0	379.2	691.5	584.2	576.8	588.6	647.4
Assets not classified elsewhere	–	95.1	94.9	–	–	–	–
Total assets	818.8	1 083.6	1 340.6	1 196.8	1 206.7	1 279.0	1 390.5

Table 31.11 Council for Scientific and Industrial Research: Activity information (continued)

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Accumulated surplus/deficit	319.9	347.7	392.7	423.9	456.9	491.9	529.0
Post-retirement benefits	14.9	12.8	8.6	5.6	1.8	–	–
Trade and other payables	387.4	623.8	819.5	684.2	657.8	689.2	755.4
Provisions	65.3	72.2	76.6	83.1	90.2	97.8	106.2
Liabilities not classified elsewhere	31.3	27.1	43.1	–	–	–	–
Total equity and liabilities	818.8	1 083.6	1 340.6	1 196.8	1 206.7	1 279.0	1 390.5

Expenditure trends

The Council for Scientific and Industrial Research is funded by transfers (as a core grant) by the Department of Science and Technology as well as ringfenced allocations, and generates about 62 per cent of its total revenue from research and development contract income. Allocations over the MTEF period are R592 million, R627 million and R664 million (including value added tax). Over and above the MTEF allocations, the council receives additional (ringfenced) allocations of R73 million, R80 million and R84 million over the same period, reflecting an average annual increase of 4.6 per cent.

Over the medium term, the council's estimated revenue is set to grow at an average annual rate of 5.3 per cent from R1.5 billion in 2008/09 to R1.7 billion in 2011/12.

National Research Foundation

Strategic overview: 2005/06 – 2011/12

The National Research Foundation was established in line with the National Research Foundation Act (1998). The foundation is responsible for promoting and supporting research in all fields of the humanities, the social and natural sciences, engineering and technology. It serves as a catalyst for stimulating both fundamental and applied research for a broader knowledge economy by supporting knowledge production and highly skilled human capital needs and providing critical science platforms.

In accordance with the legislation, the National Research Foundation performs an agency function on behalf of the Department of Science and Technology, and is a service provider to all government departments. The clustered activities of the foundation include: research innovation support and advancement; national research facilities; astro, space and geosciences; biodiversity and conservation; and nuclear sciences.

In 2007/08, the foundation developed a new strategic plan reaching to 2015. The plan recognises the following high level strategic goals, aimed at contributing to a prosperous and sustainable continent: an internationally competitive science, technology and innovation system; a representative research and technical workforce; world class science benchmarking and granting systems; leading edge research, technology and innovation platforms; and a vibrant national system of innovation.

Medium term priorities are to increase student bursary values and establish a stable funding base in order to recapitalise equipment and the national research facilities' infrastructure.

Selected performance and operations indicators

Table 31.12 National Research Foundation

Indicator	Past			Current	Projections		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Number of honours students supported each year	662	687	274	715	772	834	884
Number of masters students supported each year	2 003	2 496	1 954	2 329	2 505	2 706	2 868
Numbers of PhD students supported each year	1 179	1 417	1 098	1 293	1 396	1 508	1 598
Number of black researchers supported each year	473	494	497	427	469	517	548
Number of female researchers supported each year	600	670	681	500	549	605	641
Number of researchers supported each year	1 617	1 680	1 716	916	1 006	1 108	1 175

Table 31.12 National Research Foundation (continued)

Indicator	Past			Current	Projections		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Number of masters and PhD students supervised by National Research Foundation staff each year	146	167	203	261	313	391	415
Number of peer reviewed publications by researchers funded through the Research and Innovation Support Agency each year	3 024	2 534	3 030	3 273	3 437	3 609	3 825
Number of refereed journal articles by National Research Foundation staff each year	119	164	264	175	186	197	209

Service delivery and spending focus

The National Research Foundation has established a separate business unit to manage the activities of the Square Kilometre Array project. Progress with the development of KAT7 is on track, with the acquisition of the site in the Karoo being finalised and construction having commenced.

The foundation's rating system is one of the main instruments used to evaluate the quality of research in South Africa and contributes to an increasingly competitive science system. The system was reviewed by the Higher Education Statistics Agency in 2007/08 and road shows were taken to 48 tertiary and research institutions to raise awareness of the results. In 2008/09, the number of rated researchers across all disciplines at South African higher education institutions and science councils increased from 49 to 1 653.

In line with the department's human capital development strategy, the National Research Foundation launched the PhD project in November 2007. A PhD fair in May 2008 was attended by about 300 participants representing academia, business, and government. The PhD project aims to facilitate an increase in the numbers of South African PhD graduates to strengthen academic expertise and talent for the knowledge economy. The project has already successfully negotiated 10 fully paid scholarships at Singapore University and 17 co-funded scholarships at Vrije Universiteit in Amsterdam. Discussions are ongoing with Rutgers University, the German Science Council and the Common Wealth Research Council for scholarships.

The research information management system, hosted by the National Research Foundation on behalf of the research and academic sector, has progressed substantially during the year, with two modules implemented and other modules in development. The University of the Witwatersrand is using the research output module for submitting research output data to the Department of Education, soon to be followed by other members of the research information management consortium. The process of awarding research chairs has progressed more slowly than anticipated due to funding constraints. However, 18 research chairs are expected to be awarded by the end of March 2009.

Grant holders supported through core government funds increased from 1 680 in 2006/07 to 1 716 in 2007/08, with an average grant size of R89 000. This represents 4 out of every 10 fundable projects. Total research outputs, such as peer-reviewed articles, increased by 13 per cent from 2 507 in 2006/07 to 2 884 in 2007/08. International collaborations increased from 190 in 2006/07 to 231 in 2007/08.

The number of students supported through Research and Innovation Support Agency grant holder linked and free standing bursaries decreased from 4 678 in 2006/07 to 3 675 in 2007/08 due to the competitive funding process, an increase in bursary values, and an increasing number of science councils offering their own bursaries at higher levels to students.

During 2007/08, the National Zoological Gardens, a facility of the National Research Foundation, was awarded gold status by the heritage environmental rating programme for environmental practices. Despite this, an inability to adequately sustain maintenance due to funding constraints led to the suspension of its accreditation with the Pan African Association for Zoos, Aquaria and Botanical Gardens.

Expenditure estimates

Table 31.13 National Research Foundation: Programme information

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Research innovation support and advancement	737.7	485.4	581.4	745.5	906.9	936.4	1 004.1
National facilities	245.1	280.0	316.9	320.7	347.2	375.0	392.6
South African Agency for Science and Technology Advancement	27.5	29.0	30.1	46.9	39.4	42.6	44.6
Square Kilometre Array project	20.4	30.5	47.4	76.5	113.0	163.8	196.4
Total expense	1 030.7	824.9	975.8	1 189.6	1 406.5	1 517.8	1 637.7

Table 31.14 National Research Foundation: Financial information

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Statement of financial performance							
Revenue							
Non-tax revenue	447.3	255.6	491.2	653.1	869.3	1 161.5	1 027.4
Sale of goods and services other than capital assets of which:	7.7	19.8	25.3	25.2	30.2	33.5	36.2
Sales by market establishments	7.7	19.8	25.3	25.2	30.2	33.5	36.2
Other non-tax revenue	439.7	235.8	465.9	627.9	839.1	1 128.0	991.3
Transfers received	542.1	580.4	621.3	399.8	537.2	356.3	610.2
Total revenue	989.5	836.0	1 112.5	1 052.9	1 406.5	1 517.8	1 637.7
Expenses							
Current expense	393.8	427.5	491.8	660.2	652.1	743.1	799.4
Compensation of employees	203.6	221.7	242.8	308.8	341.9	376.0	394.9
Goods and services	179.0	190.1	219.9	319.4	276.7	322.2	350.4
Depreciation	11.1	15.1	28.6	31.5	33.0	44.4	53.6
Interest, dividends and rent on land	0.2	0.7	0.4	0.4	0.5	0.5	0.5
Transfers and subsidies	636.9	397.4	484.0	529.4	754.4	774.7	838.3
Total expenses	1 030.7	824.9	975.8	1 189.6	1 406.5	1 517.8	1 637.7
Surplus / (Deficit)	(41.2)	11.2	136.7	(136.7)	-	-	-
Statement of financial position							
Carrying value of assets	163.1	210.6	240.1	603.3	794.8	1 232.7	1 474.3
of which: Acquisition of assets	43.4	62.8	59.8	395.0	224.4	482.4	295.1
Investments	81.1	53.4	52.0	52.0	50.0	50.0	50.0
Inventory	2.9	2.7	2.6	3.1	3.5	3.5	4.0
Loans	3.1	3.5	-	-	-	-	-
Receivables and prepayments	745.7	102.9	298.5	250.1	300.0	350.0	375.0
Cash and cash equivalents	311.5	371.2	507.3	422.3	380.0	350.0	300.0
Total assets	1 307.4	744.2	1 100.5	1 330.8	1 528.3	1 986.2	2 203.3
Statement of financial performance							
Accumulated surplus/deficit	(69.0)	(72.6)	42.6	(92.3)	(55.0)	(48.0)	(40.0)
Capital and reserves	77.6	77.1	98.6	125.6	125.6	125.6	125.6
Borrowings	9.8	-	-	-	-	-	-
Post-retirement benefits	88.1	89.0	93.6	96.6	99.6	102.6	105.4
Trade and other payables	1 037.4	456.6	644.5	650.0	654.7	596.8	569.4
Provisions	15.7	-	-	-	-	-	-
Liabilities not classified elsewhere	147.7	194.1	221.3	551.0	703.4	1 209.3	1 442.9
Total equity and liabilities	1 307.4	744.2	1 100.5	1 330.8	1 528.3	1 986.2	2 203.3

Expenditure trends

The National Research Foundation is funded by transfers (as a core grant) from the Department of Science and Technology, as well as ringfenced allocations. Allocations over the MTEF period are R697 million, R759 million and R814 million. Over and above the MTEF baseline allocations, the foundation will receive additional allocations of R37 million, R43 million and R46 million.

The decrease in the audited outcome in 2006/07 and 2007/08 compared to 2005/06 is attributable to the disaggregation of two key programmes, the Innovation Fund and the technology for human resources and industry programme, from the consolidated results of the foundation. In terms of accounting standards, control over these programmes rests with the Department of Science and Technology and the Department of Trade and Industry respectively.

The foundation received a lower government grant (6 per cent) in 2007/08. However, overall income increased substantially due to the increase in contract funded programmes which correlates with the spending pattern. This impact is reflected mainly in expenditure items relating to salaries and wages and research grants. Key contract funded programmes include: the Department of Labour scarce skills study; the development of the research information management system; the South African National Antarctic Programme; the Department of Science and Technology innovation honours programme; the African coelacanth ecosystem programme; and the establishment of six South African environmental observatory network nodes. The single largest source of contract funds is from the initial phase of the Square Kilometre Array project, which is capital intensive and therefore impacts significantly on deferred income.

Additional tables

Table 31.A Summary of expenditure trends and estimates per programme and economic classification

Programme	Appropriation		Audited outcome	Appropriation			Revised estimate
	Main	Adjusted		Main	Additional	Adjusted	
R million	2007/08		2007/08	2008/09			2008/09
1. Administration	85.3	115.1	113.4	115.3	(0.2)	115.1	115.1
2. Research, Development and Innovation	546.6	541.3	531.4	862.9	0.2	863.1	863.1
3. International Cooperation and Resources	118.0	103.8	99.4	129.3	1.5	130.8	130.8
4. Human Capital and Knowledge Systems	1 257.3	1 252.1	1 272.6	1 449.5	3.4	1 452.8	1 452.8
5. Socioeconomic Partnerships	1 135.3	1 132.0	1 110.4	1 147.0	12.9	1 159.9	1 159.9
Total	3 142.5	3 144.2	3 127.3	3 704.0	17.7	3 721.7	3 721.7
Economic classification							
Current payments	222.2	246.9	211.0	226.6	16.2	242.9	242.9
Compensation of employees	113.0	114.9	104.1	130.2	5.7	135.9	135.9
Goods and services	109.3	132.1	106.8	96.5	10.5	107.0	107.0
Financial transactions in assets and liabilities	—	0.0	0.1	—	—	—	—
Transfers and subsidies	2 917.8	2 894.6	2 908.4	3 475.1	1.6	3 476.7	3 476.7
Departmental agencies and accounts	1 624.9	1 616.0	1 516.9	1 927.7	(17.0)	1 910.6	1 910.6
Universities and technikons	10.0	15.0	45.8	10.0	8.3	18.3	18.3
Public corporations and private enterprises	517.4	593.5	1 023.2	550.9	328.2	879.1	879.1
Non-profit institutions	765.6	669.4	322.2	986.5	(318.2)	668.3	668.3
Households	—	0.6	0.2	—	0.4	0.4	0.4
Payments for capital assets	2.5	2.7	7.9	2.3	(0.1)	2.1	2.1
Machinery and equipment	2.5	2.7	7.9	2.3	(0.1)	2.1	2.1
Total	3 142.5	3 144.2	3 127.3	3 704.0	17.7	3 721.7	3 721.7

Table 31.B Summary of personnel numbers and compensation of employees

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Permanent and full time contract employees							
Compensation (R million)	61.1	79.5	99.8	134.1	190.9	202.1	213.8
Unit cost (R million)	0.3	0.3	0.3	0.4	0.5	0.5	0.4
Personnel numbers (head count)	235	301	301	339	385	431	477
Part time and temporary contract employees							
Compensation (R million)	4.0	4.3	4.3	1.8	1.9	2.0	2.2
Unit cost (R million)	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Personnel numbers (head count)	31	33	33	14	14	14	14
Total for department							
Compensation (R million)	65.1	83.7	104.1	135.9	192.8	204.2	215.9
Unit cost (R million)	0.2	0.3	0.3	0.4	0.5	0.5	0.4
Personnel numbers (head count)	266	334	334	353	399	445	491

Table 31.C Summary of expenditure on training

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Compensation of employees (R million)	65.1	83.7	104.1	135.9	192.8	204.2	215.9
Training expenditure (R million)	3.3	1.0	3.6	5.2	5.0	5.1	5.4
Training as percentage of compensation	5.0%	1.1%	3.5%	3.9%	2.6%	2.5%	2.5%
Total number trained in department (head count)	113	120	127	141			
<i>of which:</i>							
Employees receiving bursaries (head count)	37	38	41	46			

Table 31.D Summary of donor funding

Donor	Project	Departmental programme name	Amount committed	Main economic classification	Spending focus	Audited outcome			Estimate 2008/09	Medium-term expenditure estimate		
						2005/06	2006/07	2007/08		2009/10	2010/11	2011/12
R thousand												
Foreign												
In cash												
Canadian International Development Agency	Epidemiological modelling for HIV and AIDS policy in South Africa	Research, Development and Innovation	20 000	Departmental agencies and accounts	Improved region, age and gender specific epidemiological measures incorporated into routine surveillance. Increased capacity of young South Africans to perform gender sensitive, policy impacting epidemiological research	-	-	-	4 000	4 000	4 000	4 000
Japan International Cooperation Agency	Productivity training	International Cooperation and Resources	700	Goods and services	Increase the employability level of science and technology graduates	-	-	200	500	-	-	-
Japan International Cooperation Agency	Climate change regional conference	International Cooperation and Resources	600	Goods and services	Support the Southern Africa Development Community climate change agenda	-	-	-	600	-	-	-
Japan International Cooperation Agency	Science centre baseline study on learning material	International Cooperation and Resources	200	Goods and services	Provide quality baseline data on what learning materials are available in science centres and recommend a standardisation of learning material	-	-	-	200	-	-	-
Japan International Cooperation Agency	African Initiative for Capacity Development support	International Cooperation and Resources	200	Goods and services	Logistical and administrative support for the African Initiative for Capacity Development technical assistant	-	-	-	200	-	-	-
Japan International Cooperation Agency	Intellectual property management training	International Cooperation and Resources	1 200	Goods and services	Build South African capacity in intellectual property rights management	-	-	-	1 200	-	-	-
AUSAID, Australia	Postgraduate mentor bursary programme and South African Energy Research Institute	International Cooperation and Resources	186	Goods and services	Funded postgraduate exchange programmes, creating opportunities in energy research.	-	-	186	-	-	-	-
European Union	Sector budget support	International Cooperation and Resources	300 000	Departmental agencies and accounts	Create programmes and measures designed to reduce poverty and encourage economic growth in South Africa	-	-	-	100 000	100 000	100 000	-
Finland	Cooperation framework on innovation between Finland and South Africa	International Cooperation and Resources	30 000	Departmental agencies and accounts	Support the development of provincial and local systems of innovation, especially in Eastern Cape, Gauteng and Western Cape	-	-	10 000	10 000	10 000	-	-

Table 31.D Summary of donor funding (continued)

Donor	Project	Departmental programme name	Amount committed	Main economic classification	Spending focus	Audited outcome			Estimate 2008/09	Medium-term expenditure estimate		
						2005/06	2006/07	2007/08		2009/10	2010/11	2011/12
R thousand												
Foreign In cash												
Finland	South Africa-Finland knowledge partnership on ICT	International Cooperation and Resources	30 000	Departmental agencies and accounts	Interventions to help South Africa become a knowledge society with ICT branding reflecting research excellence and demonstrating improvements in quality of life and economic competitiveness	-	-	10 000	10 000	10 000	-	-
Finland	Finland and South Africa to support the development of biosciences in Southern Africa	International Cooperation and Resources	30 000	Departmental agencies and accounts	Institutional strengthening of the Southern Africa biosciences network secretariat. Development of the operating environment. Capacity development. Network creation and dissemination. Identification, development and implementation of projects by the network	-	-	-	10 000	10 000	10 000	10 000
AUSAID, Australia	Science centre manager training	Human Capital and Knowledge Systems	862	Goods and services	Train 20 South African and 5 Lesotho science centre managers in South Africa initially. Further train 5 South African and 2 Lesotho participants in Australia on a similar course	-	-	-	862	-	-	-
Germany	Financial assistance towards the Academy of Sciences for the Developing World conference	International Cooperation and Resources	1 000	Goods and services	Host the multilateral Academy of Sciences for the Developing World conference, aiming at promoting scientific excellence	-	-	-	1 000	-	-	-

Table 31.D Summary of donor funding (continued)

Donor	Project	Departmental programme name	Amount committed	Main economic classification	Spending focus	Audited outcome		Estimate 2008/09	Medium-term expenditure estimate		
						2005/06	2006/07	2007/08	2009/10	2010/11	2011/12
R thousand											
Foreign											
In kind											
Japan International Cooperation Agency	African Initiative for Capacity Development technical assistance	International Cooperation and Resources	6 800	Foreign governments and international organisations	Assistance with creation and implementation of the African Initiative for Capacity Development, and the design and implementation of pilot projects	–	–	1 700	1 700	1 700	–
Japan International Cooperation Agency	Science centre senior volunteers in Limpopo	Human Capital and Knowledge Systems	6 000	Foreign governments and international organisations	Support science centres to develop teaching material for science and maths education and to develop exhibitions	–	–	1 500	1 500	1 500	–
Japan International Cooperation Agency	Science centre senior volunteers in Eastern Cape	Human Capital and Knowledge Systems	2 000	Foreign governments and international organisations	Support science centres to develop teaching material for science and maths education and to develop exhibitions	–	–	–	1 000	–	–
Japan International Cooperation Agency	Technical assistant	International Cooperation and resources	8 500	Foreign governments and international organisations	Improve bilateral relationships with the Japanese national system of innovation	1 700	1 700	1 700	1 700	–	–
Germany	Technical assistant	International Cooperation and Resources	838	Foreign governments and international organisations	Improve bilateral relationships with the German national system of innovation	–	–	–	449	–	–
France	Partnership on in vitro screening of inhibitors to plasmodium falciparum glutathione S-transferase platform	Research, Development and Innovation	150	Departmental agencies and accounts	Finalise the work between the Council for Scientific and Industrial Research and France on the drug development platform	–	–	–	150	–	–
Total			439 236			1 700	1 700	25 286	135 061	117 200	14 000

Table 31.E Summary of expenditure on infrastructure

	Type of infrastructure	Service delivery outputs	Current project stage	Total project cost	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate			
					2005/06	2006/07	2007/08		2009/10	2010/11	2011/12	
R million												
Mega projects or programmes (over R300 million per year for a minimum of three years or R900 million total project cost)												
	Square Kilometre Array Infrastructure	Radio Telescopes	Construction of telescopes	Design	1 945.8	–	–	80.0	264.3	490.3	535.7	575.6
Large projects or programmes (costing between R50 million and R300 million per year within the MTEF period)												
	Centre for High Performance Computing	Research Equipment	Purchase of equipment	Identification	222.6	–	–	–	–	65.5	75.1	82.0
	Science and Technology Head Office Building	Building	Construction of building	Completed	133.0	–	133.0	–	–	–	–	–
	Research and development infrastructure	Research Equipment	Purchase of equipment	Identification	962.8	–	110.0	50.0	140.6	203.1	221.4	237.6
	Frontier Science and Technology Infrastructure	Research Equipment	Purchase of equipment	Implementation	288.0	–	40.0	103.5	144.5	–	–	–
	Space Infrastructure	Satellite	Satellite construction	Implementation	197.9	–	20.0	20.0	15.0	36.4	51.4	55.2
	Hydrogen Strategy	Research Equipment	Purchase of equipment	Implementation	195.0	–	–	10.0	40.5	44.2	48.4	51.9
	Research Equipment	Research Equipment	Purchase of equipment	Implementation	50.0	–	50.0	–	–	–	–	–
Small projects or programmes (costing less than R50 million per annum)												
	National Nanotechnology Centres	Research Centres	Equipping centres	Implementation	110.6	–	–	–	–	29.9	38.3	42.4
Total					4 105.8	–	353.0	263.5	604.9	869.4	970.3	1 044.7

