

# Vote 33

## Science and Technology

### Budget summary

R million	2010/11				2011/12	2012/13
	Total to be appropriated	Current payments	Transfers and subsidies	Payments for capital assets	Total	Total
<b>MTEF allocation</b>						
Administration	182.9	179.1	1.0	2.8	193.9	203.8
Research, Development and Innovation	1 284.0	45.9	1 237.9	0.2	1 341.2	826.2
International Cooperation and Resources	135.1	58.9	75.8	0.5	143.1	148.5
Human Capital and Knowledge Systems	1 748.7	31.4	1 717.2	0.1	1 955.1	1 933.9
Socioeconomic Partnerships	1 264.8	46.7	1 217.6	0.5	1 335.5	1 447.8
<b>Total expenditure estimates</b>	<b>4 615.5</b>	<b>362.0</b>	<b>4 249.5</b>	<b>4.1</b>	<b>4 968.8</b>	<b>4 560.2</b>
Executive authority	Minister of Science and Technology					
Accounting officer	Director-General of Science and Technology					
Website address	www.dst.gov.za					

The Estimates of National Expenditure booklets for individual votes are available on [www.treasury.gov.za](http://www.treasury.gov.za). They provide more comprehensive coverage of vote specific information, particularly about goods and services, transfers, public entities and lower level institutional information.

### 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 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:** Policy leadership, innovation and research.

#### 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:** A strategic partner within government and with industry, contributing to South Africa's transition to a knowledge economy.

### **Strategic overview: 2006/07 – 2012/13**

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 priorities for creating a knowledge based economy**

Over the medium term, government's medium term strategic framework, the national research and development strategy and the 10-year innovation plan guide and inform the department's strategic priorities for socioeconomic development. The medium term strategic framework identifies technological innovation as playing a critical role in speeding up growth and transforming the economy to create decent work and sustainable livelihoods. The framework emphasises biotechnology, pharmaceuticals, space science and technology, energy security and environmental change (including climate change).

#### *10-year innovation plan*

The national research and development strategy is based on an integrated approach that includes human resource development, knowledge generation, investment in science and technology infrastructure, and improving the strategic management of the public science and technology system. The 10-year innovation plan for South Africa for 2008 to 2018, called innovation towards a knowledge based economy, recognises that while South Africa's science and technology system has made important strides, there is a large gap between South Africa and the countries identified as knowledge driven economies.

To close this gap, the national system of innovation needs to become more focused on long term objectives, including urgently confronting South Africa's failure to commercialise the results of scientific research, and the inadequate production (both qualitative and quantitative) of knowledge workers capable of building a globally competitive economy. The plan's success will be measured by the degree to which science, technology and innovation play a driving role in enhancing productivity, economic growth and socioeconomic development.

#### *More emphasis on implementation*

So far, the implementation of the 10-year innovation plan has resulted in three major developments: the Technology Innovation Agency, the Intellectual Property Rights from Publicly Financed Research and Development Act (2008), and the centres of competence. The Technology Innovation Agency will address the challenges of commercialising scientific results and the fragmentation of funding instruments for establishing a network of centres of competence. These centres are instruments for developing new research and development led industries and foster cooperation between industry, higher education institutions and science councils. The agency will accelerate translating research results into products and services. It will also support the development of technology based enterprises, thus stimulating venture capital and foreign direct investment.

The Intellectual Property Rights from Publicly Financed Research and Development Act (2008) is a step forward for stimulating innovation and economic growth. It provides a mechanism for identifying commercialisation opportunities arising from publicly funded research and development, and gives preferential access to such opportunities for small enterprises and black owned entities.

#### **Aligning scientific and technological innovation with sectoral priorities**

Following Cabinet approval of the national industrial policy framework in 2007, the department introduced new strategic policy capacity aimed at identifying and facilitating the research, development, and innovation activities needed for growth and competitiveness in strategic economic sectors. The department will identify frontier technology interventions that support important labour intensive sectors, such as mining, agriculture,

and tourism. It will also sharpen the focus of the advanced manufacturing technology strategy in light of the current economic downturn to generate long term growth opportunities. It will accelerate the implementation of a technology localisation framework, which supports the technological capabilities of local manufacturing companies that are potential suppliers to large scale government infrastructure programmes. Finally, the department will promote new long term research and development led technology and knowledge based industries, such as advanced batteries, titanium products and biocomposites, enabling South Africa to shift from a resource based economy to a knowledge based economy and create new growth engines.

### Rural development and the regional innovation system

The department recently began to explore ways in which innovation can support sustainable economic development and social upliftment in rural areas. These include new approaches to agro-processing and affordable wireless connectivity solutions. A study was conducted in Eastern Cape, which identified a number of interventions that can drive innovation led initiatives.

### Innovation to support small medium and micro enterprises and communities

New ideas and innovation based approaches, such as wireless mesh networks, can help to develop small, medium and micro enterprises (SMME) and communities. Over the last few years, the department has initiated a range of pilot projects and demonstrator community enterprise development initiatives in aquaculture, fisheries, and agro-processing targeted at marginalised communities. The department's role is to demonstrate the viability of innovation based approaches and identify the prerequisites for success. Successful projects, such as the abalone aquaculture project, are migrated to other government departments or agencies for large scale rollout.

### Research and development

The increase of gross national expenditure on research and development as a percentage of GDP has been reasonably steady, growing from 0.60 per cent in 1997 to 0.95 per cent in 2006. The department is aiming for research and development expenditure to reach a 1 per cent of GDP by 2008/09. The 2007/08 research and development survey which was released in November 2009 showed that expenditure on research and development as a percentage of GDP decreased slightly in 2007/08, but this is expected to have increased in 2008/09.

### Regional and international cooperation

Regional and international cooperation advances science and technology through shared learning. The department's strategies include leading South Africa's engagement in the United Nations (UN) family of science organisations, maximising participation in major summits and international conventions, strengthening South-South partnerships, and accessing international research programmes such as the European Union's (EU) framework programme of research.

## Savings and cost effective service delivery

Over the MTEF period, a R578.8 million baseline reduction will be realised through improving efficiency and value for money, and reducing waste and ineffective spending. Although the development of innovation capacity will slow down, the department will be able to continue with existing activities and meet its objectives. The reductions per programme over the MTEF period are:

The *Research Development and Innovation* programme's budget is reduced by R142.7 million. The affected areas are the Innovation Fund, the biotechnology strategy, innovation projects, space science and the Square Kilometre Array project. The *International Cooperation and Resources* programme's budget is reduced by R9.9 million, affecting global science projects. The *Human Capital and Knowledge System* programme's budget has been reduced by R261 million. The affected areas are learnerships, human resource development, emerging research areas, youth programmes, science themes and the National Research Foundation. The *Socioeconomic Partnerships* programme's budget has been reduced by R165.2 million. The affected areas are advanced manufacturing technology, global change, human and social development dynamics, local manufacturing

capacity, quality of life nuclear technology, the research information management system, resource based industries, science and technology indicators, IT, and the Council for Scientific and Industrial Research.

## Selected performance indicators

**Table 33.1 Science and Technology**

Indicator	Programme	Past			Current	Projections		
		2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Size of the portfolio of intellectual property, including the number of patents, patents applications and trademarks resulting from publicly funded research	Research, Development and Innovation, and Socioeconomic Partnerships	--	--	--	--	20	40	55
Number of companies provided with a technology assistance package per year to facilitate successful participation in infrastructure public procurement processes	Socioeconomic Partnerships	--	--	--	24	24	24	28
Total number of research chairs established at higher education institutions	Human Capital and Knowledge Systems, and Socioeconomic Partnerships	21	72	82	82	102	132	150
Total number of peer reviewed scientific and technical papers published		--	--	--	500	620	706	774
Total number of internships awarded		49	68	100	225	348	371	471
Number of students registered for Masters and PhDs per year and supported by targeted human capital development instruments		--	280	415	1 200	1 400	1 800	2 000
Amount of foreign funds leveraged in support of science, technology and innovation cooperation	International Cooperation and Resources	R70m	R94.1m	R189m	R230m	R196.3m	R199.3m	R68.1m
Total number of functional centres of excellence	Research, Development and Innovation, Human Capital and Knowledge Systems, and Socioeconomic Partnerships	7	7	7	8	9	9	9
Number of learners benefiting per year from targeted mathematics, science, english, engineering and technology capacity building programmes	Research, Development and Innovation, Human Capital and Knowledge Systems, and Socioeconomic Partnerships	--	--	--	2 550	2 700	2 700	2 700
Number of new joint science, technology and innovation initiatives with African partners	Research, Development and Innovation, Human Capital and Knowledge Systems, and Socioeconomic Partnerships	--	--	--	--	8	10	12
Number of new technologies under development	Research, Development and Innovation, Human Capital and Knowledge Systems, and Socioeconomic Partnerships	5	9	13	17	22	31	44
Number of new technology based companies established as a result of products developed through funded research and development programmes	Research, Development and Innovation, Human Capital and Knowledge Systems, and Socioeconomic Partnerships	5	8	14	15	17	22	29
Number of households benefiting from technology based interventions per year	Socioeconomic Partnerships	--	--	--	--	2 800	3 000	3 500

## Expenditure estimates

**Table 33.2 Science and Technology**

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
R million								
1. Administration	225.9	116.8	129.9	173.6	173.6	182.9	193.9	203.8
2. Research, Development and Innovation	394.0	529.8	855.8	1 143.4	1 143.4	1 284.0	1 341.2	826.2
3. International Cooperation and Resources	124.3	99.4	140.5	132.0	132.0	135.1	143.1	148.5
4. Human Capital and Knowledge Systems	878.2	1 275.3	1 457.6	1 599.0	1 599.0	1 748.7	1 955.1	1 933.9
5. Socioeconomic Partnerships	990.6	1 105.9	1 119.6	1 213.8	1 213.8	1 264.8	1 335.5	1 447.8
<b>Total</b>	<b>2 613.0</b>	<b>3 127.3</b>	<b>3 703.5</b>	<b>4 261.7</b>	<b>4 261.7</b>	<b>4 615.5</b>	<b>4 968.8</b>	<b>4 560.2</b>
Change to 2009 Budget estimate				27.6	27.6	(92.5)	(129.0)	(188.0)

### Economic classification

<b>Current payments</b>	<b>173.9</b>	<b>210.9</b>	<b>260.2</b>	<b>342.4</b>	<b>342.4</b>	<b>362.0</b>	<b>382.6</b>	<b>401.9</b>
Compensation of employees	83.7	104.1	144.9	200.2	200.2	215.0	227.3	239.1
Goods and services	90.2	106.8	115.3	142.2	142.2	147.0	155.2	162.8
<i>of which:</i>								
Communication	5.6	7.0	6.8	7.8	7.8	8.4	8.5	8.9
Consultants and professional services:	0.2	0.3	4.9	22.2	22.2	18.2	21.0	21.9
Business and advisory services								
Agency and support / outsourced services	30.2	33.8	21.1	20.2	20.2	22.9	25.1	26.3
Travel and subsistence	27.7	31.7	38.2	37.8	37.8	41.6	43.3	45.4
<b>Transfers and subsidies</b>	<b>2 293.4</b>	<b>2 908.4</b>	<b>3 439.9</b>	<b>3 914.8</b>	<b>3 914.8</b>	<b>4 249.5</b>	<b>4 582.9</b>	<b>4 155.0</b>
Provinces and municipalities	0.1	–	–	–	–	–	–	–
Departmental agencies and accounts	1 160.2	1 516.9	1 866.5	2 230.8	2 230.8	2 082.0	2 309.9	2 347.4
Universities and technikons	46.0	45.8	69.5	119.9	119.9	–	–	–
Public corporations and private enterprises	740.7	1 023.2	1 075.1	1 204.0	1 204.0	900.6	935.3	973.1
Non-profit institutions	345.5	322.2	428.4	360.1	360.1	1 266.9	1 337.7	834.4
<b>Payments for capital assets</b>	<b>145.6</b>	<b>7.9</b>	<b>3.3</b>	<b>4.5</b>	<b>4.5</b>	<b>4.1</b>	<b>3.3</b>	<b>3.4</b>
Buildings and other fixed structures	133.2	–	–	–	–	–	–	–
Machinery and equipment	12.4	7.9	3.3	4.5	4.5	4.1	3.3	3.4
<b>Payments for financial assets</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>
<b>Total</b>	<b>2 613.0</b>	<b>3 127.3</b>	<b>3 703.5</b>	<b>4 261.7</b>	<b>4 261.7</b>	<b>4 615.5</b>	<b>4 968.8</b>	<b>4 560.2</b>

## Expenditure trends

Expenditure increased at an average annual rate of 17.7 per cent between 2006/07 and 2009/10, rising from R2.6 billion in 2006/07 to R4.3 billion in 2009/10. This was mainly due to: substantial allocations for projects in the *Research, Development and Innovation* programme; human capital development initiatives; and increased 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 Human Science Research Council in the *Socioeconomic Partnerships* programme.

Expenditure is expected to increase to R4.6 billion at an average annual rate of 2.3 per cent between 2009/10 and 2012/13. This marginal growth can be attributed to: the discontinued allocation for the Square Kilometre Array project from 2012/13 in the *Research, Development and Innovation* programme; the salary adjustments for the department and its public entities; and the additional allocation of R50 million to the South African Research Chairs Initiative.

Over the medium term, the spending focus will remain on human resource development, knowledge generation, and investment in science and technology infrastructure.

## Infrastructure spending

In May 2007, a primary node of the Centre for High Performance Computing was launched in Cape Town. This is a joint initiative between the department and the Council for Scientific and Industrial Research's Meraka Institute. The centre provides researchers with the computing power they need for sophisticated research and innovation. The centre, in conjunction with the department, will conduct a feasibility study for the second node, which will be a very large database. The second node will cater for the generation of data emanating from the centre, the Square Kilometre Array radio telescope, and the National Bioinformatics Network. To date, R207 million has been spent on the project and R234.6 million has been allocated over the MTEF period.

The layout of the first phase of the physical infrastructure for the South African Research Network reached a significant milestone when the first 4 research infrastructure sites went live in Johannesburg in March 2008. The sites are the main campuses of the University of the Witwatersrand and the University of Johannesburg, and 2 of the University of Johannesburg's satellite campuses. Currently, the Tshwane University of Technology is being connected. The connection between Hartebeesthoek radio astronomy observatory and the Satellite Applications Centre was completed in May 2008. This ensures full access to the pan-European GEANT network, a multi-gigabit data communications network reserved specifically for research and education. To date, R366 million has been spent on the rollout of the network, and R302.7 million has been allocated over the MTEF period.

The South African Strategic Forum for Research Infrastructure will play a major role developing a 10-year national research infrastructure strategy as well as the establishing and maintaining a database of the forum's records. The national equipment programme supports research by acquiring state of the art equipment for researchers and scientists to encourage cutting edge, innovative and competitive science

In September 2006, South Africa and Australia were short listed as suitable sites for the Square Kilometre Array radio telescope. The successful bid is expected to be announced in 2012. Both bidding countries are building demonstrator telescopes. Construction of a precursor to the South African MeerKAT demonstrator has started at the site in Northern Cape. Infrastructure layout for the MeerKAT has begun and supporting legislation is being implemented. To date, total spending for the Square Kilometre Array project has been R834.6 million, and over the medium term payments will amount to R1.1 billion.

## Scientific and technological activities

The 2004 governance framework for science and technology sets out the key elements for the 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 was initiated, and will be published annually as a national science and technology expenditure report.

The department's investment is assessed in 3 categories: scientific and technological services, which includes payments for studies on policy, research and development plans in different programmes; scientific and technical education and training, which includes science and youth programmes, and bursaries in the department for training employees in the natural sciences and engineering; and scientific and technological innovation, which includes programmes such as technology diffusion, science platforms, cross-cutting science and technology activities, transfers to the National Research Foundation for research chairs, national facilities, centres of excellence and research infrastructure. The work done by the Human Sciences Research Council, the National Advisory Council on Innovation, the Academy of Science of South Africa and other science councils is shown in the table below.

**Table 33.3 Summary of expenditure on science and technology activities funded by the Department of Science and Technology**

R thousand	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
STS	405 777	614 828	71 338	599 988	360 283	380 761	310 220
STET	24 482	35 300	49 828	61 548	54 439	59 364	63 182
STI	1 830 266	2 279 254	2 781 818	3 159 576	2 984 373	3 142 450	3 176 721
<b>Total STAs</b>	<b>2 260 525</b>	<b>2 929 382</b>	<b>3 402 984</b>	<b>3 821 112</b>	<b>3 399 095</b>	<b>3 582 575</b>	<b>3 550 075</b>

**Table 33.4 Public institutions that undertake scientific and technological activities which report to the Department of Science and Technology**

R thousand	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
National Advisory Council on Innovation	9 132	9 757	10 351	11 949	12 666	13 261	13 924
Academy of Science of South Africa	3 000	3 400	3 820	9 893	10 554	11 152	11 710
Africa Institute of South Africa	28 879	26 530	27 830	27 122	30 594	32 440	34 062
Human Science Research Council	119 873	115 949	160 706	157 858	169 730	180 729	189 887
National Research Foundation	586 671	648 394	680 832	680 396	741 343	79 368	77 410
Council for Scientific and Industrial research	483 194	507 352	534 749	561 487	627 348	630 986	668 249
South African National Energy Research Institute	40 000	42 000	44 268	–	–	–	–
<b>Total</b>	<b>1 270 749</b>	<b>1 353 382</b>	<b>1 462 556</b>	<b>1 443 055</b>	<b>1 592 235</b>	<b>1 664 486</b>	<b>1 695 242</b>

## Departmental receipts

The department's receipts include miscellaneous items such as debt repayments, interest on bank accounts, and recovered private telephone costs. The receipts for the medium term are expected to increase marginally. Only R79 000 had been received after the adjustments budget. The amount for future years cannot be determined with certainty.

**Table 33.5 Departmental receipts**

R thousand	Audited outcome			Adjusted estimate	Revised estimate	Medium-term receipts estimate		
	2006/07	2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
<b>Departmental receipts</b>	<b>1 029</b>	<b>219</b>	<b>333</b>	<b>1 005</b>	<b>1 005</b>	<b>111</b>	<b>112</b>	<b>115</b>
Sales of goods and services produced by department	301	24	26	25	25	26	26	27
Interest, dividends and rent on land	–	6	9	6	6	7	7	8
Sales of capital assets	57	110	–	–	–	–	–	–
Transactions in financial assets and liabilities	671	79	298	974	974	78	79	80
<b>Total</b>	<b>1 029</b>	<b>219</b>	<b>333</b>	<b>1 005</b>	<b>1 005</b>	<b>111</b>	<b>112</b>	<b>115</b>

## Programme 1: Administration

### Expenditure estimates

Table 33.6 Administration

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
R million							
Minister <sup>1</sup>	1.0	1.1	1.6	1.7	1.8	1.9	2.0
Deputy Minister <sup>1</sup>	0.9	0.9	1.3	1.4	1.5	1.6	1.7
Management	15.2	11.3	14.2	51.0	66.5	70.7	74.1
Corporate Services	204.3	95.3	107.9	106.6	100.3	106.7	112.5
Governance	2.6	3.8	3.4	9.7	9.0	8.9	9.4
Office Accommodation	1.9	4.3	1.4	3.3	3.8	4.0	4.2
<b>Total</b>	<b>225.9</b>	<b>116.8</b>	<b>129.9</b>	<b>173.6</b>	<b>182.9</b>	<b>193.9</b>	<b>203.8</b>
Change to 2009 Budget estimate				2.3	5.7	6.3	7.0

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 allowance are included. Administrative and other subprogramme expenditure may in addition include payments for capital assets as well as transfers and subsidies.

#### Economic classification

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Current payments</b>	<b>79.2</b>	<b>108.7</b>	<b>127.1</b>	<b>169.0</b>	<b>179.1</b>	<b>190.9</b>	<b>200.8</b>
Compensation of employees	37.5	47.4	60.7	96.8	105.6	111.9	117.9
Goods and services	41.8	61.3	66.4	72.2	73.5	78.9	82.8
<i>of which:</i>							
Communication	2.5	3.7	3.0	4.2	4.3	4.5	4.7
Consultants and professional services:	0.2	0.3	3.9	8.2	8.3	9.9	10.3
Business and advisory services							
Agency and support / outsourced services	17.0	25.0	15.1	4.2	4.2	4.6	4.8
Travel and subsistence	7.4	10.8	12.8	16.7	16.5	17.4	18.4
<b>Transfers and subsidies</b>	<b>2.5</b>	<b>1.1</b>	<b>0.6</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>
Departmental agencies and accounts	0.1	–	–	–	–	–	–
Universities and technikons	0.9	0.4	0.0	0.1	–	–	–
Non-profit institutions	0.9	0.6	0.6	0.9	1.0	1.0	1.0
Households	0.5	0.1	–	–	–	–	–
<b>Payments for capital assets</b>	<b>144.1</b>	<b>6.8</b>	<b>2.1</b>	<b>3.5</b>	<b>2.8</b>	<b>2.0</b>	<b>2.1</b>
Buildings and other fixed structures	133.2	–	–	–	–	–	–
Machinery and equipment	10.9	6.8	2.1	3.5	2.8	2.0	2.1
<b>Payments for financial assets</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>
<b>Total</b>	<b>225.9</b>	<b>116.8</b>	<b>129.9</b>	<b>173.6</b>	<b>182.9</b>	<b>193.9</b>	<b>203.8</b>

#### Details of selected transfers and subsidies

Universities and technikons	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Current</b>	<b>0.9</b>	<b>0.4</b>	<b>0.0</b>	<b>0.1</b>	<b>–</b>	<b>–</b>	<b>–</b>
Institutional and Programme Support	0.9	0.4	0.0	0.1	–	–	–
<b>Non-profit institutions</b>	<b>0.9</b>	<b>0.6</b>	<b>0.6</b>	<b>0.9</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>
Institutional and Programme Support	0.9	0.6	0.6	0.9	1.0	1.0	1.0

### Expenditure trends

Expenditure decreased from R225.9 million in 2006/07 to R173.6 million in 2009/10, at an average annual rate of 8.4 per cent. This can be attributed to once-off expenditure in 2006/07 relating to the purchase of the department's new building and the decreases in outsourced services and operating leases.

Expenditure is expected to increase over the MTEF period from R173.6 million to R203.8 million, at an average annual rate of 5.5 per cent. This is due to an increase in compensation of employees spending due to: cost of



living adjustments to salaries; the carry through costs of the senior management salary adjustments in September 2008, and the funding of additional positions in the ministry, following the change in the executive authority of the department. In addition, advertising, audit and communication expenditure is expected to increase over the medium term due to tariff adjustments.

## Programme 2: Research, Development and Innovation

- *Space Sciences* focuses on creating the necessary strategic and institutional regimes for a viable space programme and an earth observation system. This includes providing strategic direction on the Square Kilometre Array demonstrator telescope, MeerKAT, to ensure that Africa is well positioned to host it. Targeted national space initiatives are intended to harness the benefits of space science and technology for socioeconomic growth and sustainable development.
- *Hydrogen and Energy* provides policy leadership in long term, 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 broad socioeconomic benefits from the nascent global hydrogen economy.
- *Biotechnology and Health* provides policy leadership for developing a world class bio-economy in South Africa. This will be achieved through innovation instruments that provide financial, intellectual property and innovation management support.
- *Innovation Instruments and Planning* 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 policy and institutional structures that facilitate the development of technology 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 relevant entities.

### Objectives and measures

- Support the creation of a viable space industry in South Africa through operationalising the South African National Space Agency by establishing an interim structure and appointing the board of directors by December 2010.
- Position South Africa to host the Square Kilometre Array radio telescope in 2012 by constructing 7 dishes as part of the demonstrator telescope, MeerKAT, by March 2011.
- Drive the delivery of sustainable energy solutions by showcasing a hybrid transportation technology powered by a fuel cell or battery by March 2011.
- Provide a strategic roadmap for the growth of the bio-economy in South Africa by finalising the capability audit and the bio-economy strategy by September 2010 and the Farmer to Pharma implementation plan by June 2010.
- Promote technology commercialisation that will increase the number of technology based companies in South Africa by operationalising the Technology Innovation Agency by March 2011.
- Harness intellectual property emanating from public financed research by establishing the National Intellectual Property Management Office and 3 offices of technology transfer by March 2011.

### Service delivery focus

In 2009/10, the Technology Innovation Agency Board was established and an interim chief executive officer appointed. In 2010/11, the focus will be on fully operationalising the agency. In September 2009, the SumbandilaSAT was launched into space. The focus in 2010/11 will be to increase space applications to address socioeconomic issues. This will be done by extending financial support for developing 5 new applications to form part of the South African earth observation strategy portal. In 2009, the Square Kilometre Array radio telescope core site attracted 2 international initiatives, the C-Band All Sky Survey and the Precision Array to Probe the Epoch of Reionisation.

As a result of the hydrogen and fuel cells technologies research, development and innovation strategy, in 2009 a private company in the mining industry announced an investment of over R100 million into a platinum market development and beneficiation strategy. In the same year, a public private partnership including this company, another private company and the department was proposed, to establish local fuel cells manufacture. The Innovation Fund is currently completing the due diligence exercise, and the decision to invest or not will be made by March 2010. A plant to manufacture fuel cells in South Africa is planned over 18 months.

To reduce disease in South Africa, the department launched the following initiatives in 2009/10: the South African HIV and AIDS research and innovation platform to provide evidence based solutions to contribute to the Department of Health's current strategic plan for HIV and AIDS; the tuberculosis research centre of competence, concentrating on developing technologies and drugs; and iThemba Pharmaceuticals, a drug discovery company for research and development for new and affordable medicines for infectious diseases.

With the draft of the regulations under the Intellectual Property Rights from Publicly Financed Research and Development Act (2008) finalised in 2008, the focus in 2010/11 will be to establish the National Intellectual Property Management Office as a government agency along with offices of technology transfer at higher education institutions.

## Expenditure estimates

**Table 33.7 Research, Development and Innovation**

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
R million							
Space Science	202.3	296.2	344.2	574.4	611.5	659.3	113.6
Hydrogen and Energy	9.6	33.8	139.7	150.0	134.2	142.8	148.9
Biotechnology and Health	178.1	194.2	228.1	259.3	310.0	298.4	321.8
Innovation Instruments and Planning	4.0	5.7	143.9	159.6	228.3	240.6	241.9
<b>Total</b>	<b>394.0</b>	<b>529.8</b>	<b>855.8</b>	<b>1 143.4</b>	<b>1 284.0</b>	<b>1 341.2</b>	<b>826.2</b>
Change to 2009 Budget estimate				0.5	(31.4)	(41.9)	(69.5)
<b>Economic classification</b>							
<b>Current payments</b>	<b>13.5</b>	<b>16.1</b>	<b>26.7</b>	<b>40.9</b>	<b>45.9</b>	<b>48.2</b>	<b>50.7</b>
Compensation of employees	5.8	8.8	14.9	21.3	22.0	23.2	24.4
Goods and services	7.7	7.2	11.8	19.6	23.9	25.0	26.3
<i>of which:</i>							
Communication	0.5	0.5	0.7	0.8	0.7	0.7	0.8
Consultants and professional services:							
Business and advisory services	–	–	0.5	1.5	1.1	1.2	1.2
Agency and support / outsourced services	1.0	0.9	2.2	10.9	14.6	15.3	16.1
Travel and subsistence	4.0	3.7	5.9	4.1	4.4	4.6	4.7

Table 33.7 Research, Development and Innovation (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Transfers and subsidies</b>	<b>380.1</b>	<b>513.4</b>	<b>828.9</b>	<b>1 102.2</b>	<b>1 237.9</b>	<b>1 292.7</b>	<b>775.3</b>
Departmental agencies and accounts	150.9	303.0	458.5	698.2	302.2	318.3	321.4
Universities and technikons	26.4	16.3	54.1	87.3	–	–	–
Public corporations and private enterprises	30.3	49.7	32.6	73.6	–	–	–
Non-profit institutions	172.3	144.4	283.7	243.0	935.7	974.4	453.9
Households	0.3	0.0	–	–	–	–	–
<b>Payments for capital assets</b>	<b>0.4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>
Machinery and equipment	0.4	0.4	0.2	0.2	0.2	0.2	0.2
<b>Total</b>	<b>394.0</b>	<b>529.8</b>	<b>855.8</b>	<b>1 143.4</b>	<b>1 284.0</b>	<b>1 341.2</b>	<b>826.2</b>

## Details of selected transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	150.9	222.9	194.3	206.0	302.2	318.3	321.4
Biotechnology Strategy	–	37.5	2.0	7.5	–	–	–
South African National Energy Research Institute	–	–	–	8.6	42.0	44.5	46.7
HIV/ AIDS Prevention and Treatment Technologies	–	8.1	–	–	18.2	19.3	20.3
Hydrogen Strategy	–	–	8.7	16.5	–	–	–
Innovation Fund	131.3	141.8	140.0	149.2	189.5	181.4	184.7
Innovation Projects	–	–	–	3.0	30.0	50.0	47.5
International Centre for Genetic Engineering and Biotechnology	–	10.0	–	–	9.9	9.9	10.4
Space Science	0.2	–	18.1	9.2	–	–	–
Square Kilometre Array	19.4	25.5	25.5	12.0	12.6	13.2	11.8
<b>Capital</b>	<b>–</b>	<b>80.0</b>	<b>264.3</b>	<b>492.2</b>	<b>–</b>	<b>–</b>	<b>–</b>
Space Science	–	–	–	1.9	–	–	–
Square Kilometre Array	–	80.0	264.3	490.3	–	–	–
Universities and technikons							
Current	17.2	10.4	15.2	43.1	–	–	–
Biofuels	–	1.5	–	–	–	–	–
South African National Energy Research Institute	–	–	–	14.7	–	–	–
Health Innovation	5.3	0.2	–	–	–	–	–
Hydrogen Strategy	6.0	6.0	10.0	28.5	–	–	–
Space Science	5.8	2.7	5.2	–	–	–	–
<b>Capital</b>	<b>9.3</b>	<b>5.9</b>	<b>38.8</b>	<b>44.2</b>	<b>–</b>	<b>–</b>	<b>–</b>
Hydrogen Strategy	–	3.0	38.8	44.2	–	–	–
Space Science	9.3	2.9	–	–	–	–	–

Table 33.7 Research, Development and Innovation (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Public corporations and private enterprises</b>							
<b>Public corporations</b>							
<b>Other transfers</b>							
<b>Current</b>	<b>21.5</b>	<b>28.6</b>	<b>16.6</b>	<b>39.2</b>	–	–	–
Biofuels	–	3.0	–	–	–	–	–
South African National Energy Research Institute	–	–	–	14.4	–	–	–
Health Innovation	–	2.5	1.0	–	–	–	–
Hydrogen Strategy	4.0	4.7	8.8	6.0	–	–	–
Innovation Fund	–	–	–	2.0	–	–	–
Innovation Projects	3.2	4.6	–	–	–	–	–
Space Science	14.4	13.8	6.8	16.7	–	–	–
<b>Capital</b>	<b>8.7</b>	<b>21.1</b>	<b>15.9</b>	<b>34.5</b>	–	–	–
Hydrogen Strategy	–	4.0	1.7	–	–	–	–
Space Science	8.7	17.1	14.2	34.5	–	–	–
<b>Non-profit institutions</b>							
<b>Current</b>	<b>170.3</b>	<b>141.4</b>	<b>283.7</b>	<b>243.0</b>	<b>327.1</b>	<b>320.5</b>	<b>343.9</b>
Biofuels	–	–	5.0	5.0	5.0	5.3	5.6
Biotechnology Strategy	148.1	124.2	175.3	172.5	227.1	211.8	230.8
South African National Energy Research Institute	–	–	44.3	2.1	–	–	–
Health Innovation	4.0	6.2	14.5	36.0	37.9	39.7	41.6
HIV/ AIDS Prevention and Treatment Technologies	15.0	–	16.6	17.2	–	–	–
Hydrogen Strategy	–	9.9	18.0	0.2	28.6	30.4	30.9
International Centre for Genetic Engineering and Biotechnology	–	–	10.0	9.9	–	–	–
Space Science	3.2	1.0	0.1	–	28.5	33.4	35.1
<b>Capital</b>	<b>2.0</b>	<b>3.0</b>	–	–	<b>608.6</b>	<b>653.9</b>	<b>109.9</b>
Hydrogen Strategy	–	3.0	–	–	48.4	51.9	54.5
Space Science	2.0	–	–	–	51.4	55.2	55.4
Square Kilometre Array	–	–	–	–	508.9	546.8	–

## Expenditure trends

Expenditure increased substantially from R394 million in 2006/07 to R1.1 billion in 2009/10, at an average annual rate of 42.6 per cent. The significant growth is attributable to the introduction of programmes that bolster biotechnology, hydrogen energy and innovation instrument initiatives, and the Square Kilometre Array project. This caused increases in current payments, which grew at an average annual rate of 44.7 per cent from R13.5 million in 2006/07 to R40.9 million in 2009/10. Capital transfers to departmental agencies and non-profit institutions also increased, at an average annual rate of 42.6 per cent from R380.1 million to R1.1 billion.

Over the medium term, expenditure is expected to decrease to R826.2 million at an average annual rate of 10.3 per cent. This is solely due to the discontinued funding for the Square Kilometre Array project in 2012/13. The decrease is offset slightly by marginal growth which sustains existing projects that support the national system of innovation.

## Programme 3: International Cooperation 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. Key activities include: facilitating South Africa's engagement in the UN family of organisations;

maximising South Africa's participation in implementing the outcomes of major summits and international conventions at national, regional and international levels; strengthening South Africa's participation in global science projects for immediate national benefit; and increasing South Africa's participation in South-South partnerships. This also includes contributing to effective science and technology governance in Southern African Development Community (SADC) and the AU, contributing to New Partnership for Africa's Development (NEPAD), and supporting science and technology programmes at a regional and continental level. In addition, the subprogramme promotes the department's engagement with bilateral African partner countries.

- *International Resources* accesses funding, human capital and knowledge, hosts global research infrastructures in South Africa, and accesses international research facilities for the benefit of the national system of innovation. Key activities include: facilitating South Africa's participation in international research programmes; strengthening developmental partnerships to attract official development support for science and technology in South Africa and Africa; supporting the establishment of global research infrastructure programmes in South Africa; and facilitating partnerships with multinational companies to encourage them to invest in research and development activities.
- *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. Activities include: developing country strategies; conducting joint management meetings; and evaluating cooperation and co-funding research and development projects. The subprogramme consists of two units: the unit for Europe and the Middle East, and the unit for Asia and the Americas.

Funding will be used for staff remuneration and associated personnel costs, as well as for transfers to public entities on the basis of approved work plans and business plans.

### Objectives and measures

- Promote and manage South Africa's international science, technology and innovation cooperation in support of national priorities by:
  - ensuring the participation of 14 African partners in the Square Kilometre Array radio telescope activities by March 2011
  - establishing 30 new joint science, technology and innovation projects with African partners by March 2011
  - leveraging new Organisation for Economic Cooperation and Development opportunities to provide professional assistance for developing indicators that could measure South African research and development spend more accurately by March 2011.
- Enhance South Africa's regional impact on the international science, technology and innovation environment to make the country and the region an important international science and technology partner by:
  - influencing the agendas of global and African multilateral institutions on an ongoing basis
  - contributing to international environmental negotiations, such as on climate change, on an ongoing basis.
- Increase international funding for science and technology in South Africa by:
  - promoting foreign direct investment and donor support, mostly through bilateral and multilateral agreements on an ongoing basis
  - strengthening partnerships with multinational companies from R189 million in 2008/09 to R352 million in 2011/12.

### Service delivery focus

In 2009, South Africa increased its participation in multilateral organisations and enhanced its impact in the region and globally by: winning the bid to host a new regional NEPAD water initiative; co-chairing the steering

group for the Organisation for Economic Cooperation and Development's global science forum project on science and technology cooperation between developed and developing countries; and serving on the organisation's committee for scientific and technological policy steering group on science, technology and innovation cooperation to address global challenges. In enhancing South-South partnership, South Africa hosted the third World Academy of Science, Engineering and Technology general conference in October 2009 and was elected vice chair of the Centre for Science and Technology of the Non-Aligned and Other Developing Countries from 2010 to 2013.

In 2009, South Africa was mandated to lead SADC science, technology and innovation initiatives in the following areas: intellectual property rights; women in science; the SADC science, technology and innovation strategy; and training for senior science and technology officials. In the same year, South Africa also enhanced bilateral relations through funding joint projects with Kenya, and an expression of interest with Namibia will be finalised in March 2010.

Engagement with the EU continued through policy dialogue on space science, energy, and social sciences and the humanities, resulting in specific EU framework programme calls to address African challenges. The ongoing dialogue resulted in significant research funding of about €100 million for a wide range of projects.

Finnish-South African innovation partnership programmes have been under way since 2006/07. They support emerging entrepreneurs and build innovation capacity, such as foresighting and managing living laboratories and science parks, in poor provinces and rural areas. They aimed at strengthening the network for biosciences to advance life sciences research to address the challenges of HIV and AIDS, food security and environment protection. In 2009/10, funds were secured from donor organisations for food security and climate change initiatives in the SADC region.

In 2009/10, joint research projects in the India-Brazil-South Africa framework were completed in areas such as nanotechnology, biotechnology, and polar and oceanographic research. Bilateral engagements were completed in 2009/10 with Germany, Norway, Belgium, Argentina, the Republic of Korea, Japan, India, China and Argentina in areas such as space, energy, biodiversity, ICT, and advanced manufacturing.

## Expenditure estimates

**Table 33.8 International Cooperation and Resources**

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
R million							
Multilateral Cooperation and Africa	68.9	73.3	61.4	56.9	56.5	60.3	62.8
International Resources	27.3	10.0	37.4	50.4	48.9	51.3	53.2
Overseas Bilateral Cooperation	28.2	16.1	41.8	24.7	29.6	31.5	32.5
<b>Total</b>	<b>124.3</b>	<b>99.4</b>	<b>140.5</b>	<b>132.0</b>	<b>135.1</b>	<b>143.1</b>	<b>148.5</b>
Change to 2009 Budget estimate				0.7	(1.2)	(1.5)	(3.5)
<b>Economic classification</b>							
<b>Current payments</b>	<b>42.0</b>	<b>40.1</b>	<b>53.1</b>	<b>55.3</b>	<b>58.9</b>	<b>61.2</b>	<b>64.1</b>
Compensation of employees	17.4	19.8	30.4	31.0	33.3	35.1	36.9
Goods and services	24.6	20.3	22.7	24.2	25.6	26.1	27.3
<i>of which:</i>							
Communication	1.3	1.4	1.4	1.1	1.6	1.4	1.4
Consultants and professional services:	–	–	0.2	1.6	0.2	0.7	0.7
Business and advisory services							
Agency and support / outsourced services	8.0	3.3	2.9	4.1	3.7	4.3	4.5
Travel and subsistence	9.8	9.9	11.9	9.9	12.6	13.3	13.9

**Table 33.8 International Cooperation and Resources (continued)**

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Transfers and subsidies</b>	<b>81.8</b>	<b>59.0</b>	<b>86.9</b>	<b>76.4</b>	<b>75.8</b>	<b>81.4</b>	<b>83.8</b>
Departmental agencies and accounts	29.6	27.3	44.3	38.7	30.6	32.4	34.1
Universities and technikons	3.2	4.5	2.8	3.0	–	–	–
Public corporations and private enterprises	28.7	22.7	34.3	21.5	–	–	–
Non-profit institutions	20.2	4.4	5.5	13.2	45.2	48.9	49.8
Households	0.2	0.0	–	–	–	–	–
<b>Payments for capital assets</b>	<b>0.5</b>	<b>0.3</b>	<b>0.5</b>	<b>0.3</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>
Machinery and equipment	0.5	0.3	0.5	0.3	0.5	0.5	0.5
<b>Total</b>	<b>124.3</b>	<b>99.4</b>	<b>140.5</b>	<b>132.0</b>	<b>135.1</b>	<b>143.1</b>	<b>148.5</b>

**Details of selected transfers and subsidies**

<b>Departmental agencies and accounts</b>							
<b>Departmental agencies (non-business entities)</b>							
<b>Current</b>	<b>29.6</b>	<b>27.3</b>	<b>44.3</b>	<b>38.7</b>	<b>30.6</b>	<b>32.4</b>	<b>34.1</b>
Africa Institute of South Africa	25.0	26.5	30.5	29.3	30.6	32.4	34.1
Global Science	4.6	0.8	13.8	9.4	–	–	–
<b>Universities and technikons</b>							
<b>Current</b>	<b>3.2</b>	<b>4.5</b>	<b>2.8</b>	<b>3.0</b>	<b>–</b>	<b>–</b>	<b>–</b>
Global Science	3.2	4.5	2.8	2.8	–	–	–
<b>Public corporations and private enterprises</b>							
<b>Public corporations</b>							
<b>Other transfers</b>							
<b>Current</b>	<b>28.7</b>	<b>22.7</b>	<b>34.3</b>	<b>21.5</b>	<b>–</b>	<b>–</b>	<b>–</b>
Global Science	28.7	22.7	34.4	21.6	–	–	–
<b>Non-profit institutions</b>							
<b>Current</b>	<b>20.2</b>	<b>4.4</b>	<b>5.5</b>	<b>13.2</b>	<b>45.2</b>	<b>48.9</b>	<b>49.8</b>
Global Science	20.2	4.4	5.6	13.2	45.2	48.95	49.8

**Expenditure trends**

Expenditure increased from R124.3 million in 2006/07 to R132 million in 2009/10, at an average annual rate of 2 per cent. The growth can be attributed mainly to an average annual increase of 22.7 per cent in the *International Resources* subprogramme, as it received additional allocations of R23.1 million from 2006/07 to support multilateral and bilateral cooperation.

Expenditure increased marginally over the MTEF period to R148.5 million, at an average annual rate of 4 per cent. The increase is to sustain existing projects.

The spending focus over the MTEF period remains advancing and facilitating South Africa's participation in strategic bilateral and multilateral agreements, accessing funding, human capital and knowledge, and leveraging resources in support of the national system of innovation.

**Programme 4: Human Capital and Knowledge Systems**

- *Human Capital and Science Platforms* is aimed at: developing and renewing science, engineering and technology human capital to promote knowledge generation, protection and exploitation; developing science platforms that leverage off South Africa's geographical advantages; and promoting science, technology, engineering, mathematics and innovation literacy and awareness. Funding is provided to the National Research Foundation for programmes to develop research and human capital.
- *Indigenous Knowledge System* promotes the role of indigenous knowledge systems in national research and development programmes to strengthen their contribution to science, technology and innovation.

- *Emerging Research Areas and Infrastructure* facilitates the strategic implementation of research equipment and infrastructure to promote knowledge production in areas of national priority and to sustain research and development led innovation. The subprogramme promotes new and emerging research areas through supporting the required research and infrastructure capacity. Funding is provided to institutions and programmes such as the South African Research Network, the Centre for High Performance Computing, national nanotechnology innovation centres, the national equipment programme and new and emerging research areas.

### **Objectives and measures**

- Promote human capital development through improving supervisory capacity and student support by increasing the number of research chairs appointed at national system of innovation institutions from 82 in 2009/10 to 150 in 2012/13.
- Promote human capital development and knowledge production by:
  - increasing the number of centres of excellence from 8 in 2009/10 to 9 in 2012/13, and from 1 200 students per year in 2009/10 to 1 900 per year in 2012/13
  - providing work training experience to 1 100 science, engineering and technology graduates placed as interns at various national system of innovation institutions by March 2013.
- Contribute to increasing the number of matriculants with university exemption by increasing the number of learners and schools benefiting from supplementary tuition in mathematics, physical sciences and English from 2 550 per year in 2009/10 to 2 700 per year in 2012/13.
- Promote science literacy, among the youth in particular and the general public, by increasing the number of participants at National Science Week sites across all the provinces and people reached through the media from 200 000 per year in 2009/10 to 300 000 per year in 2012/13.
- Drive the ideals of knowledge production to accrue social and commercial benefits by increasing the total number of research outputs in peer reviewed journals across human capital development initiatives from 500 journal articles per year in 2009/10 to 674 journal articles per year in 2012/13.
- Promote the protection and development of indigenous knowledge systems by:
  - developing indigenous knowledge systems legislation by 2012, establishing 1 research chair by 2012, and consolidating 1 centre of excellence on curriculum development by 2011
  - doubling the number of participants attending the Annual World Expo as well as developing a national recordable system by the end of 2012
  - developing a framework for the accreditation and certification of knowledge holders and practitioners by 2011.

### **Service delivery focus**

The number of postgraduate students supported by research chairs grants increased from 115 to 423 between 2007 and 2009. The research chairs supervised an average of more than 10 students per research chair in 2009, including students funded from other sources. The number of publications by research chairs increased from 162 to 265 between 2008 and 2009. The number of postdoctoral fellows supported increased from 18 in 2007 to 53 in 2009. The number of students supported under the current 7 centres of excellence increased from 126 in 2004/05 (the year of inception) to 395 in 2008/09. Of the 395 students, 53 per cent were female and 43 per cent were black, against a targeted 50 per cent and 60 per cent.

In 2007 and 2008, the department's bursary scheme supported 539 honours students, of which 420 completed their degrees within their year of registration. Of the 206 graduates in 2008, 118 enrolled for Masters degrees, representing a 57 per cent retention rate. In 2009, 33 Masters students were awarded bursaries under the department's bursary scheme. Of the more than 300 interns placed in science, engineering and technology related work environments, more than 60 per cent gained employment during or immediately after their internship.



In November 2009, over 1 300 knowledge holders and practitioners attended the Indigenous Knowledge System Expo in Polokwane organised by the National Indigenous Knowledge System Office, national government departments and the Limpopo Department of Science and Technology. The office also ensured the deployment of digital doorways in Mpumalanga and KwaZulu-Natal in June 2009. The research chair on indigenous knowledge studies was awarded to Walter Sisulu University in 2009/10. The office hosted the SADC workshop in the Seychelles on the protection of indigenous knowledge systems.

Drafting legislation on indigenous knowledge systems is in abeyance, awaiting finality on the Intellectual Property Laws Amendment Bill.

## Expenditure estimates

**Table 33.9 Human Capital and Knowledge Systems**

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
R million							
Human Capital and Science Platforms	754.0	946.1	1 066.2	1 122.4	1 233.8	1 396.9	1 377.9
Indigenous Knowledge System	8.4	10.5	12.1	25.4	27.4	29.2	30.7
Emerging Research Areas and Infrastructure	115.8	318.7	379.3	451.2	487.5	529.0	525.4
<b>Total</b>	<b>878.2</b>	<b>1 275.3</b>	<b>1 457.6</b>	<b>1 599.0</b>	<b>1 748.7</b>	<b>1 955.1</b>	<b>1 933.9</b>
Change to 2009 Budget estimate				0.9	(40.9)	(56.3)	(130.2)
<b>Economic classification</b>							
<b>Current payments</b>	<b>17.9</b>	<b>21.4</b>	<b>24.4</b>	<b>32.9</b>	<b>31.4</b>	<b>33.1</b>	<b>34.7</b>
Compensation of employees	10.2	11.9	17.0	21.5	22.8	24.1	25.3
Goods and services	7.7	9.5	7.4	11.4	8.6	9.0	9.5
<i>of which:</i>							
Communication	0.5	0.7	0.8	0.7	0.8	0.8	0.8
Consultants and professional services:	–	–	0.1	2.5	0.4	0.7	0.7
Business and advisory services							
Agency and support / outsourced services	1.7	2.0	0.3	0.5	0.2	0.6	0.6
Travel and subsistence	3.2	3.9	4.2	4.1	4.2	4.1	4.3
<b>Transfers and subsidies</b>	<b>860.0</b>	<b>1 253.9</b>	<b>1 433.0</b>	<b>1 566.0</b>	<b>1 717.2</b>	<b>1 922.0</b>	<b>1 899.1</b>
Departmental agencies and accounts	774.9	936.1	1 090.1	1 181.1	1 372.0	1 544.8	1 512.4
Universities and technikons	6.5	8.3	5.8	22.7	–	–	–
Public corporations and private enterprises	47.1	259.9	262.1	302.4	98.8	104.7	99.9
Non-profit institutions	31.3	49.6	74.7	59.8	246.4	272.5	286.8
Households	0.0	0.0	0.4	–	–	–	–
<b>Payments for capital assets</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
Machinery and equipment	0.3	0.1	0.2	0.1	0.1	0.1	0.1
<b>Total</b>	<b>878.2</b>	<b>1 275.3</b>	<b>1 457.6</b>	<b>1 599.0</b>	<b>1 748.7</b>	<b>1 955.1</b>	<b>1 933.9</b>

Table 33.9 Human Capital and Knowledge Systems (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Details of selected transfers and subsidies</b>							
<b>Departmental agencies and accounts</b>							
<b>Departmental agencies (non-business entities)</b>							
<b>Current</b>	<b>724.9</b>	<b>886.1</b>	<b>970.6</b>	<b>1 063.9</b>	<b>1 150.6</b>	<b>1 307.1</b>	<b>1 282.9</b>
Emerging Research Areas	–	–	–	14.0	–	–	–
Frontier Science and Technology	35.0	20.5	11.5	–	–	–	–
Human Resources Development	55.0	169.4	227.0	264.1	351.2	446.1	437.7
Indigenous Knowledge System	2.5	1.6	1.3	10.2	–	–	–
Learnerships	–	–	–	6.7	7.1	7.8	8.2
National Research Foundation	596.7	657.7	683.4	692.1	734.4	789.1	769.8
Science and Youth	2.5	2.6	2.2	18.8	–	–	–
Science Themes	33.3	34.3	45.2	57.8	57.9	64.1	67.1
<b>Capital</b>	<b>50.0</b>	<b>50.0</b>	<b>119.5</b>	<b>117.2</b>	<b>221.4</b>	<b>237.6</b>	<b>229.5</b>
Research and Development Infrastructure	50.0	50.0	119.5	117.2	221.4	237.6	229.5
<b>Universities and technikons</b>							
<b>Current</b>	<b>6.5</b>	<b>8.3</b>	<b>5.8</b>	<b>9.7</b>	<b>–</b>	<b>–</b>	<b>–</b>
Emerging Research Areas	–	–	–	5.4	–	–	–
Frontier Science and Technology	0.7	–	0.5	–	–	–	–
Human Resources Development	1.0	6.4	0.1	–	–	–	–
Indigenous Knowledge System	0.2	1.2	2.6	4.0	–	–	–
Science and Youth	1.3	0.4	2.6	0.2	–	–	–
Science Themes	3.4	0.0	–	–	–	–	–
Women in Science	–	0.3	–	0.1	–	–	–
<b>Capital</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>13.0</b>	<b>–</b>	<b>–</b>	<b>–</b>
Research and Development Infrastructure	–	–	–	13.0	–	–	–
<b>Public corporations and private enterprises</b>							
<b>Public corporations</b>							
<b>Other transfers</b>							
<b>Current</b>	<b>5.1</b>	<b>97.9</b>	<b>153.9</b>	<b>102.5</b>	<b>–</b>	<b>–</b>	<b>–</b>
Centre for High Performance Computing	–	–	–	61.3	–	–	–
Emerging Research Areas	–	–	–	27.9	–	–	–
Frontier Science and Technology	0.4	83.0	132.5	–	–	–	–
Human Resources Development	–	9.6	20.5	2.0	–	–	–
Indigenous Knowledge System	–	0.5	0.9	1.7	–	–	–
Learnerships	4.4	3.1	–	–	–	–	–
Science and Youth	–	–	–	9.3	–	–	–
Science Themes	0.3	1.7	–	–	–	–	–
Women in Science	–	–	–	0.3	–	–	–
<b>Capital</b>	<b>42.0</b>	<b>162.0</b>	<b>108.2</b>	<b>199.9</b>	<b>98.8</b>	<b>104.7</b>	<b>99.9</b>
Centre for High Performance Computing	–	–	–	1.4	–	–	–
Frontier Science and Technology	20.0	–	–	–	–	–	–
National Nanotechnology Centres	–	–	–	34.9	–	–	–
Research and Development Infrastructure	–	–	19.2	70.1	–	–	–
South African National Research Network	22.0	162.0	89.0	93.5	98.8	104.7	99.9

Table 33.9 Human Capital and Knowledge Systems (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Non-profit institutions</b>							
<b>Current</b>	<b>31.3</b>	<b>49.6</b>	<b>72.9</b>	<b>57.8</b>	<b>137.7</b>	<b>150.0</b>	<b>158.2</b>
Academy of Science of South Africa	3.0	3.4	5.6	9.9	10.6	11.2	11.7
Centre for High Performance Computing	–	–	–	–	1.6	1.8	1.9
Emerging Research Areas	–	–	–	2.0	50.5	55.6	58.2
Frontier Science and Technology	5.3	–	–	–	–	–	–
Human Resources Development	–	10.5	16.1	19.0	–	–	–
Indigenous Knowledge System	0.8	1.0	–	–	17.4	18.7	19.7
Learnerships	–	–	6.6	–	–	–	–
Science and Youth	16.4	25.0	40.8	23.1	54.4	59.4	63.2
Science Themes	3.8	7.3	1.5	1.2	–	–	–
Technology Top 100	2.1	2.4	2.3	2.6	2.7	2.9	3.0
Women in Science	–	–	–	–	0.4	0.5	0.5
<b>Capital</b>	<b>–</b>	<b>–</b>	<b>1.8</b>	<b>2.0</b>	<b>108.7</b>	<b>122.5</b>	<b>128.6</b>
Centre for High Performance Computing	–	–	–	–	70.4	80.1	84.1
National Nanotechnology Centres	–	–	–	–	38.3	42.4	44.5
Research and Development Infrastructure	–	–	1.8	2.0	–	–	–
<b>Households</b>							
<b>Other transfers to households</b>							
<b>Current</b>	<b>–</b>	<b>–</b>	<b>0.4</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>
Women in Science	–	–	0.4	–	–	–	–

## Expenditure trends

Expenditure increased from R878.2 million in 2006/07 to R1.6 billion in 2009/10, at an average annual rate of 22.1 per cent. This was driven by increased expenditure in the *Human Capital and Science Platforms* and *Emerging Research Areas and Infrastructure* subprogrammes in the form of transfers to the National Research Foundation and the South African Research Network.

Expenditure is expected to increase to R1.9 billion over the medium term, at an average annual rate of 6.5 per cent. This can mainly be ascribed to the expansion of the South African Research Chairs Initiative. An additional R50 million is allocated in 2012/13 for the South African Research Chairs Initiative. The spending focus over the MTEF period will remain on developing and renewing science, engineering and technology human capital and facilitating research equipment and infrastructure.

## Public entity

### National Research Foundation

Strategic overview: 2006/07 – 2012/13

The National Research Foundation Act (1998) mandates the National Research Foundation to promote and support research in all fields of the humanities, the social and natural sciences, engineering and technology. It provides funding, research facilities, and science awareness education and communications. The foundation performs an agency function on behalf of the Department of Science and Technology and is a service provider to several other government departments.

The 2015 strategic plan aims to: promote internationally competitive research as the basis for a knowledge economy; grow a representative science and technology workforce in South Africa; provide cutting edge research, technology and innovation platforms; operate world class evaluation and grant making systems; and contribute to a vibrant national innovation system.

The medium term priority of the National Research Foundation is to facilitate the training of competent human resources at all levels to address the severe shortages of researchers, particularly previously disadvantaged researchers. In the high-tech environment, this requires making use of the specialised research infrastructure based at national research facilities. The foundation will address infrastructure and maintenance needs at national facilities to ensure sustainability. Other medium term priorities are to coordinate science awareness activities and upgrade the Johannesburg observatory via the South African Agency for Science and Technology Advancement.

### Savings and cost effective service delivery

Austerity measures have been implemented to curtail travel and subsistence by 30 per cent. Space has been maximised by moving from closed to open plan offices. The performance management and reward system has been applied and refined to improve service, productivity and efficiency. Non-core activities, mainly at national facilities, are being reduced. Economies of scale are being created in grant management and systems administration. Stand-alone servers are being replaced with a virtualised IT management environment supporting multiple user programmes.

### Selected performance indicators

**Table 33.10 National Research Foundation**

Indicator	Programme/Activity	Past			Current	Projections		
		2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Number of peer reviewed journal articles funded per year	Research and Innovation Support Agency	2 507	2 884	3 239	NA	6 350	6 350	6 650
Number of learners assisted per year	South African Agency for Science and Technology Advancement	–	351 466	365 274	214 232	300 064	300 100	305 120
Number of educators assisted per year	South African Agency for Science and Technology Advancement	3 954	15 954	14 638	218 435	278 433	278 668	279 264
Number of grantholders supported by the Research and Innovation Support Agency per year (excluding the Innovation Fund)	Research and Innovation Support Agency	2 021	2 098	2 422	7 712	5 196	5 427	5 436
Number of student bursaries and scholarships (3rd and 4th year) awarded per year	Research and Innovation Support Agency	451	158	195	256	200	205	240
Number of student bursaries and scholarships (BTech and Hons) awarded per year	Research and Innovation Support Agency	662	274	1 215	1 529	1 400	1 411	1 452
Number of student bursaries and scholarships (Masters) awarded per year	Research and Innovation Support Agency	2 148	1 954	2 475	2 101	2 230	2 481	2 332
Number of student bursaries and scholarships (PhD) awarded per year	Research and Innovation Support Agency	1 197	1 098	1 370	1 190	1 220	1 321	1 372
Number of post-doctoral fellowships supported per year	Research and Innovation Support Agency	220	191	222	230	210	230	250
Number of postgraduate students making use of facilities for training per year	National facilities	319	570	411	355	416	445	459
Number of Masters and PhD students supervised per year	National facilities	167	203	217	156	193	214	216

### Service delivery focus

The National Research Foundation awarded grants of R1.2 billion in various disciplines in 2009/10. A major focus of the foundation is on supporting the establishment of a highly skilled human resource base in South Africa, which it does through various programmes, including the PhD project, the student and postdoctoral support programme, the Department of Science and Technology-National Research Foundation internship programme, and the scarce skills development programme.

In addition to various contract programmes that the foundation manages on behalf of the department, such as support for established researchers through research chairs and centres of excellence, in 2009/10 the foundation identified and implemented various funding programmes in key investment areas to ensure equity and redress in the science and technology workforce. Funding is provided for: researchers, strategic knowledge fields, human capital development, strategic platforms, applied and industrial research, innovation, and international initiatives.

The foundation hosts the national research facilities as major research platforms. These platforms provide access to unique multi-user research infrastructure, collections and datasets, which facilitate research and science awareness in various science fields. The fields include radio and optical astronomy, earth magnetic observation and services, nuclear sciences, a broad range of biodiversity disciplines, and long term environmental observation and applications.

The foundation also manages radio astronomy projects on behalf of the Department of Science and Technology, including the Square Kilometre Array radio telescope. At present, smaller versions of the radio telescope and array are being built, paving the way for the MeerKAT demonstrator.

### Expenditure estimates

**Table 33.11 National Research Foundation: Programme information**

R million	Audited outcome			Revised estimate 2009/10	Medium-term estimate		
	2006/07	2007/08	2008/09		2010/11	2011/12	2012/13
Research innovation support and advancement	485.4	606.4	898.9	1 055.3	1 131.4	1 199.1	1 130.4
National Facilities	280.0	316.9	345.4	356.2	391.1	414.9	438.3
SAASTA	29.0	30.1	36.9	42.9	47.4	47.9	50.4
SKA Project	30.5	47.4	80.4	107.1	149.2	155.2	164.6
<b>Total expense</b>	<b>824.9</b>	<b>1 000.8</b>	<b>1 361.6</b>	<b>1 561.5</b>	<b>1 719.1</b>	<b>1 817.2</b>	<b>1 783.8</b>

**Table 33.12 National Research Foundation: Financial information**

Statement of financial performance R million	Audited outcome			Revised estimate 2009/10	Medium-term estimate		
	2006/07	2007/08	2008/09		2010/11	2011/12	2012/13
<b>Revenue</b>							
<b>Non-tax revenue</b>	<b>255.6</b>	<b>408.7</b>	<b>702.7</b>	<b>840.5</b>	<b>946.9</b>	<b>985.2</b>	<b>963.3</b>
Sale of goods and services other than capital assets	201.9	331.2	574.6	750.5	857.6	891.0	861.2
Other non-tax revenue	53.7	77.5	128.2	90.0	89.2	94.2	102.2
<b>Transfers received</b>	<b>580.4</b>	<b>639.0</b>	<b>659.0</b>	<b>721.7</b>	<b>772.2</b>	<b>831.9</b>	<b>820.4</b>
<b>Total revenue</b>	<b>836.0</b>	<b>1 047.7</b>	<b>1 361.7</b>	<b>1 562.2</b>	<b>1 719.1</b>	<b>1 817.2</b>	<b>1 783.8</b>
<b>Expenses</b>							
<b>Current expense</b>	<b>427.5</b>	<b>495.0</b>	<b>595.3</b>	<b>657.7</b>	<b>746.9</b>	<b>785.0</b>	<b>822.0</b>
Compensation of employees	221.7	242.8	287.9	347.2	381.3	409.1	434.9
Goods and services	190.1	223.1	275.8	265.0	318.1	324.1	325.1
Depreciation	15.1	28.6	30.9	45.4	47.2	51.6	61.8
Interest, dividends and rent on land	0.7	0.4	0.6	0.1	0.2	0.2	0.2
<b>Transfers and subsidies</b>	<b>397.4</b>	<b>505.8</b>	<b>766.3</b>	<b>903.8</b>	<b>972.3</b>	<b>1 032.2</b>	<b>961.8</b>
<b>Total expenses</b>	<b>824.9</b>	<b>1 000.8</b>	<b>1 361.6</b>	<b>1 561.5</b>	<b>1 719.1</b>	<b>1 817.2</b>	<b>1 783.8</b>
<b>Surplus / (Deficit)</b>	<b>11.2</b>	<b>46.8</b>	<b>0.0</b>	<b>0.7</b>	<b>(0.0)</b>	<b>(0.0)</b>	<b>(0.0)</b>

**Table 33.12 National Research Foundation: Financial information (continued)**

Statement of financial position	Audited outcome			Revised estimate	Medium-term estimate		
	2006/07	2007/08	2008/09		2009/10	2010/11	2011/12
R million							
Carrying value of assets	210.6	240.1	319.6	514.8	833.5	1 134.4	1 355.5
<i>of which: Acquisition of assets</i>	62.8	59.8	111.1	241.2	366.5	353.0	283.3
Investments	56.9	48.9	46.1	44.0	42.0	40.0	40.0
Inventory	2.7	2.6	3.9	4.5	5.4	6.0	9.5
Receivables and prepayments	102.9	276.6	265.0	290.0	311.0	298.0	332.0
Cash and cash equivalents	371.2	507.3	756.2	502.6	484.0	512.4	473.3
<b>Total assets</b>	<b>744.2</b>	<b>1 075.5</b>	<b>1 390.8</b>	<b>1 355.9</b>	<b>1 675.9</b>	<b>1 990.8</b>	<b>2 210.3</b>
Accumulated surplus/deficit	(72.6)	(47.3)	(78.0)	(77.3)	(77.3)	(77.3)	(77.3)
Capital and reserves	77.1	98.6	129.3	129.3	129.3	129.3	129.3
Post-retirement benefits	89.0	93.6	92.2	95.2	98.2	101.1	103.8
Trade and other payables	441.3	691.6	926.3	695.0	693.3	704.5	700.1
Provisions	–	–	2.5	–	–	–	–
Liabilities not classified elsewhere	209.5	239.0	318.5	513.7	832.4	1 133.3	1 354.4
<b>Total equity and liabilities</b>	<b>744.2</b>	<b>1 075.5</b>	<b>1 390.8</b>	<b>1 355.9</b>	<b>1 675.9</b>	<b>1 990.8</b>	<b>2 210.3</b>
<b>Contingent liabilities</b>	<b>671.0</b>	<b>1 340.9</b>	<b>1 508.1</b>	<b>1 500.0</b>	<b>1 200.0</b>	<b>1 100.0</b>	<b>1 000.0</b>

### Expenditure trends

Revenue increased from R836 million in 2006/07 to R1.6 billion in 2009/10, at an average annual rate of 23.1 per cent. Over the medium term, the National Research Foundation's total revenue is expected grow at an average annual rate of 4.5 per cent to reach R1.8 billion. The growth is mainly to cater for adjustments for inflation for existing key research and infrastructure activities.

Expenditure increased from R824.9 million in 2006/07 to R1.6 billion in 2009/10, at an average annual rate of 23.7 per cent. This is mainly due to the ramping up of key programmes, including the South African Research Chairs Initiative and the Square Kilometre Array project. Expenditure over the medium term is expected to increase to R1.8 billion, at an average annual rate of 4.5 per cent.

Spending over the MTEF period will largely be in key investment areas, as well as in compensation of employees and goods and services.

## Programme 5: Socioeconomic Partnerships

- *Science and Technology for Economic Impact* strengthens the achievement of 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. Key activities include: providing policy direction, providing oversight, and managing the implementation of research, development and innovation strategies and programmes in mission areas. Transfers are for research, development and innovation projects managed by the department's implementing agencies.
- *Science and Technology for Social Impact* leads and supports knowledge generation in human and social dynamics in development, promotes technology transfer to support the creation of sustainable job and wealth opportunities, and contributes to creating sustainable human settlements in areas of deprivation. It focuses on mature technologies that do not yet have widespread application but are seen as having the potential to achieve government's broad development objectives. It does this in partnership with other government departments which also focus on research and technology transfer.
- *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). This involves administering the reporting by private companies on research and development claims against the tax allowance. Transfers and subsidies are used for implementing the research information management system and for developing new science and technology indicators.

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

## Objectives and measures

- Enable growth in advanced industries, such as metals manufacturing, ICT, electronics and chemicals, through support to companies by providing 76 companies with technological assistance packages by March 2013.
- Increase the quality of life in households by providing an additional 10 decision support interventions for sustainable development by March 2013.
- Contribute to improving government decision making on science and technology as productive investments by producing 3 evaluation reports per year on science, technology and innovation indicators.
- Build closer links with industry, institutions of higher learning and government by increasing support for targeted research networks in the national system of innovation to 11 supported research networks in 2010/11.
- Develop human capital by supporting an additional 390 research graduates (honours and PhD) and work based learnerships by March 2013.
- Support new knowledge generated for economic and social benefit by:
  - enlarging the portfolio of intellectual property by 33 new inventions by March 2013
  - increasing the number of published scientific and technical papers by 270 by March 2013.

## Service delivery focus

The department entered its second year of the Broadband for All project to provide internet access in rural communities using wireless mesh technology. The project is testing a more suitable and sustainable innovation business model to network government facilities such as schools, clinics, Thusong centres and libraries. This core infrastructure can then be extended to individual households. The project also includes innovations in e-government, e-education, e-health and other communication services.

Technology and innovation areas that support the development and green industries and a green economy have been identified, such as fuel cells and hydrogen energy. A green technologies development strategy will be finalised by 2011/12 to provide the framework for investing in and driving the local environmental technologies sector. In 2009/10, the department's public awareness programme on green research and a tax incentive led to a substantial increase in the volume of enquiries. By the end of October 2009, the department had received 301 submissions totalling research and development expenditure of about R3.2 billion. The 2007/08 annual national survey on research and development is complete, and a high level results report was published in 2009.

The department continued supporting other departments in understanding the importance of investing in critical technology intensive services, such as health laboratories, agricultural public assets and services, and geological and weather services. The department commissioned 2 studies to review the research and technological capacity of the national health laboratory services and agricultural national public assets.

The number of institutions using 1 or 2 modules of the research management system increased from 3 in 2008/09 to 14 in 2009/10. 3 universities (Witwatersrand, Johannesburg and Free State) reported their research outputs to the Department of Higher Education and Training using this platform in 2009/10.

In 2009, the department commissioned the Council for Scientific and Industrial Research and the Human Sciences Research Council to cooperate with other science councils and institutions of higher learning to develop an integrated science based IT platform to improve the quality of evidence for integrated spatial planning in all 3 spheres of government across a range of settlement scales.

## Expenditure estimates

Table 33.13 Socioeconomic Partnerships

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
R million							
Science and Technology for Economic Impact	769.0	847.0	848.3	915.4	981.3	1 013.9	1 049.1
Science and Technology for Social Impact	216.0	254.1	247.6	274.2	260.8	299.4	374.1
Science and Technology Investment	5.5	4.8	23.7	24.2	22.7	22.2	24.6
<b>Total</b>	<b>990.6</b>	<b>1 105.9</b>	<b>1 119.6</b>	<b>1 213.8</b>	<b>1 264.8</b>	<b>1 335.5</b>	<b>1 447.8</b>
Change to 2009 Budget estimate				23.1	(24.8)	(35.7)	8.0

## Economic classification

<b>Current payments</b>	<b>21.2</b>	<b>24.6</b>	<b>28.9</b>	<b>44.3</b>	<b>46.7</b>	<b>49.2</b>	<b>51.6</b>
Compensation of employees	12.9	16.1	22.0	29.5	31.3	33.0	34.6
Goods and services	8.4	8.5	7.0	14.7	15.5	16.2	17.0
<i>of which:</i>							
Communication	0.8	0.8	0.9	1.0	1.1	1.1	1.2
Consultants and professional services:	–	–	0.1	8.3	8.2	8.7	9.1
Business and advisory services							
Agency and support / outsourced services	2.6	2.6	0.7	0.4	0.2	0.4	0.4
Travel and subsistence	3.4	3.4	3.4	3.0	4.0	3.9	4.1
<b>Transfers and subsidies</b>	<b>969.0</b>	<b>1 080.9</b>	<b>1 090.4</b>	<b>1 169.2</b>	<b>1 217.6</b>	<b>1 285.9</b>	<b>1 395.7</b>
Departmental agencies and accounts	204.7	250.5	273.7	312.7	377.1	414.4	479.5
Universities and technikons	8.9	16.3	6.7	6.8	–	–	–
Public corporations and private enterprises	634.6	690.9	746.1	806.5	801.9	830.6	873.2
Non-profit institutions	120.8	123.2	63.9	43.2	38.6	40.9	43.0
<b>Payments for capital assets</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	<b>0.4</b>	<b>0.5</b>
Machinery and equipment	0.3	0.3	0.3	0.4	0.5	0.4	0.5
<b>Total</b>	<b>990.6</b>	<b>1 105.9</b>	<b>1 119.6</b>	<b>1 213.8</b>	<b>1 264.8</b>	<b>1 335.5</b>	<b>1 447.8</b>

## Details of selected transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	204.7	250.5	273.7	312.7	377.1	414.4	479.5
Global Change Science and Technology	–	–	12.7	19.4	29.7	33.6	33.3
Human and Social Development Dynamics	–	–	14.3	1.0	36.2	40.6	35.4
Human Science Research Council	121.5	155.9	163.9	166.2	169.8	180.7	189.9
Information Communication Technology	13.0	16.0	–	–	–	–	–
Leveraging Services Strategy	1.7	–	–	–	–	–	–
Local Manufacturing Capacity	–	–	–	–	28.2	30.0	28.4
Local Systems of Innovation	–	–	5.0	5.0	8.6	9.1	8.6
National Public Assets	43.0	43.0	–	–	–	–	–
Natural Resources and Public Assets	–	–	52.8	55.3	58.5	62.0	65.1
Quality of Life Nuclear Technologies	–	–	–	5.0	5.9	6.3	4.6
Research Information Management System	–	–	14.0	9.9	3.9	2.3	3.6
Science and Technology Indicators	–	–	3.0	4.0	7.9	8.5	9.0
South African Research Chairs Initiative for Human Sciences	–	–	–	21.3	18.3	19.4	70.4
Technology for Poverty Alleviation	6.2	24.0	8.0	25.6	10.1	21.8	31.3
Technology for Sustainable Livelihoods	–	0.3	–	–	–	–	–
Technology Planning and Diffusion	19.3	11.3	–	–	–	–	–



Table 33.13 Socioeconomic Partnerships (continued)

R million	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Universities and technikons</b>							
<b>Current</b>	<b>8.9</b>	<b>16.3</b>	<b>6.6</b>	<b>6.8</b>	–	–	–
Leveraging Services Strategy	0.6	–	–	–	–	–	–
Local Manufacturing Capacity	–	–	–	6.8	–	–	–
Local Systems of Innovation	–	–	0.4	–	–	–	–
Technology for Poverty Alleviation	–	9.0	–	–	–	–	–
Technology for Sustainable Livelihoods	8.3	7.3	6.2	–	–	–	–
<b>Public corporations and private enterprises</b>							
<b>Public corporations</b>							
<b>Other transfers</b>							
<b>Current</b>	<b>634.6</b>	<b>690.9</b>	<b>746.1</b>	<b>806.5</b>	<b>801.9</b>	<b>830.6</b>	<b>873.2</b>
Advanced Manufacturing Technology Strategy	41.8	47.7	38.0	47.7	50.5	54.6	48.3
Council for Scientific and Industrial Research	483.2	517.4	554.7	599.4	634.2	638.2	675.8
Global Change Science and Technology	–	–	4.3	3.4	–	–	–
Human and Social Development Dynamics	–	–	12.0	17.8	–	–	–
Information Communication Technology	14.2	54.2	55.0	55.6	63.8	72.3	73.9
Local Manufacturing Capacity	–	–	10.0	12.2	–	–	–
Local Systems of Innovation	–	–	0.7	2.8	–	–	–
Resource Based Industries	24.2	22.2	29.6	34.9	36.9	39.1	39.0
Technology for Poverty Alleviation	20.1	–	15.5	–	–	–	–
Technology for Sustainable Livelihoods	44.7	45.0	21.3	32.9	16.5	26.4	36.1
Technology Planning and Diffusion	6.4	4.4	–	–	–	–	–
Quality of Life Nuclear Technologies	–	–	5.0	–	–	–	–
<b>Non-profit institutions</b>							
<b>Current</b>	<b>120.8</b>	<b>123.2</b>	<b>63.9</b>	<b>43.2</b>	<b>38.6</b>	<b>40.9</b>	<b>43.0</b>
Advanced Manufacturing Technology Strategy	10.0	10.0	10.0	–	–	–	–
Leveraging Services Strategy	0.6	–	–	–	–	–	–
Local Manufacturing Capacity	–	–	13.5	6.8	–	–	–
Local Systems of Innovation	–	–	0.3	–	–	–	–
Resource Based Industries	5.5	5.4	3.5	–	–	–	–
South African National Energy Research Institute	40.0	42.0	–	–	–	–	–
Technology for Poverty Alleviation	9.0	7.0	–	–	–	–	–
Technology for Sustainable Livelihoods	–	0.4	–	–	–	–	–
Technology Planning and Diffusion	55.7	22.5	–	–	–	–	–
Tshumisano Trust	–	36.0	36.6	36.4	38.6	40.9	43.0

## Expenditure trends

Expenditure increased from R990.6 million in 2006/07 to R1.2 billion in 2009/10, at an average annual rate of 7 per cent. The increase is attributable to the introduction of activities such as: policy and indicator development, tax incentives, sustainable human settlement research, and sustainable livelihoods and social development analysis.

Over the medium term, expenditure is expected to increase at an average annual rate of 6.1 per cent to reach R1.4 billion in 2012/13. Expenditure was reprioritised to provide funding for a technology localisation programme to support government's key priorities. The programme will provide technological support to local manufacturing firms to allow them to become potential suppliers to large scale public procurement processes. In addition, funding is also being increased and re-directed to 2 of the grand challenges outlined in the 10-year innovation plan. These are the human and social dynamics grand challenge and the science and technology for global change grand challenge. In addition, funding continues to be set aside to enhance information and data collection on the functioning and impact of the national system of innovation to assist with long term monitoring, evaluation, and planning.

Over the MTEF period, spending will focus on a number of long term technology development mission areas that can provide opportunities for research and development led long term industrial and economic development. These include areas such as advanced manufacturing, ICT, minerals beneficiation, and technology for poverty alleviation. These programmes are being consolidated as funding is being maintained at current levels, and a key focus will be on growing the budget.

## Public entity

### Council for Scientific and Industrial Research

Strategic overview: 2006/07 – 2012/13

The Council for Scientific and Industrial Research was established under the Scientific Research Council Act (1988). Its objectives are to foster industrial and scientific development in the national interest through multidisciplinary research and technological innovation. The council's activities, focused on directed research and development, cut across the research and innovation value chain.

The council's research impact areas are: renewable and alternative energy; new drug development and nutrition; defence capability as a national asset; climate change, pollution and waste, water and coastal issues; transport and human settlements; manufacturing, forestry and mining; and cyber infrastructure and information security and accessibility. These impact areas support national priorities.

The council's organisational priorities are: building and transforming human capital; strengthening the science, engineering and technology base; doing relevant research and development; and transferring technology and knowledge through patents, research contracts and skilled human capital. Financial sustainability and good governance must also be maintained.

#### Savings and cost effective service delivery

The council has put a number of initiatives in place to address potential reductions in income and improve cost effective delivery on contracts, including: securing funding from both the private and public sectors in excess of current inflationary cost increases, including income from international contracts; rationalising costs, maintaining economies of scale in operations and realising efficiencies; diversifying the council's income streams by growing royalty income through effective technology transfer; and maintaining prudent balance sheet management practices.

#### Selected performance indicators

**Table 33.14 Council for Scientific and Industrial Research**

Indicator	Programme/Activity	Past			Current	Projections		
		2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Total number of permanent staff studying towards Masters or PhD degrees	Human capital development	–	90	201	225	220	218	182
Percentage of science, engineering and technology workers who are black	Human resource development	49%	52%	53%	54%	54%	55%	56%
Total number of staff with PhD level qualifications	Human resource management	237	234	273	282	305	325	375
Number of publications by staff per year	Science and technology outputs	220	343	452	425	450	475	575
Number of new technologies demonstrated	Science and Technology outputs	–	–	43	27	30	32	35
Value of contract research and development formally recognised as supporting national strategies	Contract research and development	R274.3m	R373.5m	R435.2m	R464.1m	R525m	R565m	R625m
Number of new international and national patents granted	Research and development outputs	12	21	35	12	14	16	18

## Service delivery focus

Examples of what the council delivered in 2009/10 include: deploying integrated asset management systems for government departments and parastatals; working with the Department of Water Affairs to enhance the management of water resources, improve water quality, and assist rural communities with access to safe drinking water; rolling out the first phase of the national high speed broadband network backbone to connect more than 45 research and education facilities; developing a modular design to fit approach to housing delivery, which will improve living conditions and the durability of houses; developing new methods for the design and delivery of roads; and creating a range of enterprises in the agriculture, agro-processing and manufacturing sectors. In 2008/09, more than 250 sustainable jobs were supported in underdeveloped parts of South Africa and 22 enterprises were created.

## Expenditure estimates

**Table 33.15 Council for Scientific and Industrial Research: Programme information**

R million	Audited outcome			Revised estimate	Medium-term estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	20011/12	2012/13
Defence, Peace, Safety and Security	172.9	217.2	298.0	293.9	308.0	331.7	357.5
Materials Science and Manufacturing	131.2	146.4	182.7	180.2	188.8	203.4	219.1
Biosciences	97.8	126.7	122.6	120.8	126.6	136.4	147.0
Natural Resources and the Environment	188.0	181.2	185.2	182.1	190.8	205.5	221.5
Built Environment	110.6	126.5	157.0	155.5	162.9	175.5	189.1
Other programmes	460.3	445.2	581.0	583.7	600.7	647.0	697.2
<b>Total expense</b>	<b>1 160.7</b>	<b>1 243.3</b>	<b>1 526.5</b>	<b>1 516.2</b>	<b>1 578.0</b>	<b>1 699.5</b>	<b>1 831.4</b>

**Table 33.16 Council for Scientific and Industrial Research: Financial information**

Statement of financial performance	Audited outcome			Revised estimate	Medium-term estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	20011/12	2012/13
<b>Revenue</b>							
<b>Non-tax revenue</b>	<b>726.8</b>	<b>868.5</b>	<b>1 104.5</b>	<b>946.9</b>	<b>976.1</b>	<b>1 096.0</b>	<b>1 193.0</b>
Sale of goods and services other than capital assets	682.7	793.4	991.8	897.0	928.7	1 051.0	1 150.2
<i>of which:</i>							
Contract income	682.7	793.4	991.8	897.0	928.7	1 051.0	1 150.2
Other non-tax revenue	44.0	75.2	112.7	49.9	47.4	45.0	42.8
<b>Transfers received</b>	<b>460.4</b>	<b>429.0</b>	<b>480.3</b>	<b>599.4</b>	<b>634.2</b>	<b>638.2</b>	<b>675.8</b>
<b>Total revenue</b>	<b>1 187.2</b>	<b>1 297.5</b>	<b>1 584.8</b>	<b>1 546.3</b>	<b>1 610.4</b>	<b>1 734.2</b>	<b>1 868.8</b>
<b>Expenses</b>							
<b>Current expense</b>	<b>1 160.7</b>	<b>1 243.3</b>	<b>1 526.5</b>	<b>1 516.2</b>	<b>1 578.0</b>	<b>1 699.5</b>	<b>1 831.4</b>
Compensation of employees	592.8	628.3	772.0	853.8	888.0	941.3	997.8
Goods and services	510.7	580.6	705.6	620.3	646.3	711.1	782.7
Depreciation	50.7	28.1	37.4	42.1	43.6	47.1	50.9
Interest, dividends and rent on land	6.4	6.4	10.0	–	–	–	–
<b>Total expenses</b>	<b>1 160.7</b>	<b>1 243.3</b>	<b>1 526.5</b>	<b>1 516.2</b>	<b>1 578.0</b>	<b>1 699.5</b>	<b>1 831.4</b>
<b>Surplus / (Deficit)</b>	<b>26.5</b>	<b>54.3</b>	<b>58.3</b>	<b>30.1</b>	<b>32.4</b>	<b>34.7</b>	<b>37.4</b>
<b>Statement of financial position</b>							
Carrying value of assets	219.1	225.4	298.0	372.6	415.9	450.0	501.6
<i>of which: Acquisition of assets</i>	66.4	41.8	115.1	116.7	86.9	81.2	102.5
Investments	200.0	–	100.0	–	–	–	–
Inventory	43.2	61.7	79.3	105.2	115.8	127.3	140.1
Receivables and prepayments	146.9	267.1	138.7	146.6	143.9	139.7	222.0
Cash and cash equivalents	379.2	691.5	782.5	743.4	723.0	666.5	637.0
Assets not classified elsewhere	95.1	94.9	96.8	1.6	1.6	1.6	1.6
<b>Total assets</b>	<b>1 083.6</b>	<b>1 340.6</b>	<b>1 495.3</b>	<b>1 369.5</b>	<b>1 400.1</b>	<b>1 385.1</b>	<b>1 502.3</b>
Accumulated surplus/deficit	347.7	392.7	449.5	479.6	512.0	546.7	584.1
Post-retirement benefits	12.8	8.6	8.9	5.8	–	–	–
Trade and other payables	623.8	896.1	995.0	884.0	888.1	838.4	918.2
Provisions	72.2	–	1.4	–	–	–	–
Liabilities not classified elsewhere	27.1	43.1	40.6	–	–	–	–
<b>Total equity and liabilities</b>	<b>1 083.6</b>	<b>1 340.6</b>	<b>1 495.3</b>	<b>1 369.5</b>	<b>1 400.1</b>	<b>1 385.1</b>	<b>1 502.3</b>

### Expenditure trends

The Council for Scientific and Industrial Research is funded by transfers from the Department of Science and Technology and receives additional ringfenced grant allocations for the centres of competence, the laser loan programme, ICT and demonstration in government, and the Meraka Institute. The council generates about 66 per cent of its income from research and development contract income. It generates a marginal surplus on this contract income and on technology transfer activities, which is reinvested in terms of the council's mandate.

Over the MTEF period, the council is expected to receive transfers of R634.2 million, R638.2 million and R675.8 million, and additional ringfenced allocations of R56.5 million, R63.9 million and R67.1 million, excluding value added tax.

The variable portion of the council's expenditure is dependent on the nature of the research and development contract income secured and undertaken by the council. Expenditure increased from R1.2 million in 2006/07 to R1.5 billion in 2009/10.

The spending focus over the MTEF period will remain on fostering industrial and scientific development in the national interest through multidisciplinary research and technological innovation.

## Additional tables

**Table 33.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	2008/09		2008/09	2009/10			2009/10
1. Administration	113.0	112.8	129.9	171.3	2.3	173.6	173.6
2. Research, Development and Innovation	862.9	863.1	855.8	1 142.9	0.5	1 143.4	1 143.4
3. International Cooperation and Resources	129.3	130.8	140.5	131.3	0.7	132.0	132.0
4. Human Capital and Knowledge Systems	1 451.8	1 455.2	1 457.6	1 598.0	0.9	1 599.0	1 599.0
5. Socioeconomic Partnerships	1 147.0	1 159.9	1 119.6	1 190.7	23.1	1 213.8	1 213.8
<b>Total</b>	<b>3 704.0</b>	<b>3 721.7</b>	<b>3 703.5</b>	<b>4 234.1</b>	<b>27.6</b>	<b>4 261.7</b>	<b>4 261.7</b>
<b>Economic classification</b>							
<b>Current payments</b>	<b>226.6</b>	<b>242.9</b>	<b>260.2</b>	<b>334.8</b>	<b>7.6</b>	<b>342.4</b>	<b>342.4</b>
Compensation of employees	130.2	135.9	144.9	192.8	7.3	200.2	200.2
Goods and services	96.5	107.0	115.3	142.0	0.3	142.2	142.2
<b>Transfers and subsidies</b>	<b>3 475.1</b>	<b>3 476.7</b>	<b>3 439.9</b>	<b>3 894.8</b>	<b>20.0</b>	<b>3 914.8</b>	<b>3 914.8</b>
Departmental agencies and accounts	1 927.7	1 910.6	1 866.5	2 033.7	197.1	2 230.8	2 230.8
Universities and technikons	10.0	18.3	69.5	–	119.9	119.9	119.9
Public corporations and private enterprises	550.9	879.1	1 075.1	581.1	623.0	1 204.0	1 204.0
Non-profit institutions	986.5	668.3	428.4	1 280.1	(920.0)	360.1	360.1
Households	–	0.4	0.4	–	–	–	–
<b>Payments for capital assets</b>	<b>2.3</b>	<b>2.1</b>	<b>3.3</b>	<b>4.5</b>	<b>–</b>	<b>4.5</b>	<b>4.5</b>
Machinery and equipment	2.3	2.1	3.3	4.5	–	4.5	4.5
<b>Payments for financial assets</b>	<b>–</b>	<b>–</b>	<b>0.1</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>
<b>Total</b>	<b>3 704.0</b>	<b>3 721.7</b>	<b>3 703.5</b>	<b>4 234.1</b>	<b>27.6</b>	<b>4 261.7</b>	<b>4 261.7</b>

**Table 33.B Detail of approved establishment and personnel numbers according to salary level <sup>1</sup>**

	Personnel post status as at 30 September 2009			Number of personnel posts filled / planned for on funded establishment						
	Number of posts on approved establishment	Number of funded posts	Number of posts additional to the establishment	Actual			Mid year <sup>2</sup>	Medium-term estimate		
				2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Department</b>	<b>155</b>	<b>391</b>	<b>–</b>	<b>291</b>	<b>324</b>	<b>342</b>	<b>356</b>	<b>442</b>	<b>449</b>	<b>454</b>
Salary level 1 – 6	40	56	–	59	61	61	55	57	82	87
Salary level 7 – 10	61	109	–	84	86	89	101	137	119	119
Salary level 11 – 12	19	116	–	73	97	108	106	136	136	136
Salary level 13 – 16	35	110	–	75	80	84	94	112	112	112
<b>Administration</b>	<b>155</b>	<b>167</b>	<b>–</b>	<b>141</b>	<b>145</b>	<b>155</b>	<b>155</b>	<b>239</b>	<b>246</b>	<b>251</b>
Salary level 1 – 6	40	40	–	38	40	40	40	40	65	70
Salary level 7 – 10	61	66	–	57	58	61	61	97	79	79
Salary level 11 – 12	19	20	–	15	15	19	19	50	50	50
Salary level 13 – 16	35	41	–	31	32	35	35	52	52	52

**Table 33.B Detail of approved establishment and personnel numbers according to salary level <sup>1</sup> (continued)**

	Personnel post status as at 30 September 2009			Number of personnel posts filled / planned for on funded establishment						
	Number of posts on approved establishment	Number of funded posts	Number of posts additional to the establishment	Actual			Mid year <sup>2</sup>	Medium-term estimate		
				2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
<b>Research, Development and Innovation</b>	-	41	-	31	36	43	38	39	39	39
Salary level 1 – 6	-	3	-	3	3	3	3	3	3	3
Salary level 7 – 10	-	4	-	4	4	4	4	4	4	4
Salary level 11 – 12	-	16	-	12	16	20	16	16	16	16
Salary level 13 – 16	-	18	-	12	13	16	15	16	16	16
<b>International Cooperation and Resources</b>	-	64	-	51	60	59	61	61	61	61
Salary level 1 – 6	-	4	-	6	6	6	4	4	4	4
Salary level 7 – 10	-	24	-	15	15	15	22	22	22	22
Salary level 11 – 12	-	20	-	18	25	24	19	19	19	19
Salary level 13 – 16	-	16	-	12	14	14	16	16	16	16
<b>Human Capital and Knowledge Systems</b>	-	56	-	33	36	39	44	43	43	43
Salary level 1 – 6	-	4	-	7	7	7	4	4	4	4
Salary level 7 – 10	-	5	-	2	2	2	5	5	5	5
Salary level 11 – 12	-	31	-	15	18	23	23	22	22	22
Salary level 13 – 16	-	16	-	9	9	7	12	12	12	12
<b>Socioeconomic Partnerships</b>	-	63	-	35	47	46	58	60	60	60
Salary level 1 – 6	-	5	-	5	5	5	4	6	6	6
Salary level 7 – 10	-	10	-	6	7	7	9	9	9	9
Salary level 11 – 12	-	29	-	13	23	22	29	29	29	29
Salary level 13 – 16	-	19	-	11	12	12	16	16	16	16

1. Data has been provided by the department and may not necessarily reconcile with official government personnel data.

2. As at 30 September 2009.

**Table 33.C Summary of expenditure on training**

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Compensation of employees (R million)	83.7	104.1	135.9	192.8	204.2	215.9	226.7
Training expenditure (R million)	1.0	3.6	5.2	6.5	5.1	5.4	5.6
Training as percentage of compensation	1.1%	3.5%	3.9%	3.4%	2.5%	2.5%	2.5%
Total number trained in department (head count)	120	127	141	180			
<i>of which:</i>							
Employees receiving bursaries (head count)	38	41	46	131			
Internships trained (head count)	-	-	-	22			

Table 33.D Summary of expenditure on infrastructure

Project name	Service delivery outputs	Current project stage	Total project cost	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
				2006/07	2007/08	2008/09		2010/11	2011/12	2012/13
<b>Departmental infrastructure</b>										
Science and Technology Head Office Building	Office construction	Handed over	133.0	133.0	-	-	-	-	-	-
<b>Infrastructure transfers to other spheres, agencies and departments</b>										
Square Kilometer Array	Construction of telescopes	Construction	1 890.3	-	80.0	264.3	490.3	508.9	546.8	-
Space infrastructure	Construction of telescopes	Construction	252.6	20.0	20.0	14.2	36.4	51.4	55.2	55.4
Hydrogen strategy	Satellite construction	Various	447.5	-	10.0	40.5	44.2	48.4	51.9	54.5
National nanotechnology centres	Purchase of equipment	Various	310.4	-	-	-	34.9	38.3	42.4	44.5
South African national research network	Equipped centres	Various	906.2	22.0	162.0	89.0	93.5	98.8	104.7	99.9
<b>Total</b>			<b>3 939.9</b>	<b>175.0</b>	<b>272.0</b>	<b>408.0</b>	<b>699.3</b>	<b>745.7</b>	<b>801.0</b>	<b>254.4</b>

