

Vote 31

Science and Technology

R thousand	2006/07 To be appropriated	2007/08	2008/09
MTEF allocations	2 614 093	2 908 479	3 250 497
<i>of which:</i>			
Current payments	180 770	186 657	196 763
Transfers and subsidies	2 299 469	2 720 924	3 052 787
Payments for capital assets	133 854	898	946
Statutory amounts	-	-	-
Executive authority	Minister of Science and Technology		
Accounting officer	Director-General of Science and Technology		

Aim

The Department of Science and Technology seeks 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

Provide core support services, including finance, human resources, legal services and IT. Manage the governance and reporting system for government-funded science and technology in general and the department's institutions and programmes in particular.

Programme 2: Science and Technology Expert Services

Provide expert content-based services to the line programmes, the executive committee and the national system of innovation across a range of science and technology domains. Provide research and innovation management practice, policy inputs and evaluation.

Programme 3: International Co-operation and Resources

Develop bilateral and multilateral co-operation in science and technology to strengthen the national system of innovation. Establish technological intelligence capacity to monitor and evaluate international science and technology trends.

Programme 4: Frontier Science and Technology

Provide leadership for relevant, long-term and cross-cutting research, development, innovation and human capital development across the national system of innovation.

Programme 5: Government Sectoral Programmes and Co-ordination

Provide leadership and support to other government departments for sector-specific research, development and technology, and directed human capital programmes.

Strategic overview and key policy developments: 2002/03 – 2008/09

Scientific discoveries, which frequently lead to new, marketable technologies, are key long-term drivers of economic development. The concomitant positive socioeconomic effects are an incentive for public and private investment in science and technology. Because of its distinct mandate, the Department of Science and Technology moved away from the social services to the economic services cluster and became a separate department in 2004. With its predecessor, the Department of Arts, Culture, Science and Technology, the department set up key enabling policies which form the basis for the sector-specific strategies in biotechnology, advanced manufacturing technology and IT. It continues to develop strategies in new areas of knowledge and technology such as indigenous knowledge, nanotechnology, astronomy and intellectual property derived from publicly funded research.

A new strategic management framework

The new governance framework for the state-owned part of South Africa's science and technology system gives the Department of Science and Technology the role of developing emerging areas of science and technology, as well as supporting sister government departments in more mature areas. This new framework as well as the change in approach to the publicly funded portion of South Africa's science and technology system have led to a number of concrete organisational and operational changes, evident in the different programmes.

Dealing with challenges

The department and the innovation environment face many challenges, including the fragmented governance structures of research institutions and the lack of human resources development in the area of science and technology. The institutions need to replenish the stock of knowledge upon which their success in serving industry and government has historically been based. Research chairs in strategic areas are to be set up in South African universities, and scientific infrastructure such as scientific laboratories and information technology equipment is to be renewed and extended. Human resources for science and technology remain a critical challenge and the basic constraint is still the quantity and quality of students entering higher education programmes. Bringing large numbers of much younger researchers into the system and ensuring that they develop viable research careers is a key focus of the department. Insufficient attention has been paid to engineering and technical skills that underpin economic growth, and this will be a key planning focus in the years ahead.

Other interventions

The department's other interventions include the establishment of new innovation and technology transfer institutions, which could result in high quality job creation. To foster innovation, the Innovation Fund was maintained while the eventual goal of the department is to achieve research and development-based commercial successes. Over the 2006 medium-term expenditure framework (MTEF) period, higher priority will also be given to the social impact programme and technology to promote poverty reduction.

Funding and international linkages

The department wants to see that South Africa is keeping abreast of other developing countries' levels of investment in science and technology. Its intermediate goal is for 1 per cent of the country's GDP to be dedicated to research and development and it aims to achieve this by 2008/09. Government funding to the Department of Science and Technology for research and development increases by R1,2 billion over the MTEF, largely to fund core science and technology infrastructure, such as the Centre for High Performance Computing, nanotechnology characterisation centres, and astronomy and space science.

By 2001/02, foreign funding in South African research and development had grown to 6 per cent from a zero base in 1994 and by 2003/04 foreign funding stood at 10 per cent of total funding. There is a burgeoning of bilateral and multilateral activity linking South Africa with science and technology systems internationally. The breakthroughs include South Africa's increased participation in the EU's sixth framework programme and in the New Partnership for Africa's Development (Nepad), South Africa drove the development of a continent-wide plan of action. The astronomy geographic advantage programme established South Africa as a provider of world-class ground-based observation facilities. Developments such as the South African Large Telescope (SALT) and a new astronomy project, the Karoo Array Telescope (KAT), will demonstrate South Africa's engineering competence and improve its chances of hosting the Square Kilometre Array. The global scientific community and leading technology businesses are the major direct users and beneficiaries of these types of investment. As a result, there is a significant opportunity for South Africa to increase its participation in global knowledge-intensive businesses and programmes.

Expert service

Pooling the department's core content and research management expertise will result in a flexible and responsive science and technology expert service. The objective of the *Science and Technology Expert Services* programme is to provide the expertise and resource base to deliver on the national system of innovation (NSI) initiatives, as well as support leadership and governance functions. The aim is to improve the department's strategic capacity to place science and technology human resources and direct innovation potential in new areas of science and technology and across existing sectors, in partnership with other government departments and the private sector. The underlying principle is that the global nature of science and technology gets appropriately applied locally.

Expenditure Estimates

Table 31.1 Science and Technology

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06		2006/07	2007/08	2008/09
R thousand								
1. Administration	47 153	57 873	62 558	74 098	100 028	211 582	82 657	87 208
2. Science and Technology Expert Services	41 579	33 487	41 416	38 283	38 283	51 556	54 581	57 510
3. International Co-operation and Resources	30 512	40 508	46 170	83 165	83 165	131 946	146 921	176 969
4. Frontier Science and Technology	875 148	1 064 822	1 170 201	1 384 585	1 383 655	1 633 037	1 978 957	2 231 662
5. Government Sectoral Programmes and Co-ordination	107 054	194 892	312 532	464 324	439 324	585 972	645 363	697 149
Total	1 101 446	1 391 582	1 632 877	2 044 455	2 044 455	2 614 093	2 908 479	3 250 497
Change to 2005 Budget estimate				57 816	57 816	430 701	467 919	678 146

Table 31.1 Science and Technology (continued)

R thousand	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06		2006/07	2007/08	2008/09
Economic classification								
Current payments	79 667	105 573	127 140	164 156	164 156	180 770	186 657	196 763
Compensation of employees	31 756	45 710	58 204	80 196	80 196	93 107	97 453	102 663
Goods and services	47 904	59 863	68 728	83 960	83 960	87 663	89 204	94 100
<i>of which:</i>								
<i>Communication</i>	3 229	4 048	4 459	5 216	5 216	5 544	5 644	5 957
<i>Computer Services</i>	2 675	2 817	2 965	3 121	3 121	3 309	3 507	3 696
<i>Consultants, contractors and special services</i>	9 684	12 144	12 867	21 476	21 476	21 739	22 123	23 327
<i>Inventory</i>	5 612	5 907	6 219	6 546	6 546	6 940	7 356	7 753
<i>Maintenance repair and running cost</i>	146	153	161	169	169	178	189	199
<i>Operating leases</i>	2 204	2 465	5 107	2 996	2 996	3 195	3 442	3 697
<i>Travel and subsistence</i>	12 450	15 613	15 346	20 116	20 116	21 397	21 706	22 878
<i>Other</i>	11 904	16 716	21 604	24 320	24 320	25 362	25 238	26 593
Financial transactions in assets and liabilities	7	–	208	–	–	–	–	–
Transfers and subsidies	1 017 478	1 282 827	1 497 448	1 879 494	1 854 494	2 299 469	2 720 924	3 052 787
Provinces and municipalities	106	139	6 732	229	229	26	–	–
Departmental agencies and accounts	614 254	748 769	712 761	940 340	940 340	1 221 549	1 432 127	1 575 444
Universities and technikons	–	–	16 289	22 036	22 036	–	–	–
Public corporations and private enterprises	302 751	334 554	489 201	479 166	479 166	483 194	507 352	534 749
Foreign governments and international organisations	–	–	11	–	–	–	–	–
Non-profit institutions	100 367	199 365	263 526	202 898	202 898	594 700	781 445	942 594
Households	–	–	8 928	234 825	209 825	–	–	–
Payments for capital assets	4 301	3 182	8 289	805	25 805	133 854	898	946
Buildings and other fixed structures	–	–	–	–	–	133 000	–	–
Machinery and equipment	4 301	3 182	8 289	805	25 805	854	898	946
Total	1 101 446	1 391 582	1 632 877	2 044 455	2 044 455	2 614 093	2 908 479	3 250 497

Expenditure trends

Expenditure showed strong growth, increasing at an average annual rate of 22,9 per cent from R1,1 billion in 2002/03 to R2 billion in 2005/06. Expenditure is expected to continue its rapid increase over the MTEF, to reach R3,3 billion in 2008/09 at a growth rate of 16,7 per cent. These increases are largely for science and technology infrastructure.

The additional allocations set out by the 2006 Budget, of R428 million in 2006/07, R465 million in 2007/08 and R675 million in 2008/09, are for a new head office, science and technology infrastructure, the international leveraging fund, and VAT adjustments to several public entities.

An additional R750 million was added to the baseline of the department's budget over the period 2003/04 to 2005/06 in response to the imperatives of the national research and development strategy.

The *International Co-operation and Resources* programme has new and additional resources for international co-operation amounting to R42,5 million in 2006/07 and rising to R78,5 million in

2008/09. This is intended to benefit South African public research institutions that work in this sphere and stimulate inward investment in R&D capacity by large multinationals.

The *Frontier Science and Technology* programme will receive R132 million of new and additional funding in 2006/07, which rises to R412 million in the outer years of the MTEF. These programmes will benefit the research and academic community with new modern research facilities and infrastructure.

The first phase of implementing the South African National Research Network (SANReN) will begin in 2006/07, with total funding of R178 million over the MTEF. This will develop South Africa's Internet 2 infrastructure for its public research and innovation communities, and will also strengthen their global and regional links.

Furthermore, the astronomy geographic advantage programme receives R8 million in 2006/07, rising to R127,6 million in 2008/09. This will have placed South Africa on an equivalent footing with Chile as a provider of world-class observational facilities for ground-based observations in all wavelengths.

Science and technology activities

In collaboration with National Treasury, the Department of Science and Technology has structured a framework for reporting, across government, on science and technology expenditure. This framework includes a survey instrument with internationally benchmarked definitions on science and technology activities. In the future, it will allow science and technology expenditure reporting by all government departments to be integrated into ENE reports. Then the department will be in a position to analyse expenditure across government and give a comprehensive view of it.

The Department of Science and Technology's appropriations are guided by the 2002 national research and development strategy, with a new focus on cross-cutting and cutting edge science and technology activities. The activities funded by the department, according to the classifications in the National Treasury guidelines, are set out below.

Scientific and technological services

- *Payments to consultants, contracts and special services* are for studies on policy, research and development plans in different science programmes. In addition, work done by the Human Sciences Research Council, the National Advisory Council on Innovation, and the Academy of Science of South Africa falls under this classification.
- *S&T services for dissemination of S&T documentation and factual data* includes expenditure on global science activities, such as the products of the Global Earth Observation System of Systems.
- *Human Sciences Research Council transfer* is used to support policy analysis and research. The earmarked funding to conduct the research and development survey and new funding for indicators is also included here.
- *Scientific and technological collections* includes expenditure on biological collections, such as the National Public Good Assets Fund at the Agricultural Research Council and the National Zoological Gardens.
- *Technology transfer services* includes funding appropriations to technology transfer programmes for poverty alleviation and sustainable livelihoods where there is no significant design, research or innovation involved.

Scientific and technical education and training

The department's scientific and technical education and training (STET) expenditure is channelled through programme and agency subsidies.

- *STET programmes* includes transfers to external programmes which do not form part of a grant or subsidy to an institution. These programmes provide vehicles for developing Masters level researchers, young scientists and technologists in pre-PhD or career enhancement programmes other than PhD or post-doctoral fellowships, such as Science for Youth and advanced science and technology learnerships.
- *STET type transfers to agencies* will in future include the parliamentary grant to the National Research Foundation for bursaries.

Scientific and technological innovation

- *Technology diffusion programmes* funds technology programmes where a new product is researched, including the incubators.
- *Science platforms* funds grants for research activities and funds big science programmes.
- *Cross-cutting science and technology activities* funds activities that will have an impact on more than one sector, including emerging technologies.
- *Transfer funding to the National Research Foundation* supports research at universities and national facilities, and funds research chairs, centres of excellence, pebble bed modular human capital, and science and technology research equipment.
- *Public institutions* funds institutions, such as the Council for Scientific and Industrial Research, which primarily do research and development.

Summary of expenditure on science and technology activities

R thousand	2006/07	2007/08	2008/09
Scientific and Technological Services (STS)	457 185	510 865	582 077
Scientific, Technological & Educational Training (STET)	26 000	28 300	29 828
Scientific and Technological Innovation (STI)	1 814 424	2 182 197	2 441 284
Total for Science and Technology Activities (STAs)	2 291 609	2 715 062	3 046 549

Public organizations that undertake science and technology activities

R thousand	2006/07	2007/08	2008/09
National Advisory Council on Innovation (NACI)	8 722	9 158	9 653
Academy of Science of South Africa (ASSAf)	3 000	3 150	3 320
Africa Institute of South Africa (AISA)	21 954	23 030	24 249
Human Science Research Council (HSRC)	119 873	129 949	136 706
National Research Foundation (NRF)	594 671	630 394	663 480
Council for Scientific and Industrial Research (CSIR)	483 194	507 352	534 749
South African National Energy Research Institute (SANERI)	40 000	42 000	44 268
Total	1 271 334	1 345 033	1 416 425

Departmental receipts

Departmental receipts are mainly miscellaneous items such as debt repayments and private telephone calls. All receipts are deposited into the National Revenue Fund.

Table 31.2 Departmental receipts

R thousand	Audited outcome			Adjusted appropriation	Medium-term receipts estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Departmental receipts	10	270	302	50	1 057	63	70
Sales of goods and services produced by department	6	40	17	44	50	55	61
Sales of capital assets	–	–	–	–	1 000	–	–
Financial transactions in assets and liabilities	4	230	285	6	7	8	9
Total	10	270	302	50	1 057	63	70

Programme 1: Administration

The *Administration* programme conducts the overall management of the department and provides centralised support services. It also ensures that funded organisations comply with good corporate governance practices and are aligned with the strategic focus of the national system of innovation, and monitors and evaluates the science councils. The new *Property Management* subprogramme is for functions and funds which have been devolved from the Department of Public Works.

Expenditure estimates

Table 31.3 Administration

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Minister ¹	685	746	813	836	888	935	981
Deputy Minister ²	1 024	607	780	680	721	760	798
Management	5 757	3 808	5 840	3 912	4 970	5 233	5 491
Corporate Services	36 593	49 300	51 337	63 629	199 028	69 371	73 167
Governance	1 300	1 378	1 461	2 522	3 273	3 439	3 625
Property Management	1 794	2 034	2 327	2 519	2 702	2 919	3 146
Total	47 153	57 873	62 558	74 098	211 582	82 657	87 208
Change to 2005 Budget estimate				5 262	138 609	6 001	6 412

¹ Payable as from 1 April 2005. Salary: R 669 462. Car allowance: R 167 365.

² Payable as from 1 April 2005. Salary: R 544 123. Car allowance: R 136 030.

Economic classification

	44 320	55 612	55 391	72 366	76 823	80 806	85 247
Current payments							
Compensation of employees	21 125	26 295	24 182	35 726	40 869	42 797	45 108
Goods and services	23 188	29 317	31 002	36 640	35 954	38 009	40 139
<i>of which:</i>							
Communication	1 498	1 910	2 246	2 291	2 429	2 550	2 688
Computer Services	1 424	1 499	1 578	1 661	1 761	1 866	1 967
Consultants, contractors and special services	4 493	5 729	6 739	8 566	8 764	9 216	9 723
Inventory	2 072	2 181	2 296	2 417	2 562	2 716	2 862
Maintenance repair and running cost	21	22	23	24	25	27	28
Operating leases	1 989	2 239	4 870	2 746	2 930	3 161	3 401
Travel and subsistence	5 776	7 366	7 445	8 837	9 369	9 837	10 368
Other	5 915	8 371	5 805	10 098	8 114	8 636	9 102
Financial transactions in assets and liabilities	7	–	207	–	–	–	–

Table 31.3 Administration (continued)

R thousand	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Transfers and subsidies¹	70	88	83	1 432	1 441	1 517	1 608
Provinces and municipalities	70	88	83	82	10	–	–
Non-profit institutions	–	–	–	1 350	1 431	1 517	1 608
Payments for capital assets	2 763	2 173	7 084	300	133 318	334	352
Buildings and other fixed structures	–	–	–	–	133 000	–	–
Machinery and equipment	2 763	2 173	7 084	300	318	334	352
Total	47 153	57 873	62 558	74 098	211 582	82 657	87 208

1. Where the name of an entity is not specified, transfer payments are being made to various institutions

Details of major transfers and subsidies:

Non-profit institutions							
Current	–	–	–	1 350	1 431	1 517	1 608
Technology Top 100	–	–	–	1 350	1 431	1 517	1 608
Total	70	88	83	1 432	1 441	1 517	1 608

Expenditure trends

Expenditure over 2002/03 to 2005/06 increased rapidly, from R47,2 million to R74,1 million, at an average annual rate of 16,3 per cent. This was mainly due to the development of administrative capacity and the expansion of the functions the department performs, such as frontier science and technology programmes, science programmes and centres of excellence.

Expenditure over the 2006 MTEF is expected to rise at a slower rate of 5,6 per cent, to reach R87,2 million in 2008/09. The main driver for expenditure during this period is the science and technology infrastructure spending. The sharp increase in 2006/07 is due to the allocation of R133 million for a new head office. In addition, over the 2006 MTEF, expenditure is affected by the additional allocations from the devolution of the Departments of Public Works' funds.

From 1 April 2006, costs for leases and accommodation charges will be devolved from the Department of Public Works to individual departments. The Department of Science and Technology received the following amounts: R2,7 million in 2006/07, R2,9 million in 2007/08 and R3,1 million in 2008/09. Expenditure has been adjusted for 2002/03 to 2005/06.

Programme 2: Science and Technology Expert Services

The role of the *Science and Technology Expert Services* programme is to provide expert services in science and technology policy, implementation, monitoring and reviewing initiatives.

There are two subprogrammes:

- *Expert Services* provides content-based services to the line programmes, carries out initiatives commissioned by the executive committee, and deals with ad hoc requests. It maintains a set of core skills in the department, while using a network of specialists and service providers to complement and improve its core competences. This subprogramme will undertake the mainstreaming of the indigenous knowledge systems strategy.
- *National Advisory Council on Innovation* provides policy advice to the Minister of Science and Technology on the role and contribution of innovation in promoting and achieving national objectives.

Expenditure estimates

Table 31.4 Science and Technology Expert Services

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
R thousand							
Expert Services	41 579	28 029	34 916	30 055	42 834	45 423	47 857
National Advisory Council on Innovation	–	5 458	6 500	8 228	8 722	9 158	9 653
Total	41 579	33 487	41 416	38 283	51 556	54 581	57 510
Change to 2005 Budget estimate				(2 743)	7 092	6 918	7 273

Economic classification

Current payments	17 015	21 385	32 746	33 922	41 087	42 825	45 138
Compensation of employees	4 872	7 966	16 421	21 120	25 387	26 507	27 938
Goods and services	12 143	13 419	16 325	12 802	15 700	16 318	17 199
<i>of which:</i>							
Communication	1 144	1 110	1 133	1 193	1 265	1 340	1 421
Computer Services	231	244	257	270	286	303	320
Consultants, contractors and special services	2 550	2 818	2 378	1 205	1 379	1 507	1 588
Inventory	1 629	1 715	1 805	1 900	2 014	2 135	2 250
Maintenance repair and running cost	9	9	10	10	11	11	12
Operating leases	86	90	95	100	106	112	118
Travel and subsistence	3 279	3 623	3 058	3 477	3 701	3 866	4 075
Other	3 215	3 811	7 590	4 647	6 939	7 043	7 415
Transfers and subsidies¹	23 868	11 741	8 438	4 161	10 257	11 533	12 137
Provinces and municipalities	17	26	39	77	8	–	–
Departmental agencies and accounts	10 000	–	–	–	–	–	–
Universities and technikons	–	–	–	130	–	–	–
Non-profit institutions	13 851	11 715	8 399	3 954	10 249	11 533	12 137
Payments for capital assets	696	361	232	200	212	223	235
Machinery and equipment	696	361	232	200	212	223	235
Total	41 579	33 487	41 416	38 283	51 556	54 581	57 510

1. Where the name of an entity is not specified, transfer payments are being made to various institutions

Details of major transfers and subsidies:

Departmental agencies and accounts							
Public entities							
Capital	10 000	–	–	–	–	–	–
Grant-In-Aid to Various Institutions	10 000	–	–	–	–	–	–
Universities and technikons							
Current	–	–	–	130	–	–	–
Grant-In-Aid to Various Institutions	–	–	–	130	–	–	–
Non-profit institutions							
Current	13 851	11 715	8 399	3 954	10 249	11 533	12 137
Academies	1 350	2 290	2 500	2 500	3 000	3 150	3 320
Institutional and Programme Support	12 501	9 425	5 899	1 454	2 249	3 383	3 547
Indigenous Knowledge Systems	–	–	–	–	5 000	5 000	5 270
Total	23 868	11 741	8 438	4 161	10 257	11 533	12 137

Expenditure trends

Expenditure has decreased at an average annual rate of 2,7 per cent, from R41,6 million in 2002/03 to R38,3 million in 2005/06. Spending on expert services decreased due to less funds transferred to non-profit institutions. However, these transfers will increase from 2006/07 going forward.

Over the 2006 MTEF, expenditure grows at a much higher rate of 14,5 per cent and is expected to reach R57,5 million by 2008/09. The increase is mainly due to the increased provision of expert support services.

The allocations to the National Advisory Council on Innovation increase over the 2006 MTEF, from R8,2 million in 2005/06 to R9,7 million in 2008/09.

Service delivery objectives and indicators

Recent outputs

The programme has made progress in areas of research and development that target specific economic sectors, in support of government's growth strategy. These include:

- The hydrogen economy initiative and the nanotechnology strategy – approved by Cabinet as two key frontier programmes driven by the department
- The Fablab facility on the innovation hub, which has given concrete expression to the second phase of the advanced manufacturing technology strategy.

Energy

The pebble bed modular reactor (PBMR) human capital, research and innovation frontier programme and the South African National Energy Research Institute are making good progress with implementation.

Innovation studies

The National Advisory Council on Innovation completed key studies on: science and technology resources in the higher education system; the mobility of science and technology workers internationally and across science areas; and research and development indicators.

Publications

The Academy of Science of South Africa has taken over the publication of the South African Journal of Science, whose impact as a national journal has improved. The academy also further developed Quest, a general science periodical aimed at scientifically literate readers.

Selected medium-term output targets

Science and Technology Expert Services

Measurable objective: Deliver required outcomes within the strategic themes and portfolio of the department to give effect to the strategy and mandate of the national system of innovation.

Subprogramme	Output	Measure/Indicator	Target
Expert Services	Provide analytical support and services according to briefs set by political principals and department's executive	Policy responses, speeches, and briefing notes provided timeously	Response within timelines to all three line programmes

Programme 3: International Co-operation and Resources

The *International Co-operation and Resources* programme develops and services 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.

There are three subprogrammes:

- *Multilaterals and Africa* co-ordinates and manages South Africa's participation in international science and technology platforms at sub-regional (Southern African Development Community), continental and global levels. Financial support is provided to the Africa Institute of South Africa and to various institutions in support of international science programmes.
- *International Resources* provides help in accessing international resources for science and technology through leveraging strategic international partnerships, supporting participation in competitive international funding programmes, promoting foreign investment, locating global scientific infrastructure in South Africa, and developing a strategic international technology information capacity.
- *Bilateral Co-operation* ensures that South Africa is a priority destination for science and technology through facilitating collaborative activities with countries beyond Africa and leveraging resources in support of the national system of innovation.

Expenditure estimates

Table 31.5 International Co-operation and Resources

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05		2005/06	2006/07	2007/08
R thousand							
Multilaterals and Africa	24 418	27 554	28 954	40 852	84 763	97 378	124 750
International Resources	–	4 864	8 715	26 305	29 791	31 281	32 970
Bilateral Co-operation	6 094	8 090	8 501	16 008	17 392	18 262	19 248
Total	30 512	40 508	46 170	83 165	131 946	146 921	176 969
Change to 2005 Budget estimate				454	42 454	53 454	78 454

Economic classification

	9 371	20 474	24 320	35 901	40 400	39 637	41 725
Current payments							
Compensation of employees	3 001	7 899	10 361	13 500	16 410	17 186	18 061
Goods and services	6 370	12 575	13 959	22 401	23 990	22 451	23 664
<i>of which:</i>							
Communication	446	880	924	1 568	1 677	1 569	1 654
Computer Services	527	555	584	615	652	691	728
Consultants, contractors and special services	1 338	2 641	2 773	4 704	5 030	4 706	4 960
Inventory	1 602	1 687	1 776	1 869	1 981	2 100	2 213
Maintenance repair and running cost	114	120	126	133	141	149	158
Operating leases	129	135	143	150	159	169	178
Travel and subsistence	1 720	3 395	3 565	6 048	6 468	6 051	6 378
Other	494	3 162	4 068	7 314	7 882	7 016	7 395
Transfers and subsidies¹	20 678	19 625	21 326	47 134	91 408	107 138	135 090
Provinces and municipalities	10	11	25	36	3	–	–
Departmental agencies and accounts	8 981	11 713	16 325	25 119	21 954	23 030	24 249
Universities and technikons	–	–	–	726	–	–	–
Public corporations and private enterprises	–	–	–	619	–	–	–
Foreign governments and international organisations	–	–	11	–	–	–	–
Non-profit institutions	11 687	7 901	4 965	20 634	69 451	84 108	110 840
Payments for capital assets	463	409	524	130	138	146	154
Machinery and equipment	463	409	524	130	138	146	154
Total	30 512	40 508	46 170	83 165	131 946	146 921	176 969

1. Where the name of an entity is not specified, transfer payments are being made to various institutions

Table 31.5 International Co-operation and Resources (continued)

R thousand	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Details of major transfers and subsidies:							
Departmental agencies and accounts							
Public entities							
Current	8 981	11 713	16 325	25 119	21 954	23 030	24 249
Africa Institute of South Africa	8 981	11 713	16 325	18 968	21 954	23 030	24 249
Global Science	-	-	-	6 151	-	-	-
Universities and technikons							
Current	-	-	-	726	-	-	-
Global Science	-	-	-	726	-	-	-
Public corporations and private enterprises							
Public corporations							
Current	-	-	-	619	-	-	-
Global Science	-	-	-	619	-	-	-
Foreign governments and international organisations							
Current	-	-	11	-	-	-	-
Global Science	-	-	11	-	-	-	-
Non-profit institutions							
Current	11 687	7 901	4 965	20 634	69 451	84 108	110 840
Global Science	11 687	7 901	4 965	20 634	69 451	84 108	110 840
Total	20 678	19 625	21 326	47 134	91 408	107 138	135 090

Expenditure trends

Expenditure increases rapidly over the seven-year period, rising from R30,5 million in 2002/03 to an expected R177 million in 2008/09, at a rate of 34 per cent. The increases are for transfer payments to various institutions in support of international science programmes, and for leveraging international resources through matched payments. The sharp increases in this programme are due to an increase in international science co-operation and more bilateral arrangements made.

Service delivery objectives and indicators

Recent outputs

Significant achievements include over 400 research and development projects from 38 bilateral arrangements and the promotion of human capital development projects to address social development issues and institutional capacity building, especially at historically disadvantaged institutions. Policy discussions with a view to strengthening the South African national innovation system have also taken place in the trilateral consortium between India, Brazil and South Africa (IBSA). Other strategic initiatives include a co-operation programme on innovation systems with the government of Finland and a pre-feasibility exercise on the viability of enhanced EU development co-operation support for South African science and technology.

European Union

During 2005, the department established the European-South African Science and Technology Advancement Programme (ESASTAP) with the support of the European Union to promote improved South African participation in the EU's framework programmes for research and other funding instruments. This programme positions South Africa well for the seventh framework programme to be launched in 2006.

Group on Earth Observations

The Global Earth Observation System of Systems (GEOSS) was articulated by the UN Millennium Declaration and the 2002 World Summit on Sustainable Development. South Africa was re-elected as one of the four co-chairs of the Group on Earth Observations (GEO). South Africa was instrumental in contributing to the successful outcome of the Ottawa negotiations, which resulted in the GEO members reaching agreement on the draft 10-year plan, for adoption at the Third Earth Observation Summit. South Africa's leadership role in the GEO will continue to enable the country to be a leader in advancing international co-operation in GEO in support of the global sustainable development agenda, as envisioned at the World Summit on Sustainable Development.

Global partnerships unit

The newly established global partnerships unit will promote South Africa as a preferred destination for the location of global scientific infrastructures.

Regional and international co-operation

The department's participation in the Organisation for Economic Co-operation and Development committee for scientific and technological policy has significantly increased over the last few years, and it continues to play a significant role in UN organisations.

As the inaugural chair of the African Minister's Council on Science and Technology, South Africa led the development of the consolidated plan of action for science and technology, and science and technology's increased profile led SADC ministers to recommend the creation of a SADC science and technology desk. South Africa's bilateral strategic engagement with Africa is being intensified through science agreements with Algeria, Kenya, Namibia, Botswana, Lesotho and Senegal.

Selected medium-term output targets**International Co-operation and Resources**

Measurable objective: Increase flows of scientific knowledge and resources to South Africa by participating in joint programmes.

Subprogramme	Output	Measure/Indicator	Target
Multilaterals and Africa	African and multilateral co-operation on science and technology	Number of new bilateral programmes Number of Nepad flagship science and technology programmes South African institutes participate in Formal bid for 3rd International Centre for Genetic Engineering and Biotechnology component centre submitted	Programmes in at least 2 more countries All 12 programmes By 2006/07
International Resources	Flow of international resources to science and technology in South Africa and Africa	Percentage increase in current level of international funding won through leveraging and participation	50%
Bilateral Co-operation	Country-to-country co-operation in science and technology outside Africa	Co-operative relationships extended to target countries	Remaining countries of the new 10 of the EU, and Latin America and Asia

Programme 4: Frontier Science and Technology

The *Frontier Science and Technology* programme provides leadership in long-term and cross-cutting research, and human capital development in the national system of innovation.

There are two subprogrammes:

- *Frontier Programmes* focuses on cross-cutting research, development and innovation that will help to make the national system of innovation a world-class science and technology resource.

The programme focuses on harmonising activities in research, development and innovation in industry, academia and research institutions.

- *Human Capital* focuses on developing and implementing national programmes aimed at the production of knowledge and the development of human capital. Focus areas include astronomy, human paleontology and indigenous knowledge systems. Future developments will include establishing research chairs in South African universities in strategic areas, as a human capital development endeavour, as well as renewing and extending South Africa's scientific infrastructure base.

Expenditure estimates

Table 31.6 Frontier Science and Technology

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
R thousand							
Frontier Programmes	482 895	652 440	677 438	785 134	882 794	1 051 312	1 253 924
Human Capital	392 253	412 382	492 763	599 451	750 243	927 645	977 738
Total	875 148	1 064 822	1 170 201	1 384 585	1 633 037	1 978 957	2 231 662
Change to 2005 Budget estimate				22 508	132 211	252 211	411 671
Economic classification							
Current payments	4 640	3 602	10 110	8 693	7 108	7 466	7 870
Compensation of employees	1 489	1 462	5 681	4 050	4 293	4 508	4 751
Goods and services	3 151	2 140	4 428	4 643	2 815	2 958	3 118
<i>of which:</i>							
<i>Communication</i>	86	90	95	100	106	112	118
<i>Consultants, contractors and special services</i>	662	449	930	2 558	592	621	655
<i>Inventory</i>	80	84	88	93	99	104	110
<i>Maintenance repair and running cost</i>	1	1	1	1	1	1	1
<i>Travel and subsistence</i>	851	578	1 196	718	761	799	842
<i>Other</i>	1 471	938	2 118	1 173	1 256	1 320	1 392
Financial transactions in assets and liabilities	–	–	1	–	–	–	–
Transfers and subsidies¹	870 318	1 061 138	1 159 804	1 375 892	1 625 929	1 971 491	2 223 793
Provinces and municipalities	4	5	11	15	2	–	–
Departmental agencies and accounts	510 734	583 600	480 200	636 298	804 864	951 212	1 060 029
Universities and technikons	–	–	–	20 430	–	–	–
Public corporations and private enterprises	302 751	334 554	489 201	452 249	483 194	507 352	534 749
Non-profit institutions	56 829	142 979	190 392	97 780	337 869	512 927	629 015
Households	–	–	–	169 120	–	–	–
Payments for capital assets	190	82	287	–	–	–	–
Machinery and equipment	190	82	287	–	–	–	–
Total	875 148	1 064 822	1 170 201	1 384 585	1 633 037	1 978 957	2 231 662

1. Where the name of an entity is not specified, transfer payments are being made to various institutions

Table 31.6 Frontier Science and Technology (continued)

R thousand	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Details of transfers and subsidies:							
Departmental agencies and accounts							
Public entities							
Current	494 346	576 759	476 200	632 058	754 864	901 212	948 923
National Research Foundation	357 921	404 239	446 288	512 641	586 671	618 394	650 832
Centers of Excellence	–	11 070	1 500	15 000	–	–	–
Frontier Science and Technology	–	–	–	170	–	–	–
Science Themes	–	–	–	2 650	–	–	–
Innovation Fund	136 425	161 450	28 412	101 597	128 193	132 818	139 990
Human Resource Development	–	–	–	–	40 000	150 000	158 100
Capital	16 388	6 841	4 000	4 240	50 000	50 000	111 106
Centres of Excellence	6 700	–	–	–	–	–	–
National Research Foundation	9 688	6 841	4 000	4 240	–	–	–
Research and Development Infrastructure	–	–	–	–	50 000	50 000	111 106
Universities and technikons							
Current	–	–	–	20 430	–	–	–
Biotechnology Strategy	–	–	–	200	–	–	–
Frontier Science and Technology	–	–	–	20 200	–	–	–
Science Themes	–	–	–	30	–	–	–
Public corporations and private enterprises							
Public corporations							
Current	302 751	334 554	489 201	452 249	483 194	507 352	534 749
Council for Scientific and Industrial Research	297 751	323 014	348 326	431 649	483 194	507 352	534 749
Human Resource Development	–	–	–	2 600	–	–	–
Biotechnology Strategy	–	–	122 875	–	–	–	–
Council for Scientific and Industrial Research: National Laser Centre	5 000	11 540	18 000	18 000	–	–	–
Non-profit institutions							
Current	56 829	142 979	190 392	97 780	277 869	297 927	314 015
Square Kilometer Array	–	–	–	8 000	8 000	12 000	12 648
Frontier Science and Technology	–	–	–	36 630	40 700	44 300	46 692
Science Themes	3 500	13 983	25 681	2 400	50 583	53 112	55 980
Science and Youth	10 829	7 294	11 000	–	20 000	22 000	23 188
Biotechnology Strategy	41 850	116 001	143 711	40 750	158 586	166 515	175 507
Indigenous Knowledge System	650	5 701	10 000	10 000	–	–	–
Capital	–	–	–	–	60 000	215 000	315 000
Frontier Science and Technology	–	–	–	–	60 000	135 000	200 000
Square Kilometer Array	–	–	–	–	–	80 000	115 000
Households							
Other transfers							
Current	–	–	–	159 120	–	–	–
Science and Youth	–	–	–	18 000	–	–	–
Science Themes	–	–	–	19 670	–	–	–
Biotechnology Strategy	–	–	–	114 050	–	–	–
Human Resource Development	–	–	–	7 400	–	–	–
Capital	–	–	–	10 000	–	–	–
Equipment Placement	–	–	–	10 000	–	–	–
Total	870 318	1 061 138	1 159 804	1 375 892	1 625 929	1 971 491	2 223 793

Expenditure trends

Expenditure increased at an average annual rate of 16,5 per cent from R875 million in 2002/03 to R1,4 billion in 2005/06. The trend from 2006/07 shows steady growth of 16,5 per cent over the 2006 MTEF. The growth is mainly due to new and increased support for research and development infrastructure.

Service delivery objectives and indicators

Recent outputs

Space science and technology

Support for a project to develop a multispectral imaging technology by the Innovation Fund has resulted in South Africa's developing the capability to design and manufacture world-class small satellites for earth observation. A school competition to name the first satellite aims to cultivate an interest in satellite science and technology.

High performance computing

Stakeholders gave their unanimous support to establishing the Centre for High Performance Computing. The centre will be administered by the newly established Meraka Institute at the Council for Scientific and Industrial Research. The open source software initiative is now part of the Meraka Institute.

Biotechnology strategy

A national bioinformatics network was set up, to address South Africa's shortage of human capacity in bioinformatics.

A programme for public understanding of biotechnology was established to provide a source of balanced, science-based information on biotechnology as well as a platform for public dialogue on biotechnology developments.

Innovation

Recent highlights from the Innovation Fund include the establishment of a zirconium plant for downstream zirconium products with associated value-added chemical lines. The locally developed orbital eye implants can become widely available at much more competitive prices than existing ones.

Indigenous knowledge

A national office on indigenous knowledge systems is being established as one of the priorities in the implementation of the indigenous knowledge systems policy. Included in the mandate and activities of the national office are the development of a recording system, an aggressive public awareness programme, and the development of a national database on indigenous knowledge systems.

Human capital

In an effort to develop human resources in science, engineering and technology, research professional development and innovation post-doctoral fellowship programmes have been initiated.

The South African research chairs programme was recently developed to increase the number of highly qualified scientists, advance the frontiers of knowledge through focused research in

identified fields or problem areas, advance transformation in the scientific community, increase the level of excellence in identified research areas, and increase the stock of world-class researchers nationally.

Centres of excellence

Centres of excellence are physical or virtual centres of research, which use existing capacity and resources to enable researchers to collaborate across disciplines and across institutions on long-term projects. Six centres were launched in 2004 and will be funded over a 10-year cycle. A seventh centre was established in 2005.

Youth and science

The draft Youth into Science strategy was developed in partnership with the Department of Education in an attempt to consolidate a number of initiatives on feeder systems into the higher education sector.

National science and technology events create excitement in targeted science fields, especially among the youth. National Science Week is now an annual event.

Astronomy

In order to develop and consolidate South Africa's astronomy programme, the department is pursuing several projects including SKA (Square Kilometre Array), KAT (Karoo Array Telescope) and SALT (Southern African Large Telescope). The Southern African Large Telescope Inauguration Ceremony took place on 10 November 2005 at Sutherland. SALT is one of South Africa's flagship science projects.

Antarctica

The department formulated an Antarctic research strategy for South Africa, which guided funding for researchers and students in the South African National Antarctica Programme.

Palaeontology

The Department of Science and Technology continues to fund research in palaeontology and related fields through the Palaeo-Anthropological Scientific Trust (PAST). In order to strengthen and broaden research in this area a strategy to support palaeo-sciences through the African Origins Platform is being formulated with stakeholders.

Marine research

In partnership with the Department of Environmental Affairs and Tourism, South Africa is acquiring a submersible for its marine research programme. The African coelacanth ecosystem programme will also benefit from the submersible. Exploratory discussions on an integrated marine research programme continue with various stakeholders.

Physics

The department developed a comprehensive programme for the International Year of Physics in 2005, targeting schools and universities and the broader public. The world conference on physics and sustainable development in Durban was successful, as was the launch of the South African Women in Physics programme.

Selected medium-term output targets

Frontier Science and Technology

Measurable objective: Build research, innovation and human capital programmes within the national system of innovation, effectively using the resources of the department. Develop public research institutions to make sure that South Africa has an evolving world-class science and technology portfolio.

Subprogramme	Output	Measure/Indicator	Target
Frontier Programmes	Biotechnology strategy	Regional biotechnology instruments plans finalised	By June 2006
	Nanotechnology strategy	Documentation of all successful projects	By September 2006
		Implementation plan for nanotechnology strategy developed	By June 2006
	Hydrogen economy innovation strategy	Number of demonstration projects funded	2 projects
		Strategy approved by Cabinet	By March 2007
		Intergovernmental committee established	By June 2006
	Pebble bed modular reactor programme	Fuel cell demonstration project initiated	By December 2006
Number of new chairs established		3 new chairs by August 2006	
Space science	Framework for space agency approved by Cabinet	By June 2006	
	Satellite technology roadmap developed	By September 2006	
Research and development infrastructure	Centre for high performance computing set up	By March 2007	
	Number of fully operational nanotechnology characterisation centres established	At least 1 by January 2007	
Human Capital	The South African Research Chairs Initiative	Research chairs identified from proposals submitted	By November 2006
	Centres of excellence	Number of chairs established	20 chairs
		Number of new centres of excellence established	3 more centres
	Youth into Science strategy	Cabinet approval of final strategy	By December 2006
	Science, engineering and technology, (SET) human capital strategy	Approval of the SET human capital strategy	March 2007
		Science missions and platforms	Astronomy geographical advantage strategy approved by Cabinet
		Palaeo-sciences research development plan developed	By July 2006
	Research equipment plan developed	By June 2006	

Programme 5: Government Sectoral Programmes and Co-ordination

The *Government Sectoral Programmes and Co-ordination* programme aims to lead and give support to other government departments in sector-specific research and development, technology and human capital programmes.

There are three subprogrammes:

- *Science and Technology for Economic Impact* leads and supports a number of strategic science and technology interventions requiring interdepartmental and government and industry co-operation to achieve government's strategic economic growth and development objectives.
- *Science and Technology for Social Impact* leads and supports a number of strategic science and technology interventions requiring interdepartmental co-operation for extending scientific research and technology to address identified priorities in different sectors and those expressed by the millennium development goals.
- *Sector Research and Development Planning/Co-ordination* supports sector-based departments and institutions to develop five-year research and development plans. It also prepares an annual national science and technology expenditure plan aimed at providing a holistic view of government's total science and technology spending. The annual national science and technology expenditure plan will also improve decision-making on the deployment of all government funds allocated to research and development.

Expenditure estimates

Table 31.7 Government Sectoral Programmes and Co-ordination

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	008/09
R thousand							
Science and Technology for Economic Impact	19 530	84 516	140 220	261 124	324 324	396 376	434 976
Science and Technology for Social Impact	83 957	102 230	168 066	199 503	257 139	244 253	257 183
Sector Research and Development Planning / Co-ordination	3 567	8 146	4 246	3 697	4 509	4 734	4 990
Total	107 054	194 892	312 532	464 324	585 972	645 363	697 149
Change to 2005 Budget estimate				32 335	110 335	149 335	174 335

Economic classification

	4 321	4 500	4 573	13 274	15 352	15 923	16 783
Current payments							
Compensation of employees	1 269	2 088	1 559	5 800	6 148	6 455	6 804
Goods and services	3 052	2 412	3 014	7 474	9 204	9 468	9 979
<i>of which:</i>							
Communication	55	58	61	64	68	72	76
Computer Services	493	519	546	575	610	646	681
Consultants, contractors and special services	641	507	47	4 443	5 974	6 073	6 401
Inventory	229	241	254	267	284	301	317
Maintenance repair and running cost	1	1	1	1	–	–	–
Travel and subsistence	824	651	82	1 036	1 098	1 153	1 215
Other	809	435	2 023	1 088	1 171	1 223	1 289
Transfers and subsidies¹	102 544	190 235	307 797	450 875	570 434	629 245	680 160
Provinces and municipalities	5	9	6 574	19	3	–	–
Departmental agencies and accounts	84 539	153 456	216 236	278 923	394 731	457 885	491 167
Universities and technikons	–	–	16 289	750	–	–	–
Public corporations and private enterprises	–	–	–	26 298	–	–	–
Non-profit institutions	18 000	36 770	59 770	79 180	175 700	171 360	188 993
Households	–	–	8 928	65 705	–	–	–
Payments for capital assets	189	157	162	175	186	195	206
Machinery and equipment	189	157	162	175	186	195	206
Total	107 054	194 892	312 532	464 324	585 972	645 363	697 148

1. Where the name of an entity is not specified, transfer payments are being made to various institutions

Table 31.7 Government Sectoral Programmes and Co-ordination (continued)

R thousand	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	008/09
Details of transfers and subsidies:							
Provinces and municipalities							
Municipalities							
Municipal bank accounts							
Current	5	9	6 574	19	3	-	-
Technology for Poverty Alleviation	-	-	6 561	-	-	-	-
Departmental agencies and accounts							
Public entities							
Current	84 539	153 456	216 236	278 923	394 731	457 885	491 167
Learnerships	-	-	4 000	3 367	6 000	6 300	6 640
Technology Planning and Diffusion	19 452	46 176	47 900	56 263	94 058	91 486	96 426
Advanced Manufacturing Technology Strategy	-	2 750	21 000	31 500	51 800	62 400	56 204
South African National Energy Research Institute	-	-	10 000	20 000	40 000	42 000	44 268
National Public Assets	-	30 000	35 000	43 000	43 000	43 000	45 322
South African Aids Vaccine Initiative	-	-	15 000	20 000	15 000	15 750	16 601
Human Science Research Council	65 087	70 030	83 336	104 293	119 873	129 949	136 706
South African National Research Network	-	-	-	-	22 000	67 000	89 000
Indicators	-	4 500	-	500	-	-	-
Leveraging Services Strategy	-	-	-	-	3 000	-	-
Universities and technikons							
Current	-	-	16 289	750	-	-	-
Technology for Sustainable Livelihoods	-	-	16 289	750	-	-	-
Public corporations and private enterprises							
Public corporations							
Current	-	-	-	26 298	-	-	-
Learnerships	-	-	-	1 633	-	-	-
Technology for Sustainable Livelihoods	-	-	-	4 665	-	-	-
Nuclear Energy Corporation of South Africa: Fluoro Chemicals	-	-	-	20 000	-	-	-
Non-profit institutions							
Current	18 000	36 770	59 770	79 180	175 700	171 360	188 993
Natural Resources	-	650	10 000	3 880	30 000	31 500	33 201
Technology Planning and Diffusion	-	-	-	23 400	-	-	-
Information Communication Technology	-	4 856	9 000	14 000	29 200	44 210	54 977
Technology for Poverty Alleviation	-	9 263	24 200	37 900	63 500	40 000	42 160
Technology for Sustainable Livelihoods	18 000	22 001	16 570	-	53 000	55 650	58 655
Households							
Other transfers							
Current	-	-	8 928	65 705	-	-	-
Natural Resources	-	-	-	24 120	-	-	-
Technology for Sustainable Livelihoods	-	-	8 928	41 585	-	-	-
Total	102 544	190 235	307 797	450 875	570 434	629 245	680 160

Expenditure trends

The expenditure increase from 2002/03 to 2005/06 is especially fast, rising from R107,1 million in 2002/03 to R464,3 million in 2005/06, at an average annual rate of 63,1 per cent. The high increase in funding is due to the introduction of new programmes such as the South African National Energy Research Institute, the South African Aids Vaccine Initiative at the Medical Research Council and an increase in the contribution to the Human Sciences Research Council. Over the 2006 MTEF, expenditure is expected to grow at a slower rate of 14,5 per cent, reaching R697,1 million by 2008/09.

From 2005/06, these increases in expenditure reflect a stronger commitment to the national research and development strategy's technology mission areas and the Human Sciences Research Council's research programmes, and investments in technology applications that can address the millennium development goals for poverty reduction and access to basic services.

Service delivery objectives and indicators

Recent outputs

Research networks

The department's technical specifications for the three-phase establishment of the South African National Research Network (SANReN) have been finalised. SANReN will connect approximately 45 research institutions to similar research networks across the world.

ICT research

The ICT research and development and innovation strategy has been finalised, with inputs from stakeholders and experts. Flagship research programmes in geomatics, wireless and satellite communications and ICT in education have been developed.

Advanced manufacturing

Flagship programmes to support advanced manufacturing activities in the aerospace and automotive sectors are being implemented. A key area of intervention is in growing capabilities and technology in composite materials.

Advanced tooling

The Tshumisano programme has started setting up two regional institutes for advanced tooling, one at the Soshanguve Campus of Tshwane University of Technology and the other at the University of Stellenbosch and Cape Peninsular University of Technology.

Biofuels

The technical standards for biodiesel have been completed, as well as the testing of six candidate crops for biofuels (soy, sunflower, canola, ground nut, cotton and jatropha).

Interdepartmental co-operation

Through the department's SciTES programme, co-operation with the Department of Minerals and Energy has included the establishment of the South African National Energy Research Institute and the development of the energy research and development strategy. High-level co-operation with the Department of Environmental Affairs and Tourism included the conference on climate change held in October 2005. The Department of Science and Technology has secured funding to support fluoro-chemicals research at the Nuclear Energy Corporation of South Africa.

Selected medium-term output targets

Government Sectoral Programmes and Co-ordination

Measurable objective: Build partnerships, programmes and institutional capacity to ensure the appropriate contribution of science and technology within different sectors and synergistically within clusters.

Subprogramme	Output	Measure/Indicator	Target
Science and Technology for Economic Impact	Strategic government partnerships and directed science, engineering and technology programmes for positive economic results	Number of new flagship programmes of advanced manufacturing technology strategy, rolled out	3 programmes
	Science, engineering and technology human capital development	Number of new flagship programmes under ICT research and development strategy Number of new chairs of energy research and development under South African National Energy Research Institute established Support programmes and interventions implemented in provinces with low GDP	At least 1 programme 2 chairs 2006/07
Science and Technology for Social Impact	Strategic government partnerships and directed science, engineering and technology programmes for positive service delivery results within the social cluster and the justice, crime prevention and security cluster	Number of working agreements with social cluster departments Number of working agreements with the justice, crime prevention and security cluster departments	4 agreements by end March 2006 3 agreements by end 2006
	Strategic programmes based on transfer of technology for sustainable livelihoods and aimed at improvement of quality of life	Number of new technologies for sustainable livelihoods adopted	2 new technologies by August 2006
	Research on social cohesion and integration	Number of research projects on science and technology best practice co-ordinated	At least 1 research project by July 2006
	Identification and dissemination of poverty reduction technologies designed to improve sustainable livelihoods	Progress on development of nutritional supplements Joint poverty reduction projects with government departments and municipalities identified	Phase 1 completed by end of 2006/07 By September 2006
Sector Research and Development Planning/Co-ordination	Science and technology expenditure plan	Publish government science and technology expenditure plan	2006/07
		Science and technology investment management system accessible to all public research and development institutions and users	2006/07
	Effective planning and efficient investment on science and technology by government departments	Scope of the Science and Technology Systems Bill agreed and bill drafted	2006/07
	Share good practices in sector-specific research and development planning	Number of reports published on organisation and funding of research in specific sectors	At least 2 reports

Public entities reporting to the minister

Human Sciences Research Council

The Human Sciences Research Council of South Africa (HSRC) is a statutory body established in 1968. It supports development nationally, in the Southern African Development Community (SADC) and in Africa. It primarily does large-scale, policy-relevant, social science projects for public sector users, non-governmental organisations and international development agencies, in partnership with researchers globally, but specifically in Africa.

Over the last couple of years, the HSRC underwent major restructuring, aligning its research activities and structures with South Africa's national development priorities, notably poverty reduction through economic development, skills improvement, job creation, the elimination of discrimination and inequalities, and effective service delivery.

The HSRC generates about 20 per cent of total revenue from sales of goods and services (its research outputs). The balance of revenue comes from transfers. Allocations over the 2006 MTEF are R120 million, R130 million and R137 million. Compensation of employees is relatively high,

at 42 per cent of total expenses. In recent years, there was not enough revenue to cover expenses, but the HSRC expects to run balanced accounts over the MTEF.

With its new structures and greatly extended research complement of about 120 top researchers and 100 support staff in five different centres across the country, the HSRC is well equipped to respond flexibly and comprehensively to current and emerging needs.

Table 31.8 Financial summary for the Human Sciences Research Council (HSRC)

	Outcome			Estimated Outcome	Medium-term estimate		
	Audited 2002/03	Audited 2003/04	Audited 2004/05		2005/06	2006/07	2007/08
R Thousand							
INCOME STATEMENT SUMMARY							
Revenue							
Non-tax revenue	46 209	64 510	91 949	57 884	60 903	54 827	57 195
Sale of goods and services other than capital assets	33 542	51 053	75 359	46 152	48 741	42 025	43 762
<i>of which:</i>							
<i>Sales by market establishments</i>	33 542	51 053	75 359	46 152	48 741	42 025	43 762
<i>Other non-tax revenue</i>	12 667	13 457	16 590	11 732	12 162	12 802	13 433
Transfers received	90 628	122 643	145 459	165 931	178 887	194 390	190 775
Total revenue	136 837	187 153	237 408	223 815	239 790	249 217	247 970
Expenses							
Current expense	145 105	184 507	229 056	221 418	237 223	246 549	245 315
Compensation of employees	59 736	70 777	82 816	93 497	100 170	104 108	103 587
Goods and services	81 105	108 036	140 058	122 740	131 501	136 671	135 987
Depreciation	4 265	5 694	6 182	5 181	5 551	5 769	5 741
Transfers and subsidies	2 208	2 856	3 558	2 396	2 567	2 668	2 654
Total expenses	147 313	187 363	232 614	223 814	239 789	249 216	247 969
Surplus / (Deficit)	(10 477)	(210)	4 794	1	1	1	1
BALANCE SHEET SUMMARY							
Carrying value of assets	52 778	57 930	49 494	48 988	48 437	47 667	46 927
Investments	58 851	39 352	29 070	14 273	14 273	14 273	14 273
Inventory	970	1 724	1 474	1 312	1 312	1 312	1 312
Receivables and prepayments	15 306	27 679	33 731	37 345	39 100	40 938	40 119
Cash and cash equivalents	6 963	8 995	1 305	1 781	1 781	1 781	1 781
Total assets	134 868	135 680	115 074	103 699	104 903	105 971	104 412
Capital and reserves	55 262	53 419	46 994	44 275	44 276	44 276	44 276
Trade and other payables	72 701	74 707	60 608	50 680	51 276	51 985	50 474
Provisions	6 905	7 554	7 472	8 744	9 351	9 710	9 662
Total equity and liabilities	134 868	135 680	115 074	103 699	104 903	105 971	104 412

Data provided by the Human Science Research Council

Council for Scientific and Industrial Research

The Council for Scientific and Industrial Research (CSIR) is governed by the Scientific Research Council Act (1988), as amended. Its mandate is to foster industrial and scientific development – either by itself or in partnership with public and private sector institutions – aimed at improving the quality of life of South Africans. This must, in terms of the legislation, be done in the national interest through directed and multidisciplinary research and technological innovation.

The CSIR generates more than half its total revenue from research contracts. Transfers in the form of a parliamentary grant account for 38 per cent, which increases from R432 million to

R535 million over the MTEF, which include VAT amounts that are not reflected in the financial summary table. The CSIR expects to maintain a surplus of about R30 million over the MTEF.

Building on past successes, the CSIR will continue to use its research skills innovatively in the transformation of South Africa. Its current five-year strategy highlights the following strategic initiatives: alignment with and contribution to key government initiatives; consolidating excellence in science, engineering and technology; excellence in business and innovation; contributing to sustainable development; and accessing and developing top researchers.

Table 31.9 Financial summary for the Council for Scientific and Industrial Research (CSIR)

	Outcome			Estimated outcome	Medium-term estimate		
	Audited	Audited	Audited		2006/07	2007/08	2008/09
R Thousand	2002/03	2003/04	2004/05	2005/06			
INCOME STATEMENT SUMMARY							
Revenue							
Non-tax revenue	700 840	654 239	674 737	666 667	700 000	735 000	771 750
Sale of goods and services other than capital assets	671 970	638 931	659 241	638 187	670 096	703 601	738 781
<i>of which:</i>							
<i>Sales by market establishments</i>	671 970	638 931	659 241	638 187	670 096	703 601	738 781
<i>Other non-tax revenue</i>	28 870	15 308	15 496	28 480	29 904	31 399	32 969
Transfers received	295 429	321 996	356 992	439 408	423 854	445 045	460 099
Total revenue	996 269	976 235	1 031 729	1 106 075	1 123 854	1 180 045	1 231 849
Expenses							
Current expense	704 765	938 136	954 275	1 060 252	1 082 129	1 136 600	1 193 794
Compensation of employees	669 634	539 741	567 621	587 566	585 445	614 717	645 453
Goods and services	–	360 390	344 382	433 243	455 270	478 398	502 682
Depreciation	34 411	37 788	42 272	38 580	40 509	42 535	44 661
Interest, dividends and rent on land	720	217	–	862	906	951	998
Transfers and subsidies	–	–	–	7 422	7 793	8 183	8 592
Total expenses	704 765	938 136	954 275	1 067 674	1 089 922	1 144 782	1 202 386
Surplus / (Deficit)	291 504	38 099	77 454	38 400	33 932	35 263	29 463
Tax payment	836	155	3	–	–	–	–
Outside shareholders Interest	1 049	–	(805)	–	–	–	–
BALANCE SHEET SUMMARY							
Carrying value of assets	212 085	218 884	228 950	253 585	259 919	266 571	273 554
Investments	17 936	39 150	29 895	22 153	22 000	20 000	18 000
Inventory	52 761	50 032	65 504	26 506	27 831	29 223	30 684
Receivables and prepayments	171 053	149 512	143 157	156 681	162 916	168 311	173 077
Cash and cash equivalents	124 253	214 108	304 209	276 840	313 430	354 974	391 307
Total assets	578 088	671 686	771 715	735 765	786 096	839 079	886 622
Capital and reserves	148 782	183 975	262 388	300 471	334 403	370 166	399 629
Borrowings	85	–	–	–	–	–	–
Post retirement benefits	170 647	148 224	107 307	107 307	107 307	107 307	107 307
Trade and other payables	192 380	268 246	329 168	273 809	287 499	301 874	316 968
Provisions	66 194	71 241	72 852	54 178	56 887	59 731	62 718
Total equity and liabilities	578 088	671 686	771 715	735 765	786 096	839 079	886 622

Data provided by the Council for Scientific and Industrial Research

National Research Foundation

The National Research Foundation (NRF) was established by the National Research Foundation Act (1998). The foundation supports and promotes research through funding, human resources development and providing research facilities for creating knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contributes to improving the quality of life of South Africans.

More than 50 per cent of total revenue comes from government transfers, which grow moderately over the 2006 MTEF. For 2005/06, the organisation is projected to run a deficit of R52 million, following two previous consecutive deficit years. Viewed in this light, the balanced budget forecast over the MTEF will require a step up in own revenue sources or a slower increase in the cost base.

By forging strategic partnerships locally and internationally, the NRF aims to advance research in all fields of the humanities, social and natural sciences, engineering, and technology, including indigenous knowledge. To achieve its objectives, it will continue to focus on human resources development.

Table 31.10 Financial summary for the National Research Foundation (NRF)

	Outcome			Estimated Outcome	Medium-term estimate		
	Audited 2002/03	Audited 2003/04	Audited 2004/05		2005/06	2006/07	2007/08
R Thousand							
INCOME STATEMENT SUMMARY							
Revenue							
Non-tax revenue	289 551	353 850	500 639	558 373	527 615	568 948	592 733
Sale of goods and services other than capital assets	8 824	9 872	34 928	47 311	39 000	44 000	47 500
<i>of which:</i>							
Admin fees	8 824	9 872	28 071	38 828	30 000	33 000	35 000
Sales by market establishments	–	–	6 857	8 483	9 000	11 000	12 500
Other non-tax revenue	280 727	343 978	465 711	511 062	488 615	524 948	545 233
Transfers received	336 431	378 966	413 669	538 944	599 671	635 394	668 480
Total revenue	625 982	732 816	914 308	1 097 317	1 127 286	1 204 342	1 261 213
Expenses							
Current expense	208 936	244 892	323 143	462 099	438 204	462 036	488 457
Compensation of employees	122 522	142 985	174 990	234 531	246 360	261 581	274 595
Goods and services	71 879	84 527	129 511	206 866	170 036	177 273	189 191
Depreciation	14 535	17 380	18 642	20 702	21 808	23 182	24 670
Transfers and subsidies	397 291	491 763	592 657	687 862	689 082	742 306	772 756
Total expenses	606 227	736 655	915 800	1 149 961	1 127 286	1 204 342	1 261 213
Surplus / (Deficit)	19 755	(3 839)	(1 492)	(52 644)	–	–	–

Table 31.10 Financial summary for the National Research Foundation (NRF) (continued)

	Outcome			Estimated Outcome	Medium-term estimate		
	Audited	Audited	Audited		2006/07	2007/08	2008/09
R Thousand	2002/03	2003/04	2004/05	2005/06			
BALANCE SHEET SUMMARY							
Carrying value of assets	131 282	125 339	126 801	152 501	160 689	160 758	161 384
Investments	75 052	72 100	97 547	97 543	97 543	97 543	97 543
Inventory	1 846	1 878	2 801	3 000	3 000	3 000	3 000
Receivables and prepayments	155 391	95 477	136 184	129 500	123 500	122 500	116 500
Cash and cash equivalents	277 885	456 925	426 407	298 893	305 893	312 643	324 392
Total assets	641 456	751 719	789 740	681 437	690 625	696 444	702 819
Capital and reserves	253 625	245 083	243 381	216 437	224 625	220 694	215 320
Post retirement benefits	22 385	35 725	38 225	45 000	50 000	58 000	66 000
Trade and other payables	221 678	279 984	435 672	350 000	350 000	350 000	350 000
Provisions	8 818	10 247	14 535	15 000	16 000	16 750	17 499
Managed funds	134 950	180 680	57 927	55 000	50 000	51 000	54 000
Total equity and liabilities	641 456	751 719	789 740	681 437	690 625	696 444	702 819

Data provided by the National Research Foundation

Africa Institute of South Africa

The Africa Institute of South Africa (AISA) is a statutory body primarily focused on political, socioeconomic, and international and development issues in contemporary Africa. Although it has been operating for more than 40 years, it only recently became a science council under the Africa Institute of South Africa Act (2001).

AISA acts as an independent research organisation and think-tank, focusing on Africa in its research, publications and resource library. Its key roles are to do research and support policy development; to participate in training programmes; and to establish, maintain and participate in networks for peace, development and prosperity in Africa. It contributes to the goals of the national system of innovation, because its research programmes have a particular impact on knowledge generation and human resources development.

Amounts of R22 million, R23 million and R24 million were allocated to AISA over the MTEF period.

Godisa Trust

The mandate of the Godisa Trust emanates from government's explicit intention to improve the capacity of small enterprises, in response to the demands facing a modernising economy to have a growing, vibrant and dynamic small, medium and micro-enterprise (SMME) sector. The trust creates sector-focused technology business centres for developing successful technology-based SMMEs in Africa. It operates the innovation and technology demonstration activities and incubator programme, initiated by the EU and now co-financed by the Department of Trade and Industry and the Department of Science and Technology.

During 2005, progress was made in transferring Godisa to the Department of Trade and Industry under the Small Enterprise Development Agency. The transfer in April 2006 will give effect to the national strategy of strengthening and co-ordinating support for small enterprise development. In terms of the transfer arrangement, Department of Science and Technology funding for Godisa will continue in 2006/07. From 2007/08, the Department of Trade and Industry will take responsibility.

Tshumisano Trust

The Tshumisano Trust was registered by the former committee of technikon (now universities of technology) principals. Tshumisano is a joint venture, funded by the Department of Science and Technology and including participation by the Department of Labour, universities of technology, and the German government's funding agency GTZ. The core focus is to leverage skills and product development support for small and medium sized businesses off the technological expertise at universities of technology, while at the same time providing these institutions with opportunities to engage directly with industry.

A focused internship programme was set up during 2005/06. The trust has also worked with the Department of Science and Technology to set up specialised training platforms in scarce skills areas, such as tooling, and the number of technology stations has grown at several technikons.

Academy of Science of South Africa

The Academy of Science of South Africa Act (2001) established the Academy of Science of South Africa. Its objectives are: to promote common ground for scientific thinking across all disciplines; to encourage and promote innovative and independent scientific thinking; to promote the best development of the intellectual capacity of all people; and to link South Africa with scientific communities at the highest levels, in particular in Africa. The academy publishes scientific reports, investigates matters of public interest concerning science, and manages South African research journals.

South African National Energy Research Institute

A Cabinet decision allowed, in terms of existing legislation, the South African National Energy Research Institute (SANERI) to be established as a subsidiary of the Central Energy Fund (Pty) Ltd. This is being finalised through the collaborative efforts of the Department of Science and Technology and the Department of Minerals and Energy. SANERI's main aim is to build research capacity by funding research at universities and in science councils. The Department of Science and Technology provides funding for this to the Central Energy Fund.

Between November 2004 and February 2005, the national energy research and development strategy was adopted, developed consultatively by the national strategy working group of experts. Considerable progress has been made since then in developing the SANERI action plan for the short term (2005 to 2007). Other progress includes launching some of the centres of excellence scheduled for the start of the 2006 academic year.

The official launch of SANERI is expected before the end of 2005/06.

Annexure Tables

Vote 31: Science and Technology

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

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

Table 31.C: Summary of expenditure on training

Table 31.D: Summary of official development assistance expenditure

Table 31.E: Summary of expenditure on infrastructure

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

Programme	Appropriation		Audited outcome	Appropriation			Revised estimate
	Main	Adjusted		Main	Additional	Adjusted	
R thousand	2004/05		2004/05	2005/06			2005/06
1. Administration	56 072	62 599	62 558	68 836	5 262	74 098	100 028
2. Science and Technology Expert Services	41 458	41 458	41 416	41 026	(2 743)	38 283	38 283
3. International Co-operation and Resources	46 186	46 186	46 170	82 711	454	83 165	83 165
4. Frontier Science and Technology	1 168 718	1 170 218	1 170 201	1 362 077	22 508	1 384 585	1 383 655
5. Government Sectoral Programmes and Co- ordination	312 104	312 604	312 532	431 989	32 335	464 324	439 324
Total	1 624 538	1 633 065	1 632 877	1 986 639	57 816	2 044 455	2 044 455
Economic classification							
Current payments	109 235	136 597	127 140	156 607	7 549	164 156	164 156
Compensation of employees	66 461	70 661	58 204	80 196	–	80 196	80 196
Goods and services	42 774	65 936	68 728	76 411	7 549	83 960	83 960
Financial transactions in assets and liabilities	–	–	208	–	–	–	–
Transfers and subsidies	1 514 288	1 495 453	1 497 448	1 829 227	50 267	1 879 494	1 854 494
Provinces and municipalities	220	220	6 732	229	–	229	229
Departmental agencies and accounts	1 053 675	1 050 675	730 761	942 742	(2 402)	940 340	940 340
Universities and technikons	–	–	16 289	–	22 036	22 036	22 036
Public corporations and private enterprises	–	–	471 201	449 649	29 517	479 166	479 166
Foreign governments and international organisations	–	–	11	–	–	–	–
Non-profit institutions	196 712	184 677	263 526	141 857	61 041	202 898	202 898
Households	263 681	259 881	8 928	294 750	(59 925)	234 825	209 825
Payments for capital assets	1 015	1 015	8 289	805	–	805	25 805
Machinery and equipment	1 015	1 015	8 289	805	–	805	25 805
Total	1 624 538	1 633 065	1 632 877	1 986 639	57 816	2 044 455	2 044 455

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

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimates		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
A. Permanent and full-time contract employees							
Compensation (R thousand)	31 756	45 710	70 661	80 196	93 107	97 453	102 663
Unit cost (R thousand)	125	199	338	341	309	324	341
Compensation as % of total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Personnel numbers (head count)	254	230	209	235	301	301	301
B. Part-time and temporary contract employees							
Compensation (R thousand)	3	5	5	6	6	7	7
Unit cost (R thousand)	0	0	0	0	0	0	0
Compensation as % of total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Personnel numbers (head count)	17	25	28	31	33	33	35
Total for department							
Compensation (R thousand)	31 759	45 715	70 666	80 202	93 113	97 460	102 670
Unit cost (R thousand)	117	179	298	302	279	292	306
Personnel numbers (head count)	271	255	237	266	334	334	336

Table 31.C Summary of expenditure on training

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimates		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Training and staff development							
Expenditure (R thousand)	200	2 313	2 519	4 225	4 670	4 715	4 998
Number of employees trained (head count)	6	62	67	113	120	127	135
Bursaries (employees)							
Expenditure (R thousand)	12	139	162	254	269	285	303
Number of employees (head count)	5	20	22	37	39	42	44
Total	212	2 452	2 681	4 479	4 939	5 000	5 300
Number of employees	11	82	89	150	159	169	179

Table 31.D Summary of official development assistance expenditure

Donor	Project	Cash/ kind	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
			2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
R thousand									
Foreign									
European Union	GODISA Programme to support SMMEs		16 091	18 580	4 728	-	-	-	-
Total			16 091	18 580	4 728	-	-	-	-

Table 31.E Summary of expenditure on infrastructure

Description	Service delivery outputs	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
		2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
R thousand								
Other large infrastructure projects (Over R20 million)								
Science and Technology Head Office Building		-	-	-	-	133 000	-	-
Infrastructure transfers to other spheres, agencies and departments								
Research Equipment	Science system to serve the research community	-	-	-	-	50 000	50 000	70 000
Research and Development Infrastructure		-	-	-	-	60 000	215 000	315 000
Total		-	-	-	-	243 000	265 000	385 000