

**NATIONAL ADVISORY COUNCIL ON INNOVATION  
(NACI)**

**CORPORATE BUSINESS PLAN  
2007/08**



**INNOVATION FOR A BETTER FUTURE**

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## LIST OF ACRONYMS

ARC	Agricultural Research Council
ASGISA	Accelerated and Shared Growth Initiative of South Africa
ASSAf	Academy of Science of South Africa
CBP	Corporate Business Plan
CEO	Chief executive officer
CSIR	Council for Scientific and Industrial Research
DG	Director-General
DST	Department of Science and Technology
dti	Department of Trade and Industry
ExCo	Executive committee
FTI	Foundation for Technological Innovation
GAAP	Generally accepted accounting principles
GDP	Gross Domestic Product
HESA	Higher Education South Africa
ICT	Information and communications technology
IPR	Intellectual Property Rights
IRG	Indicator Reference Group
IT	Information Technology
JIPSA	Joint Initiative for Priority Skills Acquisition
MTEF	Medium term expenditure framework
NACI	National Advisory Council on Innovation
NBAC	National Biotechnology Advisory Committee
NEPAD	New Partnership for Africa's Development
NRDS	National Research and Development Strategy
NRF	National Research Foundation

NSI	National System of Innovation
NSTF	National Science and Technology Forum
OECD	Organization for Economic Co-operation and Development
PMFA	Public Finance Management Act
R&D	Research and development
S&T	Science and technology
SARG	South African Reference Group on Women in Science and Technology
SET	Science, Engineering and Technology
SET4W	Science, Engineering and Technology for Women
ST&I or STI	Science, Technology and Innovation
TIP	Technology and Innovation Policy
UK	United Kingdom

## FOREWORD

The National Advisory Council on Innovation (NACI) is a statutory council appointed by the Minister of Science and Technology in terms of the NACI Act (Act 55 of 1997) to advise him on various matters regarding the National System of Innovation (NSI). This document is NACI's corporate business plan (CBP) for the fiscal year April 2007 until March 2008. The planning and project aspects described in this document were deliberated by NACI's plenary meetings and the plan itself approved by NACI's Executive Committee.

This document represents an operationalisation of NACI's strategic priorities, particularly for the fiscal year commencing in April 2007. It does not, however, detail the project plans of individual studies and initiatives. Working plans for each of the projects will be developed within the broader framework of the Corporate Business Plan. It is important to acknowledge that NACI executes its statutory mandate in a dynamic environment that requires it to adjust its course from time to time.

NACI Council members are appointed for a four year term. The current members of NACI were appointed in 2004, and hence the term of the current Council will come to an end in April 2008. Since its appointment early in 2004, the Councillors of the current NACI Council have, together with a very dedicated Secretariat, strived to give effect to NACI's mission of rendering advice to the Minister of Science and Technology. After having taken office, the Council considered its mandate and conducted a planning workshop in August 2004. An ambitious plan was developed as a result the planning session. The outcomes of that workshop were converted into a programme for its four year term of office. Most of the projects following from the August 2004 planning session have been completed and culminated in a substantial number of advices to the Minister. The remaining projects will be completed in due course, and the advice following from them delivered to the Minister.

NACI must necessarily prioritise, given the wide spectrum of challenges in the NSI on the one hand and the limited resources at its disposal on the other. The quality of NACI's advice must be of a high standard and be based on the best available evidence. Mindful that it has one year left of its term, but at the same time that NACI is a going concern and that the current Council must leave a firm planning foundation to its successor in April 2008, NACI undertook a comprehensive planning exercise in two phases during its plenary meetings in November 2006 and February 2007, respectively. The planning sessions accounted for international trends as well as national priorities and agendas as they now unfold. As a result of the planning exercise, NACI has developed a new, equally ambitious, set of initiatives that will lead to advice to the Minister which will hopefully enhance his capacity to lead the country's science, technology and innovations programmes.

The priorities for NACI's remaining term of office, as reflected in this document, accounts *inter alia* for consultations with the Minister, whose inputs are gratefully acknowledged, as well as presentations from experts from within as well as outside NACI on the priorities of government, the ten year plan of Department of Science and Technology (DST), the draft industrial policy of the Department of Trade and Industry

(DTI) and on the general economic outlook over the next ten to fifteen years. An important consideration in determining the programme for 2007/08 was the completion of the studies which form part of the four year programme following the planning meeting in August 2004.

In setting its agenda, NACI ever is mindful of its mission – to provide advice to the Minister of Science and Technology on various matters pertaining to the National System of Innovation. NACI is not an executive agency or department, and hence it takes care to limit its activities to those that culminate in advice to the Minister. In this regard NACI strives to provide the Minister with advice that will alert him to issues in the National System of Innovation (NSI), and also provide him with decision support.

NACI remains committed towards its mission of providing the Minister of Science and Technology with relevant and useful advice regarding the National System of Innovation, and to execute its duties as an independent council with diligence and integrity.

Prof. Calie Pistorius  
Chairperson: NACI  
10 April 2007

# 1. INTRODUCTION

## 1.1 The National Advisory Council on Innovation

The National Advisory Council on Innovation (NACI) is a statutory Council, with the primary task of advising the Minister of Science and Technology on various matters pertaining to the National System of Innovation (NSI). NACI is constituted and mandated by the NACI Act (Act 55 of 1997). The Councillors of NACI, including the chairperson, are appointed by the Minister of Science and Technology to advise the Minister (and through the Minister the Cabinet) on the role and contribution of science, innovation and technology (including indigenous technologies) in promoting and achieving national objectives, namely:

- Improving and sustaining the quality of life of all South Africans
- Developing human resources for science and technology
- Building the economy
- Strengthening South Africa's international competitiveness.

NACI functions as an independent advisory council, although its budgetary, human resource and related functions are administered by the Department of Science and Technology (DST). The NACI Act stipulates that the Director-General (DG) of DST is the CEO of NACI.

The members of NACI, including the chairperson, all serve in part-time capacities. Two members, viz. the DG of DST and a representative from the Department of Trade and Industry (DTI) are ex-officio government officials. NACI is also served by a secretariat consisting of a Head of Secretariat (Executive Director) and a number of full-time officials. The contract of the current Head of Secretariat, Dr Bok Marais, expired at the end of March 2007. Mr Vuyani Lingela has been appointed in a permanent capacity to succeed him.

NACI assumed operations in 1998, when the first council was appointed. The current council was appointed early in 2004 for a four-year term of office. The Minister is expected to appoint a new council to take office on 1 April 2008.

## 1.2 The nature of NACI's advice

The NACI Act refers to a wide spectrum of issues on which NACI can render advice to the Minister (as described in Appendix A). Clearly the intention is not that NACI should address all of these issues simultaneously. Given the resource constraints, NACI must select and prioritise issues that it deems important given the challenges and demands of the current and foreseen environment. Since NACI advises the Minister of Science and Technology, it addresses issues that the Minister puts to it as a matter of priority. The Act also provides for NACI to identify issues that it deems important for the Minister to receive advice on.

### 1.3 Setting priorities in August 2004

The current Council, which was appointed in April 2004, held a strategic planning session in August 2004. At that meeting a number of thrusts were identified that would serve as the basis of NACI's advice to the Minister for much of the Council's term. These were:

➤ **Infrastructure for innovation promotion**

Productive Science, Technology and Innovation (STI) systems in developed economies are characterised by configurations of policies conducive to innovation across sectors, access to optimal physical infrastructure and high if not growing levels of expenditure on STI. A key cause for concern for the sustainability of minimum levels of STI in developing economies has been identified as largely the opposite, viz. acceptable policies, but inadequate and aging physical infrastructure and low expenditure. Against this background, NACI identified advice on necessary dimensions and conditions defining an environment that would promote innovation, as an important thrust.

➤ **Human capital and the knowledge base**

Two of the key elements of any innovation system are human resources and knowledge. Neither can be strategically changed over the short term, but both are very sensitive to the dynamics and consequences of globalisation. The impacts of the global mobility of scientists and importance of aligning national legislation with international trends with regard to the protection and exploitation of intellectual property are typical examples. South Africa is especially vulnerable with regard to the provision and spread of its human capital and the challenges posed to its knowledge base by the dual nature of its economy. NACI therefore identified issues pertaining to the parameters of an optimal human capital and knowledge base as a strategic thrust.

➤ **Science, Technology and Innovation (STI) for competitiveness**

There is general agreement that enhanced innovation and international competitiveness is key to South Africa's economic growth and the improvement of the quality of life of its citizens. This notion is, in fact, stated very explicitly in the NACI Act, and hence it is appropriate for NACI to consider it as a strategic thrust in its deliberations. Economic growth and greater levels of employment are fundamentally important national imperatives, and it is thus important for NACI to develop a deep understanding of the dynamics of innovation and competitiveness that are at play in large, medium, small and emerging industrial undertakings in South Africa, with a view to identifying how these might be enhanced to the benefit of the nation.

➤ **Social dimensions of innovation**

The scientific, engineering and technological aspects of innovations are of importance, particularly with regard to the DST's and NACI's point of view. It is also true however, that any national system of innovation is equally dependent on the quality, effectiveness and efficiency of its social systems. The measurements of international competitiveness in fact all account for these

dimensions in one way or another. NACI therefore deemed it essential to consider some aspects of the social dimensions of innovation in its work.

➤ **Position and role of NACI in the NSI**

NACI was established in 1997. Since NACI's inception and inauguration ten years ago, much has been learned by experience in NACI itself as well as from international best practices with regard to the nature of providing "science advice to government". The aim of this thrust was to reflect on NACI's role as a body rendering advice to the Minister of Science and Technology, and included operational matters pertaining to NACI's structure, management, operations and effectiveness.

## **1.4 NACI's outputs up to 2006**

At its meeting in August 2004, NACI formed five sub-committees, each consisting of a number of its Councillors that would be responsible for developing advice on each of the strategic thrusts. A number of studies were commissioned to serve as evidence base for advice to the Minister. Since the inception of the development of these thrusts, NACI has delivered 9 advices (together with relevant reports) to the Minister (see Appendix C for a full list of NACI's outputs from 2002 until 2006). The lists includes advice provided to the Minister as well as details of supporting reports, conferences, workshops and seminars hosted by NACI.

One of the major outcomes of NACI's work during 2006 was its contribution towards the OECD peer review of the National System of Innovation (NSI). South Africa was one of a number of non-OECD countries that were reviewed by the OECD. NACI led the initiative to prepare a comprehensive report that served to inform the OECD mission and it also facilitated the OECD fact finding mission's visit to South Africa. The findings and recommendations of the OECD will form the basis of part of NACI's programme for 2007 and beyond.

In addition to the strategic thrusts that NACI developed at its meeting in August 2004, NACI also developed advice to the Minister on a number of issues that arose during the year. These included advice on the management of intellectual property flowing from publicly funded R&D, tax incentives for R&D as well as publications of scholarly papers (including a report on the matter produced by ASSAf, following a conference on the topic).

NACI's primary mission and hence its output, is advice to the Minister of Science and Technology. With regard to the projects initiated in 2004, particularly in respect of the research projects that are needed to support evidence-based advice, all have now been completed, or are in their final phases. The same is also true of NACI's subcommittee SET4W (Science, Engineering and Technology for Women). This subcommittee has been very active and productive, and has produced a number of outcomes that deal specifically with gender related issues (also listed in Appendix C).

The priorities and projects identified in August 2004 have now run their course, culminating in advice to the Minister. The advice was supported by evidence-based research reports, hence the need for setting new priorities for the last year of this Council's term of office.

## 1.5 Setting new priorities for NACI

By the middle of 2006, it had become clear that it was necessary for NACI to have another major planning exercise, similar to the one in August 2004. Not only had all its projects been completed (or were in the final stages of completion), but the science, technology and innovation landscape had changed significantly during the preceding years. Apart from the developments in science and technology per se, the Minister and Department of Science and Technology have also launched a number of new initiatives, many of them reflecting the increasing prominent international presence and position of the country. The DST's ten-year plan is in the offing and in a similar vein, the DTI is developing a national industrial policy. From a national perspective, a number of new government initiatives have been launched, notably the *Accelerated and Shared Growth Initiative of South Africa* (ASGI-SA) and the associated *Joint Initiative on Priority Skills Acquisition* (JIPSA).

In order to formulate new priorities, NACI subsequently undertook a comprehensive planning exercise towards the end of 2006 and beginning of 2007. NACI's planning was informed by a number of inputs, including the following:

- Inputs by the Minister of Science and Technology
 

In response to a briefing by the Chair and the CEO on the first phase of the strategic planning held in November 2006, the Minister gave formal inputs in a letter in which he supported NACI's proposals to render advice regarding the "provision of science advice to government" and a biennial publication on the "state of the NSI". He further indicated that the DST would continue to engage NACI on the development of a national innovation strategy, referring to the DST's development of a 10 year plan for the NSI. DST will consider incorporating issues raised in NACI's studies on the required physical infrastructure to attain its vision for the system.
- Presentations at the planning session on 9 November 2006
  - ASGISA (representative from the Presidency)
  - STI Environment in South Africa and the DST's strategy (representative from DST; a presentation on Science and Technology for South Africa: The 10 year plan (2007 – 2016), was subsequently made at the second planning meeting in February 2007)
  - The DTI's draft industrial policy framework (representative of the DTI)
  - Economic outlook and competitiveness (economist from the University of Pretoria's Gordon Institute of Business Science (GIBS))
  - Revisiting NACI's mandate (NACI chair)
- A summary of feedback from the Parliamentary Portfolio Committee in October 2006, where NACI's Annual Report was presented
- Draft OECD report
 

An analysis of the draft report suggested that there will a number of issues flowing from the OECD report and its recommendations that must be pursued by NACI with a view of developing advice for the Minister

- Previous and ongoing NACI studies, workshops and interactions with international counterparts and related bodies
- Other government policies and reports
- Wide range of literature on related contemporary international developments

During the second phase of NACI's planning session, held at the plenary meeting in February 2007, the Council identified a number of priority areas on which it would focus in 2007/2008. In this process, two important conditions were observed. Firstly, cognisance was taken of the fact that a new Council will take office in April 2008 and the need to allow the new council space to formulate its own agenda, whilst at the same time providing continuity with ongoing projects for advice. Secondly, capacity and resources were reserved to address issues that will be raised in the OECD report.

Chapter Two of this document gives a brief synopsis of the anticipated innovation landscape, thereby providing a backdrop for the planning rationale set out in the rest of the document. Chapter Three describes the new initiatives that NACI will undertake, following its planning sessions late in 2006 and early in 2007. The finalisation of the projects that followed the 2004 planning sessions also described, as are the mandates of the three standing committees (SET4W, the National Biotechnology Advisory Committee (NBAC) and the Indicators Reference Group (IRG)). NACI's resource requirements and application, budget as well as its human capital and physical infrastructure is described in Chapter 4. Chapter Five briefly touches on performance evaluation and monitoring. Three appendices cover NACI's objectives and functions as set out in the NACI Act (A), the names of the NACI councillors as well as those of the three standing committees mentioned above (B) and finally a list of the outputs of NACI from 2002 until the end of 2006 (C). A list of acronyms is also included.

## 1.6 Conclusions

The current Council's term of office started on 1 April 2004 and has been marked by the launching of a set of 14 evidence generating studies and 9 advisory submissions to the Minister of Science and Technology, with more to follow. NACI's success in the past three years can be ascribed to a dynamic relationship with the Minister of Science and Technology, an welcome interest shown by the Deputy Minister, revised internal processes, such as its sub-committee system functioning effectively, and the strengthening of the Secretariat.

Strategic planning meetings in November 2006 and February 2007 afforded the Council opportunity to reflect on its past performance and systems and to develop new priorities for the remainder of its term of office. This document summarises the outcomes of those planning meetings and represents the corporate business plan for the last year of the Council's term of office.

As part of its regular evaluation processes, NACI will undergo an external evaluation during the latter part of 2007. The evaluation is necessary and welcomed by NACI. It should provide not only an opportunity to strengthen NACI, but also serve as an input towards building an enhanced and more comprehensive structure for providing

*science advice to government* as an essential component of the National System of Innovation.

## 2. ANTICIPATED INNOVATION LANDSCAPE

### 2.1 Introduction

NACI must ensure that the advice it offers to the Minister of Science and Technology enhances the Minister's decision making capabilities. The degree to which the advice provides decision support for the Minister is an important characteristic thereof. The advice must therefore be relevant, particularly in a pro-active manner. An advisory body such as NACI continuously has to scan the science, technology and innovation (STI) environment – international and national - to ensure that its advice accounts for international developments and is aligned with local trends and needs. Much of NACI's work relates to the scientific, engineering and technological aspects of the NSI. Very often the research that forms the basis of NACI's advice is outsourced to various research organisations. NACI must ensure that it adds value by interpreting the evidence and translating the findings into policy-related advice to the Minister.

As NACI sets a new agenda, it is important not only to scan the “as-is” innovation landscape nationally and internationally, but also to anticipate future developments and trends. This chapter offers thumbnail descriptions of the main characteristics of the environment which NACI anticipates in the near future. However, future work of NACI will not only be influenced by its interpretation of its environment and anticipation of future developments, but also by its recent and ongoing work. This chapter therefore also touches on the work of NACI during the 2006/7 year. The perspectives offered in this chapter are presented as broad brush strokes to put its new priorities into perspective.

Some of the international and national trends identified in the previous Corporate Business Plans (CBP) remain valid and are first summarised, before emerging and more direct, albeit shorter term, developments are identified.

### 2.2 Medium term trends

NACI's previous CBPs offered concise but substantiated overviews of medium to longer term international and national trends that might directly and indirectly impact on STI policy. Most of those will remain valid for at least the next few years. The following trends and developments need to be monitored by those involved in STI policy:

- International political volatility, such as the conflicts in Africa and Middle East, that could impact on funding for STI, research agendas of countries, and the mobility of STI workers.
- Continued commitment to STI by the South African government with the concomitant accountability imperative. As the country continues to play a more prominent role internationally and especially in Africa, this will necessarily also be reflected in its STI policies.

- The big economic powers are continuing their positive, albeit slow, economic growth and commitment to increase the gross expenditure on R&D, eventually to the Lisbon target of 3 per cent in the case of the OECD countries. The most recent budget speech by the South African Minister of Finance reflected optimism that the current economic upswing would be sustained. Such forecasts auger well for our National System of Innovation. The country seems to be on track towards attaining its target of spending of 1% of GDP on R&D by 2008. Furthermore, the favourable economic climate enables addressing priorities, such as human capital shortages, replacing ageing equipment, sustaining and/or validating big science initiatives, ranging from the Square Kilometre Array (SKA) Telescope to research and development on the Pebble Bed Modular Reactor (PBMR).
- The human capital base remains one of the most critical challenges of the NSI. This holds true when supply is related to the demand generated by the accelerated economic growth and also when the situation is compared to our comparator countries. The gap between supply and demand seems to be widening. The skills shortage in the country is a critical issue, particularly regarding those pertaining to science, engineering and technology. This aspect necessarily puts not only the higher educational system, but also the secondary and primary schools, under the spotlight.
- The situation with regard to, what the previous business plan referred to as moderating variables, has not changed significantly. Firstly, establishing an effective digitised innovation network still poses an Achilles heel to developing a knowledge society and the future of innovation more generally. In this regard, access to ICT, particularly cheap broadband, requires urgent attention. Secondly, the effective alignment between the rich spectrum of NSI related policies and strategies still poses serious problems.
- There is a prognosis that the country will experience serious energy and water shortages in the short and medium term. The effects of these on the NSI must be ascertained.

## 2.3 Developments in Science, Technology and Innovation Policy

An analysis of both the international and national STI agendas yields a wide range of developments that NACI must consider in its proposed inventory of advice to the Minister and government in the next few years. The following issues represent some of the important issues on both the international and national agendas.

### 2.3.1 International agenda

The STI agendas of industrialised countries and international organisations show correlations – not surprisingly so given the extent of interaction at international organisations, such as the OECD, the European Commission, and various UN committees and commissions.

- The growing cooperation and collaboration facilitated by international organisations represent a first dynamic that South Africa increasingly has to consider in the further development of its own STI policy agenda. To the extent

that South Africa values its membership of various international organisations, it will have to commit itself to decisions made at these forums. Evidently, these go beyond those in which the country may be playing a leadership role, such as the African Union and the Non-aligned Movement.

- The internationalisation of R&D is part of a broad spectrum of dynamics (e.g. post-modern philosophy and globalisation) and contributes to challenges and effects such as international mobility, open access to data from publicly funded research<sup>1</sup>, “partnerships among the strong at the expense of the weak”, possible erosion of home-base R&D, open innovation and new approaches to intellectual property, and new patterns of funding.
- The rise of India, China and South Korea as important role players in STI necessitate a reconsideration of South Africa’s position vis-à-vis these countries. The recent *Atlas of Ideas Conference* in the UK reported, for instance, that
  - China had moved ahead of Japan for the first time to become the world’s second largest investor in R&D after the US, South Korea’s spending increased 15% over 2005 to 3% of GDP, while Indian R&D spending rose by 24%. Many multinational corporations now have operations, including R&D facilities, in these three countries.
  - India’s engineers are flooding into the world’s job markets at a rate of 350,000 a year, forecast to reach 1.4 million a year by 2015 and that its talent pool comprises 14 million graduates, twice that of the US.
  - The growth in R&D expenditure and GDP in these countries has been identified as being responsible for the serious attention that these countries were now getting.

When a country such as the UK is warned at the *Atlas of Ideas* conference that it might become sidelined in ten years time, the message to South Africa would even be starker. NACI can be expected to consider carefully the recommendations resulting from a report on the conference, including the building of strong international collaborative networks; becoming a magnet for talent from abroad; building accessible knowledge banks, and influencing global science to focus on key African problems. These can be summarised as the overriding imperative to develop and promote a clear vision of the role of global collaboration in furthering science, technology and innovation in South Africa.

- Another very important issue in the international agenda is the phenomenon of open innovation which essentially states that innovation is increasingly being characterised by collaboration between parties, be they enterprises, institutions or countries, in contrast to the past approach of protectiveness when each entity would have done its own thing. The implication of this transformation of a cornerstone of innovation such as intellectual property rights should be clear.

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<sup>1</sup> The OECD has accepted that “*The value of data lies in their use. Full and open access to scientific data should be adopted as the international norm for the exchange of scientific data derived from publicly funded research*” and have embarked on a process of approving a set of principles and guidelines that would be binding on members.

Other aspects of STI policy affected by this emerging trend include funding of projects and the notion of programme and project management.

- Developments in Africa with respect to STI policy, particularly those pertaining to science, technology and innovation on the African continent remain important in setting NACI's agenda. Over the past five years NACI has, for instance, been involved in promoting science, technology and innovation in Africa by means of a commissioned report, the hosting of an international workshop, representation on at least three delegations to African countries and participation in several seminars. Against this background, NACI should monitor the outcomes of the African Union's 2007 annual meeting in Addis Ababa where science, technology and innovation featured prominently. Decisions on the promotion of science education, increasing the funding of R&D, revitalisation of African universities and regional and international cooperation represent important parameters in the further deployment of NACI's agenda in 2007. The same is true for the African Union's and NEPAD's Consolidated Plan of Action (with its flagship programmes).

### **2.3.2 National agenda**

A great deal of dynamic change with regard to STI is taking place in different government sectors. NACI will have to consider its contribution to (and/or impact of its past involvement) with regard to at least the following developments:

- The importance of the Accelerated and Shared Growth Initiative of South Africa (ASGI-SA) and its associated programme, the Joint Initiative on Priority Skills Acquisition (JIPSA) for NACI can hardly be overestimated. Although NACI has actively participated in the activities of JIPSA, the last phase of the JIPSA programme may require taking more initiatives, such as the assessment of the provisional outcomes against the background of relevant current NACI studies and specially commissioned work.
- Developments within the Ministry of Science and Technology and DST during the preceding years and planned initiatives for the next year should form an important context for NACI. In this regard the following items feature prominently:
  - The STI environment can be expected to remain very dynamic over the next couple of years. A number of new policy and strategic initiatives, such as the proposed establishment of a Foundation for Technological Innovation, hydro-economy strategy, and a Human Capital strategy, have recently been and/or are being developed.
  - The DST is currently developing a ten year strategic plan for science and technology in South Africa. The plan can be expected to serve as important coordinates for prioritisation and deployment of STI resources in the National System of Innovation over the next decade. There are at least three rather obvious levels at which NACI will have to put the emerging plan on its agenda. Firstly, it may wish to advise on aspects of the plan, before its finalisation; secondly, it may use the plan to feed into its own priorities; and thirdly, it may consider monitoring the implementation of the plan over time. The notion of NACI producing a biennial "State of the NSI" report is discussed elsewhere in this document.

- South Africa is fortunate that there has been a substantial growth of the S&T budget over the last number of years. In fact, the present allocation is nearly three times that of 2005/06. There is reason to expect investment in STI to continue, if the economy can maintain its sustained growth of recent years.
- From NACI's perspective, the following are some of the relevant policy and related initiatives and issues of other government departments that could be flagged:
  - Department of Trade and Industry: The draft industrial policy framework is expected to be released for public comment soon.
  - Department of Education: Several issues in the field of higher education might be worth monitoring since they can be expected to affect components and processes in the NSI. These developments include the effects of the implementation of the new funding formula for higher education, mergers of higher education institutions and the fundamental reconfiguration of some institutions, and the revised enrolment framework. The impact of the higher education sector on the national research output should also not be overlooked. At the same time, it is evident that serious attention should be paid towards strengthening the primary and secondary education sectors.
  - Department of Home Affairs: The situation with regard to immigration by and work permits for prospective workers in the STI sector remains one of great concern

➤ The OECD report

Although NACI has taken note of the draft OECD report, it has not yet had time to study the final report. The Council has, however, committed itself to study the report closely with a view to identifying priorities it may have to attend to, following the findings and recommendations of the report. Without pre-empting the release, first indications from the draft report are that it identifies at least the following cross-cutting issues that may justify NACI's attention:

- A number policy and governance issues. These include what is referred to a "national arena" at cabinet level that can provide broad direction, priorities and budgets, as well as decide on the ways to 'join-up' STI policies. Elsewhere, the report briefly considered NACI in this regard, but identified its current responsibility to one line-function Minister as a factor which may restrain its ability to address cross-departmental issues.
- The human capital pipeline, and especially blockages and possible solutions, received considerable attention in the report. The OECD assessment in part represents a confirmation of what has become mainstream thinking in South Africa, but in part offers new, if radical perspectives. What is of great importance, is that the OECD conclusions take full account of the international arena and how that might further confound our situation if not used as a variable in a future human capital strategy.
- The need for a sharpening of the focus on innovation is highlighted against the background of a reasonably well developed R&D system. Important elements covered under this heading include the need for a foundation for

technological innovation, and more forward-looking and timely strategic thinking around new technology development in order to reflect comparative advantages.

- A fourth cross-cutting issue in the report is the urgent need for addressing the 'other' innovation chasm, namely that between the STI system of the first economy and the second economy's growing need for effective access and utilisation to address its needs, especially with regard to combating poverty. The report also warns of the political fall-out that a lack of progress in this regard may have.

Over the past few years NACI and other role players have attended to selected dimensions of the NSI, including some of the cross-cutting challenges mentioned above. The OECD report is bound to make it clear that much more will have to be done. As such, NACI will devote some its resources towards dealing with the matters raised in the report. This matter is discussed further in section 3.2.4.

## **2.4 Conclusion**

It is clear from this concise scan of the STI environment that dynamic changes are taking place at both the international and the national levels. The government, and particularly the Minister of Science and Technology and the DST will be faced with a number of challenges and opportunities in the foreseeable future. As an advisory body the Minister, NACI has its work cut out for it.

## **3. PORTFOLIO OF INITIATIVES**

### **3.1 Introduction**

Based on the planning sessions undertaken by NACI towards the end of 2006 and the beginning of 2007 as described in the preceding chapters, and taking into account the requests and directives from the Minister, NACI decided at its plenary meeting on 15 February 2007, to initiate a number of projects and studies, all of which will form the basis of advice to the Minister. The new projects are described in Section 3.2 below.

It was mentioned in previous chapters that a number of projects initiated by NACI earlier are currently being completed. These studies will form the base of further advice to the Minister. An overview of the progress that has been made with and the expected outcomes of studies initiated in August 2004 (and that are to be completed soon), is given in Section 3.3.

The NACI Act provides for NACI to establish committees to assist it in the performance of its functions. In addition to the NACI Council itself, NACI currently has three national advisory committees, viz. SET4W (SET for Women), the National Biotechnology Advisory Committee (NBAC) and the Indicators Reference Group (IRG). The members of the advisory committees are appointed by NACI, and each is chaired by a council member of NACI. Each of the three advisory committees work in the field of its specialisation, and each contribute towards NACI's ultimate mission, viz. the rendering of advice to the Minister of Science and Technology. The advisory committees and their programmes are discussed in Section 3.4. The members of the three advisory committees are indicated in Appendix B.

Conferences, seminars and workshops planned are listed in Section 3.5. The scheduling of the projects is discussed in Section 3.6. NACI's budget is presented in Chapter Four, together with the resources and notes pertaining to the functioning of the Council. Chapter Five briefly describes the evaluation of NACI and the external review that is to be held later in 2007.

### **3.2 New evidence-generating studies**

The new evidence-generating studies that NACI will initiate as a result of its planning exercise of November 2006 and February 2007 are described below:

### **3.2.1 South African system of providing science advice to government**

#### **Motivation**

As part of the previous portfolio of projects, NACI considered its own role as a statutory Council providing advice to the Minister of Science and Technology on various aspects relating to the NSI. As part of the study, NACI also considered a number of operational issues as well as its relationship with the DST. Advice on the matter was submitted to the Minister on 30 November 2006.

During the course of the study on NACI's role in the NSI, it became evident that a more comprehensive review on the broader system and process of "providing science advice to government" is required. There can be little doubt that an effective system of providing science advice to government is a necessary element of any modern national system of innovation. In this regard, one must account for the terms "government" and "science" in their broadest interpretation.

#### **Coverage**

The term "government" will typically include the executive branch (Presidency, Cabinet as well as the various Ministers and Ministries), the legislative branch (Parliament and its various portfolio committees) as well as the various government departments. Similar requirements exist on the provincial and local levels. There are very few if any branches of government (be it on the national, provincial or local levels) that are not to a more or lesser degree reliant on or involved with various aspects of science, technology and innovation. It is essential that all the branches of government are adequately served by effective advice structures with regard to science, technology and innovation, and that these are coordinated within the NSI.

The study will map the current structures that provide science advice to government, whilst at the same time gaining insights into international best practices in the area. It is foreseen that the study will address all components of government (including the legislative branch) with regard to their requirements for science, technology and innovation related advice.

As part of the study, NACI will draw on national as well as international expertise.

#### **Potential contribution**

The desired outcome is both better quality decision-making and decision support, and enhanced trust in the use of expertise in S&T policy-making.

It needs to be noted that NACI will undergo an external review during the latter half of 2007, and it is expected that this process will also add valuable insights to the issue.

#### **Time frame**

The study will commence immediately, and will build upon the knowledge gained by NACI's study on its own role within the NSI. It is expected that the project will be completed by the middle of 2008, and that appropriate advice will then be rendered to the Minister.

### 3.2.2 Regular reporting on the “State of the NSI”

#### Motivation

A number of national S&T related studies are currently undertaken, many of them on an annual basis, others every two years. These include the National Innovation Survey (the first high-level findings to be released in April 2007), the National Survey of Research and Experimental Development for 2004/5 published by the Department of Science and Technology, Facts and Figures published by NACI in 2002 and a myriad of other indicators published by STATS SA, the Reserve Bank and numerous other government departments as well as other public and private institutions. These surveys typically focus on some aspect of the NSI. Various countries and international organizations (e.g. OECD and UNESCO) regularly produce overviews of the state of their innovation systems, the best known probably being the NSF’s *Science and Engineering Indicators*. The last similar publication on South Africa was the Foundation for Research Development’s *SA Science and Technology Indicators – 1996*.

A number of foreign institutions also regularly publish data that pertains to the national innovation systems of countries, including that of South Africa. The data are very often comparative in nature. The annual reports dealing with the competitiveness countries of the World Economic Forum and the IMD are typical examples, as is data from organisations such as the World Bank and the OECD. Again, the surveys and data typically also focuses on aspects of the NSI. The recent visit of the OECD and the subsequent review report on South Africa are extremely valuable instruments and benchmarks with regard to the performance of the NSI. The Minister and Council concurred that the success of the *Background report* in presenting an overview of the state of STI in the country, justified such overviews to be compiled as an ongoing project.

The various national surveys and indicators, as well as the comparative international surveys, all focus on various aspects of the NSI. The country’s experience with the various indicators, and specifically the recent OECD-related exercise, has raised the suggestion of a report that will describe entire the national system of innovation, rather than merely various aspects thereof. Many of the indicators that describe the NSI can be quantified, but many others will be of a more qualitative nature. What is needed is a description of the performance of the entire *system* and its impacts.

#### Outcomes

A biennial publication is envisaged, consisting of representations of a comprehensive set of indicators, complemented by overviews of the larger national context, policy developments, analyses of strengths and weaknesses and imminent developments. The NACI Indicators Reference Group has identified the development of a framework for an indicator system which will characterise the NSI as a project for 2007/08 (see Section 3.4). A biennial report, which will have consolidated indicator information, drawn from various sources will be produced and could be used as input into the “State of the NSI” study for monitoring aspects such as inputs into the NSI and performance of the NSI.

The project is a comprehensive and ambitious one, but one that will certainly contribute greatly towards measuring the performance of the NSI and its impact. Such

a gauge of the “state the NSI” will also be a useful instrument towards the development and adjustments of policies across the government.

### **Research approach**

It is foreseen that the project will be done in phases. The first phase will investigate the various indicators and measures that need to be accounted for in a report on the “State of the NSI”. It will be essential to account for international best practices in this regard. In order to measure the performance of the South African NSI, it will be necessary and useful to use indicators and parameters that are also used elsewhere in order to benchmark performance. The system is also characterised by many uniquely South African features, and those need to be accounted for as well. Much of the data that will be required is currently available from various sources inside and outside the country, albeit not necessarily in the format required for a “state of the NSI” report. The data and sources need to be identified and secured. Additional data and processes for acquiring the data will then have to be developed. The output of this phase will be a clear description of the NSI and its desired outputs, as well as the parameters and indicators that will be used to measure its performance together with comparative and normative performance benchmarks. All of this will then constitute the “State of the NSI”.

Systematic analysis of the structure of similar publications of selected countries and international organizations will be done, together with the development of a structure in terms of which the state of the NSI would be reported. The identification of relevant comparator countries, regular updating of information on each of the elements of the structure, design and maintenance of a data base of sources as well as the analysis of data will be undertaken.

The next phase will be the gathering of information, both with regard to data elsewhere and performing of surveys to gather data that can not be obtained other than by primary research. It will be necessary to constantly benchmark not only the data itself, but also the usage of various metrics to ensure that international compatibility is maintained.

### **Time frame**

It is foreseen that the first phase can start immediately, and that it will be completed by the middle of 2008. The second phase will probably be completed within another year, so that the first “State of the NSI” report should be available in the second half of 2009. Thereafter, the reports should be produced biennially, i.e. every two years.

## **3.2.3 Recommendations towards a National Innovation Strategy**

### **Motivation**

There can be little argument as to the importance and value of the process of innovation as a very important contributor towards the creation of wealth, economic growth and an increasing quality of life. In this regard innovation and international competitiveness go hand in hand. NACI’s existence and its mission as mandated in the NACI Act as well as the premises set out in the White Paper on Science and Technology and numerous subsequent national strategies and policies bear witness to

the importance that South Africa also attaches to innovation. The concept of a National System of Innovation stands central to the whole notion.

In recent years, the DST has unveiled a National Research and Development Strategy (NRDS). The Department of Trade and Industry is currently developing a national industrial policy. International experience has shown, however, that a national *innovation strategy*, as opposed to a research and development strategy or industrial policy (by itself) can have great benefits. Many countries, regions and even cities, including the European Union for example, have developed innovation strategies with great success and benefits. The National Research and Development Strategy and White Paper on Science and Technology have guided the NSI since the late nineties. However, in line with international best practice, all policy documents need to be evaluated from time to time in terms of a set of criteria, including relevance, since it is well known that the innovation playing field is dynamic and global. The notion of a *Foundation for Technological Innovation* (FTI), for example, is currently under discussion in various forums. As a line department, it would be the task of the Department of Science and Technology to develop and implement a *national innovation strategy*. The DST is currently in the process of drafting a ten year plan, which will form the core of such a strategy. Its efforts and initiatives in this regard should be lauded.

NACI, on the other hand, is an advisory structure rather than an implementation agency. NACI is, however, mandated to render advice with regard to a comprehensive spectrum of issues regarding the NSI. As an independent advisory body, it will therefore contribute to the national debate and effort by also applying its mind towards the development of a national innovation strategy, and render advice to the Minister on the matter. In this regards, it will as always, be mindful that the task of developing and implementing the strategy lies with the DST.

### **Methodology**

NACI will conduct a study of current best practice regarding national and regional innovation strategies internationally. This will include literature studies, conferences and interviews with international experts and analyses of the South African NSI. Analysis of its findings will be translated into advice to the Minister.

### **Time frame**

This project will commence immediately. For the moment it is foreseen that it can be an ongoing project over a number years, with regular reports and advices to the Minister.

### **3.2.4 Projects following from the OECD report**

Although NACI has seen a preliminary draft of the OECD report, it has (at the time of finalisation of this document) not yet analysed the final report. It is evident, however, that the OECD report contains a number of recommendations and other matters that will fall within NACI's domain and on which NACI will render advice to the Minister.

In its planning process, NACI has thus foreseen that the final OECD report will be studied, after which it will identify and initiate a number of projects that will lead to advice to the Minister. These initiatives will be discussed and finalised at NACI's plenary meeting in May 2007.

### 3.3 Evidence-generating studies initiated from the 2004 planning process

Table 3.1 shows the status that has been made on studies initiated in August 2004 and that are to be completed shortly. Appendix C shows a comprehensive list of NACI's completed projects since 2002, including those that were initiated at its planning meeting in 2004.

**Table 3.1: Finalisation schedule of work-in-progress projects**

Project	Advice
Provincial innovation systems	End of May 2007
Appropriate human resources for the NSI Phase 2	End of June 2007
Ethics in the NSI	End of April 2007
Tracking of R&D expenditure	End of May 2007
Physical infrastructure for NSI	End of May 2007
Knowledge base	End of April 2007
Dynamics of competitiveness	End of April 2007
OECD evaluation of the NSI – Second phase	1) Popular version of OECD background report: to be ready by May 2007 2) Conference in May 2007

### 3.4 NACI advisory committees

The broad scope of NACI's mandate required the appointment of specialised national advisory committees to assist it in its tasks. The establishment of such a national advisory committee could be the outcome of a ministerial or Council decision and could include persons who are not Councillors of NACI. Currently, the following national advisory committees assist NACI:

- **Science and Technology for Women (SET4W, previously known as the South African Reference Group on Women in S&T):** The aims of this national advisory committee are to achieve greater equality between women and men by bringing a gender equality perspective into everyday policy-making, and by complementing the more traditional approaches of promoting gender equality, such as legislation and positive action. In 2006, the Minister approved a new dispensation whereby SET4W would become a ten-person NACI standing committee. A new committee was appointed in February 2007 and its inaugural meeting took place on 19 March 2007. The committee is currently

undertaking a prioritisation exercise and its proposed initiatives will be submitted to the Council as soon as they have been finalised.

- **Indicators Reference Group (IRG):** The strategic objective of the IRG is to monitor and advise on the process of developing a comprehensive science, technology and innovation indicator system that would form part of the national statistical system and inform long range strategic planning. The committee's membership was extended to include a NEPAD representative, an international expert and a member from the DTI. An important development in 2006 was that the DST indicator programme was transferred from NACI back to the DST. It was agreed with the DST that it would take over the management function of the R&D and Innovation surveys, but that NACI would still be responsible for further analysis of indicators, hence NACI's involvement via the IRG.

The IRG had a meeting in February 2007 during which the following projects were identified for the year:

- Development of a position paper on best practice and international developments in science, technology and innovation indicator systems.
- Proposal of a framework for the STI indicator system based on the findings of the position paper.
- Investigation into the development of a NACI Innovation Index.
- Deeper analysis of the SA indicators (R&D and Innovation survey data). A set of priorities will be defined and the corresponding analysis will be undertaken.

The first phase of the new study on regular reporting on the "State of the NSI" discussed in Section 3.2.2, will therefore fall within the remit of the IRG, namely the development of the position paper and the proposal of a framework for the STI indicators system.

- **National Biotechnology Advisory Committee (NBAC):** The aim of NBAC is to support the implementation and further development of the National Biotechnology Strategy. The committee was launched in November 2006. Projects identified by this newly established committee include:
  - Contributions towards a revision of the National Biotechnology Strategy (NBS). Since its release in 2003, a number of recommendations have been implemented, including the establishment of the Biotechnology Research and Innovation Centres (BRICS)
  - Enhancement of public understanding of genetically modified food (GMF) was identified as an important barrier in the biotechnology area. The initial dimensions of the initiative currently being planned will include current state of the general public's understanding of GMF, coverage in school curricula and the mass media, and official policy. The study is expected to be completed within a year.

### 3.5 Workshops and Conferences

NACI's primary function is to advise the Minister of Science and Technology on aspects relating to the NSI. NACI must ensure that it is well informed in order to render such evidence-based advice. Very often, it is necessary to arrange workshops and conferences where the expertise of local and international experts can be applied to the topic at hand. NACI therefore arranges a number of these events during the year to assist it in gathering information. The following conferences and workshops are planned for the year:

- **OECD conference:** As part of the OECD country review of SA's science and innovation system undertaken in 2006, a national conference will be hosted together with the DST to share the findings and recommendations of the OECD and to promote active participation in policy related matters. International experts will be invited to participate.
- **Provincial innovation conference:** Two NACI studies, viz. "Provincial Innovation systems" and "Human Capital and the SA Knowledgebase" generated evidence in the form of findings and recommendations on innovation activities at the regional level. This regional breakdown is important information for all levels of government to ensure balance and the creation of equal opportunities in the most economically effective way. At least two regional conferences are planned where information will be disseminated to all stakeholders. We believe that it will also play a coordinative role in aligning the efforts of the different layers of government.
- **JIPSA /HR model seminar:** In response to the human resource dilemma in the NSI and especially the critical shortage of engineers and artisans, NACI has developed a computer model which can be used to estimate the number and composition of the student body to be trained to obtain a specific output at a future stage. A workshop is planned with key stakeholders from JIPSA to share the results and to promote the use of the model.
- **Placement of post-doctoral researchers:** The idea with this workshop is to bring together academics, post-doctoral students and representatives from industry to explore how to best place post-doctoral scholars in industry to acquire the required practical background and in return get the opportunity to transfer state-of-the-art academic knowledge to the business sector at limited cost for the latter.
- **Lunch seminars:** A number of lunch seminars are planned for the year. International and local experts will be invited as speakers.

### 3.6 Scheduling and time frames

In the process of policy advice development, NACI's main activities for 2007/08 will include the completion of its portfolio of studies (including the new initiatives mentioned in Section 3.1 and the completion of the projects mentioned in Section 3.2),

projects of the three subcommittees, viz. SET4W, the National Biotechnology Advisory Committee and the Indicators Reference Group discussed above, the hosting of national conferences and workshops, corporate functions, communication related projects and an external performance review. NACI will also from time to time render advisory notes to the Minister on urgent issues that may arise during the year.

Table 3.2 provides a framework for planning and monitoring during the year. Each row in the table represents a meeting, project or activity. Columns are used to indicate dates (in the case of meetings) and time frames, indicated by gray shading.

**Table 3.2 Scheduling of corporate goals**

Item	2007										2008		
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<b>Meetings</b>													
Exco meeting	8 <sup>2</sup>	10	3	21	19	16	13	4					
NACI plenary meetings			24				6		8		✓		
Sub-committees 1 to 5			✓				✓		✓				
IRG						✓					✓		
NBAC												✓	
SET4W	19			✓									
JIPSA	8	19	17	7	19	16	13	11	15				
<b>Corporate documents</b>													
Corporate strategic plan		✓											
Launch of new portfolio			✓										
OECD booklet			✓										
Annual report						✓							
<b>Communication and promotion of Science</b>													
Websites and innovation portal													
NACI Newsletter													
Science Expo	5-9					✓							
<b>Event hosting</b>													
OECD conference			✓										
Provincial innovation conference					✓								
JIPSA /HR model seminar							?						
Placement of post-doctoral researchers							?						
Lunch seminar	✓		✓			✓			✓			✓	

<sup>2</sup> Date: 8 March 2007

Item	2007										2008		
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<b>External performance review</b>													
Approval of plan			24										
Review process						✓							
Approval of draft report									✓				
<b>Projects</b>													
South African system of science advice to government													
An overview of the state of the NSI													→
Innovation and competitiveness strategy recommendations													
OECD country review recommendations													→
Development of a national STI indicator systems framework													
NBAC study: Advice on Biotechnology Strategy													
NBAC study: Advice on public understanding of genetically modified foods													
Provincial innovation systems													
Appropriate human resources for the NSI (2)													
Ethics in the NSI													
Tracking of R&D expenditure													
Physical infrastructure for NSI (secondary school component)													
Knowledge base													
Dynamics of competitiveness													

## Conclusions

The initiatives described in this chapter form the basis of NACI's projects, all of which are aimed at providing advice to the Minister of Science and Technology. The bulk of the projects initiated in August 2004 have culminated in advice to the Minister (see Appendix C). The remainder of these projects are being finalised, and will be rendered as advice soon.

NACI undertook a planning exercise late in 2006 and early in 2007, where a number of new projects were initiated. The Minister's input and requests were also solicited and accounted for in the planning. In addition to a number of specific projects that were identified, NACI also accounted for the fact that resources will need to be applied towards rendering advice on the findings of the OECD report.

## 4. RESOURCE APPLICATION

### 4.1 Introduction

NACI's mission is to be a relevant, prominent, credible, proactive and responsive advisory body to the Minister of Science and Technology on national matters concerning innovation, thereby contributing to the achievement of the national objectives of our country by utilising accountable scientific approaches and the best available resources.

In setting its agenda and work schedule, NACI must necessarily be mindful of its resources. The resources are human resources, primarily the Council members, other members of NACI's advisory committees and the Secretariat, financial resources and infrastructure. In this chapter the focus will be on the functioning of Council and on resources at its disposal to give effect to its mission, including the budget for the current year.

### 4.2 Council

Reference was made to the work of the Council and to aspects of the Councillors in previous chapters and sections. All NACI members, including the chairperson, have other occupations, and tend to their duties as NACI members on a temporary part-time basis. A typical NACI Council member attends four plenary meetings during the year and will contribute towards the activities of or chair one or more of the subcommittees. Some members are active in or chair the three advisory committees, and a few also serve of the Executive Committee. Two NACI Council members are ex officio government employees, viz. the DG of DST (who is also the CEO of NACI) and a representative of the DTI. The Council members are listed in Appendix B.

The NACI Act stipulates that NACI shall be composed as follows:

- A chairperson appointed by the Minister
- Sixteen to 20 members appointed by the Minister (after consultation with the Ministers' Committee and after submission to the Cabinet for notification)
- A CEO (who is automatically the Director-General [DG] of the Department)
- An officer of the Department of Trade and Industry (appointed by the Minister with the concurrence of the Minister of Trade and Industry).

Apart from the two government officials, the other members (including the chairperson) of NACI are appointed in their personal capacities and serve on a part-time basis. These members are typically appointed for a period of four years, although they may be reappointed. The Act states that the members, other than the two government officials who serve in their official capacity, shall be persons who have:

- Achieved distinction in any field of science and technology in their own right or in the context of innovation

- Special knowledge or experience in relation to the management of science and technology or innovation
- Special insight into the role and contribution of innovation in promoting and achieving national and provincial objectives, or
- Special knowledge and experience of the functioning of the NSI within the science and technology system or any other aspect of NACI's domain of responsibility.

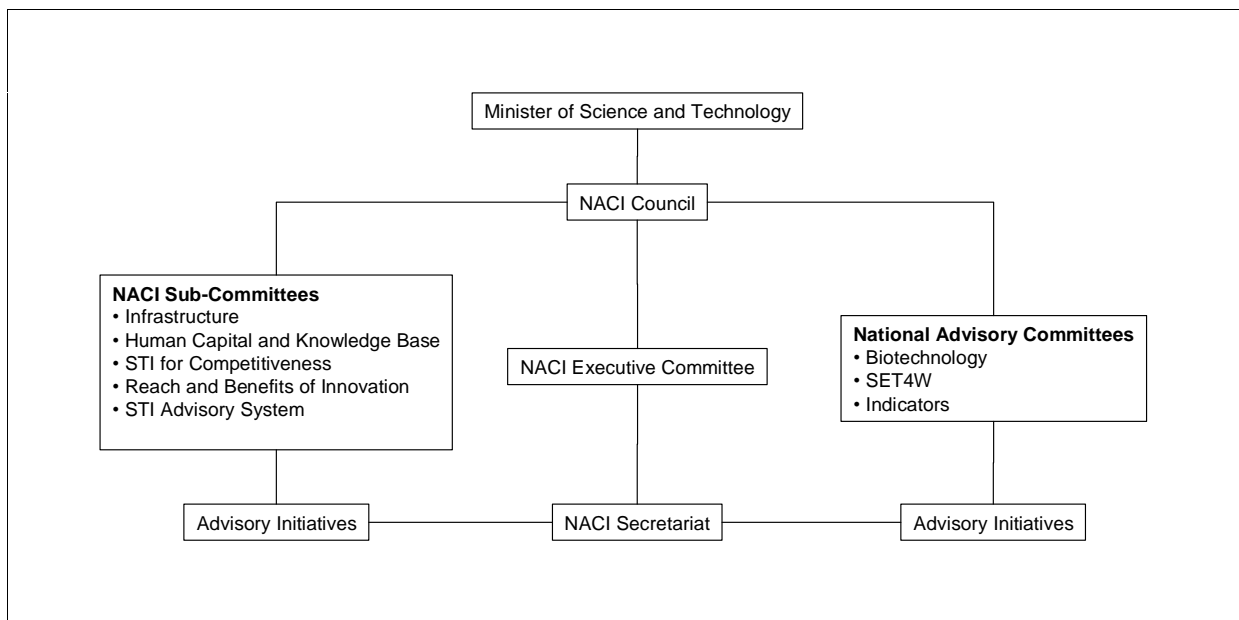
NACI must be broadly representative of all sectors and be constituted in a manner that will ensure a spread of expertise regarding:

- National and provincial interests
- Scientific and technological disciplines
- Innovation
- Needs and opportunities in different socio-economic fields
- Research and development in all sectors.

NACI currently has three standing advisory committees, viz SET4W, NBAC and the IRG. Each advisory committee is chaired by a member of NACI, although some of the members of the advisory committees are not NACI members per se.

NACI's functional structure is depicted in the following diagram:

**Figure 4.1: NACI's functional structure**



### 4.3 Secretariat

In addition to the Council members, NACI is also served by a Secretariat, headed by the the Head of the Secretariat. Dr Bok Marais has served NACI very ably for a number of years as the Head of the Secretariat. His contract expired at the end of

March 2007, and was succeeded by Mr Vuyani Lingela, previously a DST representative in Tokyo.

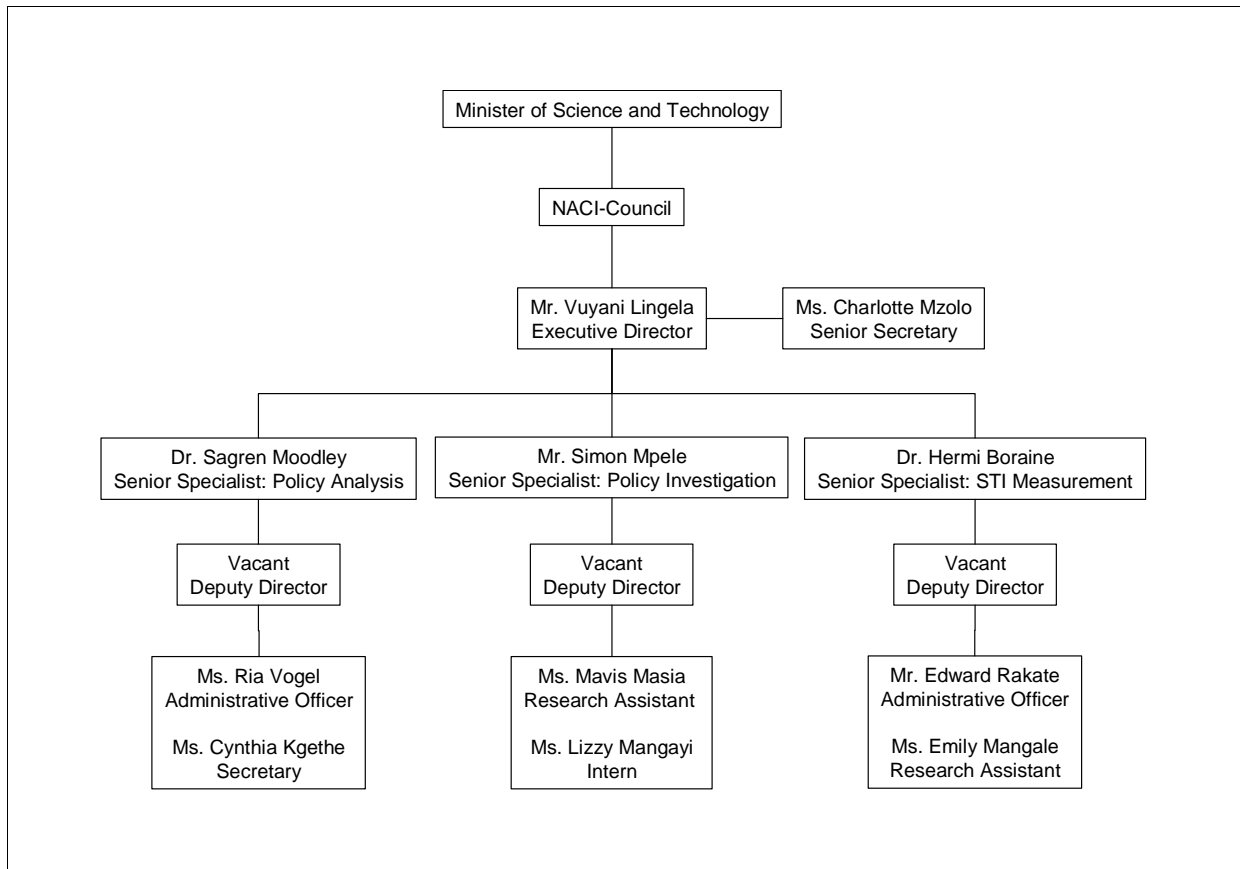
The following points of departure guide the staff structure of the Secretariat:

- Human resources and finances of the Secretariat resort under the DST.
- The permanent staff complement should be as small as is functionally possible.
- The Secretariat will rely on project-specific contract appointments and secondments to address additional needs that will arise from time to time.
- The structure should allow for flexibility and adjustment to changing circumstances and resource sharing, be able to operate in matrix mode and should be sufficiently flat.
- The staff should be appropriately qualified and skilled, but provision will be made for capacity development.

The posts and their associated key functions are shown in Table 4.1. Figure 4.2 shows the functional organisational structure of NACI's Secretariat.

**Table 4.1: Posts and associated key performance areas**

Post	Key functions
Mr. Vuyani Lingela - Executive Director	Professional executive service to Council and strategic and intellectual support to the Chair
Dr. Sagren Moodley – Senior Specialist: Policy analysis	Identification of innovation priorities, evaluation of relevant information and conversion into advice
Mr. Simon Mpele – Senior Specialist: Policy investigations	Co-ordination and administration of projects, incl. financial control, project monitoring and quality control.
Dr. Hermi Boraine – Senior Specialist: Measurement of STI system	Analysis and interpretation of STI indicator information.
Ms. Charlotte Mzolo - Senior Secretary Ms. Cynthia Malebo Kgete - Secretary (Two posts, one permanent and one contract)	Administrative support for executive director and senior staff
Ms. Emily Mangale - Research Assistant Ms. Mavis Masia - Research Assistant Mr. Edward Rakate - Administrative Officer Ms. Ria Vogel – Administrative Officer (Four posts, two permanent and two contract)	Administrative support for specialists; secretariat for reference groups

**Figure 4.2 Secretariat: Functional organisational structure**

Since 2005, NACI has participated in the DST/NRF internship programme. NACI contributes to capacity building of young graduates by exposing them to training (both in-house and through professional courses) and by providing a platform for them to find permanent employment.

#### 4.4 Financial resources and budget

Funding for NACI's programmes and logistics are provided by the DST under the Research, Development and Innovation programme, supplemented by limited amounts earmarked by other sub-programmes. The expenditure administration and control of the medium term expenditure framework (MTEF) compliance will therefore, as in the past, be dealt with by the relevant divisions of the DST.

##### 4.4.1 Budget: 2007/08

The detailed budget for the 2007/08 financial year represents a separate document, the key features of which are reflected in Table 4.2.

**Table 4.2 Budget 2007/08**

Item	R'000	Percentage
Advice Development	5,366	51
National Advisory Committees' Initiatives	1,383	13
Council	527	5
Institutional	3,265	31
<b>Total</b>	<b>10,541</b>	<b>100</b>

**Advice development**

All expenses incurred for advice development, excluding the work of the advisory committees, Council meetings and institutional costs are financed under the category "advice development".

**Advisory committees**

The three national advisory committees SET4W, IRG and NBAC have defined projects (see Section 3.4) for advice development in specialised and prioritised areas.

**Council**

Council meetings: 4 times per year, including honoraria, transport, venue and catering. Provision is also made for the costs of the sub-committee meetings.

**Institutional**

Under this item is included salaries of ten members of the Secretariat (R2,753,000), scholarships and courses, inventory, operating leases and capital assets.

The medium term expenditure estimates for 2008/09 and 2009/10 are R11.09 million and R11.752 million respectively, which represents a mean annual growth of between 5.5%. NACI's budget allocation as a proportion to that of the DST shows a decreasing trend from 0.34 per cent in 2007/08 to 0.29 per cent in 2009/10.

**4.5 Infrastructure****Accommodation**

The present premises in the DST building satisfy most of the current needs, although the open plan office environment is not experienced as optimal for high-level research work.

**ICT**

NACI is generally adequately resourced and supported, but the following aspects should receive attention:

- Easy access to tele- and audiovisual conferencing facilities
- State of the art and appropriate hardware and software
- Proper management of hardware maintenance

### **Dynamic web site and support**

A new Innovation Portal was built and incorporated in the NACI web in December 2005. Since November 2005 the web is administered by Secretariat support staff, enabling more dynamic web development with shorter turnaround time. The site is presently hosted by DST and the IT section provides support in this regard.

### **Open Source Software**

A direct consequence of advice that NACI has rendered to the Minister in 2002 was that the NACI Secretariat was selected as the first section in Government to officially undergo a conversion process to Open Source Software. A training course was offered in 2006, which some staff members could attend. The selection of a suite of open source software products that is equal in performance to the best available products on the market, with regard to user-friendliness, functionality, seamless interface with other frequently used professional software products and user support would determine the success of the experiment in the long run.

### **Administrative facilities and processes**

By definition, NACI cannot afford to be subject to non-optimal administrative processes. These processes should be marked by short turn-around times and quality service, albeit fully accountable in terms of financial and related controls. The management of increasing volumes of information since 2003 has made this component of NACI a continuous priority for 2007/08.

## 5. PERFORMANCE MONITORING AND EVALUATION

### 5.1 Performance monitoring

NACI's project management system provides for ongoing monitoring of progress. The Secretariat presents an integrated project management schedule at every ExCo and Council meeting. This schedule consists of a cumulative listing of all NACI initiatives since 2001 and detailed progress indicators of current initiatives.

### 5.2 Performance evaluation

In terms of its mission as a statutory advisory body, NACI is an important reference point on innovation policy in the country. NACI is further committed to the effective execution of its statutory mandate. These commitments challenged NACI to develop an approach for assessment of its annual performance.

**Table 5.1: Dynamic performance monitoring system**

Perspective	Key questions	Action	Performance area	Reference
Strategic	Has NACI done the right/appropriate things during the year under review?	Prioritisation	Alignment with principal's agenda Alignment with other government bodies Leadership and direction to NSI priorities	Government
Tactical	Has NACI done the right things right?	Implementation	Best practice Overhead efficiency	Peers and networks
Results	Were the effects functional?	Assessment	Fulfilment of statutory functions Outcomes and impact of advice	NACI Act Strategic plan Operational context
Strategic	Any changes in priorities and direction required for the new financial year	Prioritisation/ Repositioning	Outcomes-target differentials	Strategic plan Networks

The first external evaluation of NACI was commissioned in 2002. In 2003 and 2004 Council considered internal reports on its performance and subsequently in 2004 decided to commit itself to formal annual performance evaluations: Annual internal performance reports, moderated by an external moderator in the first three years of the four year cycle of Council and an external evaluation in the fourth year. To this end a dynamic performance monitoring system, based on the comprehensive

evaluation cycle model, was decided upon. It consists of the following interrelated processes, namely: strategic planning, operational execution and outcome evaluation. These are summarised in Table 5.1.

### **Internal assessment**

The following annual schedule will be followed in years 1, 2 and 3 (bearing in mind that the Council serves a four-year term of office): Firstly, the Chair and CEO will draft a self-assessment report in August. Secondly, Council will submit the self-assessment report to an external moderator in September. The following issues (in accordance with the principles of the Balanced Scorecard) will receive in-depth attention in the external validation:

- Stakeholder perspective
- Financial perspective
- Organisational (and transformation) perspective
- Learning and growth.

Thirdly, the validation report with recommendations will be a set item on the agenda of the November meeting of Council in years 1, 2 and 3. A full report with a Council response will be submitted to the Minister after the November meeting (i.e. before the beginning of the next financial year).

### **External assessment**

In the fourth year, an external expert panel will be commissioned to undertake a fully-fledged evaluation of NACI's performance during the Council's full term of office. The Council will be invited to respond to the report, and its response will be included in the report submitted to the Minister in November of the fourth year.

### **External review 2007**

According to the assessment schedule, NACI will be externally evaluated in 2007. NACI has, as part of a project to evaluate its role in the NSI, rendered advice to the Minister regarding its functioning and role as well as suggested changes to the NACI Act. The Minister has subsequently indicated that the upcoming review will be used in considering amendments to the NACI Act. The evaluation process will entail panel members spending about eight working days in the country, and will include the following elements:

- Timeously making accessible to the panel relevant documentation (minutes, strategic plans, annual and other performance reports, project reports, etc.); also to be made available to every Councillor.
- Arranging interviews with the Minister, senior DST officials, the NACI Chair and other Councillors, senior members of the NACI Secretariat, STI opinion leaders in all three sectors, key service providers, etc.
- Selected site visits.

- Sufficient time for internal planning and assessment meetings by the panel.

The panel will consist of senior individuals from the main NACI stakeholders plus two international experts. The scheduling (including the approval of the plan by Council, the review process and approval of the draft report) can be found in Table 3.2.

The importance of an effective and efficient structure to provide science advice to government is an essential element of any modern national system of innovation. As the statutory council that renders advice to the Minister of Science and Technology, NACI is a very important component in this system. NACI has, as part of its new portfolio of projects, identified a project to investigate the broader structure of providing science advice to government. The external review of NACI is timeous and will be very valuable in this regard.

## **APPENDIX A**

### **NACI's objectives and functions**

#### **NACI's objectives**

NACI's objectives are set out in section 3 of the NACI Act (Act 55 of 1997). It is stipulated that NACI shall advise the Minister and, through the Minister, the Ministers' Committee and the Cabinet, on:

- The role and contribution of science, mathematics, innovation and technology (including indigenous technologies)
- In promoting and achieving national objectives, namely to:
  - Improve and sustain the quality of life of all South Africans
  - Develop human resources for S&T
  - Build the economy
  - Strengthen the country's competitiveness in the international sphere.

#### **NACI's functions**

The Act stipulates that in order to achieve its objectives, NACI may, or shall at the request of the Minister, advise on:

- The coordination and stimulation of the National System of Innovation (NSI)
- The promotion of cooperation within the NSI
- The development and maintenance of human resources for innovation through selective support for education, training and R&D in the higher education sector and at science councils, science and technology institutions (SETIs) and private institutions
- Strategies for the promotion of technology innovation, development, acquisition, transfer and implementation in all sectors
- International liaison and cooperation in the fields of science, technology and innovation
- Coordination of S&T policy and strategies with policies and strategies within policies and strategies in other environments.
- The structuring, governance and coordination of the S&T system
- The identification of R&D priorities in consultation with provincial departments and interested parties, and their incorporation in the process of government funding of R&D

- The funding of the S&T system in respect of its contributions to innovation, including:
  - A framework for national and government expenditure on R&D
  - The building and maintenance of S&T capacity by way of selective funding of training and R&D
  - The distribution of funds allocated to science councils
  - The funding of R&D in all sectors
  - The funding of national facilities utilised for research
  - The establishment, phasing out, rationalisation and management of:
    - Science Councils
    - National facilities utilised for research
    - National R&D programmes conducted by research councils
    - S&T institutions with the NSI
  - The promotion of mathematics, the natural sciences and technology in the education sector in consultation with the Minister of Education and the Minister of Labour
  
- Strategies for:
  - The promotion and dissemination and accessibility of scientific knowledge and technology
  - The promotion of the public understanding of S&T and its supportive role in innovation for development and progress
  
- The establishment and maintenance of IT systems to support:
  - The monitoring and evaluation of the overall management and functioning of the S&T system and the NSI
  - The continuous revision of S&T policy to address changing and new circumstances
  
- Developments in the fields of science, technology and innovation that may require new legislation
  
- Any other matter relating to science, mathematics, innovation and technology, including indigenous technologies, which the Minister may refer to NACI, or in respect of which NACI may deem it necessary to advise the Minister.

## APPENDIX B

### NACI Councillors

(Appointed until April 2008)

Name	Position	Organisation
Prof Calie Pistorius - Chair	Vice-chancellor & Principal	University of Pretoria
Dr Philemon Mjwara – CEO	Director-general	Dept of Science and Technology
Ms Luci Abrahams	Director: Learning Information Networking Knowledge Centre	University of the Witwatersrand
Dr Ntuthuko Bhengu	Executive Director	Afrika Biopharma Investments
Prof Cheryl de la Rey	Deputy vice-chancellor	University of Cape Town
Mr Alan Hirsch	Chief Policy Analyst	President's Office
Mr Fairoz Jaffer	Chief Executive Officer	Abnoba Information Dynamics
Dr Steve Lennon	Managing Director: Resources & Strategy	ESKOM
Mr John Marriott	Advisor	SASOL Synfuels International
Prof Tshildzi Marwala	Associate Professor: School of Electrical & Information Engineering	University of the Witwatersrand
Dr Khotso Mokhele	Advisor; Past President and CEO	National Research Foundation
Dr Nhlanhla Msomi	Executive Director	Africa Vukani
Dr Francis Petersen	Head: Strategy & Planning	Anglo American Platinum Corporation Ltd
Dr Johannes Potgieter	Chief director: Innovation & Technology	Department of Trade and Industry

Name	Position	Organisation
Mr Geoff Rothschild	Director: Government & International Affairs	Johannesburg Security Exchange
Mr Thero Setiloane	General Manager: Marketing	AngloGold Ashanti Limited
Dr Sibusiso Sibisi	President and CEO	CSIR
Dr Mala Singh	Acting CEO	Council for Higher Education
Dr John Stewart	Consultant: Technology, environment, safety and sustainable development	
Dr Nthoana Tau-Mzamane	Past President and CEO	Agricultural Research Council
Prof Jennifer Thomson	Professor: Molecular and Cell Biology	University of Cape Town
Dr Nombasa Tsengwa	General Manager: Safety, Health and Environment	Exxaro Resources

## Members of the SET4W 2007 – 2010

Name	Position	Organisation
Ms Luci Abrahams	Director: Learning Information Networking Knowledge Centre	University of Witwatersrand
Prof Judith Bishop	Professor: Computer Science	University of Pretoria
Prof Cheryl de la Rey	Deputy Vice-Chancellor	University of Cape Town
Dr Steve Lennon	Director: Resource and Strategy	Eskom
Dr Romilla Maharaj	Executive Director: Institutional Capacity Development	NRF
Dr Linda Cikizwa Nontsha Makuleni	CEO	South African Weather Service
Ms Khungeka Njobe	Group Executive: R&D outcomes and human capital development	CSIR
Dr Yolisa Pakela-Jezile	Manager for Sustainable Rural Livelihoods	ARC
Ms Jacqueline Williams	National Coordinator for Women in Oil and Energy South Africa (WOESA)	Women in Oil and Energy South Africa (WOESA)

## Members of the Indicator Reference Group

Name	Position	Organisation
Dr John Stewart: Convener	Consultant: Technology, environment, safety and sustainable development	
Prof Tshildzi Marwala	Associate Professor: School of Electrical & Information Engineering	University of the Witwatersrand
Dr Johannes Potgieter	Chief director: Innovation & Technology	Department of Trade and Industry
Dr Owen Njamela	General Manager: S&T Investment and Indicators	Department of Science and Technology
Prof Akiiki Kahimbaara	National Statistics System Division	Statistics South Africa
Dr John Mugabe	Science and Technology Advisor	NEPAD
Dr Ulrich Schmoch	Director of Taskforce Innovation Indicators	Fraunhofer Institute, Karlsruhe, Germany

## Members of the National Biotechnology Advisory Committee

<b>Name</b>	<b>Position</b>	<b>Organisation</b>
Prof Jennifer Thomson (Convener)	Professor: Dept. of Molecular and Cell Biology	University of Cape Town
Dr Ntuthuko Bhengu	Executive Director	Afrika BioPharma Investments
Prof Henk Huismans	Professor and Head: Department of Genetics	University of Pretoria
Dr Gatsha Mazithulela	Executive Director	CSIR Biosciences
Dr Sagadevan Mundree	General Manager: Innovation and Biosecurity Investment	Department of Primary Industries and Fisheries, Queensland Government, Australia
Prof Michael Pepper	Director	NetCare Institute of Cellular and Molecular Medicine, Unitas
Dr Heather Sherwin	Fund Manager	BioVentures
Prof Mbudzeni Sibara	Interim Vice-Chancellor,	Tshwane University of Technology
Prof Jocelyn Webster	Executive Director	AfricaBio
Prof Solly Benatar	Professor of Medicine	University of Cape Town

## APPENDIX C

### Completed NACI studies, reports and advice: 2002-2006

Project	Title of report	Advice
Open source	Free/ Libre and Open Source Software and Standards in South Africa	Minister, May 2002
11 September 2001	Potential effect of 9/11 on the NSI	Minister, April, 2002
NACI Audit	Audit of the performance of South African National Advisory Council on Innovation	Minister, August 2003
Audit of SETI reviews	Investigating into the Implementation of SETI Reviews Recommendations.	Internal
Facts & Figures	South African Science and Technology: Key Facts and Figures	Minister, June 2003
Advanced manufacturing	A National Advanced Manufacturing Technology Strategy of South Africa.	Minister, Sept 2003
Innovation audit	Evaluation of the Implementation of South African Innovation Policy.	DG, to be edited by BM
Utilisation	Utilisation of Research Findings Extent, Dynamics and Strategy.	Forthcoming
Mobility	A Study on Mobility of Research and Development Workers.	Minister, June 2004
Technical skills	The Potential Impact of Skills Shortage on the Innovative Capacity of Major Capital.	Submission revised, March 05
Funding black research	A Profile of Postgraduate Higher Education and the Academic Research Community in South Africa	Submission revised, March 05
Facing the facts: Women in S&T	Facing the Facts: Women's Participation in Science, Engineering and Technology	Minister, Nov 04
Appropriate human resources for the NSI (1)	Appropriate human resources for the productive NSI	Submission being prepared after stakeholder consultation
Women in industrial S&T	An Assessment of the Participation of Women in Industrial Science, Engineering and Technology in South Africa	Minister: Gender policy; submitted 13 Nov 06
SET through eyes of women(Four sub-projects)	Looking at SET through Women's Eyes	Minister: Gender policy; submitted 13 Nov 06
Monitoring framework	A Monitoring and Evaluation Framework to Benchmark the Performance of Women in the NSI	Minister: Gender policy; submitted 13 Nov 06
OECD evaluation of the NSI - Phase one	The South African National System of Innovation: Structures, Policies and Performance (Background Report to the OECD Country Review of South African NSI)	Minister and OECD submitted on 25 July 06; OECD x Min interaction: 8 Sept 06
Draft gender and race equity policy	Creating the Future: Gender, Race and SET Sector Policies for Capacity Building and Innovation	Advice to Minister: 13 Nov 06
Profile of best practices	Development of a Profile of Best Practice of NSI	Advice to Minister: 30 Nov 06
Physical infrastructure for NSI	A Study on the Required Physical Infrastructure to attain the vision of the NSI	Advice to Minister: 30 Nov 06
Revisiting NACI's mandate, position and role	NACI position, role and function in the NSI	Advice to Minister: 30 Nov 06
Advisory note on IPR from publicly funded R&D	Intellectual Property Rights from Publicly Financed Research Findings	Advice to Minister: 25 Jul 06
Advisory note on ASSAF report on research publishing	ASSAF Report: A Strategic Approach to Research Publishing in South Africa	Advice to Minister: 25 Jul 06

<b>Project</b>	<b>Title of report</b>	<b>Advice</b>
Advisory note on tax incentives	Tax Incentives	Advice to Minister: 25 Jul 06

## Completed SET4W studies, reports and advice 2004-2006

Project	Title of report	Advice
Facing the facts: Women in S&T	Facing the Facts: Women's Participation in Science, Engineering and Technology	Minister, Nov 04
Women in industrial S&T	An Assessment of the Participation of Women in Industrial Science, Engineering and Technology in South Africa	Minister: Gender policy; submitted 13 Nov 06
SET through eyes of women (Four sub-projects)	Looking at SET through Women's Eyes	Minister: Gender policy; submitted 13 Nov 06
Monitoring framework	A Monitoring and Evaluation Framework to Benchmark the Performance of Women in the NSI	Minister: Gender policy; submitted 13 Nov 06
Draft gender and race equity policy	Creating the Future: Gender, Race and SET Sector Policies for Capacity Building and Innovation	Advice to Minister: 13 Nov 06

## NACI Conferences, Workshops and Seminars: 2002-2006

Title	Date	Venue
WSSD Workshop: Science as bridge between development and sustainability	26-31 August 2002	CSIR
Conference: Optimising the contributions of S&T to the NEPAD process	9-10 October 2002	ESKOM
Seminar at NACI plenary meeting by Dr G Black, Georgia State University, USA	9 May 2002	SAASTA Boardroom
NACI lunch seminar by Prof A Rip, University of Twente, The Netherlands	7 October 2002	NRF Auditorium
Exploratory workshop: Skills Shortage	16 April 2003	Rosebank
NACI Regional Seminar	24 April 2003	BMF, Bellville
Stakeholder workshop: Skills Shortage	23 May 2003	Rosebank
Workshop: Skills Shortage-best practice	19 June 2003	CSIR Conference centre
Utilisation workshop	05 August 2003	NACI, Didacta Building
NACI Regional Seminar	05 September 2003	Bloemfontein
Final workshop: The potential impact of skills shortages on innovation capacity of major capital engineering projects	16 September 2003	Eskom, Midrand
International Conference: Utilisation of research findings	9-10 October 2003	Eskom, Midrand
NACI Regional seminar	05 March 2004	Port Elizabeth
NACI Sunday seminar: Intellectual property rights and innovation-Prof Prabuddha Ganguli; Mumbai, India	09 May 2004	Court Classic Hotel, Arcadia
NACI Lunch Seminar: Dynamics of Innovation-Prof Edward Lumsdaine, New Mexico State University	19 May 2004	SAASTA Boardroom
NACI Lunch seminar: ICT: its role in development-Prof Wesley Shrum, Louisiana State University	06 July 2004	Didacta Building, NACI Boardroom
NACI Secretariat operational planning meeting	02 September 2004	Farm Inn, Pretoria
NACI Lunch seminar: NSI concept to think and frame African Development-Prof Mammo Muchie (Middlesex University Business School and the University of Aalborg, Denmark)	15 September 2004	SAASTA Auditorium
Think Tools training workshop	16 September 2004	SAASTA Auditorium
Operationalisation workshop: Appropriate human resources for productive NSI	10 November 2004	Technopark, Pretoria
Operationalisation workshop: NSI after the first decade of democracy	13 December 2004	
Operationalisation workshop: Design of the innovation survey	23 March 2005	Diep in die Berg, Pretoria
NACI Lunch seminar: Strategies to promote the transformation of knowledge into innovation-Prof Russ Lea (University of North Carolina)	11 May 2005	NRF Auditorium
Operational workshop on the development of a dynamic model for human resources	04 August 2005	SAASTA Boardroom
NACI Secretariat strategic workshop	09 September 2005	SAFARI, Pretoria
SET4W workshop on gender equity policy	14 October 2005	SAASTA
Operationalisation workshop on the social dimension of innovation	25 October 2005	Diep in die Berg, Pretoria

<b>Title</b>	<b>Date</b>	<b>Venue</b>
NACI Secretariat planning workshop	27 January 2006	SAFARI, Pretoria
NACI Lunch seminar: Indicators as evidence base for policy development-Prof Anastassios Pouris, University of Pretoria	15 February 2006	CHE Boardroom
NACI Lunch seminar: R&D expenditure and economic growth: Nordic Paradoxes-Dr Per Koch, NIFU, Norway	17 February 2006	SAASTA Boardroom
Operationalisation workshop on tracking of R&D expenditure	13 March 2006	Burgers Park, Pretoria
International workshop on measuring systems of innovation: Inputs, Flows and Outputs	23-24 April 2006	Sheraton Hotel, Pretoria
NACI Lunch seminar: The role of cooperative digitized R&D information resources in a development context-Prof Harry Wels (Vry University of Amsterdam)	02 June 2006	DST, Timbuku
Project workshop-Tracking of the R&D	04-05 September 2006	Stellenbosch
NACI Lunch seminar: Science, Technology and Innovation Advice to Policy Makers: Challenges, Problems and Possible Solutions- Prof Peter Weingart (Institute of Science and Technology Studies, University of Bielefeld, Germany)	05 October 2006	DST, Gondwanaland
Workshop on Human Resource Model	25 October 2006	DST, Gondwanaland
NACI Secretariat strategic planning workshop	11 January 2007	Casa Toscana, Pretoria
Perspectives on the NSI: Past and Future	23 March 2007	Gondwanaland meeting room, DST, Pretoria