

White Paper on the Energy Policy of the Republic of South Africa

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1. Ministerial foreword

South Africa is a country endowed with abundant energy resources. Fossil fuels, such as coal, uranium, liquid fuels, and gas, play a central role in the socio-economic development of our country, while simultaneously providing the necessary infrastructural economic base for the country to become an attractive host for foreign investments in the energy sector. Biomass forms the main energy source in the rural domestic sector, while other renewable energy development opportunities are already being explored in the fields of solar power, wind power, pumped storage and in hydro-power schemes.

Successful tapping of all possible energy carriers in our country is vital for sustainable economic growth and development. We are fortunate in South Africa to be in a position to utilise such a broad spectrum of energy carriers. Various economic sectors that contribute to the GDP of our country are practically driven by these energy carriers. For instance, the manufacturing sector, which accounts for about 25% of GDP, and the mining industry, which accounts for about 10%, are both heavily reliant

upon electricity. In fact, industry as a whole consumes approximately 40% of the total electricity generated. This means that electricity is one energy carrier that makes a significant contribution to our economic growth and development. This is made possible by the fact that industry alone accounts for a sizeable proportion of local capital investment.

As government pursues its macro-economic policy on growth, employment and redistribution, as well as its policy of reconstruction and development, changes take place within the energy sector that continue to present us with interesting challenges. These challenges include the transformation of state-owned entities, the reshaping of governance principles, the enhancement of socio-economic welfare within communities, and even changing people's attitudes towards the use and importance of national energy resources.

Government is committed to the promotion of access to affordable and sustainable energy services for small businesses, disadvantaged households, small farms, schools, clinics, in our rural areas and a wide range of other community establishments. As provided for in our Constitution, the state must establish a national energy policy which will ensure that the national energy resources shall be adequately tapped and developed to cater for the needs of the nation. Energy should therefore be available to all citizens at an affordable cost. Energy production and distribution should not only be sustainable, but should also lead to improvement of the standard of living for all of the country's citizens. For this to become a reality, the state should ensure that energy production and utilisation are done with maximum efficiency at all times.

In view of all of the above, our energy policy should preserve an appropriate balance between energy demand and supply. It should pronounce itself on short, medium and long term priorities. It should also balance the use of natural energy resources with environmental considerations.

The state should establish a clear difference between its primary role as a policy making and regulatory entity of the energy sector, and its secondary role as a facilitator in the supply of energy services.

This White Paper has been written so as to clarify government policy regarding the supply and consumption of energy for the next decade. The policy strengthens existing energy systems in certain areas, calls for the development of underdeveloped systems and demonstrates a resolve to bring about extensive change in a number of areas. It addresses international trade and co-operation, capacity building, and the collection of adequate information. The document is comprehensive, addressing all elements of the energy sector as practically as it can.

Considering the complexity of some of the priority policy changes, it will not be possible to implement the whole body of new policy in the short to medium term. The executive summary gives an indication of the government's priorities.

The White Paper was developed by an active process of consultation, beginning with the publication of the *Energy Policy Discussion Document* in August 1995. This process was concluded in December 1998 when Cabinet approved this White Paper as Government policy on Energy. The Introduction and the Appendix give more information on this consultation process.

The White Paper is intended for parliamentarians, those involved in the energy sector and any other concerned and interested parties, including energy suppliers, and consumers, employees in the energy sector, researchers, academics, environmentalists, policy makers, contractors, product developers and manufacturers. The White Paper takes a broad approach, but provides specific policy statements on

what Government intends for the energy system as a whole. It does not attempt to deal with strategies, for implementation. Indeed, such issues are part of the core functions of my Department. It should be borne in mind that my Department is not dealing with energy matters from a 'greenfields' approach. We are continuously engaged in strategic planning and review regarding the implementation of our functions in the delivery of energy systems to communities in the country on a day-to-day basis. The White Paper will not therefore serve as a means to 're-invent the wheel', but will constitute a formal framework within which the energy sector will operate within the broad national strategy for reconstruction and development. It will serve to bring more focus and direction to what is already being achieved.

This document is the product of an intense process in which a large number of dedicated people participated. They are the authors of the Energy Policy Discussion Document, the organising committee of the consultation process, commentators on the Energy Policy Discussion Document and members of my Department, to list but a few.

I would like to thank the Parliamentary Portfolio Committee on Minerals and Energy for having called public hearings and for the positive public response. The response on the draft White Paper by the public was also positive. The NEDLAC discussions have assisted in clarifying and understanding the policy issues from labour and business perspectives and have enhanced the White Paper.

Special thanks are due to the International Energy Agency and the United States Department of Energy for their dedicated evaluation documents, direct participation in a variety of workshops and detailed advice and support. To all of you I would like to convey my thanks for the hard work that you have put into this important project. I trust that your reward will be to see that the energy policy that we implement in the future is the best one for our country. We want it to achieve our main goal: the socio-economic development of all our people.

Dr P M MADUNA
MINISTER OF MINERALS AND ENERGY

2. Deputy Minister's foreword

Energy is the life-blood of development. Development is about reducing poverty and about increasing access to basic needs so as to allow people the freedom of self development. Communities do not exist in a vacuum but within a framework of government policies, laws and institutions. It is therefore incumbent on us to present an energy policy that will achieve our desired objectives.

South Africa has a relatively strong energy supply industry, to the extent that we export energy in the form of coal, electricity and liquid fuels. Previous policy neglected the energy demand sector, and especially that of our poor communities. This energy White Paper endeavours to redress that state of affairs. Without the opportunity for all citizens to participate in the mainstream energy economy, our national and personal development is limited. In this area we need to explicitly address the previously disadvantaged and especially the circumstances of the rural poor.

South Africa has a successful electrification programme, with over 2.4 million households electrified during the period 1991 and 1997. Currently approximately 60% of households are electrified. Recently, pilot projects have been undertaken for the electrification of rural areas using solar energy through photovoltaic systems. Through an integrated programme incorporating inter alia both grid and non-grid technologies, electrification can be sustained.

Notwithstanding the successes of our electrification campaign, renewable energy for such applications as solar hot water heating, wind generated electricity shall also be addressed. Energy efficiency needs to be promoted, especially in households where such measures will increase disposable income. These issues are important not only from a financially viable energy supply aspect but also from an environmental aspect.

The technicalities of energy policy are important, but more so are the social dimensions. The building of human resources is paramount to the effective utilisation of energy and the ensuing benefits. This White Paper therefore addresses these issues as an integral part of the energy policy. This also brings into perspective the important role that women play in our energy economy.

S SHABANGU
DEPUTY MINISTER OF MINERALS AND ENERGY

3. Executive Summary

3.1 Introduction

The South African government last published a white paper on energy policy in 1986. With the end of apartheid South Africa experienced fundamental shifts resulting in significant changes in the energy policy context. The election of a new government necessitated a review of existing policy.

In response to democratisation, a number of negotiating processes began spontaneously within the energy sector, usually in stakeholder-based forums such as the Liquid Fuels Industry Task Force and the National Electrification Forum. Government's wish to integrate these and provide policy stability led to it formally launching the energy policy white paper process in 1994.

The general approach to policy formulation has also changed and places greater emphasis on transparency, inclusiveness and accountability. The energy white paper process has therefore attempted to make government's approach more *transparent*; to build public *confidence*; to *clarify* organisational roles; to *communicate* policy effectively; and to *integrate* policy processes.

The process commenced with the drafting of an Energy Policy Discussion Document by a multi-disciplinary team of experts. It described the energy sector and identified 111 major energy policy issues. Informally known as the 'Green Paper', it was released by the Minister of Mineral and Energy Affairs in August 1995 for analysis and comment. Formal and informal workshops were then held with interested parties (see the appendices). In August 1995, a team of expert 'issue rapporteurs' was appointed to draw up the first draft white paper. Their contributions were then edited for review by an editorial committee. The Draft White Paper was revised during 1997/98 in the Department and Cabinet approved its release in July 1998.

The general approach to policy formulation is to recognise problems; to identify causes and solutions; to analyse their implications and make choices; and to implement, monitor and evaluate the effects of policy.

In his historic, budget speech in Parliament on 21st May 1997, the Minister of Minerals and Energy, Dr P M Maduna, set forth a new vision for energy, especially for the liquid fuels industry. He identified the opportunity which exists to restructure and consolidate the state's assets in the industry, whilst achieving maximum value for them. Such restructuring was to be informed, *inter alia*, by the need to redress economic and social power imbalances. Emphasis was also placed on the pursuit of cooperation among African countries and the need for a Pan-African energy strategy. This speech has helped to illuminate South Africa's policy challenges.

Broadly speaking the energy sector can be viewed from demand and supply perspectives. The South African energy sector has historically tended to promote policies, which predominantly address supply side issues. In South Africa the demand side is generally analysed in terms of the energy requirements of households, industry, commerce, mining, transport and agriculture. Supply sub-sectors include the coal, electricity, nuclear, liquid fuels, gas and renewables industries.

From a policy perspective, social problems can arise in both demand and supply sub-sectors. Identifying the causes of these problems can be difficult. Causal linkages may extend beyond the energy sector. Energy policies must, therefore, be carefully co-ordinated with other social sectors and also be co-ordinated between energy sub-sectors.

To cope with multiple causal linkages, energy policy analysis usually commences with the demand side by means of the process entitled- 'integrated energy planning'. This recognises that energy is not an end-good but is rather consumed as a means to an end. Policy must facilitate optimal energy consumption and production to meet social needs. This requires consumer choice and the operation of market forces.

Integrated energy planning suffers from the same drawbacks as other ideal models. It requires a great deal of data and analysis to implement, of which South Africa has a scarcity. Nonetheless, this white paper identifies integrated energy planning as the most suitable base for planning purposes and also addresses the issue of data scarcity.

The logical components dealt with in each demand, supply and cross cutting section are: a *background* to the sector; the key policy *challenges*; government's proposed *policies* with *motivations* where necessary; *implementation*; and *monitoring* and *evaluation*. Clear policy objectives have been established.

3.2 Part 1: Context, Objectives and priorities for energy policy

3.2.1 *The context for energy policy*

Nearly every aspect of social and economic policy in South Africa is being re-examined, reformed and redrafted. As government sets out on a path of growth with redistribution, many economic sectors require bold, new thinking. More than most, the energy sector presents a challenge of transforming specific industries and governance systems.

Before deriving detailed energy policy objectives, however, it is necessary to understand the energy policy context and energy sector challenges. Three aspects are considered:

- economic, social and environmental policies and forces;

- the nature of the South African energy sector and its linkages with broader forces; and
- what the sector needs to achieve overall policy goals.

3.2.1.1 **International context**

International relations had a profound effect on South Africa's energy sector during the apartheid era. South Africa's energy sector is still influenced, albeit differently, by international pressures. As the economy opens up, energy sector decisions must ensure appropriate energy supply and use. Local policy developments inevitably acknowledge international trends.

Significant international shifts have occurred in post-oil-crisis energy policies. South Africa can learn from abroad. Perhaps the most significant shift is that energy security is now being achieved through greater diversification and flexibility of supply. One of the implications is that the energy sector is relying increasingly on market-based pricing. The state is placing greater emphasis on commercialisation and competition. Competitive energy markets need sophisticated regulatory regimes.

Global financial markets are also changing. Private finance is becoming increasingly important. Government needs to create policy that attracts investment, while ensuring the achievement of national policy objectives.

The energy sector has larger environmental impacts than most other economic sectors. Energy policies are reducing emissions as energy investments are subjected to greater environmental scrutiny. There is a greater focus on energy end-use. The research and development of alternative and renewable energy sources is also being promoted.

The Southern African Development Community (SADC) has adopted an energy co-operation policy and strategy. South Africa's energy policy must therefore seek to be compatible with regional energy policy.

3.2.1.2 **National context**

Since 1994, the interests of the South Africa majority have found expression through new social and economic policies, particularly the *Reconstruction and Development Programme* (RDP). The government's new macro-economic strategy - *Growth, Employment and Redistribution* (GEAR) - places emphasis on two core strategies:-

- promoting growth through exports and investment; and
- promoting redistribution by creating jobs and reallocating resources through the budget.

The energy sector can contribute to economic growth and employment creation, as well as providing infrastructure for households. The RDP base document included a number of policy proposals, especially the electrification of 2,5 million households by 2000, which the industry is well on its way to achieving. By contrast, the RDP white paper and the Growth, Employment and Redistribution macro-economic strategy have not set out detailed sectoral strategies.

Government has also prepared a protocol on corporate governance of state-owned entities, including the energy sector. This includes a programme of asset restructuring at the national level, which is being undertaken in terms of the Government policy on rationalisation of State-owned assets.

Sectoral policies recognise linkages and overlaps in related economic sectors. White papers in many of these areas have been, or are in the process of being, developed.

Energy policy must also take into account the provisions of the Constitution of the Republic of South Africa, 1996, which has created new organs of government and demarcated specific powers and functions for the various spheres of government.

Having established the international and national policy context for the energy sector, the white paper examines the sector's problems and challenges to determine energy policy objectives.

3.2.1.3 *The South African energy system*

It is not easy to provide a coherent and comprehensive overview of the energy sector. Perhaps even more difficult to understand are its linkages to, and impact on, the rest of the economy. The white paper gives an overview of the South African energy sector's contribution to GDP, employment, taxes and the balance of payments. It concludes that the sector can greatly contribute to a successful and sustainable national growth and development strategy.

3.2.2 *Energy sector policy objectives*

3.2.2.1 *Increasing access to affordable energy services*

- Government will promote access to affordable energy services for disadvantaged households, small businesses, small farms and community services.

3.2.2.2 *Improving energy governance*

- Governance of the energy sector will be improved. The relative roles and functions of the various energy governance institutions will be clarified, the operation of these institutions will become more accountable and transparent, and their membership will become more representative, particularly in terms of participation by blacks and women.
- Stakeholders will be consulted in the formulation and implementation of new energy policies, in order to ensure that policies are sympathetic to the needs of a wider range of stakeholder communities.
- Co-ordination between government departments, government policies, and the various spheres of government will be improved in order to achieve greater integration in energy policy formulation and implementation.
- Government capacity will be strengthened in order to better formulate and implement energy policies.

3.2.2.3 *Stimulating economic development*

- Government will encourage competition within energy markets.
- Where market failures are identified government will intervene through transparent, regulatory and other carefully defined and for time delineated mechanisms, to ensure effective delivery of energy services to consumers.
- Government policy is to remove distortions and encourage energy prices to be as cost-reflective as possible. To this end prices will increasingly include quantifiable externalities.
- If subsidies are required these should be implemented transparently based on agreed criteria.

- Energy taxation will continue to remain an option within government's fiscal policy, but will be exercised with more consideration for the economic and behavioural impacts of such policies.
- Government will work towards an investor-friendly climate in the energy sector through good governance, stable, transparent, regulatory regimes and other appropriate policy instruments.

3.2.2.4 *Managing energy-related environmental and health impacts*

- Government will promote access to basic energy services for poor households, in order to ameliorate the negative health impacts arising from the use of certain fuels.
- Government will work towards the establishment and acceptance of broad national targets for the reduction of energy-related emissions that are harmful to the environment and to human health.
- Government will ensure a balance between exploiting fossil fuels and maintenance of acceptable environmental requirements.

3.2.2.5 *Securing supply through diversity*

- Given increased opportunities for energy trade, particularly within the Southern African region, government will pursue energy security by encouraging a diversity of both supply sources and primary energy carriers.

The above five policy objectives form the foundation for South Africa's new energy policy.

3.2.2.6 *Energy policy priorities*

This document outlines specific policy priorities to achieve each policy objective, for both the short and medium term. It is acknowledged that as time passes it may be necessary to amend these priorities.

3.3 Part 2: Demand Sectors

3.3.1 *Households*

The trends indicate the complexity of multiple-fuel use in many households. Beyond the home, energy is required for infrastructural services to communities. Energy services for low income households have not been adequate, since previous governments' emphasis was to create a modern industrial urban society to meet the needs of the industrial sector and a privileged white minority. Households suffering unemployment and poverty rely on less convenient and often unhealthy fuels. Grid electrification may not satisfy all the energy needs of low-income households. Although most household consumers are women, past energy policy has largely ignored their needs. Energy policy has also not adequately addressed energy conservation by high-income electricity-dependent households.

The environmental effects of household energy use are particularly severe on the rural poor, who use fuelwood as their primary energy source. Coal-use in urban areas also results in indoor air pollution with serious health consequences. With both fuels, pollution in many cases exceeds World Health Organisation standards.

Energy security for low-income households can help reduce poverty, increase livelihoods and improve living standards. Government will determine a minimum standard for basic household energy services and monitor progress over time. People must have access to fuels that do not endanger their health. Basic energy needs must consider costs, access and health. Technological interventions are only likely to be used if they are introduced in consultation with households.

Government will have to consider appropriate appliance/fuel combinations; households' abilities to acquire these fuels and appliances; the availability of efficient and safe appliances and fuels; and the effect of pricing and financing on affordability.

Building thermally efficient low cost housing presents an opportunity to promote energy efficiency and conservation. There is also great potential to stimulate energy demand management and other strategies in middle and high-income households. Energy savings would free resources and delay the need for further investment. Government commits itself to the promotion of energy efficiency awareness in households. An initiative is needed to inform householders on how to use appliances and fuels.

3.3.2 Industry, commerce and mining

The overview of the use of energy by this sector also addresses the development of large primary industrial, mining and minerals beneficiation sectors, all of which are energy-intensive. Whilst large industry has been well supplied with energy, a major priority is to provide lesser supplied areas with energy access.

Past governments devoted little attention to energy efficiency in industry, mining and commerce. Greater efficiency will provide financial and environmental benefits, with industry becoming more internationally competitive. Government needs to tap this potential.

Cheap energy benefits our foreign exchange earnings, but there are harmful environmental and health effects, which are not included in the price. Changing international environmental standards may have an adverse effect on some of South Africa's future exports. Government needs to balance energy prices with sustainable environmental standards. Many energy supply/demand issues do not require regulatory intervention. The regulatory framework must, at the same time, stimulate large industry's growth and competitiveness. Productive activities in underdeveloped areas will economically empower the poor. Energy, particularly electricity, is a key requirement for these productive activities.

It is estimated that greater energy efficiency could save between 10% and 20% of current consumption. Government needs to facilitate increased energy efficiency. Obstacles include:

- inappropriate economic signals;
- lack of awareness, information and skills;
- lack of efficient technologies;
- high economic return criteria; and
- high capital costs.

Government commits itself to facilitate greater energy efficiency.

Cleaner energy end-use technologies, environmental performance auditing and incorporating environmental costs could reduce the environmental impacts of energy use by industry, mining and commerce. The Department will collaborate with other departments and public authorities to improve the management of these environmental impacts.

Government will continue to monitor international environmental standards. It will then formulate policies preventing loss of exports due to unwitting violations of the environmental

policies of our trading partners. Economic implications of environmental agreements will be properly assessed.

The Department will develop a comprehensive energy demand database that, subject to sensitive commercial interests, will be available to all.

3.3.3 *Transport*

Liquid fuels play a prominent role although supply security is less important than it was. South Africa now needs equitable access to affordable public transport. Fuel diversity within the transport sector needs to be increased.

Past land policies resulted in the poor being located furthest from work. In addition to being a burden on the poor this results in the inefficient use of transport energy. The Energy White Paper has only limited scope for addressing transport issues, although it comments on several energy-related challenges.

Liquid fuel prices consist of costs and government imposts. Pricing enables government to influence the fuel mix by adjusting taxation levels. A suitable differential between diesel and petrol will be determined, through research and negotiation, and will be phased in.

The Department of Minerals and Energy will advise other departments, particularly Transport and Finance, on the energy efficiency implications of alternative transport modes and subsidy policies. It will also help in formulating fiscal and transport policies to promote energy conservation and efficiency.

Government needs to co-ordinate and integrate transport, energy, land use, economic development, environment and other policies. This may be more difficult under the new constitutional dispensation, since transport functions have been devolved to provincial and local government.

Past policies' failure to consider transport energy efficiency implications resulted from a lack of adequate co-ordination. Government policy instruments, including fiscal measures, have been used to generate revenue without considering their effect on energy efficiency. An inter-departmental Transport Energy Co-ordinating Committee will be established to co-ordinate and integrate policy. It will also co-ordinate and communicate transport energy policies between national, provincial and local government. The Committee will formulate guidelines to assist metropolitan and other authorities to consider the transport energy use impacts of land use, transport and traffic management plans.

3.3.4 *Agriculture*

Agricultural energy use both in commercial and traditional agriculture are reviewed. Commercial farmers have access to energy supplies and technologies. The main issue is energy efficiency since energy inputs have increased for the same agricultural output.

Smallholder agriculture requires improved energy services, rural schools, clinics, roads, communication infrastructure and well-trained people. Relevant energy policies include: access to diesel (government seeks to facilitate the removal of market barriers so as to provide access to bulk supplies for small-scale farmers); the electrification of farm worker households; and providing agricultural, forestry and agro-forestry products, by-products and residues as raw-materials for bio-fuels.

3.4 Part 3: Supply Sectors

3.4.1 *Electricity*

Primary challenges are outlined, the development of electricity policy over the past few years is described and government's vision for the industry is presented.

The distribution industry faces a number of challenges if it is to meet electrification targets and continue to provide low cost, equitably priced, quality supplies to consumers. The distribution industry will accordingly be restructured into regional electricity distributors. Government will establish a transitional processes that will lead up to the establishment of independent regional electricity distributors.

The present state of the electrification programme is reviewed and government is committed to implementing reasonable legislative and other measures, within its available resources, to progressively realising the goal of universal household access to electricity. Detailed policies are described to achieve this goal.

The criteria for pricing policy are stated. Government expects electricity tariffs to become increasingly cost-reflective at all levels of the industry. Approaches to meeting growth in electricity demand are also discussed. In future government will expect greater public participation in decisions on large public sector electricity investments, and will require evaluations using integrated resource planning (IRP) methodologies.

Some of the debates around competition within the electricity sector are raised. Government supports gradual steps towards a competitive electricity market while investigations into the desired form of competition are completed. Eskom will be restructured into separate generation and transmission companies. Government supports the development of the Southern African Power Pool (SAPP). Various measures to improve governance effectiveness within the sector are presented.

3.4.2 *Nuclear energy*

An overview of the nuclear energy sector is given, both in South Africa and internationally. Whether new nuclear capacity will be an option in the future will depend on the environmental and economic merits of the various alternative energy sources. Nuclear energy governance is described. Government will review and assess the Atomic Energy Corporation's activities and future plans as a basis for decisions on the desirability of its restructuring and further fiscal support for its activities. The Department of Minerals and Energy will investigate and clarify the functions of other bodies associated with the nuclear industry, such as the Council for Nuclear Safety, as well as the implications of separating nuclear energy governance from issues associated with the use of nuclear materials. The complete nuclear fuel cycle, in particular the issues of spent nuclear fuel, nuclear fuel procurement and radioactive waste management will be investigated by the Department.

3.4.3 *Oil and gas: Exploration and production*

South Africa's situation and Soekor's role in particular are described. Government's policy approach to the promotion, development and regulation of oil and gas exploration and production is set out. Key among these are the "use it and keep it" principle and the "polluter pays" principle. Offshore rights will continue to vest with the state. Government will determine the need to introduce dedicated oil and gas legislation or to make specific requirements in the existing legislation where appropriate.

3.4.4 **Liquid fuels**

A brief overview of the liquid fuels sector is given and the policy challenges set out. Government believes that the desired attributes for the liquid fuels industry can ultimately best be met in an environment of minimum governmental intervention and regulation. Its vision emphasises international competitiveness and investment in a rapidly globalising economy as a contribution to low cost and widely available products. Appropriate environmental and safety standards along with sustainable employment and the accommodation of local black interests are also a part of the vision. This vision underpins the identified cornerstones of government policy.

Policy statements covering all facets of the industry are made. Crude oil procurement and refining are effectively deregulated. Government will promote a refining and petrochemicals hub at the coast. Price control will be removed and the Service Station Rationalisation Plan phased out. Legislation will be introduced to secure full service and the retail sector for small business. Import and export control will be phased out although quality standards will be compulsory. Protection afforded to the synfuels industry will be reviewed prior to mid 2000.

Progress towards these policy goals will be in three phases. Phase one will be preparatory and will phase in certain elements so that key milestones are achieved. The milestones are set out and include significant black economic empowerment. Phase two will commence once the milestones have been achieved and will witness the simultaneous removal of price control, import control and governments support for the Rationalisation Plan. Phase three will involve monitoring and corrections for price distortions. Generally applicable legislation such as competition law will be applicable.

The CEF group of companies will be restructured to effect a separation of the three kinds of activities it is engaged in, namely; strategic, regulatory and commercial. Soekor's promotional, data management and regulatory functions will fall under the auspices of the Department of Minerals and Energy. Its exploration and production activities will be commercialised. Government will seek to optimise its investment in Moss gas and does not intend to embark upon any new synfuels projects. Government will determine the country's strategic crude oil requirements and will ensure that supply security is maintained.

3.4.5 **Gas**

An overview of the existing gas industry in South Africa is provided. Gas resources within South African, Mozambique and Namibia are described, and the importance of stable policies is outlined. From an energy policy point of view natural gas is an attractive option and government is committed to the development of this industry. Government is attempting to harmonise regional gas policies and establish bi-national agreements. Key policy challenges are outlined. Coal-bed methane mining will be promoted at both the exploration as well as the production stages.

Government will legislate for the transmission, storage, distribution and trading of piped gas. The legislation will provide for a minimal regulatory regime consistent with the orderly development of a competitive gas industry. Limited vertical integration will be permitted. Gas regulation will require transmission pipelines to provide open access to uncommitted capacity, transparent tariffs, and disclosure of cost and pricing information. The Department of Minerals and Energy will assist the Department of Labour to develop national health and safety standards for gas infrastructure. The Gas Regulatory Authority will be established to regulate the gas industry.

3.4.6 **Coal**

An overview of the existing coal industry in South Africa is provided. The industry will remain deregulated and its performance will be monitored. Whilst coal will probably remain the major source of energy for the foreseeable future significant scope exists to reduce the environmental impacts of coal with clean coal technologies. The resource potential of coal bed methane will be investigated. Government will continue to investigate options for the utilisation of coal discard streams and will promote these as appropriate.

3.4.7 *Renewable energy sources*

The advantages of renewable energy are set out, particularly for remote areas where grid electricity supply is not feasible. Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included, and will therefore provide focused support for the development, demonstration and applications of renewable energy. In particular, government will facilitate the sustainable production and management of solar power and non-grid electrification systems, such as the further development of home solar systems (SHS), solar cookers, solar pump water supply systems, solar systems for schools and clinics, solar heating systems for homes, hybrid electrification systems, wind power. All of the above will be largely targeted at rural communities. Power from the Cahora Bassa hydro-electric scheme, and other similar options, in southern and central Africa will be tapped, provided that suitable agreements can be worked out between the participants at government level. Government will also promote appropriate standards, guidelines and codes of practice for renewable energy and will establish suitable renewable energy information systems.

3.4.8 *Transitional Fuels: Low-Smoke Fuels*

Government will promote research into low-smoke fuels as a transitional product that may be utilised as an energy source for remotely located and rural households. Investigations will be made into simple strategies that may be used in order to reduce the production costs.

3.5 Part 4: Cross-Cutting Issues

3.5.1 *Integrated energy planning*

Integrated energy planning (IEP) entails many technical functions that are listed and require institutional capacities, which currently do not exist. Government believes that it should be playing this role and will provide the necessary resources to establish IEP so as to facilitate future energy policy development.

3.5.2 *Statistics and information*

Good data is required for the energy policy process and integrated energy planning. A database needs to cover a number of areas, as outlined in the White Paper. Government will provide information to the public at a reasonable price in a manner, which does not compromise legitimate commercial interests.

3.5.3 *Energy efficiency*

Significant potential exists for energy efficiency improvements in South Africa. In developing policies to achieve greater efficiency of energy use, government is mindful of the need to

overcome shortcomings in energy markets, but without unduly interfering with market forces. Government will create an energy efficiency consciousness and will encourage energy-efficiency in commerce and industry. Government will establish energy efficiency norms and standards for commercial buildings and industrial equipment, and voluntary guidelines for the thermal performance of housing. A domestic appliance-labelling programme may also be introduced. Publicity campaigns will be undertaken to ensure that appliance purchasers are aware of the purpose of appliance labels.

Government will promote improved combustion techniques and appliances for fuelwood and other traditional fuels and will implement an energy efficiency programme to reduce consumption in all its own buildings. Government's capacity to implement energy efficiency programmes is currently limited. Government will investigate the establishment of appropriate institutional infrastructure and capacity for the implementation of energy efficiency strategies. The functions of such an institution are outlined. Targets for industrial and commercial energy efficiency improvements will be set and monitored.

3.5.4 *Environment, health and safety*

There is an inevitable interaction between environmental and development goals. The key policy challenge is thus to maintain an acceptable balance by utilising an integrated approach. The immediate priority for energy-environment policy is the negative environmental and health effects of air pollution arising from coal and wood use in households. A set of measures to address these problems is outlined. Government will continue to encourage household electrification, whether grid or non-grid, and will introduce safety and performance standards for paraffin retail and paraffin stoves.

Government will monitor international developments and participate in negotiations around response strategies to global climate change, in order to balance its environmental responsibilities and development interests in these processes. The Department of Minerals and Energy will follow a 'no regrets' approach that minimises environmental impacts commensurate with cost effectiveness and positive cash flow. The Department will also access international funding in re-directing development projects towards more favourable environmental effects.

3.5.5 *Research and development*

The state of energy related research and development in South Africa are outlined. Government spending on energy research has decreased steadily since 1990. The challenges in developing policy on research, development and demonstration are described. Government expects energy suppliers and the private sector to carry out appropriate research.

3.5.6 *Human resources*

Government recognises the integral nature of human resource development to its industrial strategy for the energy sector. To transform and develop appropriately trained and skilled human resources, the Department of Minerals and Energy will develop policies to redress the inverse skills profile and increase access to institutions, resources and opportunities. The Department of Minerals and Energy will facilitate investigations to establish the sector's skill requirements, assess current training provision and recommend human resource development strategies and programmes.

The Department of Minerals and Energy will develop an employment equity plan to assist with attracting appropriately skilled people and correcting imbalances of the past. It will attempt to increase the number of women and black people on all policy development structures, forums, parastatal boards and similar structures. The target is at least 30% women, 2% people with disabilities and 50% black participants by the year 2000. The Department will ensure increased support and access for black and women businesses providing services or

contracting with the Department and energy parastatals. This is in line with the White Paper on Affirmative Action Policy that was launched by the Public Service Minister in April 1998.

3.5.7 *Capacity building, education and information dissemination*

Government will support capacity building, education and information dissemination. The Department of Minerals and Energy will monitor energy awareness and assess communication strategies and will allocate funding and staffing for this purpose. The Department will, wherever possible, seek to integrate energy issues into other government communication programmes.

3.5.8 *International energy trade and co-operation*

The major policy challenges in this area are stated. Government will develop strategies to reduce trade barriers, facilitate regional co-operation, and establish energy sector co-operation with other countries and international bodies.

3.5.9 *Fiscal and pricing issues*

Fiscal and energy policies need to be aligned, since fiscal policies can either promote or hinder the accomplishment of energy policy objectives. The five categories of fiscal transfer and their impact on the energy sector are dealt with.

Government may consider the use of special-purpose levies earmarked on the budget to fund regulatory and other agencies, provided the additional costs are borne by those benefiting from the activities of the relevant agency, the agency so funded is accountable to government and these levies are managed in a responsible manner that promotes the principles of accountability, transparency and fiscal integrity. These levies will be dedicated to the special purposes for which they were designed while retaining parliamentary responsibility for appropriating the required expenditure. Government will fund a National Electrification Fund from a dedicated electrification levy, the level of which will be determined annually, as part of the budgeting process.

Tax differentials may be used to support government's policy of promoting more efficient and environmentally sound transport modes, such as diesel-driven motor vehicles where they form part of a holistic approach and are simultaneously underpinned by other supporting measures. Government will investigate an environmental levy on energy sales, together with appropriate fiscal support for more environmentally benign and sustainable energy options including energy efficiency.

3.5.10 *Governance and institutional capacities*

The range of players and the complexity of their inter-relationships makes energy sector governance difficult to understand, and even harder to manage. Key challenges facing government are spelt out. The roles of the various institutions involved in energy sector governance are described.

The Department of Minerals and Energy will create mechanisms to improve communication with national, provincial and local government.

• Introduction

4.1 The need for a new white paper on energy policy

South Africa's external and internal environments have experienced fundamental shifts which, not surprisingly, have resulted in significant changes in the context for energy policy. The apartheid-inspired United Nations oil embargo, for instance, was lifted following moves towards democracy within the country. The adoption of broad government policy frameworks, such as the Reconstruction and Development Programme, also necessitated a review of existing energy policies. Given that government's last white paper on energy policy was published in 1986 it is clearly high time that the sector's policies undergo a major re-evaluation.

In response to the process of democratisation a number of negotiating processes began spontaneously within the energy sector, usually in stakeholder-based forums. These processes have examined problems facing individual sub-sectors, with policy positions being developed within the Liquid Fuels Industry Task Force (1993–) eventually under Nedlac, the National Electrification Forum (1993–95), and the Nuclear Fuel Cycle Initiative (1994–96), among others.

Recognising the need to integrate these energy policy processes and, furthermore, the need to provide policy stability for energy suppliers, investors and consumers alike, government formally commenced the energy policy white paper process in 1994.

4.2 The process of energy policy formulation

Not only has the context changed for South Africa's energy policy, but so has the general approach to policy formulation. Democratisation of the country's political system has resulted in greater emphasis being placed on transparency, inclusiveness and the accountability of elected officials and their appointed managers. The energy white paper process has therefore attempted to achieve the following:

- to make government's approach to energy policy formulation more *transparent*;
- to build public *confidence* in the policy formulation process;
- to clarify *accountability* and organisational roles through the process of policy formulation;
- to *communicate* policy in a manner which is clear and understandable for all; and
- to *integrate* various government policy processes.

The process commenced with the drafting of an Energy Policy Discussion Document by a multi-disciplinary team of experts. This 220-page document describes the energy sector and identifies 111 major energy policy issues. These were divided into sections dealing with energy governance, energy demand, energy supply, and cross-cutting issues. Policy alternatives and implementation strategies were identified and discussed for each issue.

The Energy Policy Discussion Document, informally known as the 'green paper', was intended to be used as a resource for the policy consultation process and was released by the Minister of Mineral and Energy Affairs in August 1995 for study and written comment by interested parties.

Following the release of this document a number of formal and informal workshops were held with interested parties.

More than one hundred individuals and organisations, including ten international organisations, responded to the Energy Policy Discussion Document with formal submissions.

A team of individuals were subsequently appointed in August 1995 to write the first drafts of the various sections of the white paper. Known as 'issue rapporteurs', these individuals were selected on the basis of their knowledge of specific issues. As far as possible rapporteurs were drawn from within government and the academic and research communities in order to reduce the potential for conflicts of interest. Their tasks were:

- to read and synthesise the written submissions stemming from the Energy Policy Discussion Document and other relevant documents;
- to interact with stakeholders through the medium of formal and informal workshops;
- to develop a draft policy document (or 'straw dog') for discussion at the National Energy Policy Summit;
- to record the outputs of the summit and all other discussions; and
- to prepare a section for the draft white paper.

The contributions by the various issue rapporteurs were then edited into a draft white paper for review by an editorial committee to ensure consistency, clarity, practicality, appropriateness, balance, and comprehensiveness. The members of this committee were selected on the basis of their specific areas of expertise, backgrounds in energy policy development, and availability. The editorial committee was deliberately established as a non-stakeholder body in order to avoid the difficulty of ensuring proportional representation from the large, diverse and fragmented energy sector. The process followed in formulating this White Paper is summarised in the Appendix.

4.3 ***The approach to policy formulation***

In many ways the approach to policy formulation for the energy sector is identical to that taken for any other sector of society, namely:

- to recognise problems;
- to identify the underlying causes;
- to identify potential solutions, analyse their implications and make choices; and
- once implementation of the policies has commenced, to monitor and evaluate their effects.

This process is, however, somewhat complicated by the nature of the energy sector itself. Broadly speaking the sector can be divided between demand and supply. Although one may intuitively expect activities on the supply side to arise as a result of expressed demand this is not automatically the case. In fact a dominant feature of the South African energy sector has been a tendency to promote policies which address issues predominantly from the supply side.

Analysis of the energy sector typically commences with the identification of different demand and supply sub-sectors. In South Africa's case the demand side is generally analysed in terms of the energy requirements of households, industry, commerce, mining, transport and agriculture. Supply sub-sectors would include the coal, electricity, nuclear, liquid fuels, gas and renewables industries. Both demand and supply sub-sectors can be broken down into smaller and smaller divisions as required.

When approaching the sector from a public policy perspective, analysts are faced with the reality that problems can arise in both demand and supply sub-sectors. For instance, a financially unsustainable state-owned energy-supply institution, or energy poverty in rural households, could both be constituted as problems requiring policy decisions on the part of government. Identifying the causes of these problems can, however, present policy analysts with an extremely difficult task. The problem of rural energy poverty, for instance, may stem from insufficient energy supply by multiple supply sub-sectors. Causal linkages may well extend beyond the energy sector itself. For instance, problems to do with liquid fuel consumption for transport purposes may arise as a result of broad fiscal policies.

Energy policies must, therefore, be carefully co-ordinated with other sectors to avoid unwanted side effects. For instance a policy of rural electrification will not resolve rural energy poverty on its own. It must be complemented by other policies and programmes, such as social forestry programmes, education and job creation, to have the desired effects. Energy policies must also be co-ordinated between energy sub-sectors. Using the example of rural electrification again, it is necessary to recognise that poor households cannot afford expensive electrical appliances and hence continue to utilise wood, paraffin and other fuels. Supply-side initiatives are therefore also required in other energy sub-sectors too if rural energy poverty is really to be addressed.

In order to cope with the analytical problem of multiple causal linkages energy policy analysis usually commences with the demand side. This approach, commonly known as ‘integrated energy planning’, recognises that energy is not an end-good in itself, but is rather consumed as a means to some end. Since technology generally allows fuels to be treated as substitutes there are almost always multiple solutions to any one energy service need. The role of policy is thus to facilitate the optimal consumption of energy resources to meet social needs. This obviously requires a recognition of consumer choice and the need to open up the energy sector to market forces where appropriate.

Despite its intuitive appeal the integrated energy planning approach suffers from the same drawbacks as other ideal models, in that it requires an enormous amount of data and analysis to implement. For various reasons South Africa has very limited energy data and, furthermore, very limited capacity to perform this sort of policy analysis. Nonetheless, this white paper has attempted to follow the integrated energy planning approach, as reflected by the structure of the paper, which deals firstly with the demand sectors, secondly with the supply sectors, and finally with the broader cross-cutting issues which affect the sector as a whole.

4.4 ***The expression of policy***

In expressing government’s energy policies for the particular demand, supply and cross-cutting sectors, care has been taken to present the following logical components within each section:

- a brief *background* to introduce the reader to the major features of the sector under discussion. This could include a review of pertinent statistics, the historical development of the sector and a brief analysis of the over-arching problems faced by the sector;
- the key *challenges* that government sees for itself in presenting policies for the sector;
- government’s *policies* for the sector;
- where necessary short *motivations* for particular policies;
- necessary details on the *implementation* of the policies; and
- mechanisms for the *monitoring* and *evaluation* of policies.

In keeping with any good policy formulation process a set of clear policy objectives have been established at the outset to guide policy choices. These are presented in the following section, which deals with the context, challenges and objectives for energy policy.

- ***Part 1: Context, Objectives and priorities for energy policy***

5.1 The context for energy policy

Nearly every aspect of social and economic policy in South Africa is being re-examined, reformed and created anew. As government sets out on a path of growth with redistribution, many economic sectors require bold, new, imaginative thinking. More than most, the energy sector presents a challenge of transforming industries and governance systems in order to pursue new policy goals.

Before deriving detailed energy policy objectives, however, it is necessary to understand the context within which energy policy must be formed and the major challenges confronting the sector. This is achieved by considering, firstly, broader economic, social and environmental policies and forces, from both local and international sources; secondly, the dimensions and nature of the South African energy sector, as well as the linkages between the sector and the broader forces; and hence, thirdly, the challenges that have to be overcome in order for the sector to contribute successfully to the achievement of the overall policy goals.

5.1.1 International context

International relations had a profound effect on South Africa's energy sector during the apartheid era. The energy sector, dependent on oil imports for fuelling transport, and faced with a UN-led oil embargo and an international ban on nuclear materials, embraced patterns of investment shaped by a preoccupation with self-sufficiency. Massive, skewed and uneconomic investments were made in synthetic fuel plants and in the nuclear fuels chain. This legacy presents the sector with large and complex challenges, including a nuclear related industry which consumes two-thirds of the Department of Minerals and Energy's state budget, and a petroleum sector with a labyrinthine set of regulatory controls.

South Africa's energy sector is still influenced by international pressures, but in very different ways. As the economy opens up to global competition, energy sector policy and investment decisions need to ensure the availability of abundant, easily sourced, and competitively priced oil and nuclear fuel supplies. Other more subtle international influences are also being experienced as local policy developments inevitably acknowledge international trends in trade relations, foreign investment criteria, knowledge and information flows, and political and economic ideologies.

Significant shifts have occurred in energy policies internationally in the post-oil-crisis era and South Africa has the opportunity to learn from best practices from abroad. Perhaps the most significant international shift in consciousness is a realisation that commercial energy sources will not become scarce in the short or even the medium-term. The 'limits to growth' school of thought has receded. Energy security is now being achieved, not through self-sufficiency, but through greater diversification and flexibility of supply, including increased cross-border energy trade. One of the implications of this trend is that national, uneconomic energy industries are no longer being protected. Increasingly the energy sector is relying on cost-reflective or market-