

ENERGY SECOND PAPER

Policy Recommendations and Interventions

**ACCESS MARKET INTERNATIONAL (PTY) LTD
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EXECUTIVE SUMMARY OF ENERGY SECTOR

State of the sector

South Africa's energy sector is predominantly fuelled by coal. Eskom, South Africa's state-owned utility provides 95% of the country's electricity.

In 2003, peak demand was around 31 500MW and national installed capacity was around 38 000MW. This current capacity is fuelled 88% by coal, 2% by hydro-electric power, 5% by nuclear power, 4% by pumped storage and 1% by oil-fired gas turbines (Eskom, 2004). The remaining 5% of the requirements is provided by municipalities, Independent Power Producers (IPP's) and imports from the South African Power Pool (SAPP).

As a result of the country's economic growth, the overall electricity demand in South Africa has increased significantly, by 15% per annum, which means that by 2007 peak-period demand will exceed the utility's ability to supply electricity during peak periods. This will cause a deficit between supply and demand. Long-term projections show that South Africa will require an additional 20 000MW of electricity by 2025. Additional base-load capacity will be required by as early as 2010.

The Western Cape's total energy requirement is estimated by the DME to be in the region of 114 138TJ which is 7.1% of the national requirement. The transport sub-sector has the greatest demand for energy and fuels, followed by industry, residential, agriculture, commerce, and finally mining and quarrying.

Since the Western Cape does not have a readily available coal resource base, other avenues have been identified to meet the region's energy needs. The identified alternatives are natural gas, wind energy, solar energy, biomass and biofuels, nuclear energy as well as wave energy.

The various alternatives are driven by a number of strengths attributed to Western Cape. The most important being that the province has access to a high rate of solar radiation, there is a strong wind capacity off the West coast with wind blowing from two directions throughout the year. Over and above this there is strong wave energy capacity off the surrounding coast as well as a high rate of innovation in renewable energy technologies from organisations and institutions. These strengths provide various opportunities such as the potential to implement solar water heaters and other such technologies into the province. There is also a strong possibility for the development of wind farms, as well as providing the potential of manufacturing various innovative renewable energy technologies.

These options also have the potential to attract foreign direct investment (FDI) and to create additional job opportunities directly/indirectly in the sector.

With regards to labour conditions and alternative energy sources, employment gains could be achieved within areas such as drilling and testing, developing gas delivery systems and bringing the gas to the market. Employment gains could also be achieved quickly and easily within the renewable energy sector, especially in SWH and biofuels, as well as showing good returns on a limited investment by government.

Challenges and Barriers

Various barriers to entry have been identified with regards to accessing the energy market in the Western Cape. Some of the more influential barriers to entry include the high capital costs of renewable energies. These prices are high due to low sales volumes, therefore economies of scale would greatly assist in reducing manufacturing costs and lowering the need for high profit margins.

Another significant barrier to entry is the domestic electricity price in South Africa which is currently among the lowest in the world, as well as the current substitutes that are used such as paraffin and candles. The low cost of these energy sources make it difficult for alternative energy resources to compete. However these low costs do not take into consideration the health risks due to greenhouse gas emissions attributed to coal and other fossil fuels as well as life and property damage or loss due to fires attributed to paraffin and candles. The future electricity-tariff hikes are also likely to exceed inflation as Eskom begins financing the programme to provide additional capacity.

Government has realised that these barriers exist and is considering a number of measures in order to overcome the problem. A decision has therefore been taken to institute measures to support independent power producers (IPPs) of renewable energy and to promote the use of alternative forms of energy through government initiatives and policies.

Within the first stage of the report various conclusions were made in terms of the energy sector.

- There is firstly a lack of detailed market share and demand-side data at a provincial level. Data on electricity is more readily obtainable than data on other fuels, but is not adequate.

- The departments are not cooperating with one another with regards to an integrated and coordinated energy strategy.
- Another vital conclusion is that the Western Cape has considerable advantages within the energy sector that are currently under-utilised. With the correct planning and support from Government as well as private parties, these alternative energies have the potential to generate additional employment, particularly in the sphere of renewable energy such as wind, solar and biofuels.

Policy analysis

Taking the above into consideration a second report was developed which provided a full analysis into the policy environment of the Western Cape. This analysis consisted of several interviews with various government and private stakeholders, as well as an in-depth study of the policies currently at hand.

The report provides a summary of the elements, which form the foundation of the energy policy environment. It provides a brief description of the various governmental stakeholders, which have an influence or are influenced by the energy sector. The summary also provides a review of the various policies, which are already in place. This type of overview was necessary to provide a context for the energy sector policy environment.

The report then considers the policies that currently have the most impact on the province. These policies have various implications for businesses and the economic growth of the Western Cape. An analysis has been done of what is currently being implemented out of the policies and what issues need to be addressed. Certain financial mechanisms have also been included on the basis of the current South African situation as well as international applications.

In order to develop policy or policy lever recommendations for the energy sector in the Western Cape, certain factors need to be considered:

- The energy sector is a sensitive domain due to its cross-cutting properties. The primary directive comes from the DME and Eskom, but clarification is required with regards to which governmental department within the Western Cape has the mandate for the energy sector.
- An integrated energy strategy is currently in the process of being developed, this was authorised by the DEADP and the completion of this strategy is crucial before any policies are formulated. The energy strategy will clarify the energy mix within the Province as well as who has the mandate for the sector within the Western Cape.

- There is a lack of coordination, integration and information sharing amongst the various provincial departments that deal with the energy sector including DEDT, DEADP, the Department of Housing and the Department of Transportation and Public Works. The departments are not cooperating in coordinating efforts to address their priorities, which are often common ones such as job creation, causing great misalignment within the various strategies and policies that they are intending to implement.
- There is a lack of detailed market share and demand-side data at a provincial level. Data on electricity is more readily obtainable than data on other fuels, but is not adequate and realistic targets cannot be set, to monitor effective strategy implementation, whilst developing supporting policies enhance the growth of the energy sector. As an example, the shortage of data regarding initiatives in housing and transport, and the lack of clarity on the energy-mix, impede the identification of risks to energy security across the Province.
- The economies of scale and costs of alternative energy resources is a significant barrier to implementing renewable energy initiatives as part of the Western Cape energy mix.

Future steps and support

In support of the integrated Western Cape Provincial Energy strategy the following recommendations in terms of policies were made to ensure growth in the energy sector in the Western Cape.

The recommendations have a large emphasis on acquiring greater clarity and agreement with the aim of ensuring that all the provincial authorities play a more effective role in driving through the adoption of effective and integrated energy strategies throughout the province.

- **Policies for Information Development and Sharing:** Adequate data collection will be required to precede proper energy planning and micro-economic strategy development. The lack of detailed energy data at a provincial level seriously impairs the capacity to accurately assess and strategise around addressing problems and promoting sustainability in the energy field. Therefore a complete province wide energy inventory is recommended for the Western Cape.
- **Formulation of an Energy Task Group within the Province:** Formulation of an energy task group within the Western Cape to ensure all initiatives and strategies are aligned between the various departments and stakeholders within the Western Cape energy sector. The provincial government has a limited mandate with regards

to the energy sector. There is also currently a lack of co-ordination which is being experienced between the various departments which results in various discrepancies with regards to the energy sector and mix. Therefore creating a focal point to implement a province wide strategy is vital.

- **Assisting the implementation of Solar Water Heaters into the province:** The DEDT could provide industry the necessary assistance with re-introducing Solar Water Heaters into the Province. The economies of scale and costs of alternative energy resources is a significant barrier to implementing renewable energy initiatives as part of the Western Cape energy mix. Therefore should provincial government provide assistance these barriers of entry could be reduced or even eliminated.

Upon analysing the most important policies and strategies impacting on the Western Cape the aforementioned are deemed to impact the most on the growth of the energy sector in the province. These are believed to be the policy and strategy interventions which need to be considered to enhance economic development in the Western Cape.

TABLE OF CONTENTS

1	INTRODUCTION	1
2	ENERGY SECTOR POLICY ENVIRONMENT	3
2.1	DEPARTMENTS AND ORGANISATIONS INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE	3
2.1.1	Department of Minerals and Energy	3
2.1.2	Eskom.....	4
2.1.3	National Electricity Regulator (NER)	4
2.1.4	The Western Cape Department of Environmental Affairs and Development Planning	4
2.1.5	The Western Cape Department of Economic Development and Tourism	5
2.1.6	Department of Transport and Public Works.....	5
2.1.7	Department of Housing.....	5
2.1.8	The South African Nuclear Energy Corporation (NECSA)	6
2.1.9	National Nuclear Regulator (NNR).....	6
2.1.10	Central Energy Fund (CEF).....	7
2.2	INTERNATIONAL SECTOR POLICIES INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE	7
2.2.1	Kyoto Protocol	7
2.3	NATIONAL SECTOR POLICIES INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE	9
2.3.1	The Constitution of the Republic of South Africa (Act 108 of 1996).....	10
2.3.2	White Paper on the Energy Policy of South Africa (December 1998).....	11
2.3.3	National Integrated Energy Plan for the RSA (March 2003)	12
2.3.4	White Paper on Renewable Energy (November 2003).....	13
2.3.5	DME Energy Efficiency Strategy (March 2005)	13
2.3.6	NER Regulatory Policy on Energy Efficiency and Demand Side Management (EEDSM)	15
2.3.7	National Nuclear Energy Act (No. 46 of 1999)	16
2.3.8	Electricity Act (No. 40 of 1987).....	16
2.3.9	Electricity Distribution Industry Restructuring Bill (April 2003)	17
2.3.10	Gas Act (No. 48 of 2001).....	17
2.3.11	The 2002 Gas Regulator Levies Act	17
2.3.12	The 2003 Petroleum Pipelines Bill.....	18
2.3.13	The 2004 Energy Regulator Bill.....	18
2.3.14	National Environmental Management Act (No. 107 of 1998)	18
2.3.15	National Environmental Management: Air Quality Act.....	18
2.3.16	Environment Conservation Act (Act 73 of 1989).....	19
2.4	PROVINCIAL SECTOR POLICIES IMPACTING ON THE ENERGY SECTOR IN THE WESTERN CAPE	20
2.4.1	Integrated Energy Strategy for the Western Cape.....	20
2.4.2	Western Cape Provincial Transport Policy (1997)	20
3	ENERGY SECTOR POLICY ANALYSIS AND IMPACT	22
3.1	INTERNATIONAL POLICY ANALYSIS	22
3.1.1	Kyoto Protocol	22
3.2	NATIONAL AND PROVINCIAL POLICY ANALYSIS.....	23

3.2.1	White Paper on Energy Policy (1998).....	23
3.2.2	Policy on Renewable Energy.....	24
3.2.3	Energy Efficiency	30
3.2.4	Synergistic renewable energy and energy efficiency initiatives.....	30
4	ENERGY SECTOR POLICY AND STRATEGY RECOMMENDATIONS.....	32
4.1	POLICY RECOMMENDATIONS.....	32
4.1.1	Policies for Information Development and Sharing.....	35
4.1.2	Formulation of an Energy Task Group within the Province.....	37
4.1.3	Assisting the implementation of Solar Water Heaters into the province	42
5	CONCLUSION	44
6	REFERENCES	45
7	APPENDIX A: INTERNATIONAL CASE STUDY: CHINA.....	48
8	APPENDIX B: RESPONDENTS	51

LIST OF TABLES

Table 1: National governmental instruments	9
Table 2: Government instruments influencing the Western Cape Energy Sector	20

LIST OF FIGURES

Figure 4-1: Plan of integrated energy strategy and implementation plan	34
Figure 4-2: Positioning of the Energy Task Team	39
Figure 4-3: Extrapolated implementation of SWH in Cape Town	43

TABLE OF ACRONYMS AND DEFINITIONS

CDM	Clean Development Mechanisms
CEF	Central Energy Fund
CER	Certified Emission Reductions
CFL	Compact Fluorescent Light Bulb
CoCT	City of Cape Town
DEAT	Department of Environmental Affairs and Tourism
DEDT	Department of Economic Development and Tourism of the PGWC
DME	National Department of Minerals and Energy which, amongst other SOEs, owns PetroSA
DNA	Designated National Authority
DPE	National Department of Public Enterprises which, amongst other SOEs, owns ESKOM and Transnet
EDC	Energy Development Corporation
EDRC	Energy Development and Research Council
EEDSM	Energy efficiency and demand-side management
GWh	Gigawatt per hour
IPP	Independent Power Producer
kW	Kilowatt
MEDS	Micro-economical development strategies

MW	Megawatts
NEPAD	New Partnership for Africa's Development
NER	National Electricity Regulator
NGO	Non-Governmental Organisation
NNR	National Nuclear Regulator
pa	per annum
PBMR	Pebble Bed Modular Reactor
PGWC	Provincial Government of the Western Cape
PGDP	Provincial Growth and Development Plan
RDP	Reconstruction and Development Program
RED	Regional Electricity Distributor
RE	Renewable Energy
RERA	Regional Electricity Regulators Association
SA	South Africa
SADC	Southern African Development Council
SAPP	South African Power Pool
SECCP	Sustainable Energy and Climate Change Partnership
NECSA	South African Nuclear Energy Corporation
SOE	State-Owned Enterprise, such as ESKOM or PetroSA

SWH	Solar Water Heating
UNDP	United Nations Development Programme
WSSD	World Summit on Sustainable Development

1 INTRODUCTION

The first report was developed to create an understanding of the Western Cape energy sector, identify the major drivers of the sector as well as draw various conclusions from the analysis. The overview provided a foundation on which recommendations for the formulation of policies were made.

From the initial report, analysis, and workshops conducted with various stakeholders within the industry, it is clear that there are three key principles to consider in defining energy related policies and programmes for the Western Cape:

1. Firstly, the province is in a constant state of development and there has been a rapid increase in energy demand. As a result the current supply will not be sufficient to meet the projected requirements. In order to address the projected shortfall additional base load generation capacity need to be created. The current gas and nuclear envisaged projects presents the best opportunity to create the required base load:
 - Opportunities have been identified to develop gas power stations in Atlantis and Saldanha within the province.
 - The development of the PBMR at Koeberg, will not only address the nergy requirement from the Province but also create a competitive export products in the forms of the PBMR technology.
2. .Secondly, a worldwide emphasis has been placed on environmental concerns, global warming, climate change and the reduction of greenhouse gas emissions. These concerns have raised the importance of considering the replacement of fossil fuels with renewable energy sources. The Western Cape has considerable advantages within the renewable energy sector that are currently under-utilised. With the correct planning and support from Government as well as private parties, these alternative energies have the potential to generate additional employment, and additional capacity particularly in the sphere of renewable energy such as wind, solar and biofuels.
3. Thirdly, it is envisaged that the Provincial Spatial Development Framework's proposal that renewable energy source comprise 25% of the province's energy generation capacity by 2020 will be fulfilled by a combination of comprise of demand side management activities, solar, wind, wave, natural gas, bio-fuels and other RE sources. This target will be confirmed during the Western Cape Sustainable Development Conference which is to be held during June 2005.

The policy analysis has been done bearing the abovementioned drivers in mind. The current integrated energy strategy which is being conducted by the Department of Environmental Affairs and Development Planning (DEADP) is also an important factor within the scenario. This blueprint for the province will have repercussions on what the energy mix will be as well as who will have the mandate within the provinces energy sector.

The report has been divided into three sections. The first section provides a summary of the elements which form the foundation of the energy policy environment. It will provide a brief description of the various governmental stakeholders which have an influence or are influenced by the energy sector. The section will also provide a review of the various policies which are already in place. This type of overview is vital for the provision of the context within the overall picture and within which the policy recommendations and analysis were made.

The second section of the paper considers the policies that currently have the most impact on the province at its current state. These policies have various implications for businesses and the economic growth of the Western Cape. An analysis has been done of some of the various clauses within the policies as well as provides an indication of what is currently being implemented out of the policies and where issues need to be addressed. Certain financial mechanisms have also been included on the basis of the current South African situation as well as international applications.

Finally, recommendations for the MEDS process were done. These recommendations were done by taking the initial report which provides a comprehensive overview of the energy sector into account. The recommendations were also made bearing the current 3 key drivers of the sector in mind as well as bearing the policy environment within which the energy is a part of. The last section of the report addresses these recommendations more specifically.

2 ENERGY SECTOR POLICY ENVIRONMENT

This section provides a summary of the elements which form the energy policy environment. It will provide a brief description of the various governmental stakeholders which have an influence or are influenced by the energy sector. The section will also provide a review of the various policies which are already in place. This type of overview is necessary, to place the recommendations and analysis into context within the overall picture of the energy sector.

2.1 DEPARTMENTS AND ORGANISATIONS INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE

There are various departments on a national as well as provincial basis that have an influence on the energy sector within the province. Through these departments the various policies and strategies are implemented and each department has varying mandates. A brief description of each of these departments and organisations are below in this section.

2.1.1 Department of Minerals and Energy

The Department of Minerals and Energy operates on a national basis and in conjunction with government, is in charge of policies, strategies and legislation pertaining to the minerals and energy sector.

The DME's major mandate is to optimise the operation of the Electricity Supply Industry (ESI) so as to maximise the potential of providing adequate, reliable and low cost electricity to the people and industries of South Africa. As a result there have been various debates of the need for changes in generation, transmission and distribution of electricity.

Government with the DME has begun investigations into future market structures for the Southern African Electricity Supply Industry (ESI), as well as the facilitation to introduce Independent Power Producers (IPPs) into the South African energy market.

The DME has passed various legislatures pertaining to alternative resources of energy such as gas and renewable energy, consequently the department has taken overall responsibility for the renewable energy policy in South Africa. The department therefore has the mandate to amend the policies pertaining to this as well as establish the appropriate enabling environment to ensure that activities undertaken by other stakeholders are coordinated, uniform and effective.

2.1.2 Eskom

Eskom is South Africa's state-owned utility and primary electricity supplier with a generation capacity of 95% of South Africa's power. The company is governed by the South African Electricity Council and a Management Board, which was established in terms of the Eskom Act of 1987. The utility plays a large role within the energy sector of South Africa because the members of the Council are appointed by the South African government and this board manages the affairs of Eskom according to the policy which is determined by the Council and its counterparts.

2.1.3 National Electricity Regulator (NER)

The National Electricity Regulator was established in terms of the Electricity Act, 1987 (Act 41 of 1987) and regulates the ESI to ensure order in the generation and improve efficiencies in the supply of energy. Its primary mandate is to ensure that the energy industry is efficient and effective.

The NER's key objectives are to approve the prices at which electricity is sold and to set and monitor the quality of supply and service standards.

The NER was also mandated to facilitate and co-ordinate non-grid electrification for rural areas. The Darling wind farm was licensed as a generator by the NER. This makes it the first Renewable Energy Independent Power Producer (IPP) in South Africa.

2.1.4 The Western Cape Department of Environmental Affairs and Development Planning

The Department of Environmental Affairs and Development Planning was structured with the interest of sustainable development in the Western Cape. The key focus areas are on integrated environmental management planning, biodiversity management and coastal management, pollution and waste management.

The role of the Department of Environmental Affairs and Development Planning is significant within the energy sector, through its current initiatives of developing a sustainable development framework with the energy sector. The department, together with various consultancies, is in the process of developing an *Integrated Energy Strategy* for the Western Cape which in essence aims to define the energy mix and way forward with regards to energy within the province. The need for this integrated strategy and action plan is critical for the Western Cape to effectively meet the developmental challenges and growth in demand which lie ahead.

2.1.5 The Western Cape Department of Economic Development and Tourism

The Department has a focus of economical development within the Western Cape and to grow the economy as well as the province. The Department is working towards economic growth partly through supporting small and emerging businesses, including tourism businesses, promoting export initiatives, promoting black economic empowerment, developing and marketing responsible, sustainable tourism in the Western Cape.

The department is currently in the process of putting in place the first comprehensive *Micro-Economic Development Strategy* for the province whereby substantial research studies are done into 16 economic sectors and four cross-cutting themes in the economy.

These documents and regular updates of the research and analysis would form the solid platform of evidence and analysis upon which economic strategies and interventions as a Province will be built. All of these industry-based economic strategies focus on sustainable growth and the global competitiveness of sectors and sub-sectors.

2.1.6 Department of Transport and Public Works

The Department of Transport and Public works has the mandate to deal with all major capital projects, with the exception of day-to-day maintenance of schools, hospitals and clinics. The department has three main programmes within which the budget is distributed namely transportation, administration and public works.

The department's key objectives are transformation, empowerment and job creation, targeting previously disadvantaged communities. The challenge does still remain toward improvement of the rail and road infrastructure, as it was outlined in the Provincial Growth and Development Plan (PGDP). Improvement of the public transport system is also important for this department in order to meet their key objectives mentioned.

The department's role within the energy sector is significant because the large fuel and energy consumption, especially within the Western Cape, is attributed to transportation. As a result the department has embarked on various plans and strategies to mitigate against this high energy consumption. Several of these intents have been provided for by legislation such as the White Paper on the Western Cape Transport Sector (1997).

2.1.7 Department of Housing

The Housing Department within the Western Cape has the mandate of providing housing for the residents of South Africa and ensuring that everyone has access to a secure

permanent residential dwelling as well as basic social amenities like water, sanitary facilities and domestic energy supply.

Subsequently the Department of Housing monitors the activities of the home building industry on a continuous basis to ensure the transformation of the industry and has a current low cost housing programme, which strives to meet the goals of economic growth, job creation and poverty alleviation for the poor. It forms part of the larger spatial development framework.

Housing is one of the key deliverables in generating growth, employment and wealth. The Government's low cost housing programme does not only support the use of labour intensive methods, but also employs local labour and emerging contractors.

The department therefore has a key role within the energy sector through the low cost housing initiative, the spatial development framework as well as the mandate to assist in providing basic amenities such as electricity and energy to the population.

2.1.8 The South African Nuclear Energy Corporation (NECSA)

NECSA was established in terms of the Nuclear Energy Act, 1999 (Act 46 of 1999) to conduct research and development in nuclear technology. It is being restructured to pursue safe and commercially viable opportunities. NECSA is also playing a role in the development in the Pebble Bed Modular Reactor technology. (PBMR)

2.1.9 National Nuclear Regulator (NNR)

The NNR was established in terms of the National Nuclear Regulator Act, 1999 (Act 47 of 1999). It provides for the protection of persons, property and the environment against nuclear damage through the establishment of safety and regulatory practices for the following:

- The construction or use of a nuclear installation
- Use, production, storage, processing, enriching, reprocessing, conveyance or disposal of radioactive materials.
- Discarding of radioactive waste and storage of irradiated nuclear fuel.

The NNR ensures that an adequate level of safety is maintained through safety assessments, improvement and optimisation of the nuclear authorisation, and through implementing an effective compliance assurance programme.

2.1.10 Central Energy Fund (CEF)

CEF (Pty) Ltd was established in terms of the Central Energy Fund Act, 1977 (Act 38 of 1977) as amended. It oversees a diverse number of subsidiaries and manages the Equalisation Fund.

"The purpose of CEF is to give effect to the objectives of the Act, which are to finance and promote:

- The acquisition of coal, the exploitation of coal deposits, the manufacture of liquid fuel, oil and other products from coal, the marketing of the said products and any matter connected with the said acquisition, exploitation, manufacture and marketing.
- The acquisition, generation, manufacture, marketing or distribution of any other forms of energy and research connected therewith.
- Any other objective for which the Equalisation Fund may be applied, and which has been designated or approved by the said Minister with the concurrence of the Minister of Finance."

The CEF is currently reviewing its portfolio of activities with a view to broadening its range of interests from petroleum to interests such as natural gas, renewable energy, energy efficiency, low smoke coal and other developmental energy initiatives.

2.2 INTERNATIONAL SECTOR POLICIES INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE

The following is a description of the international policies influencing the energy sector in the Western Cape Province

2.2.1 Kyoto Protocol

There is a specific international treaty known as the Kyoto protocol, which will have an effect on the types of energy sources which will form part of the energy mix in the future. It is a treaty with the aim of reducing global greenhouse gas emissions through carbon emission targets worldwide.

¹The Kyoto Protocol is a document which was initially signed by about 180 countries at Kyoto, Japan, in December 1997.

Now the Kyoto Protocol is a very significant and far-reaching environmental treaty that has recently been introduced worldwide. In terms of this treaty, which took effect on Wednesday, 16 February 2005, 54 industrialised countries were now legally bound to reduce the pollution that is causing global warming.

The treaty requires industrialized countries in general to reduce carbon-dioxide gas emissions by 5.2% before 2012 as compared with their 1990 levels. Targets have been set individually for each nation.

The United States and Australia are the only major industrialized countries that have refused to ratify the Kyoto Protocol. These two countries combined, account for 30% of global greenhouse gas pollution.

The treaty seeks to reduce emissions of carbon dioxide, the by-product of burning oil, gas and coal. It also seeks to reduce emissions of methane (mostly the result of agriculture), nitrous oxide, hydrofluorocarbons (HFC's), perfluorocarbons (PFC's) and sulphur hexafluoride.

The developing world has no obligations under the treaty as yet. As a 'non-Annex 1 country' to the Protocol, South Africa does not have any concrete reduction targets for greenhouse gas emissions. It is, however, required to put policies and measures in place to reduce greenhouse gas emissions and it can benefit from implementation actions such as the Clean Development Mechanism (CDM). One of the first CDM projects in the country has been implemented in the Western Cape in Kuyasa, Cape Town.

The various industry experts who were interviewed were all in agreement that South Africa is 14th highest in terms of world carbon dioxide (CO₂) emissions. This is largely attributed to South Africa being the largest user of coal (95% of electricity is generated from coal) and to the fact that transportation plays such a large role in energy consumption.

Consequently, it is believed that in 2012, the commencement date of the second commitment period of the Kyoto Protocol, South Africa will be forced to sign the treaty to significantly reduce CO₂ emissions and receive carbon credits as incentives.

¹ <http://www.ec.gc.ca/climate/kyoto-e.html>

2.3 NATIONAL SECTOR POLICIES INFLUENCING THE ENERGY SECTOR WITHIN THE WESTERN CAPE

The section below provides a brief explanation of the most significant legislation from a national perspective, which has the greatest influence on the Western Cape energy sector. There are 4 types of legislation which has been identified namely policies, strategies as well as Acts and Bills. The national legislation influencing the sector has been summarised within the table below.

Table 1: National governmental instruments

Policies	Strategies	Acts	Bills
White Paper on the Energy Policy of South Africa (December 1998)	National Integrated Energy Plan for the RSA (March 2003)	Constitution of the Republic of South Africa (Act 108 of 1996)	Electricity Distribution Industry Restructuring Bill (April 2003)
White Paper on Renewable Energy (November 2003)	DME Energy Efficiency Strategy (March 2005)	National Environmental Management Act (No. 107 of 1998)	The 2003 Petroleum Pipelines Bill
NER Regulatory Policy on Energy Efficiency and Demand Side Management (EEDSM)		National Nuclear Energy Act (No. 46 of 1999)	Energy Regulator Bill (2004)
		Electricity Act (No. 41 of 1987) Electricity Amendment Acts (No. 58 of 1989), (No. 46 of 1994) and (No 60 of 1995)	
		Gas Act (No. 48 of 2001)	
		The 2002 Gas Regulator Levies Act	
		National Environmental Management Act (No. 107 of 1998)	
		National Environmental Management: Air Quality	

Policies	Strategies	Acts	Bills
		Act	
		The Environment Conservation Act (Act 73 of 1989)	

2.3.1 ²The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution provides the legal basis for allocating powers to different spheres of Government and contains a number of rights specifically relevant to the national energy policy. The Constitution states that Government must establish a national energy policy to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the nation.

In terms of the constitution, energy should be made available and affordable to all citizens, irrespective of geographic location. The production and distribution of energy should be sustainable and lead to an improvement in the standard of living of citizens.

In terms of Section 24, all South Africans have the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through legislative and other measures that:

- prevent pollution and ecological degradation;
- promote conservation; and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic social development.

In terms of section 26 of the Constitution everyone has the right to have access to adequate housing (Section 26(1)). The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right (Section

² The Constitution of the Republic of South Africa (Act 108 of 1996)

26(2)). The legislation that the Department of Housing has promulgated and implemented falls squarely within the Constitutional imperative.

Chapter 3 of the Constitution states that the governance of the Republic shall be administered by national, provincial and local spheres of government that are distinct yet interdependent. Section 104 of the Constitution states that the Province has the legislative authority to pass legislation for its province with regard to any matter within the functional list of Schedule 4 (concurrent competence) and Schedule 5 (exclusive competence), and any matter outside these functions yet delegated to the province by national legislation. Key issues identified in Schedule 4 that have a direct bearing on energy management include environment, housing, provincial public transport

2.3.2 White Paper on the Energy Policy of South Africa (December 1998)

This White paper was issued in 1998, and provides the Government's overarching energy policy.

³The foundation of the South African energy policy is based on five major objectives which the policy seeks to achieve in both the short (1-2 years) to medium term (3-7 years).

These objectives include:

Promoting access to affordable energy services, for disadvantaged rural and urban households, small businesses and farms as well as community services. This includes the evaluation of grid or non-grid options to meet this objective, in particular renewable energy options are considered.

Improving energy governance, which has implications for the free flow of information as well as increased broad stakeholder consultation and representation on issues relating to energy policy and investment. This would also involve the restructuring of state energy assets and creating the capacity to implement energy efficiency programmes. The role of the NER in regulating the sector is emphasized and its stated aim of ensuring South Africa's position as a low cost electricity supplier has implications for energy options.

Stimulating economic development and empowerment through the creation of SMME's, entry of previously disadvantaged persons (PDI) into the energy sector, promoting energy efficiency in all sectors of the economy, and encourage competition within energy markets. Intervention where market failures are identified will be via transparent, regulatory and other

³ DME, 1998. White Paper on the Energy Policy of South Africa

carefully defined measures. Establishing the regulatory and legislative framework for the natural gas industry to develop is also a priority.

Managing energy related environmental and health impacts by promoting access to basic energy services where the use of certain fuels result in negative health problems, establishing broad targets for the reduction of harmful energy related emissions, and thus establish energy efficiency targets and energy conservation efforts. A balance between exploiting fossil fuels and maintenance of acceptable environmental requirements is promoted. An active role in the international negotiations around global climate change is regarded as priority action.

Securing supply through diversity of supply sources in particular through energy trade and active cooperation in the Southern African region, reappraise coal resources and support other primary energy carriers is to be embarked upon. Privately owned generators of their own electricity are allowed subject to National Electricity Regulator (NER) approval.

Specific reference is made within the White Paper to the importance of such issues as: promoting more equitable access to energy, addressing obstacles that hinder greater adoption of energy efficiency, stimulating access to affordable public transport, and facilitating the sustainable production and management of renewable energy sources.

The White Paper proposes restructuring of the distribution industry into independent regional electricity distributors (RED's), and provision a means for the establishment of a competitive electricity market.

2.3.3 National Integrated Energy Plan for the RSA (March 2003)

In 2003 the Department of Minerals and Energy published an integrated energy plan. The plan provides a framework for taking decisions on energy policy and for the development of different energy sources and energy technologies in the country. A computerised analysis of this plan has been undertaken based on the energy reserves, energy demand and consumption up to 2020 using different scenarios of the South African economy. The scenarios relate to future energy use based on the use of different energy sources, and also assess the implications of associated pollution including the emissions of greenhouse gases (Energy Research Centre, 2004).

2.3.4 White Paper on Renewable Energy (November 2003)

⁴This White Paper on Renewable Energy supplements the White Paper on Energy Policy, which recognises the significant medium and long-term potential of renewable energy. The White Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. Government's long-term goal is the establishment of a renewable energy industry that will offer a sustainable, fully non-subsidised alternative to fossil fuels subsequently ensuring energy security through the development of renewable energy resources in order to reduce the requirement for coal based power generation.

To proceed towards this goal, the Government's medium-term (10-year) target is: 10 000 GWh renewable energy contributions to final energy consumption by 2013, which is to be produced primarily from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and biofuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41 539 MW), and is equivalent to replacing two 660 MW units of Eskom's combined coal fired power stations.

The White Paper identifies four key strategic goals:

- To establish appropriate financial and fiscal instruments
- To develop, implement and maintain an effective legislative system
- To promote technologies for the implementation of sustainable renewable energy
- To raise public awareness of the benefits and opportunities of renewable energy

2.3.5 DME Energy Efficiency Strategy (March 2005)

The document is the first to comprehensively address energy efficiency as a strategy for South Africa. It takes its mandate from the White Paper on Energy Policy (1998) and links energy sector development with national socioeconomic development plans. The White Paper on Energy Policy (1998) states:

⁴ DME, 2002, White Paper on the Promotion of Renewable Energy & Clean Energy Development: Part One – Promotion of Renewable Energy

⁵“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. Government would create energy efficiency consciousness and would encourage energy efficiency in commerce and industry, 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 program will be introduced and publicity campaigns will be undertaken to ensure that appliance purchasers are aware of the purpose of the labels. Targets for industrial and commercial energy efficiency improvements will be set and monitored.”

The aim of the strategy is to reduce energy consumption in the key demand sectors which are a burden on the economy, thereby lessening the impact of greenhouse gas emissions on the environment and promoting sustainable development, it also provides clear and practical guidelines for the implementation of efficient practices within the economy, including the setting of governance structures for activity development, promotion and coordination.

The strategy highlights eight specific goals which fall under three categories namely social, environmental and economical sustainability.

The strategy sets a national target for energy savings, of at least 12%, to be achieved by 2015, (this target is set in relation to the national energy demand forecast) and offers a blueprint for energy efficiency interventions over the next ten years. These interventions will include amongst others economic and legislative means, efficiency labels and performance standards, energy management activities and energy audits, as well as the promotion of efficient practices. The industrial, mining and building sectors were identified as immediate priorities.

The strategy will cover all economic sectors, and be implemented through Sector Programmes. Systems will be put in place to monitor and evaluate progress in energy efficiency improvements and a periodic strategic review of the implementation will be undertaken.

The strategy has set a 10-year target for energy saving of 12% of total energy consumption to be reduced by the year 2014. The Draft Strategy gives a clear signal of Government's intentions in respect of the World Summit on Sustainable Development commitments, and

⁵ DME, 1998. White Paper on the Energy Policy of South Africa

provides implementation plans for a 3 phase 10 year programme of interventions including the development of regulations and standards, best practice, energy management and financial mechanisms.

2.3.6 NER Regulatory Policy on Energy Efficiency and Demand Side Management (EEDSM)

The policy identifies the problems of requiring peak generation capacity in the near future and the inefficient end-use of electricity. This policy sets annual Energy Efficiency And Demand-Side Management (EEDSM) targets and specifies the programmes that would qualify for EEDSM funding. It also examines the current regulatory mechanism of implementing EEDSM programmes through Eskom.

Eskom is obliged to ensure that these targets are met, and all metros in South Africa are obliged to incorporate EEDSM in their planning and to ensure EEDSM implementation. The policy describes the regulatory mechanisms to be implemented by the NER and outlines the following: access to funding; administration of funds; assets ownership; development of EEDSM plans; establishment of the Energy Agency in the future; the obligation of the future REDs to implement EEDSM to all end-users through Energy Services Companies (ESCOs); and the requirement of licensees (the distributors) to create awareness and advertise benefits of EEDSM among customers and to offer time-of-use tariffs to all industrial and commercial customers.

The successful implementation of the EEDSM programmes are hoped to become a solution to the various challenges faced by NER and the electricity industry.

⁶The policy proposes that the NER implement the following regulatory mechanism in the near future:

- Create a greater awareness of the benefits of EEDSM in the electricity sector
- The current EEDSM funding mechanism through Eskom tariffs is maintained
- Major licensed distributors develop EEDSM plans and implement EEDSM programmes in accordance to the plan and NER EEDSM Policy
- Funding is to be provided through the EEDSM funds which are currently administered by Eskom.

⁶ http://www.saeec.co.za/showpage.php?page=display&p_=_mainframe.php&catid=962

In a restructured electricity industry, EEDSM funding is to be collected through an energy surcharge (cents/kWh) and/or from other sources. The funds would be administered by an Independent Energy Agency (IEA) whose focus would be the implementation of Energy Efficiency programmes across all energy sectors.

Further, an obligation is to be placed on the future Regional Electricity Distributors (REDs) through the licenses to implement EEDSM and apply for funding of Energy Efficiency projects from the Energy Agency through a competitive tendering process.

2.3.7 National Nuclear Energy Act (No. 46 of 1999)

This act was created with the purpose to bring all nuclear activities funded by the state under the control of the atomic energy, with specified exceptions.

Through this Act there is a provision of the South African Nuclear Energy Corporation Limited which is a public company wholly owned by the Government and defines the corporations functions and power. The company has the mandate to provide for the implementation and application of the Safeguards Agreement and any additional protocols which are entered into by the republic as well as the International Atomic Energy Agency.

Other objectives are to regulate the acquisition and possession of nuclear fuel and other nuclear related materials, as well as the importation and exportation of nuclear related elements. The company also is required to take care of radioactive waste and the storage of irradiated nuclear fuel and to provide for incidental matters relating to nuclear energy.

2.3.8 Electricity Act (No. 40 of 1987)

This Act defines the structures and responsibilities of the Electricity Control Board. The Act also assigns the right of electricity supply within municipal boundaries to local government authorities. This Act has over the number of years been amended with additions to the legislation.

The *Electricity Amendment Act (No. 58 of 1989)* amends the Electricity Act, 1987 to provide for a levy on electricity; ensuring that a license shall not be required for the generation of electricity; and to provide for the transfer of servitudes on the transfer of undertakings; and other incidental matters.

The Electricity Amendment Act (No. 46 of 1994) amends the Electricity Act, 1987 by providing for the continued existence of the Electricity Control Board as the National

Electricity Regulator (NER), and applying certain provisions of the Act to other institutions and bodies.

The Electricity Act of 1987 was further amended through the Electricity Amendment Act (No 60 of 1995) to establish the NER as a juristic body; to make provision for the appointment, conditions of employment and functions of the chief executive officer and employees; and for the funding and accountability of the NER.

The objectives of the NER were given as to eliminate monopolies in the generation and sales/supply sectors; rationalise end-use prices and tariffs; provide customers with the right to choose their electricity supplier, create an electricity market, introduce competition into the industry especially within the generation sector, address the impact of giving customers the right to choose their electricity supplier; address the impact of generation, transmission and distribution on the environment; permit open, non-discriminatory access to the transmission system and level the playing fields between distributors of electricity.

2.3.9 Electricity Distribution Industry Restructuring Bill (April 2003)

The Electricity Distribution Industry (EDI) Restructuring Bill, published in April 2003, provides for the establishment of a national framework for the restructuring of the distribution industry, the creation of regional electricity distributors, and the management of the restructured electricity distribution industry. The Bill followed the Restructuring Blueprint issued by the Department of Minerals & Energy in 2001. The Blueprint sets out the objectives with the restructuring of the South African EDI. It further addresses some of the pertinent issues with respect to the formation and transfer of resources to regional electricity distributors.

The Bill does stand as it is for the time being but there has been hearsay with regards to amending the EDI restructuring, but nothing concrete or conclusive has been established as yet, and the uncertainty around the ESI and EDI restructuring is extensive.

2.3.10 Gas Act (No. 48 of 2001)

This Act was made for the orderly development of the piped gas industry and also established a National Gas Regulator.

2.3.11 The 2002 Gas Regulator Levies Act

The Act provided for the imposition of levies by the National Gas Regulator. The gas regulator according to the act may impose levies for the purpose of meeting the general

administrative and other costs of the Gas Regulator and the functions performed by the Gas Regulator; specify the intervals and times in respect of the payment of such levies and to determine the interest as well as vary these levies within the gas industry.

2.3.12 The 2003 Petroleum Pipelines Bill

The Bill seeks the establishment of a national regulatory framework for petroleum pipelines, and provides for the licensing of persons involved in the manufacturing or sale of petroleum products.

2.3.13 The 2004 Energy Regulator Bill

To establish a single regulator to regulate the electricity, piped-gas and petroleum pipeline industries

2.3.14 National Environmental Management Act (No. 107 of 1998)

“To provide for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.”

The principles of this Act include:

- Environmental management must place people and their needs at the forefront of its concern and serve their physical, psychological, developmental, cultural and social interest equitably
- Sustainable development should consider that the use of non-renewables is responsible and equitable, and takes into account the consequences of the depletion of the resource, and that the use of renewables and their ecosystems of which they are part is not jeopardized.
- There must be intergovernmental coordination and harmonization of policies, legislation and actions relating to the environment

2.3.15 National Environmental Management: Air Quality Act

The objective of this Act is:

- To protect the environment by providing reasonable measures for

- the protection and enhancement of the quality of air in the Republic;
- the prevention of air pollution and ecological degradation; and
- securing ecologically sustainable development while promoting justifiable economic and social development; and generally to give effect to section 24 (b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

2.3.16 Environment Conservation Act (Act 73 of 1989)⁷

The Environmental Impact Assessment regulation was introduced to South Africa on a mandatory basis from September 1997 through the Environmental Impact Assessment Regulations (1997), whereby the regulation identified activities which “may have a substantial determinable effect on the environment” (Republic of South Africa, 1997).

⁸The Environment Conservation Act (Act 73 of 1989) addresses the regulations concerning Environmental Impact Assessments (EIA). It is required that EIA’s must be conducted for all listed activities. The system may be defined as a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead. The EIA must be used as the basis for a decision to approve or reject an application. The responsible government authority is the Department of Environmental Affairs & Tourism, at national level as well as the equivalent bodies at provincial level.

An EIA study has been structured according to eight stages namely project application, project scoping, specialist studies, draft EIA, review of the draft, final EIA, decision, environmental management plan, so it is a lengthy procedure and may result in delaying the project for quite a considerable amount of time.

⁷ http://w3.sasol.com/natural_gas/EIA/eia.asp

⁸ EIA in Thailand, South Africa and Malaysia

2.4 PROVINCIAL SECTOR POLICIES IMPACTING ON THE ENERGY SECTOR IN THE WESTERN CAPE

The section below provides a brief explanation of the most relevant provincial legislation influencing the Western Cape's energy sector. These policies and strategies have been summarised within the table below.

Table 2: Government instruments influencing the Western Cape Energy Sector

Policies	Strategies
Western Cape Provincial Transport Policy (1997)	Integrated Energy Strategy for the Western Cape

2.4.1 Integrated Energy Strategy for the Western Cape

The need for an energy strategy and programme is being addressed by the Department of Environment Affairs and Development Planning. The department has identified the need to formulate an energy strategy if the Western Cape is to effectively meet the developmental challenges which lie ahead. A sound energy policy is also critical for addressing environmental concerns, including the most notable issue of climate change.

The development of this strategy is still in the process of being completed. The project comprises of four phases and as yet the first phase which is an analysis of the current status quo of the energy sector has been analysed. The relevant steps forward for the next phases are currently being taken, in order to complete the strategy.

2.4.2 Western Cape Provincial Transport Policy (1997)

This policy was published in 1997 with the overall aim of restructuring the transport system throughout the Western Cape Province to make it efficient, effective and sustainable. The principles behind this policy have not as yet changed and it has the following key components:

- Establish a role for transport in employment creation
- Assess the distributional effects of transport programmes
- Increase productive potential in the transport sector
- Establish accessible, supportive and responsive administrations

- Use provincial monies, through the provision of services and subsidies, to benefit the poor
- Set transport prices at appropriate and realistic levels, consistent with the aims of restructuring and redistribution
- Ensure that decision making is truly participative and democratic
- Propositions to guide the provincial Department of Transport and Public Works
- Establish strong policy direction and guidance
- Provide for the maximum delegation of powers and functions
- Build capacity and capability in third-tier government structures
- Adopt management-intensive rather than capital-intensive programmes
- Ensure that all transport actions are development-based
- Make transport part of an integrated planning process

3 ENERGY SECTOR POLICY ANALYSIS AND IMPACT

South Africa's dominant coal reserves as a major source of primary energy to cope with its energy demand from industry including the mines, transport, and residential customers, amounts to almost three quarters of the total energy feed stocks. South Africa is highly industrialised in comparison to other African countries and utilises about 40% of the total electricity consumed in the continent. The bulk electricity supply is crucial for its energy-intensive industries like mining and minerals beneficiation, in addition to other energy demands. However, in comparative terms, the South African economy uses a relatively high amount of energy per unit of economic output, compared to countries with similar economies. This feature creates significant potential for policies and measures and strategies for greenhouse gas emissions as well as energy efficiency.

The section above provided an overview of the policy environment influencing the energy sector. These policies have various implications for businesses and the economic growth of the Western Cape Province. The section below provides an analysis of these policies and the impact of these policies on the energy and other related sectors.

3.1 INTERNATIONAL POLICY ANALYSIS

The following section analyses the range of international policies addressed in the previous section of the report in the context of the Western Cape Province and its energy environment.

3.1.1 Kyoto Protocol

The Kyoto Protocol is a worldwide treaty whereby industrialised countries sign an agreement with the mandate of reducing their greenhouse gas emissions. This treaty could have an adverse influence on the energy future of South Africa and warrants further analysis on the future implications of this treaty within the South African national and regional context.

South Africa as a 'non-Annex 1' country has as yet not entered into this agreement as such and does not have any definite reduction targets for greenhouse gas emissions. SA is however, required to put policies and measures in place to reduce greenhouse gas emissions. In the Western Cape, numerous air pollution studies have been undertaken, and air pollution cloud modelled over the Cape Town conurbation. The future impact of the protocol will therefore require the unacceptable quantities of air pollutants in the Cape Town conurbation to be addressed.

It is therefore believed, due to SA being the 14th largest emitter of CO₂, that in 2012 (commencement date of the second commitment period of the Kyoto Protocol) SA will be forced to sign the treaty to significantly reduce CO₂ emissions and receive carbon credits as incentives. The high emission levels are largely attributed to South Africa being the largest user of coal (95% of electricity is generated from coal) and to the fact that transportation plays such a large role in energy consumption. The latter is relevant to the Western Cape, through the indirect use of coal from generation sources outside of the province.

These mandatory reductions could have an adverse effect on the growth of the economy because of its high reliance on resources such as fuel and coal, but South Africa could also benefit from implementation actions such as the Clean Development Mechanism (CDM).

The treaty will also result in an increase in strict environmental management requirements and regulations governing access to alternative sources of energy such as solar, wind, biomass, natural gas and bio-fuels, rather than coal.

The implementation of carbon tax could have an impact on the way that companies run their businesses. For the Western Cape it would be crucial for businesses and industries to be educated around reduction of carbon emissions as well as implications of not doing so (increased costs of energy, carbon tax, global warming and possible reduction in economic growth). The industries and organisations should be encouraged through policy development to already now initiate the implementation of this practice by assessing their baselines and energy usage as well as where emissions could be reduced, in preparation for the future.

3.2 NATIONAL AND PROVINCIAL POLICY ANALYSIS

The following sections provide an analysis of which national and provincial policies are likely to impact most significantly on the energy sector in the Western Cape.

3.2.1 White Paper on Energy Policy (1998)

The existing South African energy policy, as indicated through the 1998 White Paper on Energy Policy, is aimed at providing wider access to electricity and other energy related services to South Africans through various means such as grid electrification, rural energy supply, distributed generation and mini-grids. According to the policy this should be achieved while trying to minimise the environmental impacts of energy production and usage. This White Paper has been the basis for energy related strategies and legislation, subsequently various other policies and strategies have stemmed from this policy, which have a direct impact on the energy sector within the Western Cape Province. The province

has a number of natural resources to utilise for renewable energy generation, which presents a major opportunity for the Western Cape to comply to the policy.

3.2.2 Policy on Renewable Energy

The South African government has realised that renewable energy is taking its rightful place in the South African energy sector and that it is playing a significant role in contributing towards sustainable development. As a result the White Paper on Renewable Energy supplements the White Paper on Energy Policy (1998), which recognises the significant medium and long-term potential of renewable energy. The Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

Due to the Western Cape not having easy access to coal as a source of energy coupled with the provinces call for sustainable development, renewable energy is the next alternative energy initiative within the province. Much activity in this regard has already occurred as was identified within the first paper of this MEDS Energy project. Initiating market incentives such as national grid feeder laws into the policies could also promote renewable energy technologies and increase sustainable development.

Within this policy the government has set a target of 10 000 GWh renewable energy contribution to final energy consumption by 2013, which is to be produced from alternative sources such as biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels.

The policy identifies that promoting renewable energy will contribute towards the diversification of electricity supply and energy security. In doing so, Government at both national and provincial level, needs to create an enabling environment that facilitates the introduction of independent power producers that generate electricity from renewable energy sources, thereby inviting greater investment by the private sector in renewable energy power producers, and in the commercialisation and local manufacturing of renewable energy technologies.

A problem experienced with renewable energy technologies is that they are currently perceived not to be a viable option. This results from a perception that technologies are too expensive and there is currently a low economy of scale. There is therefore a need for Government to create an enabling environment through the introduction of fiscal and financial support mechanisms such as incentives or subsidies, within an appropriate legal

and regulatory framework. This will allow renewable energy technologies to compete with fossil-based technologies.

The form in which subsidies are administered may be classified in various ways. Some of these subsidies may have a direct effect on price such as grants and tax exemptions, while others act indirectly, such as regulation that direct the market in favour of a specific energy source or government sponsored technology development. Taking into consideration various international case studies and applications the following financial mechanisms could be considered:

- *Direct financial transfers:* These consist of grants to producers, grants to consumers and low interest or preferential loans. The loans could take the form of soft loans or grants for energy related activity to encourage the use of energy efficient technologies.

International applications:

The Danish government offers subsidies of up to 30% for investments into energy efficiency in industry.

The government provides tax rebates on such investments.

Denmark also offers cash subsidies to producers of Renewable energy.

Australia uses tax credits to foster industry R&D and cash subsidies to renewable energy producers.

- *Preferential tax instruments:* this could be in the form of rebates or exemptions on certain royalties, duties, producer levies and tariffs, tax credits and relief's and accelerated depreciation allowances on energy supply equipment.
 - **Differential tax** could be used to encourage or discourage production and use of certain fuels or to lower the effective cost of heating fuels to end users. The subsidies to lower the effective cost of heating fuels should be intended to benefit the poor end users for who heating forms a high ration of the overall household income.
 - According to a budget speech by the Minister of Finance (2002), Government has already stated that it will provide incentives for the production of bio-fuels produced from biomass in the form of a 30% **reduction in the Fuel Levy** on such fuels.

- ⁹**Tax rebates** for energy efficient investments. With this investment in co-generation facilities, energy efficient buildings and the like are exempt from fixed asset taxes. Energy conservation and pollution reduction equipment which is imported from abroad is also exempt from value added import taxes.
- **Tax credits** could be provided for energy-efficient building equipment
- The government could instate a policy which provides **tax incentives** to conserve energy
- ¹⁰**Pollution tax** could encourage the use of natural gas over coal and provide even more advantage towards renewable energy technologies.
 - The **climate change levy is an explicit form of pollution tax and applies to the business and public sectors**. It encourages greater energy efficiency and cuts industrial emissions, especially from industries that are heavy users of energy and leading sources of greenhouse gas emissions.

¹¹**International applications:**

The climate change levy has been implemented in the UK

It was expected to save at least 2 million tons of carbon per year.

The levy has been the subject of intensive lobbying to the government by many high profile industries.

Businesses are concerned about the impact of the tax on their international competitiveness. They believe that reductions in carbon emissions can be achieved in more efficient ways than an explicit levy.

The alternatives include negotiated settlements and emission trading.

⁹ http://www.worldenergy.org/wec-geis/publications/reports/eepi/a1_incentives/chinadata.asp

¹⁰ Extract From The PAMS Study Draft Report

¹¹ Tutor2u, 2003. The climate change levy. [Online] Available from:
http://www.tutor2u.net/economics/content/topics/externalities/climate_levy.htm

Amendments to the climate change levy:

Energy-intensive industries receive a rebate of up to 80% if they agree on a programme of energy savings

Combined heat and power as well as renewable energy sources were exempted from the levy

- ¹²Another means of incentivising organisations within the Western Cape is by establishing a **Carbon Trust** as it was done in the UK. This will provide a co-ordinated, targeted programme of support measures for businesses investing in energy efficiency technology and practices.
- Investment enabling measures include the enhanced capital allowances scheme which will give 100% first year capital allowances for approved energy saving instruments for businesses, which will be able to take this into account when calculating their corporation or income tax bills.

International applications:

All the Scandinavian countries have introduced carbon taxes

European countries are planning either carbon taxes or green taxes

Carbon tax was introduced in the UK whereby higher costs were imposed directly on those that use dirtier fuels, coal was hit harder than natural gas and clean solar and wind energy was not taxed at all.

- *Trade instruments:* such as quotas, technical restrictions and trade embargoes.
- *Energy-related services provided directly by government at less than entire cost:* this type of subsidy could include things like direct investment into energy infrastructure and R&D.

¹² World Energy Council, 2005, Energy Efficiency Policies and Indicators Annex I - Case Studies on Energy Efficiency Policy Measures Case studies on economic and fiscal incentives in the United Kingdom, [Online] Available from: http://www.worldenergy.org/wec-geis/publications/reports/eepi/a1_incentives/ukdata.asp

International applications:

The governments of almost all ¹³OECD countries undertake energy R&D, either directly or indirectly through support for private sector programmes.

In general the publicly funded R&D is directed to sectors where the country has a strong production capability or towards more environmentally friendly technologies such as wind farms as is the case in Denmark.

Majority of the R&D funding is going towards fossil fuels, but programmes are aimed at improving combustion efficiency, subsequently lowering fossil fuel use and the related emissions thereof.

Financial instruments to promote renewable energies

The high initial costs for renewable energy necessitate the establishment of funding mechanisms to promote their implementation. Subsidies and incentives should be used by the Western Cape Government to encourage development and deployment of renewable energy sources.

International applications:

There is a rise in the provision of these types of subsidies internationally. This is principally driven by local, regional and global environmental concerns as well as international treaties like the Kyoto Protocol.

Funded renewable energy initiatives which are undertaken need to be closely monitored to ensure successful outcomes. Government should therefore take the lead by:

- Setting supply and demand targets
- Establishing a target percentage of national and provincial Government
- Establishing Government related financial institutions and agencies' project budgets to invest in renewable energy programmes.

¹³ Member countries of the Organisation for Economic Co-operation and Development (OECD) include Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, UK and the US

Another means of promoting renewable energy into the country and province is through the introduction of quotas of alternative renewable energy sources into the national grid. Policies such as a **National Grid Feeder Law** could be used as a driving mechanism to provide a means of regional incentives, and provide encouragement for using alternative resources.

¹⁴Energy markets usually consist of three elements namely the energy producers, the electricity distributors (national electricity grid) and the final users of the energy. Through the National Grid Feeder Law the electricity grid is obliged to purchase renewable energy from every grid connected producer. To achieve this certain minimum prices must be paid by the electricity grid to every producer of renewable energy (grid feeder tariffs decided by the NER). The tool of a Grid Feeder Law allows the government effective control while still being a market instrument with no direct intervention. Some energy consumers could also be given more favourable pricing than others which could focus the renewable component of the energy mix.

The development and implementation of these financial and legislative frameworks will assist in reducing the barriers to the increased production of electricity from renewable energy as a source. There is a need for Government support for renewable energy to help establish initial market share and demonstrate the viability of renewable sources, after which economies of scale and technological development take over.

Government policy on renewable energy is concerned with meeting the challenges of:

- Ensuring that economically feasible technologies and applications are implemented through the development and implementation of an appropriate programme of action.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable energy industry.

New policies could be developed at the provincial level to meet these requirements which are of particular relevance to the Western Cape, given that it is furthest from the current generation facilities, given Koeberg's limited output.

¹⁴ Policy discussion paper on the National Grid Feeder law within South Africa and the information was received from Dieter Holm who is involved in sustainable development projects within the country.

3.2.3 Energy Efficiency

As previously described the DME Energy Efficiency Strategy (2005) document is the first energy efficiency strategy for South Africa and it takes its mandate from the White Paper on Energy Policy (1998).

There is a need in the Western Cape to reduce energy consumption in the key demand sectors which are a burden on the economy. This would in turn lessen the impact of greenhouse gas emissions on the environment and promote sustainable development.

The DME's mandate is to promote energy efficiency through various guidelines on the implementation of the efficient practices within the region and sectors of the economy. As stated government's present capacity to undertake energy efficiency programmes are limited, therefore the provincial departments should integrate, finalise and consolidate considerations to ensure appropriate leadership in the sector.

3.2.4 Synergistic renewable energy and energy efficiency initiatives

There are several areas of overlap between renewable energy and energy efficiency that warrant further exploration. According to the Energy Efficiency Strategy (2005) a widespread installation of solar water heating in industrial and commercial buildings and houses has the potential to defer the need for building new power plants, as the combined heating requirements of these sectors consume the energy produced by three average power stations.

The main constraint on implementing a national solar water heating programme in the residential sector relates to cost, which is a function of the current small market and lack of economies of scale. This lack of demand in itself is due to low public awareness of the technology or its economic benefits. Currently the cost of a domestic solar water heater would take in excess of 5 years to pay back.

This is contrary to large commercial installations. Due to the installation size, and electricity tariff at peak times, these solar water heaters are competitive with electric geysers. Thermally efficient housing, which is specifically designed to save energy, can reduce household space heating requirements. The Department of Housing in collaboration with DME has developed appropriate guidelines for the construction of thermally designed housing incorporating passive solar design.

The following measures have been identified by the household sector:

- Regulation of low-cost energy efficiency measures in housing;

- Incorporating passive solar design;
- Heat insulation in homes;
- Replacement of electric geysers by solar water heaters.

The Department of Housing has initiated a task team which is focused on delivering a housing product which has no-cost and very low-cost options. This intent has been specified within a document “low cost housing programme” and this document identifies three major aspects to the development of environmentally sound low cost housing, one of which is energy efficiency. Recommendations are drafted with the intention that they be incorporated into the Department of Housing’s norms and standards. However, this document is limited to general recommendations that can be implemented by developers or individuals building houses under the housing program.

Although the requirement for solar water heating has been identified as a possibility for energy efficiency as well as an alternative source of energy, especially within the low cost housing sector, nowhere within the policies has this been identified. Therefore this provides a leeway whereby policy for renewable energy and energy efficiency could be developed at provincial level, with the mandatory incorporation of solar water heaters into the next phase of low cost housing developments.

As the transport sector in the Western Cape is the largest consumer of energy, compared to other sectors, in the form of liquid fuels, which include petrol, paraffin, diesel and heavy fuel oil. Therefore in terms of the transport sector and the energy efficiency strategy the province presents an important opportunity for exploring energy efficiency measures within the fuel mix of road transportation through the usage of renewable energy such as bio-fuels. The strategy has also provided intent for investigating the usage of regenerative braking systems in locomotives which could also provide a means of generating power for the national grid.

The Western Cape Transport policy (1997) identified various objectives that have a direct impact on implementing a full scale initiative to provide alternative means of public transportation to reduce emissions and provide access to the important socio-economical amenity.

In light of the Provincial transportation policy (1997) large environmental, economic and welfare gains are said to be made with a shift from private to public transport in the province. This does however require significant capital investment and planning. To initiate this process government has announced investment programmes for Spoornet to improve

its efficiencies and thus to win back customers lost to road transport, but a large barrier to all of these processes and strategies are related to lead times with the actual implementation of the projects.

4 ENERGY SECTOR POLICY AND STRATEGY RECOMMENDATIONS

Taking the initial report which provides a comprehensive overview of the energy sector, and bearing in mind the 3 key drivers of the sector stated in the introduction as well as the policy environment within which the energy is a part of, recommendations were made to assist in the development of the MEDS as well ensure sustainability within the energy sector.

4.1 POLICY RECOMMENDATIONS

The Western Cape has the most energy demand within the transportation sector followed by the industry, residential and agricultural sector. As stated in the sector report the province is rapidly growing on a continuous basis resulting in a continuous increase in energy demand. This situation drives the search for alternative fuels to coal which is not readily available within the province and imported from other provinces. These primary problems need to be addressed, and opportunities for policies specifically pertaining to demand side management and alternative resources should be developed.

Throughout the initial overview of the energy sector as well as the current policy analysis other issues were also identified which could be overcome through policy interventions and the development of specific strategies to address the issues.

These are summarised as follows:

- An integrated energy strategy is currently in the process of being developed under the direction of the DEADP and the completion of this strategy is necessary before any policies are formulated. This integrated energy strategy will clarify the energy mix within the Province as well as who has the mandate for the sector within the Western Cape.
- There is a lack of coordination, integration and information sharing amongst the various provincial departments that deal with the energy sector including DEDT, DEADP, the Department of Housing and the Department of Transportation and Public Works. The departments are not cooperating in coordinating efforts to address their priorities, which are often common ones such as job creation, causing great misalignment within the various strategies and policies that they are intending to implement.

- There is a lack of detailed market share and demand-side data at a provincial level. Data on electricity is more readily obtainable than data on other fuels, but is not adequate and realistic targets cannot be set, to monitor effective strategy implementation, whilst developing supporting policies enhance the growth of the energy sector. As an example, the shortage of data regarding initiatives in housing and transport, and the lack of clarity on the energy-mix, impede the identification of risks to energy security across the Province.
- The economies of scale and costs of alternative energy resources is a significant barrier to implementing renewable energy initiatives as part of the Western Cape energy mix.

There is a requirement for greater clarity and agreement on the above issues, with the aim of ensuring that all the provincial authorities play a more effective facilitating role in driving through the adoption of effective and integrated energy strategies throughout the province.

It is important to emphasise that the DEADP is currently in the process of formulating an integrated energy strategy for the Western Cape Province, the output of this strategy will include a complete energy framework with various supply scenarios. This strategy will set the framework for policies regarding the energy sector in the Western Cape.

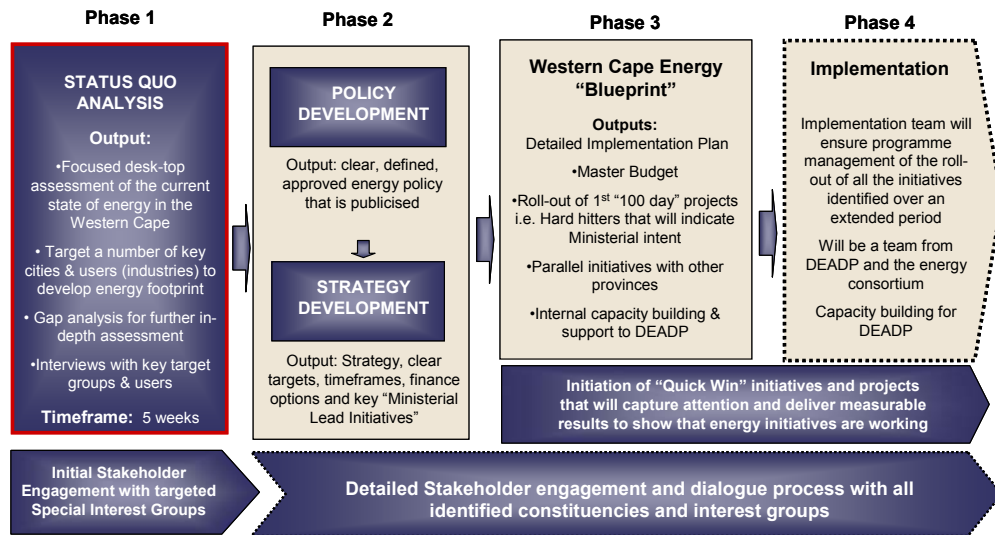
Integrated energy strategy by the DEADP

This project was created with the intent of developing an energy blueprint for the province which is created in partnership with various key stakeholders within the province.

The department is working within boundaries which have been set by national government and takes into account the initiatives at a local government level across the Province. This programme has the intent of ensuring that economic and social development, poverty alleviation, infrastructure development, environmental issues, energy conservation and climate change, and energy security and energy investment are effectively and uniformly addressed throughout the province with the co-operation of the various stakeholders.

The project that the DEADP has embarked on is a 4 phase process. The diagram below illustrates the course which is currently being followed.

Figure 4-1: Plan of integrated energy strategy and implementation plan



Source: *Developing an integrated energy strategy and implementation plan for the DEADP, 2005*

The project comprises of four phases.

- Phase 1 – Status Quo and Gap Analysis: The aim of this phase was to provide an overview of the current activities relating to energy management within the Western Cape, and to identify key strategic needs and areas of concern. This phase has been completed at the end of April 2005.
- Phase 2 – Policy and Strategy Development: During the second phase of the project, a provincial Policy and Strategy for Integrated Energy Management is developed, in which clear targets and timeframes are set, and a number of ministerial lead initiatives are identified. This phase is currently in the process of being conducted and should be completed by the end of 2005.
- Phase 3 – Energy Blueprint for the Province: The Energy Blueprint will act as basis for a long term implementation, and will give effect to priority initiatives and projects that will be rolled-out across the Province. The time-frame for this blueprint is the end of 2006.
- Phase 4 – Implementation and monitoring: This phase will be undertaken to ensure the objectives are met as envisaged in the Integrated Energy Strategy and Programme. This integrated energy strategy will be implemented between 2007 and 2009.

This process will establish a blueprint for the province with regards to the energy sector. In support of this integrated energy strategy the following recommendations in terms of policies were made in order to ensure growth in the energy sector in the Western Cape.

The DEDT could exercise their mandate within the province by supporting a complete energy audit and the formulation of an energy task team within the province. This will guarantee that the correct information which is pertinent to understanding the capacity of energy as well as all of the departments is aligned. This support will also ensure that all the departments are addressing uniform objectives and energy related issues.

4.1.1 Policies for Information Development and Sharing

Recommendation statement: Adequate data collection will be required to precede proper energy planning and micro-economic strategy development.

Explanation of recommendation: The lack of detailed energy data at a provincial level seriously impairs the capacity to accurately assess and strategise around addressing problems and promoting sustainability in the energy field. Therefore a complete province wide energy inventory is recommended for the Western Cape.

This quantitative data would be important to assist in developing future scenarios. The audit will also provide options which would enable the development of the energy strategy and define the key initiatives which would need to take place. The energy audit will also enable an understanding of where energy efficiency could be achieved within the province.

Substantiate recommendation: There is a lack of detailed market share and demand-side data at a provincial level. Data on electricity is more readily obtainable than data on other fuels, but is not adequate and realistic targets cannot be set, to monitor effective strategy implementation, whilst developing supporting policies enhance the growth of the energy sector.

¹⁵According to the White Paper on Energy Policy (1998) the policy states that: "Government will ensure that the necessary resources are made available to establish structures, systems and legislation to facilitate the specification, collection, storage, maintenance and supply of energy data, and energy-related data, according to the requirements of integrated energy planning and international standards."

¹⁵ DME, 1998. White Paper on Energy Policy.

An initial energy inventory was conducted during the formulation of the integrated sustainable strategy for Cape Town, completed in 2003, but Cape Town does not make up the entire Western Cape and data collection is currently not being done at a provincial level. During interviews with respondents regarding the energy sector, the requirement for proper data collection was emphasised continuously and it was made clear that the shortage of data regarding energy demand, energy supply and the lack of clarity on the energy-mix, encumbers the identification of risks to energy security across the Province.

Application to the Western Cape Province: An energy audit would be able to quantify the current energy use within the Western Cape. It would also be able to provide an indication of energy efficiency improvements as well as provide recommendations on the reduction of greenhouse gas emissions.

During the audit an investigation will be done into the exact energy usage and demand within the province. The scope of the energy audit includes the entire energy consumption, energy demand as well as energy supply which is associated with specific processes within the province. This baseline data would be extrapolated from local provincial municipalities and other energy related industries such as factories, buildings and plants and includes:

- The identification of usage of all types of energy currently consumed
- An analysis of how much raw material is being consumed to enable the supply of energy to the province
- An analysis of the demand of energy versus the quantity being supplied at present

This baseline historical data will then be analysed using the LEAP (Long-range Energy Alternatives Planning System) model, which is a model currently used on a national as well as international level and is used primarily during the process of energy strategy and planning for the future. This model was used within the Integrated Energy strategy for Cape Town so Western Cape does have the capabilities of conducting this analysis. Utilising this model will ensure consistency with regards to data on a provincial and national level. It will also provide an indication of energy consumption and projected energy demand for the future.

The cost of such an audit is estimated at ¹⁶R220 000, but it will enable the identification of cost-effective measures to improve the efficiency of energy use, provide an indication of

¹⁶ Figure as provided by the government counterparts that are currently in the process of conducting an integrated energy strategy under the mandate of the DEADP

quantifiable and most recent data of energy demand vs. energy supply as well as review energy management strategies, which include monitoring systems and evaluation processes.

There are 4 key players that are required during such an audit namely the auditor who will be required to conduct all of the auditing work, the client who is required for the audit to be ordered, the administrator who is responsible for initiating the programme by a government level body and the operating agent who will in essence be responsible for the running of the model and programme.

The results of an audit should be compiled into a clear and concise energy report which communicates the results of an energy audit. This information would include relevant plant and process data, equipment data with measurements or estimates of the energy consumption for individual plant items, actual energy consumption records, energy use analysis, details of energy efficiency improvements, comparison of actual consumption with analysis of estimated results from recommended actions, and provide an indication of projected energy demand for the future.

This energy audit should be used as part of the greater information sharing. It will enable the provision of information and educating the people within the province on the implication of issues such as energy efficiency and demand side management. The energy audit will also enable the provision of quantifiable information of what the energy status within the province is and the integrated energy mix and strategy which is required to meet the provincial requirements.

This process is required to be conducted throughout the province and is recommended preceding any provincial energy strategy formulation.

4.1.2 Formulation of an Energy Task Group within the Province

Recommendation statement: Formulation of an energy task group within the Western Cape to ensure all initiatives and strategies are aligned between the various departments and stakeholders within the Western Cape energy sector.

Explanation of the recommendation: The provincial government has a limited mandate with regards to the energy sector. There is also currently a lack of co-ordination which is being experienced between the various departments which results in various discrepancies with regards to the energy sector and mix. Therefore creating a focal point to implement a province wide strategy is vital.

Substantiate the recommendation: During the initial overview of the sector and establishing information of the sector it was found that there is a wide variety of initiatives and projects within various provincial departments pertaining to energy, and energy demand. All of these departments have various initiatives affecting the energy sector within the Western Cape. An example of this initiative is the current integrated energy strategy which is being conducted at present under the authorisation of the DEADP. The relative overlap of the DEADP and the current MEDS strategy phase carried out under the DEDT mandate.

Application to the Western Cape: In order to ensure that confusion is eliminated and there is sufficient coordination between the relevant stakeholders it is recommended that this energy task group be initiated as soon as possible. This task group will have the responsibility of ensuring that all of the relevant stakeholders coordinate and align their strategies, develop policies and address energy related issues as a consortium. There should be representation from all of the various departments and decision making groups. This energy task group will ensure collaborative management structures around the energy sector and ensure integration of all strategies and recommendations within the province as a whole.

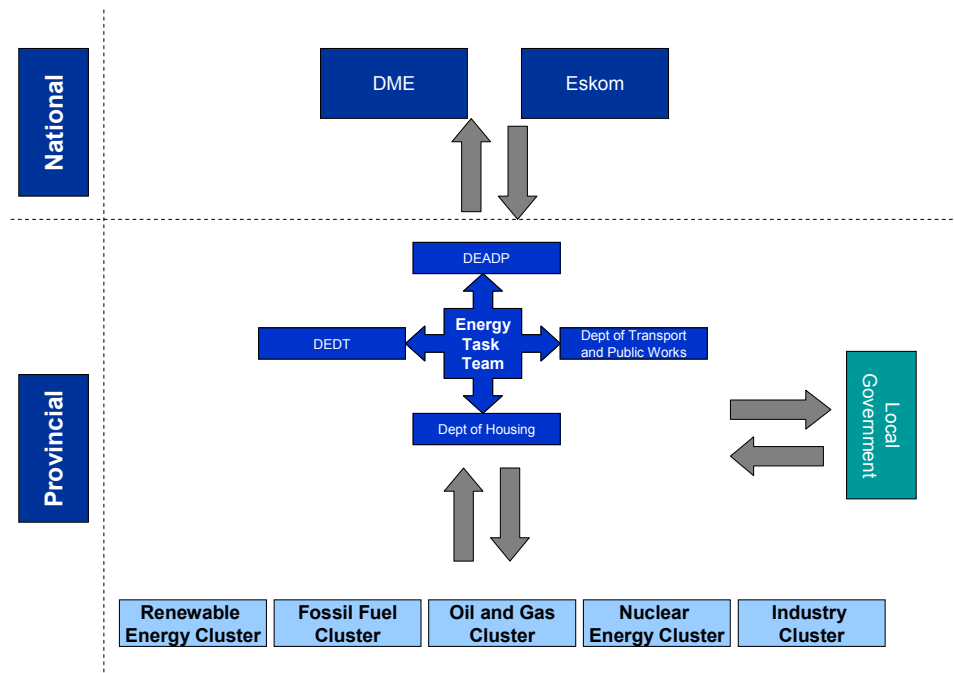
The energy task team requires a facilitator. This facilitator will be the interface with national government and National Council of Provinces regarding energy related programmes, policies and objectives. It is recommended that the DEADP acts as this facilitator and provisional home for the energy strategy and until a new alternative is found. The DEADP is in a unique position to do this due to its role in the overall integrated governance structure.

The other members of this task team should consist of the Department of Economical Development and Tourism, the Department of Housing as well as the Department of Transportation. These provincial departments each have energy related directives and should be required to align the various legislation, strategies and initiatives into a feasible energy mix.

The concerns lie internally within the various departments of provincial government. All of these departments have a responsibility to communicate with one another and ensure that all of the strategies have the same objectives in mind. Therefore the energy task team would act on behalf of provincial government to align efforts between national and provincial government, while ensuring that the province meets its energy related objectives such as security of energy supply, poverty alleviation, demand side management and environmental concerns. The team would also serve as a focal point for ensuring that the integrated government plan includes energy in the strategic and operational priorities of all departments and initiatives.

There are various private energy clusters which play a large role in the energy sector. Although the make-up of the task team is recommended to be predominantly from provincial departments, the private stakeholders should not be ignored and need to be taken into account when making pertinent decisions. As a result these additional stakeholders should be brought into the task team as the process unfolds. These stakeholders will consist of the various energy clusters.

Figure 4-2: Positioning of the Energy Task Team



In essence the primary role of the energy task team would be to act as one synergistic voice between national government, local government as well as the various energy clusters which influence the province's energy sector.

Due to the relative high importance of the Renewable Energies (RE) in the future energy mix of the province, it is recommended that the alignment of the various RE players be achieved through the establishment of an RE cluster which will act as the industry representatives to the Energy Task team.

Opportunity Assessment

Numerous workshops whether project specific or general in the alternate energy environment have a common denominator: a strongly expressed need for a central information, knowledge management and "connectivity" center.

There is a clearly demonstrated and stated need to enhance the industry voice in stimulating policy development as well as of the need for industry support in that process. The timing is now – more than a year into the life of the White Paper and in the context of the overarching energy environment context (power generation capacity issues; restructuring of the ESI etc) whilst there is industry momentum. Central to this is the requirement for a practically orientated entity that can house central information, interrogate it and manage that knowledge bank and provide links in the market, industry and government. As such, it would provide key services:

Dedicated resources structured to have the capacity to deliver on the following identified activities (*inter alia*):

- Coordination and interaction with of various governmental departments and political activities through means of the Energy Task team
- Coordination and integration of industry technologies under one roof, to include Energy Efficiency initiatives
- Development and management of an effective Knowledge Management System ('push and pull' technology based); a resource database and information sharing on key events, activities, dissemination of case studies; information on international trends etc.
- Coordination of industry workshops where appropriate
- Facilitation of international links, for example with foreign investors, technology development, export opportunities
- Coordination with SA Power Pool, REFSA and general SADC wide related events, activities and entities.

Proposed Organisational Design / Structure

The cluster or centre will be built from a renewable energy information portal that has recently been established and is in the process of being developed. The portal aims to act as a repository of all events, information, reports, research and activities, technologies etc that are current in the RE and EE environment. The portal also acts as a database of all players in the energy environment with a view to linking organisations, government bodies etc where needed.

The portal will reside in a S21 company and seeks funding to employ a dedicated resource whose functions will include populating and maintaining the portal (i.e. keeping it current and relevant), advising of events and activities, coordinating activities and acting as an avenue for those that need to interrogate the portal and its information. As such, the

individual sought will have a strong knowledge management focus coupled with a keen understanding of RE and EE issues.

The already informally established Western Cape RE task team will in turn manage the centre. This team comprises government and industry representatives and will form the Steering Committee for the Portal. It in turn should act as the link between inter-departmental government activities and the information and knowledge centre.

Proposed Implementation process

The establishment of the centre will be achieved through a four phased process:

Phase1: Define and establish the entity

- Develop a Blueprint for the organization to include identification of its key objectives, goals and activities; Spec the dedicated resource profile
- Search for the resource as per the above defined terms
- Establish a base / office/ shared premises
- Assess the possible integration of existing bodies
- Design and implement a comprehensive stakeholder engagement programme (that should span the life of all identified phases including phase 1)
- Research and identify Knowledge Management tools; define a KM strategy
- Design and implement a clear communications strategy (that will span life of all phases)
- Secure further funding if required

The expected implementation process of this phase is approximately 6 months and can be conducted through a Project Steering Committee which currently consists out of the Western Cape Task Team. Resources to be used on this phase include the current portal:

www.blueskygreeneearth.com

Phase 2: Formalise the entity

- Appoint the Resource and managing committee / board; Use the Blueprint as a mandate
- Commence activities within this blueprint
- Give vision to the communications and KM strategies and implementation plans
- Review key organizational activities and implement
- Review fund raising requirements

It is expected that this phase will take considerably longer and would last approximately two to three years. The roll-out of phase two could be accomplished through means of a dedicated task team that would hand-over the cluster to a Board, which needs to be established.

Phase 3: Mid term review and scale

- Resource entity according to industry growth and requirements
- Mid term review against meeting of targets
- Represent industry in negotiating incentives, higher industry targets etc

It is envisaged that Phase 3 would be conducted from the end of 2007 – and would continuously be conducted by the Board until 2013.

Phase 4: Continuously monitor and evaluate

Funding Requirements

A 'stop/go' approach is recommended where progress on each phase is evaluated and further funding decisions taken accordingly. Phases 1 and 2 should have committed funding at the outset. Monies raised for phase 1 will pay for the task team's activities, research, correspondence and communication, workshops, consulting fees (if necessary) and search fees for the head hunting process of a dedicated resource. Phase 2 finance will pay for the salary of a resource for a designated initial contract period (say 2 years with a clear performance contract in place), administrative and running costs, implementation of strategies such as communications and Knowledge Management, etc.

4.1.3 Assisting the implementation of Solar Water Heaters into the province

Recommendation statement: Provide industry the necessary assistance with re-introducing Solar Water Heaters into the Province.

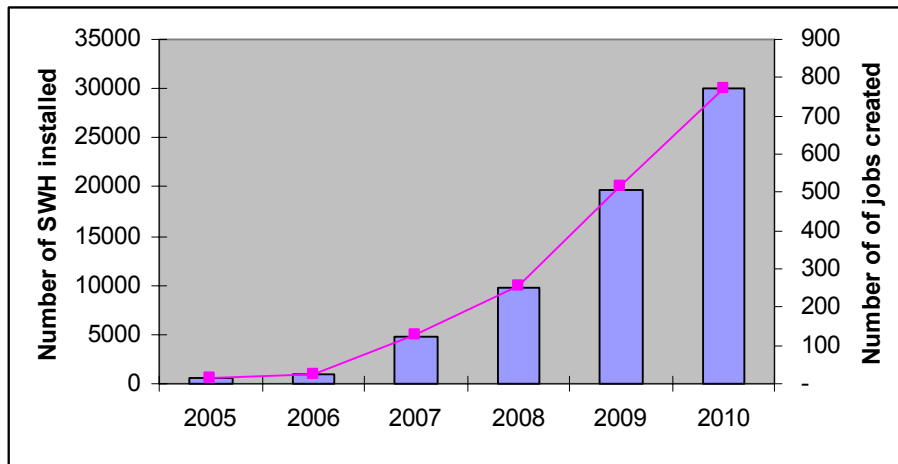
Explanation of the statement: Out of all the renewable energy technologies, SWH have been identified as the greatest potential for job creation and economic growth. The economies of scale and costs of alternative energy resources is a significant barrier to implementing this type of renewable energy initiative into the Western Cape energy mix. Should provincial government provide assistance to these initiatives, these barriers of entry could be reduced or even eliminated.

Substantiation of the recommendation: Various feasibility studies and projects have been conducted within the province. These studies have identified that between the solar technologies such as Photovoltaic and SWH, SWH have the greatest potential of being introduced into the province and creating additional job opportunities. With each of the systems 1 person is required for every 250 units/annum produced to manufacture the system, this number will be optimised with scale of production, whilst another person is required for every 80 units / annum installed. In addition, jobs dealing with the support of

SWH systems will also be required. Therefore 1 extra job could be created for every 125 units / annum produced, through sales and support activities.

Taking into account the target set by the City of Cape Town of 20% of the city's hot water requirements being met by SWH by 2010, the number of job opportunities created could amount to a total of approximately 770, over the next 5 year.

Figure 4-3: Extrapolated implementation of SWH in Cape Town



As emphasised timeously, the primary barriers against renewable technologies such as SWH are the lack of information about the technology, low public awareness combined with a current small market and lack of economies of scale. These barriers could be overcome through the implementation of a strategy which provides direction and establishes a programme that could sustain the development and increased usage of solar water heaters.

Volume production would be achieved if the use of SWH was supported. The Department could play a three-fold role which consists of:

- Providing a leading role into the implementation of SWH. The installation of SWH to all Provincial Government buildings and facilities would act both as an important message to the public that these technologies are considered safe and advisable and is endorsed by the Provincial Government but also provide the critical volume requirements to motivate the capacity up scaling in the industry. By installing SWH to strategic landmarks structures in the province such as Groote Schuur Hospital or Newlands Rugby Stadium, the Provincial Government could endorse the position of the RE friendly province.

- Assisting in the provision of SWH test rigs. This ensures that the products have the approved quality and conform to international ISO-standards before being released into the market. The implementation of test rigs would ensure that concerns regarding poor quality products, installation and maintenance are dealt with before it is sold to the consumers and the technology is approved to having superior quality and standards.
 - A new test facility for SWH has recently been imported and is implemented at Pretoria University. Access to this facility could be a concern for Western Cape Producers. The new test facilities' cost amounted to R600 000.
 - *Xstream*, a SWH and cylinder producer in Paarl owns a semi test facility that could easily be upgraded to cater for the full test and calibration requirements. The upgrade of this facility would amount to approximately R200 000.
 - Through the subsidisation of the remainder of the testing rig, the DEDT could guarantee good quality products that are brought out into the market.
- Assist the industry to create market awareness for SWH. The Government of the Western Cape in partnership with stakeholders in the solar water heating cluster could assist the industry to expand the promotion of solar energy. The provincial government and industry should plan to work together on communication with the consumers on the awareness of SHW technology and the environment. The environmental and economical benefits are poorly understood; therefore effort should be made into communicating these benefits.

The SWH situation in China is a good example of successful implementation. The case study in Appendix A provides an indication of how the government assisted to make application of SWH successful.

5 CONCLUSION

This concludes the set policy and strategy recommendations for the energy sector in the Western Cape Province. The recommendations were based on an extensive analysis of the energy sector's policy environment and a subsequent in depth assessment of the most pertinent industry issues in the context of the how the most relevant policies impact in the sectors growth trajectory.

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7 APPENDIX A: ¹⁷INTERNATIONAL CASE STUDY: CHINA

Solar Water Heater Market in China

The SWH business is a profitable business within China. It is seen as the most economical option within the country. The current hot water infrastructure is also not that well developed allowing for SWH to be the next obvious choice.

There are over 1000 factories manufacturing and selling solar systems. By 2000, the accumulated installed area of SWH systems was 26million m². SWH systems are mainly in the suburbs of cities, in medium-sized and small towns and rural areas. China holds 76% of the world wide solar market.

Barriers to entry

- Natural gas boilers in certain areas are available and of good quality, for example in Beijing the gas boiler industry has developed considerably.
- There are SWH systems available on the market which are unreliable and have poor durability, thereby damaging consumer confidence.
- There are difficulties in installing SWH on high buildings.
- A number of cities have placed restrictions on installation of SWH on the roofs of buildings for aesthetic reasons.
- Despite the low costs of SWH in China they are still beyond the means of many of the population. There is definite need for low cost loans and upfront financing mechanisms with a long payback.

Growth rate

The annual average growth rate of exports in recent years since 1999 until 2004 has been 40%. In the year 1999 the sales growth was 47%.

Creating awareness

¹⁷ Case Study as done by *Sustainable One Cape Town* in 2004

The nationwide communication of SWH focused on the supply side rather than the demand side. The government and industry plan to work together on communication with the consumers on awareness of SHW technology and the environment. Although the economic value of SWH is well known the environmental benefits are poorly understood. In China it costs as much to invest in a SWH as a mobile phone, but market penetration for such technologies are much higher than for SWHs. Government and industry should work together with consumers and professionals to raise awareness of the environmental and climate change benefits of the systems.

Financial mechanisms as support

There are no current subsidies as support for SWH. The government has however provided finance for administration and research. Research on solar thermal utilisation has been included in the list of key national priorities to be addressed in every 5 year plan.

Role of Government

The government recognised the need to develop a series of comprehensive technology and quality standards to increase market penetration. The government and governmental agencies sponsor and organise trade fairs. More than 10 Chinese SWH manufacturers participated in Sustain 2001 in Amsterdam, to promote their products in Europe and look for European partners for product/technology improvement and market development.

Targets

In the 'tenth five year plan of New and Sustainable Energy Sector Development' the government set the national target of cumulative installation area at 64m³ for 2005.

Future plans

Government has allocated special funds to support the establishment of an advanced laboratory and testing facility. Interest has been shown by international organisations such as the IFC into equity investment - such investment would be a strategic initial for the Chinese sector, in terms of entering into the international market and expanding business abroad. Continued economic growth in China together with rising living standards, urbanisation and the privatisation of the housing sector has created a significant demand for high-quality residential space (which includes SWH systems).

Lessons learned

Kunming, a town in the Yunnan province has 30%-40% of houses installed with SWH The success is due to:

- An excellent solar resource
- Poor resource of other alternative energy sources
- SWH is the most economical option
- The town has capacity for local production

8 APPENDIX B: RESPONDENTS

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Cape Peninsula University of Technology Energy Technology Unit	Prof. Ernst A. Uken	(021) 460-3127	(021) 460-3887	uken@ctech.ac.za
CEF/EDC	Msizwe	(011) 880 9727	(011) 880 9803	msizwem@cef.org.za
Development Services – City of Cape Town	Craig Haskins	(021) 487-2832	(021) 487-2255	craig.haskins@capetown.gov.za
Incite Sustainability	Davin Chown	(021) 783 5814		davinc@icon.co.za
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