



WORLD CLASS MINERALS AND ENERGY SECTORS THROUGH SUSTAINABLE DEVELOPMENT

Energy Balance for South Africa

DEPARTMENT OF MINERALS AND ENERGY

International Workshop on Energy Statistics,
Mexico, *2-5 December 2008*



the dme

Department:
Minerals and Energy
REPUBLIC OF SOUTH AFRICA

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Energy Balance -History

Data from **1991** onwards have been collected and published as energy balances according to International Energy Agency (IEA) standards

The Digest of South African Energy Statistics, which is available in electronic and print, contains information on the Energy Balance of South Africa. The Digest is published bi-annually. The latest publication is of 2006 data.

Energy Balance

The Energy Balance presents an overview of the energy flows for a specific time period.

The Energy Balance shows, inter alia, the production, transformation and final consumption of all forms of energy for a given geographical area and a given period of time, with quantities expressed in terms of a single accounting unit for purposes of comparison and aggregation.



Energy Balance

- The following very simply describes step by step the compilation process of the energy balances:
- Firstly we review the previous energy balance to identify shortcomings
- Next we review our data to determine what further data is required for the new energy balance as well as how best we can obtain such data

Energy Balance

DME then request energy data from, inter-alia, the following sources through e-mail, telephone, meetings, etc:

Electricity:

- **ESKOM:** data on annual consumption of electricity by the different sectors (Eskom power stations only) (Sales figures)
- **NERSA:** Annual consumption by municipalities and private power producers (Electricity Supply Stats)

Energy Balance Data

■ Petroleum Product

- SAPIA: Final consumption of petroleum products
- SASOL: non-crude liquefaction

– Natural Gas

- Minerals Bureau: Natural Gas and Natural Gas Condensate

– Coal Minerals Bureau (DME)

– Import and export petroleum products

- SARS: Imports\Exports of petroleum products



Energy Balance Data

- The data from the different sources is synchronised with the energy balance basic file (excel) stored on the DME server
- Next we update the basic file with the current data, update comments, calculations, sources and information from other sectors, formulas
- Create new formulas (for new entries) where required

Energy Balance Data

- Analyse the data on the basic file and if there are any discrepancies, then we verify with the relevant source.
- Update the basic file if there are any changes
- The basic file is then converted into the International Energy Agency (IEA) format and also for it to be published in the Digest of South African Energy Statistics.

Energy Balance Quality Assurance

- Data is then inputted into the energy balance and a further comparison is done
- Data is then reviewed by experts in the energy sector
- The Director General (DG) of DME approves the release of the data as well as further revisions that are made to the data
- The data is also critiqued by the IEA and other energy institutions on an informal basis

Energy Balance Dissemination

- The next step is to write a submission to the DG to approve to distribute the Digest electronically, including publishing on the website
- We obtain quotes from the Government Printers to print the Digest, specifying the bind quality, quantity and colour graphics
- Next we write a submission to the DG to print the Digest
- We then obtain financial approval to print the Digest and place order with Government Printers
- We then distribute it locally and internationally

Data Quality Assurance and Dissemination

- DME makes the Energy Balance available on its website
- The electronic version of the Energy Balance is sent to specific stakeholders for example the IEA and data suppliers
- The Energy Balance is then published in the Digest of South African Energy Statistics and this publication is then distributed to stakeholders
- The Energy Price Report is also available on our website and also published and distributed



Problems with Energy Balances

- The main problems in the compilation of our energy balances are the following:
 - Timeous supply of data
 - Quality and accuracy of the data
 - Understanding of the structure of the relationships within the energy balances for example domestic supply, transformation and final consumption
 - Lack of data for renewable energy, biomass data

Problems with Energy Balances

- Energy Balances are not available on a provincial or regional basis due to non-availability of such disaggregated data and confidentiality issues
- Evaluation of the data
- Understanding of the SA energy economy
- Limited energy statisticians within DME and with data suppliers

Uses of Energy Balance

- DME uses the energy balance in order to better understand its energy flows, have a picture of the energy situation in a country & serve as input data for planning and policy development purposes
- The data is used by the energy industry for investment purposes and for research purposes
- Statistics SA use the data for the compilation of their national energy accounts
- Other Government departments use it for purposes of planning and policy development
- The IEA and UNSD use the data to incorporate it into their publications
- Students and researchers use the data for research

Energy Flows for South Africa



SUPPLY	TRANSFORM	TRANSPORT	END USE
Oil	Oil Refineries	Rail Road Pipeline	Liquid Fuels
Natural Gas	PetroSA	Pipeline	Gas
	Sasol		
Coal	"Washery"	Road/Rail	Export
			Coal
	Eskom and Others	Transmission Wires	Electricity
Hydro			
Nuclear	Koeberg		
Biomass		Person/Road	Wood



Primary Energy Supply

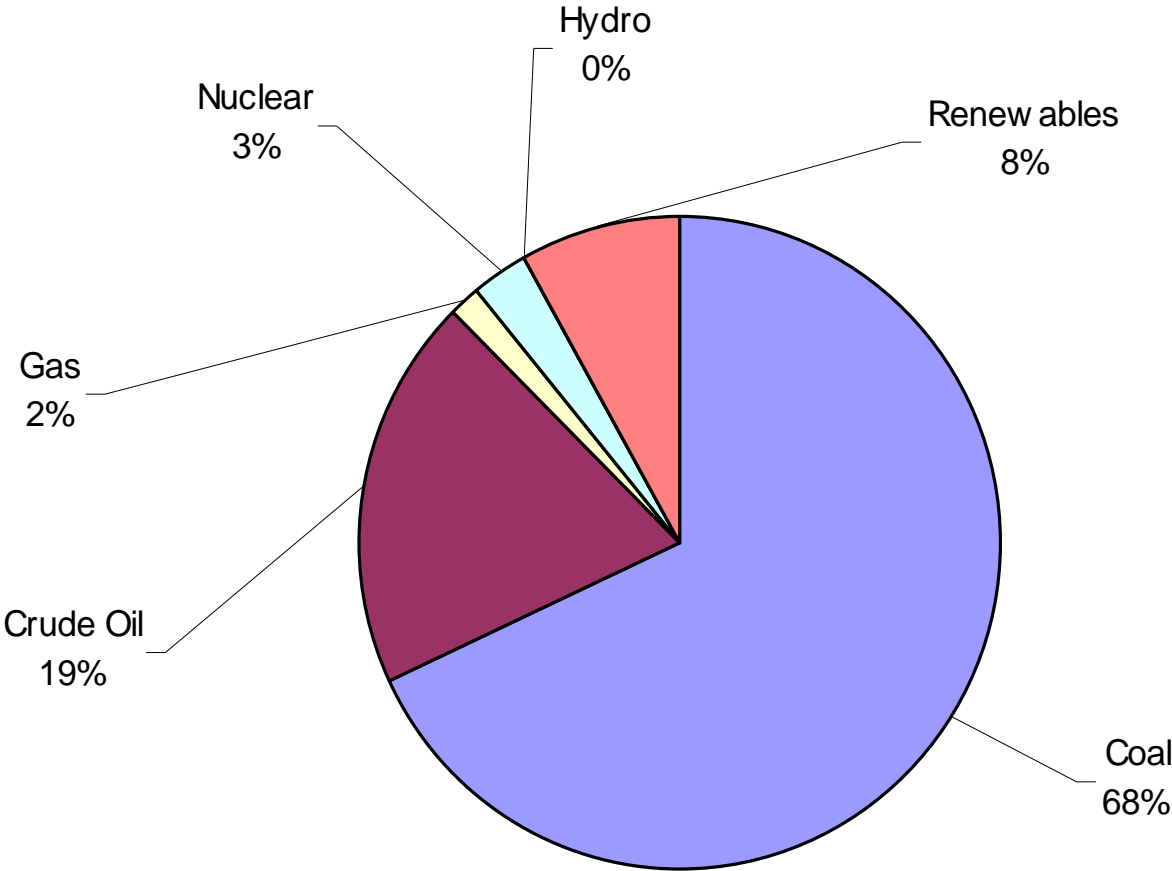
- The South African energy sector is dominated by coal which is abundant and relatively cheap by international standards.
- Most of South Africa's liquid fuel requirements are imported in the form of crude oil. Approximately 35% is sourced from coal through Sasol and 100% of the natural gas production from PetroSA is converted into liquid fuels, supplying about 7% of liquid fuel requirements.

Primary Energy Supply

- Renewable energy comprises biomass and natural processes that are replenished and can be used as an energy source. Biomass is used commercially in the pulp and paper mills and sugar refineries by burning bulk from logs, black liquor and bagasse to produce process heat. The energy produced is used by the industries concerned to meet their needs.
- In households, biomass is used for cooking and heating. It is very difficult to get an estimate of the total biomass reserves. Biomass is estimated to comprise 8% of South Africa's primary energy supply.



Primary Energy Supply: 2004

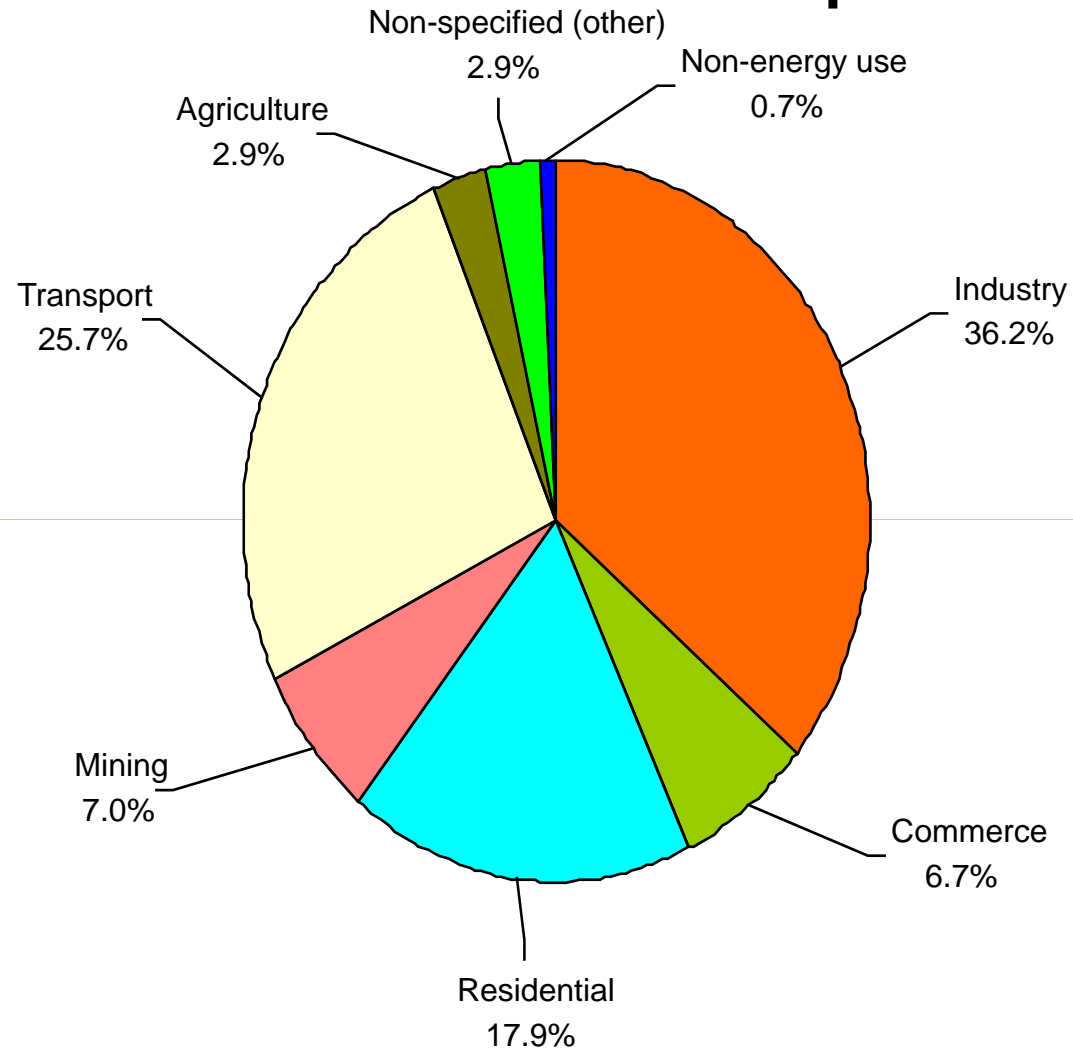


Final Sectoral Consumption

- The three major energy-consuming sectors are industry, residential and transport. In 2002 they accounted together for 80,4% whilst in 2003 and 2004 they accounted for 79,4% and 79,6% respectively of final energy demand. This shows a decrease of energy consumption from these three major energy – consuming sectors combined together of 1% in 2003 and 0.6% in 2004.



Final Sectoral Consumption of Energy



Coal

- South Africa's indigenous energy resource base is dominated by coal. Many of the deposits can be exploited at extremely favourable costs. As a result, a large coal-mining industry has developed. Coal for local electricity production is among the cheapest in the world. The country ranks as the world's fifth largest coal producer. In addition to the extensive use of coal in the domestic economy, large amounts are exported, mainly through the Richards Bay Coal Terminal. South Africa is ranked the fourth-largest exporter of steam coal.

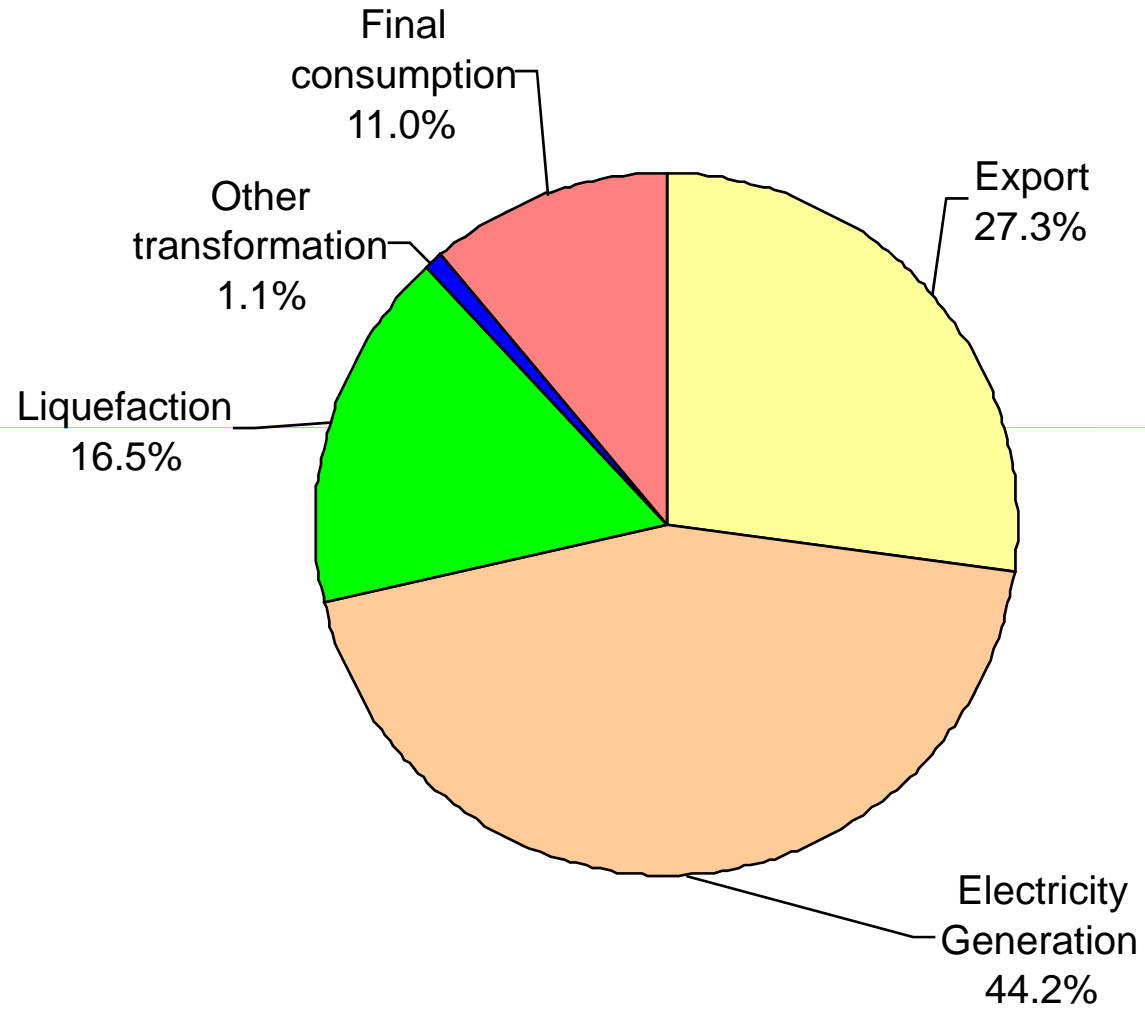
Coal

- About 51% of South African coal mining is underground and the rest is opencast. Of the coal mined underground, some 50% is produced by long walling, 5% by pillar recovery, and 35% by board-and-pillar mining and the remainder by other methods.
- The beneficiation of coal, particularly for export, results in more than 65 Mt of coal discards being produced annually. Of the run-of-mine coal produced, 21% goes to the export market, and 21% is used for local demand (excluding power-station coal). The rest is not saleable and is therefore discarded. Total discards could reach 2 000 Mt by the year 2020. Ways to make use of these discards are therefore being investigated.

Coal

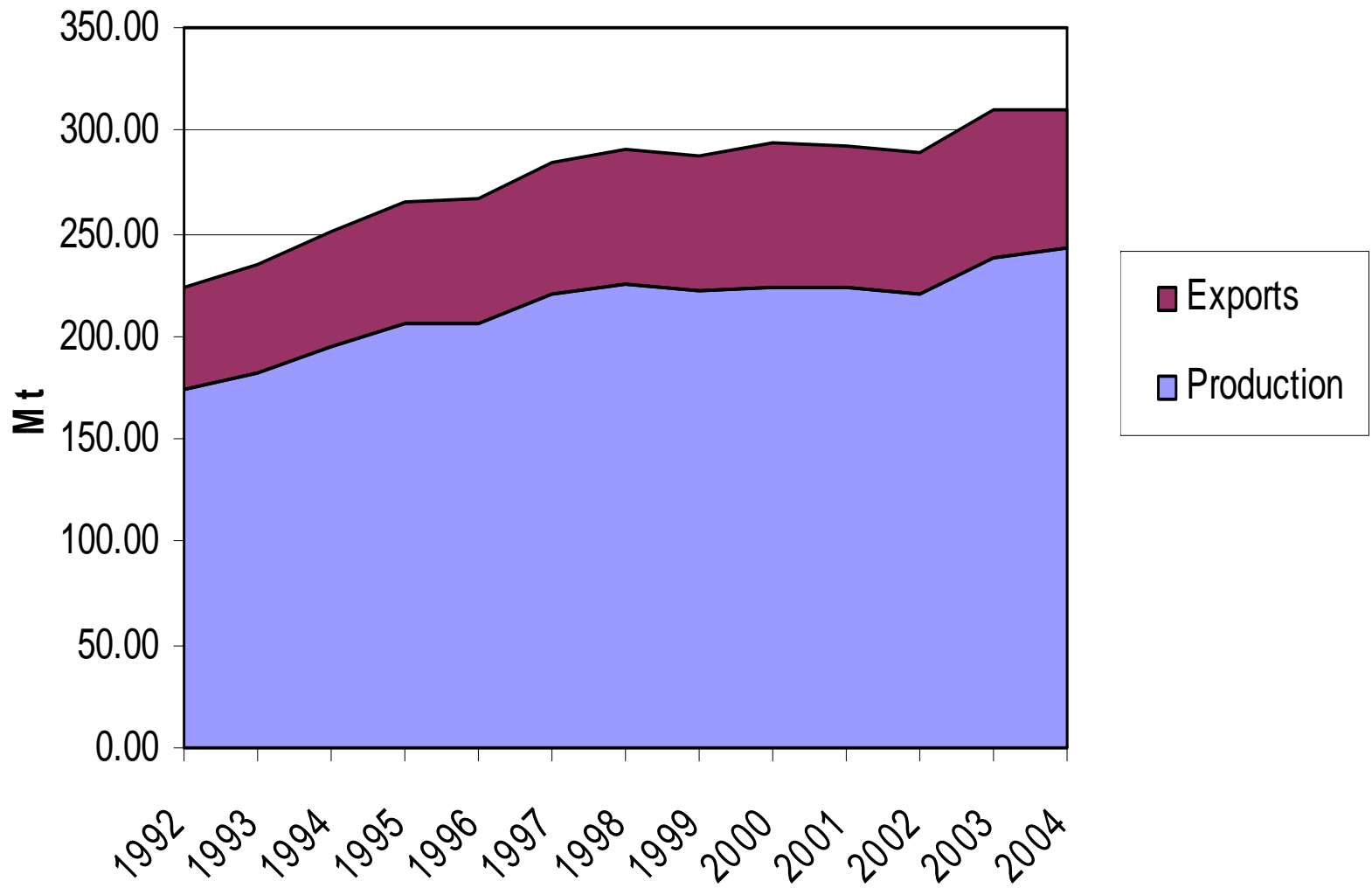
- South Africa's power sector is tightly tied to domestic coal
 - Mine mouth plants have been and continue to be the preferred development path.
 - The scope and complexity of planning and risk management is greater than this suggests:
 - Local coal sourcing does not mean local coal pricing – the power sector is exposed to global coal markets.
 - The power sector is exposed to global oil (diesel) and natural gas (LNG) prices, both directly and indirectly.
- Keeping fuel costs low is a top priority for South Africa

Coal Utilisation





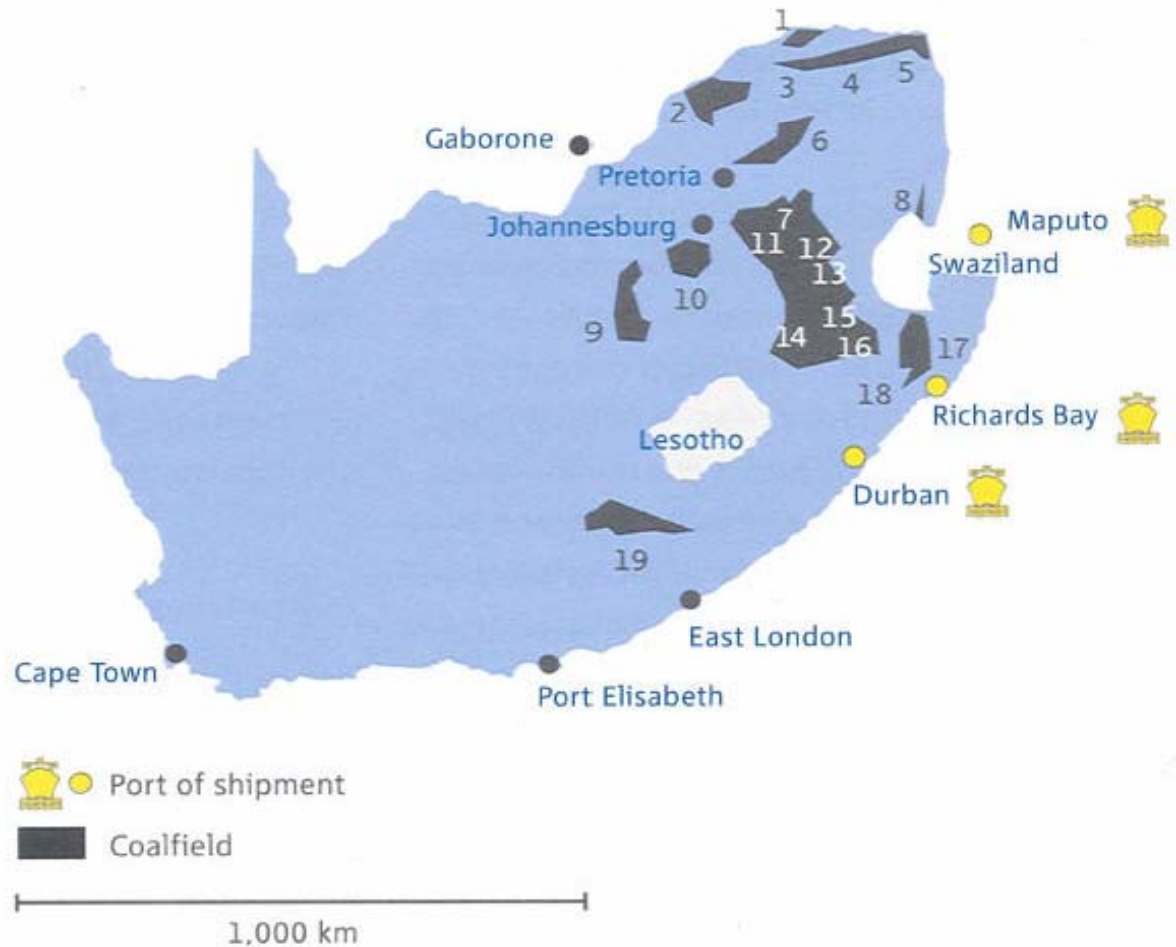
Coal Production and Exports



South Africa Coal Deposits



- 1 Limpopo
- 2 Waterberg
- 3 Western Soutpansberg
- 4 Central Soutpansberg
- 5 Eastern Soutpansberg
- 6 Springbok Flats
- 7 Springs - Witbank
- 8 Kangwane
- 9 O.F.S. - Vierfontein
- 10 Vereeniging - Sasolburg
- 11 South Rand
- 12 Highveld
- 13 Mpumalanga
- 14 Klip River
- 15 Utrecht
- 16 Vryheid
- 17 Nongoma
- 18 Somkele
- 19 Molteno - Indwe



World Electricity Costs – SA Produces low-cost electricity

2007 RANK	2006 RANK	COUNTRY	2006 COST (UScent/kWh)	2007 COST (UScent/kWh)
1	1	Denmark	13.41	22.89
2	2	Italy	13.24	15.74
3	7	Germany	10.33	13.16
4	4	Netherlands	11.01	12.62
5	6	Belgium	10.50	11.43
6	3	UK	11.03	11.16
7	8	Spain	9.30	10.35
8	9	United States	8.82	9.28
9	5	France	10.53	8.54
10	13	Australia	5.29	7.11
11	10	Finland	8.09	6.95
12	11	Sweden	6.96	6.60
13	12	Canada	5.87	6.18
14	14	South Africa	4.05	3.56

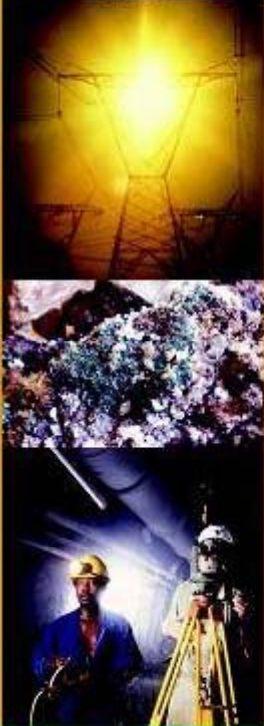


Extract of an Address by Ms Buyelwa Sonjica, MP, Minister of Minerals and Energy, introducing the debate on the Energy Bill, National Assembly

“ We are making provision for data and information related to energy demand, supply and generation mandatory by those who already possess it. We will also use this data to provide for energy modeling and planning. This will allow us, amongst others, to be able to conduct analyses which will assist us in promoting a sustainable and viable increase in the generation and consumption of renewable energies”



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I Thank You