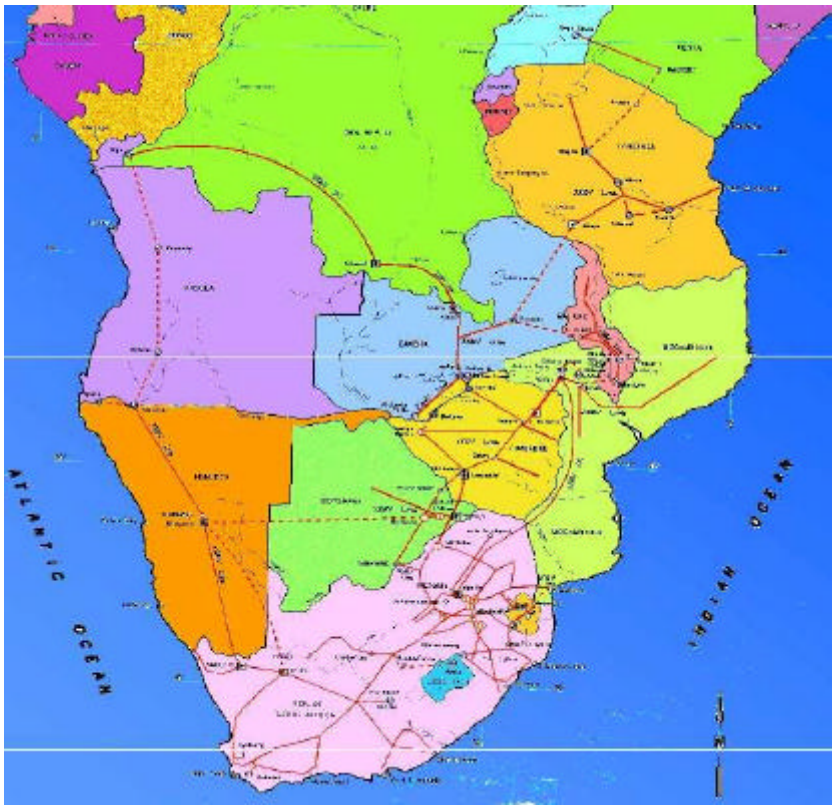

Energy Cooperation in Southern Africa: What Role for Norway?

Report from the Seminar on Regional Energy Co-operation, Luanda, 12-14 February 2002

Edited by
Jan Isaksen

WP 2002: 4

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Jan Isaksen (ed.)

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Opening of the Seminar

Mr. Ekker wished participants welcome on behalf of the Luanda Embassy and gave a brief outline on the situation in Angola. He stressed that what happened in Angola would have a pronounced effect on the rest of SADC in energy matters.

Mr. Lomøy of NORAD, Oslo explained that the meeting was agreed on in Gaborone last year. The background for the seminar was the importance of energy in development, the importance of energy in Norway, as well as the centrality of energy in the economy.

Angola receives the biggest Norwegian investment of any country in sub-Saharan Africa. There has been rapid change in the sector, which has moved from being an infrastructure sector to a commodity production sector. The donors' role must change accordingly. Energy is a major area in Norwegian co-operation and includes a number of countries within SADC. SADC is changing as an institution, which also has an effect on its relation to energy. The seminar should aim at improving the level of information in order to make better decisions and at discussing the adjustment of the role of the sector in the region.

The seminar is an experiment. If successful, it should be replicated.

Presentation 1: Developments in the electricity supply industry, and the role of regulators in promoting regional integration

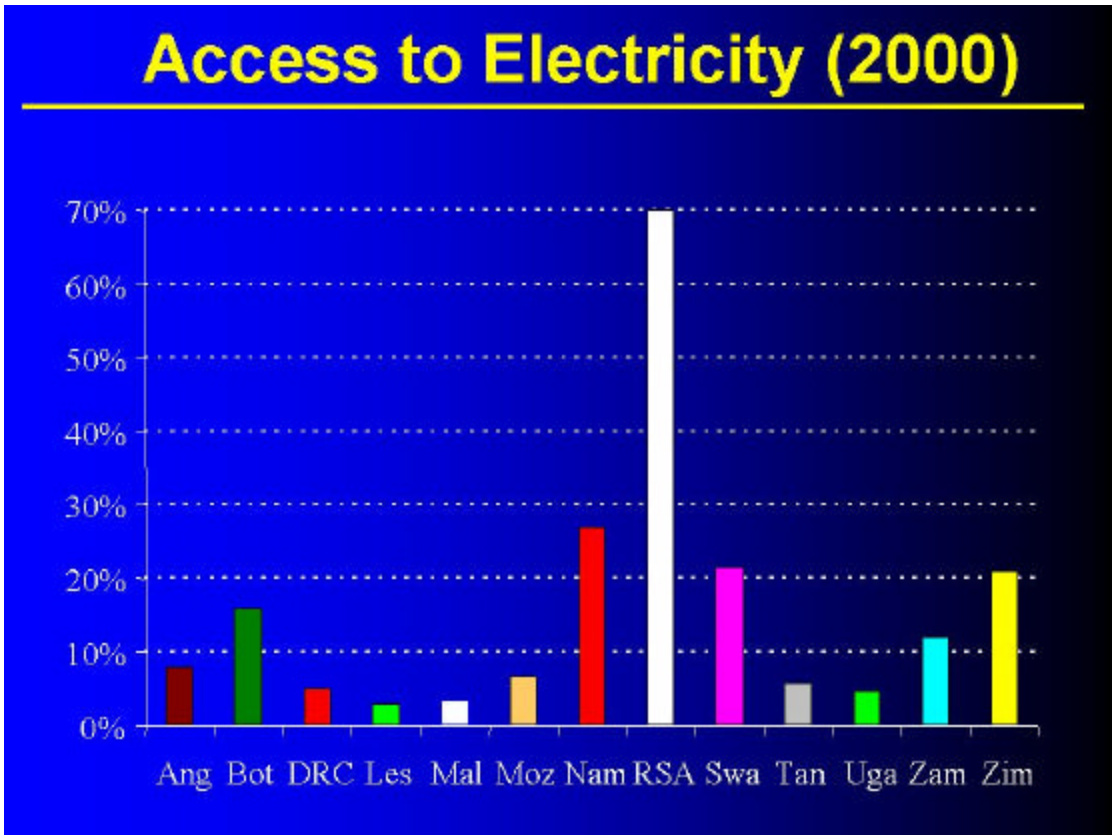
Dr Xolani Mkhwanazi, National Electricity Regulator for South Africa.

Dr Mkhwanazi enumerated the strong driving forces for change in the electricity sector. There was firstly the poor financial performance of many of the (state-owned) utilities. Another factor was limitations of public sector financing for expansion and refurbishment. A major technical weakness in distribution was due to the role of municipalities, some 40% of whose revenues come from the sale of electricity. The present managerial inefficiencies had to be dealt with.

The unsustainable subsidisation of certain categories of customer also created problems. Subsidies should be transparent. Electricity is often inappropriately priced (usually as a result of political pressures). There is also a growing belief in the benefits of private sector involvement, but it was stressed that to reap these benefits the sector would have to be structured properly.

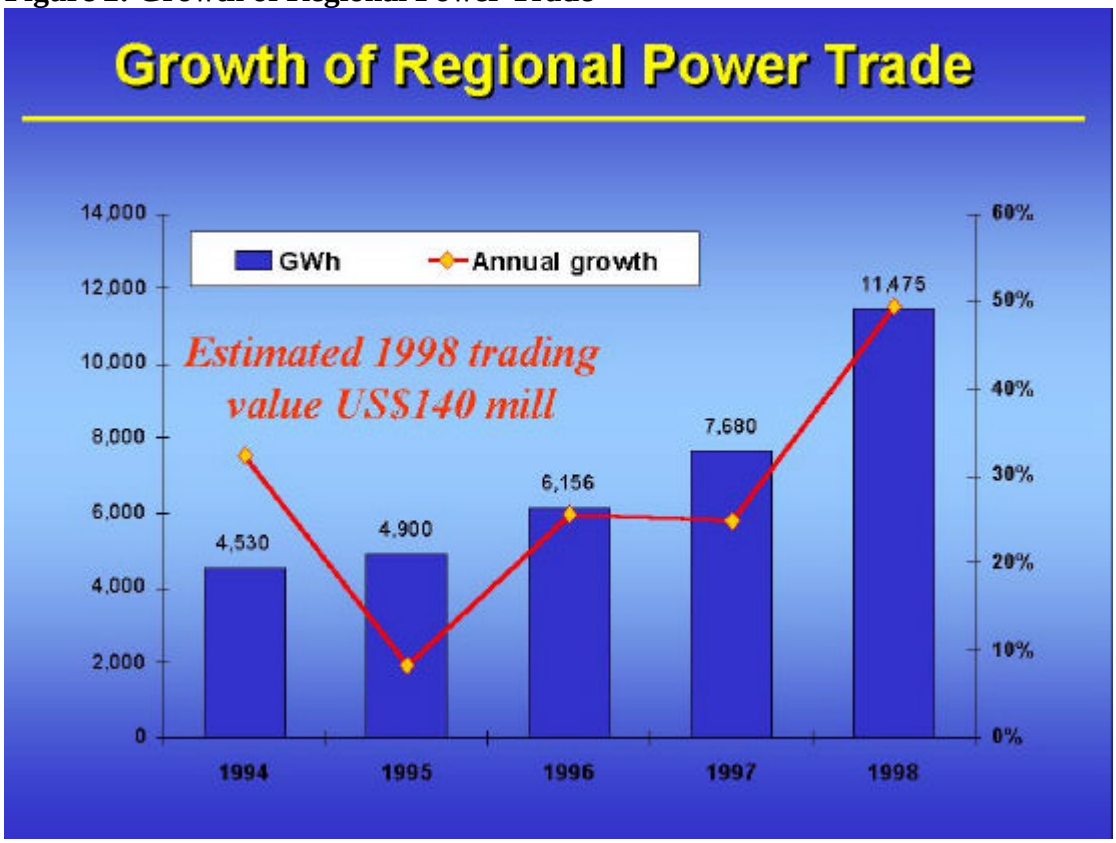
Reform is strongly on the agenda, driven by the sector's need to raise capital and to improve its efficiency. The reform focus is *firstly* on the industry's structure, which should be changed to enhance competition. *Secondly*, greater private sector involvement is needed. *Thirdly*, in view of stronger private sector involvement, better regulation is necessary and *fourthly*, improvement in access to electricity for broad population groups is a key priority.

Figure 1: Access to Electricity, Countries in SADC Region (% coverage)



The growth of regional trade in power has been strong over the last four years as shown by Figure 2.

Figure 2: Growth of Regional Power Trade

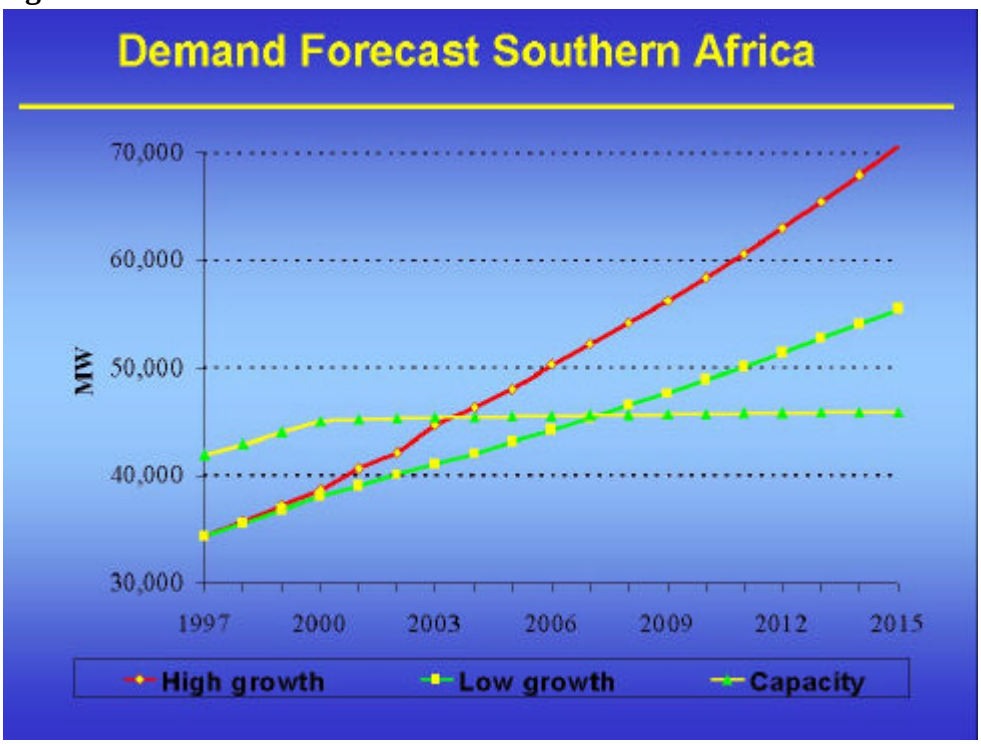


As shown by Figure 3, there is a high probability that demand will outstrip capacity during the next few years.

The sources of supply for the region are likely to broaden. Up to the present, the sources have been mainly coal generation and hydroelectricity. **Coal**, supplied from RSA, Zimbabwe and Botswana, has been the basis for the generation of 80 % of the power in the region. **Hydropower** has good potential and is generated in all countries of the region except Botswana. Of the countries in the region only RSA has generated **nuclear** power.

In the future it is likely that **coal**, because of its low cost, will continue to play a role. **Hydropower** was called a mode of the future. The price of **natural gas** supply will go down as the use of gas increases. Coal-bed methane will also be used. **Renewables** like **solar**, **wind** and **geothermal energy**, etc. are preferable for environmental reasons but at the present time these sources are too costly to have an impact on overall supply. On **nuclear** power there is today a lively discussion in South Africa and elsewhere on the basis of piloted new technology, which has some

Figure 3: Demand Forecast for Southern Africa



promise for use in very small nuclear stations, even making nuclear power possible for off-grid electricity. **Co-generation** will probably mostly be used for localised needs. **Demand side management** (DSM) will play a much greater role than at present. In a regional grid within an enlarged regional market, DSM will have great potential through the timing of the demand regionally.

There seems to be no doubt that liberalization is taking hold. The following quotes from electricity acts and energy policies serves to underline the trend:

> "To allow private sector involvement in the generation, transmission, distribution and supply of electricity in the country" (Malawi Electricity Act, 1998)
>
> "The Board shall... monitor the levels and structures of competition… with a view to promoting competition…" (Zambian Energy Regulation Act, 1995)
>
> "Creating a conducive environment for private sector investment in the power sector" (Kenyan Energy Policy, 1997)
>
> "The State shall ensure the participation of private initiative in the public service of electric energy supply…" (Mozambican Electricity Act, 1997)

Liberalization and Reforms will have several components:
Private sector investment and participation will be encouraged, especially in generation and distribution. Structural changes will allow for competition, starting with generation. Commercialization / corporatisation of state-owned utilities will take place. New institutional arrangements for electrification will be established. This will particularly focus on ways of financing electrification. There will be considerable legal reforms with new electricity acts focusing on spelling out the "rules of the game" and on catering for a "level playing field" between competing suppliers. The

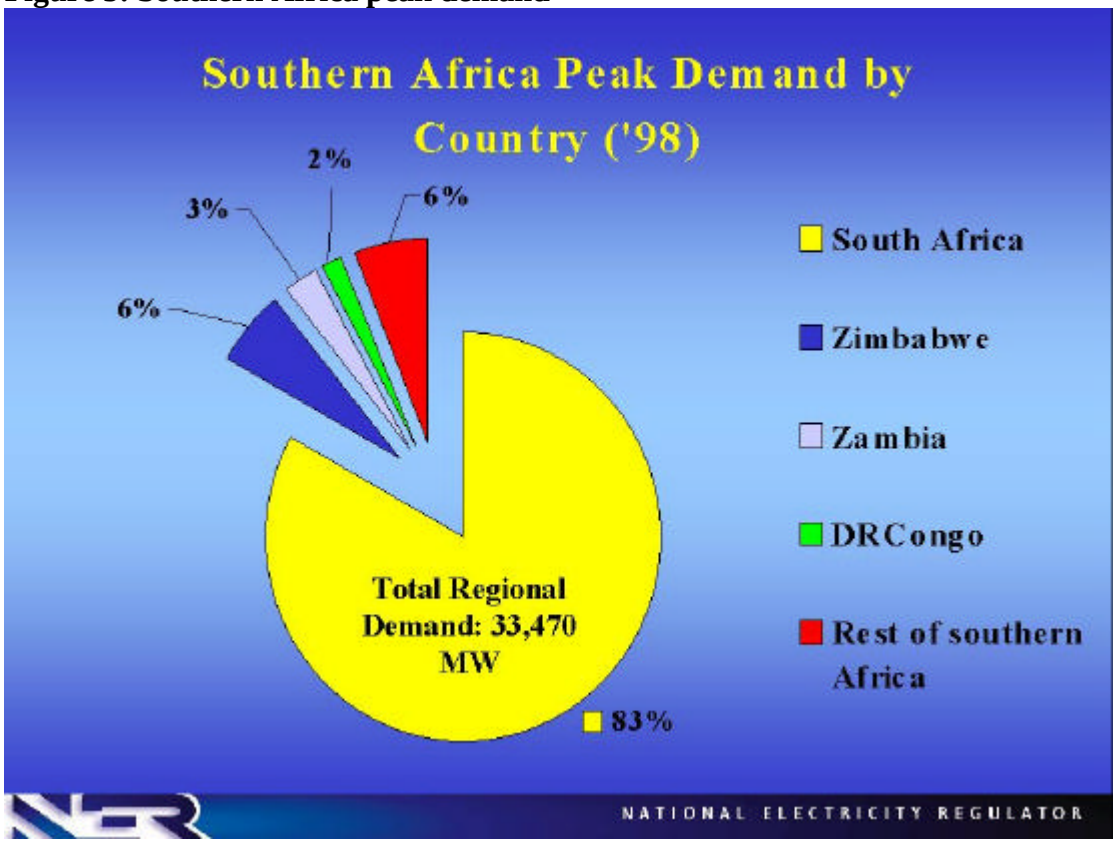
regulatory reform is likely to include independent regulatory authorities, with powers to approve prices, quality of supply and service standards.

The process of market reform in the electricity supply industry (ESI) often progresses as shown in figure 4. The process transforms a monopoly wholesale market through development of independent power producers with a single buyer to wholesale competition monitored by a regulator and later to retail competition. Countries like Norway and the United Kingdom have already arrived at the retail competition phase. South Africa is now aiming for the wholesale competition stage and not retail competition.

Figure 4: ESI market reform

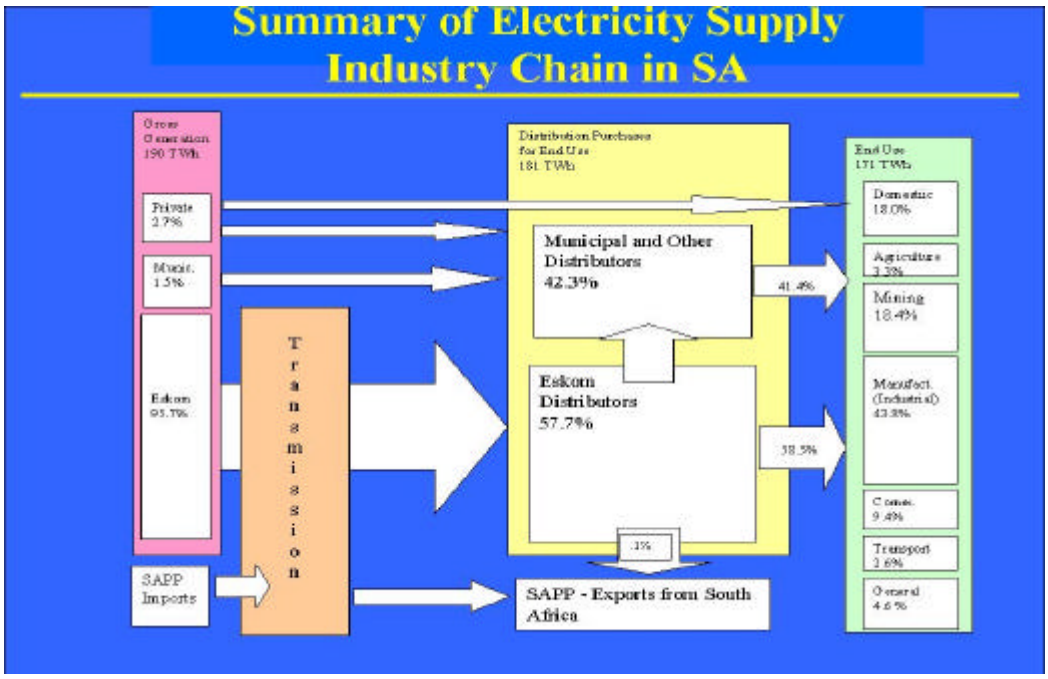
Figure 5 indicates that the overwhelming share of demand for electricity in the region comes from South Africa. In future, it is likely that there will be competition in the South African market from countries outside. Also, there should be potential for foreign investment in energy in South Africa.

Figure 5: Southern Africa peak demand



As figure 6 indicates, the South African electricity supply industry is completely dominated by Eskom, which is the 5th largest utility in the world and works with a large number of municipal distributors. The recently established 'unregulated' arm of Eskom, called Eskom Enterprises (EE), is very active in the region as well as in other parts of the world. Eskom has technical competence and access to financing at reasonable cost.

Figure 6: Electricity Supply Industry Chain in SA



The anticipated restructuring of the electricity supply industry in SA would follow a phased design to fit with South African circumstances. Under the plan, the electricity distribution industry (which now consists of municipalities and ESKOM direct) would be rationalised to six *Regional* Electricity Distributors (REDs) by 2004 (Figure 7 below). After this, the generation and transmission would be reformed in phases illustrated by Figures 8, 9 and 10 below. First, Eskom would be corporatised and generation and transmission become independent operations. Subsequently, private sector involvement and competition would be introduced.

Figure 7: Regional Electricity Distributors

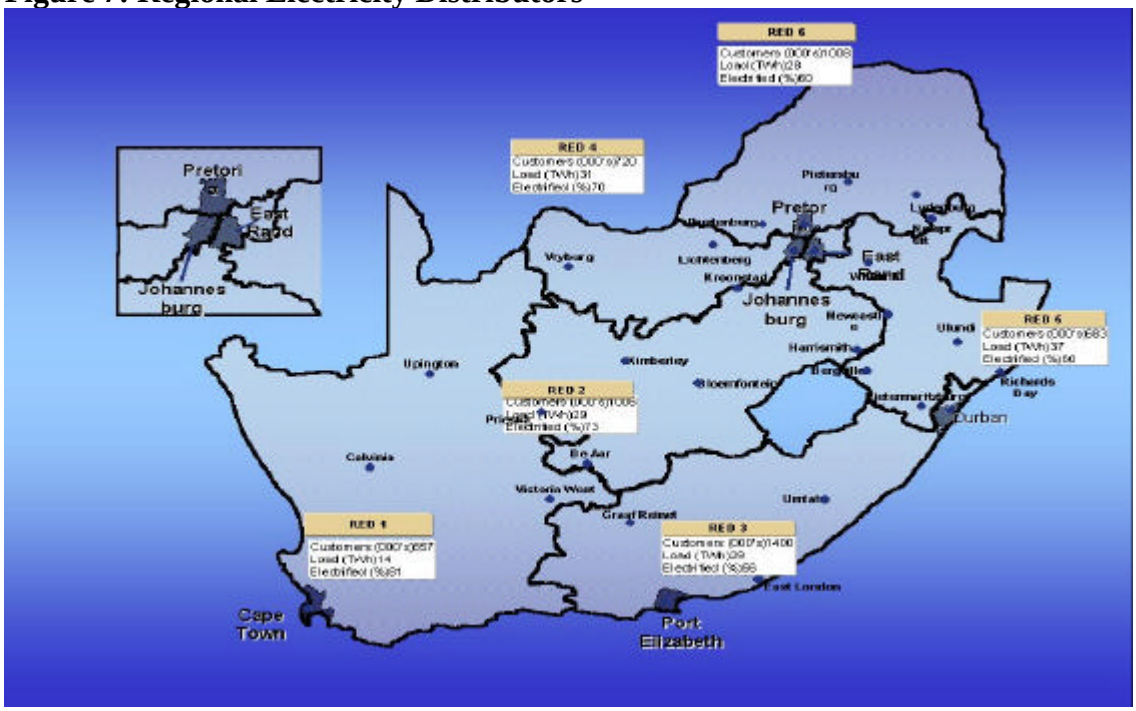


Figure 8: Generation and Transmission Reform, Step 1

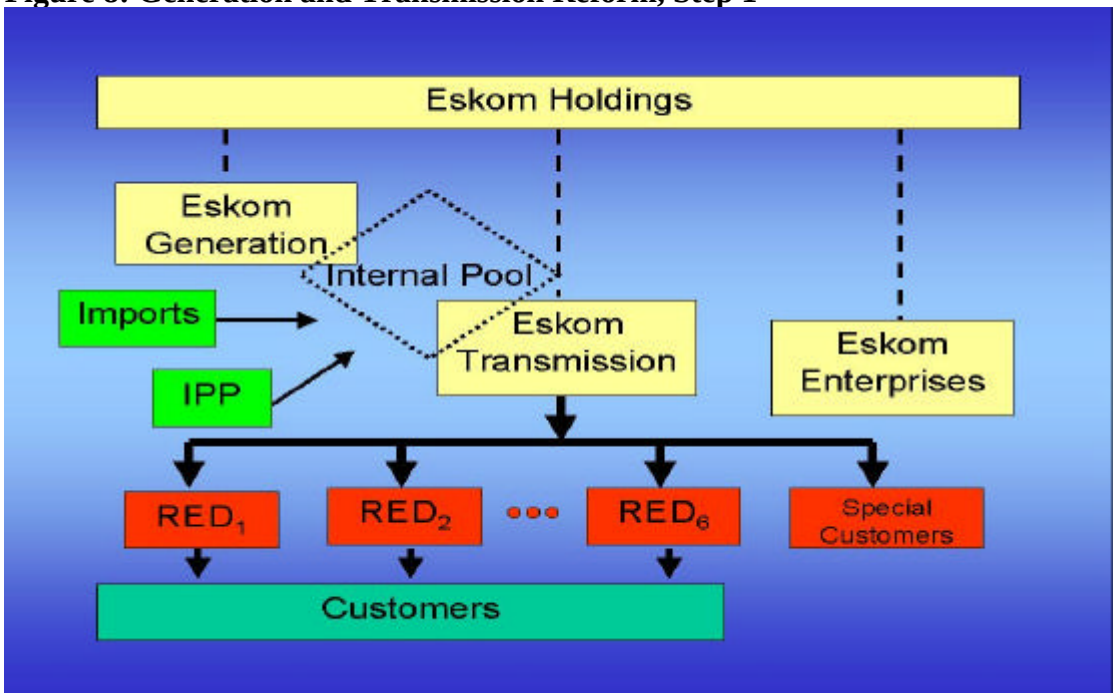


Figure 9: Generation and Transmission Reform, Step 2

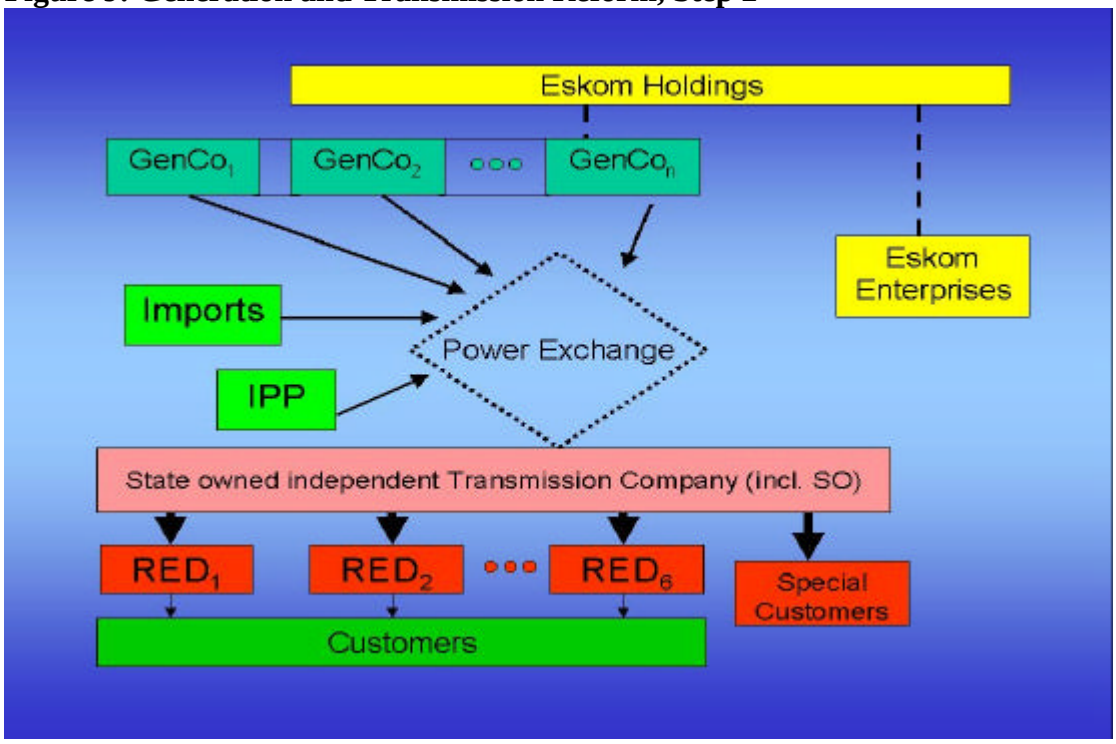
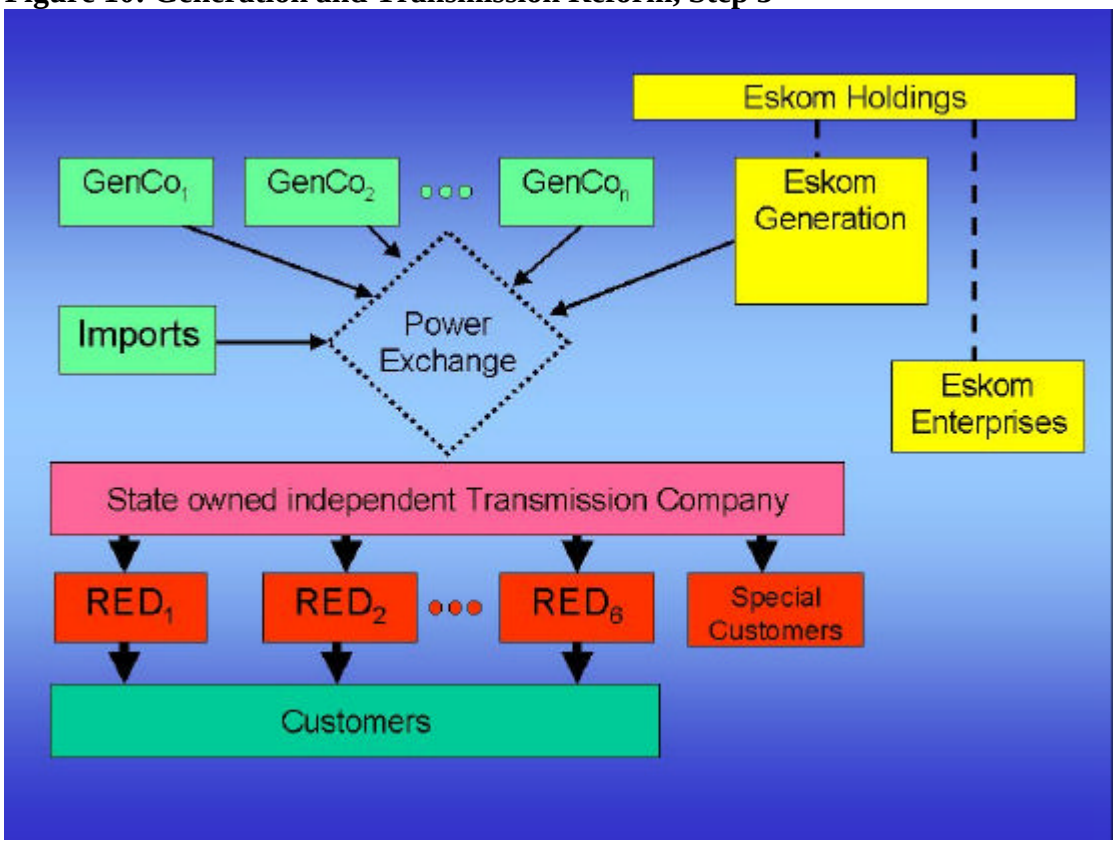


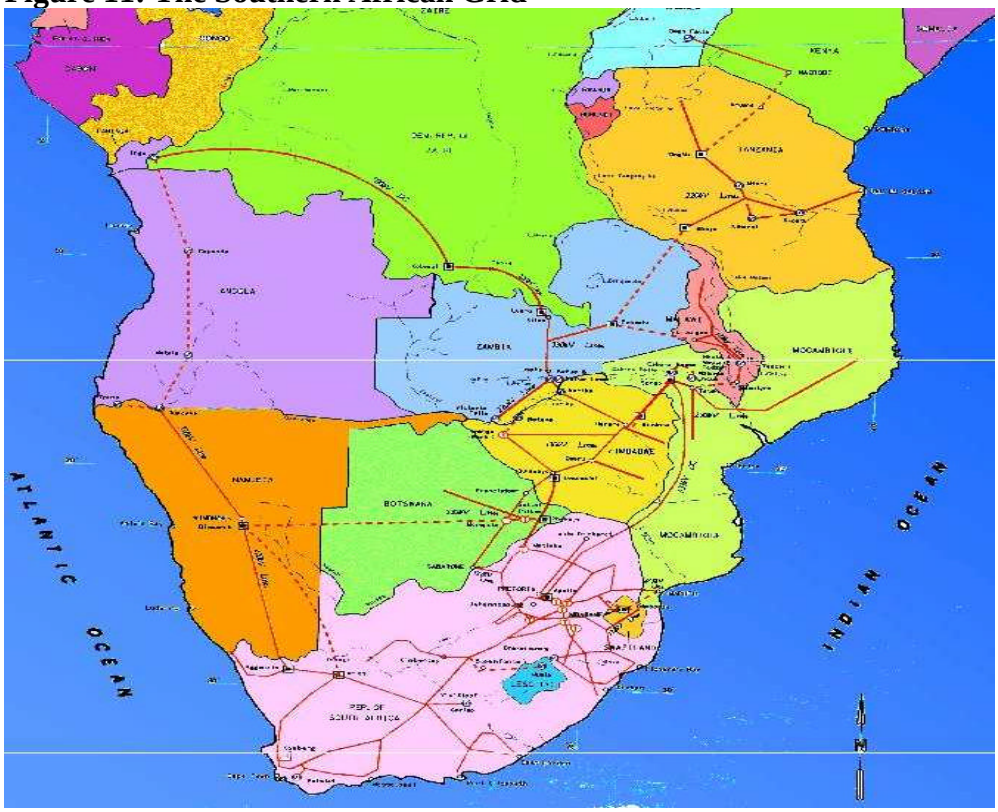
Figure 10: Generation and Transmission Reform, Step 3



The Southern African Power Pool (SAPP) Plan

With regard to the Southern African grid, Figure 11 below shows the present situation.

Figure 11: The Southern African Grid



The objective of the SAPP Pool plan is to develop a strategy for the overall generation expansion for the SAPP and to highlight the benefits that can be derived by the members from a co-ordination of their individual expansion plans.

The Pool plan analysis compares two primary scenarios, the first based on the existing independent plans for the different utilities and the second showing the alternative, which optimises regional projects based on free trade. The **Pool co-ordination benefit** *is defined as* **cost of Base Case** *minus* **cost of best Alternative Case**.

The current trends in regulation are toward independent regulators that will take technical and not political decisions to encourage investment and set the licensing conditions. In terms of the economic framework, the trend is towards transparency in tariff setting and open access to the grid. The regulator will also be responsible for the support of social and national objectives. In terms of regional co-operation the regulator may channel support from development agencies and support the regional harmonisation of models.

The regulator's role in development is to contribute to the investment climate through

- Having political independence, through ensuring a level playing field for market participation. The regulator should also ensure that there is consistency and long term stability in the regulatory framework.
- Acting as an implementation agent in support of social and economic /

industrial programmes and electrification.
- Delivering expert resources to support government in policy formulation.
- Promoting economic efficiency, particularly in the areas of competitive pricing systems, quality and service standards, and security of supply.

The need for regional regulatory collaboration arises from
- An increasing integration of electricity systems towards common electricity markets.
- Significant benefits from scale economies and shared resources.
- Needs for a framework for transactions to take place.
- Needs for regulatory arrangements for systems operations.
- Need to have oversight of the system of tariffs for the use of transmission infrastructure.

The scope of regional regulatory collaboration may include
- Sharing of expertise, experiences and information.
- Cross-border trading issues such as access to transmission capacity and cross-border transmission tariffs.
- Regulatory aspects of co-ordinating system operation.
- Harmonisation of market structures.

All SADC countries see benefits from the establishment of a regional regulatory association. They do not seem constrained by their different stages of regulatory development at national level. It is important that a regional regulatory body only deals with regional issues and does not interfere with national mandates. RERA should be designed to fill existing regulatory gaps. The organisation can learn from other SADC initiatives.

The objectives of RERA are:
- Capacity building, information sharing and experiencing sharing. This includes information sharing and skills training at national and regional levels.
- Co-ordination of regional policy, strategy and legislation by recommending frameworks for policy, legislation and regulations for cross-border trading access and tariffs and by supporting harmonization of regulatory frameworks and legal rules for systems operations/access.
- Regional co-operation in regulation. RERA may make recommendations on the economic regulation of electricity interconnections and trade between SADC member states as mandated.

The membership of RERA is open to regulators and relevant government departments in member countries and other countries by approval of SADC Energy Ministers. Each country is entitled to a single membership and memberships will be renewed on an annual basis.

Collaboration in electricity regulation through RERA enables gains to be made from increased co-operation and trade through SAPP. The gains emanate from utilisation of shared system reserves, each country using a larger (regional) set of generators which creates cost savings and price reductions to end customers. Also, RERA will put in place a regulatory framework to oversee market liberalization and facilitate

investment in the region by encouraging the countries to use "common rules of the game" and promoting certainty for investors.

Another regulatory organisation aims at covering the whole continent, the African Forum for Utility Regulators (AFUR). The Forum comprises electricity, telecommunications and water and was initially a World Bank initiative. It is now under the control of the Africans members. The Forum shares information and lessons from experience and is seen as an excellent capacity-building tool. The group allows for harmonization of ESO policies, laws and regulations and a workshop is likely to take place in South Africa during May 2002. NER is the founding chair.

One may conclude that there is change underway in the ESI in the SADC region, that regulators are playing an important role in this and that regulatory collaboration is crucial for the success of regional economic development and integration. NER is committed to playing a constructive role in both RERA and AFUR.

Comments from the floor
It was noted that most of southern Africa is interconnected. A similar degree of connection is not found in any other part of Africa. The southern African region thus plays a vanguard role in the whole of sub-Saharan Africa.

The question of an expansion of RERA outside the SADC region was raised. Kenya and Uganda were mentioned. What would be in their place in RERA? The answer was that RERA would wish new, outside SADC members welcome.

The negative sides of privatisation were pointed out by making reference to the Californian "crisis". How could things go that wrong even in the presence of a proper regulator? The answer included the following points:
The case enforces the need for a proper regulator. The problem, however, was in the structure of the sector, not so much in the regulator

- Operators were obliged to trade through the power pool
- Transmission lines were owned by the utility companies
- Environmental legislation in California cut down the profits of energy companies so that few would invest there
- Extreme weather

On the question of regulating **environmental** requirements Dr. Mkhwanazi informed the group that NER is an **economic** regulator only. Other departments in South Africa take care of environment and safety. A co-ordinating unit linking regulations in the economic, environment and safety sphere will be set up.

The issue of political interference in regulatory bodies was raised. It was pointed out that the regulators would have to report to governments but their institutions would ideally be set up by an act of Parliament. This was designed to insulate regulators. The relation with Government is the same as in other cases of statutory institutions: Government sets the policy framework but when the framework is implemented or operated, the regulator may not be interfered with. The regulator is the court system, but the state sets the law.

The structure of relations between environmental, safety and economic regulations in the various countries of the region was not completely consistent. This is one of the problems that will have to be discussed within RERA. Here RERA may work through SADC to bring problems and suggestions up to the ministerial level in the region. Without SADC this would be difficult.

On the question of capacity it is clear that some regulators are quite new and inexperienced. Training programmes may rectify this and the countries may learn from each other.

Pointing out that in some countries there is only 2% electrification, a participant questioned whether it is useful to put much effort into regulation when electrification is the problem. What comes first, electrification or regulation? The answer was that regulation is social investment. The average cost of connection in southern Africa is four times what households pay. You cannot really have electrification without industrialisation.

Presentation 2: Southern Africa: An Energy Overview

Fernando Julião, SAD-ELEC

SAD-ELEC was formed in 1995 as a NGO to facilitate energy systems development in SADC. The organisation is now a private consulting company, specialising in electricity and natural gas with a focus on southern Africa.

The presentation set out to cover Traditional Energy, Modern Renewable Energy and Commercial Energy: Electricity and Gas. Petroleum was to be covered in a later contribution by the Norwegian Oil Directorate.

Brief characterisation of the SADC Energy Sector:

- Rich energy resource base, but still heavily dependent on traditional (biomass) fuels
- Oil resources in Angola and South Africa, with exploration ongoing in many countries
- Gas resources in Angola, Mozambique, Namibia, South Africa and Tanzania
- Coal resources in many countries, particularly South Africa, Botswana and Zimbabwe
- Coal-bed methane potential
- Nuclear energy is used in SA
- There is considerable potential for renewable energy development
- A comprehensive regional electricity transmission grid exists
- There is strong growth in regional energy trade

Traditional Energy

In Southern Africa (excluding SA) biomass provides between 50 to 80% of the gross supply of energy. In rural areas biomass represents more than 90% of the gross supply of energy. In South Africa, biomass supplies around 25% of the energy needs of households. Coal dominates the energy economy, accounting for 70% of primary energy.

The prominence of biomass is likely to continue in the southern African energy picture. SADC's programmes as RPTES (Regional Programme for Traditional Energy Sector) and PROBEC (Programme for Biomass Energy Conservation) are of critical importance.

Modern Renewables

Southern Africa is well endowed with sunshine, with average solar radiation among the highest in the world. Wind energy resources are less favourable, wind energy mainly being used for water pumping. There has been, however, only limited usage of solar and wind energy sources as alternative energy sources so far.

The countries largely have energy policies which are positive towards renewable energy options, but there is a lack of institutional support and of commitment to actual implementation. Power utilities are, however, increasingly paying attention to various modern renewables as a complement to grid electrification. More extensive use of

such energy sources is dependent on, among other things, cost reductions and financing solutions.

Botswana has the highest number of solar panels per inhabitant. South Africa has local capability to install 6 MW PV/year. The commercial supply network of photovoltaic technology in the region has potential to grow. In South Africa there are private off-grid concessions which may possibly be replicated in other countries.

Electricity Supply Industry Overview

The SADC energy sector has a rich energy resource base, but is still heavily dependent on traditional (biomass) fuels. There is oil in Angola and South Africa, with exploration ongoing in many countries. There is gas in Angola, Mozambique, Namibia, South Africa and Tanzania and considerable development in this sector is perhaps the most prominent feature of future developments in the regional energy sector. Many countries have coal resources but they are particularly big in South Africa, Botswana and Zimbabwe. There is also potential for coal bed methane. Nuclear energy is used only in South Africa. There is considerable potential for renewable energy development. The regional electricity transmission grid is comprehensive and there is a growing regional energy trade.

Electrification is a great challenge for the countries in the region. South Africa has shown an impressive capacity for delivery and has connected 2,500,000 households during the period 1994 – 2000. In Namibia, Botswana, Zimbabwe and Zambia governments appear committed to electrification and programmes are in place. In Mozambique and Lesotho, the focus is on private participation with expansion subsidies. Countries like Malawi and Swaziland have attempted to separate commercial management from social delivery.

In the SADC region the electricity supply industry varies greatly between countries. There are vast differences between physical, financial and technical capabilities. There is a low access rate and liberalisation is taking place.

Key electricity demand developments in Southern Africa are characterised by the following:

- Growth is expected to be between 2.2% and 3.5%.
- Annual demand growth would be between 1,000 and 1,700 MW.
- Existing surplus capacity will be exhausted between 2005-2010.
- South African dominance is expected to reduce from 84% to 76%-77% by 2020.
- Zimbabwe's position as the second largest market is strengthened.
- Mozambique's role increases significantly.

Figure 12: Supply and Demand Balances (2000)

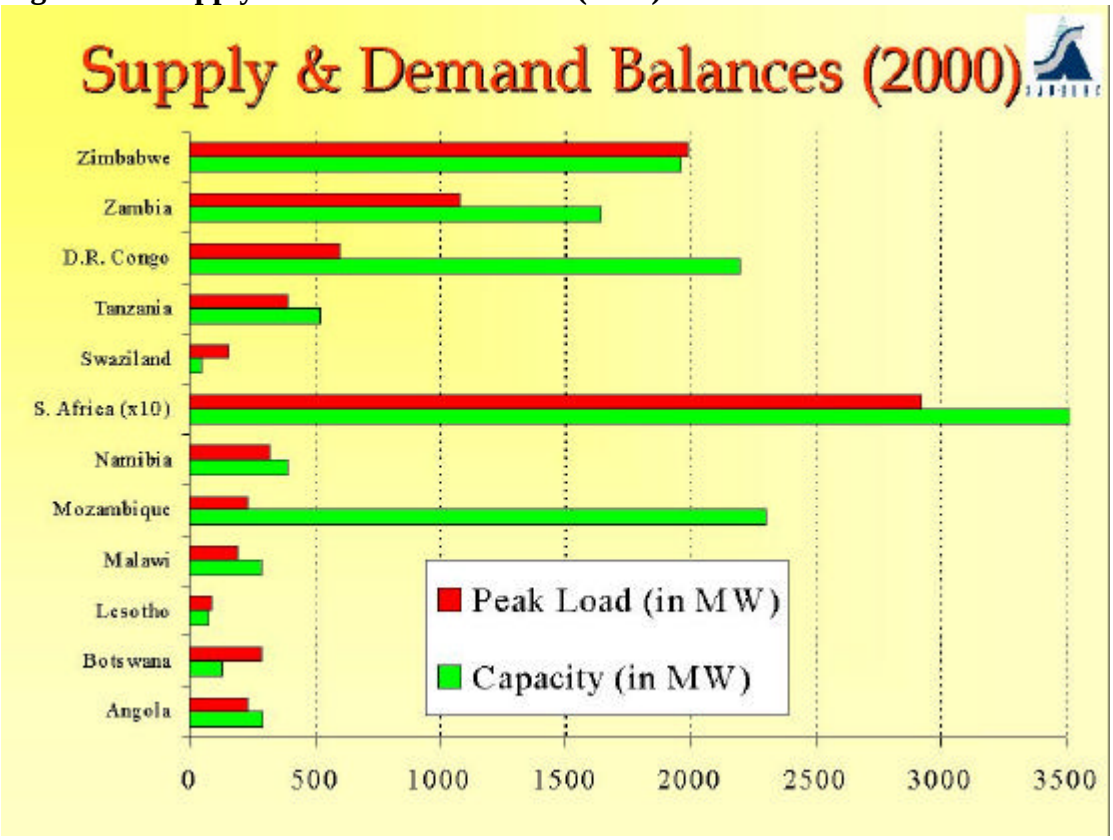
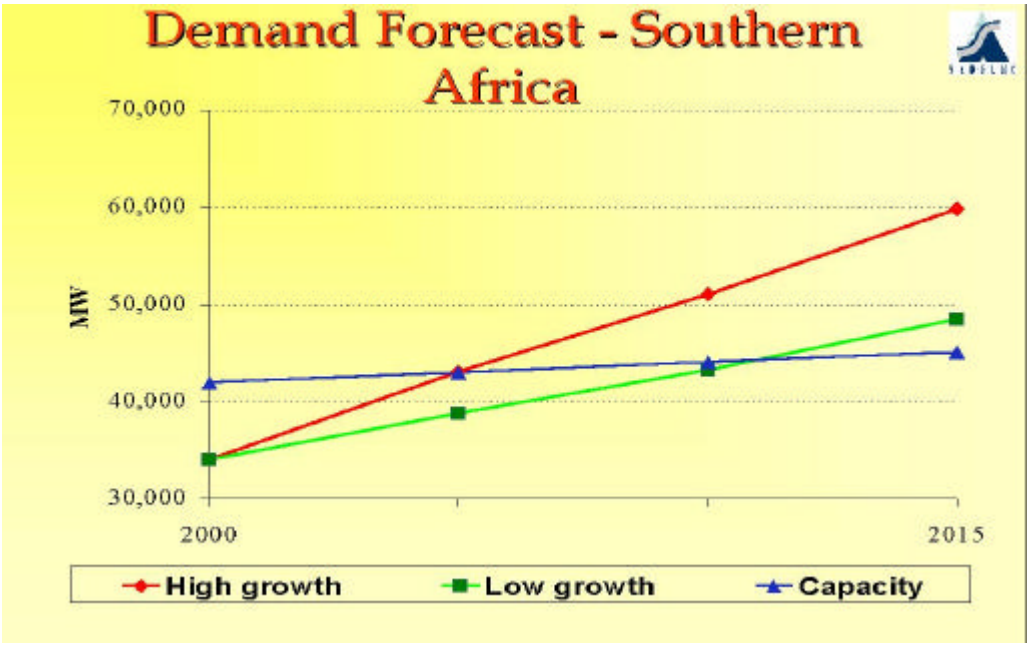
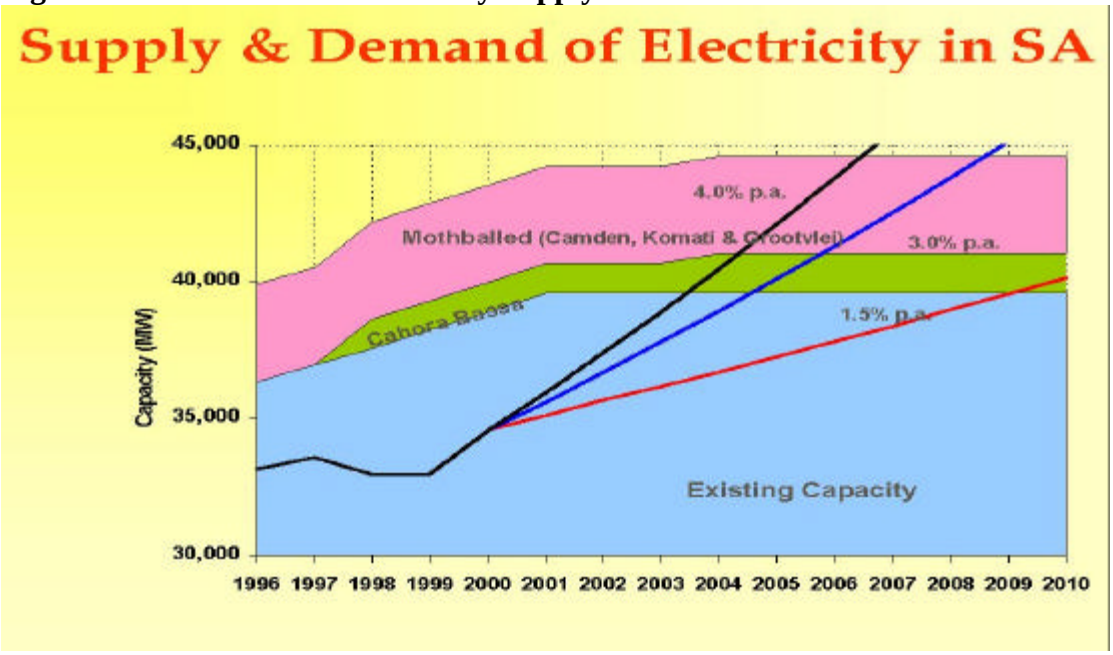


Figure 13: Electricity Demand Forecast for Southern Africa



The figures above show that capacity is rising slowly and that, depending on the assumptions for demand, supply will be insufficient somewhere during the period from 2005 to 2015. The regional situation is heavily influenced by the South African picture, which is set out in Figure 14 below.

Figure 14: South African Electricity Supply and Demand



With the lowest demand variant, it appears that existing capacity will nearly be enough to last until 2010. With the higher demand forecasts South Africa will run out of power supply between 2005 and 2008.

Whereas the present energy supply in southern Africa is based on coal in South Africa, Zimbabwe and Botswana, hydroelectricity in the rest of the region (except Botswana) and some nuclear generation in South Africa, the future will see a larger number of power supply options. These will include coal, hydro power, natural gas, coal-bed methane, and renewables such as solar, wind, and geothermal and possibly some nuclear generation. It is likely that there will be greater emphasis on co-generation and demand side management to "stretch" existing supply sources. The latter will mean expansion in regional power trade.

Apart from improved use of existing surplus capacity, possible new generation capacity would be:

- New coal plants in RSA, Zimbabwe, Mozambique and Botswana.
- New hydro projects in Mozambique, Zambia, DRC and Namibia.
- Gas fired plants in Namibia, Mozambique and South Africa.
- Options including pumped storage schemes and pebble bed nuclear generation.

Regional Electricity Trade

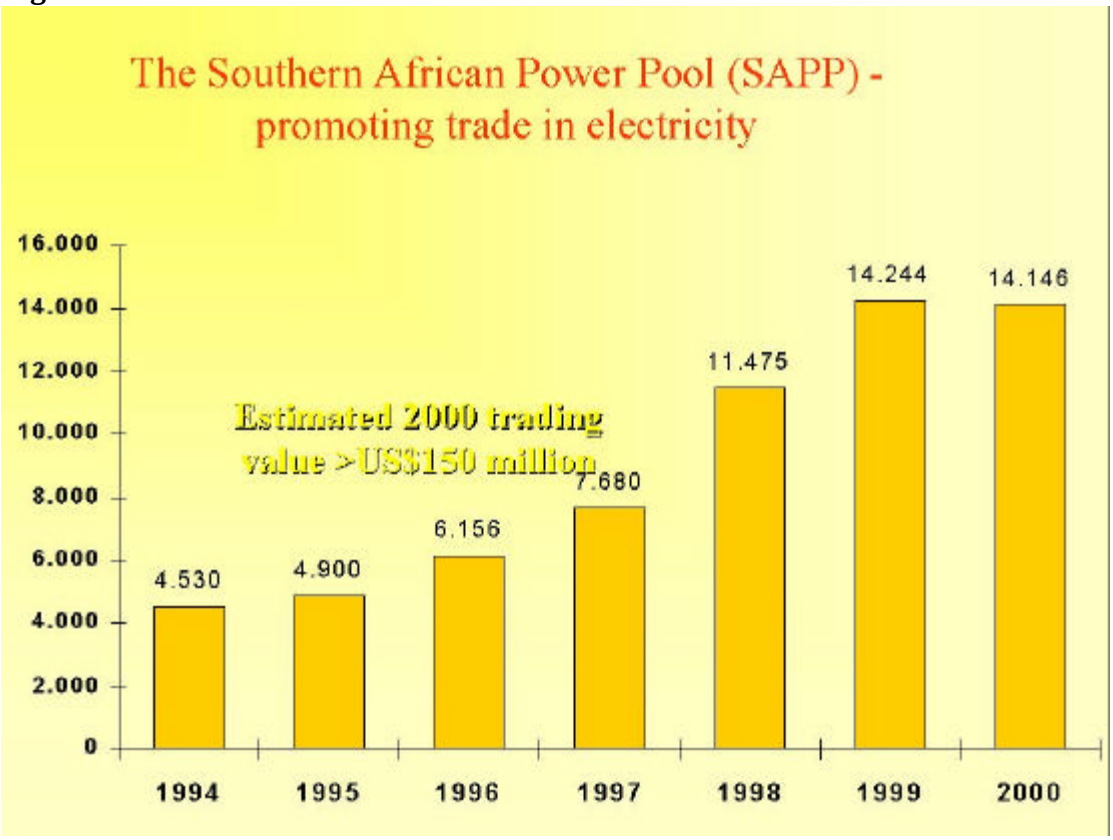
The history of electricity trade in the southern African region dates back to the early 1950s. Annual electricity exchange has been doubling every five years. The pace is now increasing.

In 1998 Eskom exports represented about 50% of the regional electricity trade and Cahora Bassa was the main regional trader in the short/medium term.

Most trading in the Southern African Power Pool (SAPP) is via bilateral contracts, the organisation serving as a wholesale market for short-term surpluses. The participants can use the short-term electricity market (STEM) to cover temporary shortages. The

challenges for SAPP at the present time are to increase number of participants in the short-term electricity market and to decongest tie lines. The need to decongest is particularly connected to two international transmission lines in the region where capacity is too low. These bottlenecks are on the borders between Zambia and DRC and on the border between Zimbabwe and South Africa. The success of STEM might motivate the creation of a regional spot market. Figure 15 below shows the development in regional power trade through SAPP.

Figure 15: Power trade within SAPP 1994 – 2000



The next two Figures, 16 and 17, shows the price ranges used in electricity **trade** and **average** price ranges for electricity sales by the regional utilities. Note the high prices for Eskom distribution. This is particularly bad for Swaziland which imports most of its electricity from South Africa. Also, in figure xx it should be noted that the STEM contract prices are probably even lower than shown in the graph. Note also in Figure 17 the very high average selling price for the CEB in Mauritius.

Figure 16: SAPP contract trade price ranges

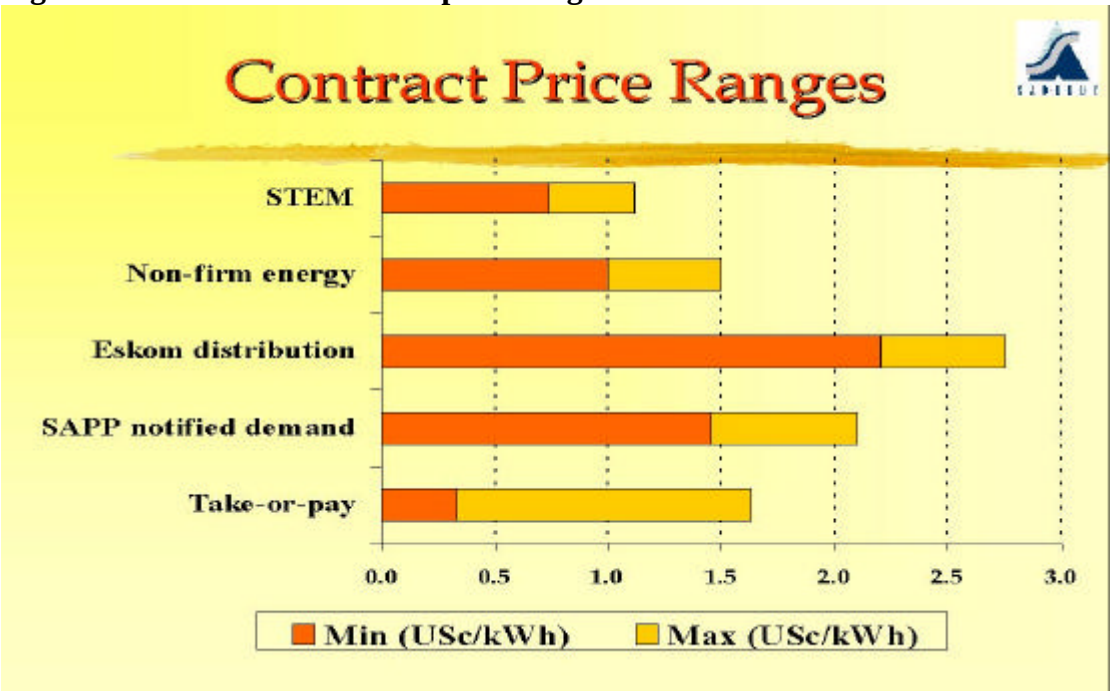


Figure 17: Average Electricity Selling Prices 2001

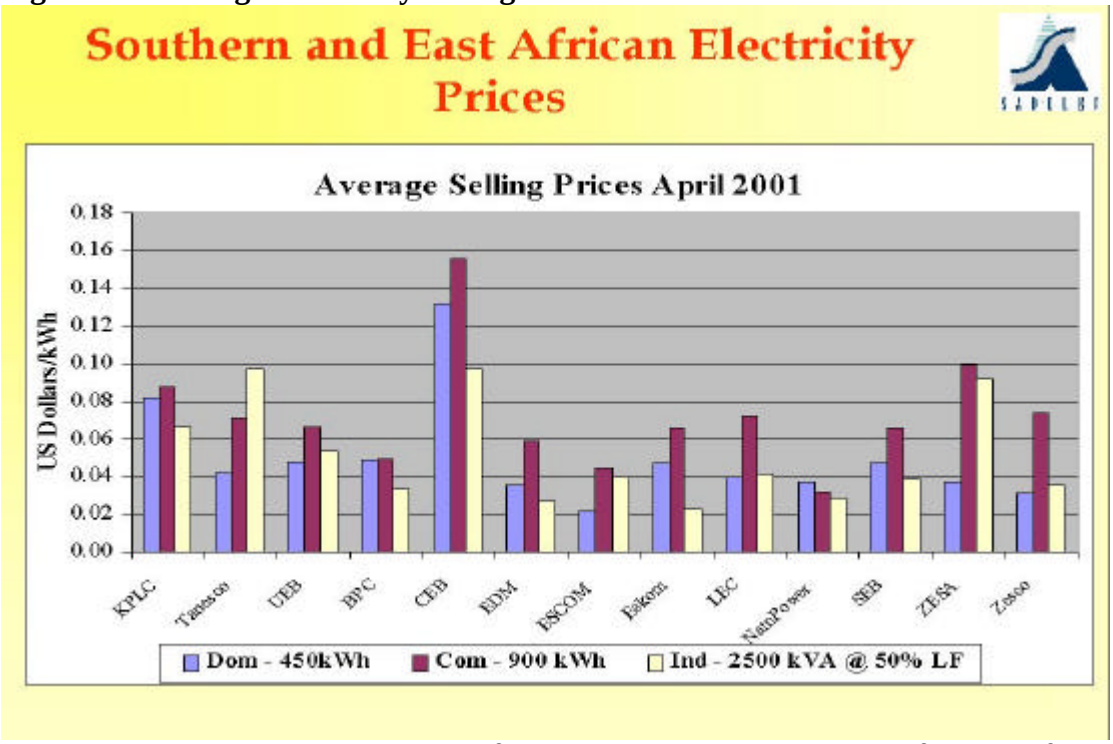
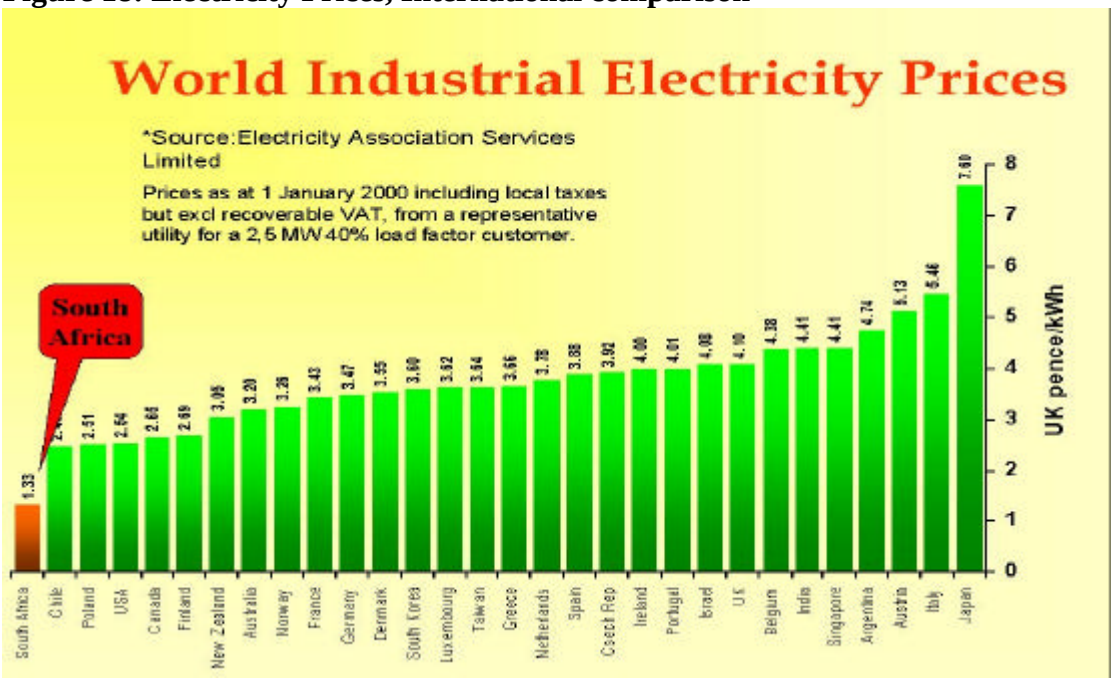


Figure 18 compares electricity prices for selected countries with that of South Africa. Prices are lower than e.g. in Norway by a factor of some 2.5. Reasons for this are several. Firstly, South Africa is endowed with vast quantities of low cost coal (shallow, low grade, limited alternative market value). Secondly, the power stations there have been designed to meet local conditions and are all built in close proximity to the coal reserves. This reduces cost since it is cheaper to transport electricity than low-grade coal. Thirdly, Eskom is operating its large coal fired power plant at high

levels of efficiency. Finally, Eskom has been exempted from tax (and dividends) and has had access to very cheap capital.

Figure 18: Electricity Prices, International comparison



On the question whether these low electricity prices can be sustained there are factors pulling both ways. The **case for continued low prices** would be supported by (a) the likelihood of surplus capacity until 2006 (peaking) and beyond 2010 (base load), (b) the expected low to moderate economic growth, (c) a wide choice of generating options as pointed out above and (d) restructuring of the distribution industry, although it may potentially have a price raising effect in the short term. The restructuring of the industry would contribute to greater competition and thus stimulate efficiency. The low average age of Eskom power stations, minimizing the need for costly new investment, would contribute to maintaining the low-price situation in the longer run. Finally, and probably most importantly for continuation of the low price situation, is the funding of electrification, which is now paid through Government budgets and not by customers or the electricity industry.

There are also a number of factors that imply an **upward pressure on electricity prices**. The plans for corporatisation of Eskom would have a substantial effect. Corporatisation would result in Eskom paying tax and dividends, which is not the case for the time being. Furthermore, Eskom's low level of profitability would in all probability have to be reversed by moving towards the 'normal' levels of return which obtain in a competitive electricity industry. A strong emphasis on social delivery aspects, and shifting of the present burden of cheap electricity for the poor away from Government budget financing over to cross subsidy so that better-off electricity customers and electricity industry players would pay more of the cost, would increase prices for the latter. Also, it is clear that the future will see more pressure on environmental issues and the need for "clean" electricity, implying environmental costs for industry players. In case of higher economic growth there would be an earlier need for new generation and supply capacity, which in a more commercial (corporatised) setting for the industry would necessitate investment costs being

factored into electricity prices in the near future. Devaluation and / or continued real depreciation of the Rand would also drive up electricity prices.

There is a considerable need for investment in the sector for the future. Any investment in this sector has long time horizons. An important question is whether price levels that are regarded appropriate from the viewpoint of households and commercial consumers will be sufficient to attract private investment. There are many regional projects of a multinational character. Presently there is dependence on a financially weak parastatal sector and public sector resources are limited. Donor fatigue and re-orientation causes concern. For investment in the sector to take place, credit enhancement facilities are required.

Is it then realistic to expect that private sector involvement will be appropriate to keep the supply growing at the required pace? There are a number of examples in various African countries of how the private sector has been or could be involved.

- In e.g. Namibia, Côte d'Ivoire and Mali, governments have used **Service Contracts,** contracting out responsibility for energy sector services.
- Lesotho, Malawi and Tanzania have used **Management Contracts,** transferring responsibility for certain core operations.
- In Ghana, Egypt and Morocco, **Build Own Operate Transfer (BOOT)** concessions have been used for the financing (and later transfer) of new or rehabilitated assets.
- **Divestiture**, i.e. the sale of existing energy businesses, has taken place in Senegal, Zambia, Lesotho and South Africa.

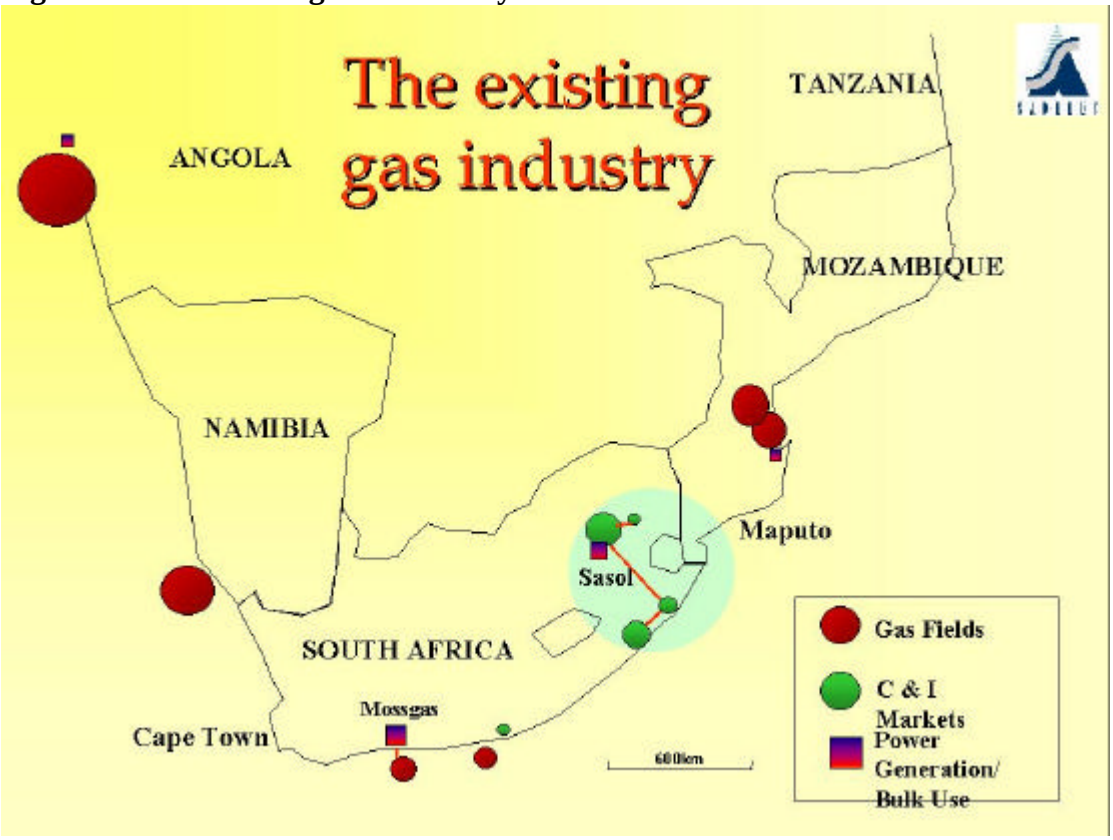
The role and scope for independent power producers (IPPs) in the region could be considerable. The appearance of more IPPs could complement governments' investment efforts, bring financing skills into the sector and introduce new technological solutions to the sector. It might also contribute to market development and efficiency improvements as well as give support to ongoing sector reform initiatives. The great challenge for the countries is to handle the private segment of the power sector in such a way that consumers will not be exploited at the same time as the private entrepreneurs benefit from an enabling environment which brings significant **regulatory challenges.**

Gas Developments in Southern Africa

In Southern African the gas supplies mainly come from four countries:

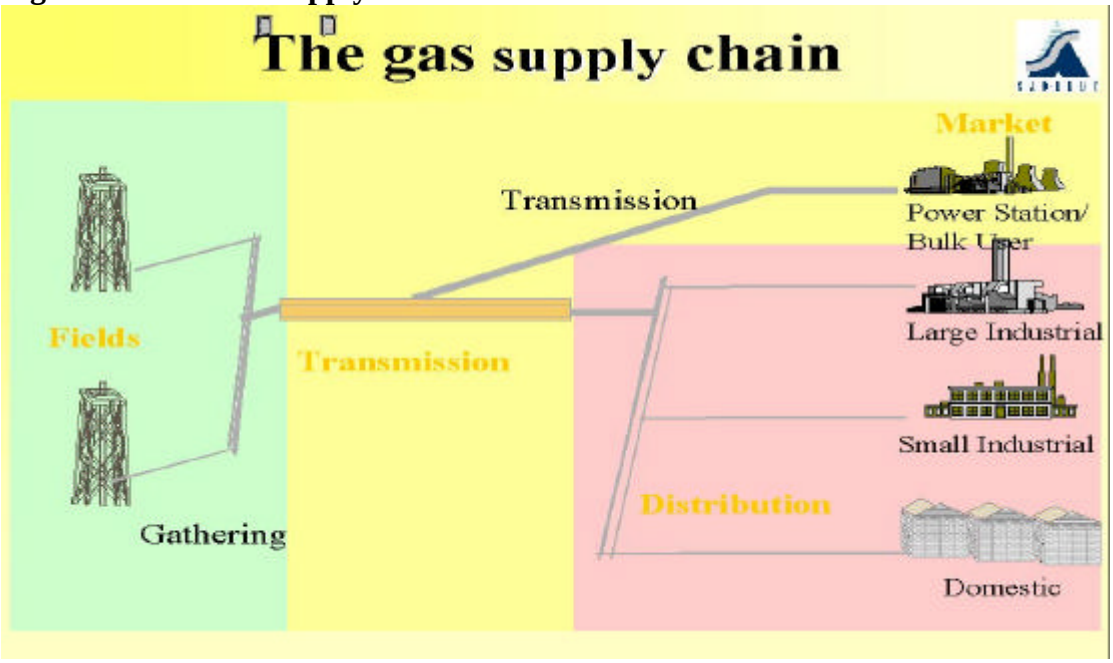
- In **Angola** there are major resources of gas associated to oil and as dry gas, but the market is presently limited to some small-scale needs for power generation in Cabinda.
- In **Mozambique** there are proven resources in the Pande and Temane fields (onshore), but no market. There may be small-scale demand for power generation locally.
- In **Namibia** there are proven resources in the offshore Kudu field, but no market solution.
- In **Tanzania** there are proven resources and plans for gas-to-power projects at Songas and Mnazi Bay.

Figure 19: The Existing Gas Industry in Southern Africa



Gas may be used as thermal energy for residential purposes (heating and cooking), for commercial purposes in heating, incineration and cooking, and in industry for steam raising, drying, kiln firing, furnace firing, cooling, heat treatment and slab re-heating. In feedstock and process applications, gas may be used in the production of direct reduced iron (DRI), in ammonia production, in mineral beneficiation, in power generation, in co-generation and in other applications, e.g. methanol.

Figure 20: The Gas Supply Chain



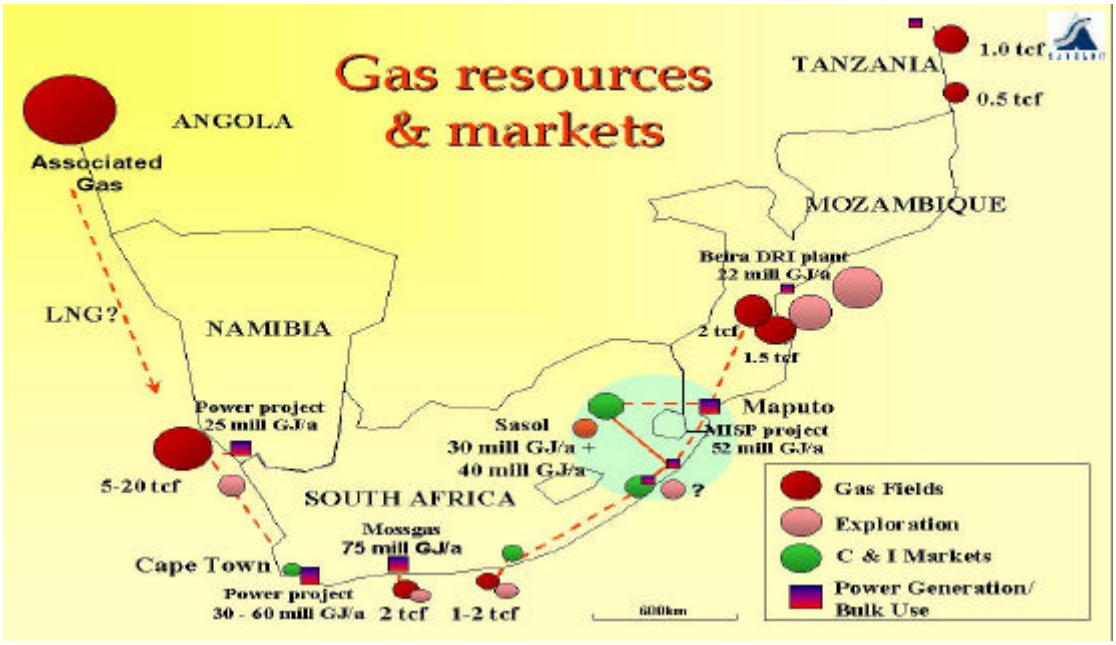
The key general characteristics of the gas industry are its need for networking, forming an integrated chain from supply to end-user. The production and transmission / distribution necessitates large up-front investments in dedicated equipment and long-term transport solutions. The preferred production profile is a plateau over a long period and capacity expansion is often lumpy. Increasing returns to scale normally apply.

When introduced into the energy market, gas will have to be able to compete not only on price but also with the convenience, environmental friendliness, ease of storage and reliability of competing supplies. Gas is rigid in volume and therefore must be flexible in price. A long-term relationship needs to exist between buyer and seller. Transport cost is a major element in the end-use price. Aggregation of demand (customers) is important because of the economies of scale. Efficient load management is important to reduce the cost of service.

The region may produce various types of gas: Natural gas (including associated gas) may be supplied from Angola, Mozambique, Namibia, South Africa and Tanzania. Coal-bed methane may be produced in South Africa, Zimbabwe, Botswana, Mozambique and Swaziland. Sasol in South Africa can produce synthetic gas where present production is based on coal gasification, including hydrogen-rich gas (HRG) and methane-rich gas (MRG).

The reasons why the gas industry, despite being small, has received so much attention are several. Firstly, gas is gaining market share globally (clean fuel image). Secondly, the expansion of gas fits well into the present drive to increase fuel diversity. There is also relatively fast growth in certain industries that require gas as feedstock. Not least, the use of gas has environmental benefits through a reduction in CO^2 emissions, low particulate emissions, negligible sulphur content and high-energy efficiency (e.g. combined cycle application). In the southern African region development of the gas sector would be conducive to implementation of regional agendas and commitments which focuses on using the potential market in South Africa as an outlet for the gas resource base, which is primarily situated in neighbouring countries.

Figure 21: Gas Resources and Markets



The Gas Industry in Southern African Countries

South Africa

In South Africa gas constitutes 1.5% of primary energy supply and 1.2% of net end-use demand. Sasol is the dominant industry player with coal-gas produced at Sasolburg and Secunda, and feedstock to synfuel/chemical operations and pipeline gas distribution (Gauteng, Mpumalanga and KwaZulu Natal). Metro Gas (Johannesburg) is the only distributor, recently privatised as Egoli Gas. Mossgas is the major user of South African gas. It is likely that the country will have gas resource constraints beyond 2007.

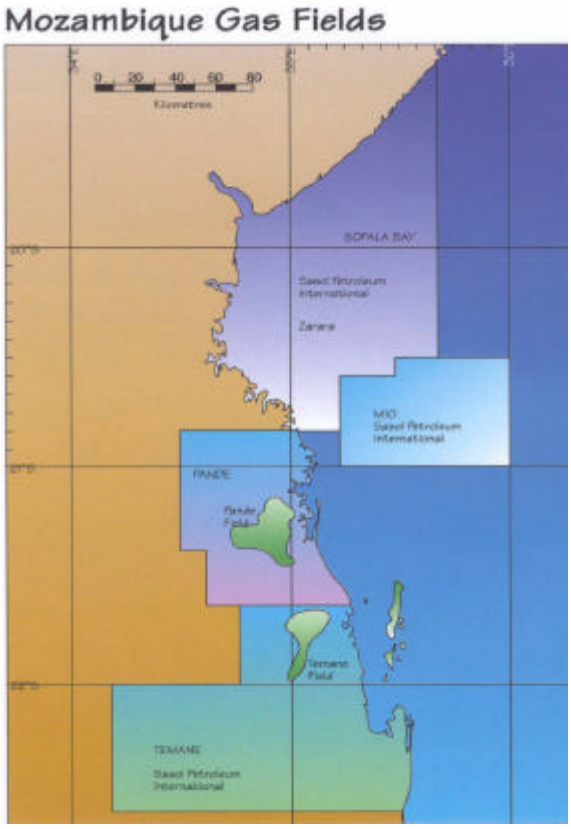
Angola's Gas Programmes

Angola has major resources of both oil-associated and dry gas, but the present market is limited to small-scale demand for power generation in Cabinda. Gas utilisation studies are being conducted for the South Congo basin. A Texaco / Sonangol project for LNG production in Luanda is emerging. A financing study by Citibank and tendering for a FEED study are ongoing.

Mozambique's Gas Reserves and Development Prospects

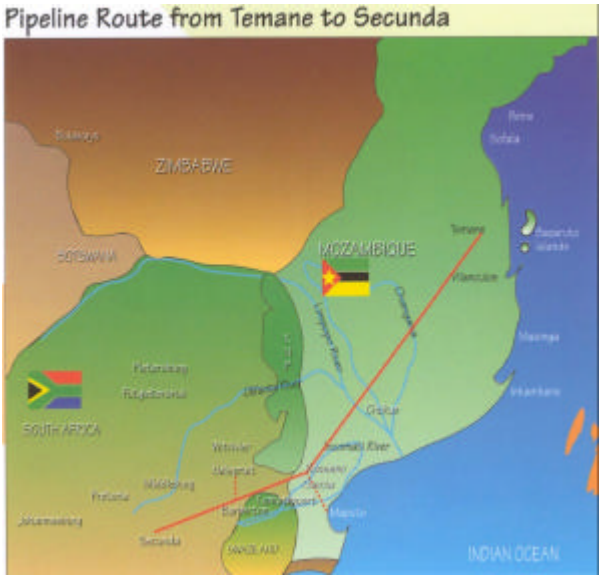
Proven reserves, for the Pande and Temane fields only, are approximately 2.0 tcf. An independent audit set reserves at Pande to 1.5 tcf. and at Temane at 0.5 tcf. Upside potential (probable reserves) in Pande and Temane are estimated at 1.5 tcf or more. Possible reserves are located in Sofala Bay, even though two wells (at M10 and Buzi) have shown disappointing results recently.

Figure 22: Mozambique Gas Fields



Sasol is the dominating player: It has a 70% share in unified Pande and Temane, with ENH, the local company, holding 30%. It has 90% in Sofala Bay (10% to Zarara Petroleum) and Sasol owns 100% of M10.

Figure 23: Pipeline from Temane to Secunda



Gas developments focus Mozambican and South African market opportunities. Sasol is pushing a "Mozambique-to-South-Africa" gas project which would comprise:

- Joint development of Pande and Temane, initial gas coming from Temane (70% Sasol, 30% ENH).
- Gas cleaning and compression facility at field (100% Sasol).
- Gas transmission pipeline (50% Sasol, 50% to Governments of Mozambique and South Africa).
- Gas offtake in SA (100% Sasol).
- Gas to be used at Sasolburg, Secunda and for pipeline gas.
- 120 mGJ/year minimum offtake envisaged (but pipeline with final capacity of 240 mGJ/year).
- Project requires 3.5 tcf to be sustainable (25 years).

The Government of Mozambique is pursuing local market options, which include a MISP in 2 phases, Phase 1 with 25 mGJ/y guaranteed supply from Pande reserves, small-scale gas usage and a Beira-based petrochemical complex.

Namibia's Gas Programmes

The Kudu Gas Field is a major offshore field, 180 km from the coast in 160m water depth. Shell is presently the main operator, holding 75%, Texaco 10% and Engen Africa 15%. Commercial reserves (without further drilling) are 1.3 tcf proven, but a review under way may prove ±2.0 tcf. Such reserves may give e.g. 1000 MW CPP + 500 MW OPP for ca. 20 years.

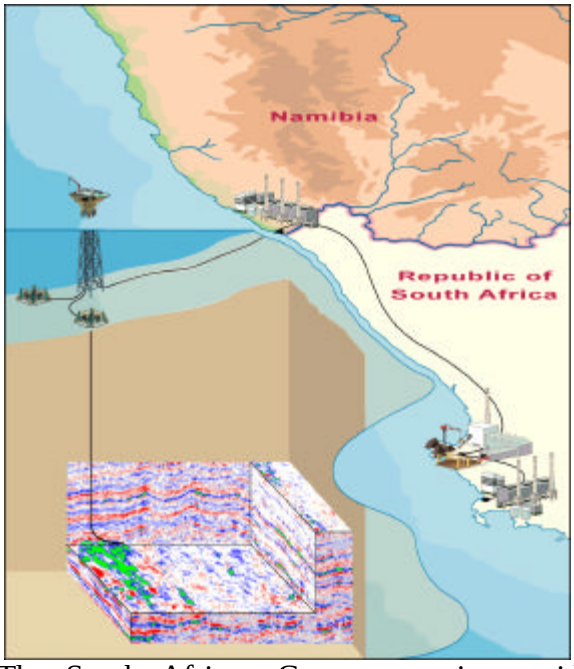
Confidence in the reserve estimates are supported by several successes to date. Five successful wells have encountered gas with no water contact. Four wells have been production tested (K1,K3,K4,K5), 700 km^2 3D Seismic, 3350 km^2 2D Seismic. The

expectation for the field is about 7 tcf (planning basis), with an upside estimate of above 20 tcf. So far, spending on exploration has been approximately US$ 100 million.

Kudu Gas Market Opportunities

The developers (led by Shell) are pushing for power generation as an anchor. Key projects are the Oranjemund Power Project (OPP), 400 MW CCGT, and the Cape Power Project (CPP), 1600 MW CCGT in Cape Town. Development depends on ESI reform and Eskom's role. There would be additional market for industrial gas usage in the Western Cape. The 'first gas' for these projects is targeted for 2006/07.

Figure 24: Kudu Gas Market Opportunities



The South African Government is considering an alternative with Mossgas as (additional) anchor customer whereas Shell may be considering LNG export.

Gas Programmes in South Africa

South Africa only has limited proven reserves, mainly in the Bredasdorp Basin. From these reserves supply to Mossgas is 75 mill GJ/yr. Satellite developments will sustain supply to 2008.

There are now a number of areas where there is renewed interest for exploration. At the West Coast several companies are exploring. Forrest Oil has discovered an indicated resource of 0.4 (upside 1.35 tcf). Resources indicated by Sasol and Global Energy are speculative. At the South Coast Pioneer Natural Resources has 1.1 - 1.7 tcf indicated and Ranger Oil a speculative resource. The East Coast exploration with Phillips/Sasol/PanCanadian/Energy Africa has been a disappointment.

Gas Reserves and Development Prospects in Tanzania

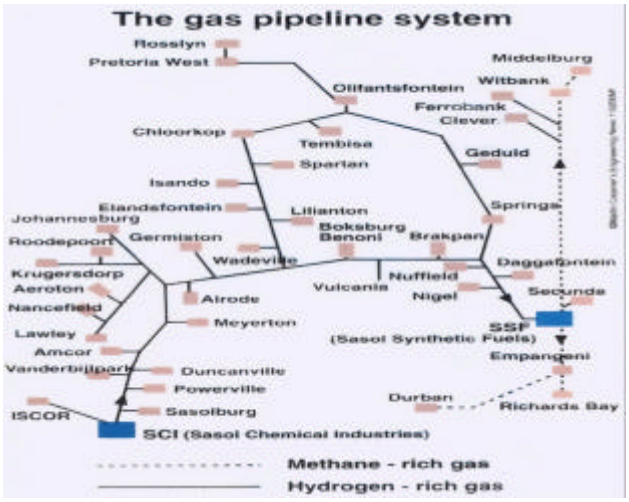
Tanzania has proven reserves of approximately 1.5 tcf with 1.0 tcf (based on recent independent reserve audit) in the Songo Songo field and 0.5 tcf (estimated) at Mnazi

Bay. There are private developers pushing both projects - mainly targeting power generation as anchor customers. AES and PanAfrican Energy Corporation are active at Songo Songo, as well as Cinergy and Global Power, with the latter in a leading role, at Mnazi Bay). Realisation of gas projects is closely linked to power sector reform.

The most realistic gas market opportunity in Tanzania is the Songas Project (i.e. Songo Songo). This consists of a 112 MW open cycle GT generation at Ubongo in Dar es Salaam (supplied from 5 wells, through 270 km of pipeline, to four existing GTs), with a target date of 2003 (financial close planned for August 2001). There would be an additional supply to Wazo Hill cement factory in Dar es Salaam. Total project costs would be US$310 million of which US$ 110 million has already been spent. Future additional possible gas sales are production and pipeline capacity equivalent to 250 MWe of gas supply. Another 38 MW of gas-fired generation at Ubongo is also possible. A subsequent step would be a gas pipeline to Mombasa, Kenya, which is now under under discussion. Mnazi Bay could yield small-scale power generation (15 MW) for an area without access to grid electricity.

The main demand for gas in the region comes from Sasol's gas distribution operation. This takes coal-gas from the Sasolburg and Secunda plants to 600 customers and 1,500 km of Sasol-owned pipeline network. Another company, Metro Gas, supplies 3 mill GJ/yr to 15,000 customers in Johannesburg and 10 mill GJ/yr of MRG (34 MJ/m3) from Secunda to Mpumalanga and KwaZulu Natal. Annual growth in demand has been 10% or more.

Figure 25: Gas Pipeline system in South Africa



The South African demand for gas is expected to expand over the years to come, for several reasons. First, the Sasol plants will increase their use of gas, Sasolburg by replacing coal and Secunda through expansion. Secondly, new 'greenfield' projects are also likely to use gas in i.a. production of iron and steel, mineral beneficiation, production of ammonia, methanol and slurry-bed diesel. Thirdly there is likely to be increased use/switching in 'brownfield' projects such as KZN co-generation projects for refineries, paper mills, minerals and metal industries. Fourthly gas will in all

likelihood penetrate industrial and commercial markets such as metal manufacturing, ceramics and glass, chemicals, food and commerce, as well as increase in Metro Gas and new gas distribution operations (e.g. Nelspruit). Finally the use of gas for power generation will expand, as for example at Western Cape and/or KZN (Richards Bay).

The South African vision of gas in the future is based on the expectation that its share of the energy market will increase from the present 1.2% to 15-20% in 20 years' time. The public sector will clearly play a role in providing and facilitating basic gas infrastructure (transmission pipelines) as well as providing regulatory certainty for private investors. To get the demand for gas up to a high and stable level it will be necessary to stimulate viable 'anchor customer' developments and initiate gas trade agreements with neighbouring countries. The sector would benefit from a change in relative energy prices. The increased environmental focus will also be a benefit for the sector. The possible barriers to development are the limited reserves of indigenous gas in South Africa as well as the low cost of alternate fuels, particularly coal and electricity. But basic factors limit demand, in particular the mild climate in South Africa, which creates no demand for space heating. Long distances from sources to markets and between markets would contribute to pushing up costs, which would become relatively high in a low value market. Limited growth would also lead to cooperation by Eskom and Sasol. The underdevelopment of environmental frameworks could also put a brake on the development of the gas market.

Presentation 3: SADC Energy Sector Development

Fernando Julião, SAD-ELEC

SADC is a group of 14 developing countries forming an economic community. Its market comprises 200 million people, with South Africa as the economic hub. The countries are committed to economic reform and trade liberalisation. The region is rich in mineral and energy resources and its policies and frameworks are focused on attracting private investment and finance.

The regional energy sector is in a 'state of flux' with reforms at both national and regional level. The reforms include new policy frameworks focusing on

- competition, private sector participation and enhancing access to affordable energy services;
- environmental sustainability and the role and involvement of women - particularly in the traditional energy sector;
- changes in the role of the public and private sector;
- reform of industry structure and composition;
- new institutional arrangements for both commercial energy supply and the traditional energy sector and development of regulatory frameworks - focused on licensing, price regulation and land tenure - to establish 'rules of the game' and build confidence among investors, financiers and private participants.

The institutional framework for the energy sector in SADC is also in transition. A SADC Energy Commission (SEC) has been ratified by Member States and became operational in April 2001. SEC will be clustered under SADC's Directorate of Infrastructure and Services. The SEC's Technical Unit (SEC-TU) Director has been appointed.

SEC-TU will change its orientation away from a predominantly operational focus (programme and project management) to a focus on regional policy, strategy and macro (resource) planning issues

The Technical Unit supports the SADC Energy Commission. The objective for the sector is to attain optimal regional social and economic benefits from the use of energy resources, while achieving the balance required to attract investment and finance.

The key activity areas for the sector are cost-reflective and market-based energy pricing; development / modernisation of legal and regulatory frameworks; information databanks on energy resources, supply and demand aspects; interaction with regional and international organisations; investment promotion and finance mobilisation. SEC-TU will need to focus on:

- Initiation and co-ordination of (high-level) regional IEP
- Facilitation of energy trade
- Promotion of energy resource development
- Promoting and supporting DSM and energy efficiency
- Supporting initiatives aimed at broadening access to energy
- Contributing to training and capacity building

The SADC Energy Activity Plan

SADC Energy Ministers approved the SADC Energy Action Plan in Arusha, Tanzania, in 1997. SADC - TAU was requested to develop a comprehensive Energy Activity Plan to reflect strategic and priority energy activities to be carried out in the short to medium term. The Energy Ministers appointed a task team after considering CVs received from Member States.

The objective of the Activity Plan is to detail a programme of priority regional activities to be implemented over a 3-5 year period: the activities should be appropriate, affordable and sustainable, and there should be consideration of the best options for institutional organisation, co-ordination and management of activities. Furthermore, the activity plan should reflect the cooperation framework in the SADC Energy Protocol and maximise the involvement of stakeholders

The Plan conducts a careful review of situation, needs and developments in the four focus areas:

- energy trade
- investment and finance
- organisational capacity building
- information and experience exchange

The Plan incorporates the views and proposals of Member States and identifies priority activities per focus area (existing, reformulated and new ones).

The Energy Activity Plan was completed in November 2000 and endorsed by SADC energy sector stakeholders. It is supposed to be a 'living' document to be updated regularly. The plan has a five-year time horizon and four focus areas:

- Energy trade
- Investment and finance
- Capacity building
- Information and experience exchange

The plan lists 30 activities with regional focus and defined priorities (compared to the previous portfolio of 43 projects). A main line of activities is the encouragement of private participation in investment, financing, management and operation as well as the active involvement of SADC Member States and regional energy institutions.

Energy Trading

Supply- (resource and capacity) and demand-side aspects indicate considerable scope for regional energy trading. The best potential seems to be in electricity, liquid fuels and natural gas. The scope for electricity trade is illustrated by SAPP developments. The liquid fuels trading potential originates from a situation where the refineries are mainly in South Africa, whereas the resource base is located in other countries and, in addition, from the existence of regional port/transport infrastructure. Natural gas trading is about to emerge, being initially focused on exports from Mozambique and Namibia to South Africa. Limited cross-border trading in coal and biomass also exist.

Private participation is key to boost regional energy trading. It is important to realise that there are trade-offs between national and regional interests. There is a need for

energy price reform. A harmonised legal, regulatory and market framework in the region will enhance the efficiency of regional energy trade.

Trading risks (real and perceived) may constitute obstacles to the strength of member states' resolve to encourage energy trade. At the *technical* level the increased complexity in planning and operations as well as the risk of 'imported' system disturbances into national grids may appear to be an argument for regional trade. *Institutionally*, the more uncertain regulatory environment in a multi-national setting may discourage participants in regional trading. Currency and payment risks tend to decrease the certainty of a predictable economic outcome from trading. Also, political factors such as a perceived need for the nation to be self-sufficient and thus avoid political risks, which could threaten supply reliability, play a role in discouraging regional energy trade.

Table 1: SADC's Proposed Energy Trading Activities

Activity No.	Activity Name	SADC Reference & Status
ET-01	Regional Electricity Regulatory Association (RERA)	Approved in principle by EO/EM meeting, May 2000
ET-02	Harmonisation of Policies, Regulation and Legislation in the Petroleum Sector	Requires reformulation of SADC Project AAA.1.8
ET-03	SAPP Pool Plan and Development of Short-Term Energy Market	Priority SAPP activities
ET-04	Energy Wheeling on SAPP System	Priority SAPP activity to facilitate increased trade
ET-05	Capacity Building at the SAPP Co-ordination Centre (CC)	Project preparation activities initiated by SAPP

Investment and Finance

The SADC energy sector requires considerable investment in the years to come. A multitude of potential sources of investment and finance exist (private and public, domestic and foreign). There are constraints in public sector financing. 'Donor fatigue' and reorientation of donors' attitudes to infrastructure investment and the public sector negatively affect the donor option.

The increasingly required investment promotion necessitates a new role for a proactive SEC and SEC-TU as well as increased transparency and harmonisation of conditions. The private sector will increasingly be approached to provide finance.

The forms of private sector participation include **Service Contracts** whereby the responsibility for energy sector services (O&M, metering, etc) is contracted out, aimed at enhancing service delivery. **Management Contracts** will transfer to the private sector the responsibility for certain core operations but generally no responsibility for investment. **BOO(T)** concessions (through competitive tender or negotiated agreements) finance and later transfer new or rehabilitated assets. **Divestiture** is the straightforward sale of existing energy businesses.

Key features of energy sector financing are firstly the long time horizon for energy infrastructure. Secondly, the sector is at present characterised by a strong involvement of parastatals with weak financing capabilities and limited creditworthiness. Thirdly, there is the lack of end-user credit schemes for small-scale

energy users (particularly for NRSE) as well as (fourthly) many regional projects with a multinational character and thereby increased risks.

The particular problems for SADC as a region revolve around its weak co-ordination of SADC finance mobilisation; the 'poor image' of the region among international financiers; low confidence in the organisation and management capacity of SADC institutions, as well as the lack of knowledge among investors and financiers about opportunities and frameworks in the SADC region.

Key finance issues to be addressed regionally are the facilitation of financing of commercially viable regional investment projects; the need for risk reduction/credit enhancement; the need for capacity building; the strategic use of (limited) donor funding; the financing of pre-investment programmes, task force activities, expert assistance and studies; and funding from SADC governments, the regional and international energy industry, and donors.

Table 2: Proposed Investment and Finance Activities

Activity No.	Activity Name	SADC Reference & Status
IF-01	Establishment of SADC Energy Financial Task Force	Update proposal in 1997 Action Plan
IF-02	Joint SADC Petroleum Exploration Programme	Energy Project AAA.1.5
IF-03	Joint Hydroelectric Development on Cunene River	Reformulation of Projects ANG.3.3 and ANG.3.6
IF-04	Interconnection of the Angolan and Namibian Power Grids	Reformulation of Projects ANG.3.2 and ANG.3.4
IF-05	Mozambique – Malawi 220 kV Interconnection	SAPP priority project, requires reformulation of Project MOZ.3.
IF-06	Zambia – Tanzania 330 kV Interconnection (private ITC)	SAPP priority project, requires reformulation of Project ZAM.3.
IF-07	Strengthening of Interconnection between DRC & Zambia	SAPP priority project
IF-08	Zambia – Malawi Interconnection	Reformulation of Project ZAM.3.7
IF-09	Barrier Removal for Renewable Energy Projects	Reformulation of Projects AAA.4.12 and AAA.4.13
IF-10	Regional Programme for the Traditional Energy Sector (RPTES)	New activity (linked to World Bank initiative)
IF-11	Coal Bed Methane Investigation and Promotion	New activity, based on SADC Gas Study (1995)
IF-12	Regional Energy Investment Forum	Follow-up of decision by EO/EM meeting, 1999

Training and Capacity Building

SADC attaches high priority to human resources development in order to ensure future effectiveness and organisational capacity. Identified specific training needs for the sector include: managerial training (executive and middle management); organisational development skills; strategy development and strategic management; energy policy analysis and advocacy; energy economics; administrative skills and financial controls; project planning and project management; procurement and negotiating skills. Needs are common throughout the energy sector.

Table 3: Proposed Training and Capacity Building Activities

Activity No.	Activity Name	SADC Reference & Status
CB-01	Regional Petroleum Sector Training	Reformulation of Projects AAA.1.2 and AAA.1.
CB-02	Power Utility Capacity Enhancement Programme (UCEP)	Reformulation of Project AAA.3.2
CB-03	Kafue Gorge Regional Training Centre (KGRTC)	Commercial continuation of Project AAA.3.10
CB-04	Rural Energy Planning and Environmental Training Programme	Continuation of Project AAA.5.17, incorporating parts of Project AAA.5.18
CB-05	Programme for Biomass Energy Conservation in Southern Africa (ProBEC)	Expansion of Project AAA.5.19
CB-06	SADC Energy Management and Efficiency Programme	Combination and expansion of Projects AAA.6.1 AAA.6.9 and AAA.6.11
CB-07	Regional Integrated Energy Planning (RIEP)	Follow-up of proposal in the Action Plan (1997)

Information and Experience Exchange

Systematic exchange of information and experience is a prerequisite to achieve energy sector goals. Areas where information and experience exchange is particularly important include cooperation:

- in sub-sectors characterised by a high degree of commonalities, e.g. biomass and NRSE
- to utilise synergies, e.g. standardisation, joint procurement policies and strategies
- to realise economies of scale, e.g. power generation, gas and petroleum product supply
- to share resources, e.g. research and training
- to strengthen the political impact of the SADC region in international bodies, e.g. in climate change fora.

Table 4: Proposed Information and Experience Exchange Activities

Activity No.	Activity Name	SADC Reference & Status
IE-01	Information Exchange on Regional Training Activities	New activity
IE-02	Information Management Centre for the Energy Sector	Reformulation of Project AAA.0.7
IE-03	Regional Energy Planning Network in the SADC Region	Operationalisation of Project AAA.0.8
IE-04	Regional Rural Electrification Initiative	Reformulation of Project AAA.3.1 + link to regional organisation (PIESA)
IE-05	Establishment of Regional Petroleum and Gas Association	New activity (from Petroleum Sub-Committee activities)

Table 5: Summary of Proposed Activities

Focus Area	Nos. of Proposed Activities	Nos. of existing SADC Energy Projects Impacted by Plan
Energy Trade	5	1
Investment and Finance	12	10
Capacity Building	7	10
Information Exchange	5	3
SUM	29	24

Table 6: Timeframe and priorities

No.	Activity Name	Start Date	End Date
ET-01	Regional Electricity Regulatory Association (RERA)	07/2001	None
ET-02	Harmonisation of Petroleum Sector Policies, Regulation and Legislation	On-going	Mid-2004
ET-03	SAPP Pool Plan and Development of Short-Term Energy Market		Mid-2001
ET-04	Energy Wheeling on SAPP System		Mid-2001
ET-05	Capacity Building at the SAPP Co-ordination Centre (CC)	On-going	None

Table 7: Responsibilities

No.	Activity Name	Primary Responsible	Others	Role of SEC – TU
ET-01	Regional Electricity Regulatory Association (RERA)	SADC Plenary Committee	Steering Committee & Technical Secretariat	Member of Steering Committee
ET-02	Harmonisation of Petroleum Sector Policies, Regulation and Legislation	SADC Petroleum Sub-Committee	SADC Petroleum Working Committee	Initiator, Facilitator, Monitoring
ET-03	SAPP Pool Plan and Development of Short-term Energy Market	SAPP Management Committee	Planning and Operating Sub-Committees	Member of SAPP Executive Committee
ET-04	Energy Wheeling on SAPP System	SAPP Planning Sub-Committee	SAPP Management Committee	Member of SAPP Executive Committee
ET-05	Capacity Building at the SAPP Co-ordination Centre (CC)	SAPP Co-ordination Centre	SAPP Operating Sub-Committee	Member of SAPP Executive Committee

It is often difficult to estimate the financial resources required to implement activities. Further preparatory work is needed on many activities. Where feasibility studies exist, estimates have been included in the activity plan. The costs of ongoing activities have been reflected. Sources indicated in the Draft Plan are those with existing commitments or where negotiations are ongoing.

Table 8: Activities Requiring Co-ordination with Other SADC Sectors

No.	Activity Name	Co-ordination with SADC Sector
IF-01	Establishment of SADC Energy Sector Financial Task Force	SADC Finance and Investment Co-ordination Unit (FISCU), South Africa
IF-09	Barrier Removal for Renewable Energy Projects	SADC Environmental and Land Management Sector (ELMS), Lesotho
IF-11	Coal-Bed Methane Investigation and Promotion	SADC Mining Sector, Zambia
IF-12	Regional Energy Round Table Conference & Investment Forum	SADC Finance and Investment Co-ordination Unit (FISCU), South Africa
CB-01	Regional Petroleum Sector Training	SADC Human Resources Development Sector (HRD), Swaziland
CB-02	Power Utility Capacity Enhancement Programme (UCEP)	SADC Human Resources Development Sector (HRD), Swaziland
CB-03	Kafue Gorge Regional Training Centre (KGRTC)	SADC Water Sector, Lesotho
IE-01	Information Exchange on Regional Training Network	SADC Human Resources Development Sector (HRD), Swaziland

Some of the activities listed relate to more than one focus area. Many activities straddle more than a single theme. For example, there is a strong link between energy trade, investment and finance. Also, capacity building and information and experience exchange are closely linked. Energy trade requires information and experience exchange.

Conclusions

SADC is responding to and facilitating reform aimed at competition, private participation and enhancing access to energy. The Energy Commission and the Activity Plan are key vehicles for realising priority developments. Focus is on energy trade, investment and finance, capacity building, and information and experience exchange. SADC is committed to developing appropriate frameworks to stimulate investment and growth.

Comments from the floor

Cheap coal in South Africa was mentioned as a blockage for environmentally sound energy development.

The Regional Indicative Strategy Development Plan (RISDP) would contain a plan of activities by sector. This would necessitate some kind of interface between the secretariat and SAPP-RERA. SAPP has its own legal structure and SADC does not play a major role in it.

Another question raised was where RERA would report. How would it enter the SADC system? Would it be answerable to some subcommittee? RERA has a business plan. It is given bilateral assistance. Can it also go to SADC for funding? May RERA have to seek approval from SADC for various activities? Formally, RERA can involve itself in any activity within its terms of reference, but it also needs

to interact with the political level. How is RERA given priority in regional development? Who gives priority if not SADC?

Another point of discussion was whether or not some activities that were necessary in the implementation of projects could have "fallen through cracks" in the reorganisation. The commission will be in Gaborone and deal with policy and strategy. Who then will do the technical tasks in implementation or leading to implementation? Are they to be done by the SADC organisations (National Committees) in the member countries? As it now seems, these are not set up for implementation.

On the other hand, it was pointed out that the new-style organisation of SADC has been set up to focus on truly regional issues and policies, whereas most of the projects the organisation dealt with before were in fact national ones. When the organisation changes to a truly regional focus, policies and co-ordination, there will not be many activities where implementation capacity is needed as it was during the "old days".

Presentation 4: The Petroleum Sub-Sector: Current Situation and Development Trends

(Tormod Slåtsveen, Norwegian Petroleum Directorate)

The budget for official development aid (ODA) in 2002 is 13,505 million Norwegian Kroner (NOK). The annual bilateral co-operation on energy is of the order of 400 million NOK (2000). Is a 3% share of aid funds a correct level for the sector?

Why focus on the petroleum sector?
Besides hydropower and electricity, Norway has an extensive knowledge and human capacity in the **petroleum** sector. It is natural that bilateral co-operation on energy focuses on these areas and develops and communicates a comprehensive knowledge in the petroleum sector. Energy and environmental issues are NORAD priority areas. Institutional co-operation is a NORAD priority tool.

Why is it then important to have a regional focus on energy?
A regional approach will give economies through integration by:

- harmonizing technical standards;
- avoiding duplication of investment; and
- being able to operate supply facilities more intensively than feasible with a single national demand

A regional approach is desirable because of the:

- capital intensive nature of the petroleum sector;
- usually high foreign exchange content;
- limited availability of investment funds in the region; and
- broader market base offered to private investors and thereby reducing the commercial risks of projects and making investment more likely.

Regional co-operation in energy
Regional co-operation in energy is run through the SADC Energy Sector. There is also sub-regional co-operation in the downstream petroleum sector (SACU). A

regional petroleum upstream working group has been initiated but only a minority of countries have appointed 'members'.

The SADC Energy Sector Activity Plan 2000–2005 sets out the following activities in the petroleum sector:

- Regional Upstream Petroleum Sector Training (CB-01)
- Establishment of Regional Petroleum and Gas Association (IE-05)
- Harmonisation of Petroleum Sector Policies, Regulation and Legislation (ET-02)
- Joint SADC Petroleum Exploration Programme (IF-02)
- Coal-Bed Methane Investigation and Promotion (IF-11)
- Joint SADC Petroleum Procurement Programme

SADC's petroleum downstream priorities involve SADC complying with ISO standards to better facilitate cross-border traffic. By 2005 petrol standards should involve a penetration of at least 5% unleaded; minimum octane leaded 93; max lead content in leaded 0.4 g/l; max lead content in unleaded 0.013 g/l. Diesel standards by 2005 would involve a sulphur level of max 0.3%, minimum cetane number (maintained) at 45. Countries are likely to adopt phase-out periods for leaded petrol in the range of 5 to 25 years

Regional issues need regional solutions

Interconnection of national petroleum markets could:

- encourage private investment;
- encourage large-scale projects;
- open export opportunities;
- build closer economic ties;
- ease political tensions; and
- promote economic co-operation.

Environmental issues and sovereign claims to resources often involve neighbouring countries. Petroleum basins extend across borders – mapping and exploitation would benefit by being conducted in a co-ordinated manner (e.g. Sonangol and Namcor). To facilitate prudent resource management and health safety and environmental practices, improved access to data across borders is needed. A regional driving force is needed to facilitate these processes.

Petroleum 'systems' also extend across borders. Natural gas will become a regional commodity. The refining industry will serve regional markets, including bottling plants for LPG, propane, butane and LNG.

Integration between sources of energy and regional solutions for conversion and distribution are needed to develop an efficient petroleum market.

The regional approach necessitates strong governmental institutions and improved planning capacity and analytical capacity for policy development. National legal and regulatory frameworks need to be established. Border issues will occur and need to be solved. Treaties for international co-operation will be required. Gas trade treaties between Mozambique and South Africa and Namibia and South Africa are examples.

Training is a major bottleneck in all countries. Health, safety and environmental issues are in focus.

There are a number of advantages to regional harmonisation:
Technical specifications for fuels and technical standards for the petroleum industry facilitate cost-efficient development and procurement. Environmental legislation, supervisory procedures and reporting requirements can be harmonised to ensure that the industry operates by best practices. Air and fresh water pollution, oil spills at sea and chemicals damaging sea life are problems needing regional solutions.

Regional co-operation will be necessary to realise SADC petroleum downstream priorities such as

- Harmonisation of liquid fuel specifications
- Harmonisation of the cost of procuring petroleum product supplies
- Establishment of institutional and legal frameworks to facilitate the introduction of the free market system in the downstream sub-sector.

Regional solutions can be more sustainable than north – south solutions, provide easy access to relevant expertise and experience and lower cost, language and cultural barriers in most cases. Regional NORAD projects can facilitate the establishment of such networks.

Human and financial resources are scarce – all countries should not develop parallel competence and capacity in all areas. The marginal returns on new investment in human capital and assets are different between countries. There are economies of scale in most areas. Some countries are more advanced in some areas and have institutional capacity to assist others.

Presently, various countries in the region have capacities and specialisation that might be interesting to explore and adapt for other countries:

- Angola has some technical training capacity
- Mozambique has modern petroleum data storage and management experience and a modern legal framework
- Namibia has progressed far on oil and gas legislation and has modern legislation
- South Africa has overall training capacity, including some specialised training capacity

There are of course also factors that work counter to regional co-operation. An environment of competition and lack of trust will not be conducive to cooperation. Some countries may have difficulties in accepting that others in the region may have relevant experience to share; cultural and historic frictions can make co-operation difficult; and competition for becoming the leading institution in a regional programme can be expected, particularly if some investment in equipment/software is involved. Exchange of data requires accepted confidentiality procedures.

Not all countries have the same interests in co-operation. Examples of possible subdivisions and areas of co-operation are as follows:

- Harmonisation of regulations for downstream petroleum activity (all SADC countries)

- Coastal protection (SADC coastal states, island states)
- Delimitation of continental shelf under UN Law of the Sea (coastal states and island states with sedimentary deep water basins)
- Harmonisation of laws and regulations for upstream petroleum activity (SADC states with petroleum potential)
- Harmonisation of gas legislation, development of gas trade treaties (SADC states with gas potential and gas market potential)

The SADC energy organisation has not succeeded in project implementation. At present, the SADC system is undergoing change. Bureaucratic management and decision making systems often make these organisations weak in managing projects but they may be used in networking and dissemination of results. SADC in Gaborone will primarily have a co-ordinating role and not be responsible for the day-to-day implementation, budget and progress reporting. Hence there is still a need to improve on project management within SADC. The questions are how to ensure that the projects in the Activity Plan are implemented. What are reasonable ambitions and goals in relation to the institutional development SADC?

Common agents must be identified. The selected institution must have management capacity and appropriate experience, represent objectivity and have credibility. An alternative is to rely primarily on established institutions in the region such as universities, industry organisations, regulatory agencies and ministries / departments. The responsibility for the implementation of the various projects would be delegated by the project management of the various projects to the institution based on ownership.

Seemingly, there is little sector co-ordination between countries. Why, for example is the petroleum sector not a priority for NORAD in Tanzania? Is it advisable primarily to focus on regional sector strategies? There is unclear policy between regional, SADC programmes, and bilateral programmes with regional elements. Regional programmes should in most cases be long term (>5 years). Since these programmes are more difficult to establish than bilateral programmes, someone has to facilitate the process. If a Norwegian institution plays the “invisible hand”, this conflicts with the principle of “recipient responsibility”. Bilateral institutional programmes should have a long phase-out period in parallel with a regional thrust. Today’s practice is to cut programmes when the main phase(s) is (are) completed. As seen from the outside there are unclear responsibilities as between regional departments in NORAD, embassies and the “fag” department. New signals indicate that NORAD will work more actively for regional programmes in the future.

Petroleum sector restructuring issues and future trends

In 2001 there were world-wide 192 mergers and acquisition deals at a combined value of 77 billion USD. The majors (ExxonMobil, ChevronTexaco and Shell) are all expanding their power assets in developing countries (due to antitrust concerns). Shell - strongest of the oil majors in the power market through its 68% in Intergen - wants to boost its natural gas operations. Between two-thirds and three-fourths of US foreign direct investment in Africa will be in the energy sector. As the majors continue to concentrate, more ambitious promotion is required in less known areas.

Restructuring issues and future trends among national oil companies.

In **Angola** SONANGOL is the sole concessionaire. The new Petroleum Act may introduce a new split of responsibilities between Sonangol and Minpet or a new regulator. The privatisation issue is a strong force in stripping Sonangol of governance functions. In **Namibia** the national oil company NAMCOR is trying to become independent of government budgets. This creates a conflict between its roles as technical advisor and commercial player in the downstream and/or upstream. In **South Africa** the national oil company SOEKOR is focusing on its future role and the outcome of the ongoing deregulation process. The announced merger with Mossgas could result in a strengthened company with a foot in distribution. The Central Energy Fund (CEF) has a role in the management of the states' ownership in the energy sector and is also subject to a reorganisation in which the regulating activities could be taken out. A Gas Regulator and Pipeline Regulator have been created. A new petroleum regulator (PASA) may be proposed in the new Minerals Act. There is discussion of whether one should not have a common regulator – including NER.

In **Mozambique** the national oil company (ENH) is in the process of laying off government functions to the directorate (DNCH). ENH has created ENG to handle state interests in the Pande/Temane gas project. A separate company has also been created to handle former ENH "service activities"

There is, however, uncertainty as to the future role of ENH: will it concentrate on gas distribution or handle future state ownership? The enacted new Petroleum Law and the Petroleum Regulations that will be approved later this year have sorted out the relationship between DNCH and ENH. Licensing, data management and other government functions are being gradually taken over by DNCH. The establishment of an independent regulator is being discussed (to allow higher wage levels).

What is happening to co-operation in the energy sector in Namibia?
Capacity building, which is instrumental in institution building, benefits from stability. The ongoing assistance to **Namibia** in the energy sector is seemingly ending at a critical stage as:

- the Directorate of Energy is suffering from high turn-over;
- the development of Kudu as an important source of regional gas supply is imminent; and
- the electricity market is being liberalized

The Kudu development has ongoing assistance relating to: framework conditions; licensing issues; regional promotion for the use of gas; monitoring and supervising the progress of the Kudu development; institutional development; managing the future environmental and social impact of a Kudu development; and planning for converting revenue into lasting benefits. There is a need for continuation of the assistance.

Other needs for assistance to Namibia emerge from the liberalisation of the electricity market. The restructuring of the Electricity Supply Industry (ESI) has just started. Implementation of new tariff structures in the ESI involves asset evaluations, new accounting systems, and extensive ring-fencing of all utilities. This amounts to a comprehensive process that the Norwegian ESI and NVE went through in the beginning of the nineties. It will be a major challenge to establish the regulator (ECB) as a credible organisation throughout the coming process.

Institutional capacity building is a long-term process. Competence building often forms an integral part of the process. The establishment of related institutions will tend to compete for the same scarce human resources. In Namibia, the establishment of the Electricity Control Board has significantly impacted on the Ministry of Mines and Energy, which experienced a surge in turnover when the regulator was formed on top of restructuring the industry. A lack of qualified personnel restricts the pace of development.

Lack of training is a major hindrance for furthering institutional cooperation. There is demonstrated interest from Angola (Sumbe) and South Africa (Cape Town) in establishing regional centres to train staff for the petroleum sector. This should be supported and these training centres could complement each other in a very efficient way as they are targeting very different needs. Since education and training in general is one of the key element to long-term success, it is highly recommended that these alternatives be supported by NORAD.

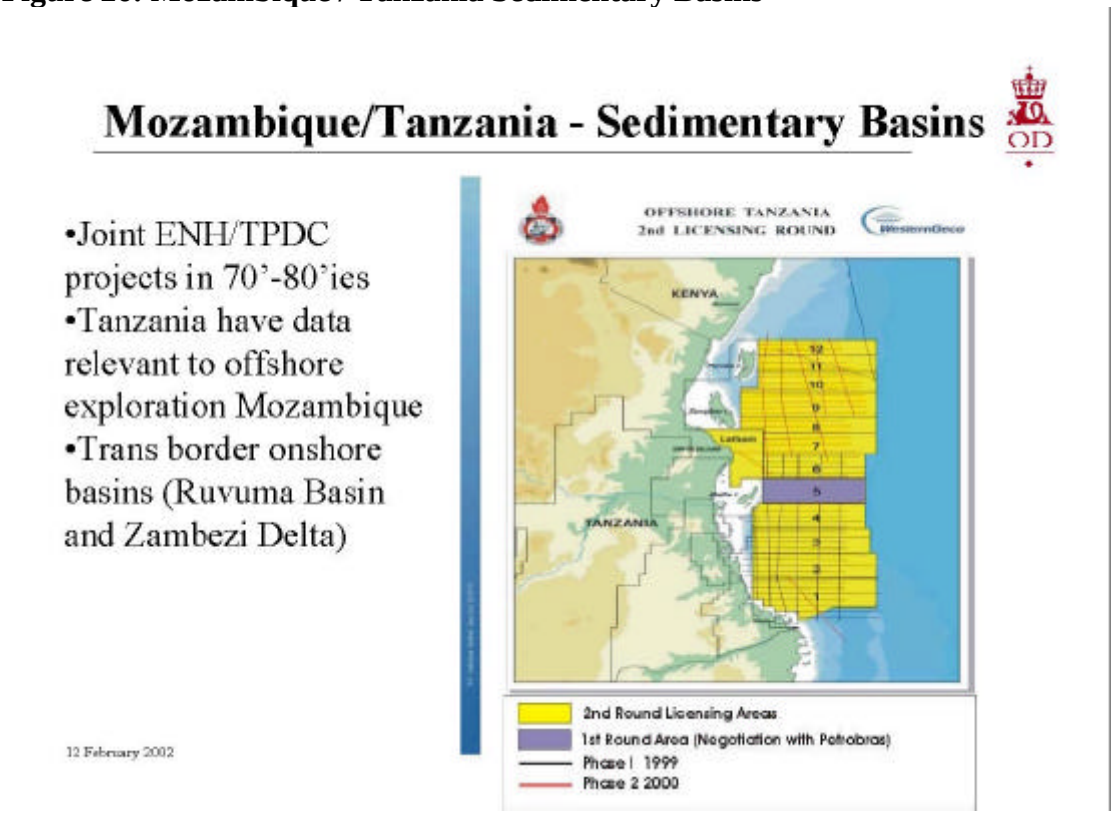
Would it be beneficial for NORAD to join forces with other donors?
During the last two years Namibia and South Africa have been approached by various donors offering assistance to the energy sector. Could all parties benefit if the assistance was co-ordinated to meet prioritised needs in the recipient countries?

Tanzania and future co-operation?
Oil and gas exploration and production is being encouraged and Songo-Songo may finally take off. On 10 October 2001 the World Bank approved a $183 million interest-free credit from the International Development Association for the Songo Songo Gas Development and Power Generation Project for Tanzania. Tanzania, with its oil seeps, seismic and other data, shows strong hydrocarbon potential in its upstream oil industry sector. Several prospects have been mapped out. There is a large potential in data management.

A regional project on data management co-operation between Tanzania and Mozambique could help secure human capacity building in Maputo. Development of a new data set for Tanzania might improve promotion of petroleum potential, enhance local competencies and skills, and deploy up-to-date computer equipment.

Country-specific assistance could consist of a cross-sectoral project proposal from Oceanor. Seawatch has initiated further development of applications within meteorology (i.e. improved typhoon forecasting); oceanography (i.e. wave forecasting); environmental monitoring (i.e. monitoring of acute pollution); aquaculture (i.e. red tide); and metocean time series (i.e. design parameters).
Implementing the Seawatch concept for the Southern African Region could contribute to a substantial upgrading of the marine institutions in the region, both technically and scientifically.

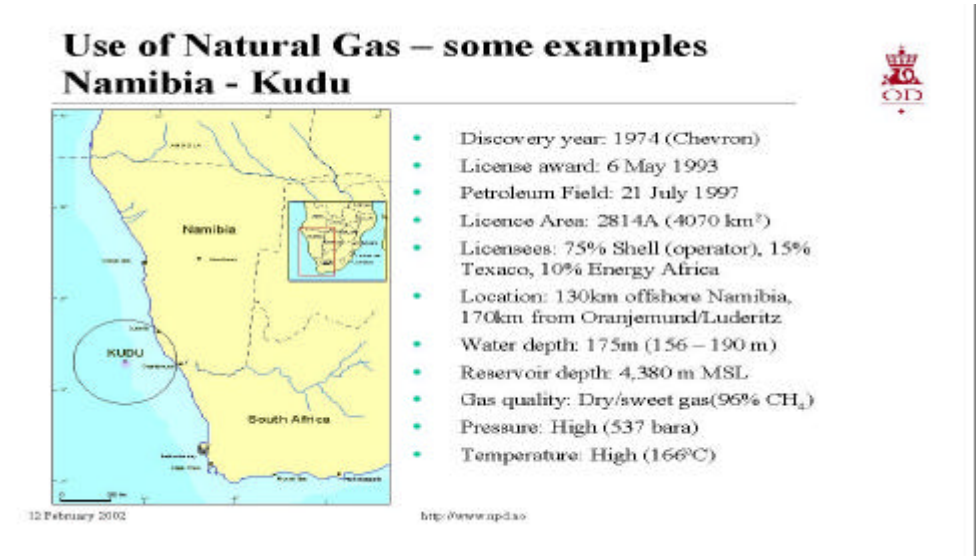
Figure 26: Mozambique / Tanzania Sedimentary Basins



A future in gas in Africa?

About 70% of the associated gas in Nigeria is being flared. The gas flared reached some 500,000 barrel of oil equivalents per day in 2000. In 1999 about 85% of the 10BCM associated gas produced in Angola was flared. The reduction in gas flaring may qualify for the Clean Development Mechanism (CDM) under the Kyoto Protocol. Gas converted into electricity, middle distillates or LNG could be sold directly into the traditional market. Other possible products to be produced based on the regional gas, like methanol, hydrogen and ammonia, would require growth in already established markets.

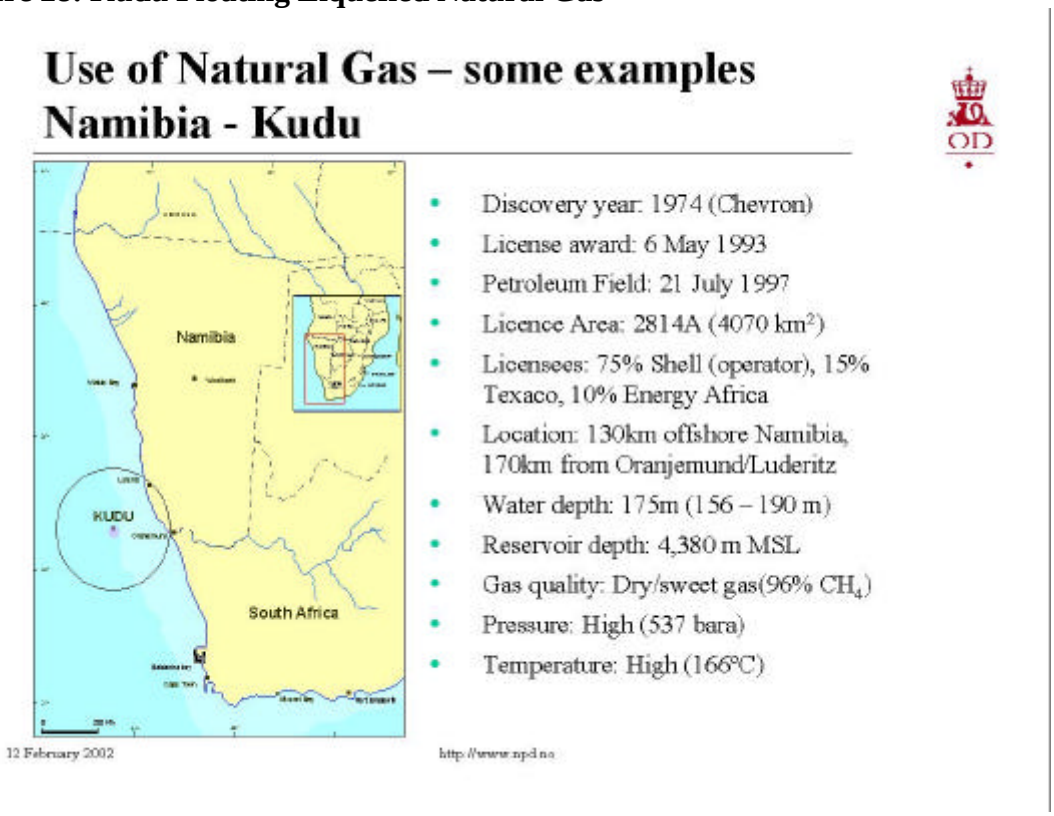
Figure 27: Natural Gas, Kudu



A Namibian power project based on Kudu gas could give 400MW with first gas/power delivery in 2005/2006. Gas could be exported to South Africa, with a potential for 1600MW CCGT gas delivery and first power in 2008/2010

Kudu Field Appraisal:
3D seismic survey: 1060 km^2 completed by Ramform Viking in 4Q 2002
Drilling: 2 firm wells + 2 optional wells from 5 January 2002. FLNG [Floating Liquefied Natural Gas] 5 million tonnes per annum. First LNG would appear mid 2006. Final decision would be taken in the second half of 2002 (dependent on the appraisal program).

Figure 28: Kudu Floating Liquefied Natural Gas



Mozambique – Temane/Pande
Mozambique could earn about $ 400 million a year from the gas produced, adding 10 % to national economic growth in Mozambique for the next two years and 2 % every year after. The project could also change the South African economy, reducing its reliance on oil and providing an alternative to cheap coal.

Alternative use of natural gas in Angola
The Angolan government is preparing a Gas Master Plan, aimed at defining strategies for developing the country's gas resources for local and export markets. Sources are associated gas from oilfields in the northern Cabinda enclave, and LNG to harness gas reserves in the Lower Congo Basin. The LNG project (Texaco and Sonangol), envisages the use of associated gas from offshore Blocks 1, 2, 3 and 17, and later stranded gas from other offshore fields. The oil companies might have to look into the possibility of floating LNG and gas-to-liquid plants as a way to capture and use gas in more remote locations.

Can oil be less detrimental for Africa?
Why have so many governments failed to convert petroleum wealth into prosperity for their citizens? A number of questions arise.

- Do we do the right things?
- Do we know enough?
- Can the assistance be even more focused with a first things first approach?
- Can Norway use its influence through bilateral channels and regional institutions like SADC and the African Union?

Developments in the energy sector are instrumental to economic growth. A move from energy resource driven markets to service driven markets requires a focus on people. Competence building and institutional co-operation require long term commitments from all parties. One needs to build on existing governmental institutions. Education and training is the key to good governance. Lack of trained and qualified personnel is a major hindrance for furthering institutional co-operation. Assistance to infrastructural projects is an important supplement to institution building.

13th February 2002

Introduction to deliberations on 13th February and summary of proceedings 12th February

Jon Lomøy, Head of Southern Africa Department, NORAD.

1 *Energy supply situation*: (a) there will be regional deficits during the next ten years. This depends on the environmental situation in South Africa and the level of taxes imposed for environmental purposes. (b) Supply will occur in other countries than deficit countries. (c) The regional power market therefore has potential.

2 There are major institutional changes towards commercialisation under way in the region. Different countries have reached different levels in this process.

3 There are no private sector power projects because of under-pricing of power in the region.

4 In the region, utilities are organising themselves (SAPP) and so are the regulators (RERA) What role could these organisations play in the energy sector for the SADC region?

5 We have not discussed forms of energy other than petroleum and electricity much. What would be interesting regional perspectives for new forms of energy and biomass?

6 We have not talked much about electrification of the rural areas. This may not be a regional task.

7 Neither did we touch the management of water resources in the region.

8 Talking about Angola, for instance, stakeholders will have to think regionally in relation to refining capacity.

9 The area of gas is exciting. The prospects are perhaps bilateral assistance at the beginning and then regional assistance for co-operation between the countries.

10 Gas and oil basins reach across the borders. This points more to country to country co-operation than to regional co-operation.

11 The role of development assistance: (a) training is one focal point, both in general terms and specifically, (b) technical assistance for institutional development, and (c) we have not talked much about the role of development assistance in investment. We might think of possible roles for development assistance in such development processes.

Comments from the floor

It was stressed that there are promising developments in new sources of energy, like biomass and solar power. The image of Norway was said to be that we were not interested in those areas, but should be.

It was also pointed out that the energy deficit presented was a macro phenomenon and that it is important to investigate in much more depth before starting to look at the possibility of transfer lines.

It was also pointed out that when speaking about the region in terms of consumption and production of electricity, the overwhelming majority of it is South Africa. This country at present exports more than it imports. The imports to SA from the region are only some 0.1 percent of its total consumption.

Reports From Countries in the Region

Mozambique

Overview

In Mozambique it appears that

- production for supply is adequate, but the transfer network has not been completed and distribution is lacking in large areas, which are partly supplied by diesel generators. The distribution of petrol, and diesel and other oil products is reasonably good.
- The most important power producer is HCB, Cahora Bassa, which delivers most of its generated power to southern Africa (ESKOM) and some to Zimbabwe.
- Gas has been found and transfer lines are now built to sell to South Africa. The buyer is SASOL. Oil exploration takes place primarily offshore.
- Some delivery from HCB to Malawi is possible.
- Important policy questions are the future role of the energy corporation EDM, where the roles in production, transfer and distribution and the need for the participation of private capital is under discussion. The fear of Eskom dominance is very considerable. A separation of roles would require the building up of necessary institutions inside or outside the ministry.
- The legal framework in the petroleum sector is now in place and operational guidelines will come soon.
- The legal framework for electricity and operational guidelines are in place and the emphasis is now on a framework for concessions.
- HCB is 80 percent privately Portuguese owned (however with a huge public debt overhang) and the rest is owned by the Mozambique government. The gas fields have been leased to SASOL, which has some share of Mozambican ownership.

- Professional competence in the ministry is weak and scarce. EDM has built some capacity based on considerable technical assistance among others from Norway.
- EDM finances its own recurrent costs but not capital expenditure. Electricity prices are high and are not often adjusted. Petrol and diesel prices are not because of low levels of taxation. There is co-operation between the petrol companies on procurement. The HCB power is sold cheaply to Eskom, based on an old agreement.

Plans
- Continuation of oil and gas exploration. The probability seems to be higher for gas.
- A new power station downstream from HCB on the Zambezi is under study, financed inter alia with Norwegian support. This is aimed at the South African market in seven to ten years' time.
- Continued electrification of the rural areas, based on loans or grants.
- Development and organisation of the energy market and regulatory frameworks will have to be discussed in a broader national and regional context (SAPP, SADC).
- There is some discussion of privatisation.
- The energy sector has been included in the poverty reduction strategy paper. The World Bank is involved, primarily with policy advice and a small GEF contribution. Denmark, Sweden and Norway are providing project funding. There is also some German funding. ADB and BADEA are involved in the financing of transfer lines.
- FAG has participated with varying intensity over the last few years, but has over the last 20 years been a central player.
- NVE and the Norwegian petroleum directorate have established institutional agreements with partners in Mozambique. Consultancy companies such as Norconsult and Norplan have participated in a variety of areas over a considerable period. They have good insight into the energy sector in Mozambique, particularly concerning electricity. Several Norwegian suppliers, such as Linjebygg and Jacobsen Electro, have, or have had, considerable orders. There is continuously considerable scope for using Norwegian expertise within the public and the private sector, inside and outside development co-operation.

Comments from the floor:
A concern about the water situation was raised. It was pointed out that better knowledge about the water situation in the region was important but that South Africa, which had most such data, seemed reluctant to put it at the disposal of other countries.

It was also pointed out that water issues in SADC were part of the agricultural sector.

Zambia

Introduction
Installed capacity for electricity generation in Zambia is today 1670 MW, which is more than demand for electricity. However, the estimated potential is 6000MW.

70% of electricity demand is related to mining. Only about 20 percent of the population have access to electricity, and the level of power consumption has not

changed since the middle eighties. In fact, a small downturn has been registered during the last two years, probably connected to turbulence around the privatisation of the mines.

Since 1990, the consumption of wood-fuel and charcoal has increased more strongly than any other consumption segment, with considerable negative environmental effects.

Despite the fact that Zambia has a supply of cheap hydroelectricity, costs are unnecessarily high as a result of inefficiencies, poor maintenance and poor management. Lack of financing from the government and ZESCO and limited ability to pay have slowed down the development of power supply to rural areas and remote areas, which mainly rely on diesel generation of electricity. In the later years, this has been very expensive because of the increase in prices.

The power sector has its own chapter in Zambia's I-PRSP. In the draft, there appears to be no attempt at setting priorities for analysing the costs or financing of the power sector activities listed. All policy issues have been omitted.

Policy issues

The responsibility for energy in Zambia lies under the Ministry of Energy and Water Resources (formerly the Ministry of Energy and Water Development). Recently the following reforms have been undertaken:

(a) Implementation of a new legal framework, which will be the basis for breaking up the monopoly
(b) A new regulatory framework and establishment of the ERB-energy regulation board
(c) In 1999, establishment of the office for the promotion of private power investments (OPPI)
(d) Privatisation of ZESCO: the government of Zambia has decided to seek a private partner to undertake a medium term concession of the operations and assets presently owned and managed by ZESCO and is seeking advisers to assist in the implementation of the decision. The Zambia privatisation agency (ZPA) will manage the concession/privatisation process provided for under the Privatisation Act Cap 386 of the laws of Zambia.

Present and planned activities

The most important co-operation partners for Zambia in the power sector are, or have been: the World Bank, the Development Bank of Southern Africa, the European Investment Bank, USAID, Sida, Finnida, Norad and the Nordic Development Fund.

The biggest donor-supported ongoing project is ZPRP, with a project cost of US$ 210 millions, comprising rehabilitation of several power stations, transformers, capacity building in ZESCO, privatisation policy etc,

Other projects are:

- rehabilitation of TAZAMA - a pipeline and fuel terminal at Ndola (US$ 48 million)
- rural electrification programme - development of a national master plan
- Kafue Lower – 600 MW (US$ 430 million). Short-listing is in progress

- Itezhi-Tezhi – 210 MW (US$ 28 million)
- The Zambia - Tanzania interconnector (US$ under 53 million) 700 kms
- Zubawanga (outside the National Grid)
- small hydropower developments (North West in particular)
- Solar power for rural areas. There is an ongoing pilot project in Eastern Province for the replacement of diesel generators.

Issues for regional co-operation:
SADC/COMESA
Zambia has been a member of SADC and COMESA from their establishment. Zambia contributes to following up the SADC energy protocol.

Southern African Power Pool (SAPP)
Zambia is an active participant in SAPP and is a member of the SAPP executive committee.

Interconnection grids for regional markets
Establishment of a Zambia-Tanzania interconnection is under planning (200 MW). Kenya has signalled interest for connection, which will make the project more attractive for a bigger market. In addition there is Zubawanga, which is outside the National Grid. Other possible interconnection lines are: Mozambique-Malawi, Namibia-Angola and Angola-DRC.

Water exploitation rights for some of the major border rivers:
The Zambezi River commission (ZAMCOM) is a regional authority charged with co-management of Zambezi river basin water resources. Its planned activities are spelled out in the Zambezi river action plan (ZACPLAN).

The ZACPLAN constitutes a programme for development and equitable utilisation of the water and related sources in an environmentally sound and sustainable manner for the social and economic benefits of the eight riparian states: Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe.

Price regulation
Regulation of prices is the role of ERB.

Regional training
Kafue regional training centre has so far not managed to attain the goal of being a regional training centre.

Challenges
According to ZESCO the greatest challenge is linked to rural distribution. To further rural distribution it is necessary to create an enabling environment for private investment. A portion of the increased income from the sale of surplus power may be earmarked for rural distribution and contribute to poverty reduction through inter alia:
- commercial development in remote areas
- reducing the influx to urban areas
- making it more attractive to move to remoter areas
- decline in the use of wood and charcoal

Comments from the floor
A point was made on electricity pricing. It appeared that electricity in Zambia was strongly subsidised. It did not help that ZESCO's system for customer billing often failed and thus, together with the low prices, gave customers the impression that electricity is a free good.

The question of Zimbabwe – Zambia co-operation was raised. There was an opportunity to strengthen the link between the two countries but the impression from the Zambian side was that the so-called Batoka project had completely stalled.

Zimbabwe

At the present time there is no Norwegian energy sector support in Zimbabwe, neither are there planned activities. Part of the reason for this is the current political situation in Zimbabwe and the Norwegian response, which has been a virtual phase-out the country to country assistance. There are some remaining activities at the civil society level, predominantly in the area of HIV/AIDS.

The energy sector is for the moment characterised by price controls on fuels. There are no subsidies and inflation is 112 percent officially but much higher in reality. The external supply of oil products is erratic and a considerable black market has developed. The country for a while got its oil supplies from Kuwait. When they stopped paying, supply was cut off. Presently, Zimbabwe is supplied by Libya and pays by selling off property, farms, and pieces of land. There is a lack of kerosene and the price has gone up from 7 to 50 cents a litre. This has led to heavy pressure on the environment, with forests and other vegetation disappearing. The local power station works at less than 50 percent of full capacity. Load sharing is disorganised. What means more for people than any of the above is that maize stores will soon be exhausted. Is it is clear that none of the parties will be likely to accept the results of the election and the probability for disturbances is considerable.

Energy is a very interesting area for development assistance, where the potential for payoffs to regional co-operation can be seen. Energy is a traded good; it is important for development and it is equally important in an environmental context. The development of the sector poses challenges in institution building and capacity building. Energy is therefore not only important in itself. It is also important for what we can learn that may be used in other sectors in regional co-operation. Other sectors may also be interesting, but they are more diffuse and could be tackled later. Also, in the context of the reorganisation of the sector there are challenges in setting up a suitable organisation for handling policies and strategies as well as project implementation. If we lend our support to solving these problems we can also learn a lot from that.

Comments from the Floor
The question of water supply in Zimbabwe was raised. It was reported that the authorities had run out of chemicals for water treatment and that households in Harare had to boil water before drinking.

There was agreement that the larger question of water, particularly in connection with power generation, was a very important one that should not be isolated from work in the energy sector.

Asked about post-election scenarios, the answer was very open and the situation was described as one in which everything from a very quiet situation to full civil war could take place. It was mentioned that none of the positions that had been advertised for the Norwegian Embassy in Zimbabwe had been filled because there was a lack of serious applicants.

South Africa

Overview

The presentation focused on the **electricity** sector in South Africa, partly because of the past and ongoing changes, which will be of interest for all countries of the region, and partly because insight into the South African situation may enhance understanding of the regional electricity regulator association (RERA). It was stressed, however, that Norway is also strongly involved in the petroleum sector, for example with support to policy processes and capacity building.

The policy challenge in the electricity sector in South Africa is to undertake wide-ranging reforms to create real competition in the market. It is envisaged that there will finally be several firms involved in generation as well as in transmission and distribution. The sector had formerly been monopolised and centralised and an opening up and restructuring would have a number of positive consequences. The key player in South Africa is the Electricity Supply Commission (Eskom), established in the twenties. Eskom covers all aspects of electricity production and distribution and is among the seven biggest electricity producers in the world, producing 35 MW, which is 95.7 percent of capacity in South Africa. (The estimated total demand in the SADC region is 45 MW).

In 1997 the South African government contacted Norway for support to its efforts to gain better insight into managing the electricity sector. A central area is the establishment of the National Electricity Regulator (NER). The key part of the co-operation between Norway and South Africa is the link-up of the Norwegian Norges Vassdrags og Energidirektorat (NVE) and NER. The immediate objective for the assistance from NVE is to formulate and implement specific regulatory objectives and requirements for the electricity supply industry in South Africa.

So far, with the support of NVE, NER has achieved a number of aims. It has developed licensing regulations, tariff systems and procedures, a regulatory framework for the wholesale markets and the relation to the power pool, access to the transfer network, a regulatory framework for the retail market and distribution as well as models for financial and economic management.

Apart from this NER also has performed other tasks:

- advising the Energy Department, formulating plans for the restructuring of the market
- supplying expertise to the ministry for liberalisation of generation and transmission

- development of a wholesale electricity pricing system (bulk prices)
- development of competence
- resolution of conflicts between suppliers and consumers
- establishing supply standards and service and licensing regulations
- supervised licensees in order to promote tariffs that reflect costs and a rational price structure

NER also licenses off-grid generation of alternative, e.g. photoelectric, energy. A Norwegian company participates and has established a factory for photoelectric panels in Namibia.

Norway has supported a study on restructuring the sector and has assisted the energy ministry in formulating proposals for restructuring. The idea is to establish six independent distributors and then introduce several transmission and generation firms in addition to Eskom.

A new phase in co-operation with Norway will particularly aim at capacity building in the ministry.

SADC

There is the danger that Eskom may become dominant in SADC because of weak national capacities in the other countries and a lack of regional co-ordination and regulation.

Eskom is for the time being quite dynamic and is expanding throughout the region. The company is for example active in the following fields:

- transfer lines in Namibia
- co-operation deals with the electricity generators in Malawi, Angola, Swaziland and Mauritius
- building a power station in Zambia
- contracts with Hwange and Kariba South in Zimbabwe

"Eskom Enterprises" is a major operator in electricity trade between the countries of the region. The company has a monopoly-like position in this market, which for the time being does not have a regulatory authority.

The need for a regional regulatory function was very strongly stressed for purposes of:

- Co-ordination in a situation where individual countries seem to focus on generation whereas interconnection between over-supplied and under-supplied countries would be a much more efficient solution.
- Capacity building for the national regulators. This is needed in a situation where countries attempt to create competition in the power markets and monopolies are broken up. Norway played a key role in the development of regulatory competence in many countries of the region.
- Private investment, which needs a modicum of security and order.

Comments from the floor

It was pointed out that there was an apparent interest from South Africa in improving co-operation with neighbouring countries. Mozambique, Tanzania and Angola, however, did not seem to be moving towards independent regulators.

It was pointed out that South Africa's agricultural sector alone stands for about half of the water demand in the entire SADC. This was connected to heavy subsidisation (between 90 and 100%) of water for agricultural purposes in South Africa. As water shortages are looming in South Africa, the country would have to look north for water. The subsidisation of water by South Africa would therefore be a regional issue.

It was pointed out that South Africa had made very impressive progress in rural electrification as 2.5 million people had gained access to electricity since 1994.

It was questioned whether the off-grid plans of SA would in fact be sustainable in the longer run. In response, it was pointed out that there had been considerable research on that issue. The conclusion had been that the economic basis for sustainable off-grid electricity supply existed.

Tanzania

General description of the sector

In Tanzania 90% of energy demand is covered by biomass (fuelwood). Electricity production was 2.4 TWH (in 2000), 90% of which was hydropower. The country is, at current levels of demand, self-sufficient in electric energy but only eight percent of the population is hooked up to the grid, with a consumption of only some 70 kWh per capita per year.

Pricing: in US cent per kWh
Households 6.6.
Industry 9.3 – 10.8
This means that the households are subsidised. There is a proposal to change to a common rate of US cent 8.6.

The problem is that the electricity supplier TANESCO is not good enough at load shedding and pricing. There is a need to restructure and partly privatise TANESCO, secure a greater supply of energy via interconnection to the SAPP and to extend the network.

In the area of policy, four different issues are important:

- Restructuring and privatising of TANESCO. The first step will be taken through a management contract.
- Open the way for private participation in the sector. In preparation for this, the legal framework for an electricity regulator EWURA went through Parliament in April 2001. Areas for private participation could be the IPTL and the Songo Songo electricity project.
- New energy sources (sun, wind, biomass).
- Extension of the network.

Norwegian support for the electricity sector in Tanzania has lasted for about 30 years and has amounted to some one billion Norwegian Kroner. The profile of assistance has been: power production (for example Kihansi, Pangani, Kidatu), the electricity network (for example Zanzibar, Sumbawanga-Mbala and transformer stations) and technical assistance within both electricity and petroleum.

There have been considerable Norwegian supplies of both goods and services, including NVE, OED and OD. Other donors active in the same area have been the World Bank, Sweden, the African Development Bank, the German Kreditanstalt für Wiederaufbau (KfW) and the European Investment Bank.

Norway has been involved in the sector programme (Power IV). Existing projects are: Kihansi, Sumbawanga-Mbala, Kunduchi substation and Kidatu rehabilitation. Zanzibar phase four is a possibility.

Experience and future perspectives
The new strategy 2002 – 2006 is built on the PRSP, where energy is not among the highest prioritised sectors. Therefore it has been decided that energy will be phased out as a sector in the development assistance programme. The petroleum sector was phased out from 1994.

The regional aspect is very important. Key issues are SADC, the East African Community and the Nile Basin project where Norway is a lead donor for power trade and the secretariat will be set up in Tanzania. Also, there is need for a SAPP connection.

There may well be a need for assistance in management and governance at a time where reform is very clearly on the agenda. There may be scope for regional programmes in this respect.

There will, as in the past, be a need for future Norwegian participation through investment, supplies and various types of private sector support.

Angola

Non-petroleum sector energy
The production of electricity is about 310 MW, plant is worn down and only 60 percent of the hydro capacity exploited. The supply is unstable and coverage very poor, which has meant an extensive use of private generation. There are no transfer lines out of the country or transfers between main regions of the country.

The Capanda power station, which is under completion, will have a capacity of 260 MW from 2003, increasing to 2,520 MW. There is a potential for regional interest. Over the border, DRC has considerable hydroelectric production (Inga). There is also a possibility for co-operation with Namibia around the Cunene. In the future, there would be a possibility of gas-powered electricity generation.

The households use mainly coal, wood and kerosene, including some gas for cooking. Electricity is largely for a lamp and a radio or TV. The industry is based on individual generators, which are expensive and environmentally unsound. Petrol, diesel and gas are produced locally at the refinery in Luanda. The lack of electricity supply has grave consequences for schools, home study, health institutions and water supply and is a barrier to social development as well as the development of industry.

Policy issues

Policy issues revolve around modernisation of the legal framework, which is by and large in place. Encouragement for private sector supply is in place formally, but not in practice. The preparation of privatisation of public sector companies is in an early phase. First, company profits must be improved. This is in fact happening at the moment. The financing of infrastructure is continuously problematic. Adaptation of tariffs to cost levels is under way. The use of alternative energy sources (sun/wind) is at an early stage. The regional electricity trade can only become reality when the security situation and financing allows.

Supervision of the sector lies in the energy and water ministry. The Energy Directorate is part of that ministry. A regulatory arrangement has been adopted and is under establishment but private sector operators are not expected in the near future. For the time being there is one producer (public sector) ENE, which also distributes outside Luanda. There is one (public sector) distribution company – EDEL – on line. Summary characteristics of the public administration of the sector are: (a) There is formal clarity on areas of responsibility because of a new legal and regulatory framework. (b) There is low capacity and competence, including capacity and competence for regional participation. (c) The staff in the public sector works on very low salaries and there is a great deal of turnover. (d) English is spoken only in the upper echelons. (e) There are very few if any private participants in the sector.

The NORAD programme was set up under a technical assistance agreement for the energy sector. The co-operation has lasted from 1987 and the last three years of agreement runs from 2000 to 2002 with a financial frame of NOK 52 million. The components in the main activity, which is institutional co-operation between the ministry and NVE, are as follows:

- institutional strengthening of the ministry, including the regulatory framework and capacity building
- construction of databases, a very important part of the ongoing liberalisation
- institutional strengthening of EDEL, the distribution company, under a contract between EDEL and NORPLAN, which aims at upgrading for possible future privatisation.
- Language training will have a considerable effect on the capacity for regional co-operation.
- The spare parts programme aims to increase stability in the supply of spare parts.

Altogether, the NVE programme has involved the presence of NVE staff about 12 weeks per annum.

The petroleum sector

Petroleum production in 2001 was 760 000 barrels per day. Norway, in comparison, produces 3 400 000 barrels per day. Many major discoveries will be turned to production in the coming years. By 2005 production is expected to reach 1 500 000 barrels per day and in 2010 from 2 million – 2.5 million barrels per day. There are plans for landing gas in the Luanda region. The project will mean an investment of about NOK 30 billion. A gas power station may be a future possibility with a regional potential. At the present time the refinery in Luanda covers domestic demand, but a new refinery is planned in Lobito. This may achieve regional significance. Norsk Hydro and Statoil will invest NOK 30 to 50 billion over the next ten years.

Many of the policy issues in the oil sector of Angola mirror the issues that arose during Norway's own oil history. The process towards improvement of resource planning and resource management has started. Macro policies to match a very profitable natural resource sector are, however, weak. The cornerstones of policy objectives are to increase national employment and ensure long-term national benefits, but policy development is at a very early stage. Environmental issues have been neglected but have received more focus over the last few years. Planning has started for the use of gas resources.

The efforts to ensure that values accrue to Angola through contractual arrangements, taxes, fees etc are reasonably strong and well directed. The implementation of policies that will ensure optimal tapping of reservoirs has began but much work is left. Use of state oil income for social sector work is weak but some improvement has taken place lately. In pricing policies for oil and oil products, changes have taken place to the better as the principle of sticking to the market price has been introduced. A national operator, Sonangol, has been established. Norsk Hydro works closely with Sonangol.

In Angola the ministry for petroleum has been given functions similar to those of OED and parts of OD. A petroleum directorate is integrated into the ministry and the state oil company Sonangol has management functions and owns a number of affiliates with activities in the oil sector. Sonangol also dominates the distribution of fuel.

Looking at the sector as a whole, the following features should be pointed out. A new legal framework has been produced but not yet passed through Parliament. Some regulations are being reviewed and renewed. There is increasing importance attached to health, environmental and safety issues. The sector suffers from unclear boundaries between the functions of policy, management and regulation. Organisational and professional capacity in the sector is weak, albeit better than in most other sectors. A problem is that a multi-faceted and changing sector requires continuous building of competence and updating.

The agreement on institution building
The agreement between Norway and Angola focuses on institutional development in the ministry for petroleum and is a three-year institutional co-operation with the OD. The present agreement commenced in the autumn 2000, based on the prior programme. Total funding is NOK 22 million.

The components of the agreement are:
- distribution of tasks and responsibilities at the central level
- legal and regulatory framework, including international co-operation
- policy level and practical level management of oil and gas resources
- safety and environment, focusing mainly regulatory issues
- downstream activities, mainly to safeguard product and distribution standards
- national mapping of the training needs in the oil sector
- language training
- macro economic policy analysis
- supplies for the domestic oil sector by the Angolan private sector

OD has so far had one person in full time occupation in Angola but is now looking at a different model.

The energy programmes: what are the main lessons?
The programmes have been well adapted to contemporary policy questions and fit well and flexibly into national plans. As Norway is the only donor, the need for co-ordination is slight. The activities have largely been executed as planned. The effect has been variable. Data systems have proven to be very demanding, in particular for establishment of databases and data collection routines.

Areas for problem-solving and improvement
Weak capacity and competence is a reality. The programmes will need to be simple, focused and gradual. Norwegian co-operating institutions have not always been equally good at following up, particularly with regard to presence and recruitment. There have also been variations in the adequacy and accessibility of competence. Occasionally workloads have been too high, particularly during times with high travel activity and personnel turnover. Unclear understanding of roles has also been a problem for Norwegian co-operating institutions.

Furthermore, language barriers make co-operation difficult. The institutional content of co-operation has been low. The idea of recipient responsibility has been difficult in practice. Corruption potentials often complicate and slow down procurement procedures. Relations have been politically delicate, particularly in the oil sector where Norwegian companies have been heavily involved. This has made it necessary to be very careful in all approaches and has led to a slower tempo than what would otherwise have been possible. We should realise that consultants from Norway are not always the best. We ought to open the way for others. Improvements depend crucially on enthusiasm and appropriate personnel from all parties.

The SADC Energy Secretariat in Luanda and institutional support
The Energy Secretariat co-operation has lasted a long time, since 1984. During the last three years the secretariat has essentially focussed on transitional activities as it has been reformed into a commission and moved to Gaborone. OD has participated somewhat. The institution and capacity building in TAU have had little effect but has been a very positive contribution to energy co-operation in SADC.

Experience with the administration of institutional support
It has often taken from one to three years from when the mandate was given to the start of the programmes. The programmes were often found not very well suited to the situation and had to be changed anyway. The answer to this could be to take a framework approach to programmes.

The agreement was not followed up adequately from the side of the recipient. The areas of reporting, planning, handling money, accounting and auditing were weak.

Norwegian institutions often seem to require more flexibility than what is stipulated in agreements, contracts and administrative decisions. Often, the preferred method has a certain whimsical character.

Annual meetings are important, but are they sufficient? Are we getting to grips with the realities of operations?

Are we too careful with respect to giving clear messages on weaknesses to the other parties and to demanding improvements?

Regional aspects as seen from Angola
In future, regional infrastructural aspects may be very important. Consider for example Inga at DRC, the Cunene/Namibia, gas power stations and Capanda. Power pooling and regional connections may become very important. Trade with petroleum and petroleum products may also gain importance.

What should we be looking at?
- prepare for and nurture the potentials mentioned above
- laws and regulations, harmonisation
- standardisation of procedures, contracts etc
- training, short courses and more extensive offers
- information exchange and building networks
- building information bases when it is found appropriate
- contribution to building personal relations
- capacity building for negotiations
- institution building, for instance the Regulators' Association

There are some important preconditions:
- Angola should be able to participate regionally in a meaningful way
- There will have to be national capacity building, institutional development and language training
- Also, there will have to be national capacity for **implementation**
- Regional aspects should be incorporated into NORAD programmes in such a way that it enables regional participation
- NORAD's regional strategy must be reflected in its policies and activity plans for each individual country
- Quality assurance must be arranged for the activities of Norwegian institutions and consultants used in regional co-operation.

Comments from the floor
Energy co-operation in southern Africa is concentrated on Mozambique, Angola and the regional co-operation within SADC. Do we wish to be a major stakeholder vis-a-vis SADC?

It is hard to answer this question without having more insight into how SADC will arrange its work in the energy sector. What will the regional energy market, including RERA and SAPP, be like? What needs will there be for regulation, administration, institutions and physical installations? What are the prospects for bio energy, and renewable sources of energy, wind etc?

The frequent differences between policy utterances and actual activities were pointed out.

It was suggested that we should limit ourselves to certain sectors in our regional co-operation, for example petroleum, energy and fish. It was also pointed out that Norway was different and unique in the energy sector.

It was agreed that we had to look at the relation between the energy sector and poverty reduction. Is there such a link?

The untying decision of the OECD will have a great effect on the investment in the energy sector.

We also have to relate to the recent change in government, involving some reconsideration of policy. The outgoing government had a strong interest in energy. The new government is stressing private sector/industrial development, education, governance, peace and security and human rights etc. The stress on industrial development is, however, very much in focus. This upgrades the importance of energy being a *sine qua non* for industrial development.

It is important to have in mind that the energy sector is more and more part of the *private* sector. Any strategy for energy co-operation ought to take commercialisation and privatisation into account.

We must be aware that if we go strongly into the power sector, we go into a sector (a) which is in rapid change (b) where public funding for activities may be scarce and (c) that it would be important to work with the interface between energy and politics in the region, and to create an understanding of the importance of the energy sector in industrial development and in industrial development policy.

Energy and poverty reduction

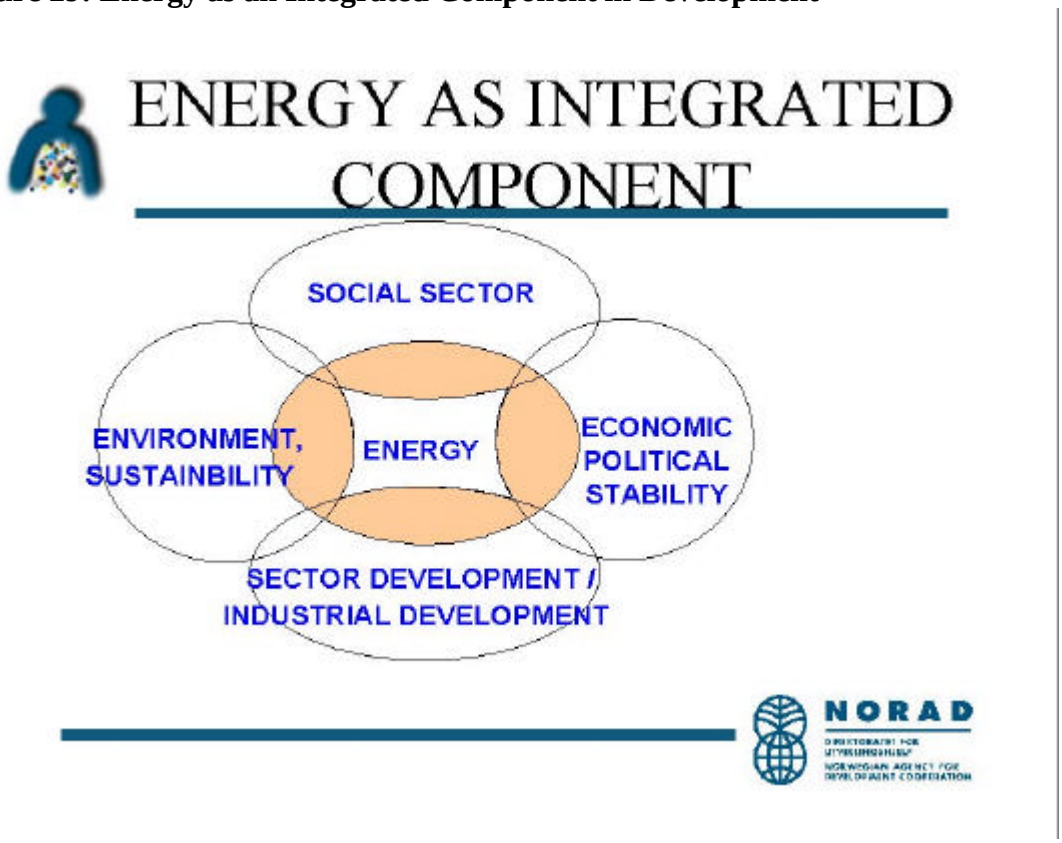
Mr. Glømmi, Special Adviser NORAD

A reliable supply of commercial energy at prices that are affordable is a significant factor in economic development. Poverty reduction is dependent on energy as an integrated component.

The road to poverty reduction goes through economic growth and social welfare. NORAD, in its battle against poverty, has made the social welfare aspects quite visible. The fundamental element in poverty reduction, namely economic development and the creation of income generating jobs, has been less visible.

One should perhaps not wonder about this since the focus on economic development in the direction of Norwegian co-operation has not been very strong, neither has there been clear enough political direction concerning economic development. The focus on energy should be seen as a fundamental element in stimulating economic development. In addition to its contribution to economic growth, energy also contributes to safety, education, health, heating and cooking. Energy is an important element for the realisation of all the sub-targets in the millennium goals for poverty reduction.

Figure 29: Energy as an Integrated Component in Development



It is also important to decide to what degree energy co-operation should affect poverty reduction directly. Energy co-operation may have both a macroeconomic angle and direct itself specifically towards poorer target groups. The relation between economic growth and consumption of commercial energy is well known, not least in the countries where industrial development is lagging. In most industrialised countries there has been a declining growth in the commercial use of energy and increasing growth in the household consumption of energy.

Multinational investment in the power sector appears to be declining in the industrialised US, Japan and Europe as well as in the LCDs. Countries like China, Thailand and the Czech Republic and other middle income countries are where the investment in energy increases most. Projects in LDCs must be seen as a means to boost the capacity to develop.

Energy as a factor in economic development

Access to energy plays a role in both establishing and running industry. Access may be a bottleneck for production and for the assessment of profitability and sustainability of new establishments. Energy has to be accessible where it can be utilised, for example in connection with the production of raw materials and processing.

Reliability in power gives an important basis for both industrial planning and achieving good economic results. It is important to have a stable and functioning environment where business can thrive.

Cost effectiveness has an effect on prices. Any producer's power prices and other economic conditions must be able to compete with those of its competitors.

Energy and development co-operation

Early in the history of development cooperation there was a belief that development would come automatically if we contributed to the building of infrastructure. The supply of energy was looked at as part of the infrastructure. This did not work out well. It was later realised that infrastructure is not enough but that it is a necessary element.

More lately there has been a focus on co-ordination of assistance to the various types of infrastructure for which assistance has been given, such as roads, water, telecommunications, energy. It has been pointed out that it is essential for development that a functioning government administration is in place.

In Norway's economic policy after the Second World War, the development of hydroelectricity was used as an engine in economic development. Overall, post-war policies focused on resource utilisation and exports of raw materials. In most countries there was, after the Second World War, a desire for a considerable self-sufficiency in energy and concentration on exploitation by the country of its own natural resources.

Pricing policy has to aim at prices which are attractive for investment and which create jobs, export potential etc.

Rapid development of the power sector does not come automatically. Countries will have to put in appropriate incentives. Attractive concession rules and an attractive investment climate for power development have to prevail. Governments will have to look at tax incentives and tax policies.

Role of authorities in energy development and governance

Different authorities may prioritise the sector differently. Some countries may not have a specialised energy policy at all. Others have separate ministries for energy.

The energy regulator may have a variety of functions and roles. Some regulators are totally independent of government while others may be a Department or Directorate or part of it. In many cases, the regulator will be given the task of regulating the transition from a state monopoly to commercial competition and supervise the running of the industry. Government will have to set concession rules. Also, government will have to set rules for supply responsibility. In many countries where electricity is not privatised, transmission and distribution continue as natural monopolies, but have been given directions to function commercially. The principle for the industry is free competition but it is important that certain aspects are supervised and directed by government

Energy and the social sector

The objectives of electricity supply for the poorer target groups have lead to investment in the social sector. Often, this takes the form of subsidisation of distribution, subsidisation of investment in for example solar power plants and the use of prepaid meters. The sector will have to have financial transfers from the

government budget, often be in need of donor financing and use cross-subsidisation. The gains from cheap power will materialise through the health sector, electricity for clinics, cooling, lighting etc. and in addition light for reading and education.

The production, transmission and distribution of electricity may have positive and negative effects on the environment. Negative effects may take the form of a widespread use of land, flooding, pollution and deforestation.

Energy and regional requirements

In the *electricity* sector the further development of the Regional Electricity Regulators Association (RERA) should be a high priority. National regulators should be established in all countries.

There is a great need for education within the part of the sector that is market-oriented. Particular areas are training for regulators (for example the Cape Town initiative), and training in economics and management of power producers and network companies.

Another priority would be the development of the Southern African Power Pool (SAPP). Two particularly important areas are mechanisms for investment to remove bottlenecks in the transmission networks and a better flow in the power market.

For the *petroleum* sector upstream there is a need for education both for cutting edge competence on the geological side (for example for postgraduate level education and interpretation of seismic data) and in resource management (Petrad Course, MEETI). Centres of excellence could be formed in the region or cutting edge competence could be acquired "out of Africa".

In the area of *exploration* it is important for countries to be better and more active in offering concessions and in marketing opportunities vis-a-vis the international oil industry. Here it would be useful to arrange joint regional efforts. Support in negotiations and also advice on how to set incentives would be needed, for example, in Mozambique.

Downstream in the petroleum sector there would also be a considerable need for education in the economic evaluation of potential oilfields and for purchasing strategies and selling gas. Also, education will be needed in the area of technology and petroleum engineering, particularly in the planning and operation of petroleum fields and the development and construction of pipes.

In the area of production and distribution there will be a need for assistance to harmonise the legal framework, particularly in areas that are needed for regional co-ordination and the securing of scale advantages in procurement and distribution.

Assistance will also been needed for surveillance for safety, security and environmental purposes. Possible areas are safety in marine installations, personal safety and in the area of environment emissions and pollution.

Energy and Norwegian competency (the petroleum sector)
The areas where it is likely that Norway has a competency edge are management, legal framework, rules and regulations, mapping, resource analysis, oil exploration, production investment and equipment, production/sales/distribution, surveillance / control. The "Norwegian sea experience" could also be extended to other areas.

This competence is found in various locations:
In the **public sector** we have the OED and OD/SFT. These connect to a number of public institutions. In the **consultancy sector** there is, particularly, competence in resource analysis, negotiations, engineering and policy analysis. Within **education** the universities of Trondheim and Stavanger as well as BI in Oslo have great competence.

In the **supply** sector we have organisations like INTSOK and we also of course have the **oil companies**. It is tempting to say that in this sector we have a "complete package" of competency that can be used for the purpose of development co-operation.

Energy and Norwegian competency (the electricity sector)
As for the oil sector, we also have competency in management, legal frameworks, regulatory provisions etc. Planning and engineering as well as the construction and supply of equipment are strong Norwegian competencies. We also have competence in management, production and distribution as well as in sales of electricity at the regional level. Surveillance and control competence is well developed.

The main sources of competence in the **public sector** are the NVE and OED. The **consultants** are particularly good in the fields of technology as well as policy and economics. The **education** sector will have competency in technology and economics. The **supply industry** has recently internationalised considerably, as for example ABB. The power companies and the network companies themselves have considerable experience and have also experienced a change in the industry through which they have gained considerable competence in modern methods of running a power industry.

Energy and Norwegian competency (new and renewable sources of energy)
Norway also has competency in new and renewable sources of energy. Companies in Norway can supply silicates for solar power panels, solar power plants and bio-energy plants. Also, Norwegian firms can supply complete solar power plants. In the area of bio-energy there is scope for supplying and managing industrial plants. Within the area of wind energy competency is being built up at present.

In the **public sector**, NVE and OED are active in new and renewable sources of energy. The Norwegian Research Council is likewise active. There are a number of **consultants** that have competence in technology, policy analysis and project planning (KAN ENERGI, IFE). The **education** sector has strongholds around the Agricultural University of Norway (Ås) and the University of Trondheim. Expertise in wind power plants is found in the power companies. Supplies of wind power equipment are particularly good in our neighbouring country Denmark.

Comments from the floor
Participants wondered whether one could rely on getting the whole range of expertise one wanted from the energy institutions. Do we really have to get people only from the classic energy sector? It was suggested that it would be possible to get TA staff that come from outside NVE but are experts in the wanted fields.

A further comment was that it was important for twinning type co-operation that personnel came from a (donor) organisation which resembled as much as possible the target (recipient) organisation.

Concluding

(NORAD put together a short note on the conclusions of the workshop: "Oppsummering regionalt samarbeide i Luanda 13.02.02". The present "concluding" reflects some of the discussion under the headings of the note.)

1. Should Norway emphasise regional co-operation in the field of energy?

The guidelines for Norwegian support for regional co-operation in southern Africa mention energy as one of several possible areas. Overall Norwegian development policy therefore clearly would be in line with support for energy co-operation.

It was stated that Norway should follow SADC's own prioritisation. What will emerge of priorities from SADC's Regional Indicative Strategic Development Plan (RISDP) would be important. The hope was expressed that more concrete guidelines would come from the mini donor conference soon to be held in the Gaborone. Norway is on the supply side and SADC will have to indicate what kind of assistance they would want from us.

A number of advantages for regional co-operation in the sector were noted. The clearest advantage was perhaps that certain problems of energy supply intrinsically require regional solutions.

It was also pointed out that regional co-operation in the sector would give the "northern" countries in SADC with more unused potential than South Africa a chance to increase exports and thus regional trade would be boosted. This may also contribute to balancing the dominant economic role of South Africa in the region.

The energy sector is furthermore a sector where Norway has particular competence and also experience in conducting development assistance.

It is also important to liaise with other donors with which there are informal contacts. Should such contacts be extended and should one go into some kind of formal co-operation? NORAD, for example, does meet Sida regularly.

The World Bank has sectoral guidelines for industrial development policy. NORAD meets with other donors in a professional context, but there was said to be little contact between FAG and the World Bank. The World Bank is also involved and tries to focus regionally. The World Bank backs the Nile Basin initiative quite heavily and seems to be holding back a bit on SADC. In connection with the World

Bank it was stated that it was important to come up with alternatives or correctives to Bank policies, for example on privatisation.

It was pointed out that focus on the energy sector did not necessarily mean that there would be greater need for public funding. The major share of financing was expected to be carried by the private sector anyway. Still, there would be very good reasons for focusing on the sector. It was reported, with reference to Tanzania, that over the years, even though aid had been increasingly untied, the value of the Norwegian know-how and supplies purchased by Tanzania was greater than the entire value of support through NORAD. The reason for this is that Norway is competitive in the energy sector.

An important question was whether and to what extent we should go heavily into the energy sector. We have to remember that although this is an important sector for Norway, we should also consider other sectors.

Discussions arouse about whether it was appropriate for this type of seminar to make recommendations on choices between the energy sector and other sectors. It was argued that

- It was not correct for a meeting on the energy sector to decide whether the energy sector should be promoted.
- At the same time, it seemed clear that Norway has a lot of insight into the sector.
- Industrial development is a priority together with trade. We should remember that energy is a very considerable tradable good and also a sine qua non for industrial development.
- The group cannot look at everything before we decide what to do with energy, "then we will get nowhere".
- It was also argued that the energy seminar had been set up with the choice of energy as a key sector in mind. The choice of the sector was clear since it is one of the areas where Norway has strong competence.

2. Regional co-operation with whom?

There are a number of energy-related institutions in the region. The most important of them are probably SADC, SAPP and RERA. The relations between them are unclear and not co-ordinated vis-à-vis the donors. The new SADC will be more of a policy organ than before but co-operation also needs to connect with the implementing levels like SAPP and RERA.

Of regional institutions, the University in Cape Town, which appeared to be important on account of the energy competence there, ought to be supported.

Competition boards were also mentioned, together with the fact that we should have good relations with SADC.

3. Regional co-operation in what sectors, in what ways?

There was consensus that there was scope for covering a broad range of energy issues within electricity, oil, gas and alternative sources of energy.

Some participants particularly stressed the importance of the petroleum sector. We may think of harmonisation, better connections and strategies for the connections, product specifications, co-ordination of procurement, and distribution of refineries.

The importance for the general population of biomass was also stressed. A question is what may function commercially? There is a regional biomass project. Otherwise, an exchange of experience and models could be discussed.

Within these sectors Norwegian aid should focus on areas that are appropriate for regional co-operation, such as training, regulation and transfer of know-how / best practices, product standardisation, procurement and regional harmonisation of product specifications. Special mention was made of the following areas:

- Training is very important. In resource management there is a need for elements of both technical assistance and training.
- It is important that the region co-ordinate its purchase of goods, whatever the goods are.
- It was argued that the use of pilot projects with transfer value had not been very successful.
- Whereas alternative energy sources are very important, particularly for the rural areas, it is perhaps an area less suited to regional co-operation, except for exchange of information.

4. How to co-operate?

NORAD is already moving with support for SADC's reorganisation.

This should be followed up with a dialogue with SADC about the Norwegian role in the energy sector as reorganisation in that sector proceeds.

Exactly how co-operation within the energy sector would be arranged would also depend on the other donors. If the idea of joint (budget support type) financing was to succeed, the approach to the sector would have to rely more on training and technical assistance. It would be a priority to start talking to the others.

Also, it would be important to start liaising better with the "specialised" organisations in the sector. NORAD does not have a relationship with the SAPP office in Harare. We should start building up a good link to them. RERA should be followed up by the Embassy in Pretoria. The head of RERA, however, sits in Windhoek.

It would also be important to have a link to the Nile Basin initiative.

We should also have a professional preparedness within NORAD FAG. NORAD now has some in-house capacity but should extend it. NORAD will have to use co-operating partners externally.

The importance of power trade within an area larger than SADC was pointed out. Within the Nile Basin initiative the Norwegian Embassy in Tanzania is a lead donor in the area of power trading.

5. The way ahead

Within NORAD there is a small reserve for regional activities which can be used if the contacts with SADC, SAPP and RERA materialise fast into projects. Otherwise the plans for 2002 and 2003 largely amount to follow-ups.

Contact should be arranged between SAFR and ØSA within NORAD about the Nile Basin Initiative.

6. Other areas for support to regional co-operation

There was a perceived need for arranging similar thinking exercises as the present. One clear sector is trade, the other the cluster of peace, security, democracy, governance and human rights (FSDMR)

In the area of **trade** it was believed that there was a lack of insight in NORAD. It would be necessary to set up a professional knowledge-base outside NORAD. How best to use consultancy for this should be examined. It may be possible to draw on the SADC trade secretariat in Gaborone. Trade and industry are closely linked up. In NORAD, there is ongoing strategy work within trade and industry. This should perhaps be finalised before proceeding. There is an April 2002 seminar about industrial development and social development. Maybe this could be a step on the way.

There should also be a seminar on FSDMR, possibly to take place as the planned annual seminar in September.

Annex 1: List of Participants

NORAD Seminar on Energy in the SADC Region (Luanda, 12 and 13 February 2002)

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Summary

This Working Paper contains a full report from a Seminar on Regional Energy Co-operation, Luanda, 12-14 February 2002. Norwegian involvement in the energy sector in Southern Africa is considerable. Energy is a major area in Norwegian co-operation and includes a number of countries within SADC.

There has been rapid change in the sector, which has moved from being an infrastructure sector to a commodity production sector. Also, the ongoing institutional changes in SADC will have an effect on its relation to energy. The donors' role must change accordingly.

Important objectives of the seminar were to discuss the changes in the sector in the region and to improve the level of information in order to make better decisions.

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