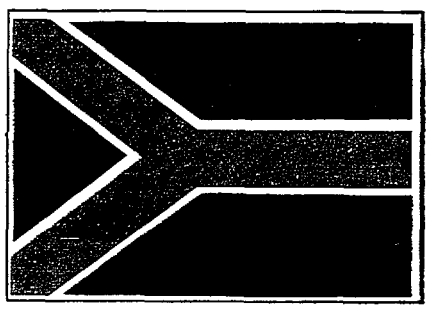
PN-ACF-956

ENERGY

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY



Johannesburg, Republic of South Africa
1 - 4 February 1996

CONTENTS

PROJECT NUMBERING SYSTEM

Projects are identified using an alphanumeric numbering system

1. The first three letters indicate the member State.

AAA	-	Regional	NAM	-	Namibia
ANG	-	Angola	SWA	-	Swaziland
BOT	-	Botswana	TAN	-	Tanzania
LES	-	Lesotho	ZAM	-	Zambia
MAL	-	Malawi	ZIM	-	Zimbabwe
MOZ	-	Mozambique			

2. The first digit defines the Sector

0	-	Overall Coordination
1	-	Cement and Cement Products
2	-	Chemicals
3	-	Educational and Health Materials and Equipment
4	-	Electrical Goods
5	-	Farm Implements and Equipment
6	-	Fertilisers, Insecticides and Pesticides
7	-	Food and Food Processing
8	-	Iron, Steel and Engineering
9	-	Leather and Leather Goods
10	-	Pulp and Paper
11	-	Salt
12	-	Support Services
13	-	Textiles
14	-	Trade Promotion
15	-	Industrial Trade Financing

3 The second digit is a serial number

A B R E V I A T I O N S

ADB	=	African Development Bank
AGIP Spa	=	AGIP Spa
AIDAB	=	Australian International Development Aid Bureau
ANG	=	Angola
ARSO	=	African Regional Organisation for Standardisation
ASEAN	=	Association of South East Asian Nations
AUS	=	Australia
AUSt	=	Austria
BADEA	=	Arab Bank for Economic Development in Africa
BEL	=	Belgium
BOT	=	Botswana
BRA	=	Brazil
CAN	=	Canada
CARICOM	=	Caribbean Community
CBI	=	Confederation of British Industries
CBIF	=	Cross-Border Investment Facility
CEFS	=	Comprehensive Export Financing Scheme
CFTC	=	Commonwealth Fund for Technical Cooperation
CHI	=	Peoples Republic of China
CITES	=	Convention on International Trade in Endangered Species
COMSEC	=	Commonwealth Secretariat
DEN	=	Denmark
ECF	=	Export Credit Facility
EEC	=	Commission of the European Communities
EPRF	=	Export Pre-Financing Revolving Fund
FAO	=	Food and Agriculture Organisation of the United Nations
FIN	=	Finland
FRA	=	France
FRG	=	Federal Republic of Germany
GDR	=	German Democratic Republic
GTZ	=	German Association for Technical Cooperation
GSP	=	Generalised System of Preferences
IBRD	=	International Bank for Reconstruction and Development
HRD	=	Human Resources Development
ICAO	=	International Civil Aviation Organisation
ICE	=	Iceland
IDA	=	International Development Agency
IDRC	=	International Development Research Centre
IDU	=	Industrial Development Unit of the Commonwealth Secretariat
IFAD	=	International Fund for Agricultural Development
ILO	=	International Labour Organisation
IMPOD	=	Import Promotion Office for Products from Developing Countries
IOS	=	International Organisation for Standardisation
IRE	=	Ireland
ISNAR	=	International Service for National Agricultural Research
ITA	=	Italy
ITB	=	International Tourism Board

ITU	=	International Telecommunications Union
ITIX	=	International Travel Industry Exposition
JAP	=	Japan
KUW	=	Kuwait Fund
LES	=	Lesotho
MAL	=	Malawi
MBS	=	Malawi Bureau of Standards
MIEs	=	Multilateral Industrial Enterprises Scheme
MOZ	=	Mozambique
NAM	=	Namibia
NET	=	Netherlands
NIPOs	=	Nordic Import Promotion Officers
NOR	=	Norway
NORAD	=	Norwegian Agency for Development
NORDICS	=	Nordic countries
NORSAD	=	Nordic/SADC Fund or Agency
NSBs	=	National Standards Bodies
OPEC	=	Organisation of Petroleum Exporting Countries
POR	=	Portugal
PTA	=	Preferential Trade Area for Eastern and Southern Africa
RIPs	=	Regional Industrial Projects
SADC	=	Southern African Development Community
SAFTTA	=	Southern African Federation of Travel and Tour Associations
SAREC	=	Swedish Agency for Research Cooperation with Developing Countries
SATEP	=	ILO Southern African Team for Employment Promotion
SAZ	=	Standard Association of Zimbabwe
SITCD	=	SADC Industry and Trade Coordinating Division
SPA	=	Spain
SQA	=	Standardisation and Quality Assurance
SRBC	=	SADC Regional Business Council
SWA	=	Swaziland
SWE	=	Sweden
SWI	=	Switzerland
TAN	=	Tanzania
TAZARA	=	Tanzania Zambia Railway Authority
TPOs	=	Trade Promotion Officers
TCU	=	SADC Tourism Coordinating Unit
TTW	=	Travel Trade Workshop (Montreaux)
UAPTA	=	Unit of Account of the Preferential Trade Area
UK	=	United Kingdom
UNDP	=	United Nations Development Programme
UNIDO	=	United Nations Industrial Development Organisation
USA	=	United States of America
USSR	=	Union of Soviet Socialist Republics
VTR	=	Visiting Friends and Relatives
WB	=	World Bank
WTO	=	World Tourism Organisation
ZABS	=	Zambia Bureau of Standards
ZAM	=	Zambia
ZIM	=	Zimbabwe

1. EXECUTIVE SUMMARY

1 1 The Windhoek Declaration and the Treaty signed by the SADC Heads of States in Windhoek in August 1992, heralded the building of a strong Community Useful experience was learned from the loose organisation and SADC will be built on the basis of some identified weaknesses, but also on some well recognised successes achieved during the past years

1 2 The new environment produced a deep impact in the region, and new goals need to be set and the opening of the Organization to South Africa implies defining stronger strategies to achieve a Community of member States, where integration will be the central focus

1 3 South Africa, which is a key player in the region by the size of its economy, population, technology, manpower and financial resources, became a full member of SADC in 1994, and it is expected that its accession to SADC will benefit the entire region

1 4 The Energy Sector that has an important responsibility in identifying the complementarity of regional energy resources, promote their development and sharing the planning of their efficient use on a sustainable basis To be able to respond to new challenges, the Energy Sector needs to identify those elements that could assist on setting future goals, possible constraints, mechanisms and procedures to better promote cooperation among several SADC stakeholders

1 5 The Energy Sector Workshop held in April 1994 was an important event which served to exchange views and to formulate inputs/guidelines for the future development of the Sector It launched the process of the Community building in the energy sector It resulted in the formulation of the SADC Energy draft Protocol The draft Protocol was first discussed at the second Technical meeting of Energy and legal experts held in Pretoria from 26 - 30 of June, 1995 and later discussed at the 20th Energy Officials and Ministers Meetings The Protocol was then approved by the Energy Ministers at their meeting held in Cape Town, South Africa from 03 -07 July, 1995 The Energy Protocol will be submitted to Council of Ministers for negotiations, in accordance with the guidelines approved by SADC

1 6 The process of transforming the Energy Sector into a regional Commission might take yet some time, therefore, it is important that the Energy Sector adopts a working platform which fits the transitional period until all Community organs are set up In order to respond the new changing environment the Energy Sector in parallel to the formulation of the Energy Protocol has also been involved in the review of its "Overall

Energy Policy and Strategy" At their 20th Meeting, the Energy Ministers approved the framework in which the revised Energy Policy and Strategy will be formulated It is expected that this Policy and Strategy Document will be approved at the next Energy Officials and Ministers Meeting, to be held in June 1996, in Swaziland

1 7 One of the weaknesses of SADC in the past was its inability to mobilize the required financial resources both internal and external to support the implementation of its Programme of Action The SADC project portfolio is increasing each year, as well as the corresponding implementation costs

1 8 The biggest portion of the SADC Energy Sector portfolio continues to be financed by external sources Due to scarcity of financial resources and the pressure on the competition for their mobilization in other regional groupings, the inflow of capital to the SADC region has drastically reduced in the recent years The learned lesson is that, the lack of strong discipline on the application of regional criteria for project definition, prioritization, lack of confidence on options that are really regional compared to national ones, has weakened the cooperation opportunities on mobilizing local funding

1 9 The Energy Sector adopted a two fold approach to tackle this problem

- on the one hand, there is a need to review the project portfolio by selecting the regionally sound projects and define priorities,

- on the other hand, one should build mechanisms and economic adjustment programmes to attract financial resources, both local and external, attract the private sector's participation in the investment programmes, increase crossborder exchanges of commodities and promote cooperation

1 10 Most of the countries are still relying so much on the primary economic sector, despite the trends on growth of the outputs of the secondary and tertiary sectors, and thereby rendering the economy of those countries very dependable on the climate changes The effect of severe droughts in the region are very known, specially their impact in the Energy Sector During the drought period, the merits of cooperation in the use of shared resources, over strictly national ones as could be supported by the self reliance and national security theories, was demonstrated Existing power interconnectors, came to alleviate what could have been too disastrous for the economy of those member States affected by the drought

1 11 The tables of funding status, as at July 5, 1995 shows that the current portfolio consists of 56 projects with a total value of about US$ 861 91 million Funding has been secured for projects amounting to US$ 624 86 million with US$ 34 14 million under negotiation The Sector has completed 4 projects (over the reporting period) while 5 projects are suspended

1 12 A new project on the Petroleum Subsector has been presented at the 20th Energy Officials and Ministers meeting The project entitled **"Harmonisation of Laws, Rules, Standards and Regulations including Environmental Protection and Safety in the Petroleum Sector"** has been approved by the Energy Ministers as project AAA 1 8 The project is expected to enhance in-house capacity in the field of peroleum management, safety and environment It will further promote regional collaboration in issues related to petroleum and the environment Retaionalization of policies and legal technical issues will be achieved by this project

2 REVIEW OF THE REGIONAL SITUATION

2 1 SADC member States have different economic structures and also different stages of development Such structural differences in the economy are reflected directly by the Energy Sector of each country, as can be seen, by the level of consumption and demand of different energy commodities in the region With the exception of South Africa, in general, the energy consumption intensity of commercial sources in the region is relatively low. Energy efficiency in the region is also very low, due to the utilization, of obsolete technology in the manufacturing sub -sector, low level of maintenance, poor system reliability, low capacity utilization and so on

2 2 The SADC population accounts for 84,5 millions of inhabitants, 80% of them been rural people The average population growth rate in SADC amounts to 3 5% annually The GDP of each member State varies according its economic development and it is a clear indicator of different economic structures among SADC countries The GDP growth in real terms between 1980 - 1992 period shows increase values for most of the member States, with exception for Namibia in a short term, during 1980 to 1988 period, with a slow down growth, and a peaking up growth after 1989 onwards

Malawi and Mozambique however, experienced a decline of its GDP growth in real terms over the period of 1980 - 1990 The SADC GDP per capita in 1990 was USD 338 while in 1991 was USD 203 at current market prices, which means a decline of 60% Botswana, was the member State with the greatest GDP growth during the period under review A economy based in the diamond industry but with strong investments in agriculture and industrial diversification and services

The SADC GDP represents 5 6% of the GDP of the total Africa of which 32% is South Africa's alone In demographic terms SADC population represents, 12 6% of the total Africa population, and South Africa population represents 38% of the SADC population The SADC GDP per capita compared to the total Africa GDP per capita was 44%, while the GDP per capita of South Africa alone represents 359% of the total Africa GDP per capita and 807% of the SADC GDP per capita Those figures show the impact of the South Africa economy when integrated in SADC The impact of such big economy in SADC cannot be ignored

2 3 In terms of energy consumption patterns, two factors are

strongly related to the consumer behaviour, the demographic and the economic In SADC, due to the small percentage of urbanized population, only a relatively small number of dwellers have access to the commercial energy sources The majority of SADC population still relies in the use of woodfuel as their main source of energy Woodfuel accounts for 75% of the total final demand in the region This figure shows the imbalance on the use of the resources and the resultant quality of living of the different dwellers in SADC as a whole Tremendous pressure is put on the forest, and the consequences are well known Increasing depletion of the forest resources, soil degradation, increasing emissions of carbon gases to the atmosphere, social and economic hardship, health hazards, increasing prices of the commodity in the peri-urban areas, are some of the immediate consequences

The countries with highest rates of woodfuel consumption are Tanzania, Mozambique, Zimbabwe, Zambia and Malawi From the total consumption, reference can be made to the following sub-sectors household with 86%, Agro-industry 3 9%, Industry 8% and others 2% A country like Malawi uses a significant amount of woodfuel in industry and agro-industry due to scarcity of coal resources and financial constraints in foreign currency to import the oil needed to sustain the industry transformation process

2 4 Since few years ago, it has been widely expressed that rural electrification is not a cost effective program to address the needs of the rural people in terms of global approach in whole region However, other alternative programs, specially the harnessing of the biomass resources and other renewable resources, are still in a very slow transference path to the masses As a result the pressure in the environment continues, by the continued increasing use of woody biomass products SADC should look very closely to all implementing strategies and policies, which will be able to harness the local resources and satisfy the needs of energy for the rural people in the region

2 5 The commercial energy resources in SADC are diverse and represent a significant amount of proved reserves of all kind Hydro, Coal, Petroleum, Natural Gas, etc, constitute natural resources that once converted could meet the commercial demand of energy by whole SADC segments of the population Electricity in the region is generated through thermal or hydro resources However, the hydroelectricity represents 65% of the total commercial supply to SADC Thermal generation accounts for 29% of the total power supply

2 6 Without South Africa, the hydroelectric capacity installed is

7,548 MW, supplying a total of 25,268 Gwh South Africa alone, has a installed capacity of over 40,000 MW, where ESKOM shares 35,000 MW ESKOM is the largest utility in SADC and is among the biggest in the world Actually ESKOM has an excess capacity of 4,300 MW, but it will be possibly absorved until the year 2000 Most of the South Africa electricity production is generated by thermal plants This has a tremendous environmental impact, due to the level of atmospheric emissions of all sort of pollutants Any increase in the demand in South Africa that employs increasing generation capacity by thermal generation will imply increasing atmospheric emissions and a multiplicative effect to the environmental damage Only the adoption of strategies of grid interconnections with countries with greater hydropower capacities and eventually the phasing out of the thermal stations, could alleviate the environmental impact of the thermal or nuclear electricity generation

2 7 By far, South Africa is the biggest producer and consumer of electricity in the SADC region Electricity accounts for 49% of the total consumption in industry, 11% in the commerce and around 15% in the household After South Africa, Zimbabwe is the largest consumer of electricity, accounting for 41% of the total SADC consumption, followed by Zambia This member State is responsible for 27% of the total SADC consumption, excluding South Africa

2 8 At regional level Industry accounts for 33%, Mining 29%, Household 19% of total electricity consumption and the Agriculture sub-sector accounts for 6 3% only

2 9 Angola is the only SADC member, which produces oil The other member States import petroleum The annual consumption of petroleum in SADC is around 5 K Tonnes The region has refineries in the following places, Luanda, Dar-Es- Salaam, Ndola and six more in South Africa The transport sector is the main consumer of petroleum and derivates 50%, followed by the industry which accounts for 16 3% Since the last oil crisis in 1989, the oil prices are almost stable in the market and hence, there is a reduced pressure on the import bills of most SADC member States

2 10 Kerosene is extensively used in rural areas for lightning and in the peri-urban areas for cooking and lighting as well The LPG is used intensively in Angola for cooking

2 11 Natural Gas fields discoveries were confirmed and reserves proven in the countries like Angola, Mozambique, South Africa and Namibia Although natural gas is still in early stages of use in the region, some projects have been identified and feasibility studies for the expansion of its use in the region are under way Gas can be a resource which use can be

advantageous to the energy balance in the region South Africa has a strong expertise and technology to address the gas exploration and marketing options for the development of this sub-sector in the region

2 12 Coal resources are abundant in the region specially in South Africa where reserves are estimated at 55,000 million tonnes representing around 10% of all world reserves The total reserves in SADC amount at 122,955 million tonnes The coal in the region is mainly used in the electricity generation in countries like South Africa, Zimbabwe and Botswana South Africa uses also some percentage of coal to produce synthetic fuels and derivates Zambia uses coal in the mining transformation processes

2 13 It is worthwhile to notice the efforts in the region to implement projects and programs at regional and national level in the NRSE, Energy Conservation, DSM as alternative options to get a more balanced use of resources, trying to attain options at least cost opportunities and to reduce the environmental impact of the energy production and use from traditional technologies and sources

3 PROGRAMME REVIEW

3 1 OVERALL ENERGY SECTOR OBJECTIVES

The drought, and the continued climate changes are affecting the economic output of most of the SADC countries and so the energy sector Although most of the economies are based on agricultural products, there are economies which are quickly changing to a significant level of industrialization and services production, affording a much better balance in the periods of drought crisis

The economic and financial situation has direct and indirect impact in the Energy Sector as can be seen in the growth rate of energy demand in the region However a substantial activity has been developed by the Energy Sector, in the implementation of projects and other activities included in the several sub-sector Strategies

The new environment in which SADC member States are operating now have been the object of analysis by different stakeholders in the SADC Community and abroad and a clear shape in the structures, procedures and modus operandi, still need to be defined This exercise of setting up structures to respond to the new mission takes time and relevant consultations Meanwhile, the Energy Sector has been engaged in the activities of its normal working cycle in parallel with those related with the Community Building

3.2 MAJOR SADC ENERGY SECTOR EVENTS

The main events held by the Sector over the reporting period can be listed as follows

The Petroleum Downstream Conference, held from 01-03 August in 1994

The 7th Electricity Subcommittee meeting, held in Mbabane, Swaziland from 2nd - 5th May 1995

The 4th Energy Conservation Specialized Subcommittee meeting held in Harare, Zimbabwe, from 8th -9th May 1995

The Energy Sector Working Group (ESWG), held in Lilongwe, Malawi on February 2, 1995

The Workshop on the Natural Gas Study, held from 07 - 08 February 1995

The 2nd Energy Workshop for the in the Community Building Process, held from 26 - 30 June, 1995 in Pretoria

The 20th Energy Officials and Ministers meeting held in Cape Town, from 03-07 July, 1995

3 3 PETROLEUM

a) Project AAA 1.5 - The Joint SADC Petroleum Exploration Programme

The most important project in the petroleum upstream is the project AAA 1 5 - The Joint SADC Petroleum Exploration Programme At a meeting with the African Development Bank (ADB) in March 1994, a TAU/ADB Joint Aide-Memoire was signed In this memorandum ADB confirms its commitment to funding PEP with USD 19 040 000 million as a part of a comprehensive finance plan Since then TAU has been actively working on solving the details of this financing plan In a high level meeting between the SADC Energy Sector and the ADB, held in 6-7 June 1995, a new Aide-Memoire was signed This Aide-Memoire states the present agreement between the ADB and the SADC Energy Sector The most important point being that the ADF-7 which was the facility envisaged for SADC PEP has not been replenished as anticipated Current negotiations also indicate that the level of country and multi-national projects allocation will be less than expected The SADC Energy Sector - TAU will continue to work for an as rapid solution to the financing of all components of the SADC PEP as possible

b) **Petroleum Downstream Conference**

In the downstream sector, TAU held a Conference in Maputo, Mozambique, from 1-3 August 1994 The subject for the Conference was "Rationalising Petroleum Products supply and Distribution in the SADC Region" The Conference had a very good attendance from the SADC member States, national and private oil companies and from other petroleum related industry and organisations

c) **Study on "The Economics of Natural Gas Utilisation in Southern Africa"**

Considering the energy resource situation of Southern Africa, natural gas are likely to become an important source of energy in industrialisation of many member States TAU has, therefore, carried out a study on *"The Economics of Natural Gas Utilisation in Southern Africa"* Norad and the World Bank supported the study with international experts on the subject for review of the Technical Papers The study is now finalised and the reports have been submitted to the member States

d) **Project AAA 1 8 - The investigation of Harmonization of Laws, Rules and Regulations Including Protection and Safety in the Petroleum Sector.**

Base on recommendations and conclusions from several seminars and conferences organised by the SADC Energy Sector and other organisations on questions related to both Petroleum Upstream and Downstream have been held in the Southern Africa region during the last few years TAU in close collaboration with the Ministry of Energy submitted to the 20th Energy Ministers meeting the TOR of a new Project

The main objective of this project is the investigation into the harmonisation of laws, rules, standards, and regulations related to the petroleum sub-sector and the environment in the region in order to create an efficient industry taking advantage of available capacity and economies of scale Furthermore securing that safety and environmental management become part of the management culture of the petroleum industry in the region, and reviewing possible joint actions for the region in order that the sector contributes to the global initiatives taken at the UN Conference on Environment and Development in Rio de Janeiro 1992

3 4 COAL

The manning of the TAU-Coal Subsector with a highly qualified international coal utilization expert has, despite frequent attempts from TAU's side to find donors willing to pay for such an expert, not yet been accomplished The funds earmarked by the German Government for such an expert has, after a meeting between the SADC Secretariat and the German Government, been redirected to the Technical Assistance Funds, administered by the Secretariat The reason for this was the political situation in Angola It is understood that once the situation in Angola is normal, the money will be replenished to TAU in order to engage a coal utilisation expert in Luanda TAU is also working on other possibilities for funding such an expert

3 5 ELECTRICITY

The Electricity Sub-sector has over the past year been dominated by some important activities and among others were The challenging process of establishing the Southern African Power Pool (SAPP), the inclusion of South Africa as the eleventh member of SADC, and the following-up of regional projects, the promotion of interconnections systems in order to enhance the Regional, Power cooperation, which is intended to be the tool to ensure an optimum use of energy resources on a regional basis The full participation of Eskom, brought a valuable contribution to the regional power cooperation

3 5 1 After the 1994 Minister"s Meeting held in Lusaka, where the principles for the establishment of the Southern African Power Pool were approved, the SADC Power utilities and TAU have been working together in order to prepare the necessary documents for formal and legally establishing the SAPP From several meetings an hierarchy of documents was proposed to regulate the power pool,

- An Inter-Governmental Memorandum of Understanding (IG-MOU)
- An Inter-Utility Memorandum of Understanding (IU-MOU)
- An Operating Agreement, and the Operating guide lines

Even though the technical discussions are being held between the power utilities" technicians, TAU has actively been following up the process of the drafting of these documents In particular TAU has assumed the responsibility for the Inter-Governmental Memorandum of

Understanding, and is now playing an active role in the political process leading to a final approval of SAPP

3 5 2 One important step was to call for an **Extraordinary Energy Officials" Meeting**, during the Annual Consultative Conference in Lilongwe, on first February 1995 This was the first opportunity for the Energy Officials to meet and exchange views on the SAPP All participants signalled a very positive attitude to the initiative, but the discussions also revealed the need for clarification in some areas

3 5 3 The Inter-Governmental Memorandum of Understanding, was distributed during the first week of May to all Energy Contact Points after having been discussed in Electricity Sub Committee meeting which took place in Mbabane Swaziland from 1 - 5 May 1995 and was submitted for Energy Ministers consideration at their 20th Energy Ministers meeting held in Cape Town, from 03 - 07 July It has been approved by the Energy Ministers

3 5 4 The 1995 Electricity Sub-committee meeting took place in Mbabane from 1 to 5 May In this important event were present 8 Chief Executives, 2 Chief Executives representatives and senior staff from the power utilities Unfortunately SWAWEK from Namibia was not represented SNEL from Zaire was invited and attended the meeting

3 5 5 The project AAA 3 2 - Specialized Training in the Field of Electric Power - As there is an obvious need to take necessary action in order to lift the project up to a level of implementation and as it seems still to be the consensus that Power Utilities do require specialized training in certain priority areas defined during the development of project AAA 3 2 The issue was discussed during the Electricity Sub-Committee meeting and it was recommended that the creation of a task force to review the list of courses and capabilities of the institutions identified in the study, recommend how the South Africa training facilities can be integrated in the project and assess the financial support that utilities benefiting directly are willing to cover

3 5.6 **The project AAA.3.4** - Regional Hydroelectric Hydrological Assistance Programme - The extension of Phase II - Part I was approved and its implementation started in January 1995 To ensure sustainability of the project, CIDA would like to see that the utilities are paying per diem to the counterparts and trainees and other costs related with project activities The utilities have expressed willingness to cover these costs and a consensus was

reached with CIDA that an interim period of 6-8 months (from January 1995) will be allowed for the necessary provision to be taken care of, in the 1995/96 national budgets

3.5.7 **The project AAA.3.7** - SADC Transmission Systems Computer Model for analysis and Planning - The project will have an important impact as a planning tool for the proposed Southern African Power Pool In a SAPP meeting on 29 - 31 August 1994 the power utilities suggested a slight change in the TOR to fit their needs TAU together with power utilities and Statnett from Norway, prepared the new Terms of Reference (TOR) and started negotiations with NORAD who has indicated interest to fund the project A follow-up meeting with NORAD took place in Luanda, on 11th May 1995 and TAU was informed that the request is presently being considered

3.5.8 **The project AAA 3 8** - Regional Generation and Transmission Capacities, including Interregional Pricing Policies - With the constitution of the "Southern African Power Pool" a great deal of Phase III will be considered as completed However, CIDA is still committed to finance activities "to be identified" through the existing project Therefore, during the ESC #7 TAU was mandated to approach potential donors, particularly CIDA requesting their financial support for concrete activities on the establishment of SAPP, particularly in training areas and telecommunications

3.5.9 **The project AAA 3 10** - Kafue Gorge Regional Training Centre (KGRTC) - After a joint investigation made by Zambia and a Norwegian team, in December 1987, the ZESCO training centre was rehabilitated and became a regional training centre In order to guarantee the sustainability of the project, the management presented a programme for continued operation of KGRTC, for the next period, from the beginning of 1996 until the end of 1998 Although training fees and student accommodation have been paid by the project, the intention is, for the coming period, to make KGRTC self - sustainable The utilities highlighted the need for further donors support for the extension period of two years, from 1996, and they stressed their commitment to cover the costs for training activities

3.5.10 To enhance the power cooperation between SADC and non SADC countries the Electricity Sub Committee meeting held in May 1995, recommended that TAU take the initiative to look at the possibility of upgrading the existing 220 kV tie line A C system from Inga -Zaire to the Southern part of the region as a SADC project The study is looking at a possible transfer of up to 800 MW to SADC region

3.6 NEW AND RENEWABLE SOURCES OF ENERGY

3 6 1 The main activities of the Department of New and Renewable Sources of Energy [NRSE] during the period from July 1994 - June 1995 were to establish contacts with international cooperating partners in order to set up mechanisms for implementing SADC-FINESSE Programme and obtain funds for other projects

3 6 2 In this context bilateral contacts were made with UNDP, New York Offices (Energy and Atmosphere Programme (E&AP), SEED/BPPS) through whom combined Dutch and OPEC financial support for SADC Project AAA 4 11 "SADC Programme for Financing Energy Services for Small Scale Energy Users" is being channelled to the SADC region The principal aim of the SADC FINESSE project is to identify and promote ways to provide technically feasible and economically viable renewable energy and energy conservation services to residential, commercial energy users

Meanwhile, SADC-TAU is going ahead setting up a FINESSE Programme Management Unit which will manage the programme and contract the services of regional and international consultants, as required The Unit's activities will be conducted under the overall direction and support of SADC-TAU through its NRSE Department Other contacts in this regard have included tripartite meetings between SADC-TAU, UNDP and ADB in an attempt to solicit ADB participation as the principal financial institution for the mobilization of funds in the project implementation

3 6 3 In addition to the above, the Sector staff participated in the activities of the Africa Region Organizing Committee of the World Solar Summit Process A paper entitled *"Experience in Implementing Renewable Energy Programmes in SADC Region"* was presented at the High Level Expert Meeting for Africa held in Zimbabwe from 20 - 23 March 1995 The purpose of this meeting was to discuss five deliverables forming the basis of an African position on the resolutions of the Rio Summit These deliverables are World Plan of Action, Strategic Solar Projects, World Solar Fund, World Solar Charter and

International Solar Treaty A follow-up meeting has been scheduled for September, 1995 and SADC Energy Sector-TAU has been requested to take the lead in elaborating project briefs for the Southern African region for presentation at this meeting

3 6 4 A series of small project identification projects from the Dutch funded Ad-Hoc Fund were implemented These include

a) Rehabilitation of Water Pumping Systems For Irrigation to Increase The Existing Productive Capacity of Forest Seedlings in Luanda", Angola,

b) Assessment of Market Opportunities for Renewable Energy Technologies in Malawi",

c) Training Manual for Renewable Energy Technologies

d) Smoked Fish Quality Monitoring For Improved Energy Efficiency, Tanzania

3.7 WOODFUEL

3 7 1 The main activities of the Woodfuel Subsector during the period from July 1994 - June 1995 was the completion of project AAA 5 15 "Improvement of Woodfuel End-Use Efficiency in Rural Industries of the SADC Region" The major outputs of the project are in the form of reports by TAG, and Lead Research Countries, energy data base, methodology and computer based analytical tools, and a set of four improved kilns All project outputs listed above were, in the course of the project implementation, subjected to stringent peer group reviews in three separate workshops attended by country research teams, TAG members and independent researchers from universities within and without the SADC region These workshops were held in Maputo in November, 1993, Harare in June, 1994 and Arusha in March, 1995

3 7 2 The implementation of project AAA 5 17 "SADC Rural Energy Planning and Environment Management Training Programme" up-to-date included two policy seminars, Energy Ministers Seminar a one day seminar held at Mulungushi Hall in Lusaka, Zambia on 22 June, 1994, and Principal/Permanent Secretaries Seminar held at ESAMI in Arusha from September 19-21, 1994

3 7 3 A total of 6 training courses were conducted and attended by the majority of the SADC member states Rural Energy Planning and Environment Management, a three-week course conducted during the period from November 21 to December,

9, 1994 Energy Data Survey Methods and Applications, a course held during the period from November 28 - December 16, 1994 Energy Technology Assessment took place as scheduled in Harare from February 13 - 24, 1995 Biomass Energy Technology Seminar was held at ESAMI Hq in Arusha, from February 27 - March 17, 1995 Rural Energy Project Planning was held at ESAMI Hq in Arusha from March 20 - April 13 The Gender Analysis workshop was held in Arusha, at ESAMI Hq from 08 - 19 May, 1995

Three Steering Committee meetings were held in the last twelve months Lusaka, Zambia, 22 June, 1994, Arusha, Tanzania, September, 1994, and Arusha, March, 5-7, 1995 The main conclusion from the meetings is that there is a need for SADC financial contributions to the training programme,which means that SADC member States are required to make financial contributions towards the scholarships offered under the project

3.8 ENERGY CONSERVATION

3 8 1 The 4th Energy Conservation Specialized Subcommittee was held in Harare on 8 and 9 May 1995 with the participation of all member States with exception of Angola that was not represented Six member States presented country reports on ongoing activities in their countries in the energy conservation/efficiency field TAU rose the concern about the need to sign the MOU regarding project AAA 6 5, SADC Industrial Energy Management, for those member States that until now have not done so

3 8 2 A review of the status of projects AAA 6 5 - SADC Industrial Energy Management, and project AAA 6 9 - DemandSide Management Opportunities for SADC utilities, have been presented and recommendations to small changes in the approach were approved to be submitted to the CEAs concerned

3 8 3 Project AAA 6 5 - SADC Industrial Energy Management

The main objectives of this project are

- to develop the energy management expertise of SADC consulting engineers to enable them to assist the industry in the development of energy management programmes and the identification and implementation of retrofit projects or process modifications,

- to motivate and develop a capability within industrial firms in at least two industrial sub-sectors to plan and undertake energy management projects with the assistance of consulting engineers or on their own,

- to develop the energy management expertise of SADC technical educational institutions to enable them to offer courses so that current and future engineers and technicians will sustain good energy management practices

The expected outputs are

- consulting engineers trained and upgraded in energy analysis and energy management techniques, technologies and processes,

- industrial plant personnel trained to conduct audits and to recognize and identify energy savings opportunities, as well as plan and implement energy programs and projects,

- training/educational institutions with expertise and expanded curricula to help sustain energy management training and skills upgrading,

- greater awareness among energy professionals of energy management opportunities, costs and benefits,

- a project database which will be of use in planning in the future such projects and in assessing opportunities for energy efficiency improvements in SADC industry,

- effective and visible demonstration projects in two key sub-sectors as well as other sub-sectors depending on inputs from member States

3.8.3.1 Project Inception Phase:

After the final approval of the project by the Government of Canada in 1994, the Canadian Executing Agency (CEA), Shawmont New Found Land Ltd, initiated activities such as project installation, procurement and preparation for the inception missions to member States

3 8 3 2 The main goal of the inception mission was to confirm the identified potential stakeholders of the project and clarify major project objectives and outputs To address this concern the CEA, completed about 30 separated missions to all member States Those missions include general assessing missions and sub-sectors assessment missions

3 8 3 3 The CEA issued the first Inception Report in November 1994 and comments from TAU, CIDA and member States allowed them to review it and issue the draft that was submitted to the Project Advisory Committee (PAC) meeting

3 8 3 4 The PAC meeting held in Harare on 10th May reviewed the Inception Report and recommended few alterations on the project presentation mainly in the member States costs associated with their participation It was agreed that the project will start at the begining of July 1995

3 8 4 Project AAA 6.9 - DemandSide Management Opportunities for SADC Utilities

To achieve the project objectives as stated in the implementation phase, the following objectives and stages have been defined

- To identify one or more potential power sector demandside management (DSM) programmes or projects for the SADC region,
- To identify potential candidate utilities, institutions, and other participants for the SADC projects
- To identify the organizational, technical, and financial requirements associated with these projects,
- Based on these findings, to develop fundable DSM projects that could be implemented on a priority basis in the SADC region

Those objectives are supposed to be achieved in three stages

Stage 1 Collection and synthesis of country energy and economic data

Stage 2. Undertaking of a first mission to SADC, and preparation of an interim report

Stage 3. Selection of candidate countries, undertaking of a second mission to the region, and preparation of proposed DSM programmes for the candidate countries

3 8 4.1 The final report was issued in May, and addressed to TAU and the member States However, during discussions in the 4th Encon Subcommittee member States were not satisfied completely with the conclusions of the report and requested TAU to approach CEA to justify the criteria used for member States selection for the implementation phase

3.8.5 Two issues are important for the implementation phase of the project AAA 6.5.

1 The need for the signature of the MOU by all member States participating in the project,

2 The constitution of the NEMCs, as guaranty of sustainability of the project in the future

The two issues have been discussed during the Subcommittee meeting, and recommendations to member States to proceed in the implementation of these measures were made

4. CURRENT STATUS OF PROJECTS

4 1 OVERALL COORDINATION

Project AAA 0 3 General Support to the Energy Sector/Technical and Administrative Unit (TAU)

The objective of this project is to provide technical and material support to facilitate the work of the TAU This support involves procurement of materials, financial and technical assistance The project is supported by Belgium, Brazil, Canada, EC, France, Norway, Portugal, Sweden and UK TAU has signed specific Memoranda with Canada, Portugal, Belgium, EC and Norway Altogether seven and a half-man years have been allocated to support TAU, including one full-time staff member from the region, have been financed under the project It is anticipated that the need for external support will be phased out gradually as the TAU develops its own internal capacity Norway has started phasing out its personnel from the middle of 1992, aimed at a reduction of two and a half-man years by the end of 1994 At the beginning of 1993, TAU has made some modifications on its structure, as well as, increased its staff in order to fill the gabs being left by expatriates

Project AAA 0 4: Energy Bulletin

The objective of this project is to increase knowledge about the energy situation in the member States and improve the flow of energy-related information between and among member States, with a view to facilitating regional cooperation

This is an ongoing project since September 1982 It receives financial and material support entirely from Angola The printing of the Bulletin has been undertaken entirely in Angola since issue No 17 for April/May 1988 The photocomposition is done by the Bulletin's own staff The production of the Bulletin has been greatly facilitated by the equipment acquired with financial assistance from Canada During 1991/92 three editions, Nos 23, 24, 25 and 27 have been produced, with No 28 in preparation

The Bulletin continued to experience editorial and technical/administrative problems during the year under review Further, distribution of the Bulletin to member States continued to pose problems Considerable difficulties continue to be experienced by TAU in the remittances of revenue realised from sale of the Bulletin by member States In September 1987, Energy Ministers have agreed the transfer of such resources to Luanda, Angola However, due to tied financial rules and shortages of foreign exchange in the member States, this decision has not been implemented up to now The Portuguese edition of the Bulletin has been suspended, pending decisions on its future status as a SADC publication only An internal TAU review is being done in order to assess the relevance of continuity producing the SADC Energy Bulletin and rather to convert it into a Newsletter

Project AAA 0 5· Information Coordination System

The project seeks to provide the Energy Sector Coordinating Unit with an effective tool for planning and analyzing various energy policy options Priority is being given to economic studies The data base will continue to be used as a tool to organize and store all information being collected, which serves as a basis for development of economic analysis The Manual on Project Evaluation has been approved by the Committee of Ministers of Energy in Maseru in June, 1991 The 1989 SADC Energy Statistics Year Book has been published and the draft SADC Statistics Year Book for 1990 circulated to member States for comments New guidelines for project definition, approval and promotion has been produced and approved by the Committee of Ministers of Energy in Maseru in June, 1991 The project has now been completed However, further activities will be carried-out either with the budget provided by the Angolan government or within the framework of project AAA 0 8

Project AAA.0.7: Documentation Centre for the Energy Sector
The objective of the project is to establish a professional filing system and an energy reference library at the TAU offices, to ensure proper management of the large flow of documents within the Energy Sector, ease access to and make the documents useful tools for sector planning and operations

The Documentation Centre is still dependant on external backstopping services and advice due to lack of adequately experienced staff within the Unit Efforts are continuing to enhance the internal capacity of the Centre to manage its operations Financial support was secured from NORAD in 1991 to assist in the training of staff of the Centre Training commenced in September 1991, and was completed in June 1992 The long-term aim for the Documentation Centre is to be self-sustainable

Project AA.0.8.Regional Energy Planning Network

The Objectives of this project are to: (1) Boost energy planning and computerized processing capacity in member States" energy planning bodies, as well as in TAU (2) Organize information and data sharing/exchange among national and regional planners (3) Broaden technical cooperation between TAU and national authorities in charge of energy issues in formulating national and regional energy development programmes (4) Make the methodology and tools utilized by TAU available to the member States according to their needs and specifications

During the meeting of the SADC Energy Ministers in Lusaka, June 23, 1994, the status of this project was discussed and in order to benefit all the region, the SADC Energy Ministers agreed on the implementation of the project through basement in Harare

The chairperson of the Energy Ministers Committee has written a letter to the Zimbabwe Government and kindly requested it to take on some of the obligations previously imputed to the Angolan Government In addition a lot of letters and messages were sent by TAU and the Belgium Embassy in Harare to the Ministry of Transport and Energy and Foreign Affairs to get a reply from the Zimbabwe Government

The implementation of the project has been discussed again at the 20th Energy Ministers Meeting held in Cape Town In accordance with latest information provided by the Zimbabwean Government it became clear that there is now a need for further consultations among all the parties involved (TAU, Zimbabwean and Belgium Governments) in order to clarify some practical issues

Project AAA.10 TAU Office Facilities

The objective of this project is to improve the working conditions and performance of the Energy Sector Coordinating body

The funding agency (NORAD) which had shown interest to co-finance the project together with the Angolan Government has now withdrawn such commitment A new application for the required funds is now under negotiation

4 2 PETROLEUM

Project AAA.1.2: Regional Petroleum Training Centre - Phase II

The objective of the project is to train technicians for the Petroleum Sector using the training facilities at the Petroleum Training Centre at Sumbe, Angola In order to foster maximum utilisation of the centre by member States, a Training Coordination Committee has been created to direct and support the school's management in the implementation of training programmes, including curriculum development, standardisation of entry qualifications Phase I of the project was extended to the end of January, 1990 with funding in the sum of US$0 3 million from the UNDP The project is being supported by the Angolan Government pending the outcome of the short-term consultancy for Phase II of the project.

An evaluation of Phase I of the Project was carried out in November, 1989 A Tripartite meeting, involving Angola, Norway and UNDP, which was scheduled for July, 1990, was eventually held in Vienna on 22nd May, 1991 The meeting recommended continuation of the project, subject to the project demonstrating that there is demand in the region for the courses run at the school

In order to confirm the demand for courses run at the school, the Committee of Ministers of Energy at its meeting in Maseru in June, 1991 decided that a short-term consultancy should be commissioned to

* update the 1988 survey,
* review, design and recommend new course structure based on the 1988 needs assessment as up-dated by the consultancy,
* redefine the framework for the establishment of a regional course selection committee,

* develop a programme for seminars in consultation with regional utilities,

* specify the need and define mechanisms for the recruitment of additional staff, including external technical assistance,

* assess the needs for materials and equipment, taking into account courses/seminars/workshops to be mounted under Phase II of the project, and

* recommend Terms of Reference, including composition and mandate, of the national staff selection and development committee

In January 1992, a meeting took place between SADC/TAU and UNIDO to review this project and delineate further activities The short term project definition consultant was fielded in June 1992 At a Project Steering Committee meeting in Harare, in September 1992, the reports from the member States were collected and discussed The resulting final report will contain recommendations for Phase II with an outline TOR and budget estimate

The final report prepared in cooperation between UNIDO and TAU was issued in September 1993 The Government of Angola will assist in broadening the capabilities of Sumbe Training Centre in the areas of Petroleum and Environment to benefit the region However the implementation of recommendations given by the report are subject to the evolution of the political situation in Angola

Project AAA.1.4: Management Development and Specialists Training for the SADC Petroleum Sector

The objective of the project is to train and develop professional core of management staff for the national oil companies and the member States' ministries responsible for energy, promote and enhance regional cooperation in oil exploration, supply, refining, gas utilization and petrochemical projects, through mutual understanding of planning, development and economics of major projects in the oil, gas and petrochemical sectors, encourage standardization of exploration agreements, safety procedures, oil supply contracts, product handling procedures and product specifications within the region, for the purpose of enhancing international cooperation with non-SADC oil companies, and to reduce costs and losses

It is the intention of the SADC Energy Sector, TAU, to establish contacts with suitable training institutes so that a major training programme can be developed and implemented in

the region The programme is envisaged to consist of a range of training modules, special workshops and possibly distance learning sections, covering the management, technology and economics etc , of both the upstream and downstream sectors of the oil industry, with an additional core of petroleum related general management modules, covering corporate planning and project development and implementation/control

Overall, as an estimate of the programme, some 54 weeks of training are involved, for a total of 800 hours or 24000 delegate/hours of achieved training (upstream and downstream)

This programme will be broken down into three main sections

i) Upstream Modules and Workshops
ii) Downstream Modules and Workshops
iii) 5 Distance Learning Packages

During the 1994 Annual Consultative Conference, a meeting was held between Executive Secretariat and EU were new rules for financial assistance were approved and TAU has resubmitted this project to EU in order to be funded under the Lome IV Convention Funding is being sought

Project AAA.1.5 Joint SADC Petroleum Exploration Programme

The main objective of PEP is to upgrade the understanding and knowledge of the sedimentary basins of SADC with a view to attract oil company investment

The Joint SADC Petroleum Exploration Programme concentrates on inland sedimentary basins that have been little explored in the past These interior basins of the region make up an area of more than 2,000,000 km^2 and have only 14 exploratory wells drilled

The proposed activities under the Programme are designed to upgrade the understanding of the petroleum potential of these basins with the view to attract oil company investment in exploration 31 different activities have been defined with a total estimated cost of about USD 61 75 million

The Programme will be financed partly by ADB loans, donor soft finance, by oil industry risk capital and by national contributions Individual activities may be joined together for efficient execution and be modified to suit requirements from the industry or from finance agencies

Originally the project consisted of four project Phases, but Phase III has been incorporated into Phase IV and will be financed as a part of this phase

- Phase I Project Task Force USD 0 75 mill (Completed)
- Phase II · Project Steering Committee USD 0 06 mill (Comp)
- Phase IV : Exploration Programme USD 61 75 mill (Divided into two phases, Phase I and II)

A meeting between TAU and the African Development Bank (ADB) 15-16 March 1994, resulted in a joint Memorandum describing a combined finance package of USD 32 698 000 The package is made up of African Development Funds (ADF), donor funds, industry participation and national contributions As the present finance plan based on pledged support falls short of the total finance requirements for PEP, the joint memorandum defines two phases Phase I is covered by a concrete finance plan Phase II include activities which are deferred and will be addressed later in terms of finance and execution The deferred activities are in the Okawango and Cassanje Basins of East Angola and in the Nama Basin The reason for this selection is in part related to the security situation in East Angola In the Nama Basin, Botswana is undertaking a borehole test programme PEP activities in this basin should be reviewed again after the results of these boreholes becomes available in 1995 Phase I projects will start as soon as money has been made available by ADB and Donors

Project ANG.1.1 Oil Supply from Lobito to the SADC Region

The project has been suspended for reformulation

Project TAN.1.1: Rehabilitation of the TAZAMA Pipeline Phase III

The objective of the project is to rehabilitate the entire pipeline system and improve/repair supporting facilities such as corrosion protection, mechanical, electrical, telecommunication and the tank farm

Phase I and II were completed in 1988 and 1990 respectively Phase III involves pipeline replacement including pipeline spares and equipment, cathodic protection works, telecommunication rehabilitation A loan of US$15 75 million was secured from the ADB in January, 1991, and the project is under implementation The project is under implementation

Project TAN.1.3: Biostratigraphic Reference Collection for the SADC Region

The objective of this project is greater utilization of existing biostratigraphical and geological data from the SADC countries, together with additional studies of geological samples, to achieve a general biozonation and correlation for the entire region The first phase of the project has been completed A meeting took place in Dar es Salaam in November, 1990 where geoscientists from the region reviewed the programme and recommended further steps to proceed with the second phase The SADC/TAU has drafted a service agreement with TPDC to implement the second phase, for which funds has been secured The draft contract was reviewed and accepted by TPDC during 4th Quarter of 1992 The project is under implementation

4 3 **COAL**

Project AAA.2.3: Manpower Development and Training for the Coal Sub-Sector

The objective of this project is to carry out a training needs survey to provide a basis for planning a **manpower development and training programme** for the coal sub-sector

The immediate objectives are

- Define the qualifications required to fill the designated positions in the Coal Utilization Sub-sector of the SADC countries

- Identify the gaps between the skills required to perform satisfactorily in the designated positions and those that are acquired through previous education, training and experience

The immediate results and outputs of the Training Needs Survey will be a report to the TAU and the PCSC, with the following information and proposals

Manpower needs

- Description of the relevant jobs or positions, with specification of required education, experience, skill and performance level

- An estimate of the skill categories and manpower needed in industry and in the energy related public sector over the next five (5) years

- An estimate of the categories and number of candidates to attend the manpower and training programme and participate in study tours and fellowship programmes over the next five (5) year period

Manpower Supply

- An assessment of the availability of manpower from universities and technical schools, the labour market and internal promotion by training, skills and experience

Education and Training

- General educational entry level and achievement level of universities, high schools and technical training institutions

- Status and level of technical training in the Energy Sector, particularly in the Coal Sub-sector

Training Policies and Strategies

- Conditions and prerequisites that have to be fulfilled to ensure the success of the project

- Consequences for long-term training policies and strategies within the coal utilization industries, and related public sectors in the member countries

- Recommendations for a further work programme

Funding is being sought

4 4 ELECTRICITY

Project AAA 3.1 Regional Rural Electrification Programme - Phase I

The objective of Phase I of the project, financed by Canada to the tune of US$0 18 million, is to identify the institutional and socio-economic setting and framework for Rural Electrification in member States, including energy resources and electricity systems, current technical experiences in rural electrification, training facilities, expert personnel and case studies of specific projects

Phase I has now been completed In June, 1993 Energy Ministers approved the reformulation of the project which has not been done yet

Project AAA.3.2: Specialised Training in the Field of Electric Power

The objective of this project is to identify training needs for electricity utilities' personnel and formulate a training programme taking into account the existing facilities in the region The objectives of Phase III is to implement the training programme defined during Phase II

Phases I and II were successfully completed, leading to a recommended list of courses to be undertaken, and approved by the Energy Ministers as the FIVE YEAR REGIONAL POWER SECTOR TRAINING PROGRAMME Phase III was initiated in 1992 through undertaking the necessary steps to implement the recommendations from the Lusaka Workshop held in March 1992, namely to issue a call for proposals to deliver 33 formal training courses, to evaluate the bids and to select the best institution for each course The Final Report was issued in June, 1993 with the final list of selected institutions

KGRTC is sponsoring five courses, namely Generation Maintenance Management Systems, Dam Safety Monitoring, Instrumentation and Control, Production Planning and Water Management, and Training of Trainers

CIDA and ODA were expected to finance four and five courses respectively The prospect of having South Africa as a new SADC member State has refrained them of funding those courses for the time being Consequently the remaining 28 courses are still available for funding The recommendation from last PSC meeting "TAU to look for alternative donors" was carried out with no success ESC #7 recommended the creation of a task force to look at, reviewing the list of courses and capabilities of the institutions identified in the study, recommend how the South Africa"s training facilities can be integrated in the project and assess the financial support that utilities directely benefiting are willing to cover

AAA 3.4: REGIONAL HYDROELECTRIC HYDROLOGICAL ASSISTANCE PROGRAMME Phase II : Upper and Middle Zambezi and Kafue Sub-Basins

The objective of this project is to improve availability, accessibility and quality of hydrological data for hydroelectric purposes within the SADC region

Phase I of the project was completed in April 1991, funded by CIDA (Canada) and ICE (Portugal) Part 1 of Phase II started in November 1991 to be finalized in September 1994, but funds have been secured only from CIDA

The extension of Phase II - Part 1 was approved and its implementation started in January 1995 after a bridging period of three months

Project AAA.3.5. Plan for Integrated Utilization of the Cunene River Basin

The objective of the project is to develop a master plan to utilize the Cunene River Basin's water resources fully

Laboratoria Nacional de Engenharia Civil (Portugal) has been selected as the consultant and Hidroportos as the supervising company The implementing agency is Cabinete da Bacia Hidrografica do Rio Cunene" (GABIC) With funds allocated by the governments of Angola and Portugal, two major activities are being carried out

- To strengthen the institutional capacity of the implementing Agency

- To perform some feasibility studies on the basin

When the project was approved Namibia was not a member State Efforts are now in place in order to amend the MOU and integrate Namibia as a full member of the Project

The first Project Steering Committee was held in Lisbon in May, 1994 The Inception Report was approved A dabatase will be created soon after all the relevant data is gathered

Project AAA.3.7: Computer Model for Analysis and Planning of SADC Transmission Systems, Phase II - SADC Power Grid Model

The objective of this project is to develop models to analyse electricity transmission systems at a regional level, in three separate stages preliminary study, development of a computer model for analysing the grid, and implementation of the model A technical mission, which involved a regional expert, visited five member States to assess the situation in those countries Questionnaires were sent to the other member States not visited Phase I of the project has been completed in late 1990

The PSS/E model was recommended to be used by SADC Power Utilities Financing of Phase II is being considered by NORAD Phase I has been completed in 1990 The PSS/E model was recommended to be used by SADC Power Utilities Financing of Phase II has been reconsidered by NORAD Funding for Phase II is expected to be allocated soon

At a SAPP meeting held in Johannesburg 29-31 August 1994, the power utilities suggested a slight shift in the TOR to fit in their needs The changes were made and TAU submitted to NORAD on 13th February 1995, a request to fund the project in accordance with the new Project Description A follow-up meeting with NORAD took place in Luanda, on 11th May 1995 and TAU was informed that the request is presently being considered and they will report in the near future

Project AAA.3.8: Coordinated Utilisation of Regional Generation and Transmission Capacities - Prefeasibility Study

The aim of this project is to assess the scope for coordinated utilisation of the total regional power generation capacity, taking into account the need for reserve capacity, reliability, etc The study will ascertain current installed capacity against demand into the future, examine power tariff and pricing policies and structures, and their possible impact on regional trade in electricity, and recommend accordingly Phase I was finalised in 1991

A PSC meeting in Gaborone in February, 1993 approved the completion of Phase II The final report clearly states the benefits of regional power cooperation The study indicates that optimum use of regional resources and installations may provide total savings of approximately US$ 1 6 billion (current values) compared to a development based on individual transmission and generation expansion plans for each country A particular 'Drought Scenario' was developed to investigate the possible impacts of a continued negative hydrological trend, and the study suggests that additional thermal support in the region may be necessary in addition to a strengthening of inter-ties with non-SADC countries The final phase (III) will deal with institutional arrangements for power exchange and pricing policies, and was approved by the Energy Ministers' in June, 1993

With the constitution of the "Southern African Power Pool" a great deal of Phase III will be considered as completed

However, CIDA is still committed to finance activities "to be identified" through existing funds of this project Therefore during the ESC #7 TAU was mandated to approach potential Donors, particulary CIDA requesting their financial support for concrete activities on the establishment of SAPP such as training in practical applications on technical equipments as well as training directed to operation of the SAPP i e financial support to second an expert to assist in the starting up of SAPP A study to identify telecommunications needs and requirements to operate the pool should also be considered under this project

Project AAA 3 9: Power Station Maintenance Programme

The project, which is a follow up to Project AAA 3 3 Maintenance of Mechanical Equipment in the SADC Power Stations (completed), seeks to increase the reliability of power plants in the SADC member States The project has been suspended for reformulation in 1992

Project AAA.3.10: Kafue Gorge Regional Training Centre Continued Operation and Expansion

The objective of the project is to continue providing specialized training for hydropower personnel from the SADC countries

Funds are secured through ZESCO and NORAD/SIDA for an extension period of three years 1993/95 After 1995 the Centre is expected to be self-sustained A sub-committee of representatives from SADC member countries was formed at the recent Reference Group meeting, and met in June, 1993 to

(a) work out modalities of funding KGRTC by the SADC,

(b) work out a staffing structure for the Centre,

(c) compile a document on (a) and (b) to send to TAU and member States

The project Monitoring Committee has an expanded role, including NORAD with an observer status A Budget Meeting composed by TAU, NORAD, ZESCO (Chairman), and the Ministry of Energy and Water Development (Zambia) has been constituted The Project Manager, KGRTC is the Secretary SIDA and the consultants are observers

For all basic, advanced, high level and AAA 3 2 courses offered at KGRTC there is general satisfaction with the standards offered The Budget meeting approved the budget for 1994/95 The sustainability of the Project after the termination of the contract is the issue being discussed now ZESCO is heavily sponsoring many activities

Project AAA 3 11 Lightning Research

The objective of this project is to carry out research related to lightning phenomena, with regards to protection of power equipment, etc The project was not presented at the 1993 ACC, due to incomplete project documentation, but is now available for funding

Project ANG.3.2: Interconnection of the Northern, Central and Southern Grids in Angola and Possible Extension to Namibia

The aim of the project is to study the technical and economic feasibility of interconnecting the three main electricity grids in Angola, as well as consider possible interconnection with Namibia

The feasibility study was carried out by THEMAG A 220 KV line from Gabela to Quileva to link the North and Central systems, and a 150 KV line from Lomaum to Lubango to make the Central to South connection was recommended The extension to Namibia, involving a 150 KV line from Matala, was included in the Terms of Reference, and the Namibian Power Utility, SWAWEK, plans to investigate the possibility of constructing the high capacity interconnector system

The project study is completed However further studies are bound to be carried out, to include a possible extension to Namibia However, studies cannot be fulfilled due to the present political situation in Angola The project has therefore been suspended

Project ANG.3.4: Communication and Information System for the Angolan National Power Grid-Phase I

The project seeks to improve communications in the Angolan power system in order to prepare for possible connection to neighbouring countries

In March, 1990, a team from Norway visited Luanda to discuss the project with TAU and Angolan utilities and authorities The consultants, EB NERA sponsored by NORAD prepared a report which demonstrated the feasibility of the project NORAD agreed to finance the implementation of Phases I and II at the same time, for the northern system at the cost of US$1 95 million The estimated cost for all the Angolan Systems is US$5 5 million

The Power Line Carrier, was installed in Luanda, Cambambe, dalatando, and Cacuso and Malanje (Northern System) Studies for Central and Southern Systems were already being carried out However, the war situation has prevented its conclusion

Project ANG 3.6: Repair of Gove Dam

The Gove Dam was sabotaged in February 1990 The objective of this project is to restore the Dam to pre-sabotage level, in order to regulate the flow of the Cunene River, so that downstream hydropower facilities can operate properly To avoid more extensive damage a number of actions have been

carried out, being all costs, so far, supported by the Angolan Government The Angolan Government approached NORAD and a team from Norway visited the site in January, 1991 Further in depth investigations will be carried out and NORAD is ready to finance part of the costs However, due to the war situation no work can be carried out on the side The project, is therefore suspended

Project BOT.3.1: Interconnection of the Botswana and Zimbabwe Grids

The objective of the project is to promote the rational utilisation of regional electricity resources in order to reduce dependence on imports from outside the region

The tariff on surplus energy was made retroactively effective from 1 November, 1991 while the firm power agreement will be effective from 1 January, 1994 The agreement is however, still conditioned on a proper solution of the parallel operation problem relating to operating the interconnected SADC system in parallel with the ESKOM system of South Africa CIDA is financing the work

Deficiencies in the PLC system have been detected very recently by ZESA Recommendations have been forwarded to the constructors, The operationality of the tie-line control to supervise the power flow on the new interconnector has been discussed taking into account the following courses of action

1 Determination of the chief deficiencies of the PLC system and their immediate rectifications

2 Finding of an alternative type of data link

3 Abandon tie-line control

Negotiations between the constructors and IOPC members are taking place in order to solve the obstacles The project is expected to be completed in 1995

Project BOT.3.4: Second 220 KV Line from Morupule to Gaborone

The objective of this project is to reduce Botswana's dependence on power supply from South Africa by improving reliability of supply to the southern part of the country by providing a second line, which in turn will raise the transmission capacity to the expected levels by 1991

Ministers of Energy, at their meeting in June 1990, decided to defer implementation of this project until the line is required for firm power supply in 1996/97 However, due to

new developments, Energy Ministers at their meeting held in Lusaka, in June 1994 approved the reactivation of the project

Project LES.3.2: Transmission Network Development in Lesotho Phase III

The objective of the project is to ensure a reliable power supply of power to the rural areas of Lesotho, and hence contribute towards lessening dependence on fossil fuels, and imports from outside the region

Phases I and II were completed in late 1987 The project was reformulated in 1991 Funding is secured in phases by BITS (Sweden) and Norad and of the project it is under implementation

Project LES.3.6: Muela Hydropower Project - Lesotho

The objectives of this project are to reduce Lesotho's dependence on external sources for energy, and to improve the reliability and availability of electricity supply

The project entails the construction of a hydropower complex, with a power output of 72 MW

This project, which is part of the Lesotho Highlands Water Project (LHWP), will promote general development of the remote Highlands region, by providing electricity, potable water and water for irrigation Economic analyses have shown that this project can generate the highest internal rate of return among possible electricity generation projects in Lesotho Funds have been secured, and the project is under implementation

Project MAL.3 2: Small Hydropower Plants in Malawi

The objective of this project is to reduce diesel imports, provide cheaper energy for rural centres and increase local self-sufficiency Funding has been secured on a bilateral basis The project it is due for completion and commissioning in November 1995

Project MAL.3.5: Supply to Chitipa and Karonga in Malawi from Mbeya in Tanzania

The project seeks to provide a cheaper source of electricity to consumers in Karonga and Chitipa, reduce Malawi foreign exchange drain due to imports of diesel fuel, and provide a more reliable source of electricity

Project activities include the construction of 267 km 33 KV overhead lines, one substation at Ibada, two substations at Chitipa and Karonga and two distribution substations at Kuela and Chilumba The draft Agreement on cross border power inter-change between TANESCO and ESCOM has been prepared and sent to the Belgium Government for comments There is no reply up till now

A Belgium mission visited Malawi in February 1995 for further discussions and collection of further technical information on the project The mission indicated the willigness to fund the project pending clarification on proposed conditions of finance The Malawi Government is studying the proposed conditions.

Project MAL.3.6: Malawi/Zambia Power Cooperation in the Border Region

The objective of the project is to provide electricity supply as an alternative source of energy to the rural areas on both sides of the Malawi-Zambia border ZESCO and ESCOM were due to meet in July, 1993 to agree on the tariff before funding can be sought The project will take 24 months to be implemented ZESCO and ESCOM are discussing at moment to finalise the Tariff Agreement The project will take 24 months to be implemented after financing is secured The African Development Fund (ADF) has shown interest to fund the project

Project MOZ.3.2: 275 Interconnection between Mozambique and Swaziland

The objective of this project are to enable more reliance and increased security of supply between the three countries Mozambique, RSA and Swaziland, and at the same time broaden the regional access to the cheap Cahora Bassa hydro power

Construction of a 275 kV transmission line from Swaziland to Southern Mozambique (Maputo)

The project was reactivated in the Energy Ministers" meeting in June 1994 as it had been suspended awaiting the restoration of the DC lines from Cahora Bassa (Mozambique) to RSA However, realizing the developments in their own electric systems and their internal power demand forecasts, the parties have now instead decided for a stronger interconnection at 275 kV, instead of 132 kV as proposed in the pre-feasibilty study of 1987

The parties have already started negotiating the Supply Agreement and the Government to Government Agreement to be in place before launching of the tender process A "Joint

Declaration on Power Co-operation between the respective governments of Mozambique and Swaziland" was signed on 3 March 1994

Although some donors have raised concern about this project it was concluded that EDM/SEB interconnection will not bring any negative impact and recomendation were made to undertake a full feasibility study

Project MOZ.3.5:Mozambique-Malawi Interconnection of Electricity Supplies

The objective of the project is to promote regional cooperation and significantly reducing possible major costs by delaying construction of large generation facilities It will also replace local diesel generation facilities saving diesel fuel expenses, as well as electrifying new areas

Construction of a 132 kV transmission line from Nkula Falls in Malawi to Tete in Mozambique, approx 190 km New considerations may influence the choice of voltage level (see below)

Equipment for installation of 132/110 kV transformer and 110 kV feeder bay is on site

In view of the findings of project AAA 3 8, Mozambique and Malawi have agreed to conduct another study to compare the use of a higher voltage of 220 kV and 132 kV (interconnecting Songo in Mozambique to Blantyre West or Kapichira in Malawi) which was proposed for the project The study will also consider supplying the north-western part of Mozambique in addition to Malawi The need for Malawi and Mozambique to cooperate in the field of economic activities of both countries resulted in the signing in Maputo of the joint Declaration and memorandum of understanding on 2nd September, 1994 by the Minister of Energy and Water Resources in Mozambique and the Minister of Energy & Mining in Malawi

A draft Agreement between Mozambique and Malawi Governments has been prepared for further comments in both countries A follow-up meeting was held between EDM, HCB, ESCOM and ESKOM with assistance of SAD-ELEC, on April 06, 1995 in Mozambique

The project requires a review study on the proposed interconnections, therefore ESCOM will contact International Donors who have shown interest in funding the review study

Project MOZ.3.7: Reconstruction of Mavuzi Hydropower Station - Implementation

This project involves the reconstruction and rehabilitation of the Mavuzi Power Station which was damaged during the Zimbabwe liberation struggle The power station is an important energy source for projects in the Beira Corridor, including the port of Beira itself The project also offers an opportunity for increased cooperation in the power sector, between Mozambique and Zimbabwe

Caisse Centrale and Indo-Suez Bank (France), and Banco de Mozambique agreed to finance the project, and construction started at the beginning of 1989 The project is estimated to cost US$8 million of which US$6 million is from France, and US$2 million from Mozambique The project has been completed

Project MOZ 3 12. Cahora Bassa Power for SADC - Phase II

The objective of the project is to establish an overhead transmission line from Cahora Bassa to the existing 330 kV grid in Zimbabwe for transmission of at least 500 MW firm power to the SADC interconnected grid (Zimbabwe-Zambia-Botswana-Mozambique)

Phases I and II (Feasibility Study) are completed Funding for Phase III (implementation) is secured The tendering process has been initiated Implementation of phase III of the project

is expected to start officially in May 1995 EDM is waiting for the legal opinion from the Attorney General 95 Kms of transmission line has already been surveyed

Project MOZ 3.13: Control Centre for the Supply of the Beira Corridor and Mozambique-Zimbabwe tie-line.

The objective of the project is to up-grade the power control centre in the EDM central Region to take account of planned national and regional power system improvement in the provinces of Manica and Sofala, and adjacent areas in Zimbabwe

Funding has been secured

Project NAM.3 1 Power Supply Cooperation in Border Regions Between Angola and Namibia

The objective of the project is to provide supply of electricity to the border areas of Namibia and Angola

Funding at the Namibian side has been secured through bilateral arrangements, and this part of the project is completed At the Angolan side, however, the last years' war actions have damaged vital parts of the infrastructure at the area of interest In addition the security situation prevents any proceeding of the construction works On this basis, the Ministers of Energy had suspended the project until the situation within Angola allows reconsideration of the project

Project SWA.3.1: DREDGING of Mkinkomo Reservoir

The objectives of the project are

1 To revive the storage capacity of the Mkinkomo weir and hence improve on Energy Generation in Edwaleni and Maguduza hydro power stations

2 To reduce the solids of sediments that flow down the water canal/conduit systems into water turbines and wear-down the runner and the seals

The project commenced in March 1993 and is going on very well About 300,000 cubic meters of slimes have already been dredged and about E1 8 million has been spent so far Estimated cost of the project is E5 million The project will take 3 years to complete and is being fully financed by Swaziland Electricity Board (SEB)

Project TAN.3.4: Songwe River Hydropower Development (Reconnaissance Study)

The project seeks to investigate the potential for hydropower development of the Songwe River, in order to provide the basis for future power systems planning in Malawi and Tanzania

Songwe River which forms part of the border between Tanzania and Malawi has been identified to have hydro power potential over 150 MW, of which 110 MW is believed to be firm It is proposed to investigate several promising hydro power sites along the river and recommend one of such sites for full feasibility study

The project has been reformulated after the recommendation from the EOEM meeting in June 1992

Project TAN.3.6 Supply of Sumbawanga in Tanzania

The project seeks to determine the preferred least cost scheme to supply Sumbawanga in Tanzania, with power

The first phase is a load flow and cost estimate study, to decide on the best of the following alternatives

(a) small hydropower development,

(b) extension of the Tanzanian grid from Mbeya, and,

(c) supply from the Zambian grid in Mbala

Funding (US$0 14 million) has been secured from Norway, and the study has been completed in October 1992, and the supply from Zambia was found to be feasible The implementation was approved in 1993 as Phase II of the project Funding is being sought

Project ZAM.3 2: Upgrading of Kafue Gorge Power Plant

Objectives For Phases I to III of the project was maintenance and rehabilitation of generation equipment and training of power station personnel Phase IV is the restoration of the Power station after the fire damage of March 1989

Phases I to III are completed On the part of Phase IV work, completion is expected by the end of the first quarter of 1994, after installation of the control system

Project ZAM 3.3 Rehabilitation of the National Control Centre (Phase II)

The project seeks to provide the national power company with modern equipment which will enable more efficient and economic operation of the electric system, and to maintain stable conditions on the 330 KV system in Zambia and consequently assist in maintaining stable conditions in Zimbabwe and Zaire

The preliminary project design report was completed in February, 1991 Tender from one Swedish company was opened on 5th May, 1993 The Project is scheduled to be completed in 27 months after contract award

Project ZAM.3.5: PLC Communications on the Northern Transmission System

The objectives of the project is to install a communication system on the north eastern 66 kV network

The project was suspended in June, 1990 Elements of this project are being implemented under projects TAN 3 5/3 6 The project was reformulated in 1993 and it is desired that the project is carried forward to the envisaged interconnections between Zambia and Tanzania

Project ZAM.3.6: Refurbishment of Victoria Falls Power Station - Phase I and II

The project originally sought to rehabilitate the station's machines, and improve reliability and security of the local 66 KV feeder In December, 1990 TAU and ZESCO finalized the detailed and reformulated TOR's, which was presented at the 1991 ACC, in Windhoek However there have been delays in awarding the contract Current position is that the consultancy for the Engineering study is being re-tendered Fresh tenders were due to be opened on 26th May, 1993 The European Investment Bank will still finance the project Therefore, funding is secured

Project ZAM.3.7: 132 KV Tieline Zambia - Malawi Feasibility Study

The objective of this project is to extend the limited study performed on project ZAM 3 1 to feasibility study level and establish whether an interconnection of the Zambia and Malawi power systems at 132 kV is feasible

Construction of a 132 kV transmission line, partly by upgrading an existing 66 kV line, from Pensulo in Zambia to Lilongwe in Malawi, total length approx 435 km New development may influence the choice of voltage level (see below)

The feasibility study recommended that ZESCO and ESCOM negotiate an agreement for the import of 30 MW from Zambia to Malawi to cover reserve capacity needs in Malawi As soon as the agreement is signed, seek financing for the project and embark on project design ZESCO and ESCOM have started tariff negotiations at a meeting in Lusaka on 26th and 27th July 1993 and general tariff principles were agreed ZESCO is working out the tariff structure for further negotiations

However, new discussions indicate that investigations should be carried for a 220 kV or higher voltage tie Depending on load flow calculations and stability analysis, the line could

be energised at 132 kV at the initial stage ESKOM of South Africa proposed to carry out this study, having suggested a 220 kV corridor within Malawi, between Lilongwe and Blantyre west (or Kapichira)

Following an agreement reached at the sixth Electricity Sub-Committee meeting in Arusha in May 1994, a plan team was formed with representatives from ESCOM, ESKOM, and ZESCO to reappraise both projects ZAM 3 7 and ZAM 3 8 The planning team met and discussed the projects in June, August and December 1994 and in March 1995 In addition aerial surveys of the possible routes were done in January 1995 The members of the team responsible for the Zambia/Malawi study will assemble in Johannesburg in May 1995 The aim of the study is to analyze and suggest a feasibility study complementary to the feasibilty report done by Tron Horn in 1992 The report that will be produced will give a technical, economic and financial analysis of the project

Project ZAM 3 8 330/220 KV Tieline Zambia/Tanzania. Feasibility Study

The objective of the study is to establish the economic and technical feasibility of an electricity supply interconnection between the national grids of the two countries in order to improve electricity supplies to Tanzania

The Final Pre-feasibility Study Report was issued in May, 1993 It recommended that an interconnector at 330 kV with a transfer capacity of 180 MW be taken to Feasibility Study level The planning team, which was set up in Arusha, and led by a project Co-ordinator from ESKOM and comprising Study Members from ESCOM, ZESCO and TANESCO carried out the study and depending on the amount of additional work that will be requested, the publication of the final report is scheduled for May 1995

Project ZAM 3.9 Power Cooperation Between Zambia and Namibia

The objective of the project is to provide hydroelectric power to enhance development of the great agricultural potential of Northern Namibia and generally improve the reliability and increase the capacity of power supply to the region which comprises Botswana, Namibia and Zambia

TAU has executed an evaluation study Efforts are being made to secure financing from ADB, who has shown interest No comments on the Appraisal Report have been received so far

During the ESC #7 ZESCO reported that they and SWAWEK have decided to reactivate the project by carrying out the load study and the design of the transmission lines internally A

joint study team comprising of engineers from ZESCO and SWAWEK will carry out the work and produce bankable documents

Project ZIM.3.3: Upgrading of the ZESA National Control Centre in Harare

The objective of this project is to enhance the monitoring and control of power exchange in the interconnected grids of Botswana, Mozambique, Zambia and Zimbabwe, by the installation of computer based supervisory, monitoring and control equipment at the National Control Centre in Harare The project has been completed

4 5 **New and Renewable Sources of Energy**

Project AAA.4.9: Assessment of Applications and Markets for Industrial Process Solar heat in the SADC Region

The main objective of this study is to assess the technical and economic viability of industrial process solar heat (IPSH) applications and to determine the potential market size and financing for the most viable IPSH applications for the SADC countries

Funding amounting to US$0 22 million, is being sought

Project AAA 4 10 Assessment of Applications and Markets for Solar Water Heating in the SADC Region

The objectives of the project are to determine the potential market size for Solar Water Heating (SWH), determine the condition which SWH are economically viable to held Governments of SADC member States establish appropriate policies, research priorities for the use of SWH technology, provide a framework for the financial evaluation of SWH applications, so that financial institutions in SADC can better evaluate loans involving SWH applications, suggest institutions and financial arrangements that can promote economically viable SWH applications Funding is being sought

Project AAA.4 11 SADC Programme for Financing Energy Services for Small Scale Energy (FINESSE)

The primary objective of the SADC FINESSE Programme is to develop means for using intermediary organisations (development finance institutions, commercial banks, power utilities, private sector companies, NGOs, etc) to channel multilateral agency and donor funds more effectively for the provision of renewable energy conservation services to small-scale energy end-users

The cost of this project is estimated at $ 1 581 Million The Royal Netherlands Government has provided US $ 1,396,400 while the OPEC Fund has put up US $ 185,000 This money is being channelled to SADC through UNDP Energy and Atmosphere Programme (E&AP), SEED/BPPS Arrangements are currently underway to set up a FINESSE Project Management Unit whose activities are expected to commence in July, 1995

Project LES.4.2: Solar Photovoltaic Power Generation in Rural Areas -Lesotho Pilot Project

The objective of this feasibility study is to determine the conditions under which supplying photovoltaic generated electric power would be cost effective compared to other alternatives The project will involve two phases Phase I Feasibility Study and Phase II Implementation

The Belgium Cooperation Agency (AGCD) has withdrawn its commitment to the financing of this project Efforts are thus currently underway to seek alternative funding

Project TAN.4.2: Accelerated Biogas Technology Diffusion

The objective of this project is to introduce and disseminate new technology, 'biogas energy production, develop and promote greater use of biogas energy in institutions and households, reduce dependence on imported fuels, improve living standards of rural populations by developing and promoting use of decentralised energy systems for power generation, lighting and cooking, and reduce woodfuel demand pressure on forest reserves through substitution with other appropriate indigenous energy sources

Funding is being sought (US$1 11 million)

Project ZIM.4 1: Feasibility Study on the Utilisation Solar Water Heating for Reducing Power Utility Demand Costs

The objective of the project is to investigate possibility of using solar water heating systems to reduce the demand for electric heating in industrial, commercial and domestic installations

Funding is being sought (US$0 25 million)

4 6 WOODFUEL AND OTHER TRADITIONAL FUELS

Project AAA.5 7 Support to TAU Woodfuel Section

The objectives of this project are to

(a) Strengthen TAU planning and coordination capacity on woodfuel issues

(b) Enable TAU to provide catalytic support to member States on planning' implementation and evaluation of woodfuel projects

(c) Funding of a regional woodfuel expert post as part of technical support to TAU

(d) Collection of woodfuel data in the SADC Region using short term consultancy

(e) Provision of essential working tools like a micro printing unit, audiovisual aids, etc

The EC has approved funding of the project costing US$ 0 58 million for a period of three years beginning August 1990 - 1993 TAU is intending to seek further extension of the project for 3 years (August 1993 - July 1995) A funding proposal has been submitted to EC for consideration under Lome IV

Project AAA.5.8. Development of National Woodfuel Strategies and Plans

The objectives of the project are to

* develop comprehensive woodfuel strategies and implementation plans for each member States,

* develop projects for energy production integrated with other sectors dealing with biomass management and rural development,

* provide data to assess national capabilities for the implementation of woodfuel programmes, and means of increasing such capabilities through institutional strengthening

The first phase of the project was implemented by a NORAD grant of US$0 86 million which was used for developing detailed implementation terms of reference for two pilot projects in Lesotho and Tanzania for Phase 2 The estimated total cost for implementing the Lesotho and the Tanzania

components is US$0 545 million for which funding is being negotiated with NORAD

Lesotho has prepared the project proposal for review The agreement between the two countries (Lesotho and Norway) is expected to be signed in August, when all the issues have been taken into account

Tanzania and Norway have discussed the proposal in Dar-es-Salaam and the draft agreement has been submitted to Norway for comments Tanzania is waiting for the comments from Norway

Project AAA.5.9· Identification and Support of Non-Governmental Organizations and Women's Groups Dealing with Woodfuel

The objectives of the project are to

(a) identify active NGOs and women's groups dealing with woodfuel programmes in the region,

(b) analyse NGOs and women's groups experiences in implementing woodfuel projects, in particular those based on people's participation at grassroots level, and

(c) explore possibilities of intensifying NGOs and women's groups involvement in woodfuel programmes, by providing them with catalytic support like training, project planning, provision of equipment and funds, etc

Funding is being sought

Project AAA 5 11 Assessment of Environmental and Socio-Economic Impact of Woodfuel Scarcity

The objectives of the project are to provide

(a) comprehensive site-specific data on environmental and socio-economic problems created by woodfuel scarcity in the SADC region,

(b) information to be used for increase of public awareness of woodfuel aspects, and

(c) data for planning future woodfuel projects

Funding is being sought

Project AAA.5 14 Increase of Public Awareness on Woodfuel Issues

The objectives of the project are to intensify

* people's participation in the production of woodfuel, and adoption of improved techniques of utilising woodfuel, and

* the awareness of decision-makers on socio-economic and environmental problems created by woodfuel scarcity, and the need to increase resources for the implementation of woodfuel programmes

Funding is being sought

Project AAA.5.15: Improvement of Woodfuel End-use Efficiency in Rural Industries of the SADC Region

The main objectives of the project are to

(a) contribute to sustained supply of woodfuel for rural industries by improving their woodfuel use efficiency,

(b) minimise environmental degradation being caused by deforestation through clearing of trees and forests to supply woodfuel to rural industries,

(c) increase public awareness of the socio-economic importance of rural industries, and the need to sustain their energy supply through improvement of woodfuel end-use efficiency, and

(d) produce country reports, indicating the main rural industries using woodfuel, and possibilities of improving their end-use efficiencies

The project is completed Major outputs are

- Six country reports for the four Lead Research countries, namely Angola, Mozambique, Tanzania and Zimbabwe,
- Three Technical Advisory Group reports entitled

• Guidelines to a methodology for assessing energy efficiency in informal industries,
• Construction and operation manuals for improved kilns,
• Policy makers summary of project findings

- A computer software
- 4 Prototypes - 2 Fish smoking kilns and 2 brick burning kilns

Project AAA.5 17· Rural Energy Planning and Environmental Training Programme

The objectives of this project are as follows

- To stimulate and contribute significantly to the human resource development efforts in the SADC region for sustainable rural energy development, utilization and environmental management

- To develop training programme that will eventually contribute to the building of professional competency in the region for effective rural energy planning and environmental management

- To conduct rural energy planning and environmental management courses in the SADC region

The project which has received financial support from the Royal Netherlands Government was launched in March, 1994 ESAMI is under contract with SADC-TAU as the Lead executing Agency The Technology Development Group of Twente University in the Netherlands is under contract with the Royal Netherlands Government to provide back-up advisory services to ESAMI by way of transferring their know-how in training activities The Energy Ministers Seminar which was held in Lusaka as a part of the 1994 EO/EM Meeting formed the first major activity to be undertaken under the project

Project AAA.5.18: Strengthening the Coverage of Woodfuel and Environmental Protection in Relevant SADC Training Institutions

The main object of the project is strengthening the coverage of woodfuel and environmental protection issues in relevant training institutions of the SADC region, aiming at

- Slowing down the now rampant problem of environmental degradation being experienced in various forms across the SADC region,

- Increasing awareness and knowledge among the general public about how to improve their own management of the environment and utilisation of the natural woodlands on a sustainable basis, and

- Encouraging people, through extension, to growing more trees

Funding is being sought

4 7 ENERGY CONSERVATION

Project AAA.6.3: Development of Energy Conservation Activities at TAU

The objective of this project is to identify national consultants in the region to assist in planning and policy formulation and development, strengthen TAU energy conservation department and develop a detailed regional energy conservation plan

Funding is sought for the period 1994 to 1996, to cover the programmed travels to the region and abroad, supplies, equipment and the functioning the Energy Conservation Subcommittee meetings in 1995, 1996

Project AAA.6.5 ENERGY MANAGEMENT IN INDUSTRY

The objective of this project is (1) to develop energy management expertise in SADC industry through training and technology transfer in order to provide sustainable energy management activities beyond the protect, (2) to determine the energy use patterns and potential for savings in selected sub-sectors (Food and Beverages, and Mining and Metals), and to provide special programmes to assist firms to improve energy efficiency in these sub-sectors and also (on a responsive basis) in other sub-sectors, (3) to develop an industry-government network to promote and coordinate energy management in the various industrial sub-sectors, (4) to develop a capability within member State engineering consulting firms to plan and undertake energy management projects

The inception mission initiated in July 1994 The Project Advisory Committee (PAC) held in May 1995, reviewed planned activities, recommended few changes and the start of the implementation at the begining of July

Project AAA 6 9 Demandside Management Opportunities for SADC Utilities

The objective of this project is to (1) identify sectors/sub-sectors where there are inefficient or peaking end-uses of electricity, (2) determine the most cost-effective means (from both power utility and energy user viewpoints) to correct these inefficient uses or to reduce peak demand, (3) develop a series of utility demandside management investment programmes (financial assistance, technical assistance and information) to encourage industry, commercial establishments and other consumers to adopt these cost-effective means to improve efficiencies or reduce peaking, (4) bring electricity tariffs in line with the long-run marginal costs of supply (including environmental costs) to encourage wider user

investment in efficient technology, to investigate disparities in pricing between different types of end-users (consumer classes), (5) compare the economic, social and environmental benefits of these DSM programmes with costs of investment in new supply, (6) ensure the long-term sustainability of these investments by providing training to both management and operational staff in SADC utilities

At beginning of 1994 the consultant, Marbeck and TAU initiated a trip mission to five member States and South Africa to assess the potential and commitment of the regional utilities to undertake DSM programmes An interim report was issued in October 1994 Comments were received by the consultant, utilities, TAU and other stakeholders

As a result of this, a 2nd visit to the region was made at the end of April 1995 A second report was issued in May 1995 At the 4th ENCON Subcommittee, member States discussed the report contents and have agreed to recommend to TAU to pursue further contacts with the consultant to review some recommendations that should be reflected in the final report

Project AAA.6.11: Energy Efficiency Improvements in SADC Heavy Industry

This project was developed at the request of the Energy Ministers meeting in Windhoek in June 1992 Following a decision by CIDA and TAU to eliminate mining and other heavy (energy-intensive) industries such as cement and metallurgical industries from Project AAA 6 5, it was recommended that a project dealing with these sub-sectors should be developed The proposed new project aims to provide a preliminary assessment of energy savings potential in a variety of heavy industry sub-sectors, followed by detailed energy audits of plants designated as having a significant savings potential Development of demonstration projects for a number of plants is also planned Funding is sought

Project Descriptions

Project: AAA.1 4: - Management Development and Specialists Training for the SADC Petroleum Sector

Estimated cost (US$ Million)		Financing gap (US$M)
		1 55
Total	1 55	Executing Agency
		TAU/RTC
Foreign	1 55	
Local	-	
Funding Secured		Start
		As soon as funds are secured
Foreign		
Local	-	Duration 2 years

Objectives.

To produce a professional core of management staff for the National Oil Companies and Energy Ministries of the SADC countries through an integrated Regional Energy Programme

To improve regional cooperation and policy making on oil exploration, supply, refining, gas utilization and petrochemical projects, through mutual understanding of planning, development and economics of major projects in the oil, gas and petrochemical sectors

To increase standardization of exploration agreements, safety procedures, oil supply contracts, product handling procedures and product specifications within the region, for the purpose of enhancing international cooperation with non-SADC oil companies and to reduce costs and losses

Description:

It is the intent of the SADC Energy Sector, TAU, to establish contact with a suitable training institute such that a major training programme can be developed and implemented in the region The programme is envisaged to consist of a range of training modules, special workshops and possibly distance learning sections, covering the management, technology and economics etc , of both the upstream and downstream sectors of the oil industry, with an

additional core of petroleum related general management modules, covering corporate planning and project development and implementation/control.

Overall, as an estimate of the programme, some 54 weeks of training are involved, for a total of 800 hours or 24000 delegate/hours of achieved training (upstream and downstream)
This programme will be broken down into three main sections

i) Upstream Modules and Workshops
ii) Downstream Modules and Workshops
iii) 5 Distance Learning Packages

Status:

During the 1994 Annual Consultative Conference, a meeting was held between Executive Secretariat and EU were new rules for financial assistance were approved and TAU has resubmitted this project to EU in order to be funded under the Lome IV Convention
Funding sought

Project: AAA.1.5: - Joint SADC Petroleum Exploration Programme Phase IV : Exploration Programme (Divided into two phases, Phase I and II)

Estimated cost (US$ Million)		Financing gap (US$M)
		29 05
Total	61 748	Executing Agency SADC/TAU
Foreign	52 130	
Local	9 618	
Funding Secured		Start
		2nd quarter 1995
Foreign	27 730	Duration 3-4 years
Local	4 968	

Objectives:

The main objective of PEP is to upgrade the understanding and knowledge of the sedimentary basins of SADC with a view to attract oil company investment

Description:

The Joint SADC Petroleum Exploration Programme concentrates on inland sedimentary basins that have been little explored in the past These interior basins of the region make up an area of more than 2,000,000 km^2 and have only 14 exploratory wells drilled.

The proposed activities under the Programme are designed to upgrade the understanding of the petroleum potential of these basins with the view to attract oil company investment in exploration 31 different activities have been defined with a total estimated cost of about USD 61 75 million

The Programme will be financed partly by ADB loans, donor soft finance, by oil industry risk capital and by national contributions Individual activities may be joined together for efficient execution and be modified to suit requirements from the industry or from finance agencies

Originally the project consisted of four project Phases, but Phase III has been incorporated into Phase IV and will be financed as a part of this phase

- Phase I Project Task Force USD 0 75 mill (Completed)
- Phase II Project Steering Committee USD 0 06 mill (Comp)
- Phase IV Exploration Programme USD 61 75 mill
  (Divided into two phases, Phase I and II)

Status:

A meeting between TAU and the African Development Bank (ADB) 15-16 March 1994, resulted in a joint Memorandum describing a combined finance package of USD 32 698 000 The package is made up of African Development Funds (ADF), donor funds, industry participation and national contributions As the present finance plan based on pledged support falls short of the total finance requirements for PEP, the joint memorandum defines two phases Phase I is covered by a concrete finance plan Phase II include activities which are deferred and will be addressed later in terms of finance and execution The deferred activities are in the Okawango and Cassanje Basins of East Angola and in the Nama Basin The reason for this selection is in part related to the security situation in East Angola In the Nama Basin, Botswana is undertaking a borehole test programme PEP activities in this basin should be reviewed again after the results of these boreholes becomes available in 1995 Phase I projects will start as soon as money has been made available by ADB and Donors

Project AAA 1.8 - Investigation of the Possible Harmonisation of Laws, Rules, Standards and Regulations Including Environmental Protection and Safety in the Petroleum Sector

---

Estimated cost (US$ Million)		Financing gap (US$M)
		1 263
Total	1 373	Executing Agency
		SADC/TAU
Foreign	1 263	
Local	0 110	
Funding Secured		Start
		1st quarter 1996?
Foreign		Duration
Local	0 110	2 years

Objectives:

The main objective of the project is the harmonisation of laws, rules, standards, and regulations related to the petroleum sector and the environment in the region in order to create an efficient industry taking advantage of available capacity and economies of scale Furthermore securing that safety and environmental management become part of the management culture of the petroleum industry in the region, and reviewing possible joint actions for the region in order that the sector contributes to the global initiatives taken at the UN Conference on Environment and Development in Rio de Janeiro 1992

The specific objectives of the project are outlined hereunder

* encouraging standardisation of agreements, safety procedures, oil supply contracts, product handling procedures and product specifications within the region to enhance international co-operation with non-SADC oil companies, and to reduce costs and losses,

* improving laws, regulations and standards in the petroleum sector,

* ensuring that safety and environmental management become part of the management culture of the petroleum industry,

* reviewing possible actions for the region to ensure that the sector contributes to the global initiatives taken at the UN Conference of Environment and Development in Rio de Janeiro in 1992

* participating in long term global conservation policies with respect to non-renewable, natural resources,

* help optimising scarce resources, including capital, skilled labour, enterprise and know-how,

* contributing to the development of a professional core of management staff for national oil companies and the member States' relevant ministries,

* capacity building and capacity sharing,

* creating a forum for discussion of petroleum related issues,

* be part of TAU's initiative to strengthen institutional capabilities,

* enhancing south-south and north-south institutional co-operation

* enhancing more collaboration among SADC and non SADC neighbouring countries

* improving regional co-operation,

Description:

Standardization of product specifications, safety procedures, legal issues and the creation of a capacity for sustainable management of the petroleum sector in the SADC countries are the key issues of concern to the industry Based on recommendations from different seminars, conferences and workshops (National Oil Companies Seminar in Windhoek 1992, Energy Sector Workshop in Windhoek 1994, the Arusha Seminars and the Petroleum Downstream Conference in Maputo 1994), the main tasks under this project will be undertaken by Working Groups which will address these issues in details Furthermore it is intended to carry out research and studies in areas identified by governments and industry as being crucial for the development of the sector and the region as a whole All these activities and the industry will benefit from the proposals related to information sharing and publications It is intended to continue with the seminars as a forum for north-south collaboration and training The details of the tasks are given in the following subsections

Status: Funding Sought

Project: AAA.2.3: - Manpower Development and Training for the Coal Utilization Subsector

Estimated cost (US$ Million)		Financing gap (US$M)	
			0 11
Total.	0 11	Executing Agency	SADC/TAU
Foreign	0.11		
Local	-		
Funding Secured		Start When funding is secured	
Foreign.	-	Duration 6 Months	
Local	-		

Objectives:

The overall objectives of the Training Needs Survey are to provide a basis for planning a manpower development and training programme for the coal utilization sub-sector

The immediate objectives are

- Define the qualifications required to fill the designated positions in the Coal Utilization Sub-sector of the SADC countries

- Identify the gaps between the skills required to perform satisfactorily in the designated positions and those that are acquired through previous education, training and experience

Description:

The immediate results and outputs of the Training Needs Survey will be a report to the TAU and the PCSC, with the following information and proposals

Manpower needs

- Description of the relevant jobs or positions, with specification of required education, experience, skill and performance level

- An estimate of the skill categories and manpower needed in industry and in the energy related public sector over the next five (5) years

- An estimate of the categories and number of candidates to attend the manpower and training programme and participate in study tours and fellowship programmes over the next five (5) year period

Manpower Supply

- An assessment of the availability of manpower from universities and technical schools, the labor market and internal promotion by training, skills and experience

Education and Training

- General educational entry level and achievement level of universities, high schools and technical training institutions
- Status and level of technical training inthe Energy Sector, particularly in the Coal Sub-sector

Training Policies and Strategies

- Conditions and prerequisites that have tobe fulfilled to ensure the success of the project

- Consequences for long-term training policies and strategies within the coal utilization industries, and related public sectors in the member countries

- Recommendations for a further work programme

Status: Funding sought

Project: AAA 3.1: - Regional Rural Electrification Programme Phase II - Information and Research Programme

Estimated Cost (US$ Million)		Financing Gap (US$)
		7 00
Total	7 00	Executing Agency
Foreign	7 00	
Local	-	
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

Identify the institutional and socio-economic settings and framework for Rural Electrification in SADC member States, including energy resources and electricity systems, current experience in rural electrification with respect to socio-economic and technical aspects, training facilities, expert personnel and case studies of specifics

Description:

The programme consists of three different activities

A REGIONAL RURAL ELECTRIFICATION INFORMATION PROGRAMME

To support the hiring of a full-time rural electrification information specialist, and provide him/her with a budget to carry out a significant rural electrification information programme

B REGIONAL RURAL ELECTRIFICATION RESEARCH PROGRAMME

A budget for an initial set of high priority research projects relating to rural electrification, and support for the hiring of a full-time research programme manager

C INNOVATIVE APPROACHES TO RURAL ELECTRIFICATION DEMONSTRATION/PILOT PROJECTS

A budget for three or more demonstration/pilot projects relating to rural electrification, and support for the hiring of a part-time demonstration programme manager

Status:

Phase I was successfully completed Phase II has been presented for funding, but has so far not attracted any interest neither from ICPs nor SADC institutions In June, 1993 Energy Ministers recommended the formulation of the project The reformulation has not yet been done

Project: AAA 3.2: - Specialized Training in the Field of Electric Power
Phase III: Five Year Regional Power Sector Training Programme

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	28 425	Executing Agency
Foreign	23 034	
Local	5 391	
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives

Identify training needs for electricity utilities' personnel and formulate a training programme taking into account the existing facilities in the region The objectives of Phase III is to implement the training programme defined during Phase II

Description

Phase III consists of three different cost items
Courses 33 specific courses have been defined, based on the analysis done during phase II of this project, when the needs were identified The courses will be conducted in cooperation with existing training institutes in the SADC region, identified in the report based on the findings during phase II

Database The database is meant to contain information on possibilities for attachment training in the various power utilities within the SADC region The database will also contain names of persons with special skills which could be of use for other utilities

Programme management The programme has to be coordinated by a full-time Human Resources Development Manager working as part of the TAU team

The *Five Year Regional Power Training Programme* is described in more detail in the Presentation to ICPs on 29th January, 1992

Status

Phases I and II are successfully completed, leading to a recommended list of courses to be undertaken, and approved by the Energy Ministers as the FIVE YEAR REGIONAL POWER SECTOR TRAINING PROGRAMME Phase III was initiated in 1992 through undertaking the necessary steps to implement the recommendations from the Lusaka Workshop held in March 1992, namely to issue a call for proposals to deliver 33 formal training courses, to evaluate the bids and to select the best institution for each course The Final Report was issued in June, 1993 with the final list of selected institutions

KGRTC is sponsoring five courses, namely Generation Maintenance Management Systems, Dam Safety Monitoring, Instrumentation and Control, Production Planning and Water Management, and Training of Trainers

CIDA and ODA were expected to finance four and five courses respectively The prospect of having South Africa as a new SADC member State has refrained them of funding those courses for the time being Consequently the remaining 28 courses are still available for funding

Project: AAA 3.11: - Lightning Research

Estimated Cost· (US$ Million)		Financing Gap (US$ Million)
Total	1 034	Executing Agency
Foreign	1 034	
Local	-	
Funding Secured		Start
Foreign·	-	Duration
Local.	-	

Objectives

To carry out an effective research and establish the real causes for the severity of the lightning strikes and hence suggests practical means of protection of both people and electrical utilities against lightning strikes

Description:

Under SADCC umbrella develop a project consisting of installing a considerable number of stroke counters to be strategically mounted for measurement of lightning intensity between cloud and earth The estimate number of stroke counters required will be over 1,000

Status

Approved by the Energy Ministers in June, 1992 The project was not presented to the 1993 Annual Consultative Conference due to incomplete project description and is now available for funding

Project: BOT 3.4 - Second 220 kv Line Morupule-Gaborone Implementation

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	39 000	Executing Agency
Foreign	36 500	
Local	2 500	
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

To improve reliability of power to the Southern part of the country, reduce dependence on power supply from the RSA, and allow for a full utilization of the interconnection with Zimbabwe and Zambia

Description

Construction of a second 220 kV line from Morupule Power station to Gaborone

Status·

The project has been suspended Its implementation was deferred until the line is required for firm power supply which may take place around 1996/97 Due to new developments Energy Ministers at their meeting held in Lusaka, June 1994, approved reactivation of the project

Project· MAL 3 5 - Supply to Chitipa and Karonga in Malawi from Mbeya in Tanzania - Implementation

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	3 980	Executing Agency
Foreign	3 050	
Local	0 930	
Funding Secured		Start
Foreign	-	Duration
Local·	-	1 year

Objectives:

To provide a cheaper source of electricity to consumers in Karonga and Chitipa, to reduce Malawi foreign exchange drain due to imports of diesel fuel and to provide a more reliable source of electricity

Description:

Electricity supply to Karonga was established in 1979, while Chitipa was electrified by the end of 1988 by diesel generators under the present Rural Electrification Programme

Reliability of supply in Karonga is poor due to frequent machinery breakdowns

By connecting the two towns in Malawi to the national grid in Tanzania considerable improvements will be achieved The following is needed

- 267 km 33kV overhead lines
- 1 substation for voltage regulation at Ibanda
- 2 substations at Chitipa and Karonga
- 2 distribution substations at Kyela and Chilumba

Status:

The project has been presented at five consecutive Annual Consultative Conferences An appraisal report was prepared by Belgium experts to determine the quantity of line materials needed for the project

The draft Agreement on cross border power inter-change between TANESCO and ESCOM has been prepared and sent to the Belgium Government for comments There is no reply up till now, and it appears that there is loss of interest in the project

Project MAL.3.6: - Malawi/Zambia Power Cooperation in the Border Region

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	5 918	Executing Agency
Foreign	3 858	
Local	2 060	
Funding Secured		Start
Foreign	-	Duration
Local	-	1 year

Objectives:

To provide electricity supply as an alternative source of energy to the rural areas on both sides of the Malawi-Zambia border

Description:

The project includes construction of more than 300 km 33 kV lines, upgrading/construction of two 33/11 kV substations, 27 distribution substations and about 15 km low voltage lines

Status:

Agreement on tariff is yet to be finalized A follow-up meeting will son be arranged to discuss the contentious issues So far ADF has not been contacted by any of the two governments for funding

Project MOZ 3.2: - 275 kV Interconnection Between Mozambique and Swaziland
Phase I: Study Revision and Tender Documents
Phase II: Implementation

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		25 000
Total	25 000	Executing Agency
Foreign	25 000	
Local		
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

Enable more reliance and increased security of supply between the three countries Mozambique, RSA and Swaziland, and at the same time broaden the regional access to the cheap Cahora Bassa hydro power

Description.

Construction of a 275 kV transmission line from Swaziland to Southern Mozambique (Maputo)

Status:

The project was reactivated in the Energy Ministers' meeting in June 1994 as it had been suspended awaiting the resoration of the DC lines from Cahora Bassa (Mozambique) to RSA However, realizing the developments in their own electric

systems and their internal power demand forecasts, the parties have now instead decided for a stronger interconnection at 275 kV, instead of 132 kV as proposed in the pre-feasibilty study of 1987

The parties have already started negotiating the Supply Agreement and the Government to Government Agreement to be in place before launching of the tender process A "Joint Declaration on Power Co-operation between Mozambique and Swaziland" between the respective governments was signed on 3 March 1994.

Funding interest has been shown by the World Bank and the African Development Bank

Project: MOZ 3.5· - Mozambique - Malawi Interconnection of Electricity Supplies. Phase III

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total:	17 000	Executing Agency
Foreign	17 000	
Local.		
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

Promoting regional cooperation and significantly reducing possible major costs by delaying construction of large generation facilities It will also replace local diesel generation facilities saving diesel fuel expenses, as well as electrifying new areas

Description:

Construction of a 132 kV transmission line from Nkula Falls in Malawi to Tete in Mozambique, approx 190 km New considerations may influence the choice of voltage level (see below)

Status:

Equipment for installation of 132/110 kV transformer and 110 kV feeder bay is on site

In view of the findings of project AAA 3 8, Mozambique and Malawi have agreed to conduct another study to compare the use of a higher voltage of 220 kV and 132 kV (interconnecting Songo in Mozambique to Blantyre West or Kapichira in Malawi)

which was proposed for the project The study will also consider supplying the north-western part of Mozambique in addition to Malawi Mozambique has approached the Government of Australia to finance the study and subsequent project

Mozambique have approached the Australian Government to finance the study and subsequent project ESCOM has expressed interest in the study

Project: TAN 3.6· - Supply of Sumbawanga in Tanzania Phase II Implementation

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	8 000	Executing Agency
Foreign	8 000	
Local	-	
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

Determine the preferred least cost scheme to supply Sumbawanga in Tanzania with power from Mbala in Zambia

Description:

Extension of the Mbala 66/11 kV substation in Zambia by another 66 kV bay, construction of a 115 km, 66 kV line from Mbala to Sumbawanga, and construction of a 66/11 kV 5 MVA substation to distribute power in Sumbawanga

Status:

Phase I, Load Flow and Cost Estimate Study, was completed in October, 1992, and supply from Zambia was found to be feasible The implementation was approved in 1993 as Phase II of the project TANESCO and ZESCO are now looking for a financier

Project: ZAM.3.5: - PLC Communications on the Northern Transmission System. Implementation

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		1 8
Total:	1 8	Executing Agency
Foreign	1 8	
Local:	-	
Funding Secured		Start
Foreign	-	Duration
Local.	-	

Objectives:

To improve communication and thus improve the reliability of power supply to Zambian and Tanzanian border towns which are served by the North Eastern 66 kV system.

Description:

A PLC links , strategically located at Kasama, Mpika, Chinsali, Nakonde, Lusiwasi and Chipata will enable communication, protection and signalling and other applications necessary for proper system operation.

Status:

The project was reformulated in 1993 and it is desired that the project is carried forward due to the envisaged interconnections between Zambia and Tanzania Funding is sought

Project: ZAM 3.7: - 132 kV Tie-Line Zambia - Malawi Project Design

Estimated Cost (USD Million)		Financing Gap
Total		Executing Agency:
Foreign·		
Local		
Funding Secured		Start:
Foreign	-	Duration:
Local	-	

Objectives·

Extend the limited study performed on project ZAM 3 1 to feasibility study level and establish whether an interconnection of the Zambia and Malawi power systems at 132 kV is feasible

Description

Construction of a 132 kV transmission line, partly by upgrading an existing 66 kV line, from Pensulo in Zambia to Lilongwe in Malawi, total length approx 435 km New development may influence the choice of voltage level (see below)

Status:

The feasibility study recommended that ZESCO and ESCOM negotiate an agreement for the import of 30 MW from Zambia to Malawi to cover reserve capacity needs in Malawi As soon as the agreement is signed, seek financing for the project and embark on project design ZESCO and ESCOM have started tariff negotiations at a meeting in Lusaka on 26th and 27th July 1993 and general tariff principles were agreed ZESCO is working out the tariff structure for further negotiations

However, new discussions indicate that investigations should be carried for a 220 kV or higher voltage tie Depending on load flow calculations and stability analysis, the line could be energised at 132 kV at the initial stage ESKOM of South Africa proposed to carry out this study, having suggested a 220 kV corridor within Malawi, between Lilongwe and Blantyre west (or Kapichira)

Project ZAM 3.8 - 330/220 kV Tie-Line Zambia - Tanzania Feasibility Study

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total		Executing Agency
Foreign		
Local		
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives

Demonstrate whether an interconnection of Zambia and Tanzania power systems at either 330 kV or 220 kV is a sound project technically and economically

Description:

To review possible interconnactions between the two countries, identification of the freferred scenarios and undertake an economic appraisal of the project

Status:

The Final Pre-feasibility Study Report was issued in May, 1993 It recommended that an interconnector at 330 kV with a transfer capacity of 180 MW be taken to Feasibility Study level

Project: ZAM 3.9: - Power Cooperation Between Zambia and Namibia

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
Total	15 938	Executing Agency
Foreign	14 545	
Local	1 393	
Funding Secured		Start
Foreign	-	Duration
Local	-	

Objectives:

To provide hydroelectric power to enhance development of the great agricultural potential of Northern Namibia and generally improve the reliability and increase the capacity of power supply to the region which comprises Namibia, Zambia and Botswana

Description:

It is intended to construct a 215 km 132 kV overhead line from Victoria Falls Power Station to Katima Mulilo, construct a 132/66 kV 10 MVA substation at Katima Mulilo and connect it to the existing 66 kV line at Katima Mulilo A 132 kV line will be construct from the 132/66 kV substation at Katima Mulilo into Namibia SWAWEK will determine the length of this line and the location of their step down substation to distribute power in Northern Namibia which has a great agricultural potential, and which is too costly to supply from Namibia's power grid because of the long distance

Status:

Fundıng ıs beıng sought TAU has executed an evaluatıon study Efforts are beıng made to secure fınancıng from ADB, who has shown ınterest No comments on the Appraısal Report have been receıved so far Currently SWAWEK ıs waıtıng for a Feasıbılıty Study on the Load Potentıal ın Northern Namıbıa before the fınancıng process of the Project can be started

Project: AAA.4.9 - Assessment of Applıcatıons and Markets for Industrıal Process Solar Heat ın the SADC Regıon

Estımated Cost (US$ Mıllıon)		Fınancıng Gap (US$ Mıllıon)
		0 220
Total	0 220	
Foreıgn	0 220	Executıng Agency
Local	0 000	TAU
Fundıng secured		Start
		When fınancıng ıs secured
Foreıgn	0 000	
Local	0 000	Duratıon Eıght Months

Objectıve

- The prıncıpal objectıve of thıs study ıs to assess the technıcal and economıc vıabılıty of ındustrıal process solar heat (IPSH) applıcatıons and to determıne the potentıal market sıze and fınancıng for the most vıable IPSH applıcatıons ın the SADCC countrıes

Descrıptıon:

- The prıncıpal outputs of the study wıll be
- development of an analytıcal framework for the fınancıal and economıc evaluatıon of IPSH systems used ın SADC for ındustrıal applıcatıon,
- an assessment of the condıtıons under whıch IPSH systems are economıcally vıable for each member state
- an analysıs of the market sıze for technıcally and economıcally vıable IPSH applıcatıons, and

- an evaluation of whether applications which are economically viable are also financially viable, and what financing arrangements and industry development conditions could encourage widespread use

Status:

Funding sought

Project AAA.4.10 - Assessment of Application and Markets for Industrial Process Solar Heat in the SADC Region

---

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 240
Total	0 240	
Foreign	0 240	Executing Agency
Local	0 000	TAU
Funding secured		Start
		When financing is secured
Foreign	0 240	
Local	0 000	Duration
		Eight Months

Objective:

The principal objective of this study is to determine the potential market size for the most viable applications of solar Water Heating (SWH) in the SADC countries

Description:

The principal study will be

- presents an analitical framework for the financial and economic evaluation of SWH systems used for domestic water heating to each members State
- indicates the conditions under which SWH is economically and financially viable for each of this applications,
- presents an analysis of the market size for technically and economically viable SWH applications in each members states
- identify cosntraints ans needs of local industry in production and distribution of SWH ans reccomended ways of overcoming them,

Status

Funding sought

Project: LES 4.2 - Solar Photovoltaic Power Generation in Rural Areas - Lesotho Pilot Project

---

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 077
Total	0 077	
Foreign	0 077	Executing Agency
Local	0 000	
		TAU
Funding secured		Start
		When financing is secured
Foreign	0 000	
Local	0 000	Duration 3 months

Objective:

The principal objective of this feasibility study is to determine the conditions under which supplying photovoltaic generated electric power would be cost effective compared to other alternatives

Description:

This proposed project will investigate the feasibility of providing solar photovoltaic generated power in remote areas The project will be carried out in two phases Phase I is a feasibility study to document the technical and economic viability of the proposed project, including identification of an appropriate site for a project pilot project Phase II will be the implementation of a pilot installation, if the results of the feasibility study warrant such action

The level of effort for the feasibility study is estimated to be 28 person weeks during a 3 month period The estimated cost is USD 77,000

Detailed level of effort and costs for phase II - Implementation will be an output of Phase I - Feasibility Study The estimated cost of implementation is USD 250,000

Status.

Funding sought

Project: TAN 4.2 - Accelerated Biogas Technology Diffusion

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		1 113
Total	1 113	
Foreign	1 113	Executing Agency
Local	0 000	REDPU
Funding secured		Start
		When financing is secured
Foreign	0 000	
Local	0 000	Duration 3 years

Objectives:

- Introduction and dissemination of a new technology, biogas energy production,
- to develop and promote greater use of biogas energy in institutions and households,
- to reduce dependence on imported fuels,
- to improve living standards of rural populations by developing and promoting use of decentralized energy systems for power generation, lighting and cooking,
- to reduce woodfuel demand pressure on forest reserves through substitution with other appropriate indigenous energy sources

Description :

This project shows the needs of dissemination of biogas energy production and utilization technology in the SADC in order to promote greater use of indigenous energy sources

Status:

Funding sought

Project: ZIM.4.1 - Feasibility Study on the Utilization of Solar Water Heating for Reducing Power Utility Demand Costs

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 080
Total	0 080	
Foreign	0 080	Executing Agency
Local	0 000	
		TAU
Funding secured		Start
		When financing is secured
Foreign·	0 000	
Local	0 000	Duration
		3 months, Phase I only

Objective:

To investigate possibility of using solar water heating systems to reduce the demand for electric heating in industrial, commercial and domestic installations

Description :

- The proposed project will investigate the feasibility of using solar water heating systems, to reduce the demand for electrical heating in industrial, commercial and domestic installations The project will be carried out in two phases
- The principal output Phase I will be a report documenting the economic and finnancial viability (or non-viability) of solar water heating in member States
- Phase II will be the implementation of a pilot installation, if the results of the feasibility study warrant such action Budget for the feasibility study (Pahse I) USD 0 080 mill, while for implementation (Phase II) USD 0 170 mill

Status:

Funding sought

Project: AAA.5.7 - Support to TAU Woodfuel Section (Extension)

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 675
Total	0 781	
Foreign	0 675	Executing Agency
Local	0 106	
		TAU
Funding Secured		Start
		When funds are secured
Foreign	-	
Local	0 106	Duration
		3 Years

Objectives:

The main objectives of the project are to

- strengthen TAU planning and coordination capacity on traditional fuels and environmental protection issues,
- enable TAU to provide catalytic support to member States on planning, implementation and evaluation of woodfuel projects,
- enable TAU to sustain its current woodfuel programmes and projects

Description:

The following activities will be undertaken

- funding of the SADC Energy Sector Biomass Fuels technical advisor post,
- provision of funds for technical missions to member States to collect data, monitor and evaluate project and share grass roots experiences with local actors on how to develop and implement traditional fuels programmes successfully in particular through peoples participation,

- sponsoring of TAU officials, to attend some International and Regional woodfuel workshops and seminars of high relevancy to the SADC region

Status:

Funding sought

Project: AAA.5.8 - Development of National Woodfuel Strategies and Plans - Phases II and III

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 545 (Phase II) 0 470 (Phase III)
Total	0 545 (Phase II) 0 570 (Phase III)	Executing Agency
		TAU
Foreign	0 545 (Phase II) 0 470 (Phase III)	
Local	0 100 (Phase III)	
Funding Secured		Start
		When funds are secured
Foreign	-	
Local	0 100 (Phase III)	Duration
		3 Years

Objectives:

The main objectives of the project are to

- develcp comprehensive woodfuel strategies and implementation plans for each member State,
- intensify development of projects for energy production, integrated with other sectors dealing with biomass management and rural development, and
- provide data to assess national capabilities for the implementation of woodfuel programmes, and means of increasing such capabilities through institutional strengthening

Description:

The following activities will be undertaken

- review of experiences, and formulation of detailed strategies and plans for implementing the project,

- strategies and plans will be compiled to form a regional woodfuel strategy and implementation plans which will be published for distribution in the member States

  The second phase of the project will compile integrated national biomass plans for Lesotho and Tanzania as a pilot study, taking into account the TOR's developed in the first phase of the project

  The third phase of the project is its implementation

Status:

Funding sought

Project: AAA.5.9 - Identification & Support of NGO and Women's Groups Dealing with Woodfuel & Environmental Protection

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		0 400
Total	0 460	
Foreign	0 400	Executing Agency
Local	0 060	
		TAU
Funding Secured		Start
		When funds are secured
Foreign	-	
Local	0 060	Duration
		3 Years

Objectives

The main objectives of the project are to

- identify active NGOs and women's groups dealing with woodfuel programmes in the region,

- analyse NGO's and women's groups experiences in implementing woodfuel projects, in particular those based on people's participation at grassroot level;

- explore possibilities for intensifying NGO's and women's groups involvement in woodfuel programmes, by providing them with catalytic support like training, project planning, provision of equipment and funds, etc

Description:

The following activities will be undertaken in order to achieve the above objectives

- compilation of a comprehensive list of active NGOs and women's groups dealing with woodfuel in each member State will be made, and

- formulation of strategies and projects to support NGOs and women's groups on short-and long-term basis

Status:

Funding sought

Project: AAA.5.11 - Assessment of Environmental & Socio-Economic Impacts of Woodfuel Scarcity

---

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		2 300
Total	2 530	
Foreign	2 300	Executing Agency
Local	0 230	
		TAU
Funding Secured		Start
		When funds are secured
Foreign	-	
Local	0 230	Duration
		3 Years

Objectives:

The main objectives of the project are to provide

- comprehensive site-specific data on environmental and socio-economic problems created by woodfuel scarcity in the SADC region,
- information to be used for increase of public awareness of woodfuel aspects, and
- data for planning future woodfuel projects

Description:

- A steering committee of environmental experts will be formed, to provide a detailed plan on how to implement the project
- Review of experiences in member States will be undertaken by short-term consultants
- Priority areas to be studied in the main project will be defined, based on the seriousness of the problem in member States
- Obtained data will be analysed and a final report prepared Demonstration materials like photographs, slides, video cassettes and films will be included as part of the study

Status·

Funding sought

Project: AAA 5 14 - Intensification of People's Participation in Tree Growing and Environmental Protection in the SADC Region

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		5 054
Total	5 354	
Foreign	5 054	Executing Agency
Local	0 300	
		TAU
Funding Secured		Start
		When funds are secured
Foreign	-	
Local	0 300	Duration 3 Years

Objectives.

The main objectives of the project are to

- intensify people's participation in production of woodfuel, adoption of improved techniques of utilizing woodfuel, and
- intensify the awareness of decision-makers on socio-economic and environmental problems created by woodfuel scarcity, and the need to increase resources for the implementation of woodfuel programmes

Description:

The project will be divided into two major phases, mainly formulation of effective ways of intensifying people's participation in tree growing and environmental protection

- Assess the effectiveness of ongoing extension services on people's participation and document models of best practices
- Develop and implement pilot projects on tree growing and environmental protection based on participatory efforts

Status.

Funding sought

Project: AAA 5.18 - Strengthening the Coverage of Woodfuel and Environmental Protection in Relevant SADC Training Institutions

---

Estimated Cost (US$ Million)		Financing Gap (US$ Million)
		7 397
Total	7 397	
Foreign	6 725	Executing Agency TAU
Local	0 672	
Funding Secured		Start When funds are secured
Foreign	-	
Local	-	Duration 5 Years - 3 Phases

Objectives·

The main objective of the project is to strengthen the coverage of woodfuel and environmental protection issues in relevant training institutions of the SADC region, aiming at

- slowing down the now rampant problem of environmental degradation being experienced in various forms across the SADC region,

- increasing awareness and knowledge among the general public about how to improve their own management of the environment and utilisation of natural woodlands on a sustainable basis, and

- encouraging people, through extension, to growing more trees

Description

The project will focus on the following priority activities

- curriculum development, based on prior assessment, improving and expanding existing curricula and where required develop new ones,

- development and distribution of teaching materials and visual aids on environmental and woodfuel subjects,

- developing local institutional capacity to mass produce and effectively distribute (ii) at regional and national levels, and

- human Resource Development through formal and informal education sectors

  Through this extensive outreach programme over 10,000 teachers and extension staff will be trained during the life of the project and well over 6 million primary and secondary school pupils and their parents will be reached each year

Status

Funding sought

Project: AAA 6 11: Energy Efficiency Improvements in SADC Heavy Industry

---

Estimated Cost (US$ Million)		Financing Gap (US$ M)
		0
Total:	1,978,900 00 (Phase I, Phase II)	
Foreign	1,978,900 00	
Local.-		
		Executing Agency
Funding Secured		Start
Foreign	_	As soon as funds are secured
Local -		
		Duration
		3 years

Objectives:

To determine the energy use patterns and potential for savings in the most energy - intensive industries of the SADC region,

To assess the amount and type of technical and financial assistance in these industries which would be required to achieve significant energy savings,

To provide special programmes to assist firms to improve energy efficiency in these same subsectors, including but not limited to energy audits programmes, training programmes, and information transfer programmes,

To develop an industry-wide network in the region to promote and coordinate energy management among energy-intensive industries

Description

The project will be carried out in three phases

Phase I	Feasibility Study and Preliminar Walkthrough Audits (1 year)
Phase II	Audits
Phase III	Audits, Demonstration Projects, Report (Years 4, 5)

Phase I

Major Activities

Assessment of the aggregate demand for energy from industry in general and heavy industry in particular using national energy statistics

An inventory of energy-intensive industries for each member State including information in current capacity and utilisation of energy by type, production levels, employment levels, future expansion plans etc

Assessment of current and planned rehabilitation/retrofit programmes which might include energy-intensive industries, including those which are sponsored by ICPs or the multilateral banks

Technical and financial capabilities of those industries

Phase II
Detailed Audits and Identification of Demonstration Projects

Phase III
Demonstration Projects and Environmental Impacts

Status

Funding sought

Annex I

Criteria for the selection of Regional Projects

1 CRITERIA FOR SADC ENERGY PROJECTS

1 1 REGIONAL CRITERIA

Various types of regional projects exist:

(a) Projects of overall regional benefit which result from the coordination of the investment programmes of two or more member States, with a view to avoiding unproductive duplication and taking advantage of economies of scale, including a larger market,

(b) Pilot and research projects whose results can be repeated in other member States, especially those projects promoting the utilization of indigenous raw materials,

(c) Studies and training programmes of importance to all or several of the SADC member States; and

(d) Projects with an indirect regional impact, located in more geographically remote member States

Accordingly, SADC Energy Sector projects need to satisfy the following regional criteria/groups of criteria, in descending order of importance, (the last criterion being applicable only to member States not bordering other member States, or with complicated border conditions of a semi-permanent nature)

- directly involve two or more member States in ownership, investment finance, production or in the sharing of benefits from energy projects,

- indirectly benefit one member State in a significant manner, in addition to benefitting the member State where the project is located, and

- directly benefit one member State, through increasing the number and flexibility of its energy supply options

1 2 TECHNICAL CRITERIA

SADC projects must be

- be technically feasible,

- use technology appropriate to the SADC region in general and the applicable member States in particular As far as possible this includes use of regional standards and codes of practice,

including safety standards, which are frequently based on international standards modified as necessary to meet the needs of the SADC environment,

- make provision for acceptable long term operational conditions (maintenance agreements, provision of spare parts, technical training of local personnel, etc); and

- include technology transfer, both between non SADC experts and their SADC counterparts, and also from more experienced SADC experts to the less experienced

1 3 SOCIO-ECONOMIC CRITERIA

These criteria include economic and social aspects The project must·

- be economically viable, i e satisfy normal socio-economic project evaluation criteria based on calculations of Economic Internal Rate of Return (IRR) and Net Present Value (NPV),

- be clearly preferable to any alternative or competing project, i e when alternative solutions exist, the project should represent the least cost solution (including investment, training, operation and maintenance costs), and

- be socially justifiable in the sense that the social impact of the project is positive The impact on the rural and peri-urban poor populations of the region is of particular importance

1 4 FINANCIAL CRITERIA

Development efforts in the SADC region experience severe financial constraints Therefore all regional projects must satisfy the following financial criteria

- the capital resources required to implement and maintain the project must be available Particularly important is an assessment of the project's required amount of equity capital and the availability of such capital, and

- the cashflow of the project must be sufficient to sustain recurrent operation and maintenance expenses

In addition, for capital investment projects, the following criteria should be met

- the cashflow of the project, both related to the investment and operation and maintenance phases should be sufficient to sustain repayment of loans, interest payments and recurrent operation and maintenance expenses, and

- the project's financial viability must be verified, i e to make certain that the project has a satisfactory Financial Rate of Return based on the proposed financial arrangements.

1 5 ENVIRONMENTAL CRITERIA

Environmental issues are attracting increasing attention in all the SADC member States, as well as in all major international financing institutions All projects should therefore

- comply with generally accepted environmental requirements of the SADC region, e g. regarding emissions to air and water, and

- contribute to minimising environmental damage in the SADC member States, particularly with regard to deforestation and soil erosion

Capital investment projects should undergo an environmental impact assessment in order to be approved in the SADC Programme of Action

2 SPECIFICATIONS FOR PROJECT DESCRIPTION

Energy Sector project descriptions must comply with the following specifications in order to expedite evaluation, presentation and project promotion

2 1 SUMMARY

The proposal must contain a brief of one page information summary in a standardized format

- Estimated project costs (both foreign and local currency),
- Funding secured (both foreign and local currency),
- Financing gap,
- SADC Executing agency(ies) for the project,
- Expected start date and duration of the project,
- Objectives,
- Short project description incl regional aspects of the project and social and economic benefits, and
- Present project status (incl date of status given)

2 2 BACKGROUND

This section should include, but not be limited to, the history of the project and should describe the project's relation to the energy situation in the actual area to be covered by the project The regional significance of the project must be elaborated.

2 3 OBJECTIVES

The objectives of the project need to be clear It is important to demonstrate that the project's objectives comply with SADC regional energy strategies and policy objectives and the national development plans for the energy sector in the member State(s) involved in the project.

2 4 TECHNICAL DESCRIPTION

This section should include information on expected outputs of the project, the scope of work (tasks to be undertaken), the methodology to be applied for the project and the conduct of work (description of actions to be taken)

2 5 ECONOMIC BENEFITS AND JUSTIFICATION

The socio-economic benefits expected from the project must be addressed

Certain aspects of the project may impose substantive costs or generate benefits outside the project itself Examples of such aspects are training, transfer of know-how and environmental effects In case such costs or benefits exist they should as far as possible be described and analyzed (both qualitatively and quantitatively)

2 6 ENVIRONMENTAL IMPACT ASSESSMENT

For all major capital investment projects an environmental impact assessment would be required This assessment shall demonstrate the project's contribution to the sustainable environmental development of the SADC region

2 7 IMPLEMENTATION (ORGANIZATION AND MANAGEMENT)

The planned project organization, including responsibilities and reporting procedures/frequencies, shall be included in the project proposal

2 8 TIME SCHEDULE

An implementation schedule for the project is required This shall include major milestones to be reached and specification of important project meetings and reports to be delivered during the implementation period Details of human resource allocation shall be included

2 9 RESOURCES AND COSTS (LOCAL AND FOREIGN)

A detailed resource and budget plan for the project must be specified. This includes investment capital, working capital requirements, human resources, raw materials, natural resources and necessary equipment. Both local and foreign components must be detailed.

2 10 PROPOSED FINANCING (LOCAL AND FOREIGN)

Proposed sources of financing shall be included. This applies to financing of both the local and foreign cost components. For the local cost components it is important that these are matched with budgetary allocations in the member State(s) involved in the project. Letters of intent indicating financial commitments may be annexed to the project documents.

3 PROJECT APPRAISAL AND APPROVAL PROCEDURES

3 1 THE ENERGY SECTOR'S PROJECT APPRAISAL PROCESS

One major concern is that all scarce resources - including capital, skilled labour, enterprise and know-how - should be used to their best advantage. Consequently, there is a clear need to have parameters which can help in the choice of the "best projects" and guide resource allocation

Project appraisal is the process whereby it is determined whether a project meets technical, economic and social criteria and objectives established in the SADC Energy Sector and the countries involved in the actual project, and whether it meets these objectives efficiently Appraisal provides a comprehensive review of all aspects of the project and lays the foundation for its implementation after it has been approved, and for its evaluation after it has been completed The project appraisal process applied in the Energy Sector is shown schematically as enclosed

3.2 URGENT PROPOSALS

Only in exceptional circumstances, as in the case of emergency projects, should consideration be given to project proposals presented directly to the Energy Officials meeting The Energy Officials will decide whether such a proposal will be forwarded to the Energy Ministers for consideration

3.3 FORMAL APPROVAL OF MAJOR PROJECTS

The decision as to whether a project may be adopted as a SADC project can only be made by the Energy Ministers. New projects must be considered at their annual meeting, usually in mid-June, before presentation to the next Annual Consultative Conference in late January

If approved by the Energy Ministers, the Chairman of the Energy Ministers' Committee presents the project proposals formally to the Council of Ministers (usually in August) for consideration and approval Once approved, the project enters the SADC Programme of Action for implementation

The procedure described above is the way new projects usually receive formal approval This applies to all major projects, e.g. all projects characterized by a large magnitude of investments, considerable working capital etc There may be situations where a more simple procedure could apply Accordingly, the Energy Sector in some cases applies simplified procedures (relating to small projects, minor extensions to existing projects, and emergency projects).

4 PROMOTION STRATEGY

When a project has been formally approved, certain promotional activities would be undertaken in order to facilitate a timely and successful implementation of the project.

4 1 PROMOTION ACTIVITIES AFTER SADC APPROVAL

Project promotion is a joint responsibility of both the member State(s) involved in the project and the TAU

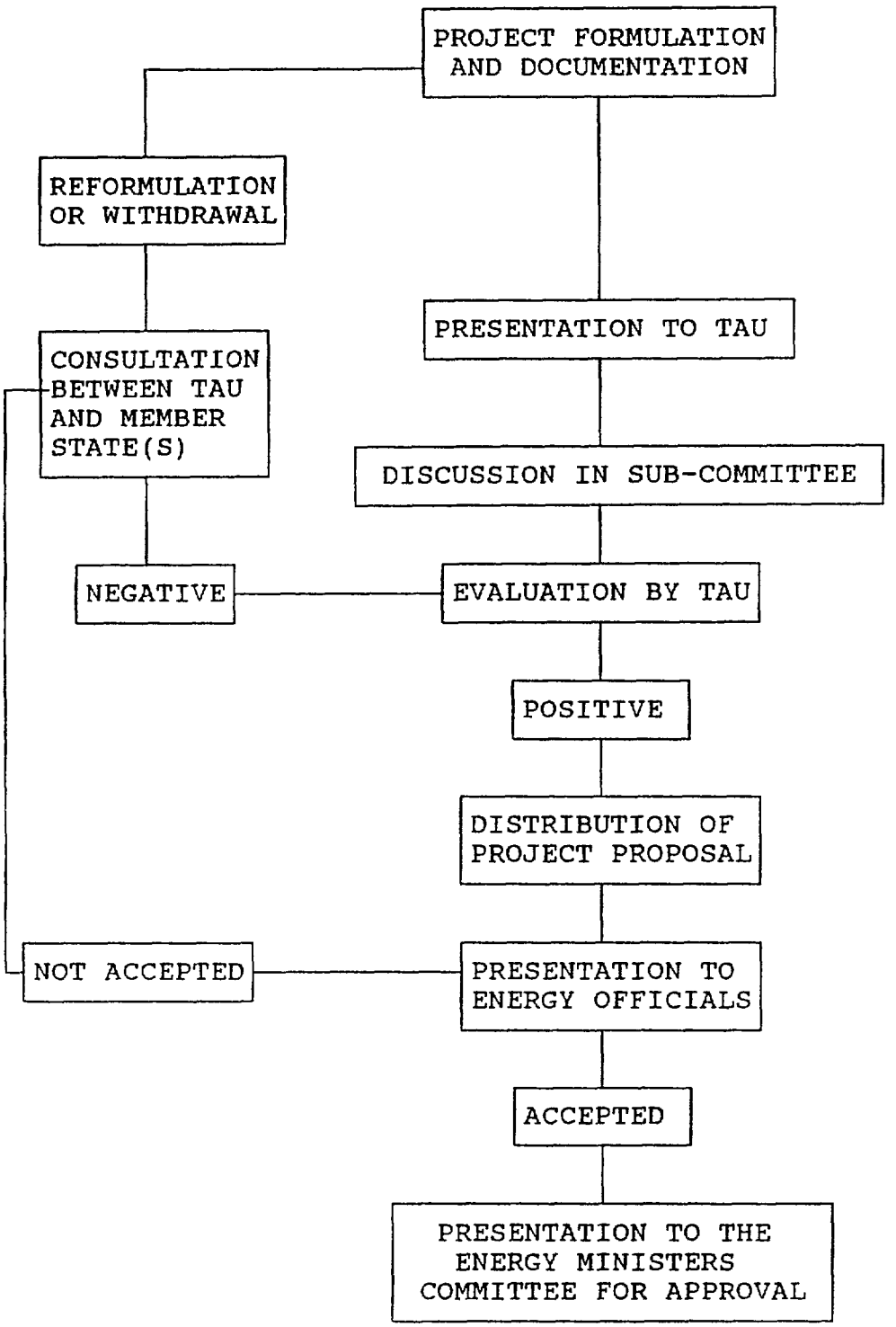
Following approval by the Energy Ministers, TAU will internally allocate responsibility for promotion and follow-up of the new project

Promotion includes circulation of project documentation to the Energy Sector's International Cooperating Partners (ICPs) This is followed-up by personal contacts between TAU and the ICPs, and between TAU and member States.

4 2 CONSULTATIVE CONFERENCE/ENERGY SECTOR WORKING GROUP

During the SADC Annual Consultative Conference (ACC) held annually in late January, sectoral working groups are held In the Energy Sector Working Group (ESWG), TAU and member State representatives meet with ICPs to discuss issues related to financing of projects in the Energy Sector portfolio On this occasion bilateral discussions are also held regarding financing of specific projects The contacts made in the ESWG are followed up throughout the year.

THE ENERGY SECTOR'S PROJECT APPRAISAL PROCESS



Annex II

Funding Status of Projects

ENERGY

	Project Title	Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
US $ Million									
OVERALL COORDINATION									
AAA.0 3	General Support to the Energy Sector - TAU	**28 08**	22 02	6 06	**6 06** **19 54** **2 48**	(ANG) (NOR) (BEL BRA, CAN SWE FRA,POR EC UK)			- Under implementation
AAA.0 4	Energy Bulletin	**0 89**	0 26	0 63	**0 63** **0 26**	(ANG) (CAN EC POR,NOR)			Under implementation
AAA 0 7	Documentation Centre for Energy Sector	**0 31**	0 31		**0 31**	(NOR)			Under implementation
AAA.0 8	Establishment of a Regional Energy Planning Network in SADC	2 50	2 50		**2 50**	(BEL)			Funding secured Awaiting practical arrangements to be put in place
AAA.0 10	TAU Office Facilities	**2 67**	2 00	0 67	**0 67**	(ANG)		2 00	Funding sought
	Sub-total	**34 44**	**27 08**	**7 36**	**32 44**		**0 00**	**2 00**	
PETROLEUM									
AAA.1 2	Regional Petroleum Training Centre								
	Phase I				-				Completed
	Phase II Intermediate Planning Phase	**0 22**	0 22	0 00	**0 22**	(UNIDO)			Under Implementation
AAA.1 4	Management Development and Specialist Training for the SADC Petroleum Sector	**1 55**	1 55	0 00	**0 00**			1 55	Funding sought
AAA.1 5	Joint Petroleum Exploration Programme								
	Phase I Task Force implementation support			-					Completed
	Phase II Project Steering Committee	-							Completed
	Phase III Basin Studies	**0 71**	0 70	0 01	**0 01**	(SADC)	0 00	0 70	Under Implementation
	Phase IV Joint Petroleum Exploration Programme	**61 75**	52 13	9 62	**0 00**		33 00	28 75	Funding sought.

ENERGY

ject Title	Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
$ Million								
..1 8 Investigation of the possible harmonization of petroleum Laws Rules Standards and Regulation	**1 37**	1 26	0 11	**0 11**		0 00	1 26	**Funding sought(New Project)**
1 1 Oil Supply from Lobito to the SADC Region								**Suspended**
1 3 Biostratigraphic Reference Collection	**0 10**	0 10	0 00	**0 10**	(NOR)			**Under implementation**
Sub total	**65 70**	**55 96**	**9 74**	**0 44**		**33 00**	**32 26**	
AL								
2 3 Manpower Development and Training for the Coal Utilization Sub sector	**0 11**	0 11	0 00	**0 00**		0 00	0 11	**Funding sought.**
Sub total	**0 11**	**0 11**	**0 00**	**0 00**		**0 00**	**0 11**	
ECTRICITY								
3 1 Regional Rural Electrification Programme								
Phase I National Surveys				-			-	**Completed**
Phase II Rural Electrification, Information Research and Pilot Programme	7 00	7 00	0 00	**0 00**		0 00	7 00	**Funding sought.**
3 2 Specialised Training in the Field of Electric Power								
Phase I Prefeasibility study								**Completed**
Phase II Power Sector Training Needs	-						-	**Completed**
Phase III Five Year Regional Power Sector Training Programme	**28 43**	23 03	5 39	**5 39**	(SADC)	0 00	23 03	**Funding sought.**
3 4 Regional Hydroelectric Hydrological Assistance Programme								
Phase I Zambezi Basin				-				**Completed**
Phase II Zambezi and Other Basins								
Part I Upper and Middle Zambezi and Kafue Sub-Basins	**4 50**	4 50	0 00	**4 50**	(CAN)			**Funding Secured Local contribution not yet budgeted for**

ENERGY

oject Title		Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
$ Million									
	- Part II Lower Zambezi and Malawi Sub-Basins Part III Outside Zambezi Basin	**4 00**	4 00	0 00	**4 00**	(CAN)	0 00		**Funding secured Under implementation**
A.3 5	Plan for Integrated Utilization of the Cunene River Basin	**0 62**	0 60	0 02	**0 02**	(ANG)	0 00		**Funding secured**
					0 60	(POR, BRA)			**Partially implemented**
A.3 7	Computer Model for Analysis and Planning of SADC Transmission Systems								
	Phase I Preliminary Study								**Completed**
	Phase II SADC Power Grid Model	**0 60**	0 60	0 00	**0 00**		0 60		**- Funds under negotiation**
A.3 8	Coordinated Utilisation of Regional Generation and Transmission Capacities - Prefeasibility Study								
	Phase I Inception				-				**Completed**
	Phase II Intermediate								**Completed**
	Phase III Institutional	**0 85**	0 85	0 00	**0 00**		0 00	0 85	**To be reviewed taking into account the SOPC and SAPP**
A.3 9	Maintainance Developing Programme Phases I and II		-	-					**- Suspended**
A.3 10	Kafue Gorge Regional Taining Centre	**10 08**	9 11	0 97	**0 58**	(SADC)	0 00	2 73	**Under implementation**
					6 77	(NOR/SWE)			
A.3 11	Lightning Research	**1 03**	1 03	0 00	**0 00**		0 00	1 03	**Funding sought**
G 3 2	Interconnection of the Northern and Southern Electricity Grids in Angola				-				**Suspended**
G 3 4	Provision of a communication and information system on the Angolan National Power Grid								
	Phase I Evaluation study			-					**Completed**
	Phase II Implementation								
	Part I Northern System		-	-					**Suspended**

ENERGY

Project Title		Estimated Cost			Funding Status		Funding Under negotiation	Financing Gap	COMMENTS/STATUS
		Total	Foreign	Local	Secured	Source			
US $ Million									
ANG 3 6	Repair of Gove Dam		-						Suspended
BOT 3 4	Second 220KV Line from Moropule to Gaborone	39 00	36 50	2 50	2 50	(BOT)	0 00	36 50	Funding sought.
LES 3 2	Power Network Expansing For The Southern And Central Region Of Lesotho								
	Phase III	10 60	10 60	0 00	0 00		0 00	10 60	Funding sought.
	Phase IV	7 70	7 70					7 70	Under implementation
	Phase V	9 80	9 80					9 80	
	Phase VI	4 50	4 50					4 50	
	Phase VII	10 90	10 90					10 90	
LES 3 6	Muela Hydropower Project	220 60	220 60	0 00	220 60				Under implementation
MAL 3 2	Small Hydropower Plants in Malawi								*Funding secured bilaterally*
MAL 3 5	Supply to Chitipa and Karonga in Malawi from Mbeya in Tanzania	3 98	3 05	0 93	0 93	(SADC)		3 05	Funding sought
MAL 3 6	Malawi/Zambia Power Cooperation in the Border Region	5 00	3 63	1 38	1 38	(SADC)	0 00	3 63	Funding sought.
MOZ.3 2	Master Plan for the Electricity Supply of Swaziland and Mozambique	0 62	0 62	0 00	0 00		0 00	0 62	Reativated in 1994 Funding sought
MOZ.3 5	Mozambique/Malawi Interconnection of Electricity Supplies (Phase II & III)								Phase II completed Phase III Funding sought
MOZ.3 7	Reconstruction of Mavuzi Hydropower Station, Mozambique								Completed
MOZ.3 12	Cahora Bassa Power for SADC Phases I and II Feasibility Study								Completed
	Phase III Engineering Services and Implementation	241 60	241 60	0 00	241 60				Under implementation

ENERGY

	Project Title	Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
US $ Million									
MOZ.3 13	Control Centre for the Supply of the Beira Corridor and Mozambique-Zimbabwe Tie-Line Phase I Feasibility Study	**0 12**	0 12	0 00	**0 12**				**Funding secured**
NAM.3 1	Power Supply Cooperation in Border Regions Between Angola and Namibia	**9 40**	9 40	0 00	**6 40**	(NOR)		3 00	**Funding partially secured Namibia side is funded by Norway Angola side suspended**
SWA.3 1	Dredging of Mkinkomo Reservoir	**5 00**	0 00	5 00	**5 00**	(SWAZ)			**Under implementation**
TAN 3 4	Songwe River Hydropower Development	**0 30**	0 30	0 00	**0 00**			0 30	**Reformulated 1993 Funding sought**
TAN 3 6	Supply of Sumbawanga in Tanzania Load flow and Cost Estimated Study Phase I		-	-					**Completed**
	Phase II (Extension)	**8 00**	8 00	0 00	**0 00**			8 00	**Funding sought.**
ZAM.3 2	Upgrading of Kafue Gorge Power Plant Phase II Extension (Training Centre)		-						**Phase I & II completed**
	Phase III Provision of spare parts							-	**Funding secured**
	Phase IV Restoration after Fire Accident	54 70	50 22	4 48	**50 22**	(NOR)		--	**Under implementation**
					4 48	(SADC)			
ZAM.3 3	Refurbishment of the National Control Centre Zambia Phase I		-		-			-	**Completed**
	Phase II	**8 50**	8 50	0 00	**8 50**	(SWE)			**Under implementation**
ZAM.3 5	Power Line Carrier Communications on the Northern Transmission System				-			-	**Reformulated 1993 Funding sought**
ZAM.3 6	Refurbishment of Victoria Falls Power Station Phase I Feasibility Study	**0 26**	0 25	0 01	**0 01**	(ZAM)			**Funding secured**
					0 25	(EIB)			
	Phase II Implementation	**10 00**	10 00		**10 00**				**Under implementation**
ZAM.3 7	132 KV Tieline Zambia - Malawi Feasibility Study				-				**Completed Feasibility study The next stage awaiting tari negotiations**

ENERGY

ect	Title	Estimated Cost Total	Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
Million									
3 8	330/220 KV Tieline Zambia - Tanzania Pre feasibility Study		-					-	Completed Pre feasibility study Funding sought.
3 9	Power Cooperation Between Zambia and Namibia	15 94	14 55	1 39	1 39	(SADC)	0 00	14 55	Awaiting road study before seeking funding
3 3	Upgrading of ZESA National Control Centre			-					Completed
	Sub total	**723 63**	**701 56**	**22 07**	**575 24**		**0 60**	**147 79**	
N AND RENEWABLE SOURCE OF ENERGY									
4 9	Assessment of Applications and Markets for Industrial Process Solar Heat in the SADC Region	**0 22**	0 22	0 00	**0 00**		0 00	0 22	Funding sought.
4 10	Assessment of Applications and Markets for Solar Water Heating in SADC	**0 24**	0 24	0 00	**0 00**		0 00	0 24	Funding sought.
4 11	SADC Programme for Financing Energy Services for small-Scale Energy Users (FINESSE)	**1 58**	1 58	0 00	**1 40** **0 19**	(HOL) (OPEC)	0 00		Funding secured
2	Solar Photovoltaic Power Generation in Rural Areas Lesotho Pilot Project Phase I - Feasibility study	**0 08**	0 08	0 00	**0 00**		0 00	0 08	Funding sought
4 2	Accelerated Biogas Diffusion Project	**1 11**	1 11	0 00	**0 00**		0 00	1 11	Funding sought.
1	Feasibility Study on the Utilization of Solar Water Heating for Reducing Power Utility Demand Costs	**0 25**	0 25	0 00	**0 00**		0 00	0 25	Funding sought.
	Sub total	**3 48**	**3 48**	**0**	**1 58**		**0 00**	**1 90**	

ENERGY

oject Title		Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
$ Million									
OODFUEL AND OTHER TRADITIONAL FUELS									
.A.5 7	Support to TAU Woodfuel Section								
	Phase I		-	-	-				**Completed**
	Phase II (Extension)	**0 78**	0 68	0 11	**0 11**	(SADC)	0 00	0 68	**Funding sought.**
.A.5 8	Development of National Woodfuel Strategies and Plans								
	Phase I Development TOR for LES/TAN	-			-				**Completed**
	Phase II Pilot Study LES/TAN	**0 55**	0 55	0 00	-		0 55		**Negotiations with Norad**
	Phase III Implementation	**0 57**	0 47	0 10	**0 10**	(SADC)	0 00	0 47	**Funding sought.**
.A.5 9	Identification & Support of NGO and Women s Groups Dealing with Woodfuel & Environmental Protection	**0 46**	0 40	0 06	**0 06**	(SADC)	0 00	0 40	**Funding sought.**
.A.5 11	Assessment of Environmental & Socio-Economic Impacts of Woodfuel Scarcity	**2 53**	2 30	0 23	**0 23**	(SADC)	0 00	2 30	**Funding sought.**
.A.5 14	Intensification of People s Partitipation in tr in tree Growing and Environmental Protection in the SADC region	**5 35**	5 05	0 30	**0 30**	(SADC)	0 00	5 05	**Funding sought.**
.A.5 15	Improvement of Woodfuel End use Efficiency in Rural Industries of the SADC Region		-		-			-	**Completed**
.A.5 17	Rural Energy Planning and Environmental Management Training Programme	**3 35**	3 09	0 26	**0 26**	(SADC)	0 00		**Under implementation**
					3 09	(HOL)			
.A.5 18	Strengthening the coverage of Woodfuel and Environmental Protection in Relevant SADC Training Institutions	**7 40**	6 73	0 67	**0 00**		0 00	7 40	**Funding sought**
	Sub total	**20 99**	**19 26**	**1 73**	**4 14**		**0 55**	**16 30**	

ENERGY

roject Title		Total	Estimated Cost Foreign	Local	Funding Status Secured	Source	Funding Under negotiation	Financing Gap	COMMENTS/STATUS
'S $ Million									
NERGY CONSERVATION									
AA 6 3	Continuing Development of Energy Conservation Activities at TAU								
	Phase I	-			-				- Completed
	Phase II	**0 60**	0 58	0 03	**0 03**	(SADC)		0 58	**Funding sought.**
AA 6 5	Industrial Energy Management	**10 00**	10 00	0 00	**10 00**	(CIDA)			**Funding secured**
AA.6 9	Demand Side Management Opportunities For SADC Utilities	**0 99**	0 99	0 00	**0 99**	(CIDA)			**Funding secured**
AA 6 11	Energy Efficiency Improvements in the SADC Heavy Industry								
	Phase I - Feasibility Study	**0 40**	0 40	0 00	**0 00**		0 00	0 40	**Funding sought.**
	Phase II & III Implementation	**1 58**	1 58	0 00	**0 00**			1 58	**Funding sought.**
	Sub total	**13 57**	**13 54**	**0 03**	**11 01**		0 00	**2 55**	
	GRAND TOTAL	**861 91**	**820 99**	**40 92**	**624 86**		34 15	**202 91**	

tober, 1995