



THE AFRICAN RIFT GEOTHERMAL FACILITY (ARGeo) – STATUS

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ABSTRACT

The African Rift, system is predicted to have high potential for geothermal energy. However, only Kenya and Ethiopia have installed several big and small power generating units with a total capacity of 210MW. Although geothermal energy is an economically viable energy option in the Eastern Africa region, the need for detailed exploration and the high cost and risk of exploratory drilling, compounded by institutional and regulatory barriers, have prevented the exploitation of this indigenous and environmentally friendly energy source in the region. In order to overcome these barriers, and to replicate the success of geothermal development in Kenya and Ethiopia, throughout the region, an African Rift Geothermal Facility (ARGeo) was established. ARGeo project is funded by the Global Environment Facility (GEF) and was initiated by six countries - Ethiopia, Eritrea, Djibouti, Kenya, Uganda, and Tanzania - and implemented by the United Nations Environment Programme (UNEP) and the World Bank. The project will be executed in partnership with other donor institutions for example UNU-GTP, ICEIDA, the German Geological Agency (BGR) and others. KfW of Germany was initially very keen in funding the project but pulled out due to some misunderstanding and has recently established its own fund similar to ARGeo but somehow enhanced. Currently about US\$ 17.75 million is available from GEF to fund the various components of this project. UNU-GTP, ICEIDA and BGR have provided some extra funds to be used in training, exploration activities and conferences. USDAID is also considering contributing some funds as well. The project has a comprehensive program of financial, policy and technical instruments for the promotion of geothermal energy that will directly support the development of viable geothermal energy resources in the African Rift. The project is also designed to actively reduce barriers and to stimulate and facilitate investment through public and private sector partnership through a drilling risk mitigation fund, a technical assistance and institutional strengthening program. A pipeline of eligible projects was developed, and Assal project selected for immediate support. The project approved by GEF CEO and World Bank Board in late 2009 and became effective in June 2010 and will run for five years.

1. INTRODUCTION

The African Rift Valley system extends from the Red Sea to Mozambique through Yemen, Eritrea, Djibouti, Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi, the Democratic republic of Congo,

Zambia, Malawi, Mozambique, and Madagascar. Geothermal power potential in Africa's Rift Valley is estimated to exceed 15,000MW.

Despite the high geothermal potential of the African Rift, only Kenya and Ethiopia have installed some capacity of some 210 MW. However, compelled by rising cost of fossil fuels (reaching 147\$ per barrel in 2008), drought and siltation affecting hydro dams in Eastern Africa, and current and projected electricity needs far exceeding installed generation capacity, countries in Eastern Africa have been very keen to develop alternative indigenous energy resources. Geothermal energy is suitable indigenous renewable energy resource that provides base-load, reliable, affordable and environmentally friendly power.

The reasons for the largely unexploited geothermal resources in the African Rift countries compared to some other developed countries are due to lack of supporting policies, regulatory frameworks, technical capacity, and resource information on one hand, and the low level of funding of exploration activities and the high cost and high-risk exploration and appraisal drilling on the other hand. Except perhaps in Kenya, awareness of high-level policy-makers that geothermal energy is a least-cost option in Eastern Africa has been low, and generally there has been poor promotion of the enormous geothermal potential in the region.

Although some exploration activities and drilling started way back in the seventies, only a few geothermal prospects have been developed. The type of barriers encountered are: (i) financial due to the high up-front investment cost, (ii) legal and regulatory barriers as a result of inadequate legal and regulatory frameworks to support geothermal energy development and stimulate private-sector investment, (iii) institutional barriers in the form of institutional weaknesses to promote geothermal development, and to identify, prepare, and implement feasible geothermal projects and (iv) technical barriers, both at the level of human resources, equipment and technological know-how, and (v) market barriers rooted in insufficient information on competitiveness of proposed geothermal development compared with traditional energy sources and in the lack of geothermal development targets in national or regional energy planning. Moreover, the difficult access to foreign financial sources, the scarcity of funds in the countries, and in some cases the lack of creditworthiness, collateral, and equity among interested project promoters have further hampered or slowed development of geothermal prospects in the Rift Valley.

Encouraged by Kenya's plans to further develop its geothermal resources, and by the growing interest to do so in other countries in the Rift Valley, the United Nations Environment Programme (UNEP), the Business Council for Sustainable Energy (BCSE), the US Trade and Development Agency and a number of other US agencies and international organizations, organized an Eastern Africa Market Acceleration Conference in April 2003, in Nairobi, Kenya. The conference brought together high-level representatives from Energy Ministries, utilities and geothermal agencies from Kenya, Tanzania, Zambia, Djibouti, Uganda, Ethiopia, Eritrea, Rwanda and Malawi as well as leading representatives from the industry, bilateral and multilateral organizations and private financing agencies, to explore commercial opportunities for geothermal development in the region and options for overcoming financial, regulatory and institutional barriers.

It was agreed, among other things, that the Eastern African Geothermal Development Initiative undertake to develop a modest 1000 MW of geothermal power by the year 2025 and a call was made for technical assistance and financial instruments to achieve this target. It was also agreed that the initiative, which was to be promoted through NEPAD, should include risk mitigation fund against drilling risk, technical assistance, transaction advice services, policy support, and linkage to preferable finance.

The resolution formed the basis for the establishment by six countries in Eastern Africa of the African Rift Geothermal Facility (ARGeo) in May 2003 by GEF. ARGeo project received Global Environment Facility development funds to be implemented by the United Nations Environment

Programme (UNEP) and initially by the German Development Bank (KfW) but later the World Bank. Other world donor organisations were requested to support.

According to the original plan, the project was to start in 2005 and take a period of 10 years. However the project suffered serious delays and was not approved until late 2009. The project proposes to establish a comprehensive program of financial, policy and technical instruments for the promotion of geothermal energy that will directly support the development of viable geothermal energy resources in the African Rift. The project is designed to actively reduce barriers and to stimulate and facilitate investment through public and private sector partnership through a drilling risk guarantee fund and a technical assistance program and institutional strengthening. A pipeline of eligible projects was then developed for each country and the Assal was selected for approval. Due to long delays in the approval of the project as a whole, new developments have taken place and the original proposed projects needs to be revised and new ones submitted for consideration. For example, the Assal project which was to be developed by Reykjavik Energy Invest (REI) of Iceland did not proceed as planned and an alternative project may be selected to be covered by the risk mitigation fund. On the other hand Kenya had submitted Longonot prospect as its pipeline project. This may now change as other prospects are now considered of higher priority.

2. THE ESTABLISHMENT OF ARGEO

Whereas the overall goal of the African Rift Geothermal Development Facility is to reduce greenhouse gas emissions by promoting the adoption of geothermal energy as a clean, renewable and economically viable energy source for the African Rift region, the immediate objective is to facilitate broadened scale geothermal energy installation along the African Rift by removing exploratory and financial investment risks. To achieve the objective, the ARGeo project was then established by UNEP in consultation with the six recipient African countries, multilateral donor organizations and technical cooperation and financial agencies.

ARGeo is founded on the thinking that: only an integrated and systematic approach to overcome regulatory, technical and institutional barriers and to assist countries to access finance and attract private sector or and public-private partnerships will lead to the development and acceleration of the geothermal resources for electricity generation; countries have to take on the bulk of the risk of surface exploration and drilling and will need technical and financial assistance to do so; without private sector investment, geothermal development will not take off, the systematic assessment of geothermal prospects in order to prioritize ARGeo funding; the demonstrated commitment by the countries to develop geothermal resources for power generation.

To achieve the objectives outlined above, there are two main instruments required, namely the risk mitigation fund and the regional geothermal network and by considering mechanisms for a sustained impact through the facility over possibly 25 years for the more significant geothermal resources of the region to be tapped. In addition to the first round of several priority projects (hopefully one for each recipient ARGeo country), it is expected that replication efforts will engage countries in the region in a sustained and systematic effort to develop geothermal energy. This will be fostered and through capacity building activities, support for surface studies, socio-economic analysis, and policy support, including in countries that are at a very early stage of geothermal exploration. While the facility is geared towards overcoming barriers in the whole region, accelerated geothermal development in pioneer countries is considered important by the project proponents for replication and wide acceptance in the rest of the region. The technical capacity and experience of pioneer countries will serve as an example upon which to improve and replicate the process of geothermal energy development in the region. Taking advantage of the experiences from Olkaria (Kenya) and Aluto Langano (Ethiopia), lessons learned were incorporated in the project design, whereas a regional approach will ensure cooperation and a more effective use of available resources in the region. Participation in ARGeo by bilateral and multilateral agencies was encouraged and facilitated at the

design and implementation stages, with the view to create a broad international partnership for the facility. The partnership will make it possible to build on current and planned activities, to bring to bear the expertise and experience of these agencies, and to complement the funding from GEF to achieve the project's objectives.

Acting as implementing and executing agencies of the project, UNEP and World Bank bring important experience and have developed appropriate technical and financial tools for an adaptable and sustainable geothermal development facility. World Bank has experience in cofinancing individual geothermal plants with the KfW, KenGen, and the European Investment Bank (for Olkaria II in Kenya). UNEP on the other hand has extensive experience with regional networking and technical assistance, and its headquarters is strategically located in Nairobi. The Global Environment Facility (GEF) is a joint partnership between UNEP, UNDP and the World Bank charged with the responsibility of forging international cooperation and to finance activities addressing climate change among other global problems.

2.1 ARGeo Components

ARGeo is based on three pillars (see Figure 1): technical assistance (TA) for exploration and regional network, a financial risk mitigation instrument (RMF), and a technical assistance facility (TAF) for post-drilling activities which include, but not limited to, feasibility studies, policy, regulation and transaction advice support. It was envisaged that once steam was discovered in a particular field and a bankable feasibility study justified further development, the activities for steam production, steam gathering and power station construction and subsequent power station development could easily be undertaken by either public or private sectors.

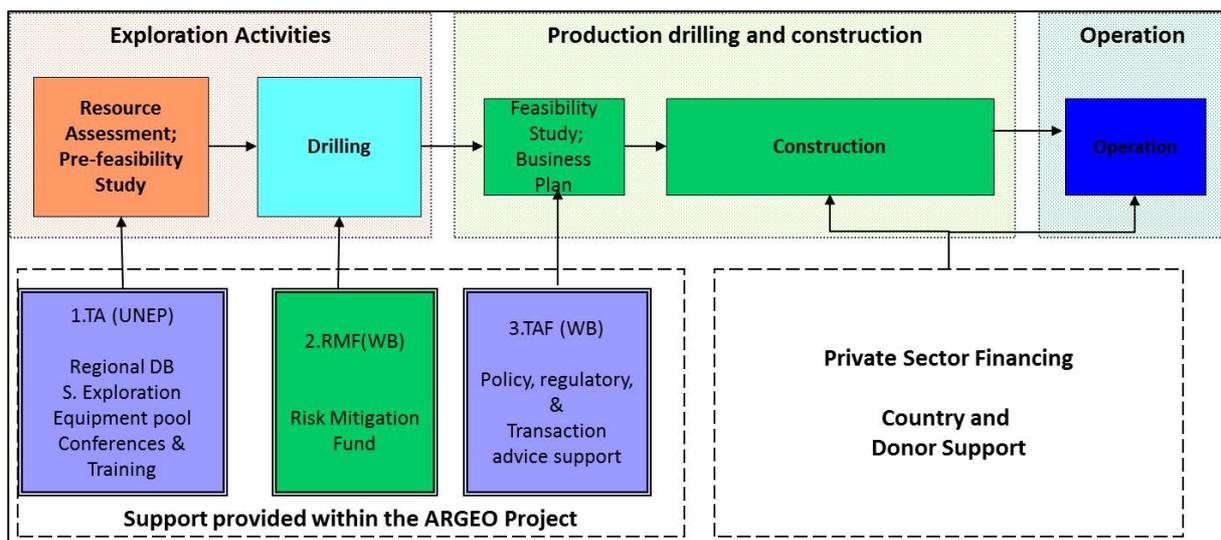


FIGURE 1: ARGeo project components

The regional network of geothermal agencies will not only deliver capacity building activities, build the information base in the region and promote clear policies and regulatory frameworks but will also promote a more effective use of resources and available expertise in the region and facilitate learning across countries. This will form the basis on which the other components will be built. Kenya will be an important source of expertise and equipment for the rest of the region. A strong argument for ARGeo's regional approach, aside from maximizing the use of regional expertise and the more effective use of resources, is the unified geological setting of the rift and the similar challenges in geophysical data collection and interpretation that countries are facing. Regional fora for exchanging information and experience, and for establishing contacts are therefore included as key project activities.

An important and unique aspect of ARGeo is its systematic and comprehensive approach that will address all the barriers, starting from the early stages of resource confirmation up to the preparation of bankable projects for priority prospects, and the transaction advice in the case of private sector investment.

2.2 Technical Assistance (TA) for Regional Network, Surface Exploration and Training Support (UNEP)

The activities under TA components will be managed by UNEP in the Division for Technology and Economics (DTIE). The regional network will deliver three main programmes as follows: a regional geothermal information exchange programme, a capacity building programme and a programme for the promotion of policies and legal and regulatory frameworks supportive of geothermal development. The network itself will consist of geothermal agencies in the region designated as focal agencies for ARGeo, and will rely on network hubs in the focal agencies supported by the facility, and on the Project Management Unit (PMU) located in UNEP/DTIE, Nairobi for coordination and outreach. In addition, a regional technical coordination group will provide an essential coordination mechanism at the regional level. The network hubs will be connected through a website already developed that will host a geothermal information metadatabase, directories and technical reports, a newsletter and project related information. Dedicated staff in each of the focal agencies supported by the GEF project funds will be responsible for maintaining the network and for the network coordination at the national level. The network will be designed as an instrument of cooperation and collaboration between institutions in each country engaged in geothermal resources related research, exploration and development.

The rationale for building a geothermal information base in the region is that the geothermal resource information in the region is generally scattered, unorganized and difficult to access, and thus forms an additional barrier to geothermal development. Many valuable reports and data collected during the 1980's exist only in hard copy and risk to be lost. The experience with geothermal exploration in East and South East Asia for example has shown that a critical part of geothermal development is the adoption of a long term resource data collection plan and a systematic methodology of exploration and prioritization. It is believed that the ready availability of the information among a wide range of users in the region will be useful in progressing geothermal resource exploration in several areas starting from higher levels of knowledge. A website is already designed and using WordPress which can easily be expanded and maintained.

The second element of strengthening the regional information base and promote learning is the organization of regional technical workshops and biannual East African Geothermal Conferences, as well as participation by experts from the region in international geothermal events. The rationale for this element is that working in the same geological environment, the professionals and technicians of the region have knowledge and experiences which are largely transferable and widely applicable within the region. Forums for the exchange of knowledge and experience will provide a platform for experience and information sharing as well as for regional cooperation, and will contribute towards the overall improvement of performance, whilst new knowledge and skills created or brought into the region can easily be propagated in this manner. The first ARGeo conference (ARGeo C1) was held in Ethiopia in 2006 and the second in Uganda in November 2008 and the third in Djibouti in 2010. ARGeo C4 will be held in Kenya in 2012. The initial assessment of the conferences is that participation is increasing all the time with many more young participants and attracting many more countries than the Six ARGeo countries.

Sustainable geothermal resource development is dependent on the existence of national technical capacities. This is well demonstrated by Kenya and countries like Philippines and Indonesia. Kenya has made considerable investments in its human resources over the years. Although existing technical capacity varies among the countries, with Kenya strong in geophysics and environmental issues, and Ethiopia in geochemistry, many gaps exist that will need to be filled over the coming decade. The need to strengthen the human resource base in the region will be addressed through the provision of

technical training by UNU-GTP and other sources of training, the participation of geothermal professionals in field operations to obtain practical experience, and the organization of short training courses in the region in collaboration with UNU-GTP that respond to the specific needs of the countries. The first short course was held in collaboration with UNU-GTP and KenGen in 2005 and has been held every year thereafter. UNU-GTP, KenGen and now Geothermal Development Company (GDC) are discussing modalities of making the short course a permanent school for the region.

The third element of the regional component involves the mainstreaming of geothermal energy into the national and regional planning process and power development plans and the promotion of clear regulatory and legal frameworks supportive of geothermal development. The project will promote policy and legislative regimes that allow the integration of geothermal energy resources into overall plans of socio-economic development and specific energy development plans. The aim is to reduce the institutional and regulatory barriers to geothermal investments.

Collaboration with geological surveys and international, regional and national geothermal centres outside the region will be actively sought through the network to ensure that the best available expertise will be brought to bear on the regional network. The regional network activities will be fully integrated with and support the technical assistance and finance components of the project. The combined activities under this programme will directly support a number of geothermal investments in the region.

Supported by the regional network, a package of technical assistance and finance will be provided to bring the proposals to the pre-feasibility stage and before exploration drilling. This will include surface exploration to confirm the potential of priority prospects in each country. The latter will directly address the barriers related to resource confirmation. GEF grants will be available for a limited number of surface exploration campaigns and agencies like BGR will offer technical assistance in undertaking surface assessments. An assessment and expert review of the exploration results at each stage will be carried out in order to achieve high quality conclusions and to make the most efficient use of resources including equipment facilitated through the regional network. The sharing of equipment will be modelled on the IRIS-Passcal centre in the US, with which the project will seek affiliation to increase the size of the equipment pool. The geophysical equipment purchased under the JGI project in Kenya for example, will be deployed in the other countries under the ARGeo umbrella. Use of the JGI methodology will effectively map high permeability zones and lead to the location of high production wells that will increase the average well production in Kenya from 2.5 MWe to over 5 MWe. It is expected that the JGI methodology will directly contribute to the removal of resource exploration and assessment barriers and will therefore reduce implementation costs related to geothermal energy development.

Where possible, the activities under this component will build on and link up with existing programmes and ongoing and planned initiatives with similar objectives at the national, regional and international level.

2.3 The Risk Mitigation Fund (RMF) Component (WB)

The activities under this component will be handled by the World Bank. The financial investment risk barrier associated with the exploration and appraisal drilling phases will be reduced by the risk mitigation fund that will be established by the project with GEF funds. It will provide guarantees that will allow public entities as well as private developers to undertake the most expensive and risky stages of geothermal exploration and appraisal drilling. The mitigation will provide partial compensation of the costs incurred in case of failure of wells drilled. Therefore, the rate of success of drilling will determine the rate of depletion of the risk mitigation fund. The structure of the drilling risk mitigation fund was originally designed by KfW and modified by the World Bank. The World Bank has already prepared guidelines and selection criteria of the pipeline projects to receive the risk

mitigation fund. These were the guidelines used to select Assal project as the first ARGeo project to be covered by RMF.

Applicable terms and conditions of the RMF for each project will be determined based on the technical due diligence and risk assessment of each project proposal by the Bank-appointed experts.

- *Size of individual commitment:* Normally up to US\$ 5 million per well.
- *Tenor of commitment:* Normally for 6- 9 months for a single well. If a set of multiple wells is covered, a tenor could be longer to allow for the completion of all wells.
- *Type of risk coverage:* Geological risk. Any failures and losses caused by other risks (e.g. technical, managerial, commercial, etc.) will be excluded.
- *Coverage ratio:* Up to 85 % of the eligible drilling expenses. Actual payout ratio will be determined based on the achieved result of the defined geological parameters as payment trigger. No payment will be made in a success case. Maximum payment will be made in a total failure case. Partial payment may be made in a partial success/ failure case as defined for each specific project. Applying declining ratios for "rolling" coverage for a series of multiple wells can also be considered.
- *Triggering parameter(s):* Geological parameters including temperature, flow rate, fluid chemistry, pressure, permeability, etc. or combination of these as well as the project's expected energy production (in electricity or heat) or internal rate of return or other technical, financial and economic indicators which are transparently measurable and can be linked to the feasibility of the proposed power station operation.
- *Fees:* Fixed fee or certain percentage of premium on the eligible well drilling expenses will be charged to the applicant. Fees will be received by IGA at an escrow account and utilized to pay for the processing and preparation cost of the ARGeo project proposals.
- The RMF can make a single commitment for a series of well drilling activities on a rolling basis if the proposed multiple wells are in the same geothermal reservoir and packaged as a single project proposal with all the project feasibility analyses are presented on the basis of multiple well drillings. Such rolling RMF will cover a series of well drillings one after another without submitting new applications for the subsequent well drilling proposals in the same project package. However, the RMF cover will roll over to the subsequent well drilling only if each well is fully successful and the RMF is not called for any compensation payment. The RMF coverage ratio or maximum compensation amount could be reduced for each well drilling as the RMF cover rolls. For this type of RMF cover, a fee will be charged to each well drilling as the RMF cover rolls.

2.4 Technical Assistance Facility (TAF) for post-drilling activities (WB)

The TAF component will primarily offer support to address and mitigate the capacity constraints of participating ARGeo countries and local utility project sponsors to proceed to power station development and the post-drilling stage. The component will provide funding to seek equity participation and financing including plant feasibility studies, project implementation planning, financial analysis and transaction advisory services, bidding and contract preparation, negotiation advice for Power Purchase Agreements, etc. Project sponsors, who have benefited from the RMF support and achieved successful drilling results, will be the main target group for TAF support. TAF support might also be provided to local government ministries and agencies developing national or regional geothermal resources to strengthen the technical, financial, legal and institutional capacity while negotiating with project sponsors thus ensuring a fair and equitable deal to the end consumer. A small portion of the grant will be made available to countries in the pre-drilling phase, to complete specific information as requested by the group of experts to qualify for RMF coverage. These activities would primarily focus on non-scientific work such as improving preliminary business plans including least-cost generation sequencing and to help prepare up-stream agreements for future power production such as initial PPAs necessary to mobilize the financing for exploration drilling. The TAF will be executed by the International Geothermal Association (IGA) on contract with the World Bank.

The TAF will also, together with UNEP implemented TA, support the creation of African Regional Branch of IGA to coordinate activities on geothermal energy development in the African Rift countries and beyond. Apart from general exchange between practitioners, the new organization would facilitate the needed regional capacity building in geothermal energy generation technologies by managing an internship program, designed to provide on the job training for managerial, technical and operational personnel that will be involved in power plant construction, commissioning, management, operation and maintenance as well as well field management and operation.

The TAF post-drilling support will be complementary to the technical assistance program implemented by UNEP that offers support for preliminary geothermal resource assessments in the pre-drilling stage. These two technical assistance facilities will accompany the project development from initial identification to plant construction and will provide a wide range of support for pre-and post-drilling activities, and will effectively enhance the likelihood of successful exploration and implementation of geothermal development projects.

2.5 Project Funding

The current project fund is about US\$ 17.75million as shown in the Table 1 below. About US\$ 11million will be used for the risk mitigation while the rest will be used for the other components. In addition, Iceland will provide about US\$ 2.5million spread over five years for technical assistance and training while BGR had provided about US\$ 2.8million up to year 2008 for various exploration projects in Ethiopia, Kenya, Tanzania and Uganda and also sponsoring ARGeo conferences. BGR will also provide more funds for their Geotherm II project. ICEIDA financed exploration work in Katwe and Kibiro in Uganda and Alid in Eritrea and also carried out survey for human and equipment capacity in the region. UNUGTP has funded short courses in Naivasha Kenya in collaboration with KenGen and GDC since 2005. USAID has recently indicated that it is willing to participate in ARGeo by providing US\$ 750,000 per year which will total about US\$3.75 million in 5 years. IAEA will provide assistance in isotope data analysis and laboratory assistance. At the individual project level, the proponent governments and private sector sponsors will be expected to contribute most of the project financing.

TABLE 1: ARGeo funding

	ARGeo Financing	Managed By	GEF (US\$m)
1.	Regional network system to manage information, and awareness creation	UNEP	1.00
2.	Risk Mitigation Fund (RMF)	WB	11.00
3.	Technical Assistance		
	a) Institutional and Technical capacity building, resource assessment	UNEP	3.75
	b) Post drilling related activities	WB	2.0
	Total Project cost		17.75
	a) UNEP		4.75
	b) WB		13.0

At the investment stage, and in the case of private sector investment, the Transaction Advice will be provided by experts selected under World Bank guidelines in order to give neutral advice to the transaction process for geothermal investments from resources owners' responsibility to investors' responsibility. Support for policy and regulatory frameworks will be provided where required.

2.6 Project Implementation Arrangements

The ARGeo project will be executed by the Governments of the six ARGeo countries. Overall responsibility will be vested with the following National Executing Agencies (NEAs): Ministry of Energy and CERD (Djibouti), Department of Mines Ministry of Energy (Eritrea), Geological Survey of Ethiopia and the Ministry of Energy (Ethiopia), the Ministry of Energy and KenGen/GDC (Kenya), the Ministry of Energy and the Department of Geological Survey and Mines (Uganda), Ministry of

Energy and Minerals (Tanzania). These agencies will implement the project in collaboration with other national government agencies, institutes and universities.

UNEP will be responsible for overseeing the successful achievement of the project objectives and will also be the international executing agency for the regional network and technical assistance components of the project. World Bank will be the executing agency for the risk mitigation fund and the transaction advice components. UNEP/DTIE will establish a Project Management Unit (PMU) in its headquarters in Nairobi, to handle the overall management, administration and financial management of the project.

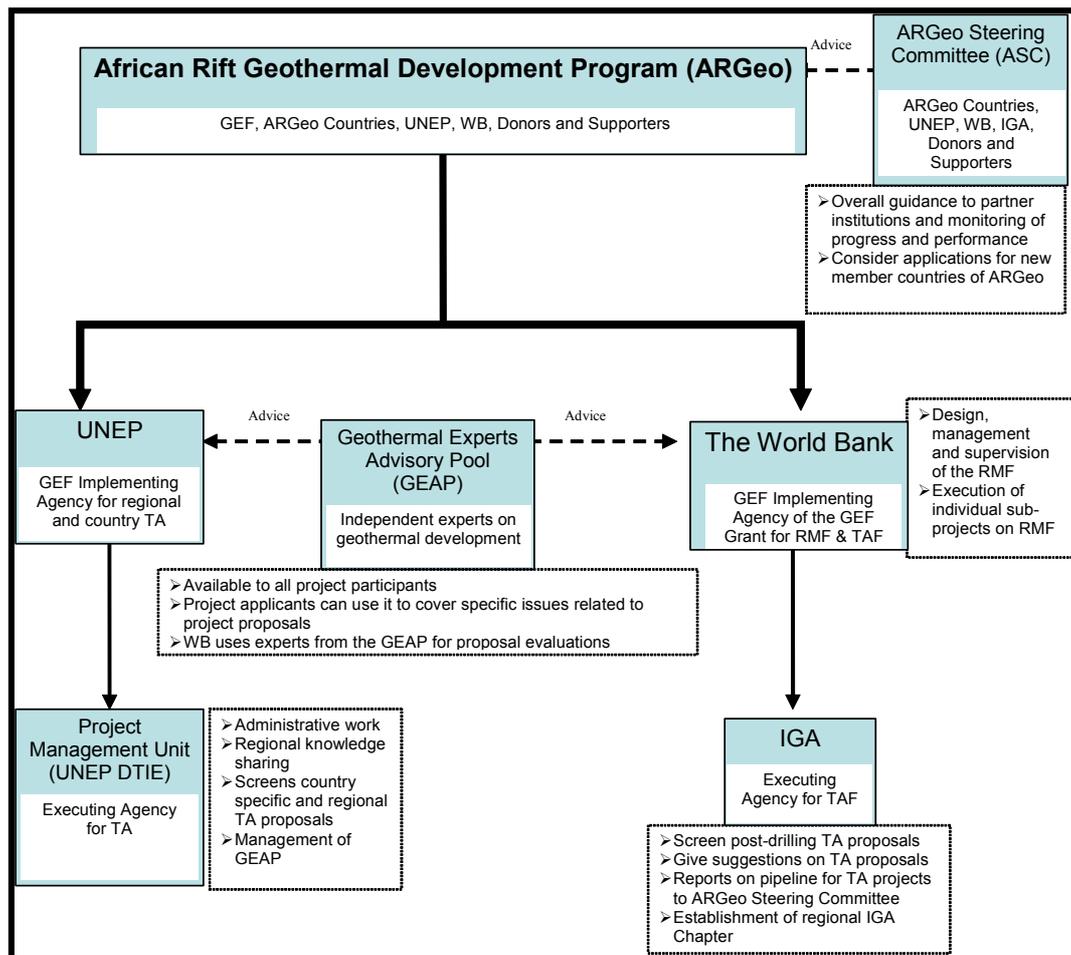


FIGURE 2: Project Organisation structure

A Project Steering Committee will be maintained at the international level to provide guidance to the project and monitor progress and performance. A Regional Network Coordination Group will be established comprising representatives from the National Executing Agencies, to ensure coordination at the regional level. The group will be supported by a network coordinator in the PMU.

A Geothermal Expert Advisory Pool (GEAP), will advise on eligibility of applications to the fund on the basis of surface exploration and previous drilling results. Applications from both private and public entities will be considered, under conditions which are transparent and the same for all applicants. A fixed premium kept at a relatively symbolic level will have to be paid by the applicant. The GEAP will be an advisory body of the ARGeo Steering Committee with a wide scope of work and will be composed of internationally recognized experts, selected on the basis of their experience and knowledge of the geology of and geothermal activities in East Africa.

3. PRIORITY PROSPECTS

A pipeline of priority geothermal prospects was prepared by each of the six countries for consideration by the project steering committee. The projects were as shown in

TABLE 2: Projects arranged in order of priority

Djibouti	Ethiopia	Uganda
Assal Obok Dikhil	Tendaho Corbetti Tulu-Moye	Katwe Buranga Kibiro
Eritrea	Kenya	Tanzania
Alid Nabro-Dubi	Longonot Menengai Suswa	Mbeya Rufiji L. Natron-Manyara

In 2007, the available information on the submitted pipeline proposals were evaluated by a panel of experts selected by the World Bank. Further information was requested from three projects from Djibouti, Ethiopia and Kenya. Based on developed scoring criteria, the three projects were found to be ready for implementation. However, additional information on the economic viability and modelling was still required for a full appraisal before the projects can be approved for risk mitigation funding. Assal was selected as the best project for consideration by GEF CEO and

the World Bank Board in 2009. Subsequently, Assal project was approved for RMF together with the rest of the ARGeo project. The projects from Eritrea, Tanzania and Uganda required additional exploration before they were considered in the next round of evaluation and selection.

Unfortunately, Assal project which was to be implemented by Reykjavik Energy Invest (REI) of Iceland could not proceed as originally envisaged due to economic crisis experienced in Iceland from 2008. Due to these difficulties, the Assal concession acquired by REI expired and the Djibouti government is currently looking for another developer.

4. UPDATE OF ARGeo PROJECT

As mentioned above, the ARGeo project was officially approved by GEF in May 2010 and will run for the next 5 years. The first Steering Committee was held in Djibouti on 21 November 2010. The process for recruiting a Project Manager to run the PMU office in Nairobi is in progress and is expected to be concluded early 2011. All the ARGeo countries have been requested to update and resubmit pipeline projects for selection for technical assistance under UNEP and Risk Mitigation Fund under the World Bank. Only Ethiopia and Uganda have to date resubmitted projects. A consultant was hired by UNEP to start evaluating the pipeline projects before the Project Manager start working. The contract between World Bank and IGA for the Technical Assistant Facility (TAF) is currently on hold until a new RMF project is identified and approved. However, the component for the establishment of the IGA African Branch might be pulled from the original component and approved separately.

5. A NEW KfW MITIGATION FUND

Although KfW withdrew its financial support to ARGeo due to some misunderstanding, its interest in supporting geothermal development in the Eastern Africa region did not diminish. In this regard, in 2010, KfW with the support of BGR, contracted SKM of New Zealand and GeoT of Germany to design another risk mitigation facility (Kessel et al, 2010) to assist both public and private investors in the early stage of geothermal development. The facility will be available to Ethiopia, Kenya, Rwanda, Tanzania and Uganda. Note that in contrast with ARGeo, Rwanda has replaced Eritria. The facility will support surface studies to locate the best sites for drilling and will also provide exploration drilling risk mitigation cover.

The KfW facility has been improved from that of ARGeo in the following respects:

- a) More funds will be available (€50m)
- b) No application fees to be charged
- c) Grants for surface exploration of 80% of the project cost
- d) Grants for drilling infrastructure (water, roads etc) of 20%
- e) Grants for drilling of 40% which will be increased to 70% for successful wells
- f) Drilling risk mitigation cover of 60%
- g) The funds will however **not** cover country wide reconnaissance surveys, institutional strengthening, university research, regulatory or political risks.

The facility will also run for 5 years and managed by the African Union Commission (AUC) in Addis Ababa under the agreements to be signed early 2011.

6. CONCLUSION

It is clear that the formation of ARGeo has potential of inspiring the geothermal activities in the East African Rift countries with far reaching benefits of installing over 1000MW of clean, indigenous renewable energy which can reduce pollution and promote poverty alleviation. Unfortunately, since its establishment in May 2003, no project has been funded although certain activities for example short course training by UNU-GTP, some surface exploration by BGR and ICEIDA, development of a website and ARGeo conferences have been undertaken. ARGeo has also enabled the participating countries and the project agencies to come to a common and better understanding of the different components of ARGeo and has produced a pipeline of projects in the target countries, and quite detailed proposals for the network, technical assistance, and risk mitigation fund components. Meetings and conferences have built partnerships that will lay the foundation for the implementation phase of ARGeo that commenced in May 2010.

The project agencies will endeavour to link up and build on existing initiatives internationally, in the region and in the host countries to ensure ARGeo's integration in on-going and planned programmes, and to build a true platform for geothermal development in Eastern Africa.

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