FINAL REPORT

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Regional Energy Cooperation in Africa and Possible Entry Points for the new Regional Results Strategy

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EXECUTIVE SUMMARY

INTRODUCTION

Sida is considering modifying and/or expanding support to regional energy cooperation in Africa and has commissioned a review of the regional institutions, investments and actors, to identify possible entry points where Swedish public, private and civil society could provide a value added.

PROBLEM STATEMENT

Africa consists of many small countries (population), small national electrical systems and thus substantial diseconomies of scale. Most countries lack large domestic energy resources and are compelled to import petroleum for generation, with large logistics penalties. Yet there are huge unexploited resource endowments, shared across water basins or in individual countries and lying in close proximity to resource poor countries: only 1% of Africa's hydropower potential is developed and there is huge known but unexploited or unmarketed natural gas resources. Thus there are potentially enormous returns to linking energy systems and pooling investments and operations: economies of scale and scope, stochastic economies and diversification and reduction of resource risks especially hydrological ones.

REGIONAL STRUCTURES AND PROCESSES

Partly for historical reasons there is somewhat of a disjunction between the Regional Structures in Africa and the relative priority given to integration of the continent as a unit in itself and to integration of the sub-regions. The African Union (AU), with increasing support from the African Development Bank is concentrating on promoting continental energy policy frameworks and strategies, reflected in the old OAU initiated New Partnership for Africa's Development (NEPAD) and the recent AU initiated The Program Infrastructure Development for Africa (PIDA), a key coordinating initiative for African Infrastructure projects. The Regional Economic Communities are concentrating on integration of their sub-regions, e.g. SADC, ECOWAS, EAC and COMESA, with their respective power pools SAPP, EAPP and WAPP. Most of the International Financing Organisations and Institutions, *inter alia* the World Bank, EIB, EU, tend to concentrate their collaborations to various partners at the sub-region or lower levels. A plethora of regional investment initiatives in Africa have prioritised the various power pool efforts. The increasing global interest in renewable energy is reflected by the creation the International Renewable Energy Agency (IRENA) in January 2009 as an international agency dedicated towards renewable energy.

Most of the regional "cross-border projects" have promoted regional power trade, involving (i) development of regional generation, (ii) intra-regional infrastructure; (ii) strengthening of power pools and directorates in charge; (iii) harmonizing regulations and system operating agreements; and (iv) harmonizing environmental and social protection frameworks. They have also necessitated the creation of Regional Regulators and regional rules for planning and operation, e.g. "grid codes".

There are also Regional Projects with common themes across regions and benefitting from economies of scale. Programmes in renewable energy (e.g. feed-in-tariff regimes) and in energy efficiency improvements are example of programmes which benefit from being rolled out on a regional rather than country basis. A regional approach to sector financial performance, planning and reform provides for a forum of sharing of information and best practices, builds capacity and through group behaviour influences organisational behaviour towards developing sound policy, regulatory, and legal frameworks and ultimately more robust, safe, efficient, reliable and stable electrical systems.

Most SSA countries are in transition phases due to recent power sector reform processes aiming at opening up the sector to new operators. Electrification processes have been constrained by lack of country commitment, macroeconomic and political crises and lack of experience with political economy factors. Thus desired outcomes (affordable access for the poor, better service quality,

improved government fiscal position, etc.) have been only partly achieved. A regional approach has a tendency to generate peer pressure towards successful approaches.

SUPPORT TO PRIVATE SECTOR ENERGY INVESTMENTS

Private sector investments is being encouraged through a broad spectrum of initiatives ranging from catalysing efforts to increase private sector investment, e.g. the Public-Private Infrastructure Advisory Facility (PPIAF) and efforts under the Private Infrastructure Development Group (PIDG); support to small and medium clean energy and energy efficiency projects, e.g. sustainable Energy Fund for Africa (SEFA) & African Renewable Energy Fund (AREF) to pure Private equity funds, e.g. the African Infrastructure Fund (AIF). The challenge fund is a new financing mechanism to allocate (donor) funds for specific purposes using competition among organizations as the lead principle. E.g. *Africa Enterprise Challenge Fund (AECF).*

The sheer size of Africa's energy infrastructure needs is well beyond the various Development Banks, Development Agencies and Financial Institutions' financial resources, but it may not be beyond the private sector's - provided there are sufficient incentives to invest. Rather than identifying the huge gaps, it is considered more productive to identify initiatives that have successfully addressed gaps. But the information to hand does not indicate that any of the initiatives have obviously "failed" in meeting their objectives.

SYNERGY BETWEEN REGIONAL AND NATIONAL APPROACHES

Sweden has traditionally carried out both "regional energy projects" with the concept of energy projects covering more than one country, typically cross-border electricity trade projects and "national energy projects" which are within the borders of one country. Increasingly it is recognised that in addition to cross-border trade projects, common themes across the region favours implementation of appropriate programmes in the region as a whole, as opposed to focussing on individual countries. There is the benefit of economies of scale if the same programmes are rolled out on a regional rather than country basis. In addition, a regional approach provides for a forum of sharing of information and best practices, builds capacity and through group behaviour influences organisational behaviour towards developing sound policy, regulatory, and legal frameworks and ultimately more robust, safe, efficient, reliable and stable electrical systems. Several energy areas benefit from regional cooperation ranging from research, policies/legislation, capacity building/planning to development of regional networks.

The relatively small scale of most electricity operations in Africa means a huge challenge in mobilizing large amounts needed to cover gaps in electricity coverage and the low returns on capital as a consequence of low operating efficiencies, regulation and governance, crimp the ability to maintain capacity, finance growth from operations and attract external financing. Thus the private sector would benefit from the risk sharing possible with operations on a regional scale.

This study has taken this broader view of the term regional energy projects, which seems to mirror the areas of engagement referred to as "regional approaches" in the World Bank 2013 Energy Strategy. The Study found that Sweden has competence and experience in most of these engagement areas.

RECOMMENDATIONS ON REGIONAL ENERGY ENTRY POINTS

Regional Distribution, Access and Rural Electrification

Support to investments and technical assistance for distribution electrification along Regional Interconnectors/ Development Corridors, including separate cross-border distribution. Support to selected investments and key elements of a facilitative framework required to obviate barriers and gaps in the way of scaled up rural electrification. The Rural Electrification component of the new Iringa – Shinyanga Transmission Line Project in Tanzania could serve as an example of such projects.

Institutional capacity building linked to regional cooperation
Capacity building linked to regional cooperation is recommend both through fine tuning of the bilateral energy programmes and through multilateral engagements.

A regional approach to national sector financial performance, planning and reform provides for a forum of sharing of information and best practices, builds capacity and through group behaviour influences organisational behaviour towards developing sound policy, regulatory, and legal frameworks and ultimately more robust, safe, efficient, reliable and stable electrical systems. Support is required to improve the currently poor energy sector and utility performance which results in poor energy services at high energy prices, which in turn negatively affect country competitiveness, crimp economic growth and negatively affect the chances for regional interconnections.

As an example for such institutional capacity building, the Sida financed project "Phasing Out the Institutional Development Support to EDM, Energy Sector 1997-1999" would be illustrative. The project included support to EDM's Operation/Protection Department and included operation/protection matters, collection of data for transmission networks and technical support to negotiations during the establishment period of the South African Power Pool (SAPP). During the project, EDM's increased involvement in the SAPP cooperation highlighted weaknesses in EDM's institutional and personnel capacity to deal with the often very complex interligation issues. Sida agreed to use the project to assist in improving EDM's capacity in these areas as far as it was possible with funding from the Mozambique Country Frame.

As inadequate project preparation funding is a key constraint to mega/transformative projects in Africa's power sector, it is recommended that Sweden provides investment preparation support.

An example of such an involvement is the Malawi-Mozambique Interconnection. Sida initially financed a feasibility study by SwedPower in 1986, and following the results of a (part Sida-financed) large Southern Africa regional 1992 study *Development of Regional Generation and Transmission Capacities,* the study was subsequently updated in 1996 through Swedish financing.

Renewable energy and energy efficiency
Support to facilitate countries to improve energy security and transition to low carbon economies through cost effective investments in technologies and practices that result in greenhouse gas mitigation as well as support to policy, regulatory, and institutional reforms that encourage clean energy development. As examples, Sida could assist with capacity building of the new Regional Centres for Renewable Energy and Energy Efficiency and/or cooperate with the International Renewable Energy Agency (IRENA) in supporting countries in their transition to a sustainable energy future.

Regional power trade
Support to the development and implementation of regional competitive electricity markets, through SAPP and EAPP.

Proposed Regional Energy Cooperation Partners
The study has made an assessment of potential Swedish regional energy cooperation through regional actors, existing funds and other types of cooperation. Although there seems to be very few cases of clear non-complementarity with the Swedish cooperation profile, the following list has been shortened to include what seems like "best fits".

- Regional Actors: SADC, SAPP, EAC, EAPP and COMESA
- Regional Partnership/Investment Initiatives: PIDA
- International Financing Institutions: World Bank (TFs, AFREA, AEI, AGAT),
- European Investment Bank/European Union

- National Interventions in Mozambique, Tanzania and Zambia
- Regional Investment Initiatives, Energy-Water Nexus: Nile Basin Initiative (NELSAP)
- Support to the Private Sector
    - Challenge Funds (AECF, NCF)
    - Power Africa (especially off-grid and renewable business models)
    - Sustainable Energy Fund for Africa (SEFA)
    - African Renewable Energy Fund (AREF)
    - Public-Private Infrastructure Advisory Facility (PPIAF)
    - Green Africa Power (A PIDG Initiative)
    - Other Initiatives: Sustainable Energy for All (SE4ALL), Energy+

China

The study proposes to engage with China in a policy dialogue as well as on joint projects of common interest that would contribute to the development of Africa. Special emphasis would be put on subject areas that are Swedish political priorities and in which Sweden has comparative advantages in terms of capacity and experience.

Counterpart in East Africa and Equatorial Lakes Area

The Study has noted the many overlapping energy initiatives in Eastern Africa with different responsible organisations, but that the obvious candidate for the central coordinating role is the EAC Secretariat based on: (i) its mandate as an AU REC; (ii) its role of implementing a Regional Access Strategy in contrast to the Basin Initiatives' focus on water resource use and (iii) no risk for overlapping with regional power trading. The Study envisages that Sweden would increasingly use the EAC as the Implementing Agency for its regional energy activities in East Africa and the Equatorial Lakes Area, while applicable sub-regional bodies like the NBI (NELSAP) and EAPP would be Executing Agencies. The Study envisages that technical assistance is likely to be required to enable the Agencies to perform their assigned duties.

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ACRONYMS AND ABBREVIATIONS

ACP	African, Caribbean and Pacific [countries]
AECF	Africa Enterprise Challenge Fund
AEI	Africa Electrification Initiative
AICD	Africa Infrastructure Country Diagnostic Study
AIF	AIG African Infrastructure Fund
APL	Adaptable Program Lending
AU	African Union
AUC	African Union Commission
CAPP	Central African Power Pool
CDM	Clean Development Mechanism
CIWA	Cooperation in International Waters in Africa
COMELEC	Northern Africa Power Pool
COMESA	Common Market for Eastern and Southern Africa
OECD-DAC	OECD Development Assistance Committee
DAM	Day-Ahead Market
DBSA	Development Bank of Southern Africa
DFID	Department for International Development
DRC	Democratic Republic of the Congo
EAC	East African Community
EAPP	Eastern African Power Pool
ECOWAS	Economic Community of West African States
EDM	Electricidade de Mocambique
EIB	European Investment Bank
EUI PDF	EU Energy Initiative Partnership Dialogue Facility
FIT	Feed-in-Tariffs
GBP	Great Britain Pound
GEF	Global Environment Facility
GtZ	German Technical Cooperation
HV	High Voltage
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICA	Infrastructure Consortium for Africa
IDA	International Development Association
IMF	International Monetary Fund
IPP	Independent Power Producer
IRENA	The International Renewable Energy Agency
km	kilometre
kV	kilovolt
MDB	Multilateral Development Bank
MoU	Memorandum of Understanding
MW	Megawatt
NBI	Nile Basin Initiative
NCF	Nordic Climate Facility
NDF	Nordic Development Fund
NEFCO	Nordic Environment Finance Corporation
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEPAD	New Partnership for Africa's Development
NOK	Norwegian Krona
NORAD	Norwegian Agency for Development Cooperation
Nord Pool	Financial Energy Market For Norway, Denmark, Sweden And Finland
OAU	Organization of African Unity
OECD	Organisation for Economic Co-operation and Development
PIDA	Programme for Infrastructure Development in Africa

PIDG	Private Infrastructure Development Group
PPA	Power Purchase Agreement
PPF	Project Preparation Facility
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	Public–Private Partnerships
REA	Rural Energy/Electrification Agency
REC	Regional Economic Community
REF	Rural Energy/ Electrification Fund
RIDMP	Regional Infrastructure Development Master Plan
RISP	Regional Integration Strategy Paper
RPTP	Regional Power Trade Project
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SE4ALL	UN Initiatives on Sustainable Energy for All
SEFA	Sustainable Energy Fund for Africa
STEM	Short-Term Energy Market
TA	Technical Assistance
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
USADF	United States African Development Foundation
USAID	United States Agency for International Development
USD	United States Dollar
WAPP	West African Power Pool
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation Limited

1 INTRODUCTION

Sida is considering modifying and/or expanding support to regional energy cooperation in Africa and has commissioned a background paper for a new regional Africa energy results strategy.

2.1 Objectives

The objectives were to undertake a review of the regional institutions, regional investment programmes and the various actors involved, in order to identify possible entry points to areas where Swedish public, private and civil society actors could provide a value added. The analysis also takes into account synergies that could be achieved through a clearer link between Swedish bilateral and regional energy sector development cooperation.

2.2 Methodology

The review was undertaken as a desk study of documentation provided by Sida and by Kind fellow electrification practitioners, as well as documents found on the Internet or already with the Author.

2.3 Structure of the Report

Chapter 2 maps the formal regional structures. Overviews are provided in Chapter 3 of regional partnerships and investment initiatives and, in Chapter 4, of on-going regional processes and regional actors. Chapter 5 looks at support for private sector investments that address energy through major challenge funds and other kinds of support. Chapter 6 tries to distil Sweden's comparative advantages in the areas of sustainable energy development in Africa. Finally, Chapter 7 provides recommendations for possible Swedish involvement in energy cooperation development in Sub-Saharan Africa.

2.4 Acknowledgements and Disclaimer

The review was conducted by Mr. Ralph Karhammar, Senior Energy Specialist.

Patrik Stålgren, Ph.D. and Elisabeth Ilskog, Ph.D. of the Swedish International Development Cooperation Agency provided valuable guidance and comments on the paper.

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The views expressed are those of the Author and do not represent the official views of Sida or any other organisation.

2 REGIONAL ACTORS, ROLES AND STRUCTURES

2.1 African Union

The African Union (AU) was launched in 2002 and replaced the Organisation of African Unity (OAU). AU's supreme organ is the Assembly of the African Union and the secretariat is the African Union Commission (AUC) based in Ethiopia. There are currently eight[1] recognised Regional Economic Communities (RECs) within the AU. Although the structure of the RECs is far from ideal, e.g. with many overlaps in membership, the RECs are the key implementing arms of the AU and development agents in their respective regions.

2.1.2 African Union Commission (AUC)

The AUC is responsible for coordinating, harmonizing and providing leadership in the continent's economic and social development and physical and political integration. Several initiatives have been initiated, including (i) the Infrastructure Consortium for Africa (ICA) to catalyse donor and private sector financing of infrastructure projects, with an emphasis on overcoming regional constraints, information sharing, project development and good practice and (ii) the Africa Infrastructure Country Diagnostic study (AICD), which is a multi-year, multi-country project to assess the needs and costs of infrastructure in Africa.

In the Energy sector, the AU promotes (i) intra-African trade in energy, especially regional power pools; (ii) clean energy, (iii) regional cooperation to ensure security of energy through trade, regional integration, pooling of energy resources and joint development; (iv) global exports of energy, and (v) energy efficiency.

Investment Plans
The 2009 AU/NEPAD[2] Africa Action Plan (AAP) 2010 -2015 in Infrastructure listed the following priority projects in energy for development between 2010 and 2015: (i) Kariba-North and Itezhi-Tezhi Hydropower Expansion Projects; (ii) Kenya-Ethiopia Interconnection; (ii) Sambangalou and Kaleta Hydropower and OMVG Interconnection; (iii) Nigeria-Algeria Gas Network Connection; (iv) Kenya-Uganda Oil Pipeline Project; (v) Zambia-Tanzania-Kenya Interconnection Project; (vi) WESTCOR (Western Corridor) -Inga III Power Station and transmission Interconnections. The AAP also listed a number of "Emerging Priorities in Energy", which are listed in Annex 2-1.

In 2009 a study was launched by the AU, NEPAD and AfDB, to develop regional infrastructure policies, prioritized development programmes and implementation strategies. This study resulted in the Programme for Infrastructure Development in Africa (PIDA), which was endorsed in 2012 by the African Union Heads of State. PIDA is covered in more detail in 3.1.2.

2.2 Southern African Development Community (SADC)

The Southern African Development Community (SADC) has an abundance of renewable energy sources with overall hydropower potential estimated at about 1,080 TWh/year but capacity being utilised at present is just under 31 TWh/year. Presently, southern Africa generates about 74% of its

[1]The Arab Maghreb Union (UMA), the Common Market for Eastern and Southern Africa (COMESA), the Community of Sahel-Saharan States (CEN-SAD), the East African Community (EAC), the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS), the Intergovernmental Authority on Development (IGAD) and the Southern Africa Development Community (SADC)

[2] The New Partnership for Africa's Development (NEPAD) is an economic development program for accelerating economic co-operation and integration among African countries originally adopted in 2001 by the Organization of African Unity (OAU), but is now a program of the African Union (AU).

electricity from coal-powered stations. Save for hydropower that accounts for about 20% of SADC's total energy generation, other renewables such as wind and solar are not considered as major contributors to the region's electricity needs.

The Southern African Development Community (SADC) has made significant strides in the electricity sector; it has connected nine out of its 12 mainland states to the SAPP; it has the highest generation capacity of all regions; system losses and outages are relatively low; collection rates are relatively good and cost of power is low. SADC has also established the Regional Electricity Regulatory Association (RERA), which has helped in harmonising the region's regulatory policies on energy and its subsectors.

SADC passed a Protocol on Energy in 1996 and has enacted several strategic plans for energy development in the region: the SADC Energy Cooperation Policy and Strategy in 1996, the SADC Energy Action Plan in 1997, the SADC Energy Activity Plan in 2000, and most recently the 2012-2027 Regional Infrastructure Development Master Plan (RIDMP) and its Energy Sector Plan (ESP) in 2012.

Investment Plans
The RIDMP ESP has prioritised some generation and transmission projects using SAPP agreed criteria and the list of priority generation projects are presented in Annex 2-2 and the prioritised transmission projects are presented in Annex 2-3. Annex 2-4 shows a Map with the RIDMP Energy Sector Projects.

In 2010, SADC passed the Regional Energy Access Strategy and Action Plan, which aims to combine regional energy resources as a means of ensuring the entire SADC region has access to affordable, sustainable electricity. The plan's goal is to within ten years reduce by half the number of people in the region without access to energy, and then halving it again every five years until the region has universal access.

2.2.1 Southern African Power Pool (SAPP)

The SAPP was created in 1995 to coordinate the planning and operation of the electric power system among member utilities and provide a forum for regional solutions to electric energy problems. The SAPP has twelve member countries[3] represented by their respective electric power utilities organised through SADC, refer Annex 2-5. Angola, Malawi and Tanzania are non operating members, which are yet to construct transmission links to the regional grid. Annex 2-6 shows a map over the Southern African Power Market.

SAPP is governed by four agreements between Governments, between Utilities and between Operating members as well as Operating Guidelines. The SAPP governance structure includes an Executive Committee (SAPP Board), a Management Committee (administration), technical sub-committees and a Coordination Centre (Harare) to monitor operations and transactions, including controlling dispatching operations and serving as trading centre for electricity auctions. In 2001, the SAPP established a Short-Term Energy Market and since 2004, it has been developing a competitive electricity market, a day-ahead market (DAM). Although STEM and DAM constitute notable achievements, the SAPP market continues to be dominated by bilateral trade. STEM accounted for only 5-10 percent of the energy traded in the region, while DAM accounts for much less.

Priority regional energy projects have been selected by the SAPP and endorsed by member countries at the highest level. The SADC has attributed to the SAPP and its Coordination Centre a clear mandate for project preparation and defined governance arrangements on the individual

[3] Angola, Botswana, DRC, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

projects and requested that appropriate skills should be established within the Coordination Centre. A Projects Acceleration Team has recently been established under the SAPP Coordination Centre, with a mandate to carry out project preparation support at regional level.

Investment Plans
A Regional Generation and Transmission Expansion Plan (SAPP Pool Plan) originally commissioned in 2001 and revised in 2009 has identified a detailed list of priority generation and transmission projects from 2006 to 2025. The SAPP has further refined this list and selected the projects that should be given highest priority by member countries and promoted for investment. In May 2013, the SADC Energy Ministers formally approved the identified priority projects and committed to fast-track their implementation.

The Southern African Power Pool Annual Report 2013 stated that 17,000MW of new generation *and with secured funding* is expected to be commissioned by 2016 (3% renewable energy, wind and solar) and that the region will then have sufficient generation capacity reserves. This report listed the priority transmission projects as

1. Zambia-Tanzania-Kenya Interconnector
2. Mozambique-Malawi Interconnector
3. Namibia-Angola Interconnector
4. ZIZABONA line through Botswana, Namibia, Zambia and Zimbabwe
5. Central Transmission Corridor, to increase wheeling capacity through the ZESA network, including these components: (i) Marvel-Insukamini line, (ii) New SVC at Sherwood, (iii) Alaska-Sherwood line and (iv) Orange Grove-Triangle line.

2.3 East African Community (EAC)

The East African Community (EAC) is the regional intergovernmental organisation of Burundi, Kenya, Rwanda, Tanzania and Uganda. The executive organ is the EAC Secretariat, in Arusha, Tanzania. The EAC region is endowed with various energy resources spread evenly throughout the member states, but they remain underdeveloped, unexplored and untapped. Tanzania has natural gas; Uganda has oil, Kenya -geothermal, Rwanda-methane gas, there is coal in Kenya and Tanzania as well as peat in Burundi while together all member countries have hydro, wind and renewable energy resources. The EAC region's hydropower potential is estimated at 27,000MW against an electricity-installed capacity of only 1,950MW.

The EAC Treaty highlights the need for regional cooperation in infrastructure and encourages EAC members to prioritize coordinated energy investment, however, there are initiatives partly overlapping the EAC, the main ones being the Lake Victoria Basin and the Nile Basin Initiative (NBI). NBI and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) have undertaken studies, putting priorities and listing potential investments, in overlapping geographic areas and using the same generation resources. In addition, the Eastern Africa Power Pool (EAPP) is building up its secretariat capacity, supported by various development partners and developed the EAPP Power System Plan Study. All these initiatives were guided by similar targets on increased access, etc., but the implementation has not been sufficiently coordinated and created overlaps, e.g. the preparation of regional power trade by the NBI-PRTP (9 Countries) and the EAPP (7 of the same countries) and the EAC concept of establishing an Eastern Africa Community Power Pool (EACPP), including 5 of these countries.

However, the EAC Energy Secretariat is now trying to improve coordination and synchronization of the East Africa energy initiatives. Thus the EAC has joined with the EAPP in the continued development of the Regional Power Master Plan and Interconnection Code. In 2009 the EAC and the EAPP signed an MOU, whereby EAPP and EAC agreed to jointly implement the Power Master Plan and Grid Code Study, for which EAPP was designated as the Implementation Agency.

The Independent Regulatory Board (IRB) was created in 2012 from the Eastern Africa Forum for Energy Regulators (EAFER) and will develop in 2 phases from a small office with essential staff to a fully-fledged regional regulator when the power market reaches maturity. It will then impose regional market rules and grid code upon the EAPP participants. Its key responsibilities will include monitoring and enforcing adherence to the rules, arbitrating disputes related to power exchanges and transactions within EAPP, and setting regulated tariffs and wheeling charges for regional transmission interconnectors.

Investment Plans
Major initiatives in the EAC power sector include (i) Regional Power Master Plan, (ii) Regional Collaboration in Power Sector Projects and (iii) Cross-Border Electrification Programme.

The Regional Power Master Plan lists the on-going interconnections, refer Annex 2-7 as well as the recommended interconnections, with a breakdown of the costs for transmission lines, substations and convertors for the recommended projects, refer Annex 2-8. Annex 2-9 shows a map with existing and future transmission lines in the EAC. The study horizon is 2038, but the initial developments cover 2013-2017.

A Regional Strategy on Scaling-Up Access to Modern Energy Services was prepared in 2009 with very ambitious targets related to MDG in 2015

2.3.1 Eastern Africa Power Pool (EAPP)

EAPP was established in 2005 by nine utilities from seven countries, tobe a framework for pooling energy resources, promoting power exchanges between utilities to secure their respective power supply, provide mutual assistance in case of failure in their respective power systems and reduce power supply costs based on an integrated master plan and pre-established rules (Grid code).

Since 2005, another three countries and five utilities have joined the EAPP. Refer Annex 2-10 for the current EAPP members. EAPP is so far governed by agreements between Governments and between Utilities. In 2006, EAPP was adopted as the Common Market for Eastern and Southern Africa's (COMESA's) specialized Institution for Electric Power. An EAPP Operations Agreement is yet to be developed, and an EAPP Interconnection Code/Regional Grid Code only exists in draft form as a COMESA Harmonized Standard.

The basic structure of the EAPP is in place: the Conference of Ministers (EAPP's supreme governing body), the Steering Committee (executive arm), the Permanent Secretariat (day-to-day activities) and Technical Sub-Committees (TSC). A future Coordination Centre (CC) will be responsible for the collection of technical and commercial information necessary for the operation of the regional interconnected power system and exchanges of power between EAPP members. It has not yet been established as a distinct entity, but 3 EAPP staff has been assigned to the CC. There have been suggestions to create additional EAPP organs, e.g. a Regional Market Operation Centre and a Regional Dispatch Control Centre, but it has been decided to keep the existing EAPP organs for the time being until the power market matures.

Because of the complexities involved in developing regional platforms for energy trade, EAPP's Strategic Road Map has established three stages for the development of the Eastern Africa Power Pool. Initially, trade will take place based purely on bilateral arrangements between neighbouring countries. During a second stage, the proposed Regional Control and Dispatch Centre and the Regional Regulatory body would become operational. As interconnections continue to develop, bilateral trade between non neighbouring countries may emerge, at which stage there may be a need for a regionally coordinated balancing mechanism. A revised intergovernmental MoU and inter-utility MoU have been prepared embodying these proposals but the Conference of Ministers is yet to endorse their establishment. EAPP is expected to enter into this stage several years after

the Ethiopia- Kenya transmission line becomes operational. During a third stage, once the Dispatch Centre and Regional Regulatory Body have increased their capacity and trade has further developed in the region, a coordinated short-term spot market could develop to exploit short-term trade opportunities that will emerge as the number of trading agents in the regional market increases. This may take as much as 10 to 20 years beyond the implementation of the Ethiopia-Kenya transmission Project.

Investment Plans
Refer above for the SAPP Regional Power Master Plan.

2.4 Common Market for Eastern and Southern Africa (COMESA)

COMESA was formed in 1994 to replace the former Preferential Trade Area (PTA). COMESA's current strategy can be summed up in the phrase "economic prosperity through regional integration"[4]. COMESA has 19 member states with a total population of over 389 million and covers a large part of Africa.

In energy, COMESA's strategic objective is to address the constraints to the improvement of the regional energy infrastructure, to foster physical regional energy connectivity and integration as well as enhance competitiveness.

Achievements in the energy sector (electricity, fossil fuels and renewable energy) programme have included:

- Energy policy and regulatory harmonization, COMESA has (i) developed a model energy policy framework, (ii) assisted the establishment of the Regional Association of Energy Regulators for Eastern and Southern Africa (RAERESA) to facilitate regulatory harmonisation and capacity building and (iii) pursued an integrated planning strategy in the development of the energy resources and a strategic policy on the development and use of renewable energy and nuclear.
- Development of regional energy infrastructure. Development of medium to long-term energy master plans. The main areas in power are generation and transmission to facilitate electric power trade and cross-border trade in electricity in order to narrow down the high discrepancies in the prices of electricity in various countries in the region.
- Facilitated trade in energy services, COMESA realized that harmonizing of energy standards was necessary and has as a matter of urgency facilitated the development of electricity standards; COMESA's Council of Ministers has adopted 65 electrical standards, which are mainly based on international standards.
- Promoted renewable energy. COMESA has elaborated a baseline renewable energy database, promoted overcoming barriers for renewable energy and promoted diversification of an energy mix.
- Development of power pools. COMESA has especially assisted the creation of the EAPP, which in 2010 was incorporated as a specialized COMESA Agency.

In 2012, COMESA established the COMESA Infrastructure Fund to provide funding for priority projects by raising capital for investment in trade-related infrastructure projects in the region. The Fund is managed by the Eastern and Southern Africa Trade and Development Bank (PTA Bank) and provides seed capital and leverage resources from a mix of public and private investors' funds.

Investment Plans
COMESA is now focusing on implementing the COMESA Priority Investment Plan (PIP) and the Energy Master Plan (EMP). The PIP and the EMP are rolling programs that are continuously

[4] http://www.comesa.int/

updated as new priority projects are identified. They will also be aligned to the PIDA, as well as the COMESA-EAC-SADC Inter-Regional Infrastructure Master Plan.

In a High Level Infrastructure Investment Conference in September 2013, COMESA "showcased" key priority infrastructure projects and programmes across the COMESA Region to potential investors, funders of infrastructure and key international cooperating partners as well as the private sector. The energy projects are presented as Annex 2-11: COMESA Region Key Infrastructure Projects, Power Transmission Networks Interconnections and as Annex 2-12: COMESA Region Key Infrastructure Projects, Power Generation.

2.4.1 COMESA-EAC-SADC Tripartite

The Tripartite is an umbrella organization consisting of EAC, COMESA and SADC established in 2005 to harmonise the REC programmes in the areas of trade and infrastructure development. In 2008, the Tripartite was directed to coordinate and harmonise the Regional Energy Priority Investment Plans and the Energy Master Plans of the three RECS.

The Tripartite has identified where infrastructure needs to be improved using apriority trade and transport corridor approach. More achievements have been realised in policy and regulatory harmonisation and trade facilitation than in the physical infrastructure development. A grant-funded Tripartite Trust Account (TTA) to leverage funds to finance the infrastructure projects has been established and is held by the Development Bank of Southern Africa (DBSA) with the DBSA as the Account Manager.

In 2011, the Tripartite established its own central project preparation mechanism: the Tripartite Project Preparation and Implementation Unit (PPIU), which is hosted by the COMESA Secretariat at its Head Quarters in Lusaka, Zambia. Operations were supported by DFiD, but this support closed early[5] on 17 March, 2014. The PPIU provides technical support throughout the project lifecycle and attempts to facilitate better cooperation among the wide range of available project preparation facilities in Africa to leverage adequate funding for preparing Tripartite infrastructure projects to a bankable stage.

In energy, the Tripartite has prioritised the construction of the missing interconnectors between the power grids in the sub region. One of these is the Zambia, Tanzania and Kenya interconnector. Through Tripartite coordination, an MOU has been signed between the three countries to fast track the realisation of this missing interconnector that would link the SAPP and the EAPP. The process of resource mobilisation for this project has commenced.

Investment Plans
The Tripartite recognises that additional power generation capacity and inter-connected transmission infrastructure are needed to meet the growing power needs of the region and to facilitate power trade between countries and cross-border investments, refer Annex 2-13: COMESA-EAC-SADC Tripartite Power Grid and Supported Power Projects**.**

2.5 Economic Community of West African States (ECOWAS)

The Economic Community of West African States (ECOWAS) is a regional group of fifteen countries[6], founded in 1975, with a mission to promote economic integration in the West African States. There are four Institutions of ECOWAS: (i) The Commission (Secretariat); (ii) The Community Parliament; (iii) The Community Court of Justice; and (iv) ECOWAS Bank for Investment and Development (EBID). The Commission's Department of Energy has a regional

[5] http://www.trademarksa.org/

[6] Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

function, which includes coordination and responsibility for*, inter alia,* energy resource development, supply of hydrocarbons, promotion of new and renewable energy, harmonize energy development plans, common energy policy, etc.

The region has important energy resources with one third (1/3) of the African gas and oil reserves and over 23,000MW of technically exploitable hydropower capacity as well as solar resources. The 1982 ECOWAS Energy Policy promotes a regional approach for the use of energy resources, which led to energy programs such as the West Africa Power Pool (WAPP), the West African Gas Pipeline (WAGP) and a common regional energy access program.

In 1999, ECOWAS put in place the WAPP as "a cooperative power pooling mechanism for integrating national power system operations into a unified regional electricity market". The collective vision is for WAPP to become the principal vehicle to help meet the region's projected electricity requirement by harnessing low cost electricity from (a) several large capacity hydropower facilities sited on the region's major rivers, (b) the substantial hydro resources of Guinea and (c) Nigeria's enormous natural gas via the West Africa Gas Pipeline (WAGP) project.

In 2007, ECOWAS established the "ECOWAS Energy Protocol", a legal framework to promote long-term co-operation in the energy field, based on complementarities and mutual benefits, with a view to achieving increased investment in the energy sector, and increased energy trade in the West Africa region. EEP states the general objective as developing an "open and competitive energy market". Within this framework, in 2008, the ECOWAS Regional Electricity Regulatory Authority (ERERA), the regulator of regional cross-border trade of electricity in West Africa, was established as a specialized institution of ECOWAS.

A regional investment plan based on an ECOWAS Master Plan for Generation and Transmission,

Investment Plans
An update of the 2004 Regional Master Plan was presented in 2011, 'Update of the ECOWAS revised Master Plan for the generation and transmission of electrical energy', refer Annex 2-14. The plan presents 36 projects to be implemented in three phases, refer Annex 2-15:

Phase 1: Commissioning in the period 2017-2019, cost $6,894 million
Phase 2: Commissioning between 2019 and 2021, cost $5,726 million
Phase 3: Commissioning at long-term (2021-2023), cost $5,887 million

2.5.1 West African Power Pool (WAPP)

The WAPP was established in 1999 and covers 14 of the 15[7] countries of ECOWAS. As an ECOWAS specialized institution the WAPP is entrusted to ensure regional power system integration and realization of a regional electricity market. WAPP is made up of public and private generation, transmission and distribution companies involved in the operation of the electricity in West Africa. It has currently 26 member companies.

The governance structure of the WAPP includes: (i) a general assembly (highest decision body); (ii) executive board; (iii) technical committees (engineering/operations, strategic planning and finance/human resources); and, (iv) the WAPP Secretariat (administrative organ responsible for the day-to-day operations). The Secretariat is based in Cotonou, Benin and includes a WAPP Information and Coordination Centre.

Progress in transition to a regional electricity and competitive wholesale market
While the ECOWAS Energy Protocol and the ECOWAS Regulator have meant some progress on the establishment of a transparent and harmonized policy, regulatory and commercial framework for cross border electricity trade, a methodology to calculate the tariffs for electric transmission

[7] Only Cape Verde is not covered.

service in a regional electricity market has been proposed but not yet been adopted. However, an Operations Manual (the Operational Security and Mitigation Plan (OSMP)) has been adopted. This manual sets the rules, principles, requirements, standards, criteria and procedures to be observed for the smooth operation of the pool. Remaining gaps include the definition and adoption of market rules and regulations, which will require commitment to harmonize policies and practices as well as transition arrangements. WAPP Secretariat will need assistance to conduct and coordinate the process with the utilities and the Member States.

Investment Plans
Progress has been made on the physical regional infrastructure development, but implementation of additional power supply and interconnections have been constrained. The approved 2011 [Updated] Regional Master Plan builds on the implementation strategy of pursuing in parallel the following five distinct but mutually-reinforcing sub-programs, refer Map in Annex 2-16:

- Coastal Transmission Backbone Subprogram (Côte d'Ivoire, Ghana, Benin/Togo, and Nigeria): aims to establish an interconnection link between the ECOWAS Coastal Member States.
- Inter-zonal Transmission Hub Sub-program (Burkina Faso and Mali via Ghana, OMVS[8] via Mali, Liberia-Sierra Leone-Guinea via Cote d'Ivoire): aims to establish transmission corridors for transfer of low cost energy to displace diesel-based sources especially in Burkina Faso through Ghana and Côte d'Ivoire, and OMVS through Mali.
- North-core Transmission Sub-program (Nigeria, Niger, Burkina Faso, and Benin): aims to upgrade and extend existing capacity to transfer low cost energy supply to Niger, Burkina Faso, and northern Benin and Togo.
- OMVG[9]/OMVS Power System Development Subprogram (The Gambia, Guinea, Guinea Bissau, Mali, and Senegal): aims to interconnect national systems of The Gambia, Guinea, Guinea Bissau, Mali, Senegal and secure access to sources of low cost energy to be built on the Gambia River, the Senegal River and the Konkoure River Basins.
- CLSG Power System Re-development Subprogram (Côte d'Ivoire, Liberia, Sierra Leone, and Guinea): aims to interconnect Côte d'Ivoire, Liberia, Sierra Leone, and Guinea into the WAPP Energy System and to develop the hydropower resources in the sub-region.

2.6 Economic Community of the Great Lakes Countries (ECGLC)

ECGLC (In French CEPGL - *Communauté Économique des Pays des Grand Lacs*) is a sub-regional organization promoting regional economic cooperation and integration. It has three members: Burundi, Democratic Republic of the Congo and Rwanda. It is headquartered in Gisenyi, Rwanda. ECGL was originally founded in 1976, but collapsed in the mid-1990s due to conflicts within and between the member states, but was re-launched in 2007. CEPGL was originally designed as an economic cooperation organization, but the recently re-established Secretariat is forming a more explicit mandate with respect to governance and peacebuilding.

During its existence, the CEPGL has set up four specialized Organizations, i.e.:

- The Institute of Agronomic and Animal Research (IRAZ);
- The Development Bank of the Great Lakes States (BDGLE);
- The Great Lakes International Electricity Company (SINELAC);
- The Organization of the CEPGL for Energy of the Great Lakes (EGL).

SINELAC
was established in 1989 and is a joint venture of Electrogaz, Rwanda's state-owned electricity supplier, Burundi's Régie de Production et Distribution d'Eau et d'Electricité (Regideso) and the

[8] OMVS = Organisation de Mise en Valeur du Fleuve Sénégal (Organization for the Development of the River Senegal)
[9] OMVG = Organisation de Mise en Valeur du Fleuve Gambie (Organization for the Development of the River Gambia)

Congolese Société Nationale d'Électricité (SNEL) and its purpose is to run the Community hydroelectric power station of Ruzizi II as well as to market the energy produced in the three Member States through their national electricity companies, i.e. National Electricity Company (NEC) for the DR of Congo, REGIDESO for Burundi and ELECTROGAZ for Rwanda. It is headquartered in Bukavu (DRC).

EGL's
main objective is to ensure cooperation between the Member States in the energy sector. It serves as a planning body, research body and also ensures the implementation of projects. This organization has actively participated in the process that was the basis upon which the Ruzizi II community power plant was constructed. Its present power is 43.2 MW. Established in 1974 as a non-profit making association, EGL was integrated into CEPGL in 1979. It is headquartered in Bujumbura (Burundi).

Investment Plans
The Regional Economic Programme for 2014-2020 includes:
• Rehabilitation and modernization of the Ruzizi I plant (29.8 MW) and Ruzizi II (43.8 MW)
• Constructing Ruzizi III (145 MW) and launch studies for Ruzizi IV (287 MW)
• Rehabilitation/increasing the capacity of the Bendera hydropower plant from 17 MW to 43 MW
• Constructing a 100 MW gas fired power plant fueled with Lake Kivu methane gas
• Constructing a trans boundary 50 MW geothermal power plant
• Constructing a 10 MW minihydro power station on the river Ruhwa as an isolated cross-border electrification project between Burundi and Rwanda.

3 REGIONAL PARTNERSHIPS AND INVESTMENT INITIATIVES

3.1 Regional Partnership

3.1.1 New Partnership for Africa's Development (NEPAD)

The New Partnership for Africa's Development (NEPAD) is an economic development program for accelerating economic co-operation and integration among African countries originally adopted in 2001 by the Organization of African Unity (OAU), but is now a program of the African Union (AU) that replaced the OAU in 2002. NEPAD has its own secretariat based in South Africa to coordinate, mobilize resources and implement its programmes. The NEPAD Secretariat is not responsible for the implementation of development programs itself, but works with the African Regional Economic Communities (RECs), the building blocks of the AU.

There was initially some tension over the place of NEPAD within the AU programs, given its origins outside the AU framework and the continuing dominant role of South Africa, symbolised by the location of the secretariat in South Africa, but its status has become less controversial as its programs have become more established and more concrete.

NEPAD's energy programme includes regional energy infrastructure development both on generation and grid connectivity, renewable energy resources utilization, regional energy market development and efficient usage of energy. Priority areas for NEPAD's energy programme include the AU/NEPAD "Programme for Infrastructure Development in Africa", (PIDA), bio energy development for energy and food security, energy accessibility through renewable energy solutions, development of the continent nuclear power resources, energy efficiency, regional energy market and capacity development at national and regional levels. The programme also supports development of power generation from natural gases, coal bed methane and geothermal power in the Rift Valley. The programme promotes the development of regional and continental energy policy frameworks and strategies, development of energy regulatory systems and realistic tariff that attracts private investment in the energy sector.

3.1.2 Program for Infrastructure Development for Africa (PIDA)

PIDA, endorsed in 2012 by the African Union Heads of State, and the associated Institutional Architecture for PIDA Implementation (IAIDA) has been regarded by a number of stakeholders as the key coordinating initiative for African Infrastructure projects.

The PIDA identification study required more than two years of intensive consultation and concerted efforts by experts from the AUC, AfDB, NEPAD, RECs, regional member countries, specialised institutions and agencies and non- regional partners. The PIDA initiative is led by the African Union Commission (AUC), NEPAD Secretariat and the African Development Bank (AfDB), the Executing Agency. The PIDA program brings together various regional and continental infrastructure initiatives, such as the AU, the NEPAD and the Regional Economic Communities (REC) level initiatives into one coherent program for the entire continent, covering the four infrastructure sectors (transport, energy, ICT and trans boundary waters).

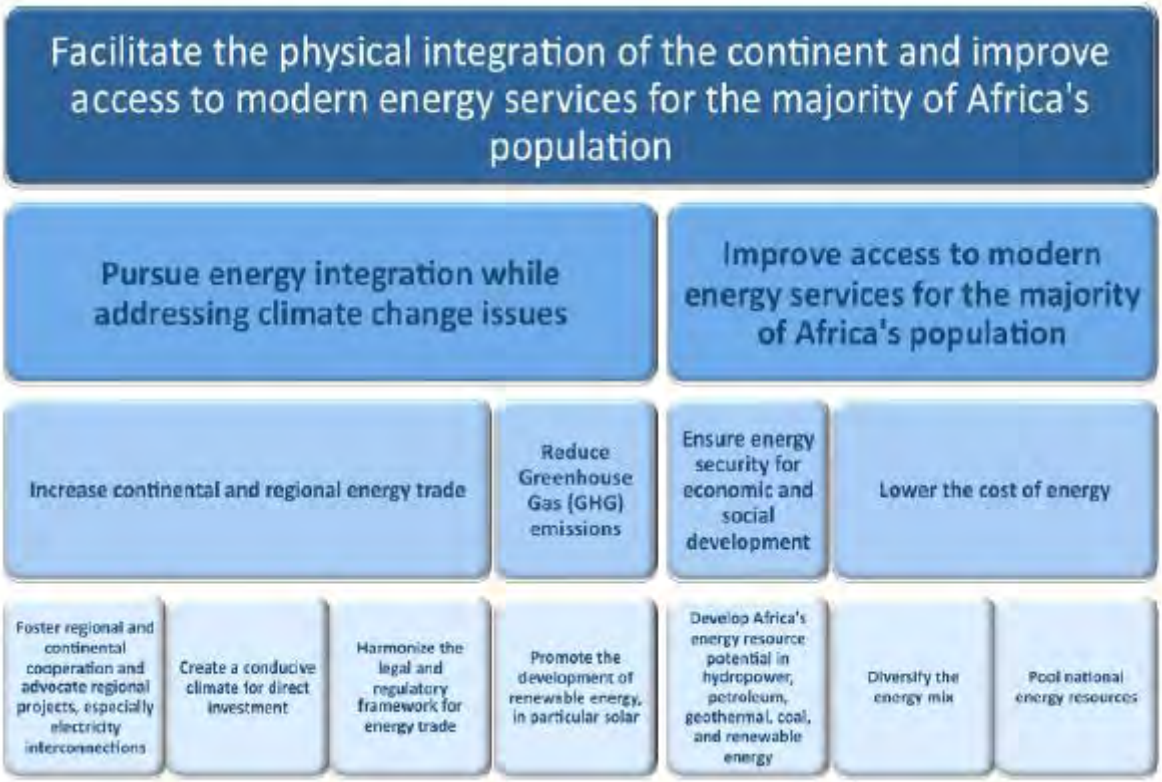
A Strategic Framework for Regional Infrastructure Projects
The extensive diagnostic work in the PIDA Study identified key components of the strategic framework:

- Infrastructure demand through to 2040 (or through 2030 for ICT)

- Projected gaps and bottlenecks created by mismatches in demand and supply
- Institutional deficiencies impeding optimal actions to fill gaps and remove bottlenecks
- Inefficiencies in infrastructure provision ($33 billion in energy)
- Options for identifying, preparing, and funding infrastructure projects that will advance regional integration and promote long-term growth.

New frameworks for each of the four sectors for choosing and building regional and continental infrastructure were articulated.

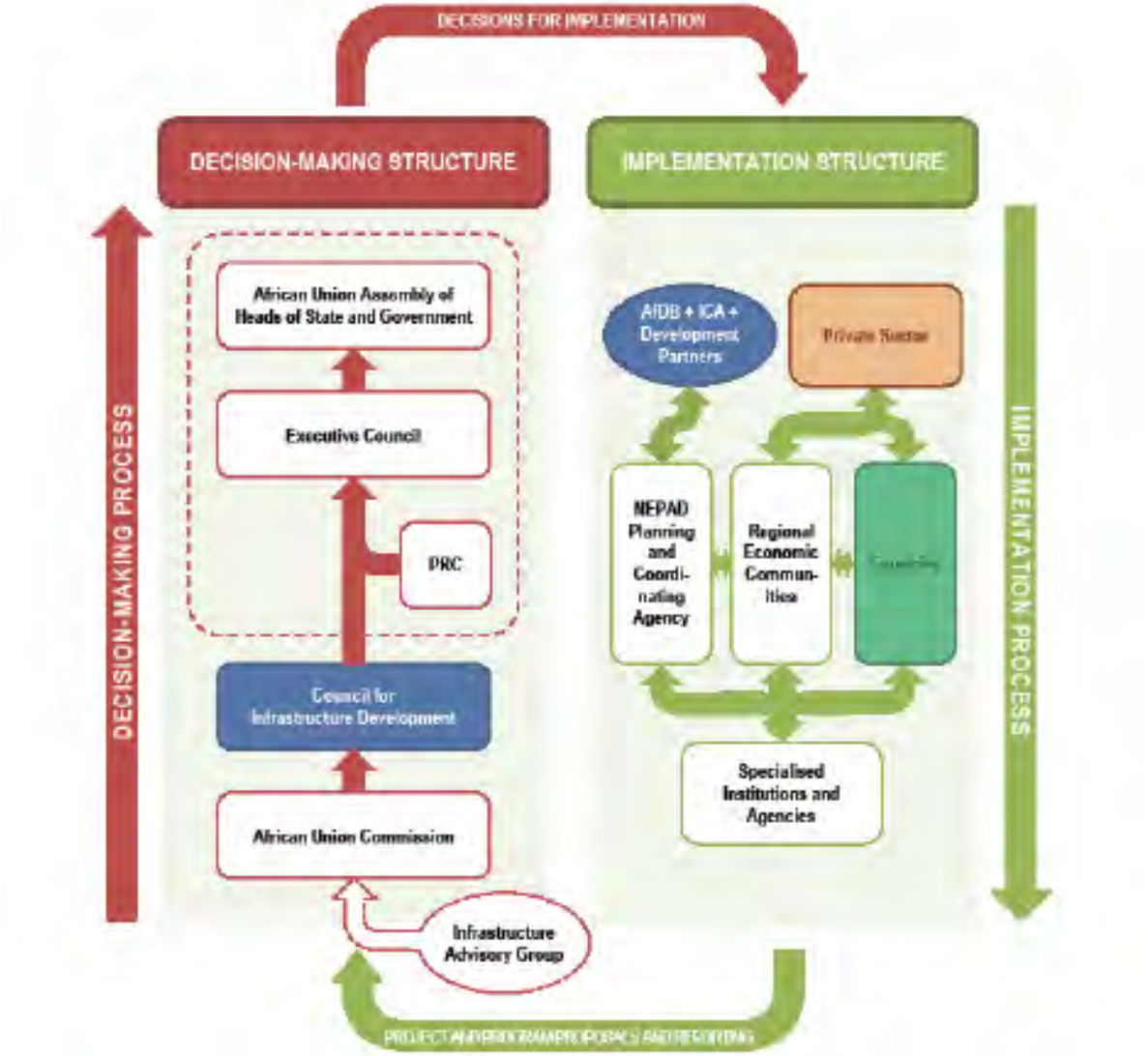
Figure 3-1: PIDA's Strategic Framework for Energy; An Objective Hierarchy diagram



PIDA Infrastructure Development Plans
Major outputs of the PIDA Study are the Infrastructure Development Plan to 2040 and the associated 2012-20 Priority Action Plan (PAP). Eligibility and ranking criteria and their weightings for the selected PIDA investments were agreed through a consultation process with stakeholders. The PIDA energy infrastructure plans call for the development of major hydroelectric projects to generate the electricity needed to meet forecasted increases in power demand resulting from increased consumption of households, industry and agriculture, as well as wider access to electricity. PIDA's plans also include transmission lines to connect the continent's power pools and permit a large increase in interregional energy trade.

Institutional Architecture for PIDA Implementation (IAIDA)
To deal with the lack of appropriate institutional frameworks for coordination and limited capacity of the RECs and the various specialized continental structures, an Institutional Architecture for PIDA Implementation (IAIDA) is being established by the AU. The IAIDA architecture consists of structures for decision-making and implementation. IAIDA defines responsibilities of Continental, Regional institutions (AUC, NPCA, and RECs) and Member States. The responsibility for devising master plans and identifying integrative regional infrastructure lies at the regional and national levels. Projects are still implemented by countries on whose territory they are located and by their agencies (public or private). The IAIDA process is illustrated below.

Figure 3-2: Implementing PIDA: The IAIDA decision-making and implementation structure



Investment Plans
The PIDA energy generation and transmission programmes for 2020 and 2040 are presented in Annex 3-1 and the energy projects in PIDA's Priority Action Plan are presented in Annex 3-2.

3.2 International Financing Organisations and Institutions

A mapping was undertaken of on-going and planned regional initiatives by the major International Financing Institutions under the geographical areas covered by SADC, EAC, COMESA and ECOWAS. A mapping has not been undertaken for ECGLC, as it is only a sub-regional organisation outside of the AU purview, with only three member countries, all (Burundi, DRC Congo and Rwanda) of which are member countries of COMESA and two (Burundi and Rwanda) which are member countries of EAC.

3.2.1 World Bank

World Bank Regional Integration Assistance Strategy (RIAS)
In 2008, the World Bank presented a Regional Integration Assistance Strategy (RIAS), which set out a comprehensive framework to guide Bank support for regional integration, key guiding

principles and selectivity criteria to prioritize investment activities, modalities for implementation, and a results framework to monitor program impact.

In 2011, the World Bank presented a progress report[10] on the regional strategy. In energy, investments in power pools have supported institutional development and policy reforms, although physical construction has moved slowly because of implementation and procurement delays. Annex 3-3 presents a description from this report of the World Bank power projects under this strategy.

In energy the lessons learned from implementation of the regional strategy:

1. *Prioritization and sequencing have been difficult* due to political involvement and overly complex designs. The World Bank Adaptable Program Lending (APL) instrument has proven useful.
2. *Complementary and coordinated policy reforms are needed* to address institutional barriers e.g. aligning national power plans with regional plans, harmonizing regulations for trade in power, etc. (need for new World Bank financing instruments, e.g. regional Development Policy Operations, i.e. rapidly-disbursing support to enabling policy frameworks and reforms), lack of harmonization among different donors' financial and procurement procedures.
3. *Regional power projects have been extremely demanding to prepare and implement.* Reasons include: Investments are large; number of countries involved can be large; (with some only non-benefitting middlemen); creditworthiness of "offtakers" significant challenge; preparation costs can be 10 percent of the investment (need to explore new mechanisms for the preparation of bankable projects); regional projects have to match national and regional capacities; government and other national stakeholders need meaningful roles in program design and oversight; participation and interaction among national institutions is required in all phases; and regional institutions require capacity building to strengthen technical and economic expertise

Southern Africa Power Market

The World Bank's first phase (APL 1) of the Southern African Power Market Project (SAPMP) was approved in November 2003 and was aimed at improving electricity trading in the SAPP and increasing security of the SAPP system. Together with the Regional and Domestic Markets Development Project (one of the first regional energy projects supported by the World Bank in the Africa region), it was intended to make a significant portion of the electricity generated from the Inga hydropower complex in the DRC available to the SAPP, and thus reducing the role of thermal power generation in the region. It was designed with four main components, with (i) the DRC component (a high voltage transmission line from Inga to the Zambia border) and (ii) an interconnector with Zambia costing 98% of the credit. The other two components comprised: (iii) support to the SAPP Co-ordination Centre to build its institutional, technical and power market operations capability, funded entirely through donor (NORAD and USAID) assistance and (iv) feasibility, and environmental and social impacts assessment studies for the future Zambia-Tanzania power transmission interconnection. The two latter components were completed by 2007, while the first two components required several credit restructurings with additional financing.

The World Bank planned for two more phases through APL2 and APL3, aimed at helping to bring the current three non-operating members, Angola, Malawi, and Tanzania, into the SAPP, further strengthening regional interconnections, improving market operations, and laying the basis for the future integration of the Eastern Africa and Southern Africa Power Pools. Two IDA credits were actually approved by the World Bank 2007 to Malawi and to Mozambique for the APL2 project (the Malawi- Mozambique power transmission interconnection), but Malawi changed its mind.

[10] World Bank. (2011). Partnering for Africa's Regional Integration: Progress Report on the Regional Integration Assistance Strategy for Sub-Saharan Africa. Washington, DC.

SAPP-Program for Accelerating Transformational Energy Projects
The World Bank is proposing a USD 50 million project to provide the SAPP with critical technical assistance to become a catalyst for priority regional energy projects consistent with the mandate it has been given by the SADC. The project will tentatively include three components: (i) Setting up the Project Acceleration Team (PAT) within the SAPP Coordination Centre comprising world-class experts with all the profiles required to take a project from design to financial close (total cost US$7 million); (ii) Project Preparation Funds to be managed by the PAT and be used for a variety of tasks related to preparation of large and complex energy projects. Depending on the stage of the process, the funds may be used independently or jointly with the funds of a project sponsor to advance project preparation (total cost US$40 million); and (iii) Analytical support to build a solid knowledge base to investment decisions and help ensure long-term sustainability of investments, e.g. a revision of the SAPP Pool Plan based on a 'risk scenarios approach' (total cost US$3 million).

East Africa Power Integration and East Africa Power Pool
The existing and committed interconnections in the East Africa Region are listed in the Table below.

Table 3-1: Existing and Committed Interconnections in the Greater East Africa Region

Interconnection	Voltage (kV)	Distance (km)	Capacity (MW)	Status	Completion date
Uganda-Kenya	132	117	118	Existing	1960s
Tanzania-Uganda	132	85	59	Existing	1970s
Ethiopia-Djibouti	220	283	180	Existing	2011
Ethiopia-Sudan	220	321	200	Existing	2013
Uganda-Kenya	220	127	300	Under construction	2014
Uganda-Rwanda	220	172	250	Under construction	2014
Rwanda-DRC	220	68	370	Under construction	2014

Source: World Bank. (2012). Project Appraisal Document on a Proposed Credit to the Federal Democratic Republic of Ethiopia and to the Republic of Kenya for the Eastern Electricity Highway Project (APL 1) under the First Phase of the Regional Eastern Africa Power Integration Program
World Bank (2013). *Implementation Completion and Results Report for the Ethiopia-Sudan Interconnector (IDA-40270/H1410).* Report No: ICR2925. World Bank, Washington, DC. December 23, 2013

In July 2012, the World Bank approved the first phase (the Eastern Electricity Highway Project (APL 1)) of a Regional Eastern Africa Power Integration Program. The Program objective is to help integrate the power systems of the EAPP member countries including Ethiopia, Kenya, Tanzania, Rwanda and Uganda. Together with the existing and committed interconnections, refer the Table above, the Program will support the interconnection of all the countries in the greater East Africa Region.

The Kenya - Ethiopia Interconnector is the anchor interconnector for the EAPP
The Project has three external development partners: IDA, the AfDB, under its concessional window) and the French Development Agency (AFD). IDA is expected to provide 54 percent of total financial requirements

The Project has two components: Component A is the construction of a High Voltage Direct Current (HVDC) transmission interconnection; and Component B is project management and capacity building. Component A includes: (i) Construction of 1,045 km of 500 kV HVDC overhead transmission line (US$308 million); (ii) Converter Substations on each end of the transmission line (US$629 million); (iii) Environmental and Social Management (US$30million); and (iii) System Reinforcement (US$87 million). Component B includes: (i) Project management

and Supervision (US$45 million) and (ii) Capacity Building and Technical Assistance (US$10 million).

Investment Plans
The World Bank intends to provide investment and capacity building support using the Adaptable Program Loan (APL) instrument. The proposed total size of the World Bank APL Program is US$1.1 billion. The Program will support the following three phases:

1. (APL 1): Ethiopia-Kenya interconnection (500 kV HVDC), estimated cost US$1.3 billion;
2. (APL 2): Kenya-Tanzania interconnection, (double-circuit 400 kV line), estimated cost US$350 million; and
3. (APL 4): Tanzania-Rwanda interconnection (200kV, cost US100 million) and Tanzania-Uganda interconnection (200 kV, cost USD100 million).

West Africa Power Pool
In 1999, the ECOWAS Council of Ministers signed the ECOWAS Energy Protocol (EEP) setting up a unified regional umbrella to harmonize legal, regulatory and institutional frameworks for WAPP and other similar regional energy initiatives. Subsequently, the World Bank designed a program, to facilitate cross-border electricity trade and help put in place the infrastructure, institutional, operational, commercial and regulatory pre-requisites for sustainable implementation of the EEP. This lending operation would provide IDA co-financing to physically integrate the power systems of about 10 ECOWAS Member States. The strategy for the World Bank's multi-year programmatic framework in support of WAPP aimed at

- A phased integration of national power systems within WAPP, initially targeting opportunities to create smaller cooperative power pooling agreements.
- Target World Bank non-lending services on institutional capacity building activities of the "WAPP Organization".
- Leverage the World Bank's Adaptable Program Lending (APL) instrument to mobilize co-financing from development partners, donors and private investors to achieve the developmental goals of WAPP (the "WAPP APL Program").

It is interesting to note that the WAPP APL program was designed, taking into account the broad lessons learned from the five decade long evolution of the best known regional power market, the Nordic power market which was operated by NordPool. The two most pertinent lessons for the design of the WAPP APL 1 project were: (i) the key to successful expansion of multi-country, regional electricity trade is to initially establish an appropriate (simple, flexible and robust) institutional structure consisting of the national TSOs and (ii) in order to maintain balance in the transformation of power system operations from a national into a multi-country, regional operations regime, it is preferable to promote greater autonomy for national TSOs so that potential conflicts of interest are minimized.

Investment Plans
In 2005, the World Bank's Executive Board endorsed the application of the Adaptable Program Lending instrument (APL) to provide US$350 million equivalent IDA resources to support a multi-year programmatic framework put in place by WAPP. The table in Annex 3-4 details IDA's contribution to the different projects. Main co-financiers were the European Investment Bank and the AfDB. Annex 3-5 WAPP Network in 2013 and Annex 3-6 WAPP Network by 2020 show the situation in 2013 and the expected situation by 2020.

3.2.2 African Development Bank

The AfDB was created in 1964 to reduce poverty and promote economic and social development on the continent. AfDB is becoming an increasingly important player in development: in 2009 alone, AfDB approved over $12 billion, while the World Bank approved just $9.4 billion in Africa.

AfDB is increasingly taking a leadership role in initiatives to promote infrastructure financing and regional integration in Africa, "an African organization serving Africans", a coordination adjustment applauded by Africa's leadership[11], but cautioned[12] by others.

The AfDB's Strategy for 2013–2022 places the AfDB at the centre of a predicted economic transformation of Africa and aims to improve the quality of Africa's growth (making it more "inclusive and green"). The strategy includes five operational priorities: (i) Infrastructure development; (ii) Regional economic integration, where it sees the Bank well positioned to play a leading role; (iii) Private sector development; (iv) Governance and accountability; and (v) Skills and technology.

The AfDB Energy Sector Policy focus on five sub-sectors that AfDB feels are the most likely to address the energy demands, while contributing to the development of a sustainable energy sector: (i) renewable energy, (ii) fossil fuels, namely coal, oil and gas, (iii) power transmission and distribution, (iv) regional cooperation, and (v) supply-side and demand-side energy efficiency.

The AfDB's regional integration strategy was approved in 2009. The AfDB has developed Regional Integration Strategy Papers (RISPs) for each of its five Regions– East, West, Central, South and North. The RISPs are the basis for the Bank's support in the various regions. Four RISPs have been approved – the one for the North has been held up because of the political situation there.

The AfDB is the Executing Agency for the PIDA, which is led by the AUC, NEPAD Secretariat and the AfDB and designed to develop a vision and strategic framework for the development of regional and continental infrastructure (Energy, Transport, Information and Communication Technologies (ICT) and Trans-boundary Water Resources). AfDB's role as Executing Agency covers the responsibility for contractual, financial, technical and administrative management of the programme including responsibility for procurement procedures, in conformity with its existing regulations, budget management and disbursements.

Searching the Internet and the AfDB WEB site for information about AfDB's regional energy projects, provides very sketchy information, which seems in line with the experience of other organizations.[13] E-mailing the AfDB with a request for pointers in mapping AfDB's on-going and planned regional investment initiatives, resulted in the reply: "The AfDB regional energy activities are guided by the PIDA Energy Priority Action Plan and information may be found on web site of AfDB, or NEPAD, or AU". [14]

3.2.3 European Investment Bank/European Union

European Investment Bank
The European Investment Bank (EIB) is the long-term lending bank of the European Union. Based on EU external cooperation and development policies, EIB's lending for development countries is mainly focused on private sector development, infrastructure development, security of energy supply and environmental sustainability.

[11] "The AfDB focuses on crucial areas," Claver Gatete, Minister of Finance and Economic Planning, Rwanda, during the 2013 AfDB replenishment proceedings
[12] Civil Society Coalition on the African Development Bank. (2012) ".despite its growing profile, the AfDB's standards and capacity to implement [….] remain behind similar institutions when it comes to social and environmental responsibility", from http://www.coalitionafdb.org/about-the-afdb/
[13] Civil Society Coalition on the African Development Bank. (2012). "Until recently, the AfDB disclosed very little information about its operations, either on its website or in-country. Despite some improvements to its information disclosure policy and upgrades to its website, the AfDB is still behind other institutions when it comes to making information available about its activities", from http://www.coalitionafdb.org/about-the-afdb/
[14] Email 8 July 2014 from the Chief Energy Expert in the AfDB regional integration department

The promotion of sustainable, competitive and secure sources of energy is a key EU policy objective. According to the EIB webpage, EIB finances:

- Sustainability through renewable energy sources to reduce greenhouse gas emissions and dependence on finite energy resources
- Competitiveness in energy supply to create a genuine European single energy market to boost efficiency and control consumer prices
- Energy efficiency technology: particularly eager to support energy-related research, development and innovation
- Supply security through diversification, particularly with indigenous sources to cut the risks from dependence on external supplies.

EIB energy funding options includes (i) Loans and structured financing options, (ii) Partnerships, i.e. working with others to provide funding, (iii) Investments: billions in climate investment through a number of funds of funds, (iv) Carbon funds, (v) Initiatives, e.g. Energy efficiency is supported via several initiatives, (vi) Research Development Innovation (RDI) support, e.g. through the Risk Sharing Finance Facility (RSFF) Programme, and (vii) Funds, e.g. the Green Initiative.

Investment Plans
The EIB ACP Business Strategy 2014-2016 has different levels of priority, with two key focus areas: Infrastructure and Financial Sector. Infrastructure has a regional focus, notably projects consistent with the PIDA (Programme for Infrastructure Development in Africa) Priority Action Plan and (i) projects with a pro-poor focus and (ii) projects which promote sustainable economic growth, in any of the following sectors: energy, water and sanitation, transport and telecommunications.

The EIB WEB page lists both the signed EIB projects and projects in the "pipeline". Annex 3-7 shows the projects signed 2009-2014 as well pipeline projects for the energy sector in Sub-Saharan Africa.

European Union

EU's energy development policy includes

- The EU Energy Initiative for Poverty Eradication and Sustainable Development (2002)
- Africa-EU Energy Partnership (2007)
- Agenda for Change (2011)
- Energising Development (2012)

The EU Energy Initiative (EUEI) was launched at the World Summit on Sustainable Development in Johannesburg in 2002 and stresses the need for including energy access in national and regional development plans and stimulates new resources for the sector.

The EUEI Partnership Dialogue Facility is demand driven and centres on the development of energy policies and strategies. It is funded by a number of EU Member States and the European Commission and hosted by GIZ, Eschborn, Germany.

The Africa-EU Energy Partnership was launched in Lisbon 2007 for dialogue on energy access and energy security. It is not a financing instrument.

There are two main funding sources managed by the European Commission:

- The European Development Fund (EDF) for ACP countries
- The Development Cooperation Instrument (DCI) - global

In addition there is EU financing available through the European Investment Bank (EIB), the European Development Financing Institutions (KfW, AFD, and EDFIs) and the EU Member States (plus Norway).

There are three EU financing instruments

1. Grants
   - National Indicative Programmes (NIP): national projects
   - Regional Indicative Programmes (RIP): cross-border and regional projects
   - ACP-EU Energy Facility
2. Blending (grants and loans)
   - EU Africa Infrastructure Trust Fund and Neighbourhood Investment Facility: Regional and continental scale projects
3. Innovative financing instruments (equity)
   - Global Energy Efficiency and Renewable Energy Fund (GEEREF)

The ACP-EU Energy Facility is a co-financing instrument which was established in 2005 in order to support projects on increasing access to sustainable and affordable energy services for the poor living in rural and peri-urban areas in African, Caribbean and Pacific (ACP) countries. It is funded by a number of EU Member States and the European Commission and hosted by GIZ, Eschborn, Germany. Main characteristics are: €420 million, small scale access projects with major focus on renewable energy, "Call for Proposals" mechanism, "pooling mechanism" introduced in 2010.

Africa-EU Infrastructure Trust Fund is a €330 million (EDF), blending instrument for national energy projects in Sub-Saharan Africa. The priority is given to investment projects targeting increased access to modern energy services in eligible countries that are committed to improving their policy and regulatory framework. Renewable energy preferred, but use of fossil fuels not excluded (hybrid). Grid, mini-grid, or off-grid. Energy projects include: FELOU Hydroelectric System (Interest rate subsidies, IRS), Caprivi Interconnector (Interest rate subsidies, IRS), Ruzizi hydro scheme rehabilitation (Technical assistance, TA) and Geothermal Risk Mitigation Facility (East Africa).

The Global Energy Efficiency and Renewable Energy Fund (GEEREF) is a Fund-of-Funds type instrument with a capital base of EUR 108 million and a focus on ACP countries. It provides equity to financially viable renewable energy and energy efficiency projects with a development impact. It is advised by the EIB.

AITF's SE4ALL envelope (pledge EUR 329m), operational since July 2013, supports regional, national and local projects targeting SE4ALL objectives. To be eligible for AITF support, projects must in addition to being economically viable and sustainable (O&M plans), be able to demonstrate development impact by contributing to poverty reduction, economic development and trade and African ownership.

EU Support to SE4ALL, EU Commitment in Rio: €400 million (until 2013)

- Extended Energy Facility (€90 million)
- Technical Assistance Facility (€65 million)
- Reinforcement of the Infrastructure Trust Fund (€330 million)
- European Development Financing Institutions Private Sector Development Facility (€50 million)
- GEEREF (€20 million)

Investment Plans

The financial framework for 2014-2020:

- The Development Cooperation Instrument (global):
  - Substantial increase in funding for sustainable energy

- 11th EDF (ACP countries):
  - Energy programmed as a focal sector in National Indicative Programmes (NIP)
  - Regional Indicative Programmes (RIP) and Intra-ACP programmes

3.2.4 Development Bank of Southern Africa (DBSA)

The Development Bank of Southern Africa (DBSA) is a state owned Development Finance Institution, which focuses on large infrastructure projects within the public and private sector. Outside of South Africa, DBSA focuses on commercially viable and sustainable development projects in the key infrastructure sectors of Energy, Transport and Bulk Water. DBSA promotes inter-regional integration and cooperation between SADC and the adjoining RECs communities, such as the EAC. Financing and investment operations are focused on the southern African region, but extend selectively to multi-country infrastructure projects and initiatives and selected pan-African private equity funds that cut across the continent. The DBSA tries to leverage its relationships with leading infrastructure agencies from Europe, Asia and the BRIC nations to secure co-financing on regional projects.

DBSA's financing strategy draws on the guiding principles of NEPAD and the Regional Indicative Sustainable Development Plan (RISDP), as well as evolving developments in the region and among the RECs in identifying priority infrastructure and development finance sectors for the region. Regional integration is considered critical to the growth of the South African economy as well as that of the broader continent. To promote regional integration, DBSA supports key infrastructure corridors, such as the North-South Corridor, which is directed towards regional economic integration through the upgrade and extension of transport links (road, rail, ports and one-stop border posts) in southern and east Africa.

DBSA is managing the European Union of £100 million for the South Africa- European Union Infrastructure Investment Programme.

Investment Plans
A number of projects are being appraised, e.g. the Ruzizi III Hydro Dam along the Ruzizi river bordering the Democratic Republic of Congo and Rwanda, which will generate electricity to serve those countries and Burundi, and the Zizabona Energy Interconnector, which connects Zambia, Botswana and Namibia to energy sources in Zimbabwe.

3.3 National Interventions in Mozambique, Tanzania and Zambia

A mapping was undertaken of national interventions in Mozambique, Tanzania and Zambia linked to the above regional initiatives.

Table 3-2 Available Generation Capacity, Overall Demand and Surplus/Deficit

Country	Available Generation Capacity (MW, 2010)	Overall Demand (MW,2010)	Surplus/ Deficit (including 10% reserve requirements
Mozambique	2,249	560	1,633
Tanzania	880	833	-36
Zambia	1,500	1,750	-425

Source: The World Bank, *Turning the Lights on Across Africa*

3.3.1 Mozambique

The Mozambique Regional Transmission Backbone Project (STE). In addition to true "regional" projects, the SAPP has identified priority transmission projects related to new generation projects, such as the Mozambique energy backbone project.

The Mozambique 2009 Generation Master Plan 2009 evaluated different options for power generation in the country for the next 20 years, taking into account economic, environmental and social aspects. It recommended that a hydropower plant 61 km downstream of the existing Cahora Bassa Dam, the Mphanda Nkuwa (MNHP) hydropower plant, with a planned capacity of 1,500 MW (phase 1) and an extension of the Cahora Bassa North Bank (CBNB), with a planned capacity of 1,245 MW should be developed as quickly as possible, in parallel with the power transmission lines connecting the central and southern regions of the country. There are also planned thermal stations that will supply power to mining projects in the Tete Province, in Moatize, with a planned initial capacity of 300 MW and Benga with a planned capacity of 500 MW. In the southern region, there are also plans to install about 300 MW of natural gas fuelled thermal power stations.

The proposed Mozambique Regional Transmission Backbone Project (STE) was launched in 2011. The aim is to wheel power from the north where most of the generation takes place to the load centres in the south, while also providing access to the central region of the country. Further, it will allow the power trade with other members of SADC through the SAPP.

The project involves construction of a new electricity transmission line from Tete, in the Zambezi Valley, to Maputo. This line, the "Centre-South (CESUL) Project", is crucial for carrying power southwards from the planned new power stations in the Tete Province. Without a new power line, the electricity generated at these new power stations cannot reach the Maputo area or be exported to South Africa.

The project is a combination of all 800 kV high voltage direct current (HVDC) overhead transmission line and 400 kV High Voltage Alternating Current (HVAC) overhead line. The maximum capacity is 2,650MW and 1,100 MW for the 800 kV and 400 kV lines respectively with a totally simultaneous transfer of capacity of 3,100MW during normal operation with an ultimate potential of 6,000MW. The implementation of the project will be in a synchronised way with the generation projects, to ensure safe operation (dynamic and transient stability) of the system.

So far the AfDB has agreed to help finance the construction of the transmission line, estimated to cost US$1.8 billion. The AfDB has pledged to provide up to US$ 400 million for the project.

Mozambique-Malawi Interconnector. The Mozambique-Malawi Transmission Interconnection Project will connect Malawi to the SAPP, allowing two-way energy trade between the two countries. This will ensure much-needed diversification in Malawi's electricity supply and allow the export of any off-peak power surpluses. It will also provide Mozambique's energy sector with a new revenue source.

It would also potentially serve another function for Mozambique. As shown in Annex 3-8, Mozambique's Transmission Network, there are plans for a future continuation of this line to Cuamba in the Niassa Province, which would considerable shorten the supply line to this area and improve on the quality of the supply.

Under the project, Mozambique will build about 135 kilometres of 220 kV transmission line and extend the existing Matambo substation while on the Malawi side, approximately 75 km of 220 kV transmission line will be constructed and a new 220 kV substation installed.

Regulation. The Mozambican national regulator CNELEC (Conselho Nacional de Electricidade) has been described as a weak advisory regulator[15], i.e. it operates by giving advice to the Ministry. CNELEC has been supervising EDM's (the state power utility) Performance Contract with Government. Quite few countries have such performance contracts in place.

3.3.2 Tanzania

Tanzania's 2008 Power System Master Plan (PSMP) is intended to be updated annually and guide the development of the power system up to 2032. The PSMP 2012 Upgrade Expansion Plan presents an assessment of generation sequencing to meet the estimated demand forecast as well as short and medium term prioritized transmission projects, refer Annex 3-9.

Generation. The expansion plan considers various generation sources, e.g. hydro, gas, coal, wind, solar, biomass, geothermal, among others. The 2012 Update generation expansion plan, base case scenario has a total installed capacity of 8,960 MW by 2035 consisting of 3,304 MW hydro, 995 MW gas-fired generation, 3,800 MW Coal, 100MW Solar, 120MW Wind, 40MW Biomass/Cogen, and some export limited to 250 MW of total available generation. For the 2013-2028 time period the foreseen expansion and retirements of generating plants are presented in Annex 3-10.

Transmission. Tanzania's national transmission grid does not cover all parts of the country, leaving a significant portion of the population without access to electricity. In Tanzania, outside major cities and towns, only regional headquarters, some district township and a limited number of villages are supplied with electricity.

The PSMP points out that Western and Northern Tanzania, including the Lake Zones need new transmission capacity to secure a satisfactory supply. In addition, South-West Tanzania and Dar es Salaam also need additional transmission capacity to transmit excess generated power to other load centers. The major load centres are Dar es Salaam and the north-western part of the country around Lake Victoria.

The Tanzanian Government has realized the importance of the transmission network and has embarked on the 400kV transmission "backbone project" between Iringa and Shinyanga, refer Annex 3-11. The government has furthermore initiated preparations for additional 400kV projects, namely the "South-West transmission project", Dar es Salaam – Chalinze - Tanga – Moshi – Arusha and Dar es Salaam – Chalinze - Morogoro – Dodoma as well as additional 220 kV projects, namely the "North-West Grid", Makambaku - Songea and Dar es Salaam – Somanga – Mtwara. Annex 3-12 presents an early version of the Planned National Grid System.

Interconnections. Transmission capacity to other countries is an integrated and important part of a main grid to ensure security of supply domestically and to increase the exchange capacity with

[15] Types of Regulatory Institutions (Governance)

Characteristic	Weak Advisory	Strong Advisory	Independent Fully Functioned
Location	Inside or Outside Ministry	Inside or Outside Ministry	Outside Ministry
Budget	Within the Ministry Budget	Separate Protected Budget	Separate Protected Budget
Decision Making Authority	Confidential Advice to Minister	Public Advice to Minister	Full decision authority without Minister's approval
Minister's Policies Directives to Regulator	Given Confidentially	Given Publicly	Given Publicly
Consultations with Affected Parties	None or Private	Private and Public	Private and Public
Transparency of Decisions	Unwritten Private	Public Written decision, views of parties and rationales	Public Written decision, views of parties and rationales

Source: Bernard Tenenbaum (2005). *Some Preliminary Thoughts on the Design of a New Electricity Regulatory System for Mozambique.* Presentation made in Maputo, April 2005

other countries, both to ensure access to power in dry years and to ensure trade of surplus power in years with high precipitation. There are six interconnection projects:

- A new 400 kV interconnector to Kenya, which is in the preparation phase, is scheduled for entering operation in 2016.
- A Tanzania - Zambia interconnection is also in the preparation phase and on schedule for entering operation in 2016.
- The 200 MW Masaka (Uganda) - Mwanza (Tanzania) interconnector is scheduled for operation by 2015.
- Tanzania is planning a new connection to Mozambique with a capacity of 200 MW and discussions with the Mozambican counterparts are currently underway.
- Tanzania, Rwanda and Burundi are planning a 63MW hydro power plant project at Rusumo border with Rwanda and Burundi; the project will enable the National grids of the three countries to be interconnected by 2016.
- A planned 340 MW hydro power plant project at Songwe border involves both Tanzania and Malawi and the project would enable the National grids of the two countries to be interconnected by 2021.

Regulation. Tanzania's national regulator, EWURA (Energy and Water Utilities' Regulatory Authority) has been ranked as one of the exemplary regulators in Africa.

3.3.3 Zambia

There are many national interventions in Zambia with relevance to regional level as Zambia plays a critical role in the SAPP as a control area operator (for the DRC and Zambia), as a supplier of hydropower from the Zambezi River Basin and an interconnector to the Congo River Basin. The Zambian power grid is interconnected to the DRC in the north and Zimbabwe in the south. On-going projects seek to interconnect the country to Tanzania in the northeast, Malawi in the east and Namibia in the west through the Zimbabwe-Zambia- Botswana-Namibia interconnector.

Zambia plans to develop a number of generation projects (both hydro and coal) in the short term, refer Table below.

Table 3-3: Zambia Plans for Increased Generation Capacity

Project	Capacity (MW)	Implementers	Estimated Commencement
Kariba North Bank	360	ZESCO	Jan 2014[1]
Maamba Coal-Fired Thermal Power Station	300	NAVA BHARAT	Unit 1 Sep, 2013 Unit 2 Jan 2015[2]
Lunzua Mini-hydro Power Plant	15	ZESCO	2014
Itezhi-Tezhi Dam	120	ZESCO/TATA	2015[1]
EMCO Coal-Fired Thermal Power Station	300	EMCO Energy Zambia	2020[3]
Lusiwasi	86	ZESC0	2015
Kapombo	40	CEC	2015
Kalungwishi Hydroelectric Project	163	Lunzua Power Authority	2015
Kafue Gorge Lower	750	ZESCO/SINOHYDRO/CAD Fund	2019[1]

Source: IRENA (2013), *Zambia, Renewables Readiness Assessment 2013*, IRENA, Abu Dhabi
[1]International Hydropower Association (http://www.hydropower.org/country-profiles/zambia)
[2] Maamba Collieries Ltd News,http://www.maambacoal.com/images/corporatemagazine/2013/Third2013.pdf
[3] http://www.bloomberg.com/news/2013-07-17/vedanta-s-zambian-unit-plans-coal-power-plant-to-reduce-costs.html

ZESCO presented more extensive plans for new hydro generation, including small hydros and potential sites during a presentation in July, 2013, refer Annex 3-13.

The same presentation revealed ZESCO plans to upgrade existing transmission infrastructures and develop new ones to evacuate additional power from rehabilitated and new power plants. In addition, there are plans on further expanding the national grid to the north-western province to new mining areas and develop new interconnectors with neighbouring countries to increase power trade. Refer Annex 3-14, Zambia's National Grid Network and Annex 3-15, new ZESCO transmission projects.

Regulation. Zambia's national Energy Regulation Board (ERB) was established in 1997 and has received considerable support from various Donors. After having established itself firmly in the sector, it has recently run into policy problems with the Government and has become somewhat subdued.

3.4 Regional Investment Initiatives – Energy-Water Nexus

Water and energy are basic components of life, economic growth and human progress and both are strongly interrelated, e,g. water is required to generate hydroelectricity and electricity is required to make water resources available for human use and consumption. A term has been coined to describe this relationship: the Energy-Water Nexus. This relates to the amount of water needed directly or indirectly for exploration, extraction, generation and transmission of energy, and to the amount of energy needed for extraction, transportation, distribution, collection, treatment and end use of water.

Water for Energy. Energy availability is a pillar for social and economic progress in a society. Water is fundamental to energy infrastructures and resource development, from extraction of raw materials, purification, washing and treatment of raw materials to coolants in power plants to being a fuel for hydropower plants.

Energy for Water. Energy is of primary importance for water management and developments. The water infrastructures rely on energy throughout its value chain, groundwater extraction, transportation, purification, distillation, distribution, collection and wastewater management and treatment.

Africa's international waters are a lifeline for its people, important for economic growth, growing food, providing electricity to power homes and businesses, creating jobs and providing critical environmental services. Over 500 million people, or 65 percent of Africa's total population, are living in 63 trans boundary river basins across the continent. The unique challenges and opportunities related to management and development of international waters warrant an approach that cuts across national borders and sectors. The study has attempted to map regional plans that address the energy-water nexus among some sub-regional cooperation entities.

3.4.1 Cooperation in International Waters in Africa (CIWA)

The Cooperation in International Waters in Africa (CIWA) is a multi-donor trust fund established in 2011 and represents a partnership between the World Bank and the governments of Denmark, Norway, Sweden, the Netherlands, and the United Kingdom.

CIWA works to strengthen the various elements comprising "the Basin Framework", i.e. data and information, trans boundary agreements, institutions, investment plans, and operation agreements. Specifically, CIWA works to strengthen (i) regional cooperation and integration by fostering cooperative trans boundary institutions and creation of an enabling environment; (ii) water

resources management and development through evidence-based knowledge for planning and decision-making; and (iii) stakeholder engagement and coordination.

CIWA delivers three categories of work (i) Sustained strengthening of information, institutions, and investments in priority basins geared towards strengthening foundational elements such as data, agreements, institutions, investment plans, and operation plants that are instrumental to effective sustained cooperation in international waters; (ii) Short term, opportunistic, catalytic work that unlocks potential for cooperative investment in basins other than priority basins; and (iii) Knowledge management and capacity building.

Examples of concrete CIWA projects are:

- A $7.5 million CIWA partnership project with the Niger Basin Authority (NBA) as part of the Niger River Basin Management Project. CIWA will facilitate improvement of NBA's capacity for water resources management and development in the Niger Basin.

- A CIWA US$6 million grant to the Zambezi River Authority (ZRA) for the Zambezi River Basin Development Project. The project will support engineering studies and environmental and social impact assessments of the Batoka Gorge Hydro-Electric Scheme (HES) on the Zambezi River. The 1600MW to be generated by the project will be shared equally by Zambia and Zimbabwe. The Batoka Gorge project is an example where analytic work on financial and economic implications of inaction played a crucial role in bringing together riparians for joint project planning and development

- Rusumo Falls is another successful case where analytical work delineating the benefits of cooperation has led to investment in trans boundary resource development. The NELSAP-CU of the NBI prepared the project and will lead its implementation.

3.4.2 Nile Basin Initiative (NBI)

The NBI, the regional intergovernmental partnership between the Nile riparian countries, has over more than a decade grown to a well-established Nile Basin institution for water resources management and development. Refer Annex 3-16 for a map over the Nile Basin. According to the World Bank, the NBI has identified, prepared or facilitated approximately US$ 1.4 billion of investments under implementation, with an additional US$4.8 billion under preparation.

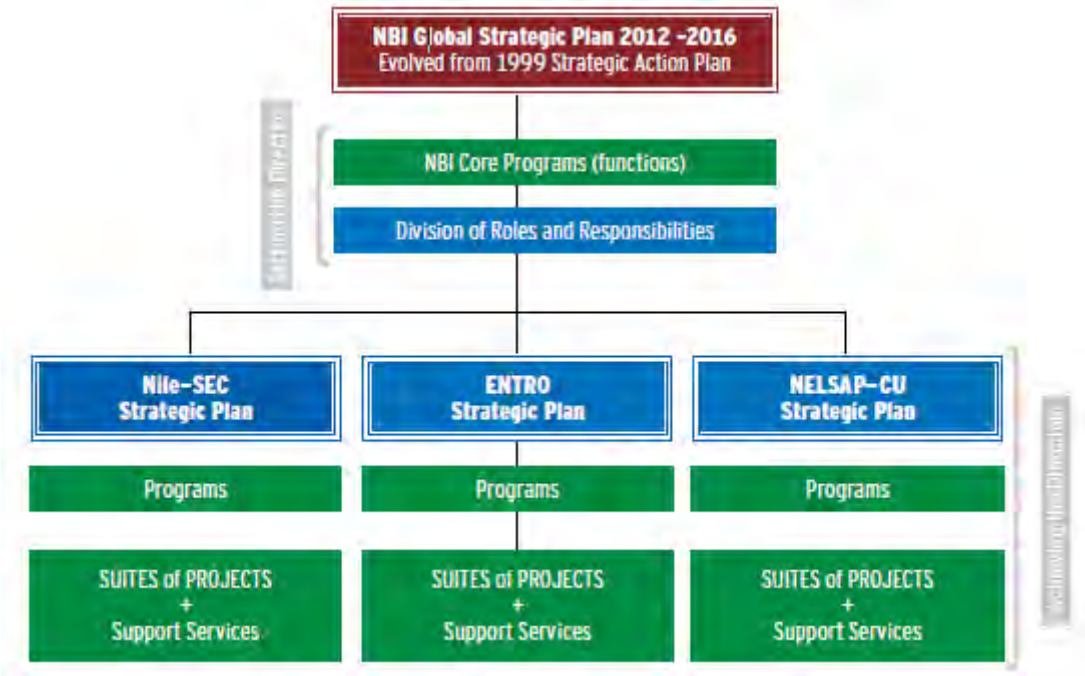
The NBI has implemented two complementary programs in its Strategic Action Plan 1999 aimed at building capacity, trust and confidence: (i) the $136 million Shared Vision Program (SVP) focusing on water resources, the environment, power trade, agriculture, applied training, communication and stakeholder involvement, and benefit sharing, as well as strengthening the capacity of NBI institutions to execute and coordinate cooperative basin wide projects; and (ii) the NBI Subsidiary Action Programs (SAP), comprising the the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and the the Eastern Nile Subsidiary Action Program (ENSAP), promoting trans boundary investments in power development and trade and water resources management and development, with a number of cooperative investment projects conferring mutual benefits having been identified.

In addition, work has been carried out on the formulation of a Cooperative Framework Agreement between the Nile Basin countries for an ultimate transition to the intended Nile River Basin Commission (NRBC). The progress has been achieved despite complicated issues related to the Cooperative Framework Agreement, unilateral development and new needs due to e.g. the independence of the Republic of South Sudan (new NBI member 2012).

NBI Strategic Plan 2012-2016

NBI has elaborated a new overarching NBI Strategic Plan 2012-2016 setting required strategic directions for the three operating Offices of NBI[16]. These Offices have flexibility in crafting their specific strategic plans, including business and activity planning, but have to stay within the global strategic directions within the overarching Plan.

Figure 3-3: Family of NBI Strategic Plans 2012-2016



Specific objectives in the NBI Global Strategic Plan include emphasis on cooperation between and commitment by the member countries, Subsidiary Action Programs, National Focal Points, NBI integrated knowledge management system, streamlined Nile-SEC and financial sustainability.

The Global Strategic Plan is based on a simple three program structure with (i) the Basin Cooperation Program and (ii) the Water Resource Management Program driven by the NBI Secretariat and (iii) the Water Resource Development Program by the two Subsidiary Action Program Centres. Appropriate institutions at national levels or multicountry levels would implement the projects including activities such as design, construction, operations and asset management and maintenance.

A number of donors have expressed support for a five-year Nile Basin Climate Resilient Growth Program (NBCRG), which is part of NBI's Strategic Plan for 2012-2016. The development objective of the NBCRG Technical Assistance Project for Africa is to facilitate cooperative water resources management and development in the Nile Basin to foster climate resilient growth.

Currently, the World Bank is administering a $33 million "Nile Cooperation for Results (NCORE)" project, a first phase of the NCBRG, funded through the Nile Basin Trust Fund and Cooperation in International Waters in Africa (CIWA) Trust Fund. The project is currently schedule to close in April, 2017 and is made up of three components implemented by the three NBI centres as follows:

(i) Support to the Entebbe based NBI Secretariat to carry out its core functions of Facilitating Cooperation and Water Resource Management. Emphasis is on basin-wide cooperation, cooperative management and development of water resources in the Nile Basin, access to NBI

[16] NBI Secretariat at NBI Headquarter in Entebbe (Nile-SEC), NELSAP's Coordination Unit in Kigali (NELSAP-CU) and the Eastern Nile Technical Regional Office in Addis Ababa (ENTRO)

Tools, Knowledge, Data and Communications, stakeholder engagement, cross-centre results and additional activities for South Sudan.

(ii) Support to the NELSAP's Coordination Unit in Kigali in advancing investment opportunities, through promoting sustainable development and planning in the Nile Equatorial Lakes region. Emphasis is on strategic opportunities to advance cooperative water resource management and development, transformative investment projects of regional significance, access to NELSAP-CU Tools, Knowledge, Data, Communications and Dissemination, improving power development and trade, preparation of additional regional investments and support to water sector planning for South Sudan.

(iii) Support to the Eastern Nile Technical Regional Office in Addis Ababa (ENTRO) to implement dam safety related initiatives; manage watersheds, water resources data, information and knowledge bases; integrate social and environmental issues; expand the stakeholder dialogue and consensus; enhance awareness and communicating benefits of cooperation.

3.4.2.1 Nile Equatorial Lakes Subsidiary Action Program (NELSAP)

NELSAP Scaling up Strategy 2005-2010
At its inception, NELSAP started preparation of twelve projects grouped into two areas, the Power Trade and Development and the Natural Resources Management and Development. NELSAP, through its sub-basin office – NELSAP Coordination Unit[17] based in Kigali, has demonstrated effectiveness in the coordination of multi-country preparation of complex regional projects. The most notable energy projects are the Regional Power Trade Project (RPTP) and the Rusumo Falls Hydropower and Multipurpose Project.

The RPTP aimed at facilitating the development of regional power markets among the ten Nile basin countries and build analytical capacity to manage the Nile basin resources. It had two project components: (i) the establishment of a conducive environment to support continued discourse and promote power trade among Nile basin countries and (ii) a comprehensive basin-wide analysis of power development options and trade opportunities in the region.

The RPTP project enabled the elaboration of a number of tools, templates, frameworks and guides to be applied in the development process of the region's resources to ensure sustainability of outcomes. It would seem to be a worthwhile effort to try to put these out into the public domain, e.g. on a web-page. So far only a limited number of people have gained from this considerable investment.

NELSAP Medium Term Strategic Plan for 2012-16
As a result of a multi-stakeholder process, involving the member countries, during most of 2011, a NELSAP Medium Term Strategic Plan for 2012-16 has been developed. The Strategic Plan, SP 2012-16 with a summarized program scope and indicative program budget is presented in Annex 3-17, together with details of the Power Sub-programme and the Water Resources Development Sub-programmes.

3.4.3 Okavango River Basin Water Commission (OKACOM)

The Okavango River begins in Angola, and then forms part of the border between Angola and Namibia before it flows into Botswana, discharging into an endoreic basin, the Okavango Delta, noted for its wildlife. Refer Annex 3-18 for a map over the Okavango Basin. In 1994 Angola, Namibia and Botswana formed the Permanent Okavango River Basin Water Commission (OKACOM), to provide advice to the three countries about the best ways to share the Okavango

[17] There is also a Council of Ministers (NEL-COM) and a Technical Advisory Committee (NEL-TAC) which oversees the work in the NELSAP region and gives strategic guidance to the NELSAP.

River's resources. The OKACOM Agreement (1994) commits the member states to promote coordinated and environmentally sustainable regional water resources development, while addressing the legitimate social and economic needs of each of the riparian states. The three countries recognize the implications that developments upstream of the river can have on the resources downstream.

Drawing on the findings of a 2011 OKACOM Trans boundary Diagnostic Analysis, the OKACOM Strategic Action Programme (SAP) is a basin-wide mid-term planning document, supported by and in accordance with the national development plans and the three National Action Plans (NAPs) for the part of the basin that have been developed in parallel with the SAP. The 2011 OKACOM Trans boundary Diagnostic Analysis noted although energy will affect the basin, it is in a less interactive way, given that the basin is not a major energy producer.

Only one hydropower scheme exists in the Angolan section of the basin and it was damaged during the civil war and is being rehabilitated. Both Angola and Namibia have considered the construction of hydropower schemes. In Angola, feasibility and design studies for three hydropower sites are being prepared, at Lyapeka on the Cuebe River, Malobas on the Cuchi River and Maculungungu on the Cubango River, with target operational dates in 2013. All three are designed as run-of-river schemes, and with the exception of Malobas, with relatively low weirs and small reservoirs. The Malobas reservoir design has a 47 m high dam wall with an active storage of 1,634 Mm3, surface area of 120 km2 and an installed capacity of 84 MW. In Namibia, Popa Falls, where the river drops a few metres, is the only feasible location for hydroelectricity generation. The feasibility of three alternative run-of-river sites associated with this location was considered in 2003, but at present there are no plans to build the Popa Falls Hydropower.

3.4.4 Trans Boundary Cooperation in the Pungwe River Basin

There are five shared water courses between Zimbabwe and Mozambique comprising the Pungwe, Buzi, Sabi, Zambezi and Limpopo rivers, with Mozambique the downstream riparian state. Refer map in Annex 3-19. The Pungwe River is shared by Zimbabwe and Mozambique. The Joint Water Commission (JWC)[18] for the Pungwe River was created in December 2002. Its core functions are to advise the principal states on measures and arrangements to determine potentially available water, utilisation levels, reasonable demand, relevant data and information, criteria for conservation, allocation and sustainable utilisation, and pollution prevention of the common water resources.

In the early 00'ies, Zimbabwe and Mozambique recognised the need for sustainable water management of the river and decided to jointly elaborate a Pungwe River Basin Joint Integrated Water Resources Management Strategy, a framework for the sustainable and equitable management, development and conservation of the water resources of the Pungwe River basin. Sweden decided to support the two countries by strengthening the capacity of the key basin institutions, the Regional Water Administration of Central Mozambique (ARA-Centro) and the Zimbabwe National Water Authority (ZINWA). This support has e.g. led to better coordinated institutions with clearly defined roles and responsibilities, established structures for early warning systems and strengthened capacity of key actors (farmers, smallholders, households, gold panners, etc.).

A 1970 reconnaissance study of possible dams in the Pungwe River basin by a Portuguese consultant came up with proposals for 9 multi-purpose dams, combining irrigation water supply

[18] The key instrument for bilateral co-operation on international waters in the southern African region is the Revised Protocol on Shared Watercourses in the SADC, which addresses key water management issues related to the equitable and sustainable use of shared water resources. The Protocol provides for the establishment of Joint Water Commissions to administer interstate agreements on water affairs, and to provide technical advice.

and hydropower, and 28 hydropower single-purpose dams. The majority of these dams would be located in the tributaries.

The 2005 Final Report on the Development of the Pungwe River Basin Joint Integrated Water Resources Management Strategy, Pungwe River Basin Development Scenario, noted that the potential for development of hydropower in the Pungwe River basin is significant. Preliminary figures indicate that the hydropower potential for a number of large dams in the Pungwe River would exceed 2 TWh per annum. The report confirmed the existence of promising large-scale multi-purpose dams on the Pungwe Mainstream, of which three alternatives, Bué Maria, Pavua and Pungwe 3, were recommended for further feasibility studies. The dams would to variable degrees combine benefits from flow regulation, water for irrigation, flood control and hydropower.

The report also noted the existence of promising sites for small-scale hydropower[19], particularly in the upper catchment but no detailed inventory was made. However, the 1.8 MW Duru scheme in the Eastern Highlands in Zimbabwe was recommended for development by the private sector for power supply to local market and the national grid. This is one of several hydro-electricity projects identified in the Eastern Highlands and it has been studied to pre-feasibility level. However, there appeared to be some environmental concerns on the effect of the project on the scenic falls below the weir due to the diversion of the water.

Although both countries have ratified the revised Protocol on Shared Watercourses in the SADC region and established a Joint Water Commission there appear a further need for a comprehensive bilateral agreement on implementing the joint integrated water management of the water resources in the Pungwe River Basin.

[19] There are no small-scale hydropower projects in the basin at present, although there are hydropower plants at Chicamba and Mavuzi in the adjacent Buzi river Basin and which are currently being rehabilitated. Although the main purpose of the Chicamba dam was hydropower production, these days the operation of the dam also has to take into account the water supply to Chimoio, Gondola and Manica, as the Mozambican Water Law states that they should be given priority in a situation of water scarcity.

4 REGIONAL PROCESSES

This chapter provides an overview of on-going regional processes related to energy cooperation.

The power systems in each of the African regions are very different in terms of their size, interconnectivity, and generating mix. They all face problems of shortfalls and suppressed demand; heavy dependence on hydropower and therefore vulnerability to regional droughts; large untapped hydro resources with limited other indigenous energy; growing importance of coal; some geothermal potential, weak transmission links between the systems and the structure of the power industry differs from country to country. Private participation in the power sectors is still relatively limited, and throughout the region most of the generation and all of the transmission assets are in public hands. Although, there is a growing understanding that regional cooperation can help solving some of these problems, the regions are at different stages of development in the sense that in some regions, like Southern and West Africa, the concept of trading power between utilities is well established.

4.1 Regional Approaches to Energy

There are numerous energy processes under way in Africa. Although some are based on "business as usual" (BAU), others are moving on a low carbon emissions development pathway, in line with the UN initiatives on Sustainable Energy for All (SE4All)[20] and its Post 2015 Global Sustainable Development Agenda, mirrored by the World Bank 2013 Energy Strategy[21].

There are many ways to structure an overview of regional energy processes, but this study has chosen to follow the areas of engagement listed under Regional Approaches in the World Bank 2013 Energy Strategy, although the selectivity of engagements becomes somewhat lost in such an aggregation. The table below singles out the World Bank areas of engagement in the Sub-Saharan Africa region. For comparison, the Author has added a tentative column for Sweden based on his understanding of previous and current Swedish engagements.

Table 4-1: Areas of engagement in Sub-Saharan Africa

Area of Engagement	World Bank	Sweden
Transmission and distribution	●	●
Regional trade and market integration	●	◐
Renewable energy		
Hydropower	●	◐
Solar	●	◐
Wind	●	
Energy efficiency improvement	◐	◐
Geothermal	●	
Natural gas	●	
Improving financial performance, sector planning, and reform	●	◐
Subsidy reform	●	
Access	●	●
Post-conflict reconstruction	●	

Source: World Bank, Author

●= active engagement, ◐= engagement, no symbol=limited or no engagement

[20] SE4ALL has three interlinked objectives to be achieved by 2030: providing universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix.

[21] World Bank 2013 Energy Strategy "Toward a Sustainable Energy Future for All: Directions for the World Bank Group's Energy Sector"

Although the African regions share many common energy challenges, the individual countries also face specific circumstances requiring tailored solutions. Normally the term "regional energy projects" is taken to denote an energy project covering more than one country, as opposed to a national energy project which is within the borders of one country. Commonly used terms are "cross-border project" and "electricity or energy trade projects." Some of the Multilateral Development Banks define a regional project as one with the participation of three or more countries in the region. However, as this study deals with "regional energy cooperation in Africa", there does not appear to be any reason for excluding projects covering only two countries and involving bilateral trade in electricity.

Although the objective of this study would seem to conjure implementation of projects in the region as a whole, as opposed to focussing on individual countries, it is assumed, that there should be recognition that there may well be common themes across regions, in terms of appropriate programmes to consider for implementation. There is potentially a benefit of economies of scale to consider if the same programmes are rolled out on a regional rather than country basis.

4.2 Regional Power Trade

4.2.1 Functions and Mandates of the Regional Power Pools

Power trade in Africa started with bilateral agreements as far back as the 1950's, but the first "power pool", the Southern Africa Power Pool (SAPP) was created in 1995 and is now the most advanced power pool on the continent. SAPP introduced the Short-Term-Energy Markets (STEM) in 2001, which run on daily and hourly contracts. This was followed by the Day-Ahead Market (DAM) in 2003 (with short-term contracts made anonymously through the power pool and where guarantees are required). The Western Africa Power Pool (WAPP) was established in 2001, but the power trade in WAPP is still under bilateral or multilateral agreements and no energy trade has yet started. The Central Africa region established the Central Africa Power Pool (CAPP) in 2003 and the Eastern Africa Power Pool (EAPP) was established in 2005. Both CAPP and EAPP are still under development. The North African countries have an Association of Power Utilities, the "Comité Maghrébin de l'Electricité (COMELEC)" established in 1989. All four power pools in South, West, Central and East Africa and COMELEC are recognized, specialized institutions in their respective RECs.

It seems one can distinguish between at least four groups of processes required to boost regional power trade: (i) development of regional generation, (ii) intra-regional infrastructure; (ii) strengthening of power pools and directorates in charge; (iii) harmonizing regulations and system operating agreements; and (iv) harmonizing environmental and social protection frameworks.

1. Development of regional generation projects, diversifying the energy mix to include hydropower, natural gas, geothermal, wind and solar power, and clean coal. Most investments are large-scale, high-impact projects, blending public and private capital, risk guarantees and creation of institutions and frameworks to attract the private sector.

2. Development of the physical intra-regional infrastructure, including cross-border transmission infrastructures. Master plans and identified priority projects are generally in place, but some technical and economic studies are still missing.

3. Strengthening of the institutional capacity and skills of the power pools and directorates in charge of energy in the RECs within a framework for systems planning and operation of the interconnected system (including technical and commercial codes). Conducive legal and regulatory framework for private participation needs to be put in place, potentially including legally empowering the power pools to act on behalf of RECs (and governments)

on structuring and negotiating power deals with the private sector, e.g. PPAs (Power Purchase Agreements). Rules and procedures need to be put in place. (i) For trading arrangements there are basically three stages of processes, initially bilateral arrangements operating under a framework of intergovernmental and inter-utility agreements and operational rules, with the addition of wheeling agreements in cases where the power has to move through a third country. Next, truly regional trade through Short-Term Energy Market (STEM), which allow versions of hourly, day-ahead, and longer-term contracts and secondary trading of contracts that have been cleared through the market. Finally, the Day-Ahead Market (DAM) with versions of a context of an agreed methodology for trade and the setting of transmission prices on a nodal basis requiring capacity building. A framework for systems planning and operation of the interconnected system (including technical and commercial codes). (ii) Regulations need to be harmonized. (iii) System operating agreements need to be concluded.

4. Harmonizing environmental and social protection frameworks, development plans for the affected areas and necessary activities to mitigate the environment and social impact of the projects.

Annex 4-1 lists organisations involved in regional trade and their mandates.

4.2.2 Regulation

In Southern Africa, the Regional Electricity Regulators Association of Southern Africa (RERA)[22] has developed guidelines for cross-border power projects. RERA is not a regional regulator, in the sense of having authority and power in regulatory matters in the region, but is instead at this stage merely an association of national regulatory institutions. RERA facilitates: (i) Electricity regulatory capacity building among members at both national and regional levels through information sharing and skills training; (ii) harmonized electricity sector policy, legislation and regulations for cross-border trading; and (iii) regional regulatory cooperation. Following a 2007 memorandum of understanding, SAPP and RERA are working together on regulatory policies, legislation, standards and practices and on opportunities for increased public and private investments in the generation of energy throughout the region.

In Western Africa, the ECOWAS Regional Electricity Regulatory Authority (ERERA) was established in 2008 to regulate cross-border electricity exchanges between member states. ERERA is responsible for the regulation of cross-border electricity connections and trading among ECOWAS member States. This includes (i) the establishment of transparent tariff setting methodology for regional power pooling; (ii) adopting technical regulation; (iii) monitoring of regional market operations; (iv) resolving disputes among regional market participants; (v) contributing to the development of regional energy policy and (vi) assisting in building capacity of National Regulatory Bodies.

In Eastern Africa, the Independent Regulatory Board (IRB) was established in 2012 by transforming the Eastern Africa Forum for Energy Regulators (EAFER). IRB is constituted of nominees of the national energy regulators in the EAPP member countries. The IRB imposes regional market rules and grid code, monitors and enforces adherence to the rules, arbitrates disputes related to power exchanges and transactions within EAPP, and sets regulated tariffs and wheeling charges for regional transmission interconnectors. The IRB is to develop in 2 phases from a small office with essential staff to a fully-fledged regional regulator as the power market reaches maturity

[22] The eight current members of RERA are: Electricity Control Board (ECB) of Namibia, Energy & Water Utilities Regulatory Authority (EWURA) of Tanzania, Energy Regulation Board (ERB) of Zambia, Institute for Electricity Regulation (IRSE) of Angola, Lesotho Electricity Authority (LEA), National Electricity Council (NECO) of Malawi, National Energy Regulator of South Africa (NERSA) and Zimbabwe Electricity Regulatory Commission (ZERC).

In Eastern and Sothern Africa, the Association of Energy Regulators for Eastern and Southern Africa (RAERESA) was established in 2009 by seven energy regulators from COMESA countries.[23] The main objectives of RAERESA fall into four broad categories, namely to facilitate: (i) energy regulatory capacity building; (ii) harmonized energy policy, legislation and regulation for cross-border trading; (iii) inter regional cooperation; and (iv) regional energy regulatory co-operation. The functions of include: (a) monitor and evaluate energy regulatory practices; (b). develop, conduct and manage information and capacity building projects for national energy regulators; (c) promote and support the development of independent energy regulators in the COMESA countries where there are none; (d) prepare position papers; (e) facilitate the co-ordination of energy trade and systems operations in conjunction with the power pools and national control centres; (f) promote the establishment of norms and standards; and (g) establish working relationships with other agencies that promote development and co-ordination of energy related matters.

Grid Code

Prior to the recent decade's restructuring and opening up of the electricity supply industry, all aspects of the supply chain, generation, transmission and distribution, were (usually) in the hands of a single entity. Technical and operational standards were therefore easy to define since they could be tailored to the requirements of a single company. Following the restructuring it has become necessary to draw up rules for planning and operation of the power system with a distribution of roles and responsibilities. The technical rules and procedures have become established as "Grid Codes".

The WAPP Operating Guidelines, which are based on the UCTE Operation Manual[24], aims at ensuring that Transmission System Operators (TSOs) of the WAPP operate the interconnected Western African network efficiently and effectively and that they participate equitably in the obligations and in the benefits resulting from the Interconnection.

The EAPP/EAC has recently carried out a review of member country Grid Codes and proposed an EAPP/EAC Interconnection Code. There were some differences in the amount of details in the four country Grid Codes submitted (Ethiopia, Kenya, Sudan and Uganda), but they can easily be developed to align with the requirements of the EAPP/EAC Interconnection Code.

There are a number of national grid codes in the Southern African countries, e.g. South Africa, (Transmission Grid Code 2005, Distribution Code 2007 and Wind Connection Code 2011), Namibia (2005), Zambia (2013) and Zimbabwe (2005), but the Study did not find a SAPP Grid Code.

4.3 Renewable Energy

The potential for renewable energy development in Africa is high. The main sources of renewable energy include large and small scale hydro-power, biomass, wind, solar and geothermal. To capture the "processes" in such a vast subject, this Study has taken inputs from various "gap" analysis carried out by different organisations to establish country status vis-à-vis the SE4ALL renewable energy target, refer Annex 4-2.

Tanzania is involved in most of these processes. In Zambia, although measures by the Electricity Regulatory Board (ERB) to stimulate off-grid electrification are in place, e.g. license fees are not

[23] Ethiopia, Egypt, Kenya, Madagascar, Malawi, Rwanda and Sudan. Associate Members (Independent Energy Regulator not yet established) are: Democratic Republic of Congo, Burundi, Comoros, Djibouti, Eritrea, Libya, Mauritius and Seychelles.

[24] The Union for the Co-ordination of Transmission of Electricity (UCTE) coordinates the operation and development of the electricity transmission grid for the Continental European synchronously operated transmission grid.

paid by solar investors; Zambia lacks "smart subsidies"; there is no specific procedure for off grid systems; development of Renewable Energy Feed in Tariffs (REFITS) is yet to be undertaken and Power Purchase Agreements are applied on case by case basis with a different tariff from ZESCO. Mozambique has published a "Renewable Energy Atlas" indicating the potential calculated for solar, wind, biomass, hydropower, geothermal and ocean energy. It also highlights areas or locations earmarked for possible energy projects based on these six renewable resources, proposing their sizes and highlighting their priority levels.

Feed-in-Tariff
Governments sometimes mandate or authorize subsidies to meet a social objective such as promoting electrification or encouraging renewable energy. Another avenue to promoting renewable energy is the use of feed-in-tariffs. There are two main methods for setting Feed-in-Tariffs (FITs) in developing countries. (i) The "avoided-cost method" is to base the FIT payments on the value of the corresponding generation to the utility or society. This approach, used in Tanzania, requires estimating the costs that the utility or society will avoid by purchasing power generated from a renewable source. (ii) Base the FIT payments on the estimated cost of generation for each designated renewable energy technology, assuming that the developer has made a least-cost investment and will operate efficiently. This method, which has become the more common, used e.g. in Kenya, Rwanda, Mauritius and Uganda, is known as the standardized, cost-reflective, technology specific method.

There are on-going processes both introducing and fine-tuning the FiTs, involving e.g. capacity payments, periodic adjustment mechanisms and proposed donor-funded FIT "top-up" programs.

South Africa had a major shift in government policies for promoting renewable generation. In 2009, the National Energy Regulator of South Africa (NERSA) proposed to FITs to set prices for purchases of energy from renewable generators. In 2011, the South African government announced that the regulator's planned administrative determination of FITs was not legal. Instead, the government decided that all independent renewable energy generation would be acquired through competitive procurements. The first two rounds of bidding (2012) were open to both large and small renewable power producers and were quite successful, but it is premature to reach any firm conclusions as to its ultimate effectiveness. The South African government has recognized that the full-fledged bidding program might not be best for promoting small power producers. SPPs and has been planning to conduct a separate Small Projects Procurement Programme for renewable energy generators between 1 and 5 MW.

4.4 Energy Efficiency Improvement

Considerable savings can be made from various energy efficiency programmes. The 2013 SAPP Energy Efficiency Framework, which was set up to provide an understanding of the energy efficiency measures being implemented in the SADC region, highlights "low hanging fruits" which are the low-cost quick solutions and other no-cost interventions, but also various interventions needed to be implemented including high cost measures with short payback periods.

The 2013 SAPP Efficiency Framework and the 2012 SADC's RIDMP, Energy Sector Plan, note that energy efficiency improvements are and will be achieved largely via enabling instruments and interventions. These will include *inter alia* economic and legislative means, efficiency labels and performance standards, energy management activities and energy audits, as well as the promotion of efficient practices and therefore has a longer term goal.

The Study reviewed the current energy efficiency programmes. The programmes in Zambia and Tanzania are shown in Annex 4-3, together with an Author composite list for Mozambique. The study arrived at a list of 31 potential Energy Efficiency and Load-shifting measures (projects), from the needs assessment study, discussions with the SAPP members and international practice in Energy Efficiency. These processes are shown in Annex 4-4. Although these measures were

deemed representative for the energy efficiency processes, the study filtered out 17 measures for low impact and for potential to be combined with other measures. The remaining 16 are shown in bold. There is a role for all stakeholders in developing and implementing sustainable EE projects, not just utilities. For example, Regulators can play a role by incentivising efficiency in various functions of utilities and by developing or adopting standards, and government departments can ban inefficient technologies. The role that the Regional Power Pool can play needs to be carefully considered, especially in view of the emerging Regional Centres for Renewable Energy and Energy Efficiency (refer below).

In the end the 2012 SAPP Needs Assessment Study on Energy Efficiency recommended four high priority projects (i) Distribution loss reduction projects; (ii) Capacity building in Measurement and Verification (M&V) of EE and load-shifting projects; (iii) Awareness campaign library; and (iv) Tariff setting principles.

Regional Centres for Renewable Energy and Energy Efficiency
The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), established in 2010 with assistance from UNIDO, Spain and Austria, has demonstrated leadership in the development of regional renewable energy and energy efficiency policies, the execution of technical programmes, as well as in the operation of the ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX).

In 2012, SADC and EAC requested UNIDO's assistance with the replication of the ECREEE model in Southern and Eastern Africa. The East African Center for Renewable Energy and Energy Efficiency (EACREEE) was approved in April, 2014 and is expected to be operational by the end of 2014. UNIDO, EUEI PDF, and ADA (Austria) are now working with SADC to design the proposed SADC Centre for Renewable Energy and Energy Efficiency (SACREEE).

The Regional Centres will (i) contribute to the creation of an enabling environment for regional renewable energy and energy efficiency markets by mitigating existing barriers; (ii) execute cross-border activities in the areas of policy and regulatory frameworks, capacity development, and knowledge management; (iii) help raise awareness, and (iv) promote business and investments.

4.5 Improving Financial Performance, Sector Planning and Reform

Financial Performance
There are many technical assistance processes aimed at improving utility management and technical operations, internal accounting, external auditing, involving financial and operational information and reporting systems, etc. However, the performance of the prevalent State-owned power utilities is still poor in Africa compared to other regions. *Performance contracts* have been attempted with mixed results. Processes are underway in different countries trying to address supply-side efficiency improvements targeting technical and commercial losses and revenue collections. *CREST,* the Commercial Reorientation of the Electricity Sector Toolkit, is a World Bank initiative (West Africa and Mozambique) based on good practices from mainly India with a "bottom-up" approach designed to attack system losses, low collection rates, and poor customer services. Under-pricing of energy is one of the main reasons for poor financial performance of many utilities, especially state-owned.

Several African energy projects have raised serious governance, oversight and transparency concerns. Although a difficult area to tackle generally, there is an emerging process involving corporate governance in power utilities, e.g. ZESCO has expressed its desire and commitment to strengthen good corporate governance and compliance procedures within the company and is in the process of contracting a Consulting Company to assist with this.

Sector Planning
There are many energy planning processes going on in Africa, including regional integration, long-

term sector planning, integrated resource planning (a tool for balancing the needs of the various economic sectors), energy plans (electricity and other plans at national level with the grid electricity plan based on generation and transmission plans), processes around PPP policies to allow governments to procure investments from the private sector, etc.

Reform
The performance of the power sectors in many African countries have fallen short of expectations. High system losses, large amount of accounts receivable and inadequate tariff have been affecting the financial viability of utilities and attractiveness for investment. Acute scarcity of resources has hindered financing of the huge costs required for the sector developments. Absence of adequate financial and commercial autonomy and lack of adequate incentives have resulted in inefficiencies in the utilities' management. This has caused Governments to undertake restructuring of the power sectors, the main elements being restructuring power utilities and markets, regulation, competition, and the role of public and private participants.

Different attempts are made to put in place conducive environment for attraction of capital for development of the power sector, private sector participation, vertical and horizontal unbundling, improving operational and financial performance of the utilities; promotion of regional electricity trading by interconnecting the national grid with the grids in the region, etc.

4.6 Subsidy Reform

High and volatile oil prices in recent years have hampered efforts in many countries to make energy affordable and a number of governments have responded to the price increases by freezing prices for months or even years, only to be caught by rapidly expanding unsustainable subsidy bills. Governments have then had to reform the subsidies so they become fiscally sustainable. Subsidy reform, e.g. replacing price subsidies with targeted assistance, increases incentives for energy conservation and energy efficiency improvement, reduces the subsidy bills for governments, and attracts more investment to the sector by enhancing the prospect of cost recovery.

Sometimes, subsidies are needed to ensure that poorer households are able to benefit from electrification schemes. Several countries have had processes designing subsidy policies. Such policies should provide benefits to targeted consumers only. Key issues in that relation: Nature and scope of lifeline tariff, with possible differences between urban and rural areas and subsidies/easy instalment payments for initial household connection costs. The subsidy policy should ensure that subsidies do not leave the power utilities financially crippled, perhaps by a surcharge on better-off consumers to generate funds to finance subsidies. In addition, the policy should make sure that no strain is put on the budget of the Government (or its development partners), perhaps involving a taper/exit policy, i.e. subsidies are reduced/eliminated over time and they should be coordinated with the subsidies provided for off-grid rural electrification. The main Parties involved in designing subsidy policy/scheme would be relevant Ministries, the Regulator, Utilities and Rural Energy/Electrification Agencies.

4.7 Access and Rural Electrification

4.7.1 Functions and Mandates of Rural Electrification Implementers

Most SSA countries are in a transition phase due to recent power sector reform processes aiming at opening the sector to new operators. These processes have been constrained by lack of country commitment, macroeconomic and political crises and lack of experience with political economy factors. Thus desired outcomes (better service quality, improved government fiscal position, affordable access for the poor, etc.) have been only partly achieved. There have also been many

unfortunate experiences for investors, think ENRON, AES, etc. It seems the overall disappointing view outweighs some good experiences.

Rural electrification (RE) was historically high voltage/medium voltage extensions by public utilities to local administration centres, but with low density low voltage (LV) electrification, high costs due to inappropriate standards and cost-inefficiency due to low demand. In an attempt to "unleash the private sector" to bring in extra capital, higher efficiency and new multiple [private] actors, many countries decentralised rural electrification and created Rural Energy/Electrification Agencies and Funds.

Today, RE implementation in SSA displays an approach spectrum from 'no change' to full decentralized rural electrification through PPP Implementation[25]:

- Countries with Ministry of Energy in charge of planning where public utilities build and operate the networks (e.g. Ghana)
- Countries with laws accepting new RE utilities, but majority of financing still into grid extensions (e.g. Zambia, Uganda)
- Countries in transition to building up new utilities (e.g. Tanzania)
- Countries building up rural electrification with new utilities (e.g. Senegal, Mali)

Senegal and Mali have opted for full PPP RE characterized by:

- The incumbent utility concession is limited to areas it serves and excluded from further participation
- New procedures aimed at PPP with independent distributors
- "Top- down" national or regional projects: areas prioritised, calls for tender to find operators
- "Down- top": calls for tender, promoters propose local projects developed by private stakeholders
- BOT contracts
- Initial investment subsidy (50 -70%), no further operation subsidy

However, at the same time there are countries with traditional 'pre-reform' RE schemes: with government fixing global milestones and grid extension planning left to utilities. This is often the cheapest way to reach new consumers, often necessary for equitable regional development and in most countries between 80 to 95 percent of the unserved communities are targeted to receive electricity supply through grid extensions, with off-grid solutions suitable for populations far from the grid or with small demand.

There is no evidence for the superiority of any specific institutional model for electrification, e.g. the choice between the REA/REF and the conventional concept for RE and whether the cost-advantages of centralised rural electrification from economies of scale (in finance, investments and management) and of scope (integration of planning, securing of investment finance and implementation) are superior to allowing multiple private actors in de-centralised RE, or vice-versa. The World Bank has pointed to some successful cases based on public/ private/cooperative models and REAs.[26] Mostert has suggested to use the centralized RE approach for grid extensions in combination with REA/REF for off-grid electrification.[27]

[25] Karhammar, R,. 2011. *REAs/REFs in Rural Electrification: A Review of three EU Rural Electrification Reports*. EUEI-PDF. Presentation made at the AEI Workshop of African Electrification Practitioners, Dakar, 14 November 2011.
[26] World Bank. 2010. *Addressing the Electricity Access Gap.* The World Bank: Washington, D.C.
[27] Mostert, W. 2008. *Review of Experiences with Rural Electrification Agencies, Lessons for Africa.* Report prepared for the European Union Energy Initiative- Partnership Dialogue Facility (EUEI-PDF).

4.7.2 Access

Access to electricity is a very wide subject. Describing “processes” in such a vast subject can be "cut" in many ways, but it would seem reasonable to take a “clue" from the discussions within the framework of the Africa Electrification Initiative (AEI).

One of the main obstacles for SSA electrification practitioners is the difficulty in obtaining practical and timely knowledge on how to overcome economic, technical, institutional, and political barriers to electrification in their day-to-day work. Launched in 2008, the AEI seeks to create and sustain a living body of practical knowledge and a network of SSA practitioners for the design, development, and implementation of rural, peri-urban, and urban on-grid and off-grid electrification programs. The list of processes in Annex 4-5 attempts to capture recent AEI discussion topics.

Tanzania with its very active Rural Energy Agency has been involved in the majority of these processes. As an example, Tanzania has with the Sida supported Small Power Project, which focused on the development of scalable, economically and financially feasible off-grid electrification alternatives, put in place all the preconditions for a successful private sector-driven renewable energy program: a comprehensive policy and regulatory framework supporting small energy projects (including Standardized Power Purchase Agreements, Standardized Small Power Tariffs, simplified rules and guidelines for project developers); supportive institutional structure; matching grants and performance subsidies for mini-grids and micro-grids; a credit line to provide long-term financing to renewable/rural energy projects through local commercial banks; and a carbon finance instrument that provides an additional contribution to the equity requirement to reach financial closure. The Zambia Rural Electricity Authority and FUNAE in Mozambique (somewhat of a mixture of a REA and REF) have had less involvement in some “AEI defined” processes, particularly promoting the private sector, e.g. small power producer inducements/tariffs, etc.

4.8 Complementarity and Overlap

There are many Donors and Financing Institutions wanting to support the regional institutions in regional trade and regional electrification with focus on capacity building. However, it is very challenging for the regional institutions to implement so much all at once and also for the Donors and Financing Institutions to coordinate their priorities and support. One might have thought that some of the regional institutions, e.g. the SADC Secretariat and the SAPP ought to be self-propelled by now and no longer in need of donor financing, although continued dialogues would be important. However, there are some obvious gaps.

Despite the formally recognized role of RECs and their importance, the capacity of each REC to achieve its mandate largely depends on the level of resources and political commitment from its member states. Given the institutional and resource limitations facing e.g. the EAC Energy Secretariat; it only includes one director responsible for all Productive and Social Sectors, one energy officer and ancillary staff; assistance from the international community to strengthen its role and meet the capacity constraints would seem vital.

Inadequate project preparation funding is a key constraint to mega/transformative projects in the power sector, including dams, connecting HV transmission projects and PPPs. A recent ICA Report[28] details the inadequate support provided by the project preparation facilities (PPFs) and other funding sources. A synopsis is provided in Annex 4-6. The report points to the needs for co-ordination around a combined funding approach, especially regarding large transformative projects, which cannot be developed solely by PPF resources. It is suggested that PPF funds should

[28] *Assessment of Project Preparation Facilities for Africa*, November 2012, by Cambridge Economic Policy Associates Ltd in association with Nodalis Conseil.

be used to facilitate initial project development activities with other resources being used for subsequent preparations. The report high lights the need for African budgetary resources and support from new donors as well as traditional ones. In June this year, a Project Preparation Facilities Network (PPFN) was launched in Tunis. This PPFN is an “alliance” of funding facilities dedicated to sustainable infrastructure in Africa. The PPFN is managed through the ICA.

5 SUPPORTING PRIVATE SECTOR ENERGY INVESTMENTS

According to the Africa Infrastructure Country Diagnostic (AICD), addressing Africa's chronic power problems and implementing regional trade will require major spending in power infrastructure, amounting to some $41 billion per year. The sheer size of Africa's energy infrastructure needs is well beyond the various Development Banks, Development Agencies and Financial Institutions' financial resources, but it may not be beyond the private sector's - provided there are sufficient incentives to invest. Outside of the traditional forms of financial and non-financial assistance, there are increasing efforts to use alternative financing models to encourage greater involvement from the private sectors of both the developed and the developing world through a variety of forms of finance.

5.1 Challenge Funds

The challenge fund (CF) mechanism is an effective and versatile financing instrument to channel public money for development. The core feature of a challenge fund is its open and competitive application progress, providing successful applicants a once-off, limited duration grant to help them overcome risks and uncertainties that inhibit innovation, research and development, investment, and pioneering of new approaches. Without the CF support, such activities are unlikely to happen at all, or if they do, may only happen much later.

A distinguishing characteristic of the CF mechanism is that, while application is open and competitive, disbursements are made to a limited number of applicants – those deemed to reflect the best ideas and offer the greatest prospect of success and long-term impact. Additionally, if successful applicants are private institutions, they are required to match or exceed the funds requested (in cash or in kind), ensuring buy-in from the implementing agency.

A catalogue of challenge fund implementations is set out in Annex 5-1. This has been populated using project descriptions from other challenge fund literature and donor websites. The catalogue does not form an exhaustive list and there may be additional examples that have not been included.

Generally it seems that Energy Challenge Funds can be divided into the following four groups:

1. Direct energy orientation
2. General challenge fund, where energy is one or a few of several windows
3. Climate change oriented funds, with energy as an important consideration
4. Innovation funds using technology to enable improved or increased access to energy [and often water or ICT] services

Examples of this division are provided below:

1. Direct energy orientation

The United States African Development Foundation (USADF) Off-Grid Energy Challenge, is a $2.4 million partnership with General Electric Africa (GE), which awards grants of up to US $100,000 for projects focused on increasing sustainable energy access – particularly off-grid solutions – extending the delivery of electrification to un-served and underserved communities in the target countries. The renewable energy technologies include solar, biogas, biomass, hydro, wind, direct use geothermal and hybrid systems.

It aims to achieve (i) Increase electrical generation; (ii) Expand electricity access – delivered through off-grid or micro-grid solutions; (iii) Extend individual and business access to electrical

power; and (iv) Will give special focus to off-grid solutions that employ renewable resources and power economic activities.

In Round One, the Challenge awarded grants of up to US $100,000 to six winners in Kenya and Nigeria. In 2014, proposals of up to US $100,000 per award will be considered and approximately eighteen awards are anticipated. USADF will consider proposals from 100% African owned and 100% African managed enterprises, associations or organizations. The organizations must not be government owned or operated in any way.

The Off-grid Challenge is part of *Power Africa*, refer 5.2 below.

The Great Energy Challenge Grantee: Solar Electric Light Fund, is a National Geographic Society program aiming at providing power for vital operations of two villages and cultivate farming opportunities via PV-powered water management systems in Benin. The long-term goal is to provide a development model for much of West Africa, where conditions are similar to those in northern Benin. The Great Energy Challenge grant program awards roughly a half-dozen grants per year. The goal of the grant program is to hasten the growth of promising, global energy solutions as a response to climate change, energy resource constraints and environmental limitations.

2. General challenge fund, where energy is one or a few of several windows

The Africa Enterprise Challenge Fund (AECF) which started operations in 2008 provides grants and conditional loans between USD 250,000 to 1.5 million to businesses who wish to implement innovative, commercial viable, high impact projects in (sub-Sahara) Africa. The fund is a major fund financed by Sida and a number of other donors. It has several windows with different focus, criteria and application rounds, some of which are country specific, other that are focused on themes such as agriculture, financial services, renewable energy and technologies for adapting to climate change agro businesses. The **AECF REACT window** funds business ideas that are based on renewable energy and adaptation to climate technologies. Key strands within REACT include (i) Increased access to low cost, clean energy for rural businesses and households, (ii) Products and services that help smallholder farmers adapt to climate change, and (iii) Financial services that increase access to finance for low cost clean energy and climate resilient technologies or catalyse financial solutions.

3. Climate change oriented funds, with energy as an important consideration

The Nordic Climate Facility (NCF), financed by the Nordic Development Fund (NDF) and administrated by NEFCO, finances projects that have a potential to combat climate change and reduce poverty in low-income countries. NCF encourages and promotes technological innovation in areas susceptible to climate change such as: energy, transport, water and sanitation, health, agriculture, and forestry and other areas related to natural resource management. NCF is based on calls for innovative proposals comprising specific themes related to climate change. The best proposals may receive grant co-financing amounting to between EUR 250,000 and 500,000. The project must be implemented in at least one of the following eligible countries: *Africa:* Benin, Burkina Faso, Cape Verde, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Rwanda, Senegal, Tanzania, Uganda, Zambia, Zimbabwe, *Asia:* Bangladesh, Cambodia, Kyrgyz Republic, Lao PDR, Maldives, Mongolia, Nepal, Pakistan, Sri Lanka, Vietnam, *Latin America:* Bolivia, Honduras, Nicaragua.

4. Innovation funds using technology to enable improved or increased access to energy [and often water or ICT] services

GSMA Mobile-Enabled Community Services (MECS) programme/MECS Innovation Fund

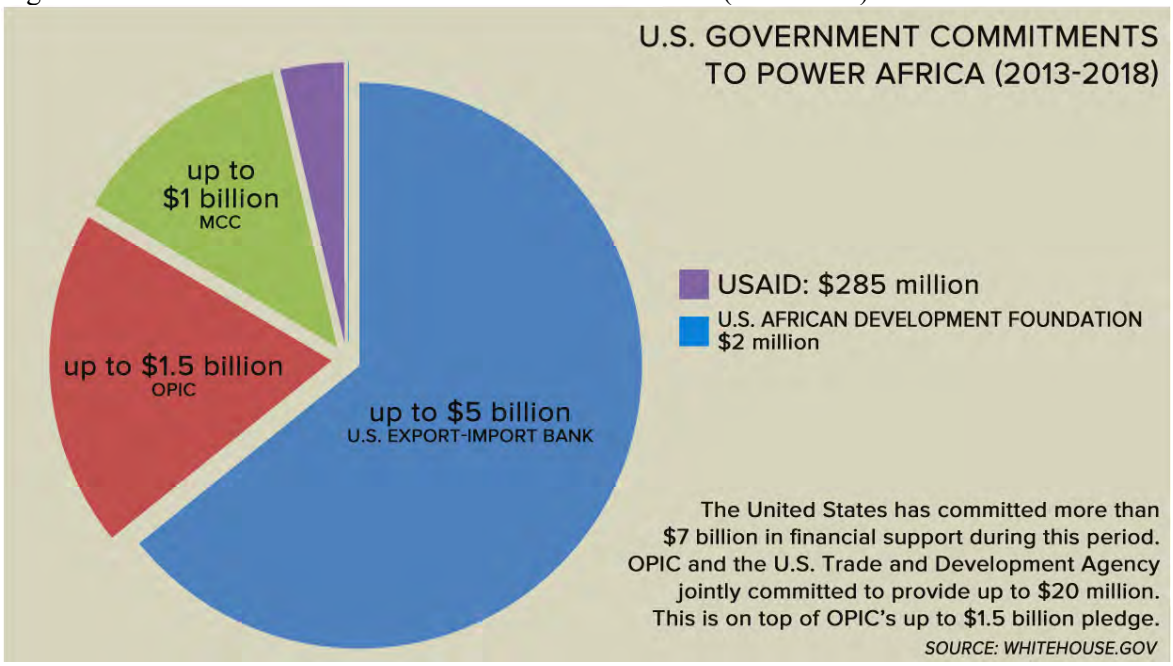
Established with the support of the UK Government the MECS Innovation Fund will provide up to £2.4M in grants. The Innovative Fund concentrates on the use of mobile technology for improved access to water and energy and provides two types of grants; (i) Seed Grants: up to £200k in funding, 25% matched by grantee to support early stage innovations; (ii) Market Validation Grants: up to £350k in funding, 50% matched by grantee to support partnerships between mobile network operators and community service providers. There is a two stage application process: concept note and if successful, full application. Funding decisions are made by an independent assessment panel. Technical assistance (TA) is provided (MECS discretion) to support the development of applications, and implementation of projects.

'Pros and Cons for Sida Involvement
Sida has already established two CFs and has contributed to several, e.g. the AECF. Sida's CF Guidelines highlights lessons learned, including an overall positive assessments of micro level impact, although reviews so far has been mainly on management issues rather than impact. The Guidelines notes that leverage of private capital seems to depend on the size of the participating companies, the delegation to professional fund management has been successful and a dual application system (initial concept and if successful, full proposal) is required. This study concurs with the Sida CF Guidelines encouraging the use of CFs as a method to achieve development results, subject to adhering to the lessons learnt.

5.2 Power Africa

Power Africa was announced in June 2013 as a $7 billion U.S. commitment to the energy sector in Ethiopia, Ghana, Kenya, Liberia, Nigeria, and Tanzania, aiming at increasing electricity access by 20 million households and businesses and electricity generation by 10,000 megawatts over the next 5 years. The plan includes efforts to improve energy governance systems and national energy plans, as well as investments from the Export-Import Bank, the Overseas Private Investment Corporation, the Millennium Challenge Corporation, USTDA and USAID. Power Africa will develop renewable and natural gas resources. Power Africa also includes $9 billion in commitments from the private sector, including General Electric, Heirs Holdings, Symbion Power, Aldwych International, Harith General Partners, and Husk Power Systems.

Figure 5-1: U.S. Government Commitments to Power Africa (2013-2018)



Source: Devex

Power Africa is built on a new development model, aimed at advancing catalytic transactions, supporting policy reforms and improved governance, and mobilizing financing to bring projects to fruition. Power Africa's private sector driven transaction-based approach looks to accelerate projects toward financial close as roadblocks are identified and addressed through joint dialogue and action among the private sector, host country governments, and donors.[29] The Power Africa 2014 Annual Report points out that Power Africa's transaction advisors, who serve as a bridge between host governments and the private sector, play a critical role in facilitating the dialogue between private sector companies advancing these projects and the government agencies and energy sector institutions critical to the completion and long-term economic viability of the projects.

The Power Africa 2014 Annual Report notes that the initiative has already reached 25 percent of its overall megawatt goals and the $7 billion public investment has so far leveraged $18 billion in private capital. However, it appears that this has been achieved in large part because of deals that have been in the works for several years.

The long-term re-authorisation of Ex-Im Bank, the key player in Power Africa providing $5 billion of the $7 billion pledge, is a looming concern. Only in September, 2014 and after a divisive re-authorisation battle along ideological lines did Congress vote to reauthorise the Ex-Im Bank, but only through June 30, 2015. There are some other issues with the Ex-Im Bank, which is at its core an export credit agency with a mission to sustain US businesses and jobs. Besides lingering doubts about Ex-Im Bank's ability to meet the $5 billion target by 2018, it is not bound by a development mandate, so there are little formal incentives to address of potential social and environmental harm of its transactions. Although the Ex-Im Bank has been directed by Congress to set aside 10% to renewable energy, it has consistently failed to do so.

During the US- Africa leaders' summit in August 2014, the World Bank announced a $5 billion commitment to Power Africa.

[29] Power Africa Annual Report July 2014

Sweden has also announced that it will join the Power Africa Initiative, although the details are still somewhat obscure. The Swedish Government webpage[30] says commitment to catalyse investments of USD 1 billion linked to the initiative and Devex talks about Sweden having committed $1 billion, which will include credit guarantees and other measures to help mitigate the risks to private sector investors in African energy.[31]. Power Africa's currently earmarked support to private sector involvement in off-grid or renewable investments is very small in comparison with the on-grid activities. It is thus recommended that Sweden supports off-grid power and renewable energy development as part of its Power Africa engagement.

5.3 African Infrastructure Fund (AIF)

The African Infrastructure Fund (AIF) was a private equity fund established in 2000 to invest in infrastructure projects in partnership with the private sector. AIF was managed by Emerging Capital Partners (ECP), a Pan-African private equity firm, which invested in approximately 55 companies and has fully exited over 31, achieving an average return of three times its initial investments. ECP has seen a high demand for capital in African markets and in the past several years' positive shifts to open-market philosophies and improved macro-economic fundamentals.

- The AIG African Infrastructure Fund (AIF), ECPs first independent fund in 2000 – a US$407 million multi-purpose 10-year term private fund – was sponsored by AIG and the International Finance Corporation. The fund's advisory board included several notable members, such as Nelson Mandela and former African National Congress general secretary Cyril Ramaphosa. AIF was advised by Emerging Markets Partnership (EMP), which also operated the AIF.
- ECP Africa Fund II, ECP's second major pan-African fund, closed in May 2007 with US$523 million. At the time, it marked the largest private equity fund ever raised for investments across the African continent. Africa Fund II was established to seek majority or minority positions in companies through equity, quasi-equity and convertible debt instruments, with a focus on telecommunications, natural resources, financial services, agribusiness, transportation and utility businesses.
- ECP Africa Fund III was closed in June 2010 at US$613 million, bringing the total capital raised to US$1.8 billion and more than US$1 billion invested.

AIF's investment strategy was to invest in Africa's infrastructure sectors including telecoms, natural resources, agro-industry, transportation, power and water among others. The fund's investments typically ranged USD 10.0 – 50.0 million, in projects or companies with total valuations of USD 25.0 – 500.0 million. AIF took significant minority positions, generally 10% to 50% of the company's equity, which were complemented by strong minority rights and board representation.

'Pros and Cons'for Sida Involvement

In 2002, the EMP fund's manager, former World Bank Vice President for Africa, Edward V.K. Jaycox asserted that the AIF's objective was to make money for its investors. "There is absolutely no trade connection, no political connection, no developmental element," he said, speaking of the fund. Jaycox recalled that the fund's expected rate of return is a minimum of 30%, and as such, he reiterated, "We are not in the charity business. We are actually looking for the best possible vehicles to make money for our investors." Thus, reputational reasons would seem to discourage Sida involvement.

[30] http://www.government.se/sb/d/18341/a/244287

[31] https://www.devex.com/news/sweden-joins-power-africa-with-1b-commitment-84052

5.4 Sustainable Energy Fund for Africa (SEFA) and African Renewable Energy Fund (AREF)

Sustainable Energy Fund for Africa (SEFA)

In many African countries, smaller clean energy projects are potentially viable from a commercial perspective but the initial development costs often prevent these from accessing necessary financing. Launched in 2012, the Sustainable Energy Fund for Africa (SEFA) was set up as a bilateral trust fund administered by the AfDB and financed from Denmark to support small and medium clean energy and energy efficiency projects in Africa by providing advisory, grant resources for technical assistance and capacity-building, as well as investment capital, to both off-set preparation costs and crowd-in additional investment. In September 2013, SEFA was scaled up from a bilateral to a multi-donor trust fund when the United States Agency for International Development (USAID) became the second anchor donor. SEFA operates through three financing windows:

	Project Preparation Grants	Equity Investments	SE4ALL and Enabling Environment
Scope **(Size range)**	Preparation support to RE/EE Projects (CAPEX USD 30m-200m)	Seed/growth capital for RE Projects (CAPEX USD 10m-80m)	Enabling environment for private investments and SE4ALL activities
Financing Instrument	Grants to project developers/sponsors	Equity and TA through a Private Equity Fund	Grants for TA & capacity building of public actors
Management	SEFA Secretariat	Berkeley Energy	SEFA Secretariat/ SE4ALL Africa Hub
Resource Envelope	USD 15 million	USD 35 million	USD 6 million

SEFA is structured to respond to requests originated or championed by AfDB staff. In June 2014 SEFA had approved USD 5.8 million in (five) project development grants, a further five (5) grants were being appraised (USD 4.2m) and four (4) grants were in the pipeline (USD 2.8m). SEFA had also co-sponsored an innovative private equity fund.

'Pros and Cons' for Sida Involvement

The SEFA fund has opened up to new donors and AfDB is pushing SEFA to be one of Africa's leading facilities for realizing the Sustainable Energy for All (SE4All) Initiative. SEFA would seem a good candidate for Sida support.

African Renewable Energy Fund (AREF)

In March 2014, the African Renewable Energy Fund (AREF), a dedicated renewable energy fund focused on Sub-Saharan Africa, was launched with US $100 million of committed capital to support small- to medium-scale independent power producers (IPPs). The fund, headquartered in Nairobi, is targeting a final close of US $200 million within the next 12 months to be invested in grid-connected development stage renewable energy projects including small hydro, wind, geothermal, solar, biomass and waste gas. The fund will target IPPs with an ideal size of between 5 and 50 MW and a commitment per project of between US $10 million and US $30 million, with the capacity to source further funding from co-investors where necessary for a larger investment.

AfDB and SEFA are the fund's lead sponsors, each contributing an equity investment of US $25 million with US $4.5 million from the Global Environment Facility (GEF). SEFA will additionally fund a US $10 million Project Support Facility (PSF), which will provide resources to be deployed at an early stage to structure bankable deals.

The investor group currently also includes West African Development Bank (BOAD), Ecowas Bank for Investment and Development (EBID), Nederlandse Financierings-Maatschappij voor

Ontwikkelingslanden N.V. (FMO), Calvert Foundation, Berkeley Energy and the African Biofuel and Renewable Energy Company (ABREC). ABREC is owned by 15 African Nations and five financial institutions and specializes in developing, managing and advising public and private sector renewable energy and energy efficiency initiatives and projects. Berkeley Energy is the fund manager of AREF.

AREF's primary technology focus is on the mature wind, small hydro, solar and geothermal solutions, with the ability to consider broader technology options such as stranded gas and captive biomass. Thus AREF is expected to have a significant impact in facilitating greater private capital inflows into clean energy technology industries across Africa, while lowering greenhouse gas emissions currently associated with the energy sector. By investing in clean technology solutions, AREF will assist Governments in meeting their renewable energy (RE) and carbon emission targets, while contributing to job creation, income generation, increased delivery of services and Government revenues. AREF's geographical focus is on the rapidly growing and power constrained markets of Sub-Saharan Africa, excluding South Africa, that exhibit a positive enabling environment for renewable energy projects.

'Pros and Cons' for Sida Involvement
As for SEFA, AREF would seem a good candidate for Sida support.

5.5 Public-Private Infrastructure Advisory Facility (PPIAF)

Established in 1999 and housed at the World Bank, the PPIAF is a multi-donor trust fund, which was created to act as a catalyst to increase private sector investment in energy (including renewable energy and energy efficiency), water, transport and telecom in emerging markets. PPIAF provides small technical assistance grants to governments in support of a sound enabling environment to foster public–private partnerships (PPPs)[32].

To support PPPs, the PPIAF provides technical assistance (TA) to governments for: (i) Enabling environment reform (policy development, legal and regulatory reforms, institutional development, tariff regimes/policy), (ii) Project cycle related assistance (early stage project preparation and legal /regulatory support around specific PPP transactions) and (iii) Dissemination and capacity building (awareness building, training, rapid assessments for PPPs, knowledge products).

PIAF also provides Sub-National Technical Assistance (SNTA) involving capacity creation in local utilities and municipalities to (i) increase creditworthiness, (ii) accelerate access to finance and (iii) create local capital markets.

PPIAF attempts to create "an enabling environment for PPPs" and thus reducing risks and transaction costs, by (i) establishing the necessary policy, regulatory and economic frameworks, (ii) strengthen institutional capacities, (iii) reduce barriers to investment, (iv) improve access to knowledge and (v) incubate projects.

PPIAF focus 60% of all TA activities on priority clusters in Sub-Saharan Africa, South and East Asia and 40% of TA on global coverage of low-income and fragile countries, priority MICs and regional initiatives.

'Pros and Cons" for Sida Involvement
Sida joined PPIAF's Donor Council two years after the program was founded in 1999. Swedish companies were sponsors in 45 infrastructure projects with private participation (PPI) in

[32] A PPP involves the private sector in the provision of infrastructure assets and services that have traditionally been provided by government. Key PPP characteristics: (i) Long-term contractual relationship between public and private sector, (ii) Transfer of key project risks to the private sector and (iii) Ownership and accountability for assets generally remains with the public sector.

developing countries by 2010[33], however none in Sub-Saharan Africa. These projects attracted total investment commitments of US$38.3 billion. Energy (greenfield power plants) accounted for six projects and 5% of total investment.

More and more Sub-Saharan African country governments are looking to engage the private sector through PPP arrangements to help with the infrastructure investment capital, technology, and know-how needed to improve dilapidated public infrastructures. PPIAF provides significant assistance to the region to support these efforts. Being located in the World Bank and being able to draw on the World Bank resources gives the PPIAF significant comparative advantages, as the World Bank is a leading international financial institution at the global scale in a number of sectors and has strong experience in investment lending focusing on institution building, infrastructure development and policy reforms. Thus continued Sida support is deemed worthwhile.

5.6 Green Africa Power (A PIDG Initiative)

The Private Infrastructure Development Group (PIDG)

PIDG is a multi-donor organisation set up in 2002[34] to tackle the major institutional and market obstacles hindering private participation in infrastructure in developing countries. PIDG Members invest public funds to leverage private sector finance. PIDG operates through activities by a number of carefully designed facilities, five of which are corporate entities[35]:

Table 5-1: Development of PIDG Companies by year of first operations:

2002	2003	2004	2005	2006	2009	2010
The Emerging Africa Infrastructure Fund Ltd	**DevCo**	**Technical Advisory Facility**	**InfraCo Ltd**	**GuarantCo Ltd**	**Infrastructure Crisis facility – Debt Pool LLP**	**InfraCo Asia Development Pte. Ltd**
Market/policy Challenge						
Shortage of long-term loans at sufficiently low interest rates due to perceived risks in developing countries	Insufficiently well prepared projects for private sector involvement due to lack of resource/cap acity by public authorities	Shortage of public and private sector resources for project preparation, evaluation and affordability	Bankable projects not being developed in Africa due to high risk of early stage project development	Shortage of long-term, local currency denominated funding to reduce exchange rate risk for projects	Reduced appetite of commercial banks to lend to infrastructure projects in developing countries due to the financial crisis.	Bankable projects not being developed in Asia due to high risk of early stage project development
PIDG Facility Response						
Provides long term loans to private sector infrastructure projects in sub-Saharan Africa	Provides advisory services to governments to help them deliver infrastructure projects	Provides grants to build capacity, support project preparation and delivery	Develops commercially viable infrastructure projects in Africa	Provides local currency guarantees to avoid exchange rate risks and stimulate local capital sources	Provides long term loans to projects to Address financing gaps as a consequence of the financial crisis	Develops commercially viable infrastructure projects in Asia

Source: DFiD: *Green Africa Power (GAP), a new facility of the Private Infrastructure Development Group (PIDG) to mobilise investment in renewable energy in Africa*, October 2012

PIDG started with the Emerging Africa Infrastructure Fund Ltd (EAIF) in 2002 to provide long-term loans to finance infrastructure. Subsequently, additional facilities were established, each in response to specific challenges created by institutional and financial constraints to mobilising

[33] PPI data update note 66, December 2011

[34] Founding members include the UK, the Netherlands, Sweden and Switzerland. Since then the World Bank, Austria, Australia, Germany, Ireland have joined and Norway is in the process of joining.

[35] DevCo is managed by/located in the IFC, and the Technical Assistance Facility (TAF) is located in the PIDG Trust.

private participation in infrastructure. Today, the activities of the PIDG facilities fall into three broad categories:

- Facilities that directly provide long-term debt finance both in foreign (EAIF, ICF-DP) and local currency (GuarantCo).
- Facilities that provide early-stage project development capital and expertise in Africa and Asia (InfraCo Africa and InfraCo Asia).
- Facilities that provide technical assistance, affordability and capacity building support to PIDG projects (TAF) and to public authorities seeking to deliver projects with private sector involvement (DevCo).

The PIDG governance structure includes the Governing Council (decision body with a representative from each member), the Programme Management Unit (PMU, the coordinator and central contact point) and the PIDG Trust (invests, owns and manages the subsidiary companies). The PIDG was established under a Memorandum of Understanding (MOU) entered into between the Members of the PIDG. The MOU, together with the PIDG Constitution, the PIDG Handbook and the Declaration of Trust for each Company govern the structure and operations of the PIDG.

Investment decisions are the responsibility of the various Boards of experienced and independent Directors. Day-to-day management of the corporate entities is then outsourced to private sector fund managers who are selected through international competitive tender. The performance and development impact of PIDG's facilities are monitored by the Programme Management Unit (PMU), through a results monitoring framework agreed with the Members. The PMU also commissions independent reviews of each facility on a three to four year cycle.

PIDG has been assessed as a top performing institution, offering very good value for money, delivering strong results, having tight cost controls and being well aligned with development objectives. PIDG is also a discussion forum for like-minded donors working with PPPs (public private partnerships). During its 11 years of operation, the PIDG have contributed USD 1.42 billion into 87 infrastructure projects, which have leveraged co-financing commitments of USD 26.7 billion.

Green Africa Power (GAP)

A 2012 scoping exercise funded by DFID and the Norwegian Agency for Development Cooperation (Norad) concluded that there was definite potential for a fund to address key market failures and stimulate private sector investment in renewable energy in Africa. Subsequently, the Private Infrastructure Development Group (PIDG) initiated Green Africa Power (GAP), a company that aims to remove barriers to private investments in renewable energy generation

The objective of GAP is to encourage private investments in renewable energy generation projects in Africa. The size of the power generation plants is expected to range between 5 and 200 MW and hence most likely to support grid based power. Focus will be on the fragile states and poorest countries, with a goal of 75% of investments in DAC I and II countries. GAP aims to address the market failure of supplying renewable energy caused by high upfront capital investment costs, non-cost reflective tariff/fossil fuel subsidies, high perceived risk and long payback period. GAP will fund the "green premium" (the difference between the cost of producing renewable and fossil fuel power) of supplying renewable energy rather than conventional fossil fuel based power.

GAP aims to generate the following results:

i. 10 Renewable Energy Projects financed in Africa by 2016.
ii. 75% of investments made in countries classified by the OECD DAC1 as Low-Income countries (LICs), or DAC I and II countries, with the remainder in Lower-Middle income countries (DAC III countries).
iii. Commercial Private Sector finance mobilised in a ratio of 1:2 to GAP investments.

iv. Expected to support projects that in total will lead to an increase in installed capacity of renewable energy by ~270 Mega-Watts (MW) by 2018.
v. Increased availability/quality of renewable power to approximately 9.2 m people 2014 onwards.
vi. Net carbon emission savings of 3.9 Million-Tonnes of Carbon Dioxide (MtCO2) using the UK's International Climate Fund's (ICF) methodology.
vii. Encourage countries and enable move towards cost-reflective tariffs.
viii. Demonstration of the commercial and technical feasibility of renewable energy projects in Africa.

GAP is addressing the lack of equity in these markets, providing patient capital (close to equity) by offering the following three instruments:

- **Quasi equity/mezzanine loan:** the main GAP instrument will be long-term loan capital (foreign currency) which will be subordinated other debt (senior debt) but above equity. This instrument reduces the upfront cost of capital, while maintaining overall commercial returns. Given that subordinated debt is higher risk capital, the rate of return over time is required to be higher than for the senior debt, but somewhat lower than equity due to the corresponding risk profile. The GAP mezzanine loan finance will only earn nominal interest (level to be decided on a case by case basis to avoid excessive subsidy and secure additionally) in the projects early years of operation to allow the equity finance to earn a reasonable rate of return. Once the level of return on equity has reached a pre-determined threshold, the interest rate on the mezzanine loan will be increased. This increases the early cash flow from the project to equity holders, increasing the likelihood that projects can be funded despite high early stage risk, and moves the return on GAP mezzanine loan capital out in time. If the expected project rate of return is not reached, it is a risk that no more than minimum/nominal rate of return is achieved on the mezzanine loan capital provided by GAP. In addition to interest income, Certified Emissions Reductions revenues under the Clean Development Mechanism (CDM) can potentially provide additional income which in turn will reduce the pay-back period for GAP mezzanine loan finance.
- **Contingent line of credit:** a guarantee providing cover for specific construction phase risks (commercial terms) faced by the project developer. If drawn down, the guarantee advance would have the same features as the quasi equity above. This guarantee aims to provide additional comfort to lenders.
- **Policy dialogue:** GAP will enter into policy dialogue to encourage host countries to move towards cost reflective tariffs where relevant, providing them with an easier path to do so by buying them time to build necessary political and public support (e.g. by agreeing to power purchase agreements with a gradual rise in tariffs to the level required for the project to be viable - hence the quasi equity will be used to handle the gap).

Sub-Saharan Africa is the world's most power-starved region with more than 700 million people lacking access to electricity. There is a shortage of all types of power generation projects in Africa and, in particular, renewable power projects. The economic cost of this power shortage is reckoned at some 4% of gross domestic product. Given the current limited financing capacity of African banks, there is expected to be a vital need for development institutions in financing African renewable energy projects, so the GAP initiative is very relevant.

'Pros and Cons' for Sida Involvement

The UK, a founding member of PIDG, has approved grant financing to GAP of GBP 98 million (GBP 95 million to capitalise GAP and GBP 3 million for set-up, M&E and knowledge management). Norway is considering[36] capitalising GAP. In December 2013, Norad carried out a

[36] In May 2013, a political decision was taken in principle to support GAP with NOK 300 million over the period 2013-2015 pending a positive appraisal.

positive appraisal of an indicative NOK 300 million grant financing to GAP [and becoming a member of PIDG].

The Norad appraisal states that if GAP shows good results and has a pipeline that calls for further capitalisation the UK has indicated that they will increase their funding. The appraisal notes that Sida has indicated that they will consider providing support after Norway has made a decision, and Switzerland is also said to have shown interest. This report concurs with the proposed Swedish involvement.

5.7 Cooperation through Development Banks

Whatever views one might have on this, the World Bank, the International Monetary Fund and the other Multilateral Development Banks can influence government policy choices in a surprising number of ways. The World Bank and the IMF asserts their influence (i) through 'hard' conditions, i.e. certain policy reforms which must be implemented before any funds are handed over; (ii) providing a de facto 'signalling' function to other donors, i.e. no IMF and World Bank programme usually means no bilateral donor will lend; and (iii) the provision of 'analytical, advisory and assessment' services, the 'knowledge Bank' notion. Notwithstanding this, these days both organizations, especially the World Bank, are more open, more environmentally conscious, and more attuned to the impact of their policies on the poor than in earlier days.

5.7.1 World Bank

The main modalities for Sida to influence the World Bank decision making would be through the Replenishments, Trust Funds and human resources. Trust Funds[37] have become a very large share of total aid flows through the Multilateral Banks.

Trust Funds
A Sida financed World Bank Trust Fund established in Tanzania in 2005 defused a strained working relationship between the World Bank and the Ministry of Energy and Minerals and was used extensively for preparation of the off grid component of the World Bank US$ 105 million Tanzania Energy Development and Access Expansion Project (TEDAP). The Trust Fund accelerated project preparation through 12 key consultancies, including the design of the TEDAP off grid component, draft regulatory framework (standard power purchase agreements and tariff) for small renewable projects in Tanzania and the preparation of a pipeline of small renewable projects to be financed under the TEDAP off grid component.The success of this Trust Fund resulted in another Sida World Bank Trust Fund being established in 2009, which was instrumental for the successful implementation of the Tanzania Small Power Project which put in place all the preconditions for a successful private sector-driven renewable energy program in Tanzania.

Human Resources
It would potentially be more rewarding and provide more leverage for Sida Staff to get "on-board" some of the nimbler World Bank Africa Region's own initiatives. By working directly with the World Bank Task Teams and sharing information on access implementation issues, Sida Staff can be expected to be better placed to achieve better performance of access programs; more informed about appropriate technology choices; national strategies, policies, and regulations; and solid preparation and implementation of access scale up programs. Interesting "internal" World Bank energy initiatives are:

[37] There are three categories of World Bank trust funds: (i) Bank-executed Trust funds (BETFs) that support the Bank's work program and enable specific issues to be further explored; (ii) Recipient-executed Trust Funds (RETFs), which are basically like lending, but they are managed by the Bank for the country; and (iii) Financial intermediary funds. They are multibillion funds, e.g. Global Fund for Health, for Agricultural Research, for Education, etc.

The Africa Renewable Energy Access program (AFREA)
In 2009, the Netherlands provided a US$28.875 million to support the implementation of the Africa Energy Unit (AFTEG) strategy and its clients, through analytical and advisory activities, while also providing recipient-executed technical assistance and investment grants that help speed up the deployment of renewable energy systems regionally,.

The Africa Electrification Initiative (AEI)
The AEI project seeks to create and sustain a living body of practical knowledge and a network of SSA practitioners in the area of design and implementation of rural, peri-urban and urban on-grid and off-grid electrification programs. Emphasis is placed on how to overcome time and cost barriers by acquiring and developing practical information and disseminating this information in a user friendly form through simple and sustainable channels of communication. The principal target audience is African practitioners. These include individuals who work for electrification agencies and funds, government ministries, regulators and state, community or privately-owned utilities. The secondary audience is the Africa Energy Practice task teams within the World Bank. AEI has partnered with the European Union Energy Initiative Partnership Dialogue Facility (EUEI PDF), the Energizing Development Partnership of the German Agency for International Cooperation (GIZ), the National Rural Electric Cooperative Association (NRECA), ESMAP and AGAT (see next).

AFTEG Accelerate On-grid Access Team (AGAT)
AGAT will endeavour to increase the quality and number of household connections in on-grid projects in the Bank's portfolio in Africa as well as support adopting pro-poor policies, enhancing energy efficiency, etc. Although electrification rates are expected to grow[38], the percentage of households effectively connected to the grid will be lower. The reality in most African countries is that the arrival of the electricity distribution grid in front of the door does not mean the household is electrified.[39] This is also reflected in the World Bank's portfolio of projects focusing on access to electricity in Africa. Since 2001, the Bank's portfolio has succeeded in connecting a mere 3 million previously un-electrified households to the electrical grid.[40] The AGAT initiative will facilitate timely access to knowledge and expertise on specific topics, disseminate good practices and roadmaps and support the preparation and implementation of grid-based electricity access projects.

'Pros and Cons for Sida Involvement
There are many "Pros" for Sida to continue to build on its successful cooperation with the World Bank in Tanzania through Trust Funds. A suitable scaling up of such cooperation would be to join or co-fund some of World Bank Africa Region's initiatives. The "Cons" are mainly the risks associated with potentially being tainted "World Bank" by the Recipients, especially in countries such as Tanzania where Sida has had a unique "independent" status with prestigious high level cooperation areas, e.g. in Energy Policy, ICT Policy, management contract for TANESCO, etc. However, on balance the "pros" would seem to dominate.

5.7.2 European Investment Bank and European Union

The European Commission recognises[41] blended finance, which combines EU grants with loans or equity from other public and private financiers, as an important vehicle for leveraging additional resources for development and increasing the impact of EU aid. Through the *EU Platform for*

[38] From 31% to 51% according to the International Energy Agency (IEA)
[39] In 2010, 54% of population in Benin had electrical supply reaching their house, but only 27 % of households were effectively connected to the grid (i.e. costumers of the electricity utility). (Source: World Bank, ECOWREX/country profile Benin).
[40] 1 million with direct access and 2 million with inferred access (Core Sector Indicators 2013).
[41] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A Stronger Role of the Private Sector in Achieving Inclusive and Sustainable Growth in Developing Countries", dated 13 May 2014

Blending in External Cooperation, the Commission is working together with finance institutions on increasing the catalytic effect of blending in crowding in more private financing through greater use of financial instruments such as guarantees, equity and other risk-sharing instruments for infrastructure investments.

The European Commission highlights its creation of regional blending facilities, developing new tools for implementing private sector development objectives and scaling up of blending in cooperation with development finance institutions thus facilitating the involvement of the private sector as a source of finance. It indicates that a larger share of the EU blending facilities could be allocated to financial instruments such as loans, guarantees, risk-sharing instruments, and equity or quasi-equity instruments. One of the suggested actions is aimed at increasing the provision of risk capital through private investment for energy efficiency and renewable energy and rural electrification projects in developing countries and setting up a risk-sharing mechanism with European Development Financing Institutions to increase private investment in energy-related projects.

The Commission will provide technical assistance to public institutions to reinforce their administrative capacities, and set up legal and regulatory frameworks and guidelines for PPPs, promote public-private dialogue mechanisms to explore opportunities for PPPs and advocate reforms in the legal and regulatory framework, and use financial instruments to leverage private funding for infrastructure projects by reinforcing the private sector lending and equity operations of eligible financing institutions through EU blending facilities.

Blended finance for Access Infrastructure. A number of initiatives, such as the EU Energy Facility have been important financiers of rural and peri-urban electrification, but the amounts involved are small in terms of the global financing needs for Africa's energy access infrastructure.

The European Investment Bank (EIB) is the EU's principal long-term development financing instrument. The EIB mandate includes financing development cooperation projects under the Cotonou ACP-EU Partnership Agreement, but it has not really been involved in financing investments in the rural electrification sector, in contrast to e.g. the World Bank.

'Pros and Cons" for Sida Involvement

Increasing EIB's involvement in financing investments in the rural electrification sector would bring a number of benefits with regard to increasing the investment volume and appetite for Africa's rural electrification sector: (i) Allowing for mixed EU financing packages blending EIB loans and EC grant financing; (ii) Providing loan financing directly to rural electrification operators, rural electrification operators programmes or to other banks and financial institutions; (iii) Leveraging the EIB's experience in financial engineering and in developing bankable infrastructure projects; and (iv) Would likely provide a "knock-on" effect on other financing institutions. Thus, there is a need for dialogue and cooperation with the EU to enable the EIB's financial engineering know how to be utilised for developing a portfolio of financial products necessary for large scale electrification in Africa. Sida could play a role in such a dialogue with EIB and those finance institutions which participate in EU blending regarding objectives, policies and result frameworks for project development and also through providing funding for project preparation, technical assistance and possibly secondment of staff.

5.7.3 African Development Bank

The AfDB is the leading financial development institution for Africa. Its mission is to promote economic and social development through loans, equity investments and technical assistance. The main modalities for Sida to influence AfDB would appear to be similar to the WB, i.e. through the Replenishments, Trust Funds and human resources.

Under its Trust Fund Reform policy, the AfDB is moving away from tied bilateral funds to multi-donor Trust Funds, most of which are thematic in nature. At the end of October 2011, the Bank managed 10 thematic funds for a total of about USD 185 million. At the time AfDB had 314 on-going trust fund projects for a total of USD 397.7 million, 40 percent of which were in knowledge-based activities.

The Australian Government made an assessment of the AfDB in March 2012 with a view to consider joining the AfDB.[42]. An overview of the assessment is presented in Annex 5-2. The assessment had the following degrees in the assessment: weak, satisfactory, strong and very strong. There were no "weak" areas, but it might be interesting to see some comments for the "satisfactory" group:

- The Bank has a gender policy and action plan that promotes gender equality and mainstreaming and Gender considerations are included in project design, but overall the impact of this approach appears minor, as the effectiveness of gender initiatives depends to a large extent on individual African governments' interests in gender issues.
- The AfDB is a lean, efficient organisation. Administrative costs were 9.2 per cent in 2010, down from 10.9 per cent in 2009.
- AfDB requires that value for money is considered in programming and its board ensures compliance, although measures to improve cost effectiveness do not feature prominently in AfDB's program documentation.
- AfDB provides technical support to partner countries to focus on strengthening transparency and accountability. Value-for-money considerations are not systematically included in agreements with partners.
- There are mixed views on the extent to which the Bank involves clients and beneficiaries in its monitoring and evaluation functions, however, partner governments considered that overall, AfDB performed adequately in providing a voice for stakeholders.
- AfDB respects the views of partner governments, and in turn member governments have a good sense of ownership of Bank activities.
- AfDB does not implement its policy against corruption very well, and has not always ensured timely action when irregularities have been identified at country-level.

'Pros and Cons' for Sida Involvement
To increase the impact of its technical cooperation as well as to promote major issues related to regional energy cooperation in Africa, Sida could consider joining forces with an organization like the AfDB. The 'pros' are mainly the association with 'an African organization serving Africans', i.e. less of the World Bank type of ballast. On the other hand, the potential cooperation would most likely be indirect, i.e, through Funds (e.g. SEFA, AREF) or initiatives (e.g. PIDA) operated by AfDB. Again, on balance it would seem the 'pros' outweigh the 'cons'.

5.7.4 China

China's three decades of unbroken growth have transformed it from an economic backwater to the world's third largest economy. This has fuelled an ever-expanding demand for energy and new markets. The international rise of China is one of the most important geopolitical trends today. In addition, as pointed out by the IMF and others, Africa will become an increasingly attractive market as incomes rise and progress in regional integration makes its markets even more attractive. It will also become a key destination for FDI, and it will continue to need infrastructure.

The growing presence of China in Africa is one significant aspect of the growing global role of China. For Africa, China is a market, a donor, a financier and investor, and a contractor and builder. While aid historically was of major importance, two significant changes have occurred

[42] This document is online at www.ausaid.gov.au/publications

since the turn of the new century. Because trade and investment have become much more significant in volume than aid flows, economic relations between China and Africa are commercial rather than aid-driven and the private sector has stepped to centre stage.[43]

According to economist Hannah Edinger, the Centre for Chinese Studies[44], China is still in the process of defining its aid (cooperation and official development assistance) program, but in 2008 it included:

- Grant aid
  - Social welfare projects
  - Hospitals, Schools, Housing, Material assistance, Technical assistance
  - Office equipment (Zambia); Agricultural equipment (Zimbabwe); Irrigation equipment (Ghana)
- Interest-free loans
- Concessional loans
  - Infrastructure, social or industrial projects
- Debt Relief

The amount of Chinese aid delivered is difficult to assess due to lack of data, but Edinger estimated that 1/3 of China's aid outflowed to Africa. The EXIM Bank is the main financier of concessional financing. According to Edinger there was no single aid administrating body; aid spending is disorganized and lacks effective coordination; lack of data makes tracking and monitoring difficult; the Ministry of Finance has been instructed by State Council to set aside funds for foreign aid (grants, interest component of interest-free loans, technical assistance). The Centre's power point presentation included a slide on the Chinese financed (EXIM Bank) and Chinese constructed hydro dams as of 2008, refer Annex 5-3.

On November 3, 2009, the Chinese Ambassador to Norway, Mr. Tang Guoqiang informed about the cooperation between China and Africa. Ambassador Tang referred to the fourth ministerial conference of the Forum on China-Africa Cooperation (FOCAC) in Egypt November 8-10, 2009 and the great progress made since the last FOCAC. China's aid to Africa had increased; tax on African investments in China had been removed; the African debt to China had been written off; a new Chinese development fund for Africa had been started; building of a new AU-headquarters in Addis had started; 13,000 africans had received training in China; new hospitals; a new antimalaria centre; new agriculture institute and schools built in Africa; bilateral trade had increased with 33.5% per year since 2000 and was in 2008 USD 106 bn (USD 50.8 bn was Chinese export to Africa and USD 56 bn African export to China); contracts for bilateral projects worth USD 40 bn had been entered into in 2008, Africa accounted for 30% of China's oil import, etc.

The fifth ministerial conference of the Forum On China-Africa Cooperation (FOCAC) action plan (2013-2015) high lights cooperation on energy and resources, establishment of a China-Africa energy forum, enhancing African countries' capacity for processing of energy and resource products, protecting local eco-environment and promoting sustainable economic and social development, clean energy and renewable resources projects, etc.

5.8 Other Initiatives

The Global Village Energy Partnership (GVEP)

was launched at the 2002 World Summit for Sustainable Development in Johannesburg. It sought to increase access to modern energy services to reduce poverty in developing countries. In 2006, GVEP evolved from its initial partnership between the World Bank, UNDP and three bi-lateral donors to GVEP International, a UK registered charity which has been active in promoting energy

[43] Jian-Ye Wang. 2007. *What Drives China's Growing Role in Africa?* IMF Working Paper WP/07/211.

[44] Edinger, H. 2008. *How China delivers rural development assistance to Africa.* Power Point presentation 2nd July 2008 in Brussels, Belgium. Centre for Chinese Studies, University of Stellenbosch

access for sustainable economic development and is supporting various initiatives to achieve universal energy access by 2030. To achieve this goal, GVEP supports the development and growth of small and medium-sized enterprises that deliver energy products and services to the poor.

Global Alliance for Clean Cook stoves
is a public-private partnership that seeks to save lives, improve livelihoods, empower women, and protect the environment by creating a thriving global market for clean and efficient household cooking solutions. The Alliance seeks to mobilize high-level national and donor commitments toward the goal of universal adoption of clean cook stoves and fuels. Its goal is to foster the adoption of clean cook stoves and fuels in 100 million households by 2020. The Alliance is mobilizing support from a wide range of private, public, and non-profit stakeholders.

Sustainable Energy for All (SE4ALL)
is a multi-stakeholder partnership between governments, the private sector, and civil society. Launched by the UN Secretary-General in 2011, it has three interlinked objectives to be achieved by 2030: (i) Ensuring universal access to modern energy services; (ii) Doubling the rate of improvement in energy efficiency; and (iii) Doubling the share of renewable energy in the global energy mix. SE4ALL contends that achieving the three objectives together will maximize development benefits and help stabilize climate change over the long run. These three objectives, while each being important in its own right, will reinforce each other in important ways. SE4ALL sees its Value-Added in e.g. leveraging the convening power of the United Nations and the World Bank, bringing together a network of leaders from all sectors of society and mobilizing stakeholders around best practices and innovative solutions.

Energy+
headed by the Government of Norway, the International Climate and Energy Partnership – Energy+ is an international partnership with a goal of addressing two interrelated problems: Energy access and Climate change. *Energy access*: 1.2 billion people (20% of the world's population) do not have access to electricity and 2.8 billion people use solid fuel for cooking. Access to sustainable energy will facilitate progress in the areas of education, health, business, sustainable development and economic growth. Access to modern energy services is prerequisite for poverty reduction and equitable, inclusive growth. *Climate change*: The world faces serious challenges related to climate change and global warming. 60 % of global greenhouse gas emissions are related to energy production and consumption. If global warming is to be limited to $2^{o}C$, the increased demand for energy has to be met by renewable energy and improved energy efficiency to avoid increased greenhouse gas emissions. Energy+ provides financial support to developing countries based on increased access to renewable energy and measures taken to achieve this.

Key features of the initiative include (i) A sector-wide approach, as opposed to a project-by-project approach, is a core feature in the intention to scale up efforts to achieve energy access and reduced or avoided emissions. (ii) A performance-based system will be developed and over time support will be provided based on verifiable progress on increased energy access and reduced or avoided greenhouse gas emissions, as well as implementation of policy and measures. This in turn can open up for funding from climate finance as a longer term objective. (iii) Commercial investments will be leveraged through strategic use of Official Development Assistance (ODA).

5.9 Possible Gaps

According to the Africa Infrastructure Country Diagnostic (AICD), addressing Africa's chronic power problems and implementing regional trade will require major spending in power infrastructure, amounting to some $41 billion per year. The sheer size of Africa's energy infrastructure needs is well beyond the various Development Banks, Development Agencies and Financial Institutions' financial resources, but it may not be beyond the private sector's - provided

there are sufficient incentives to invest. Outside of the traditional forms of financial and non-financial assistance, there are increasing efforts to use alternative financing models to encourage greater involvement from the private sectors of both the developed and the developing world through a variety of forms of finance.

As the gaps are so huge, it might be more productive to look at initiatives successfully addressing the gaps, but the information to hand does not indicate that any of the initiatives have obviously "failed" in meeting their objectives. However, in view of Sweden's commitment to Power Africa, a closer look at Power Africa seems warranted.

Power Africa

Power Africa has three potentially conflicting aims: increased private investment, off-grid power and renewable energy development and a novel "transaction oriented" implementation approach. Instead of spending years on establishing legislation to attract energy investments, Power Africa directly starts looking at identified business opportunities and tries to unblock stalled processes. USAID provides $ 285 million in technical assistance to implement reforms and risk minimization "to advance private energy sector transactions." The Overseas Private Investment Corporation and the Export-Import Bank together account for over $6 billion of the $7 billion portfolio and will provide loans and loan guarantees to businesses[45].

Although off-grid and renewable business models face similar difficulties, the current earmarked support to private sector involvement in off-grid or renewable investments, seems puny in comparison and presents somewhat of a "gap": (i) $2 million is specifically earmarked for off-grid energy development, through the "Off-Grid Energy Challenge" and (ii) $20 million is specifically directed to supporting renewables through the U.S.- Africa Clean Energy Finance Initiative.

[45] https://www.devex.com/news/power-africa-s-leaders-and-skeptics-speak-out-81459

6 SWEDEN'S COMPARATIVE ADVANTAGE

Sweden has since long enjoyed good relations with many African countries, between governments, NGOs and private sectors. Swedish organisations operating in Africa has access to considerable support, knowledge and experience from a range of trade and foreign relations oriented Swedish organisations, authorities and Embassies.

The need to address the common challenges of energy supply, which was recognised in the joint Africa-EU strategic partnership, and its importance for sustainable development, is well reflected in Sweden's Africa policy, which interweaves commitments in foreign and security policy, trade policy and development assistance policy and highlights both African and Swedish interests and cooperation for mutual benefit.

6.1 Synergy between Regional and National Approaches

Sweden has traditionally carried out both "regional energy projects" with the concept of energy projects covering more than one country, typically cross-border electricity trade projects and "national energy projects" which are within the borders of one country.

Increasingly it is recognised that in addition to cross-border trade projects, common themes across the region favours implementation of appropriate programmes in the region as a whole, as opposed to focussing on individual countries. There is also the benefit of economies of scale if the same programmes are rolled out on a regional rather than country basis.

A regional approach provides for a forum of sharing of information and best practices, builds capacity and through group behaviour influences organisational behaviour towards developing sound policy, regulatory, and legal frameworks and ultimately more robust, safe, efficient, reliable and stable electrical systems.

Several energy areas benefit from regional cooperation, including, e.g.

- Power planning, generation, transmission, storage and usage;
- Legislation on (i) commercial energy activities (trading, transport, storage, etc.); (ii) energy use (efficiency standards, emission standards, etc) and (iii) state owned energy sector assets and organizations;
- Co-ordination of energy-related research and development;
- Fiscal policies related to energy products and services (taxes, exemptions, subsidies, etc);
- Energy security and international policy measures (treaties & alliances, trading, political);
- Development of new energies and renewable energies;
- Elaboration of pricing, financial mechanisms and technical specifications for rural electrification;
- Capacity building in energy strategy, renewable and energy exchanges;
- Development of regional grid codes.

This study has taken this broader view of the term regional energy projects, which seems to mirror the areas of engagement for "Regional Approaches" in the World Bank 2013 Energy Strategy.

6.2 Sweden's Competence and Experience

Regional Infrastructure
Sweden has widely recognised competence and experience in power systems development, management and regulation as well as in the fields of hydropower development, hydrology and water resource management. Sweden has for decades been engaged in the development of power supply systems in Africa and many practitioners have in depth knowledge about these countries. The Swedish technical, institutional and administrative experience has proved to be of great value in many countries. There are sufficiently qualified resources available in Sweden for provision of all institutional, technical and environmental services needed for African regional interconnections and other services, e.g. related to institutional, legal and financial matters.

Prior to a 2008 high level energy conference *Access to Modern Energy in Sub Saharan Africa – Electrification and the Private Sector Contribution* in Stockholm, two Swedish consultants were asked to identify high priority electrical power projects in Eastern and Southern Africa, considered having special Swedish interest. The SWECO Aug 2008 Desk Study contains information regarding Angola, Botswana, Tanzania, Uganda and Lesotho and proposes Priority Energy Projects for these countries, refer Annex 6-1. As "potential for Sweden", SWECO identifies consultancy services for studies and project procurement services and that the Swedish industry can support technical know-how as well as supply of required equipment. The Vattenfall Power Consultant AB Desk Study Aug 2008 contains information about Kenya, Mozambique, Namibia, South Africa and Zambia, but does not propose any priority projects.

Regional Trade and Market Integration
The Swedish (Nordic) experience in cross-border cooperation initially through Nordel, and later through mechanisms and institutions such as Nordpool established as a consequence of the deregulation of the joint Nordic power market, represents state-of-art in the world. The success of the common liberalisation of the Nordic electricity market has become a model for regional co-operation and harmonisation in the world, e.g. the WAPP learnt a lot from Nord Pool. Nord Pool has also supplied its technology to other power exchanges in the world. "Nord Pool Spot" now runs the largest market for electrical energy in the world, offering both day-ahead and intraday markets. (Wikipedia).

Sweden has supported regulatory agencies in several countries, e.g. in energy and ICT in Tanzania, energy in Zambia as well as regional regulators, e.g. RERA in Southern Africa, however the recent capacity development support to RERA ended in limbo after RERA failed to address some concerns addressed by Sweden and Norway.

Renewable Energy and Energy Efficiency Improvement
Sweden has an obvious comparative advantage in low carbon energy systems and energy efficiency.[46] [47] [48] . Sweden has implemented energy efficiency projects in Mozambique, Tanzania and Zambia. A first loss reduction programme was started in Mozambique in the mid 90'ies and is also currently part of the Swedish energy support to Mozambique.

Addressing a variety of technologies and techniques, e.g. energy efficiency, renewable electricity, nuclear power, carbon capture and storage, biomass, hydrogen, fossil fuel industry and energy

[46] The IEA Report Energy Policies of IEA Countries – Sweden 2013 Review, notes that Sweden is a world leader when it comes to CO2 emissions per GDP and CO2 emissions per capita and commends Sweden for its leadership in energy research and development
[47] Switzerland, Sweden and France were ranked best performers according to an energy sustainability index the World Energy Council report Policies for the Future: 2011 Assessment of Country Energy and Climate Policies.
[48] Sweden is the most sustainable country in the world, a ranking it earned for its use of renewable energy sources and low carbon dioxide emissions, as well as social and governance practices such as labour participation, education and institutional framework, according to a report by sustainability investment firm Robecosam. http://www.environmentalleader.com/, August 19, 2013

services demand has allowed Sweden to: (i) use fuel and electricity more efficiently; (ii) accelerate deployment of low-carbon energy supplies, and (iii) deploy a variety of strategies to reduce the underlying demand for the energy services that give rise to the demand for fuels and electricity.

Improving Financial Performance, Sector Planning, and Reform

Swedish expertise has been involved in the power sector reform process in several countries in Africa. This has added to the knowledge about institutional aspects that are important for establishing regional power trade. Particularly in Mozambique, Tanzania and Zambia, Sweden has had a long-term engagement and local presence, which has enabled Sweden to engage in a continuous policy dialogue, assist with policy reforms and different aspects of long-term sector planning, institutional strengthening and investment financing.

One area that would seem to suit Sweden and its Scandinavian Management tradition is corporate governance. It has been observed that while very many organisations, NELSAP-CU, etc. have received tailor made training, Utility Boards have generally not benefitted from similar training. As good and efficient corporate governance is the primary task and responsibility of the Board of Directors of every public company, such training would seem very desirable in today's climate as the expertise and legitimacy of the business elite, boards as well as top management has been challenged by the media, academics and general public in many countries. It is suggested the changes in business conditions in the African environment and particularly in the energy sector necessitate an exposure to contemporary and progressive corporate governance and an understanding of actions required to improve governance including (i) board governance, transparency and accountability, (ii) efficient procurement systems and (iii) professionalism of management and staff motivation.

"Nexus" Trends

Increasing environmental pressures, deteriorating natural resource base, unpredictable and erratic weather conditions and volatile commodity prices have caused development practitioners to try to get a better understanding of the interlinkages between energy, food, water and climate; to address the issues and leverage these trends. While many of the needed actions and responses are local and context specific, a shared regional agenda can encourage attention to collaboration to address the shared resource risks. There ought to be a shared interest in the development community in strengthening the institutions that govern the way society manages and develops energy, water and food resources. Sweden's involvement in both water and energy development in SSA would seem to make it a competent player in at least the water-energy nexus.

Gender-energy-poverty nexus

Poverty is increasingly accepted as multi-dimensional and Energy Poverty is emerging as core concept: *Absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe and environmental benign energy services*.

There is a gender dimension of energy poverty as 70% of 1.3 billion people living in poverty are women and in rural areas many households have female heads. This is important because (i) Women and men have different needs; different perceptions of benefits energy services can bring, (ii) Women's access to decision making, influence on processes and resource allocation is less than men's, and (iii) women's role to provide household energy for cooked food, boiled water and warmth.

Women's Economic Empowerment

There is increasing attention on women's economic empowerment by Governments, donors, civil society organizations and businesses around the world. The World Bank drew global attention on issues of women's economic empowerment in its 2012 World Development Report: Gender Equality and Development. The Women's Empowerment Principles of the UN Global Compact and UN Women have caused organisations to look at how to support women in both the leadership and workforce roles.

The international community has signed on to the Beijing Declaration and Platform for Action, the Convention on the Elimination of All Forms of Discrimination against Women, and various ILO conventions on labor rights and protection, including on employment discrimination, among others.

Various Donors, including Sweden, the US and the UK, have developed methods for women in the economy. Thus Women's Economic Empowerment must be seen as a Swedish comparative advantage.

Access and Rural Electrification
Sweden has a history of long term commitment to rural electrification as a means to achieve sustainable development. Since the end of the 1990s, Sida has financed several rural energy and electrification initiatives in Sub-Saharan Africa, including grid extensions in Botswana, Eritrea, Ghana, Lesotho, Mozambique, Tanzania, Uganda and Zambia, and off-grid solar photovoltaic (PV) systems in Zambia and Tanzania. (Also in Asia have rural electrification schemes been carried out: Sri Lanka, concessionary credit and Vietnam, capacity building program to enhance off-grid installations in remote rural areas). In connection with energy sector reform efforts in Tanzania, Uganda and Zambia, Sweden has actively supported the establishment of Rural Energy/Electrification Agencies (REA) and Rural Energy/ Electrification Funds (REF), intended to pool funding from various sources.

6.3 Sweden's Relative Comparative Advantage

Sweden appears to have competence and experience in most of the areas of engagement listed under Regional Approaches in the World Bank 2013 Energy Strategy. Although Sweden is well qualified in the areas, the question becomes in which areas of engagement Sweden would be better placed than other ICPs. This is a difficult judgement call.

The Author has selected to allocate a perceived ranking from 1-3 (high-low) for (i) the apparent need for Sweden's engagement (subjective impression of need for support balanced against partner demand and interest from other donors), (ii) Sweden's comparative advantage (subjective impression of aggregate of resource base and aid functionality) compared to other ICPs and (iii) perceived general (commercial/political) Swedish interest.

Table 6-1 Perceived Ranking of Areas of Engagement

Areas of Engagement	Need for Swedish Input	Swedish comparative. advantage	General Swedish interest	Points	Priority
Regional Infrastructure					
Transmission	3[a]	3	1	7	4
Distribution	1[b]	1	1	3	1
National Regionally linked infrastructure	3[a]	3	1	7	4
Regional Trade and Market Integration					
Regional Power Trade	3[a]	1[x]	2	6	3
Regulation	3[a]	2[y]	3	8	5
Renewable Energy [generation]	2[c]	2	2	6	3
Energy Efficiency	1[d]	1	2	4	2
Improving Financial Performance, Sector Planning And Reform					
Financial Performance, Sector Planning And Reform	3[e]	2	2	7	4
Nexus Policymaking	2	2	3	7	4
Institutional Capacity in MOZ, TZA and ZAM linked to regional cooperation	2	1	1	4	2
Access and Rural Electrification	1[f]	1[w]	1	3	1

[a] Many ICPs are interested in this area
[b] Rural electrification along cross-border transmission lines are mandated in several countries, but falls somewhat outside the interest of MDBs. Includes separate cross-border distribution lines.
[c] Many ICPs, NGOs and other organisations are interested in this area
[d] The common cooperating partners, the Utilities are usually more interested in generation and sales of energy rather than savings on energy, which would reduce their income.
[e] Especially reform interventions are by "invitation only". In some countries Sweden has been invited.
[f] Swedish grant financing for Rural Electrification is seen as particularly attractive over MDB loans
[x] World state-of-the-art knowledge
[y] The idea of the regulatory agency was first advanced in the United States and it has been largely an American- Anglo-Saxon institution, although Sweden has supported several African Regulators.
[W] This is seen as a combination of competence, experience and Swedish Management culture.

7 RECOMMENDATIONS ON REGIONAL ENERGY ENTRY POINTS

7.1 Proposed Areas for Regional Energy Engagement

Cutting the above list about half-way and lumping similar areas together yields four proposed areas of engagement:

1. Regional Distribution, Access and Rural Electrification
2. Institutional Capacity Building linked to Regional Cooperation
3. Renewable Energy and Energy Efficiency
4. Regional Power Trade

7.1.1 Regional Distribution, Access and Rural Electrification

Regional Distribution
Cross-border transmission interconnections are by its nature very cost-intensive undertakings best suited for MDBs and larger bilateral ICPs. Nevertheless, many Swedish manufacturers, suppliers and contractors are likely to be interested in bidding for such projects.

Rural electrification along cross-border transmission lines is now mandated[49] in several countries, but many MDBs are having problems including these elements in their loan packages. It is recommended that Sweden provides support to electrification along Regional Interconnectors/ Development Corridors, both for investments and technical assistance. This includes separate cross-border distribution lines. The Rural Electrification component of the New Iringa – Shinyanga Transmission Line Project in Tanzania could serve as an example of such projects.

It is envisaged that the Swedish support would be through a number of financing mechanisms, e.g. grant/loan co-financing, trust funds with MDBs, cooperation arrangements for knowledge provision and exchange, and other forms of cooperation.

The objectives of the technical assistance support would include strengthening capacity, knowledge sharing and provision of technical assistance to facilitate integration of regional power grids in mainly East and Southern Africa. This would improve reliability and reduce the cost of power in the regions, which are pre-requisites to increase access, foster economic development and reduce poverty. Integration of power grids would also help the countries meet their respective energy shortfalls and satisfy pent-up demand, thus reducing the need for resorting to expensive emergency power generation. The technical assistance support is envisaged to have three streams of thematic activities:

1. Support the implementation of the electrical interconnections in the two regions, as well as future subsequent connections, by providing technical assistance and supervision services for the implementation of the investments/contracts for the regional interconnection systems;
2. Technical assistance to support technical and commercial operations of interconnections; and
3. Maximize the economic and technical benefits of the interconnections;

[49] E.g. The Tanzania *Electricity Act, 2008* " …For the promotion of the National Energy Policy in relation to rural electrification, every licensee shall be required to supply electrical energy to the local communities where electrical supply installations are located or along transmission lines."

For each of the three activity streams, a set of exemplary focus components is provided below. These focus components are for the illustration purposes only, and could be modified at the suggestion of Sida and/or recipient countries. Eventual activities under the thematic support areas needs to be cognizant of ongoing and planned activities of other international organizations & institutions, international, regional or national regulatory changes, and other initiatives related to capacity building for regional power trade and knowledge sharing.

Support for interconnections in the region and between the regions

- Consulting engineering services including detailed design of project packages, procurement activities and project implementation supervision;
- Feasibility studies for future interconnections;
- Environmental studies to support planned and future projects;
- Monitoring & Evaluation support; and
- Procurement support.

Operations of interconnections

- Strengthening capacity, knowledge sharing and provision of technical assistance to facilitate integration of regional power grids;
- Capacity building to Power Pools and national TSOs;
- Rules and procedures for regional power trading, operational guidelines, grid codes and power dispatch procedures;
- Software and hardware requirements, complemented by TA and studies to consolidate system grid codes; and
- Support for the preparation and development of PPAs and wheeling agreements.

Maximize economic and technical benefits of the Interconnections

- Transaction advisory services to regional projects and support for energy efficiency measures /demand-side management; and
- Capacity building, e.g. for environmental and social aspects of generation and regional transmission development.

Project preparations

Greater attention needs to be paid to making regional electricity projects bankable. The preparation costs for some projects can be very high, 8% or even higher of the investment itself. It is suggested that Sweden investigate joining the Project Preparation Facilities Network (PPFN) to inform itself about this area. The leverage effect of Swedish development funds in these types of activities can be considerable.

Access and Rural Electrification

There are many ambitious rural electrification programs in Africa, which include both grid-based and off-grid approaches. Several development partners have provided support for rural electrification and various steps have been taken to facilitate and accelerate rural electrification, including setting up Rural Electricity Agencies/Funds, Feed-in-Tariffs and Master Plans/Prospectus. Nevertheless, several barriers and gaps remain that are likely to hinder accelerated rural electrification.

There is an emerging understanding among electrification practitioners of several key elements required in a facilitative framework to obviate the barriers and gaps in the way of scaled up rural electrification. It is envisaged that Sweden would help Governments to implement selected sets of actions.

<u>On-grid Electrification</u>

There is a growing understanding that referring to "grid electrification" and "off-grid electrification" as two separate activities might miss opportunities to encourage hybrid forms of

electrification that are combinations of the two. There is also a tendency, whenever grid electrification is discussed, to see it as exclusively a [national] utility activity. Also for new on-grid rural facilities financed by a REA/F (whether from Government financing or from donor grants/credits), it seems to be assumed that the utility will be the distribution provider. But some recent developments suggest that there can be other options: (i) There is an emergence of hybrid business models among the Small Power Producers (SPPs), i.e. SPPs that are selling to the [national] utility[50], but who are also distributing electricity to newly connected villages. (ii) Some countries[51], have had success in promoting a pure distribution model with private and cooperative rural distribution enterprises buying power in bulk from the national utility and then reselling at retail in rural areas (i.e., a disco); and (iii) In some countries, the [national] utility does not have a nation-wide licence any longer, e.g. in Tanzania, private or community rural discos are now explicitly allowed by the Regulator.[52]

High level policy issues
Subsidies are needed to ensure that poorer households are able to benefit from electrification schemes and there is a need for a subsidy policy, which should be targeted; not leave the power utilities financially crippled; not put a strain the budget of the Government, or its development partners and be coordinated with the subsidies provided for off-grid rural electrification. In most countries there is a need to clearly define and coordinate the roles of the Utilities, the REA's and the Government Ministries involved in grid-based rural electrification.

Utility level issues
It is essential that the operational utility is efficient and that designers, implementers and operators of the on-ground schemes endeavour to reduce capital and operational costs of the RE projects to reduce the capital funds and subsidies required.

Investments to be financed
Given the limited aid funds, Sweden's co-financing will only partly contribute to Africa's rural electrification. Hence, Sweden should choose very carefully the specific investments it finances. There are two major paths by which on-grid electricity access will be increased. One path is densification in areas where the grid has already reached. The other path is expansion of the grid. Within this path, there may be some differences arising from the nature of the areas into which the grid is being extended. For instance, the grid may be extended into areas where there is significant potential commercial demand, or it may be extended into areas where the bulk of the electricity use would come from households.

<u>Off-grid Electrification</u>
It is presumed that off-grid investments will be undertaken by Utilities, for-profit private sector and non-profit agencies.

Financial barriers and gaps
Most countries lack (i) a subsidy scheme to ensure that subsidies are targeted, effective, equitable, and limited in value; (ii) a framework for channelling equity into RE projects; (iii) incentives for commercial banks to provide debt finance for RE investments; (iv) a mechanism for explicitly dealing with the risk aspects of RE investments and service provision (v) a tool to assist project developers with making their projects bankable, i.e., attractive to debt and equity financiers.

[50] In Tanzania, there is some anecdotal evidence that suggests that these private operators are more successful in connecting new rural customers than the national utility, TANESCO.
[51] E.g. Cambodia, Bangladesh and Nepal. It looks like it may now be working in Senegal after a long gestation period. It has also been proposed in Uganda, though that project is still in its early stages.
[52] Rift Valley Energy in Mwenga received a distribution license from EWURA and established the precedent that other non-TANESCO entities have the right to sell at retail.

Skills/scale barriers and gaps
Many African RE Developers lack adequate experience/skills to develop, commission, and operate power generation and distribution projects. As most present RE projects are small scale and operated on individual basis, there should be economies of scale and scope in developing and operating RE projects, which are not being currently utilized,

Regulatory barriers, gaps and burden
Most countries lack regulations to facilitate RE, e.g. clear regulatory rules for isolated mini- and micro-grids, including criteria on when to regulate and when to deregulate; system for benchmarking the distribution and generation costs of different types of mini- and micro-grids; workable mechanisms for monitoring the quality of service provided by off-grid suppliers; clear distinction between Regulator and REA to avoid duplication of tasks, etc. RE Developers have to comply with a large number of rules and regulations, and obtain many licenses and permissions. There is a need to assess the extent to which the requirements of each necessary permission/license can be reduced.

Private sector implementation
In contrast to conventional donor programs, where organisations rely on donor funds, Sweden could support implementation by the private sector[53]. Such Swedish support for" inclusive business"[54], could be in the form of a challenge fund to help companies meet the expenses of starting an inclusive business, e.g. leading up to a pilot phase. Funding may be disbursed on a matching fund concept, for example at a 1:10 ratio. Such a ratio would also increase the impact of Sweden's development funds by attracting commercial funding. The support could include contributing to (i) Feasibility studies and implementation plans, (ii) Brokering partnerships with NGOs, development agencies, other non-business partners, and local businesses or entrepreneurs, (iii) Knowledge and learning best practices.

7.1.2 Institutional Capacity Building linked to Regional Cooperation

Africa is in the midst of a power crisis. Despite abundant low-carbon, low-cost energy resources, Africa faces chronic energy shortages. The power crisis is the result of several constraints that, together, create a vicious cycle resulting in low network reliability, low connection rates and high costs and tariffs. One of the reasons for the African power crisis is that utilities are inefficient and perform poorly thus providing poor energy services at high energy prices, which in turn negatively affect country competitiveness, crimp economic growth and negatively affect the chances for regional interconnections. Improving energy sector and utility performance is thus an important step towards achieving regional interconnections.

It is recommended that Sweden's bilateral energy programmes are fine-tuned to include support towards these objectives. Activity streams could include:

- Long-term capacity building support to strengthen the analytical capacity of government institutions to create the foundation for the government's ability to formulate policies and conduct effective sector monitoring and governance. The capacity is deemed most efficiently built through a consistent hands-on approach as well as through long-term high

[53] Sweden joined in a statement at the September 2010 MDG Summit recognizing the private sector as equal partners around key development issues and a key driver of innovation, and undertaking to work to integrate these innovations into its program. This commitment focus on providing funding and advisory support to "spur and leverage the creative investments of private capital" to generate inclusive business enterprises and market, i.e. including poor people within business value chains as producers, employees and consumers. This is underpinned by the dramatic growth in access to IT systems, which now enable the poorest communities on earth to link into global business value chains and the immense growth potential in developing countries.
[54] As starting up inclusive businesses in poor communities involve new and unchartered risks, seed and venture financing is essential and could be part of the support. The advisory support could target support to development of businesses to increase the participation of disadvantaged producers, informal traders and employees.

education over a longer time frame, allowing sufficient time for experiences with policy formulation, policy implementation and policy revision.

- Institutional capacity building to improve administrative systems and effectively link up regional electricity centres to the central level. Included in the institutional capacity building should be transparent and easier reporting from the accounting systems and customer databases of the utilities. This documentation is important, when discussing tariffs and monitoring of the activities of the utilities and their financial status.
- Develop proper national and local maintenance skills and capacity as well as an institutional culture appreciating and rewarding maintenance. This is a major challenge and requires a long term commitment and persistence from the management and donors. Reasonable and reliable maintenance budgets together with quality assurance standards are required in order to ensure regular maintenance is performed.
- Capacity building of utilities and organisation benefitting from consultancy services, as recipient organisations often have limited capabilities in the utilisation of consultants, e.g. formulation of clear terms of reference, monitoring TA progress and performance and reviewing that work has actually been delivered.

As an example for such institutional capacity building, certain elements in the Sida financed project “Phasing Out the Institutional Development Support to EDM, Energy Sector 1997-1999” would be illustrative. Since 1987, Sida had financed a technical assistance project to strengthen EDM's organisation for operation, maintenance and planning of transmission and distribution networks. By 1997 it had reached the stage when the support would be phased out and consolidated. The project included phasing out activities in Maintenance, Operation/Protection and Distribution Planning. The support to Operation/Protection included operation/protection matters, collection of data for transmission networks and technical support to negotiations during the establishment period of the South African Power Pool (SAPP).

During the project EDM became increasingly involved in Regional Projects within the SAPP (Southern African Power Pool) umbrella, e.g. the two 400 kV inter-connections from South Africa to supply electrical power to the MOZAL aluminium smelter at Maputo. The increased involvement of EDM in the SAPP cooperation highlighted weaknesses in EDM’s institutional and personnel capacity to deal with the often very complex interligation issues. This sometimes put EDM at a disadvantage in these negotiations. Sida agreed to using the project to assist in improving EDM’s capacity in these areas as far as it was possible with funding from the Mozambique Country Frame.

Bilateral/multilateral capacity strengthening. It is recommended that Sweden provides investment preparation support, because as pointed out in 4.8, inadequate project preparation funding is a key constraint to mega/transformative projects in the power sector, including dams, connecting HV transmission projects and PPPs.

An example of such an involvement is the Malawi-Mozambique Interconnection. Sida initially financed a feasibility study by SwedPower in 1986, which showed that for an exchange limited to 50 MW a 132 kV line was sufficient. The (part Sida-financed) large regional study Development of Regional Generation and Transmission Capacities showed in 1992 that interconnecting and jointly operating the power grids in the Southern Africa region was a better option than having separate country developments. One of the high priority sub-projects identified in the study was an interconnection of the grids in Malawi and Mozambique, but with 220 kV instead of 132 kV. In 1994 Mozambique and Malawi signed a Joint Declaration on Power Co-operation and instructed their utilities EDM and ESCOM to update the 1986 SwedPower feasibility study of power supply from Cahora Bassa to Malawi. Sida decided to finance the updating of the feasibility study, which took into account recent developments. This included the proposed interconnections of power systems in the SADC region, the revised load forecasting and the proposed and implemented power-generation installations in Malawi since 1988, Mozambique's electricity export ventures and

a supply of northern Mozambique through Malawi. Special consideration was given to the future operation of the line parallel to the operation of the other discussed the SADC Interconnections

7.1.3 Renewable Energy and Energy Efficiency

Renewable Energy
It is recommended that support is provided to facilitate financing to the countries to improve energy security and transition to low carbon economies through cost effective investments in technologies and practices that result in greenhouse gas mitigation. Considerations should be given to also support/finance policy, regulatory, and institutional reforms that encourage clean energy (CE)[55] development.

Potential investments include (i) deployment of new CE technology; (ii) projects that lower the barriers to adopting CE technologies, e.g., innovative investments and financing mechanisms, and bundling of smaller CE projects; (iii) projects that increase access to modern forms of clean and efficient energy for the poor; and (iv) technical capacity programs for CE.

It is expected that such support would produce results in the form of:

- Increased focus and implementation of clean energy and energy efficiency projects in Africa
- Reduced greenhouse gas emissions as a result of increased use of clean energy.
- Faster transactions for small and medium sized projects, including the private sector.
- Additional climate focus and awareness of the need for adaptation to climate change.

It is envisaged that various financing mechanisms for support to low carbon energy systems should be considered, including grant/loan co-financing, trust funds with MDBs, cooperation arrangements for knowledge provision and exchange, and other forms of cooperation.

Energy Efficiency Improvement
It is recommended that Sweden builds on the existing energy efficiency work in Mozambique, Tanzania and Zambia. It is suggested that measures aimed at ensuring sustainability of energy efficiency are selected from the priority goals for energy efficiency in SADC's RIDMP, Energy Sector Plan, August 2012:

- Putting appropriate laws in place for the adoption of energy efficiency principles, e.g. making energy audits mandatory, banning production and retailing of incandescent lamps;
- Reward policies for energy efficiency and energy conservation; and
- Developing energy management schemes in the countries.

Loss reductions, power quality monitoring and standardisation are some areas, which would seem natural continuations of current projects.

As examples, Sida could assist with capacity building of the new Regional Centres for Renewable Energy and Energy Efficiency and/or cooperate with the International Renewable Energy Agency (IRENA) in supporting countries in their transition to a sustainable energy future.

7.1.4 Regional Power Trade

Sweden and Norway have since 2004 supported the development and implementation of regional competitive electricity markets, "Day Ahead Market" (DAM), through SAPP and since 2009 through EAPP. SAPP and EAPP are of course at different stages in the development of their power

[55] Clean energy is suggested to include initiatives in renewable energy, energy efficiency and cleaner fuel

markets, but a recent Norad/NVE Assessment shows that the DAM trade has not developed according to expectations neither within SAPP nor EAPP[56]. However, their assessment is that spot (hourly) power trade can be progressed on existing interconnectors without waiting for "critical mass" of market participants to arise. The assessment suggests some steps that may help increasing the power trade in the regions. Encouraging willing utilities to utilize these opportunities for hourly trade will bring benefit not only to the trading partners, but also for developing and shaping the regional trading environment. It is recommended that Sweden continue supporting these endeavours. With the above indicated background it is uniquely placed to do so.

7.2 Potential Regional Energy Cooperation Partners

The study has made an assessment of potential Swedish regional energy cooperation through regional actors, existing funds and other types of cooperation. There seems to be very few cases of clear non-complementarity with the Swedish cooperation profile. However, the following list has been shortened to include what seems like best fits.

Regional Actors:
- Southern African Development Community (SADC)
- Southern African Power Pool (SAPP)
- East African Community (EAC)
- Eastern Africa Power Pool (EAPP)
- Common Market for Eastern and Southern Africa (COMESA)

Regional Partnership/Investment Initiatives:
- Program for Infrastructure Development for Africa (PIDA)

International Financing Organisations and Institutions:
- World Bank (Trust Funds, AFREA, AEI, AGAT)
- European Investment Bank/European Union

National Interventions in Mozambique, Tanzania and Zambia

Regional Investment Initiatives – Energy-Water Nexus:
- Nile Basin Initiative (NELSAP)

Support to the Private Sector:
- Challenge Funds (AECF, NCF)
- Power Africa
- Sustainable Energy Fund for Africa (SEFA)
- African Renewable Energy Fund (AREF)
- Public-Private Infrastructure Advisory Facility (PPIAF)
- Green Africa Power (A PIDG Initiative)

Other Initiatives
- Sustainable Energy for All (SE4ALL)
- Energy+

Annex 7-1 includes a table listing more details on funds/initiatives of potential interest for Swedish regional energy cooperation.

[56] Norad and NVE assessment *Way Forward in the Operationalization of the Short Term Power Markets (DAM) within SAPP and EAPP*, dated 27 March 2014

7.3 China

Norway has initiated a project which analysed and identified specific opportunities for dialogue and co-operation with China in and on Africa, in the interest of Norway as well as China and Africa. The purpose was to engage with China in a policy dialogue as well as on joint projects of common interest that could contribute to the development of Africa. Special emphasis would be put on subject areas that are Norwegian political priorities and in which Norway has comparative advantages in terms of capacity and experience.

On November 3, 2009, Ambassador Tore Nedrebø, who is the Norwegian MFA co-ordinator of the project met with the Chinese Ambassador to Norway, Mr. Tang Guoqiang and discussed the project. Ambassador Tang underlined that China's cooperation with Africa was not exclusive, but on the contrary, open for participation of third parties. He highlighted that there is a large potential for three way cooperation between China, African and other countries with the assumption that it is based on equality and mutual benefits or "win-win's".

It is assumed that Sweden should be interested in similar tripartite arrangements. Research and analysis is an area that comes to mind in areas with Swedish comparative advantages.

Initially there would seem to be challenges related to traditional Swedish and Western emphasis on values of transparency, human rights and democracy. However, Deborah Brautigam[57] has pointed out that the Chinese government has become more concerned with combating corruption and to address environmental and social responsibility. For instance the Chinese Exim Bank uses the European consultancy Pöyry Finland to prepare environmental impact assessments for most of their projects in Africa[58]. The Chinese government encourages Chinese companies to take social responsibility, including environmental[59]. Chinese investment creates many jobs for Africans[60]. China has signed the Paris Declaration on Aid Effectiveness and participates in a working group on the development policy of OECD / DAC[61].

It is recommended that Sweden should enter a new international alliance through increased cooperation with China, a new major and important emerging Country. Balancing general Swedish interests with Swedish development principles might be seen as a problem, but with the increased Chinese interests in protecting local eco-environment and promoting sustainable economic and social development, it would not appear to be an unsurmountable obstacle.

7.4 Counterpart Energy Coordinating Body in the Equatorial Lakes Area

There are several overlapping energy initiatives in Eastern Africa with different responsible organisations, e.g. the Lake Victoria Basin Initiative, the Nile Basin Initiatives (NBI), the Eastern Africa Power Pool (EAPP), the East African Community (EAC) Strategy on Scaling-up Access to Modern Energy, the EAC Power Pool, etc.

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[57] Deborah Brautigam: *The Dragon's Gift: The Real Story of China in Africa*. Oxford University Press, Oxford 2009.
[58] Brautigam 2009, page 303.
[59] Peter Bosshard: "China's Environmental Footprint in Africa", China in Africa Policy Briefing, South Africa Institute of International Affairs, Johannesburg, April 2008. Bosshard refers to a Chinese Government announcement in October 2007 that encourages Chinese Investors to "fulfil the necessary social responsibility to protect the legitimate rights and interests of local employees, pay attention to environmental resource protection, care and support of the local community and people's livelihood cause [and to] preserve our good image and a good corporate reputation". Bosshard informs that CNPC and other Chinese companies have adopted the environment management system ISO 14001. Bosshard underlines that such guidelines are not necessarily complied with but refers to many examples where this happens.
[60] Brautigam 2009, page 229. Ian Taylor ("Common Sense about China's Ties with Africa", Online Africa Policy Forum, Centre for Strategic & International Studies, Washington D.C., 28.04.08) write that "...research suggests that local people accounted for the vast majority of the total workforce of most of the Chinese construction companies in Africa".
[61] The China-DAC Study Group.

Sweden would obviously prefer to deal with only one body for coordination of energy strategy and implementation activities within the Nile Basin and Great Lakes Initiatives and other regional Cooperation instruments in Eastern Africa.

The EAC is a regional economic community (REC) and the Secretariat is its executive organ. There is no other regional structure that overlaps the EAC in terms of mandates and functions in East Africa. The current energy function at the EAC is weak; the Secretariat includes one director responsible for all productive sectors and one energy officer. The EAC has hardly undertaken any activities so far. The EAC Regional Power Master Plan and the Regional Strategy on Scaling-up Access to Modern Energy Services are so far the main results, but both have essentially been facilitated by donors. However, the EAC Heads of State have given high priority to energy and the implementation of East African Power Master Plan and there ae signs of an increasing role for the EAC Secretariat, also among the Donors.

Even though the mandate of the EAC is unique, there are existing initiatives, partly overlapping the EAC, e.g. the Lake Victoria Basin and the Nile Basin Initiatives. In addition, the Eastern Africa Power Pool, supported by the EU – APC development funds and the AfDB, is building up its secretariat capacity and has been undertaking the EAPP Power System Plan Study. All these initiatives are guided by similar targets on increased access, but the implementation is not sufficiently coordinated. The Basin Initiatives are undertaking studies, prioritizing and listing potential investments, in overlapping geographic areas and using the same generation resources. There have even been examples of overlapping activities, e.g. the preparation of regional power trade by the NBI-RPTP (9 Countries) and the EAPP (7 of the same countries). Another example was the EAC concept (now defunct?) of establishing an Eastern Africa Community Power Pool (EACPP), including 5 of these countries. There is thus a clear need for a body to coordinate/synchronize these more advanced initiatives. The following are the organisations that might be considered:

Organisation	Countries	Mandate	Implementing Capacity
East Africa Community (EAC)	Kenya, Uganda, Tanzania, Rwanda and Burundi	The EAC is a regional economic community (REC) and an administrative unit in the African Union (AU)	Weak. Only a couple of energy officers in the Department of Energy, Environment and Natural Resources at EAC.
The Nile Equatorial Lakes Subsidiary Action Program (NELSAP)	Burundi, Democratic Republic of Congo, Kenya, Rwanda, Tanzania and Uganda. Egypt and Sudan	NELSAP is an investment program under the Nile Basin Initiative (NBI) promoting investments in power development, interconnection and trade, management of water resources and lakes and fisheries, agricultural development, and control of water hyacinth.	Strong. NELAP has a coordination unit (NEL-CU), located in Kigali. There is also a Council of Ministers (NEL-COM) and a Technical Advisory Committee (NEL-TAC) which oversees the work in the NELSAP region and gives strategic guidance to the NELSAP.
Eastern Africa Power Pool (EAPP)	EAPP has ten member Countries from COMESA: Burundi, Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Libya, Rwanda, Sudan, Tanzania, Uganda	Inter-Governmental Memorandum of Understanding (IGMOU) between the countries. Subsequently adopted as a specialized institution by COMESA.	Gaining strength. A Permanent Secretariat (PS) is in Addis Ababa with technical committees. Ruling authority is the Council of (electricity) Ministers. A Steering Committee of the Utility CEOs oversees the PS.
The Organization of the CEPGL for Energy of the Great Lakes (EGL).	Burundi, Democratic Republic of the Congo and Rwanda.	The Economic Community of the Great Lakes Countries (ECGLC/CEPGL) a sub-regional organization promoting regional economic cooperation and integration.	Weak. EGL's objective is to ensure cooperation between the Member States. It serves as a planning and research body and also ensures the implementation of projects.

The obvious candidate for the central coordinating role is the EAC Secretariat based on:

- The mandate of the EAC is currently "stronger" that the other sub-regional structures. EAC is a permanent REC with the "strength" of an administrative unit in the AU, which is not the case with the NBI and LVBI.
- The role of the EAC is to facilitate the implementation of the Regional Strategy, which is much wider than the Basin Initiatives. Implementing the Strategy impacts on the total range of energy supplies, in contrast to the Basin Initiatives, which are focused on the water resource use, i.e, using hydro power for electricity generation.
- The risk for overlapping with regional power trading activities is currently limited due to the few activities undertaken by the EAC.

For the future it is important to support the capacity of the Secretariat to be able to coordinate and avoid overlapping.

It is envisaged that Sweden would increasingly use the EAC as the Implementing[62] Agency for its regional energy activities in East Africa and the Equatorial Lakes Area, while applicable sub-regional bodies like the NBI (NELSAP) and EAPP would be Executing[63] Agencies. It is envisaged that technical assistance is likely to be required to enable the Agencies to perform their assigned duties.

[62] Implementation is assumed to involve project identification, preparation of project concept, appraisal, preparation of detailed project document, project approval and start-up, project supervision, and project completion and evaluation, in accordance with agreed policies and procedures

[63] Execution is assumed to include the management and administration of the day-to day activities of projects in accordance with specific agreed project requirements as well as accountability for intended and appropriate use of funds, procurement and contracting of goods and services.

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ANNEX 2-1

AU/NEPAD AFRICAN ACTION PLAN 2010-2015
Emerging Priorities in Energy

Energy sub-sector	Project / Programme
Electrical Interconnections	Ethiopia-Sudan-Egypt Interconnection, to link Eastern Africa to the North African grid. Ethiopia-Djibouti and Ethiopia-Sudan 230 kV connections are underway or planned, as are Sudan-Eritrea and Sudan-Uganda projects. Additional higher kV Interconnection projects based on hydro development in Ethiopia (e.g., Ethiopia-Sudan 500kV) have been identified in the Horn of Africa countries. Kenya-Uganda, Uganda-Rwanda, Burundi-Rwanda, Burundi-DRC-Rwanda and Nairobi-Arusha interconnections are also planned in the East Africa Power Pool region. Engineering and planning studies to interconnect countries in the ECCAS region (PEAC power pool) are underway, as is an IPPF study of cross-border electrification in the region.
Power Generation	Gilgel Gibe III Power Plant is a catalytic project located in Ethiopia, the source of power to be traded via the Kenya-Ethiopia Interconnection Project (a Priority project). Kafue Gorge Lower Hydropower Project in Zambia. This catalytic project will add storage to an existing generating scheme, enabling reduction of Zambian power deficits and power exports to ESKOM and SAPP. It is now being structured as an IPP or PPP, at an expected cost of US$ 1-1.25 billion. Refurbishment of Inga 1 and 2 in the short term, development of an effective regional energy network and ultimately exploitation of Grand Inga to export power across the continent, are strategic objectives and plans of the Central African Power Pool, a specialized body of ECCAS.
Various	Energy Projects in West Africa Power Pool, West Africa Gas Pipeline extension to Cote d'Ivoire, Regional Energy Access Programme and Renewable Energy Efficiency Programme have been identified as ECOWAS energy priorities. The Southern Africa Power Pool (SAPP) has numerous rehabilitation, generation and transmission projects underway and planned, with early cost estimates.
Renewable Energy	UMA has identified the Maghreb Renewable Energy Programme among its priorities, and six renewable energy projects are priorities in the Horn of Africa countries, including geothermal, wind, solar and biogas projects. These projects would harness Africa's large untapped renewable energy potential, especially in areas where other alternatives are costly.

ANNEX 2-2

SADC Regional Infrastructure Development Master Plan 2012
Priority Ranking Generation Projects

Priority ranking	Country	Project name	Capacity [MW]	Technology	Expected commissioning date
SAPP PRIORITY GENERATION PROJECTS (CAPACITY >1 000 MW, SCORE >50%)					
1	Mozambique	HCB North Bank	1,245	Hydro	2015
2	Mozambique	Mphanda Nkuwa	1,500	Hydro	2017
3	Zambia/Zimbabwe	Batoka	1,600	Hydro	2022
4	DRC	Inga 3	4,320	Hydro	2018
5	Zimbabwe	Gokwe North	1,400	Coal	2017
6	South Africa	New PF + FBC	6,250	Coal	2026
7	South Africa	Nuclear	9,600	Nuclear	2023
Total			25,915		
SAPP PRIORITY GENERATION PROJECTS (CAPACITY <1 000 MW, SCORE >50%)					
1	Zimbabwe	Kariba South Extension	300	Hydro	2016
2	Namibia	Kudu	800	Gas	2016
3	Botswana	Morupule 5 and 6	300	Coal	2015
4	Namibia	Baynes	360	Hydro	2018
5	Mozambique	Benga	600	Coal	2015
6	Zimbabwe	Hwange 7 and 8	600	Coal	2015
7	Zambia	Lunsemfwa Lower	255	Hydro	2016
8	DRC	Busanga	240	Hydro	2016
9	Zambia	Kalungwishi	220	Hydro	2016
10	DRC	Zongo 2	120	Hydro	2016
11	Tanzania	Kiwira	200	Coal	2015
12	Tanzania	Kinyerezi	240	Gas	2015
13	Tanzania	Rumakali	520	Hydro	2018
14	Mozambique	Moatize	300	Coal	2015
15	Zambia	Mambilima Falls Site 1 and 2	425	Hydro	2019
16	Zambia	Mpata Gorge	543	Hydro	2023
17	Malawi	Lower Fufu	100	Hydro	2015
18	Tanzania	Ruhudji	358	Hydro	2017
Total			6,481		
SAPP UTILITY INTEGRATED RESOURCE PLAN GENERATION PROJECTS (SCORE < 50%)					
1	Lesotho	Kobong Pumped Storage	1,200	Hydro	
2	Zambia	Devils Gorge	500	Hydro	
3	Malawi	Mpatamanga	260	Hydro	
4	Malawi/Tanzania	Songwe	340	Hydro	
5	Malawi	Kholombizo	240	Hydro	
6	South Africa	OCGT	2,370	Gas	
7	South Africa	CCGT Gas	3,910	Gas	
8	South Africa	New Wind	7,200	Wind	
9	South Africa	Solar PV	6,900	Solar	
10	Zimbabwe	Lupane	300	Gas	
Total			23,220		

ANNEX 2-3

SADC Regional Infrastructure Development Master Plan 2012
Priority Ranking Tranmission Projects

No.	Project Name	Countries	Capacity [MW]	Expected Date
TRANSMISSION PROJECTS TO RELIEVE CONGESTION				
1	ZIZABONA	Zimbabwe, Zambia, Botswana, Namibia	600	2014
2	Central Transmission Corridor	Zimbabwe	300	2013
3	Kafue -Livingstone Upgrade	Zambia	600	2014
4	North West Upgrade	Botswana	600	2014
TRANSMISSION PROJECTS TO INTERCONNECT NON -OPERATING MEMBERS				
1	Zambia -Tanzania	Zambia, Tanzania	400	2016
2	Mozambique -Malawi	Malawi, Mozambique	300	2015
3	Namibia -Angola	Angola, Namibia	400	2016
4	DRC -Angola	Angola, DRC	600	2016
TRANSMISSION PROJECTS ASSOCIATED WITH NEW GENERATION				
1	Mozambique Backbone (CESUL)	Mozambique	3,100	2017
2	2nd Mozambique -Zimbabwe	Mozambique, Zimbabwe	500	2017
3	2nd Zimbabwe -RSA	South Africa, Zimbabwe	650	2017
4	2nd DRC -Zambia	DRC, Zambia	500	2017

ANNEX 2-4

SADC Regional Infrastructure Development Master Plan 2012

Energy Sector Projects

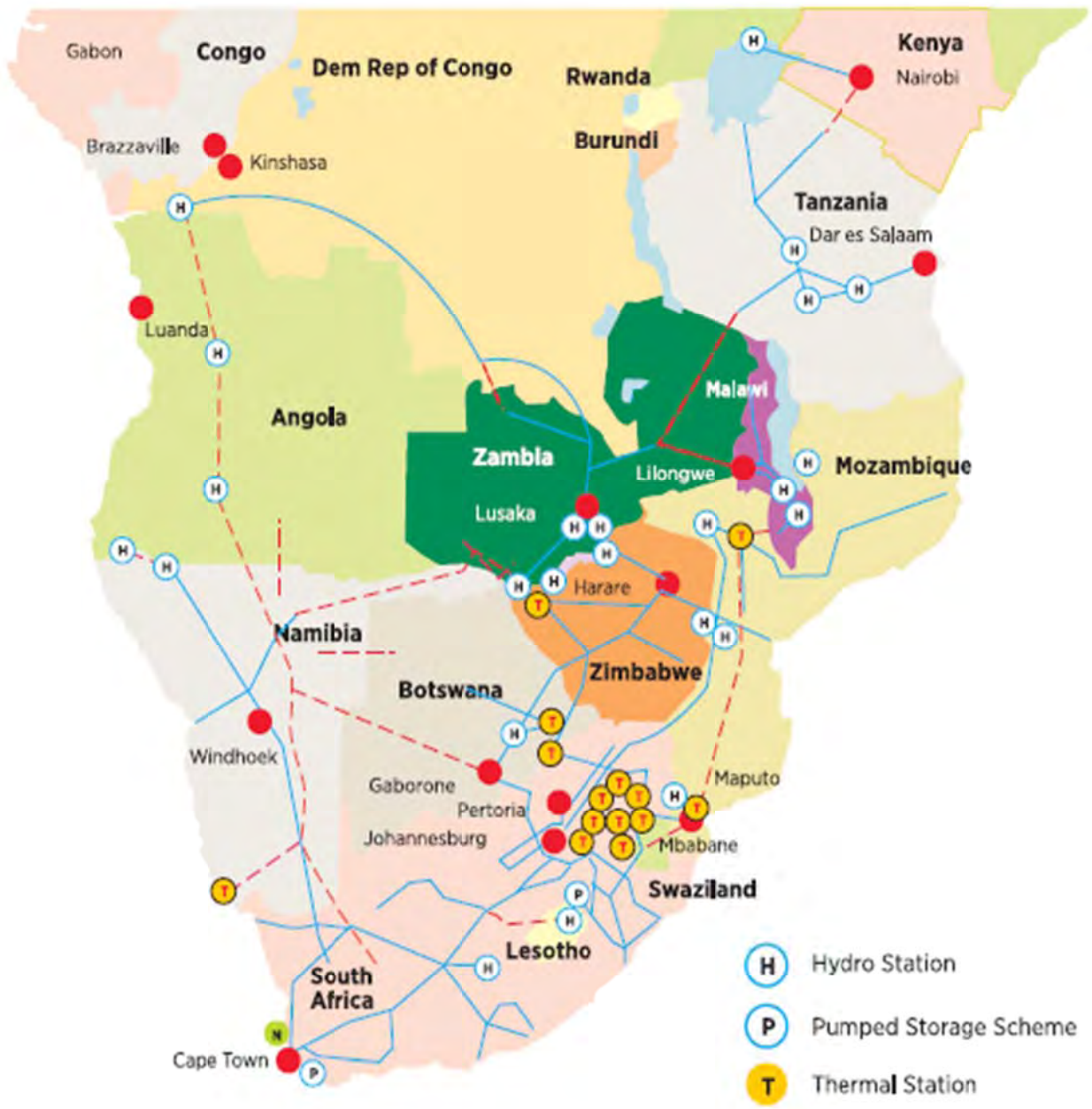
ANNEX 2-5

SAPP Membership

Full Name of Utility	Status	Abbreviation	Country
Botswana Power Corporation	OP	BPC	Botswana
Electricidade de Mocambique	OP	EDM	Mozambique
Hidro Electrica Cahora Bassa	OB	HCB	Mozambique
Mozambique Transmission Company	OB	MOTRACO	Mozambique
Electricity Supply Corporation of Malawi	NP	ESCOM	Malawi
Empresa Nacional de Electricidade	NP	ENE	Angola
ESKOM	OP	Eskom	South Africa
Lesotho Electricity Corporation	OP	LEC	Lesotho
NAMPOWER	OP	Nam Power	Namibia
Societe Nationale d'Electricite	OP	SNEL	DRC
Swaziland Electricity Board	OP	SEB	Swaziland
Tanzania Electricity Supply Company Ltd	NP	TANESCO	Tanzania
ZESCO Limited	OP	ZESCO	Zambia
Copperbelt Energy Cooperation	ITC	CEC	Zambia
Lunsemfwa Hydro Power Company	IPP	LHPC	Zambia
Zimbabwe Electricity Supply Authority	OP	ZESA	Zimbabwe

OP = Operating Member
OB = Observer
NP = Non-Operating Member
ITC = Independent Transmission Company
IPP = Independent Power Producer

ANNEX 2-6
The Southern Africa Power Pool



ANNEX 2-7

EAPP/EAC Regional PSMP & Grid Code Study, May 2011
Ongoing Interconnection projects

No	From	To	Type / Length	Capacity (MW)	Earliest Year in Operation	Comments
1	Tanzania	Kenya	400 kV, 2 circuits, 260 km	1,520	2015	
2	Rusumo	Rwanda	220 kV,1 circuit, 115 km	320	2015	Connecting Rusumo Falls HP with Tanzania, Rwanda and Burundi.
3	Rusumo	Burundi	220 kV, 1 circuit, 158 km	280	2015	
4	Rusumo	Tanzania	220 kV, 1 circuit, 98 km	350	2015	
5	Ethiopia	Kenya	500 kV, DC bipole, 1120 km	2,000	2016	
6	Ethiopia	Sudan	500 kV, 4 circuits, 570 km	3,200	2016	
7	Egypt	Sudan	600 kV, DC Bipole, 1665 km	2,000	2016	
8	Uganda	Kenya	220 kV, 2 circuits, 254 km	300	2014	Lessos S/S (KYA) to Bujagali S/S via Tororo S/S (UGA), duplicating existing 132kV line.
9	Uganda	Rwanda	220 kV, 2 circuits, 172 km	250	2014	From Mbarara to Mirama (border UGA) to Birembo/Kigali (RWA)
10	Rwanda	DRC	220 kV, 1 circuit, 68 km	370	2014	New S/S at Kibuye Methane Gas plant in RWA to Goma (DRC), completing loop around Lake Kivu.
11	DRC	Burundi	220 kV, 1 circuit, 105 km	330	Expected in 2014	S/S Kamanyola/ Ruzizi III (DRC) to Bujumbura (BUR). Study incl. line new S/S in Bujumbura-Kiliba (DRC).
12	Burundi	Rwanda	220 kV	330	2016	Rwegura (BUR) – Kigoma (RWA).

ANNEX 2-8

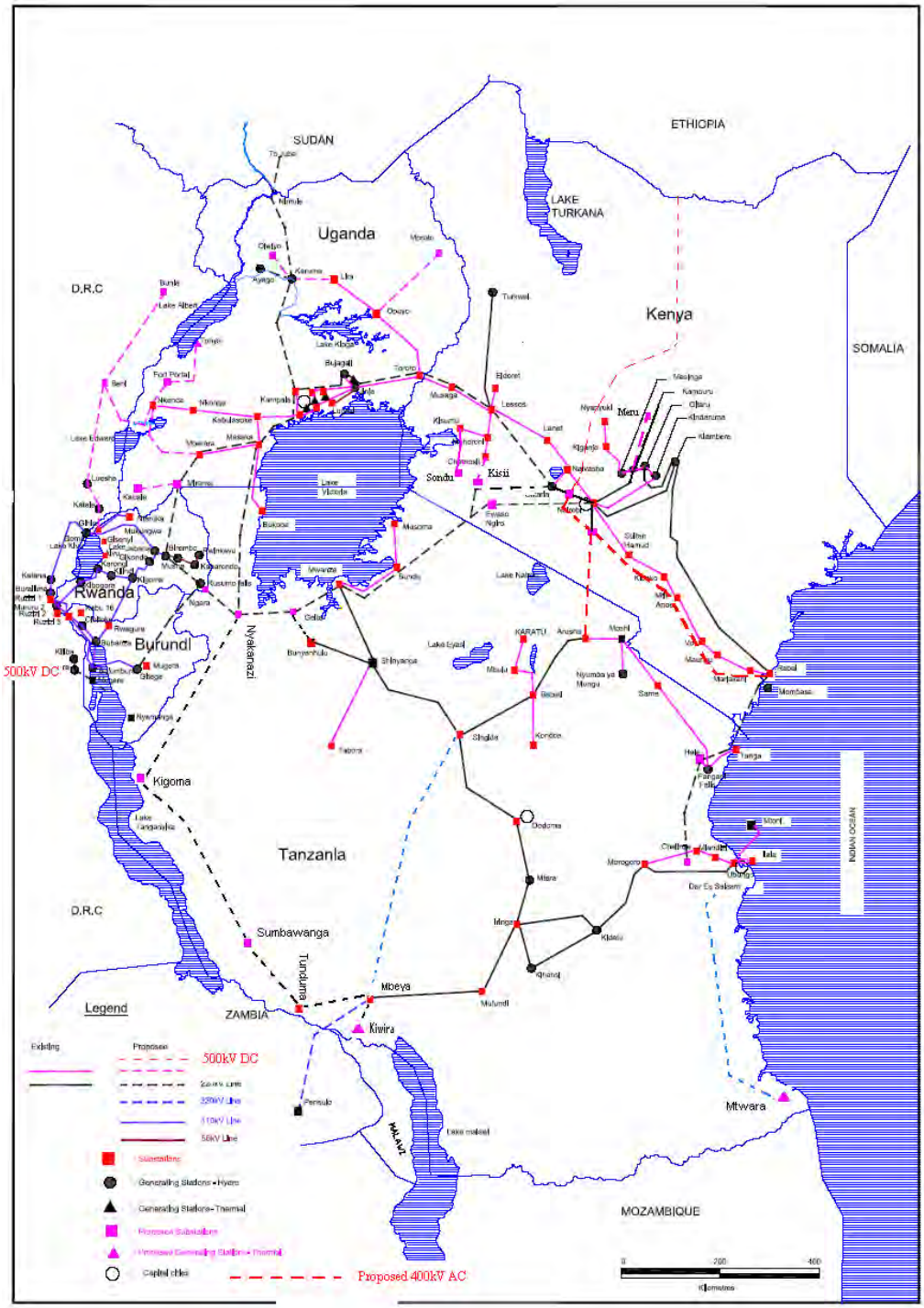
EAPP/EAC Regional PSMP & Grid Code Study, May 2011
Recommended Interconnection projects

No	Connecting	km	Year	Transmission USD million	Substations USD million	Convertors USD million	Total USD million
1	Tanzania-Kenya 400 kV, 2 Circuits	260	2015	104	13		117
2	Tanzania - Uganda, 220 kV, 2 Circuits	85	2023	20	10		30
3	Uganda-Kenya, 220 kV, 2 Circuits	254	2023	61	10		71
4	Ethiopia-Kenya, 500 kV, DC bipole	1120	2016	309	13	524	846
5	Ethiopia-Sudan, 500 kV, 2 Circuit	570	2016	239	16		255
	Ethiopia-Sudan, 500 kV, 2 Circuit	570	2016	239	16		255
6	Egypt-Sudan, 600 kV, DC bipole	1665	2016	483	16	535	1034
7	Ethiopia-Kenya, 500 kV, DC bipole	1120	2020	309	13	524	846
8	Ethiopia-Sudan, 500 kV, 2 Circuit	544	2020	239	16		255
9	Egypt-Sudan, 600kV, DC bipole	1665	2020	483	16	535	1034
10	Ethiopia-Sudan, 500 kV, 2 Circuit	544	2025	239	16		255
11	Egypt-Sudan, 600kV, DC bipole	1665	2025	483	16	535	1034
12	Uganda-Tanzania/Kenya[1]		2023				101

[1] A 12th project was identified as the combination of projects 2 and 3 into one single project as they had a similar purpose and the same entry date (2023).

ANNEX 2-9

Existing and Future Transmission Lines in EAC



ANNEX 2-10

EAPP Membership

The current members of the East African Power Pool (EAPP) comprise ten countries:

No	COUNTRY	EAPP MEMBER UTILITY	MEMBER SINCE
1	Burundi	Régie de Production et de Distribution d'Eau et d'Electricité (REGIDESO)	24 Feb 2005
2	Burundi/DRC/ Rwanda	Société Internationale d'Electricité des Pays des Grands Lacs (SINELAC)	24 Feb 2005
3	DR Congo	Société National d'Electricité (SNEL)	8 May 2005
4	Egypt	Egyptian Electricity Holding Company (EEHC)	24 Feb 2005
5	Ethiopia	Ethiopian Electric Power Corporation (EEPCo)	8 May 2005
6	Kenya	Kenya Electricity Generating Company (KenGen)	8 May 2005
		Kenya Power and Lighting Company (KPLC)	8 May 2005
		Kenya Electricity Transmission Company (KETRACO)	Jan 2010
7	Libya	General Electricity Company of Libya (GECOL)	13Jan 2011
8	Rwanda	Electricity, Water & Sanitation Agency (EWSA) – previously ELECTROGAZ	8 May 2005
9	Sudan	National Electricity Corporation (NEC)	24 Feb 2005
		Sudanese Electricity Transmission Company (SETCO)	Jan 2012
10	Tanzania	Tanzania Electricity Supply Corporation (TANESCO)	15 Nov 2011
11	Uganda	Uganda Electricity Transmission Company Limited (UETCL)	Nov 2012

ANNEX 2-11

COMESA REGION KEY INFRASTRUCTURE PROJECTS
Power Transmission Networks Interconnection

No	Project Title	Participating countries	Project Description	Status of implementation	Estimated Cost in Mill US$ Dollars
1	Zambia-Tanzania-Kenya Power Interconnector	Zambia, Tanzania and Kenya	Construction of a power interconnector connecting the Eastern and Southern Africa power pools to facilitate trading in electricity; promote power systems stability and rural electrification.	A Project implementation Unit (PIU) has already been established to coordinate fund mobilisation and project implementation	1.116
2	South Sudan-Uganda Power Interconnector	South Sudan and Uganda	Construction of a power transmission lines connecting South Sudan and Uganda power grid to facilitate trading in electricity and promote power systems stability	The feasibility study is yet to be completed which will be financed by the African Development Bank (AfDB)	1.0
3	Eritrea-Sudan Power Interconnector	Eritrea and Sudan	Construction of a power interconnector linking the South Sudan and Uganda power networks to facilitate trading in electricity and promote power systems stability	The feasibility study is yet to be completed which will be financed by the African Development Bank (AfDB)	1.0
4	Ethiopia South Sudan	Ethiopia and South Sudan	Construction of a power line connecting the Ethiopian and South Sudan power networks to facilitate trading in electricity and promote power systems stability	The feasibility studies are yet to be completed.	1.0
5	Ethiopia Sudan	Ethiopia and Sudan	Construction of a power transmission line connecting Ethiopia's and Sudan's power networks to facilitate trading in electricity and promote power systems stability	The feasibility studies are yet to be completed	1.0
6	Zambia-DRC interconnector	DR Congo-Zambia	Construction of a power interconnector between Zambia and the DRC to facilitate trading in electricity and promote power systems stability	Funding for the line in Zambia (to link with World Bank funded section of the line on the DRC side) being considered by TTA IC. Alternative financing options are being reviewed.	17.0
7	Egypt Sudan Ethiopia	Egypt, Ethiopia and Sudan	Construction of a transmission line to connect the power networks of Egypt, Ethiopia and Sudan to facilitate trading in electricity and promote power systems stability	The feasibility studies completed in December 2008 require updating	Estimated cost for update of feasibility studies, design & tender doc's is US$ 4 million.
8	Egypt Sudan	Egypt a and Sudan	Construction of a transmission line connecting the power networks of Egypt, Ethiopia and Sudan power networks to facilitate trading in electricity and promote power systems stability	The feasibility studies completed in August 2012 require updating	Depending on final interconnector configuration, the estimated costs are US$71 - US$ 560 million

Source: *COMESA REGION KEY INFRASTRUCTURE PROJECTS*, 19 August 2013

ANNEX 2-12

COMESA REGION KEY INFRASTRUCTURE PROJECTS
Power Generation

No	Project Title	Participating countries	Project Description	Status of implementation	Estimated Cost in Mill US$ Dollars
1	Kalungwishi hydro project	Zambia	Construction of a 213 MW power generation plant on the Lakungwishi river.	Feasibility study completed. Lunzua Power Authority established to implement the project. The gearing structure is 20:80 equity to debt. IRR is 27.6%	641
2	Ayago hydro power project	Uganda	Construction of 300MW power plant	Master plan study completed.	862.8
3	Ethiopian Renaissance Dam	Ethiopia	Construction of 6,000 MW power plant inclusive of a dam (to be completed in July 2017)	The design and feasibility studies have been completed. Implementation started.	8,500 including the power transmission lines.
4	Batoka Gorge Hydro-Power Station	Zambia and Zimbabwe	Construction of a dam and a 1,600 MW hydro power plant on the Zambezi River.	The detailed feasibility studies have been completed indicated that it is economically and technically feasible.	4,000
5	Ruzizi III Hydro Project	Burundi DR Congo, Rwanda	Construction of a 147 MW hydropower plant on the Ruzizi River for supply of power to Rwanda, Burundi and the Democratic Republic of Congo.	The design and feasibility studies have been completed.	530.4 including the cost of transmission lines
6	Inga Power Project	DRC	Construction of a 3,500 MW Inga 3 hydropower project on river Inga. The objective is to provide affordable, reliable and clean power DRC and neighbouring states.	Awaiting feasibility study complemented with studies on geology, hydropower production and the transmission system associated with the project	The feasibility study: 15. Total project cost: 7,600
7	300 Megawatts (MW) Wind Farm at the West Nile River Region	Egypt	Development of 300 MW capacity wind farm.	Project is at concept stage.	Preparing feasibility study & consultancy services: 9.1. Estimated capital cost: 468.
8	Geothermal Power Generation in the Rift Valley	Kenya	Construction of thermal plants to exploit abundant thermal energy sources estimated at 15,000MW	Kengen has opened bids received for the construction of 560 MW geothermal stations	12,000
9	Lac Assal Geothermal	Djibouti	Construction of a 26 MW Geo-thermal plant	Master plan completed. IRR is 28%	103
10	Djibouti Wind power sites	Djibouti	Development of wind farms to generate a total of 46 MW at Ghoubet, Ali Sabieh, Djibouti Ville, Egralyta, and Bada Wein.	Master plan completed. IRR is 28%	88.4
	Total				33,122.5

Source: *COMESA REGION KEY INFRASTRUCTURE PROJECTS,* 19 August 2013

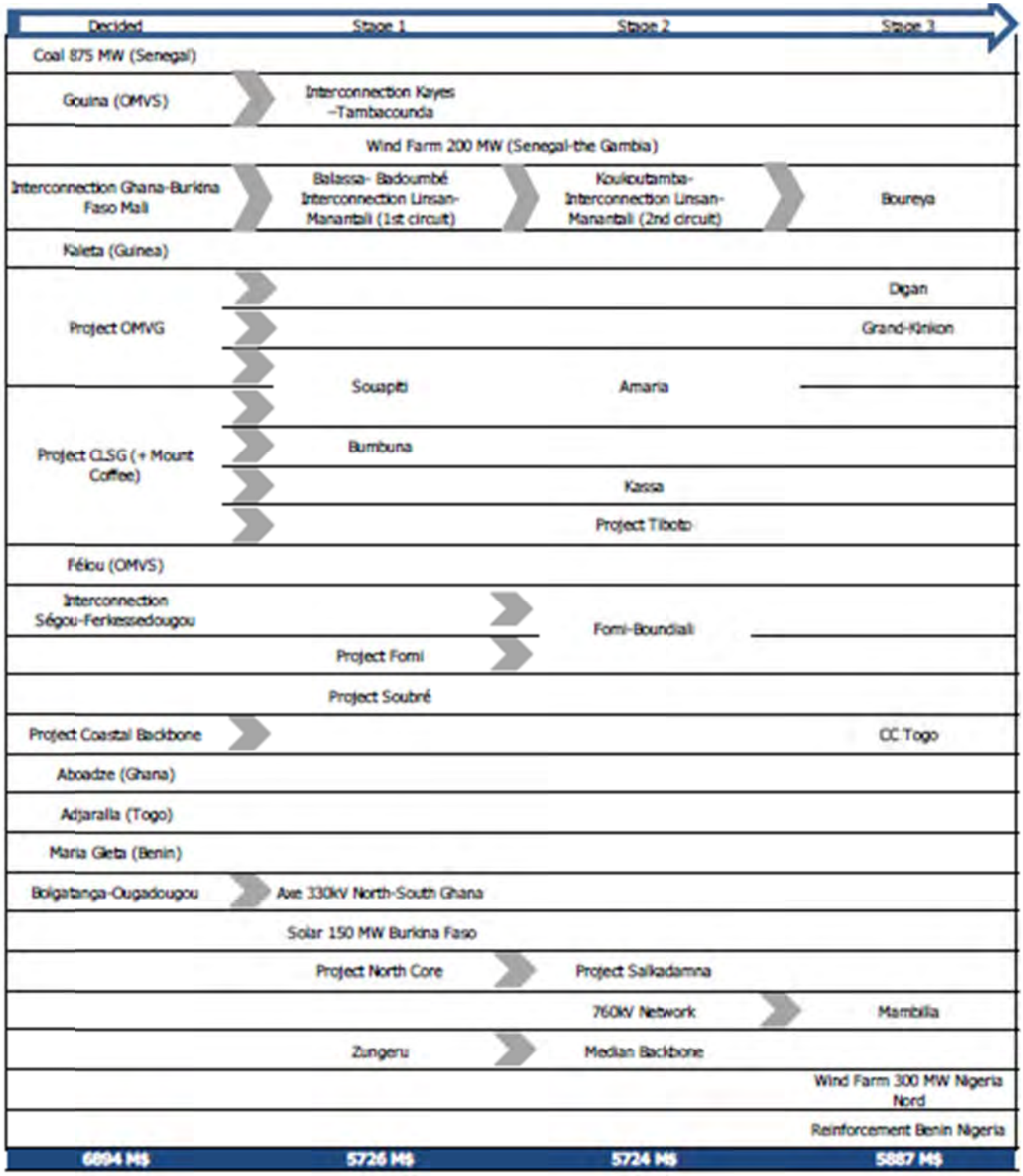
ANNEX 2-13

COMESA-EAC-SADC Tripartite Power Grid and Supported Power Projects

ANNEX 2-14

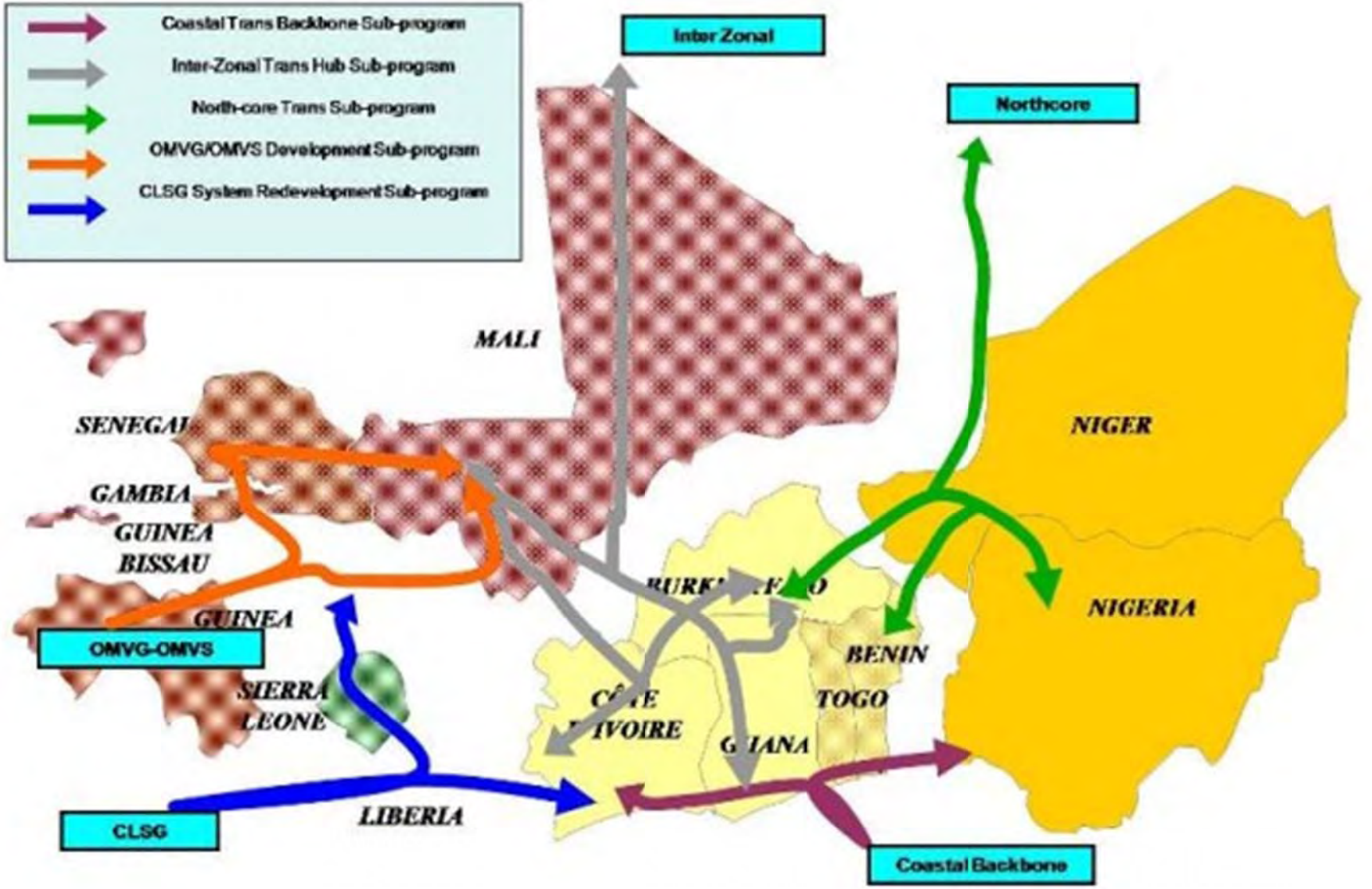
ANNEX 2-15

2011 ECOWAS Revised Master Plan for Generation And Transmission: Implementation in Three Phases



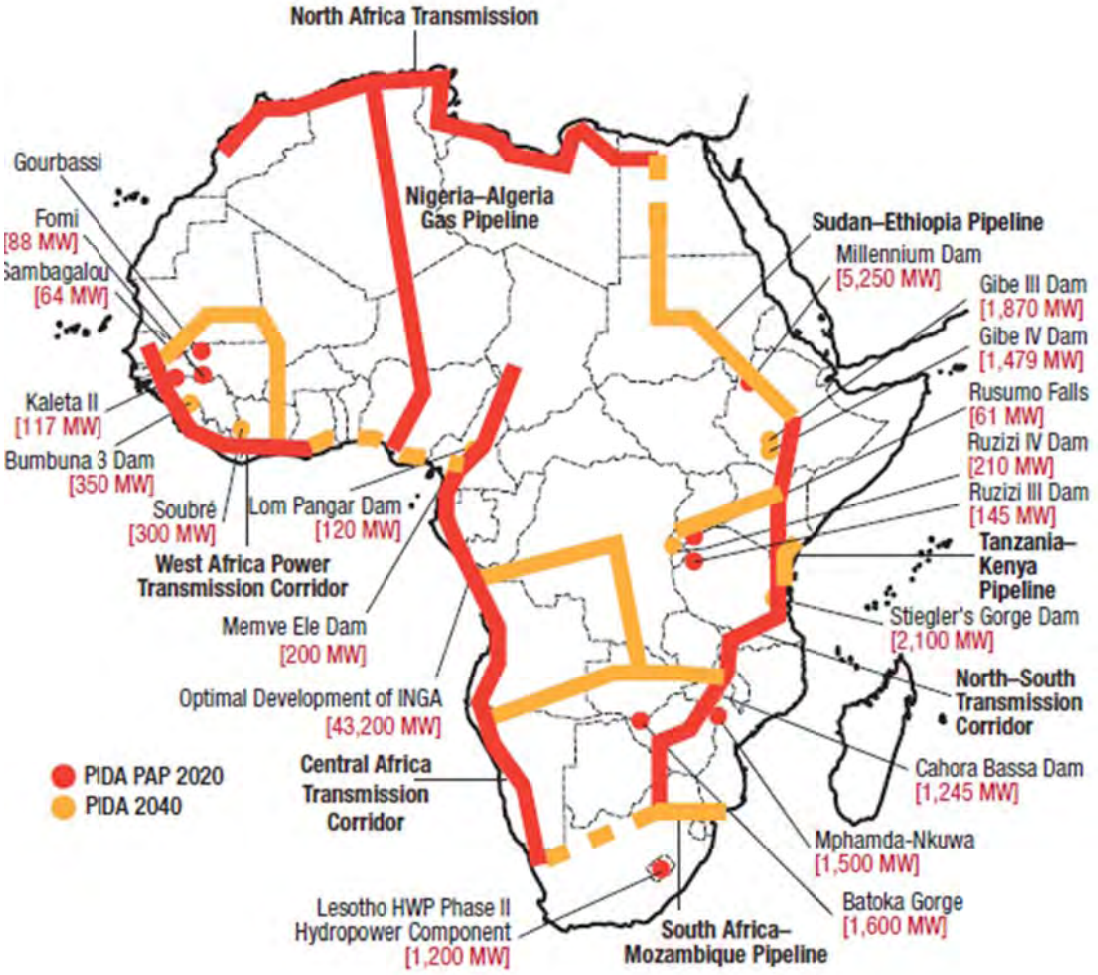
ANNEX 2-16

Implementation Roadmap of the Core WAPP Programs



ANNEX 3-1

Programme for Infrastructure Development in Africa (PIDA)
PIDA Energy Generation and Transmission Programmes for 2020 and 2040.



ANNEX 3-2

Programme for Infrastructure Development in Africa (PIDA)
Priority Action Projects (PAP) - Energy Sector

No	Project	Description	Stage[1]	Cost US$m	Countries	REC	Region
1	Great Millennium Renaissance Dam	Develop a 5,250 MW plant to supply domestic market and export electricity to EAPP market	S4B	8,000	Ethiopia, Nile basin	COMESA/ IGAD	Eastern
2	North–South Power Transmission Corridor	8,000 km line from Egypt through Sudan, South Sudan, Ethiopia, Kenya, Malawi, Mozambique, Zambia, Zimbabwe to South Africa	S3A	6,000	Kenya, Ethiopia, Tanzania, Malawi, Mozambique, Zambia, Zimbabwe, South Africa	COMESA/EAC/ SADC/IGAD	Southern
3	Mphanda-Nkuwa	1,500 MW hydroelectric power plant for export to the SAPP market	S2	2,400	Mozambique, Zambezi basin	SADC	Southern
4	Lesotho HWP phase II hydropower component	Hydropower programme for supply to Lesotho and export to South Africa	S1	800	Orange-Senqu River Basin	SADC	Southern
5	Inga III Hydro	4,200 MW run of river hydropower station on the Congo river	S3A	6,000	DRC Congo River	ECCAS	Central
6	Central African Interconnection	3,800 km line from the DRC to South Africa through Angola, Gabon, Namibia and north to Equatorial Guinea, Cameroon and Chad	S2	10,500	South Africa, Angola, Gabon, Namibia, Ethiopia	ECCAS	Central
7	Sambagalou	128 MW of hydropower capacity, 930 km from the mouth of the Gambia River to supply Senegal, Guinea, Guinea Bissau and Gambia	S3A	300	Senegal, OMVG	ECOWAS	Western
8	West Africa Power Transmission Corridor	2,000 km line along the coast connecting with the existing Ghana–Nigeria line with capacity of 1,000 MW	S3A	1,200	Guinea, Guinea Bissau, Gambia, Sierra Leone, Liberia, Côte d'Ivoire, Ghana	ECOWAS	Western
9	North Africa Transmission	2,700 km line from Morocco to Egypt through Algeria, Tunisia and Libya	S4A	1,200	Morocco, Algeria, Tunisia, Libya, Egypt	AMU	Northern
10	Kaleta	Hydropower generation of 117 MW	S2	179	Guinea – OMVG	ECOWAS	Western
11	Batoka	Hydroelectric plant with a capacity of 1,600 MW for export of electricity	S1	2,800	Zambia/Zimbabwe, Zambezi basin	COMESA/EAC	Eastern
12	Ruzizi III	145 MW hydroelectric plant to share power among Rwanda, Burundi and DRC promoted by CEPGL	S3A	450	Rwanda/DRC	COMESA/EAC	Eastern
13	Rusumo Falls	Hydropower production of 61 MW for Burundi, Rwanda and Tanzania	S3B	360	Nile River Basin	COMESA/EAC	Eastern
14	Uganda-Kenya Petroleum Products Pipeline	300 km pipeline for lower cost mode of transport of petroleum products	S1	150	Uganda, Kenya	COMESA/EAC	Eastern
15	Nigeria–Algeria Pipeline	4,100 km gas pipeline from Warri to Hassi R'Mel in Algeria for export to Europe	S3A	NA	Nigeria, Niger, Algeria	UMA/ECOWAS	Northern, Western

[1] Stage classification from Aurecon's review of the status of PIDA Priority Action Plan (PAP), 28 March 2014:
S1 = Identification/Concept,
S2 = Pre-Feasibility
S3A = Feasibility, Detailing & Structuring
S3B = Financing Obtained
S4A = Tendering
S4B = Construction
S4C = Operation

ANNEX 3-3

World Bank Regional Integration Assistance Strategy for Sub-Saharan Africa (RIAS)
Description of Projects

Fiscal Year	Project Name	Description	Amount (USDm)
Active Regional Projects			
2004	Southern Africa Power Market APL1	Construction/Rehabilitation of 800 MW transmission lines and supporting infrastructure linking the Inga hydropower site in DRC to the border of Zambia, allowing for power trading with the Southern Africa Power Pool and installation of modern ICT backbone infrastructure along transmission lines at low marginal cost. (DRC, Zambia)	359.2
2007	Southern Africa Power Market APL1b Regional & Domestic Power Market Dev't Project	Rehabilitation of the hydroelectric facilities at Inga (I & II) in DRC, increasing capacity from 700 MW to 1300 MW, allowing for export to the Southern Africa Power Pool as well as domestic consumption through construction of a 400 kV transmission line to Kinshasa. (DRC)	296.7
2005	West Africa Power Pool Phase 1 APL1	1st Phase of Multi-donor Construction/Rehabilitation of a 330kV transmission backbone and supporting infrastructure connecting West Africa Power Pool coastal states (Benin, Cote d'Ivoire, Ghana, Nigeria & Togo)	40
2006	West Africa Power Pool Phase 1 APL2	Rehabilitation of a 60 MW run-of-the-water Felou hydroelectric dam supplying power to Senegal, Mali and Mauritania, and linked with the wider West Africa Power Pool network. (Mali, Mauritania, Senegal)	160
2006	West Africa Power Pool Phase 2 APL1	Second Phase of Multi-donor Construction/Rehabilitation of a 330KV transmission backbone connecting West Africa Power Pool Coastal States from Cote d'Ivoire to Nigeria. (Benin, Cote d'Ivoire, Ghana, Nigeria and Togo)	60
Indicative Lending Program for FY11 Period			
	West Africa Power Pool (WAPP) - APL 3 (Inter-zonal transmission hub)	Construction of a 225kV inter-zonal transmission hub and supporting infrastructure from Bolgatanga to Ouagadougou and capacity building support for West Africa Power Pool (WAPP) secretariat (Burkina Faso, Ghana, WAPP)	70
	Regional & Domestic Power Market Dev't (PMEDE) - Additional Financing	Additional financing for the rehabilitation of hydroelectric generation facilities of Inga 1 and Inga 2 (increasing capacity from 700MW to 1300MW) to supply power to the Southern Africa Power Pool. (DRC)	285
	SAPP - Zambia Transmission Line	Increase in transmission capacity and efficiency along the Kafue – Muzuma – Victoria Falls transmission lines to enable exports to the Southern Africa Power Pool (Zambia).	90
Indicative Lending Program for FY12 Period			
	Southern Africa Power Pool, Mozambique Transmission Line	Construction of a north-south transmission backbone system to connect the Tete Power Plants to the Southern Africa Power Pool (SAPP). First phase of staged program to link 5 planned generation projects in Mozambique to SAPP (Mozambique)	90
	Southern Africa Power Market APL1 Additional Financing	Additional financing for contracts which have exceeded initial cost estimates (DRC)	100
	Rusumo Falls Hydroelectric and Multipurpose Project	Construction of 60-80MW Hydropower facility, 368 km of transmission lines and associated infrastructure, multipurpose local area development and institutional capacity building (Burundi, Rwanda, Tanzania)	135
	East Africa Power Pool - Ethiopia-Kenya Interconnector	Connection of 1200km of 500kV DC line between Sodo Substation (Ethiopia) and metropolitan Nairobi, including the two converting stations to transport 2,000MW from Southern Ethiopia to the Eastern Africa Power Pool (Kenya)	300
	West Africa Power Pool (WAPP) APL4 Phase 1 CSLG Power Network	Construction of a 225kV transmission line to interconnect the power networks of Liberia, Cote d'Ivoire, Sierra Leone and Guinea under the West Africa Power Pool (Liberia)	150

Source: World Bank. (2011). Partnering for Africa's Regional Integration: Progress Report on the Regional Integration Assistance Strategy for Sub-Saharan Africa. Washington, DC.

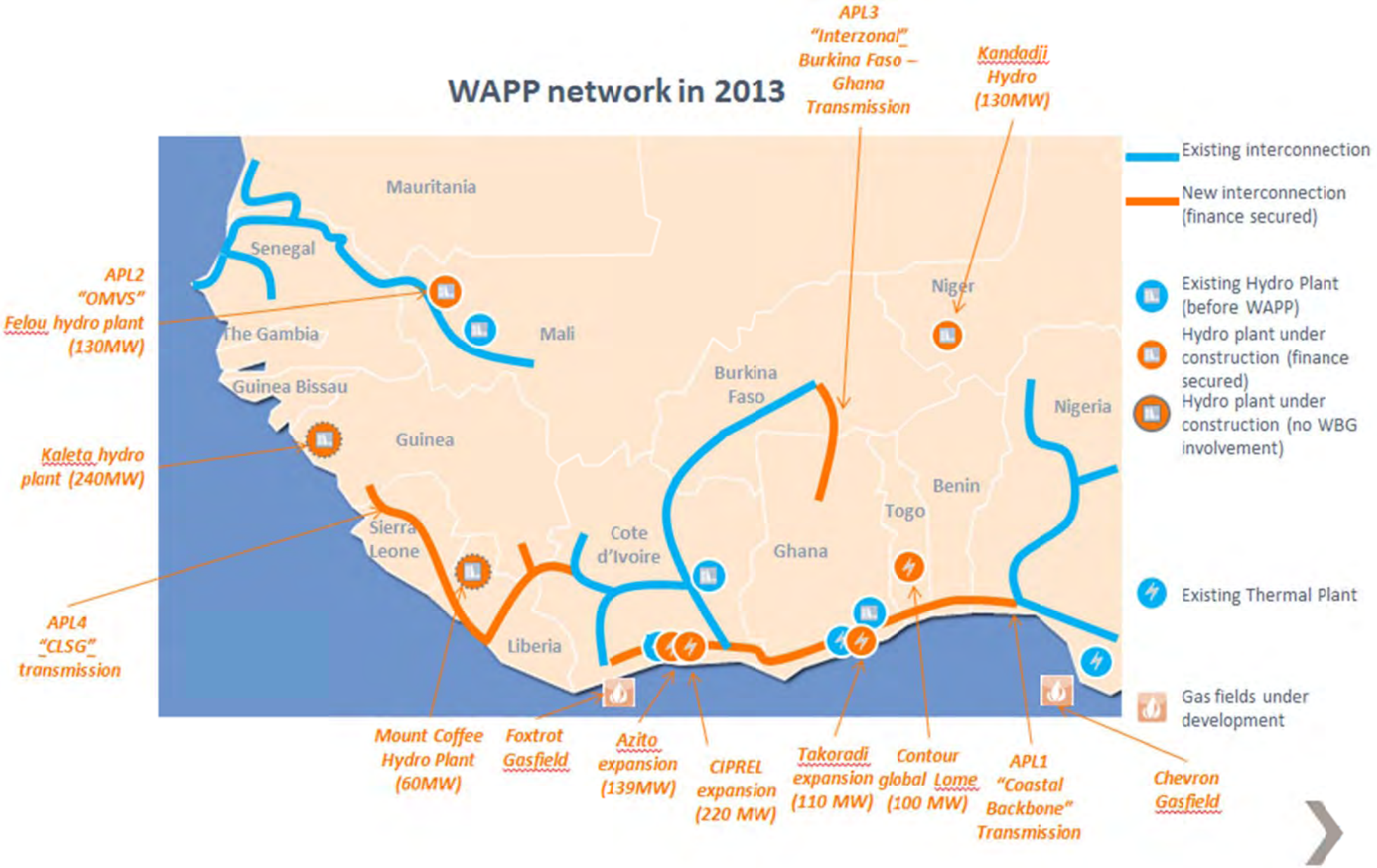
ANNEX 3-4

The World Bank Contribution to WAPP

WAPP APL	Countries	Costs/IDA US$ million	Board Approval (actual/planned)	Components
APL1 - Phase 1 (CTB)	Ghana	83/40	Jun-05	1. Construction of 330 kV Coastal TransmissionBackbone 2. Upgrade of System Control Centers (VRA System Control Center (Ghana) 3. Upgrade of Strategic Power Generation and/or transmission Assets
APL1 - Phase 2 (CTB)	Ghana, Benin	75/60	Jun-06	1: Transmission Infrastructure Development 2: Upgrade of Transmission Control and Communications System (SCADA) 3: Upgrade of Strategic Power Generation Stations (Emergency Prep. Plan for Nangbeto Stn) 4: Implementation of WAPP Action Plan (Expert Advisory Panel)
APL2 - Phase 1 (OMVS Felou HEP)	Mali, Mauritania, Senegal	241/160	June 2006 and August 2009 46	1. Design-build contract 60MW run-of- river HPS 2: Two-Stage "Project Cycle Management Contract". Transaction Adviser/Owner's Engineer 3: WAPP Action plan for the OMVS Power System.
APL3 - Phase 1 (BF - GH Transmission Hub)	Burkina Faso, Ghana	111/42	Jun-11	1: 225kV Transmission Line between Ghana and Burkina Faso 2: Reinforcement of the transmission grid in Ghana 3: Shield wire Electrification of rural localities along the right of way in Burkina Faso 4: Supervision/Owner's Engineer (US$4.2 million financed by IDA). 5: Capacity building and institutional support to GRIDCo and SONABEL
APL4 - Phase 1 (CLSG)	Cote d'Ivoire, Sierra Leone, Liberia, Guinea	476/150	May-12	The WAPP CLSG Power Interconnection Project 1A Power interconnection between CLSG 1B Institutional framework and project oversight 2B-1 Establishment of the Regional Transmission Company 1B-2 Implementation support through the Owner's Engineer The WAPP Integration and Technical Assistance Project 2A Supply Alternatives Studies and Project Preparation Support 2B Technical Assistance and Integration of WAPP network 2B-1 Technical Integration of WAPP Network 2B-2 Strengthening of the WAPP
APL1 - Phase 3 (Adjarala HEP)	Benin, Togo	435/120	PID Apr 2013 Board Mar 2014?	1: Adjarala dam, hydropower plant, transmission line, and associated infrastructure. 2: Environmental and social measures 3: Technical assistance and project management.
APL2 - Phase 2 (OMVG)	Guinea, Guinea-Bissau, The Gambia	715/173	PID Dec 2013 Board Nov 2014?	1: 225 kV Interconnection between Gambia, Guinea, Guinea-Bissau and Senegal 2: Project Management and Technical Assistance to OMVG Secretariat
APL3 - Phase 2 (CI - ML Transmission Hub)	Cote d'Ivoire, Mali	135/60	TBD	

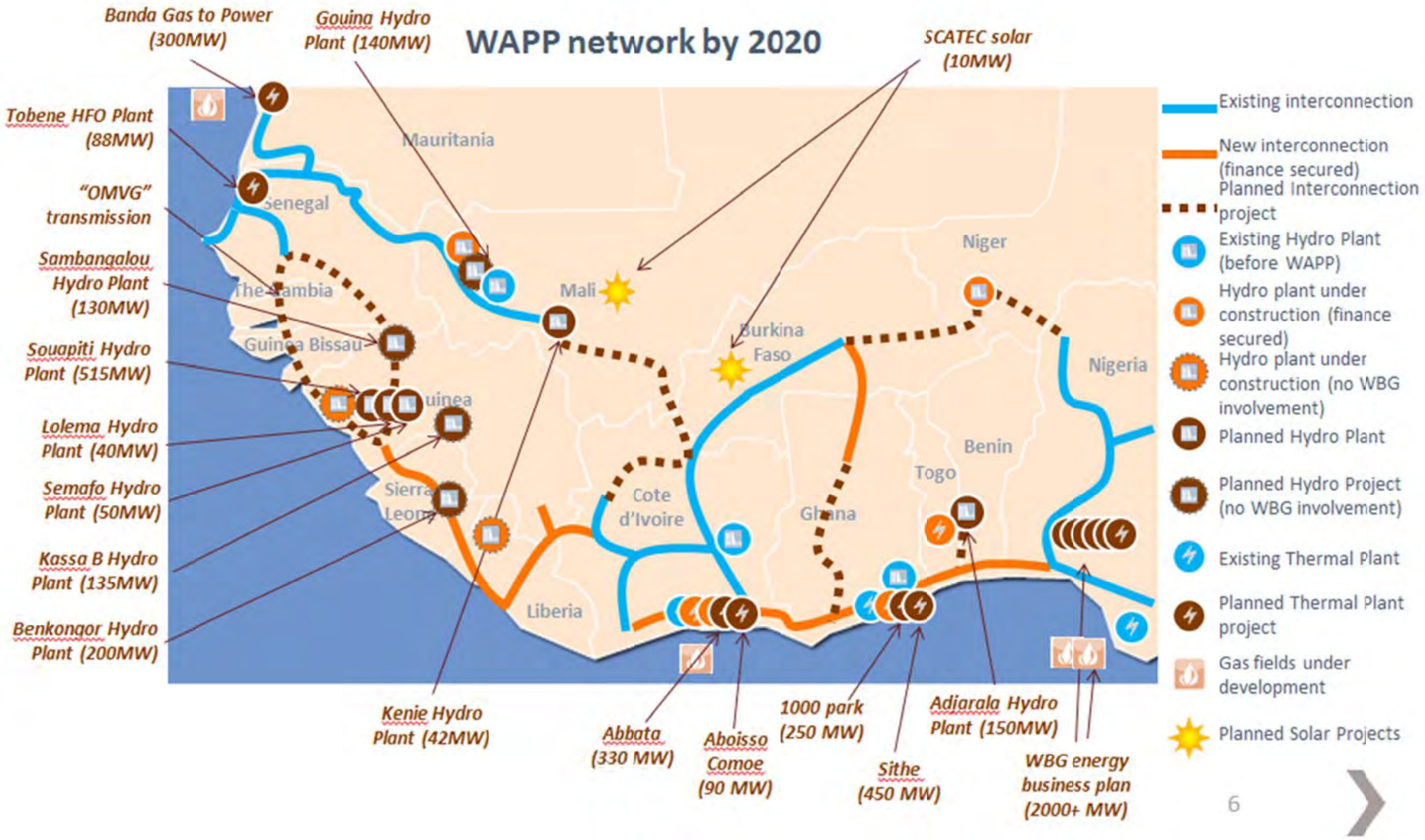
ANNEX 3-5

WAPP Network in 2013



ANNEX 3-6

WAPP Network by 2020



ANNEX 3-7

EIB Loans and Pipeline

Loans signed 2009 - 2014

Name	Country	Sector	Signature date	Signed Amount (€)	Description
Lake Turkana Wind Power	Kenya	Energy	21/03/2014	100,000,000	
Lake Turkana Wind Power	Kenya	Energy	21/03/2014	50,000,000	
Lake Turkana Wind Power	Kenya	Energy	21/03/2014	50,000,000	
The Global Energy Efficiency and Renewable Energy Fund (GEEREF)	Africa	Energy	20/12/2013	3,030,000	GEEREF invests in regional funds, which in turn invest in target projects dedicated to energy efficiency & renewable energy to support access to CE
Mount Coffee Hydro Gen Rehabilitation	Liberia	Energy	28/12/2012	50,000,000	Rebuilding of 80 MW hydropower plant on St Paul river 25 km NE of Monrovia
Itezhi- Tezhi Hydro Project	Zambia	Energy	10/12/2012	50,000,000	Construction of 120 MW hydropower plant and 280 km transmission line
CLSG Interconnection	West Africa	Energy	10/12/2012	75,000,000	1,350 km-long 225 kV transmission line to interconnect CLSG countries
Barrage Reservoir De Lom Pangar	Cameroon	Energy	07/09/2012	30,000,000	Regulating dam (Sanaga), HPS & HV transmission line to rural areas in the east
Transmission Line Kafue-Livingstone	Zambia	Energy	17/05/2012	22,000,000	Upgrading 220 kV HV transmission line between Kafue, Muzuma and Livingstone
Kribi Gas Fired Power Project	Cameroon	Energy	17/01/2012	29,500,000	Gas-fired power plant and 100 km transmission line in southern Cameroon
Interconnexion Bolgatanga-Ouagadougou	Burkina Faso	Energy	21/12/2011	23,000,000	Power interconnection Bolgatanga (Ghana) - Ouagadougou (Burkina Faso)
Energy Development And Access Project	Mozambique	Energy	10/01/2011	33,885,542	Extension of power distribution networks and customer connections
Olkaria I & IV Geothermal Extension	Kenya	Energy	15/12/2010	119,000,000	Expansion of Olkaria I and construction of Olkaria IV power plants(geothermal)
Tanzania Backbone Interconnector	Tanzania	Energy	14/12/2010	100,652,000	667 km-long high voltage power line between Iringa and Shinyanga
Cape Verde Wind Power PPP	Cape Verde	Energy	14/12/2010	30,000,000	Installation of wind farms on four islands in Cape Verde archipelago
Benin - Togo Power Rehabilitation	Togo	Energy	22/12/2009	3,000,000	Refurbishment/extension of transmission and distribution grids in Benin & Togo
Benin - Togo Power Rehabilitation	Benin	Energy	22/12/2009	32,000,000	Refurbishment/extension of transmission and distribution grids in Benin & Togo
Mombasa-Nairobi Transmission Line	Kenya	Energy	21/12/2009	60,000,000	HV power transmission lines & supporting infrastructure Mombasa - Nairobi
Olkaria II Extension	Kenya	Energy	19/11/2009	3,947,563	Expansion of Olkaria II geothermal power plant (Rift Valley)
Total:				903,615,105	

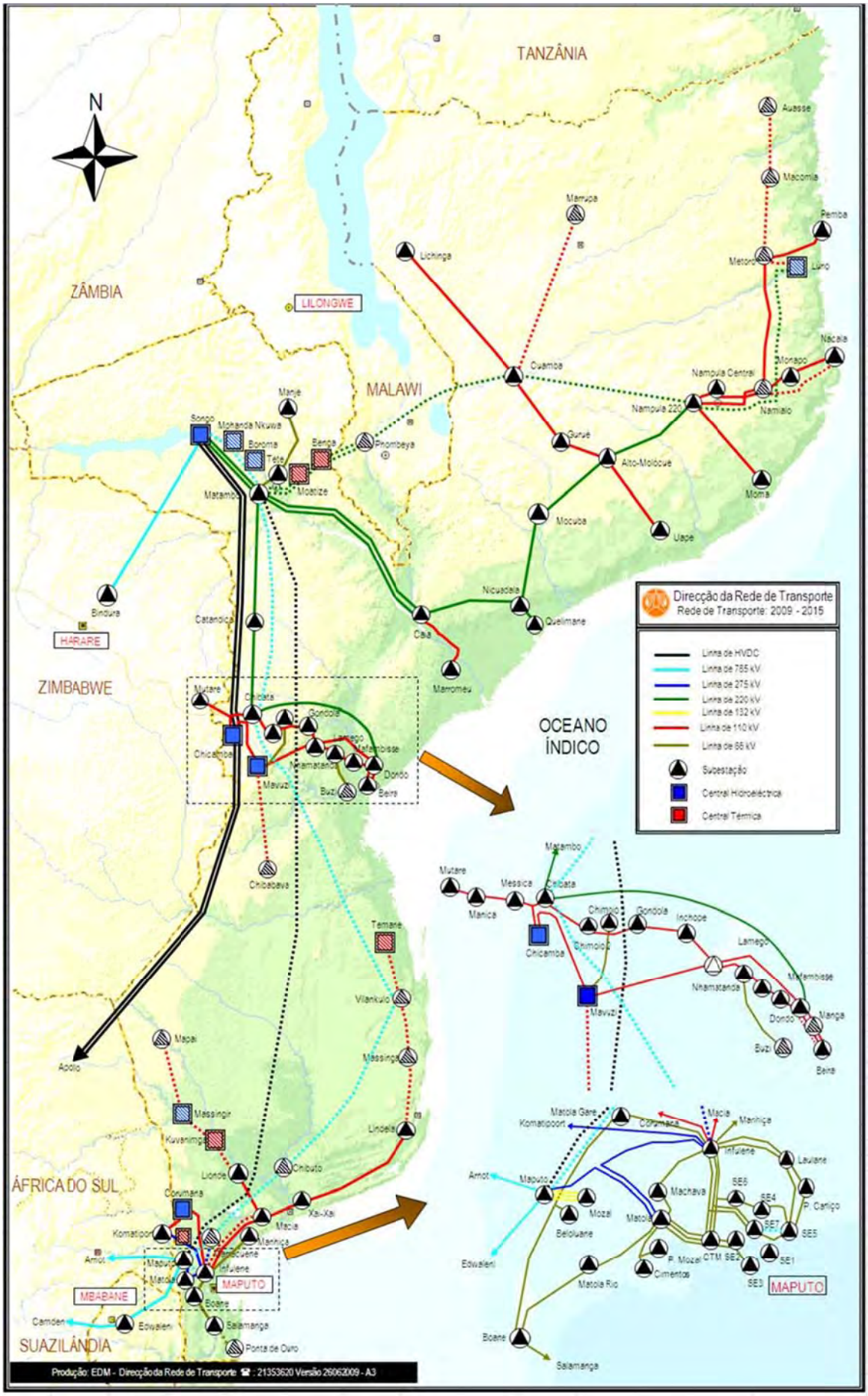
Pipeline from 2013 to 2014

Title	Country	Sector	Name		Status
Sonabel Solar Plant Burkina Faso	Burkina Faso	Energy	25/10/2013		Approved
Eskom Kiwano CSP Project	South Africa	Energy	17/10/2013		Signed
Lusaka Power Transmission & Distribution Network	Zambia	Energy	18/09/2013		Approved
Lake Turkana Wind Power	Kenya	Energy	04/02/2013		Signed

Source: http://www.eib.org/projects, accessed 23 August, 2014
HPS= hydro power plant, CE= clean energy

ANNEX 3-8

Mozambique's Transmission Network



ANNEX 3-9
Tanzania's Short and Medium Term Prioritised Transmission Projects

Measure	kV	km OHL	Description	Time
Ubungo- Mtoni	132		Connection to submarine cable to Znz	2013
Somangafungu - Kinyerezi	220	198	Connect 8MW & plan'd 320 MW PS	2014
Ubungo – Kinyerezi	220	15	Connect to new Kinyerezi PS	2014
Iringa – Shinyanga	400	647	Supply to Central, West & North	2015
Makambako – Songea	220	250	Supply to Southern TZA	2015
Bulyanhulu – Geita	220	150	Connect offgrid North West TZA	2015
Geita – Nyakanazi	220	133	Connect offgrid North West TZA	2015
Nyakanazi- Kigoma	220	280	Connect offgrid North West TZA	2015
Masaka-Mwanza	220	250	Connect offgrid North West TZA	2015
Wind Project - Singida	220	10	Connect wind power stations	2016
TZA- KYA Interconnector	400	414	Facilitate interconnection/EAPP trade	2016
Kiwira-Mbeya	400	100	Connect Coal Power Station in Kiwira	2016
Mbeya-Iringa	400	350	Facilitate interconnector/SAPP trade	2016
Solar I Project - Dodoma	220	10	Connect solar power in Dodoma Region	2016
Coastal Coal to Tanga	400	10	Connect coal power plant in Tanga	2016
Dar-Chalinze-Same-Tanga-Arusha	400	682	Supply North East TZA	2016
Factory Zone III – Zone II	132	Upgr.	Upgrade existing connection	2016
Factory Zone II - Mbagala	132	Upgr	Upgrade existing connection	2016
Mbagala to Kurasini	132	Upgr	Upgrade existing connection	2016
Kurasini - Ubungo	132	Upgr	Upgrade existing connection	2016
Nyakanazi - Mbeya	220	Upgr	Upgrade existing connection	2017
Dar – Morogoro- Dodoma	400	451	Connect offgrid North-West & South-West	2017
Ngaka - Makambako	400	200	Connect Ngaka coal power plant	2017
Somanga- Lindi Mtwara	220	154	Connect offgrid South-East TZA	2017
Nyakanazi-Rusumo	220	95	Connect power plant in Rusumo	2018
Solar II Project - Shinyanga	220	10	Connect solar power in Shinyanga Region	2018
Kigoma - Sumbawanga	220	485	Connect offgrid Kigoma & Sumbawanga	2018
Pensulo – Mbeya	330	100	Facilitate interconnection and SAPP trade	2018
Mchuchuma – Mufindi	400	200	Connect coal power station	2018
Musoma – Nyamongo	132	100	Strengthen supply	2018
Masigira – Makambako	220	180	Connect 118 MW HPS	1019
Rumakali – Mbeya	400	150	Connect HPS	2020
Rumakali – Makambako	400	200	Connect PS	2020
Mtwara - Songea	220	656	Connect Southern TZA	2021

Znz= Zanzibar, PS = power station, HPS = hydro power station

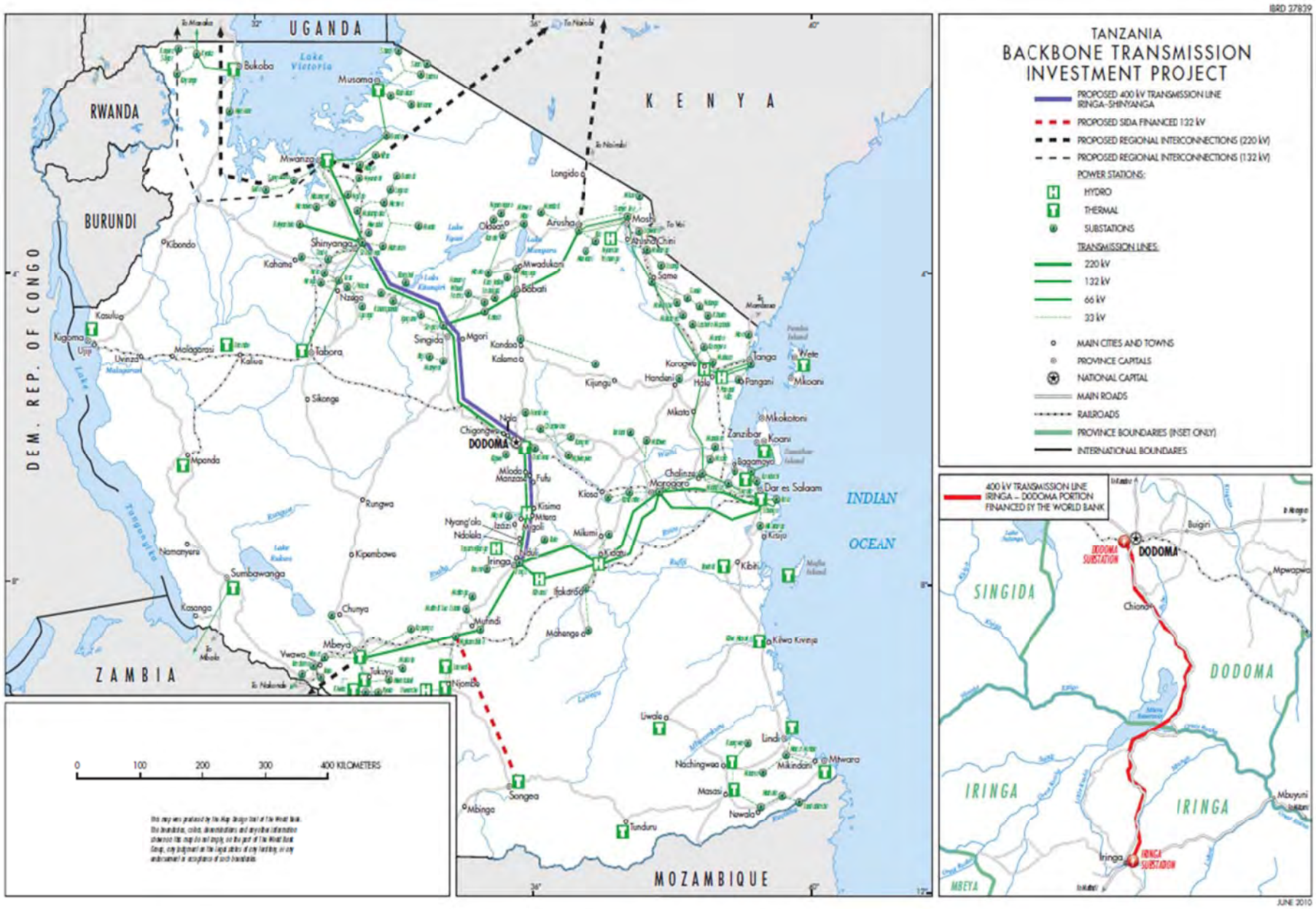
ANNEX 3-10
Tanzania's Expansion and Retirements of Generation Plants 2013-2028

Year	PLANT	FUEL	TYPE	Additional MW	TOTAL MW	Additional MW/year
2012	All existing plant			1,317	1,317	1,317
2013	Mwanza MS diesel	FUEL	Diesel	60	1,377	
	Aggreko (Ubungo)	FUEL	GO	-50	1,327	
	Aggreko (Tegeta)	FUEL	GO	-50	1,277	
	Symbion 205 DSM	FUEL	GO	100	1,377	60
2014	Somanga Tanesco	Gas	GE	8	1,385	
	Retire Symbion 205 DODOMA	FUEL	GT	-55	1,330	
	Kinyerezi I	Gas	GT	150	1,480	
	Somanga Fungu (320)	Gas	GT	210	1,690	
	Retire Symbion 112	FUEL	Jet- A1	-112	1,578	201
2015	Kinyerezi II	Gas	CCGT	240	1,818	
	Retire Symbion 205 ARUSHA	FUEL	GO	-50	1,768	
	Retire Symbion 205 DSM	FUEL	GO	-100	1,668	
	Renewable - Cogen (Sao Hill)	Biomass	Cogen	10	1,678	
	Renewable - Cogen (Mfindi)	Biomass	Cogen	30	1,708	130
2016	Kinyerezi III	Gas	GT	300	2,008	
	Somanga Fungu (320)	Gas	CC	110	2,118	
	Interconnector (Ethiopia/Kenya)	Import	Import	200	2,318	
	Kiwira I	Coal	Steam	200	2,518	
	Renewable - Cogen (Mfindi)	Biomass	Cogen	30	2,548	
	Solar I	Solar	Solar	60	2,608	
	Renewable - Wind I	Wind	Wind	50	2,658	950
2017	Renewable - Wind II	Wind	Wind	50	2,708	
	Ngaka I	Coal	Steam	200	2,908	
	Mtwara (18)	Gas	GT	200	3,108	
	Hale	Hydro	Hydro	11	3,119	
	Coastal Coal	Coal	Steam	300	3,419	760
2018	Rusumo Falls	Hydro	Hydro	27	3,446	
	Mchuchuma I	Coal	Steam	300	3,746	
	Kiwira II	Coal	Steam	200	3,946	
	Solar II	Solar	Solar	60	4,006	
	Interconnector - Rwanda/Burundi	export	export	-50	3,956	
	Interconnector – Mozambique	export	export	-100	3,856	
	Interconnector - I (Zambia)	export	export	-100	3,756	337
2019	Kakono	Hydro	Hydro	53	3,809	
	Ngaka II	Coal	Steam	200	4,009	253
2020	Mchuchuma II-1	Coal	Steam	100	4,109	
	Malagarasi	Hydro	Hydro	45	4,154	145
2021	Ruhudji	Hydro	Hydro	358	4,512	358
2022	Mpanga	Hydro	Hydro	144	4,656	
	Mchuchuma II-2	Coal	Steam	100	4,756	244
2023	Retire Tegeta IPTL	Fuel	HFO	-100	4,656	
	Stieglers Gorge I	Hydro	Hydro	300	4,956	
	Songwe Bupigu	Hydro	Hydro	34	4,990	234
2024	Masigira	Hydro	Hydro	118	5,108	
	Mchuchuma II-3	Coal	Steam	200	5,308	318
2025	Rumakali	Hydro	Hydro	520	5,828	
	Retire Songas 1+2+3	Gas	GT	-187	5,641	333
2026	Songwe Sofre	Hydro	Hydro	157	5,798	
	Mchuchuma III-1	Coal	Steam	100	5,898	257
2027	Ikondo- Mnyera	Hydro	Hydro	340	6,238	340
2028	Mchuchuma III-2	Coal	Steam	200	6,438	
	Songwe Manolo	Hydro	Hydro	149	6,587	349

Source: Tanzania Power System Master Plan 2012 Update Base Case Generation Plan

ANNEX 3-11

Tanzania's Backbone Transmission Project



ANNEX 3-12
Tanzania's Planned National Grid System

ANNEX 3-13

Planned New ZESCO Investments

New Generation Projects - Large

Name	MW	Cost USD m	Owner, Duration (Years)
Kariba North Bank Extension	360	420	ZESCO Ltd/KNBEPC, 4 years
Itezhi Tezhi Hydropower Project	120	232	PPP (ZESCO/TATA), 3.5 years
Kafue Gorge Lower Hydropower Project	750	2,000	PPP (ZESCO/SINOHYDRO/CAD Fund), 6 years

New Generation Projects – Small Hydros

Name	MW	Cost USD m	Status
Mujila Falls	1.4	25	Review of Consultant's Evaluation Report Underway
Lusiwasi Lower	86	164	EPC Contract Awarded To CNEEC
Lunzua	15	52	EPC Contract Awarded To CNEEC
Lusiwasi Upper	15	47	Awaits Site Investigations, Award of Contract, Project Financing
Rehabilitation & Uprating Chishimba Falls	6-14.8	46	Awaits EIA Approval, Award of Contract, Project Financing
Rehabilitation & Uprating Musonda Falls	5-10	32	Awaits EIA Approval, Award of Contract, Project Financing
Shiwang'andu	1	4.15	Plant Commissioned In 2012
Chikata	3.5		ZESCO, REA and World Bank

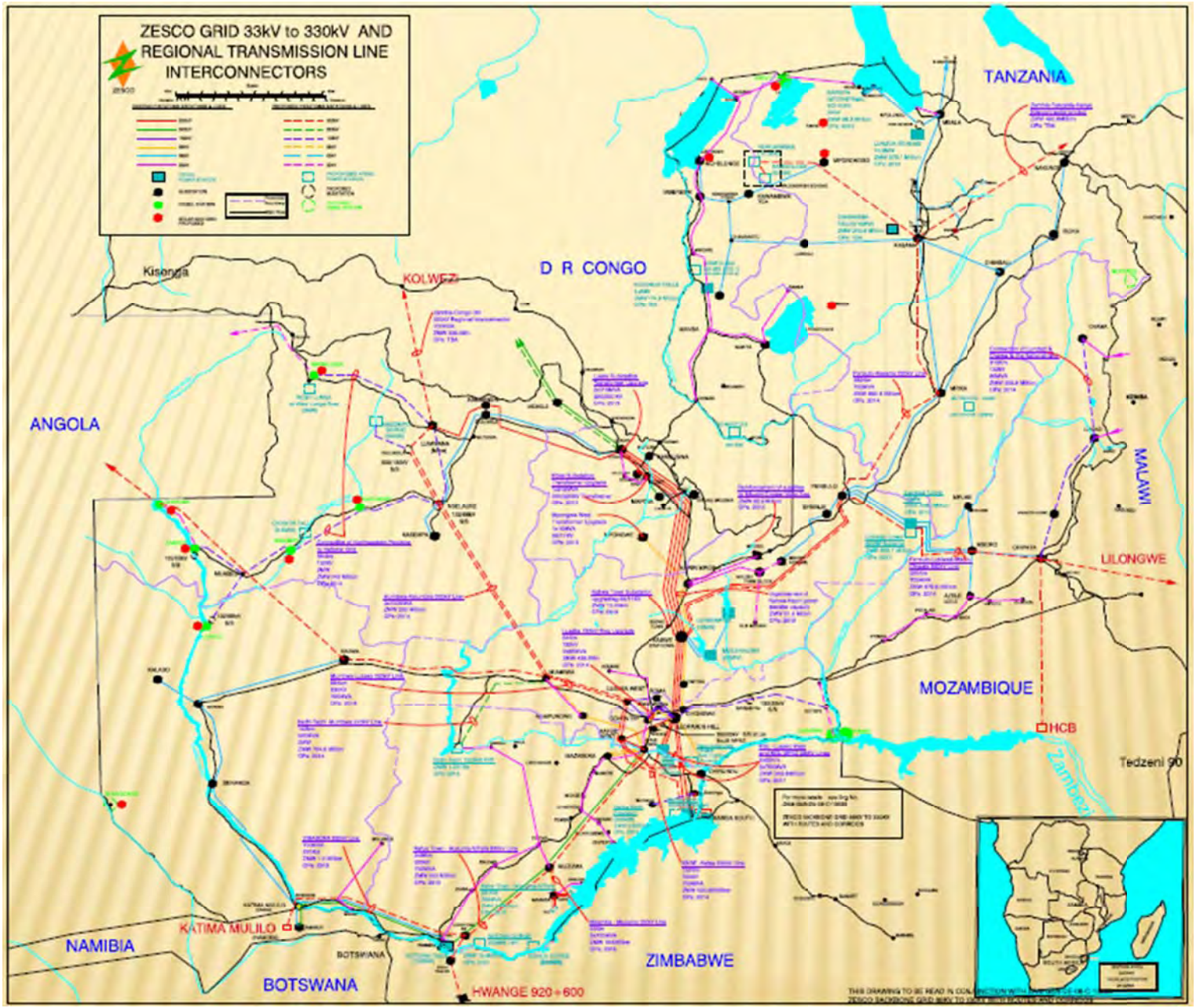
New Generation Projects – Potential Sites

Name	MW
Mpata Gorge	540
Devil's Gorge	500
Batoka Gorge	800
Mumbotuta Falls	300
Mambilima Falls Site I	124, 202
Kabwelume Falls	62
Kundabwika Falls	101
Mutinondo	40
Luchenene	30
Mkushi	65
Lumangwe	180

Source: ZESCO (2013), "Electricity Infrastructure Development for Economic Growth", North CPD presentation, *www.eiz.org.zm/phocadownload/2013-10th-July-North-CPD-Presentatation-ZESCO.pdf*

ANNEX 3-14

Zambia National Grid Network



ANNEX 3-15

New ZESCO Transmission Projects

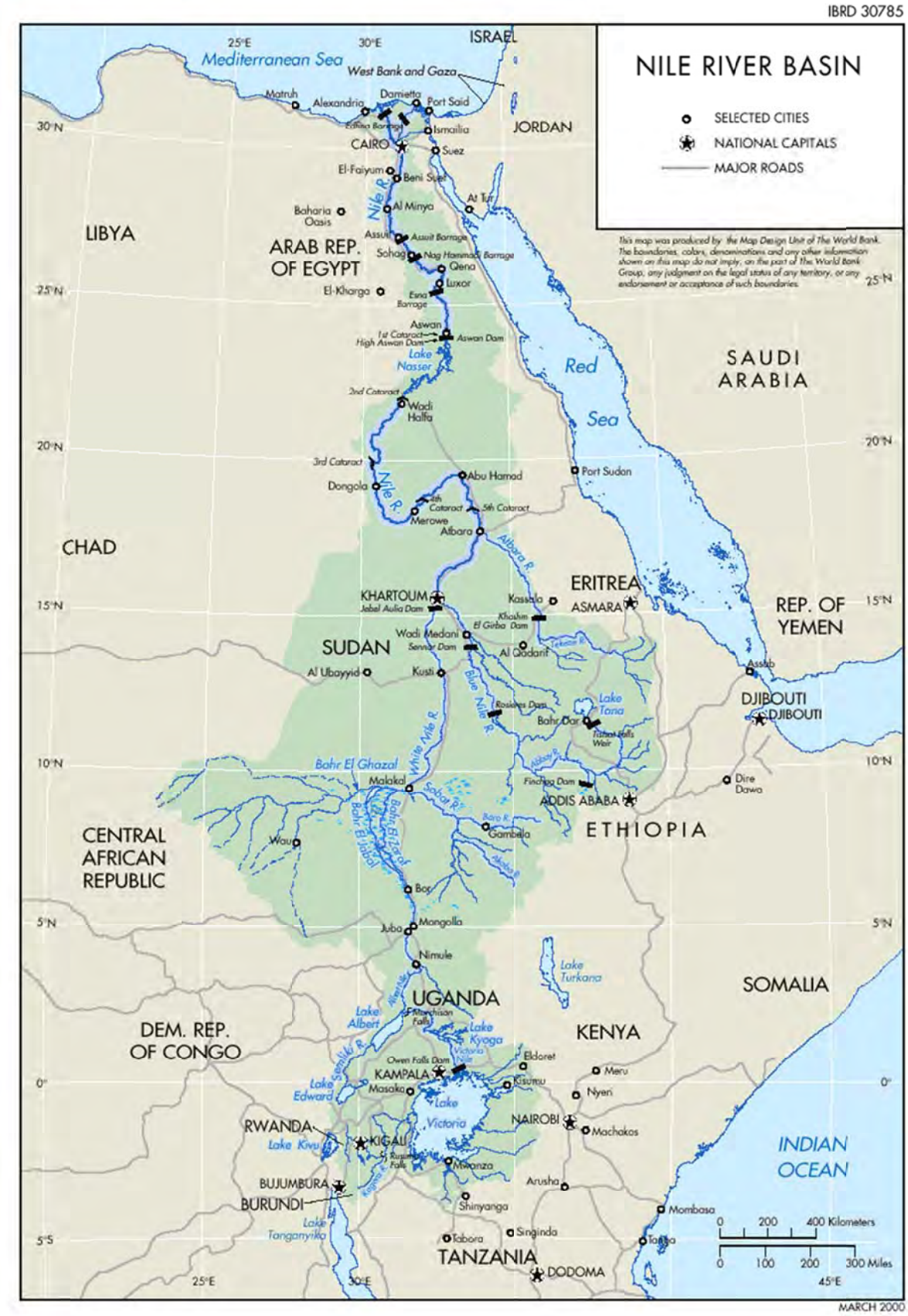
Name	Objective	Scope	Cost, USD m	Funding	Construction period
Pensulo Kasama and Pensulo Chipata 330 kV Project	Improve trans. capacity & power quality in Eastern, Muchinga, Northern and Luapula provinces	382 km 330 kV TL (Pensulo - Kasama) and 285 km of 330 kV lines (Pensulo - Chipata) w S/S's	335	Industrial and Commercial Bank of China	30 months
Connection of North Western Province to National Grid	Increased access to electricity & improved quality of service by displacing diesel generators	800 km 132 km TL, 330/132 kV & 132/33 kV S/S in Mwinilunga, Kabompo, Mufumbwe, Zambezi, Lukulu and Chavuma	140	Negotiation of contract underway	24 months
Kariba North Bank Extension Power Evacuation Project	Evacuation of power from KNBE project	123 km of 330 kV TL and S/S works	62	EXIM Bank of China	18 months
Kafue Town Muzuma Victoria Falls TL Upgrade	Export to and from SAPP and provide evacuation path for new generation projects	Upgrade 348 km of 220 kV TL to 330 kV	100	World Bank and EIB	18 months
ITT Mumbwa Lusaka West Transmission Line Project	Provide power evacuation for the ITT power station	142 km of 220 kV TL and 134 km of 330 kV TL and associated S/S at Mumbwa	133	EIB, AfDB and AFD	
Supply to Kalumbila Mine	Supply power to the FQM Kalumbila mine	500km of 330 kV double circuit TL and 66 km of 330 kV single circuit TL and associated S/S at Kalumbila	200	Kalumbila Minerals Ltd/ZESCO	
Connection of Luangwa District to The Grid	Support the increased access to electricity and improved quality of service by displacing the expensive diesel generators	187km of 132kV TL, 2x10MVA 132/33kV S/S's at Rufunsa and Luangwa, 60km of 33kV lines in Mpanshya, service connection to GRZ institution and 100km of 33kV lines in Luangwa	63	EXIM Bank of India	
Lusaka 132kV Ring Reinforcement Project – Ph. 1	Increase capacity of the Leopards Hill – Coventry 132kV TL	Reconductoring 28km of 132kV TL, Installation of 2x45MVA 132/11kV transformers at Coventry S/S	6.3	ZESCO Limited	
Lusaka 132kV Ring Reinforcement Project – Phase Ii	Increase transmission capacity of the Lusaka Transmission and Distribution Network	1- Upgrade 132kV TL & existing S/S's, 2- New 132/33kV& 33/11kV S/S's, new 33kV and 11kV lines	210	World Bank, EIB and ZESCO	
ZiZaBoNa	Increase regional power trade by increasing north-south & east-west transmission capacity	Project promoted by Zimbabwe, Zambia, Botswana and Namibia	230		

S/S = Substation, TL = transmission line

Source: ZESCO (2013), "Electricity Infrastructure Development for Economic Growth", North CPD presentation, *www.eiz.org.zm/phocadownload/2013-10th-July-North-CPD-Presentatation-ZESCO.pdf*

ANNEX 3-16

Nile River Basin



ANNEX 3-17

NELSAP Medium Term Strategic Plan for 2012-16 (SP 2012-16)

A summarized program scope and indicative program budget is presented in the table below:

	Program	Project Name	Duration	Budget
Type of Financing Required Grant Financing	Power	Preparation of Power Transmission Lines & Interconnection	5 years	$12 M
		Operationalizing NELSAP Regional Interconnected Power Grid	3 years	$3 M
		Preparation of Hydropower Projects	5 years	$13 M
	Agriculture	Regional Agricultural Trade and Productivity Project	4 years	$26 M
	River Basin Management	Kagera RBM, Mara RBM, Sio-Malaba Malakisi RBM pre-investment studies	3 years	$24 M
		Feasibility and detailed design for investments under the Multi-Sectoral Investment Opportunity Analysis	3 years	$30 M
	Climate Change	Mainstreaming Climate Change Adaptation into Investment Programs	2 years	$5 M
	Institutional	NELSAP Program Coordination, Supervision, Monitoring and Implementation of the 5 year Strategic Plan	5 years	$ 5 M
	Total Grant Financing			$117 M
Type of Financing Required Investment Financing	Power	Implementation of Power Projects	5 years	$904 M
	River Basin Management	RBM Projects - Small Dams Storage Infrastructure Development for Multi-purpose use	4 years	$148 M
		Integrated Management of Transboundary water resources of lakes Rweru and Cyohoha and Akanyaru Marshland	3 years	$50 M
		RBM Projects: Restoration of watersheds for improved livelihoods	3 years	$ 96 M
	Agriculture	Multi-national Lakes Edward and Albert integrated fisheries & water resources management project (DR Congo & Uganda)	5 years	$40 M
	Total Investment Financing			$1,238 M

The Strategic Framework also outlines and prioritizes specific actions over the 5 years. The NELSAP Power Sub-programme and the NELSAP Water Resources Development Sub-programme is presented below.

NELSAP Power Sub-programme

A. Preparation (Pre-investments): This will include the preparation of:
- Power Transmissions Lines and Interconnections in NELSAP Countries and comprises:
  i) Uganda-DR Congo Transmission Line,
  ii) Gitega-Bujumbura Transmission line in Burundi,
  iii) Uganda-Sudan Interconnection;
  iv) Zambia–Tanzania Interconnection; and
  v) Nyakanazi-Geita interconnection, Tanzania.
- Operationalizing NELSAP Regional Interconnected Power Grid comprising:
  i) development of operation guidelines;
  ii) development of PPP Strategy for generation options;
  iii) Information communication and Education activities (IEC);
  iv) Capacity building in operation, maintenance and power trade; and development of a Renewable energy power master plan.
- Preparation of Hydropower Projects in NELSAP Countries including:
  i) Feasibility study of Hydropower projects in Northern East DRC; and
  ii) Feasibility, ESIA and Detailed Design for Hydropower Projects in the Republic of South Sudan

B. Investments: These will include:
   i) The 220 KV Ruzizi-Goma interconnection in DRC;
   ii) The Rusumo Falls Hydroelectric Project;
   iii) The 400 kV Kenya-Tanzania Power Interconnection; and the 400 kV Iringa-Mbeya Power Transmission Line in Tanzania.

NELSAP Water Resources Development Sub-program

A. Preparation (Pre-investments): These will include the following:
- *Mainstreaming Climate Adaptation into Investment Programs*: Feasibility Studies and Detailed Design for three climate proofed water infrastructure Investment projects.
- *River Basin Management Projects:*
  Kagera RBM Project (Burundi, Rwanda, TZ, Uganda): Feasibility studies and detailed designs for 4 medium sized dams in Kagera Basin and Feasibility study for basin Small Hydropower Development program;
  Mara RBM Project (Kenya, Tanzania): Feasibility studies and detailed designs for 2 medium scale storage multipurpose dams for energy production, water supply and irrigation development; and
  Sio-Malaba-Malakisi RBM Project (Kenya, Uganda): Feasibility study and detailed design for Angolola dam for Energy and municipal water supply- Kenya/Uganda.
- *NEL Water Resources Development Program*: Feasibility and Detailed Design studies for portfolio of investments prioritized through the Multi sectoral Investment Opportunity Analysis (Rwanda, Burundi, Uganda, Kenya, Tanzania, DR Congo, and South Sudan).
- *Regional Agricultural Trade and Productivity Project*: Improving Food security in the Nile Basin Region through efficient use of the Nile Waters

B. Investments: These will include:

- River Basin Management Projects-Dams construction: Kagera (Burundi, Rwanda, TZ, and Uganda): This will entail the carrying out of:
  i) Detailed design and construction of 4 MP storage dams for flood control, Municipal water supply and irrigation in the Kagera Basin (Kiremba in Burundi, Taba-Gakomeye in Rwanda, Omumukura in Uganda and Karazi in Tanzania);
  ii) Mara (Kenya, TZ): Detailed design and construction of 2 MP storage dams for flood control, municipal water supply and irrigation (Norera in Kenya and Borenga in Tanzania);
  iii) SMM (Kenya, Uganda): Detailed design and construction of 2 MP storage dams for Water supply and irrigation (Maira in Kenya and Bulusambu in Uganda).
- RBMs-Restoration of watersheds for improved livelihoods:
  i) Kagera (Burundi, Rwanda, TZ, and Uganda): Undertaking of Agro-forestry/watershed restoration, wetlands Management, water quality monitoring, community driven development activities, carbon sequestration, and conservation agriculture;
  ii) Mara (Kenya, TZ): Undertaking soil & water conservation/ Agro forestry/watershed restoration, Biodiversity conservation, and Wetlands Management;
  iii) SMM (Kenya, Uganda): Agro-forestry/watershed restoration, biodiversity /wetlands conservation, carbon sequestration, water quality monitoring/pollution control.
- Lakes Edward and Albert Integrated Fisheries and Water Resources Management Project comprising:
  i) Development of a Lakes Fishery Policy Framework and establishment of a Transboundary management institution established;
  ii) Establishment of a Fisheries Monitoring, Control, and Surveillance System and Development of a Fishery Information System;
  iii) Development of Fisheries infrastructure at selected landing sites in Uganda and DRC;

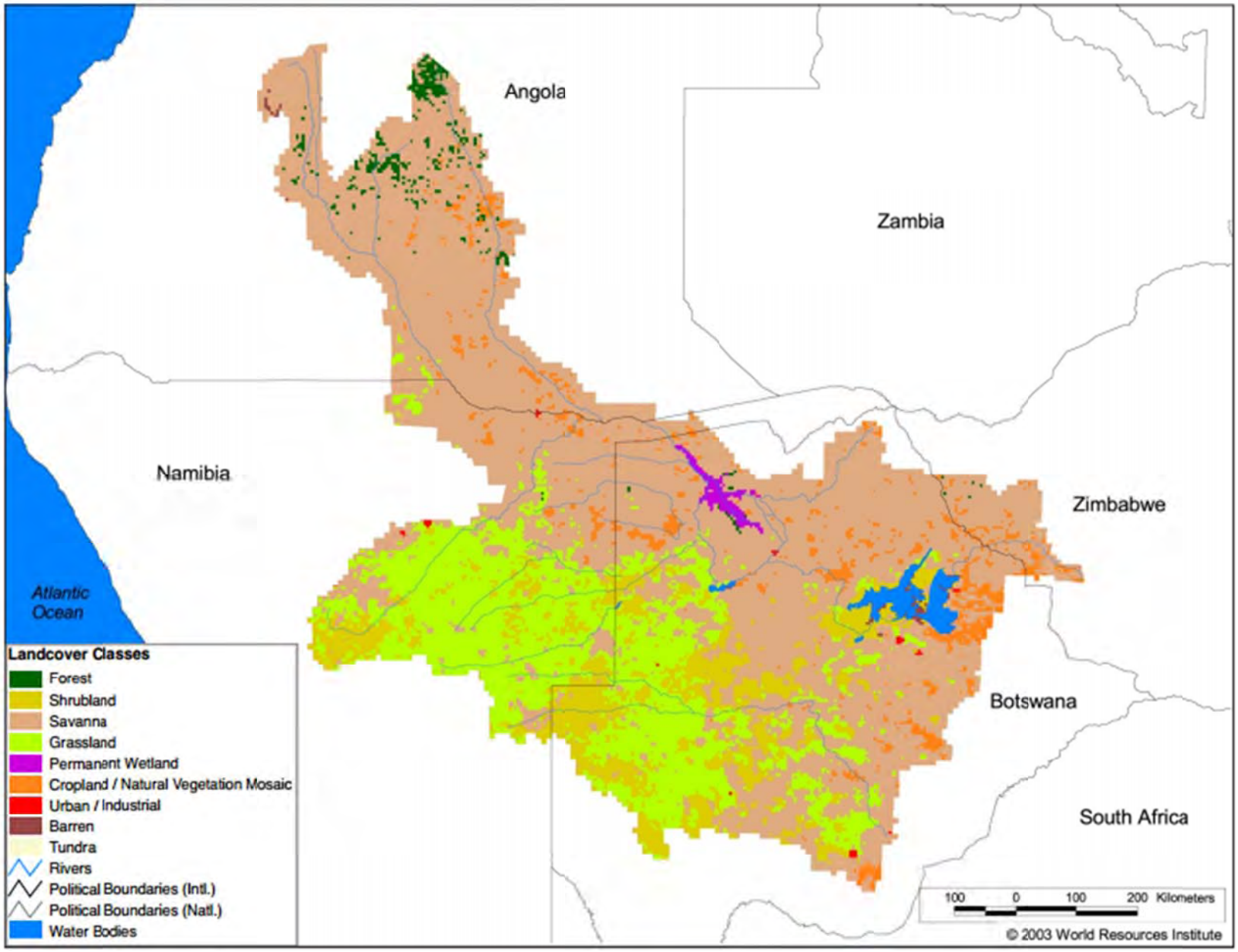
iv) Development of selected upstream watersheds/wetlands management plans and rehabilitation/ restoration; and

v) Combating invasive aquatic weeds; raising awareness on biodiversity;

- Integrated Management of Transboundary water resources of lakes Rweru and Cyohoha and Akanyaru Marshland (Bugesera IWRM Project): Implementation of the project upon completion of the ongoing feasibility/diagnostic and detailed design studies.
- Program Management, Coordination and Supervision: This is to ensure, together with the countries, effective project identification, preparation, coordination and implementation supervision and resource mobilization.

ANNEX 3-18

Okavango River Basin



ANNEX 3-19

Shared Water Courses between Zimbabwe and Mozambique

ANNEX 4-1

Regional Power Trade Organizations

Name of Organization	Function	Mandate
Eastern Africa		
Eastern African Community (Arusha)	Economic and social development of the region. Energy is dealt with by the EAC Energy Secretariat. EACs energy sector strategy aims at increasing access to sufficient, reliable, affordable, and environmentally friendly energy sources in the region through the implementation of the East African Power Supply Master Plan.	Tanzania, Uganda, Kenya, Rwanda and Burundi
Eastern Africa Power Pool (Addis Ababa)	Establishment of the Eastern Africa Power Pool and in the long term become a framework for pooling energy resources, promoting power exchanges between utilities in Eastern Africa to secure their power supply, provide mutual assistance in case of failure in their power systems and reduce power supply costs based on an integrated master plan and pre-established rules (Grid code). The day-to-day activities are handled by the *Permanent Secretariat* located in Ethiopia. Separate *Technical Sub-Committees* (TSC) for Planning, Operations and Environment.	The EAPP was formed through an inter-governmental and inter-utility Memorandum of Understanding (MOU) among the member countries. In 2006, EAPP was adopted as the Common Market for Eastern and Southern Africa's (COMESA's) specialized Institution for Electric Power.
EAPP Coordination Centre (CC)	The *Coordination Centre (CC)* will operate under the guidance of the sub-committee on operations and will be responsible for the collection of technical and commercial information necessary for the operation of the regional interconnected power system and exchanges of power between EAPP members.	The CC as a distinct entity has not been established, but 3 EAPP staff have been assigned to the CC. The CC's duties and modalities are to be defined in an operation agreement ("OA") which is yet to be developed.
EAPP Organs (future)	Regional Market Operation Centre Regional Regulatory Commission Regional Dispatch Control Centre	In 2012 the Conference of Ministers (COM) decided to keep existing EAPP organs (PS, CC and IRB) until the power market matured and justified a separation.
The Independent Regulatory Board (IRB)	Monitoring and enforcing adherence to the rules and arbitrating disputes related to power exchanges and transactions within EAPP, and setting regulated tariffs and wheeling charges for regional transmission interconnectors. The IRB is to develop in 2 phases from a small office with essential staff to a fully-fledged regional regulator as the power market reaches maturity.	The COM took the decision in March 2012 to transform the Eastern Africa Forum for Energy Regulators (EAFER) into the Independent Regulatory Board (IRB). IRB is constituted of nominees of national energy regulators in EAPP member countries. Steered by the policy decisions of the COM and deriving its authority from the IGMOU, the IRB imposes the regional market rules and grid code upon the EAPP participants.
Regional Power Trade Project (Dar Es Salaam)	Provided training and capacity building to implement and operate regional	The Regional Power Trade Project (RPTP) served as a platform for

	projects in an efficient way including multi-criteria Decision Making processes, Power Purchase Agreements (PPAs), Power System Simulations and Modelling, Public-Private Partnership Concepts, etc. Phase 1 identified a minimum regulatory platform for power trade.	Ministers of Energy, Heads of Utilities, and technical staff of the Nile Basin Initiative countries to discuss and explore power trade opportunities that in turn served to further move the power trade agenda and to better coordinate their efforts at power development.
Eastern Nile Technical Regional Office/Power Coordination Unit (Addis Ababa)	Development of regional power sector investments promoting power trade between the EN three countries. Key power sector studies and training on issues associated with Power Trade.	Egypt, Ethiopia, Sudan
Nile Equatorial Lakes Subsidiary Action Program - NELSAP (Kigali)	Facilitating investments on-the-ground tand support of rules and legal framework promoting power trade.	DRC, Burundi, Rwanda, Tanzania, Uganda, Kenya (Egypt and Sudan observers)
Southern Africa		
The Southern African Development Community (SADC)	Economic and social development of the region. SADC Protocol on Energy stipulates: a) Promote electricity trading and power pooling through SAPP; b) Promote integrated resource planning in the electricity sub-sector; c) Promote common regional standards, rules and procedures relevant to generation, transmission and distribution of electricity.	SADC Protocol on Energy was signed in 1996. Member countries include: Angola, Botswana, the DRC, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe and non-mainland countries: Mauritius, Madagascar and Seychelles.
Southern Africa Power Pool (SAPP)	Improve upon energy supply within the SADC (excluding Mauritius) by integrating national power system operations into a unified electricity market. Coordinate the planning and operation of the electric power system among member utilities and provide a forum for regional solutions to electric energy problems.	The Southern African Power Pool (SAPP) was created in 1995, as a specialised Institution of SADC. Thus mandated by SADC and the Southern African Power Pool (SAPP) Intergovernmental Memorandum of Understanding and the SAPP Agreement between Operating Members.
SAPP Coordination Centre. in Harare, Zimbabwe	Monitor operations and transactions within the Pool, including controlling dispatching operations and serving as trading center for electricity auctions. In 2001, the SAPP established a Short-Term Energy Market. Since 2004, the SAPP has been developing a competitive electricity market in the form of a day-ahead market (DAM).	In 2002, a SAPP Coordination Centre was established in Harare, Zimbabwe
The Regional Electricity Regulatory Association of Southern Africa (RERA)	Facilitate harmonisation of regulatory policies, legislation, standards and practices and to be a platform for effective cooperation among energy regulators within the SADC region. The membership to RERA is open to electricity supply industry (ESI) regulators in each country within SADC. Each country is limited to a single membership.	RERA was established by the Southern African Development Community (SADC) as a formal association of electricity regulators in July 2002, more particularly in terms of the SADC Protocol on Energy (1996) and of the SADC Energy Cooperation Policy and Strategy (1996).
The Regional Association of Energy Regulators for Eastern and Southern Africa (RAERESA)	a. monitor and evaluate energy regulatory practices among Members to determine regional needs; b. develop, conduct and manage information and capacity building	The Regional Association of Energy Regulators for Eastern and Southern Africa (RAERESA) was launched in 2009 and came officially into existence by signing of its constitution by seven

	projects for national energy regulators; c. promote and support the development of independent energy regulators in the COMESA countries; d. prepare position papers; e. facilitate the co-ordination of energy trade and systems operations in conjunction with the power pools and national control centres; f. promote the establishment of norms and standards; and g. establish working relationships with other agencies that promote development and co-ordination of energy related matters.	energy regulators from COMESA countries namely Ethiopia, Egypt, Kenya, Madagascar, Malawi, Rwanda and Sudan. Associate Members (Independent Energy Regulator not yet established): Democratic Republic of Congo, Burundi, Comoros, Djibouti, Eritrea, Libya, Mauritius and Seychelles. (Status 2012)
West Africa		
Economic Community of West African States (ECOWAS)	Economic and social development of the region. The 2003 ECOWAS Energy Protocol, a regional law, aims at promoting long-term cooperation in the energy field, with a view to achieving increased investment in energy and increased energy trade in the West Africa Region. Key provisions of this legislation include (i) Protection of foreign investments, (ii) non-discriminatory conditions for trade in energy, and (iii) Dispute resolution procedures.	ECOWAS is comprised of 15 member states: Benin, Burkina Faso, Cape Verde, Ivory Coast, Gambia, Ghana, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone & Togo
West African Power Pool (WAPP)	Integration of regional power systems and realization of a regional electricity market. WAPP has 26 members consisting of public and private generation, transmission and distribution electricity companies in West Africa. The WAPP Secretariat, the administrative organ based in Benin, is responsible for the day-to-day operations and includes a WAPP Information and Coordination Center.	Created in 1999, the West African Power Pool (WAPP) is a Specialised Institution of ECOWAS with objective to improve upon energy supply within the ECOWAS by integrating national power system operations into a unified electricity market WAPP covers 14 of the 15 countries of ECOWAS.
The ECOWAS Regional Electricity Regulatory Authority (ERERA	ERERA is responsible for the regulation of cross-border electricity connections and trading among ECOWAS member States. This includes (i) the establishment of transparent tariff setting methodology for regional power pooling; (ii) adopting technical regulation; (iii) monitoring of regional market operations; (iv) resolving disputes among regional market participants; (v) contributing to the development of regional energy policy and (vi) assisting in building capacity of National Regulatory Bodies.	ERERA was established in 2008 by Supplementary Act A/sa.2/1/08.

ANNEX 4-2

Renewable Energy Development Processes in Africa

Hydropower. On-going processes include hydropower development master plans to guide cost-effective selection of potential sites for hydropower, feasibility and pre-feasibility studies carried out by various public and private entities. Other processes include capacity building on feasibility studies, impact assessments and business plans for potential developers.

Biomass energy. Processes are on-going to address the use of biomass as a renewable resource through a number of initiatives.

Solar. Most countries have attractive mean solar insolation levels. In recent years, demand and installations of solar products has increased and the market is estimated to grow at 20% per year (source). The market is still dependent on donor and NGO projects, but the private sector and demand from individual households are growing as important actors. Important processes target installations of (i) solar PV, solar entrepreneur development, creation of revolving funds and credit facilities, e.g through processes like Lighting Africa and the Sustainable Solar Market Packages Projects (ii) Solar water heaters and (iii) development of solar based electricity generation (CSP).

Geothermal. Processes to harness geothermal power are under way in many countries. Especially for many countries located in the East African Rift Valley, the geological formation makes geothermal energy a potential renewable energy source.

Wind. Many countries have good wind potential, but it is not well understood and has not been exploited substantially. There are processes going on in several countries to try to exploit wind resources for grid and off-grid electricity, including wind assessments, project preparation and implementation of small to large (wind parks) projects. Apart from electricity production, there is also processes to harness wind for water pumping to support irrigation and drinking water supplies. Many countries already have long histories of installation of wind pumps.

Bio-fuels. Several bio-fuel processes are on-going, including to attempt to produce ethanol from sugar factories, use of Jatropha for biodiesel, use of other feed stock-based biofuels and development of biofuels development guidelines in effort to ensure their sustainable production and use. Bioenergy projects have raised concerns over power negotiating disparities between large foreign companies/low-income villagers, water and fertiliser requirements and contribution to local energy needs.

Biogas and waste-to-energy. There are many processes on-going, including domestic biogas, e.g. in Tanzania involving the Centre for Agricultural Mechanisation and Rural Technology (CAMARTEC). A number of Waste-to-energy processes have started, e.g. involving municipal waste and using sisal waste processing for energy.

Cogeneration. On-going processes include the sugar industry, wattle and sisal processing.

Grid-connected renewables, Tariffs and Renewable Energy Feed-in-tariffs (REFIT)
On-going processes include procedures for power purchase agreements between utilities and renewable energy producers, use of Renewable Energy Feed-in-Tariffs and in some countries technology based FiTs. Some countries have introduced light handed regulation for small generators, although not all for renewables.

ANNEX 4-3

Energy Efficiency Processes in Mozambique, Tanzania and Zambia

Project	Mozambique	Tanzania	Zambia
CFL exchange programme		X	X
Energy Saving / Awareness Campaign		X	X
Demand Market Participation			
Time of use tariff			X
Ripple Control			
Solar water heater project	Y		X
Energy Efficiency Programme in Buildings			
Energy efficiency Audits			X
Installation of prepaid meters		Y	X
Generation Rehabilitation	Y	X	X
Transmission line upgrade	Y	X	X
Power Factor Correction	Y	X	X
Distribution loss reduction	Y	X	X
Standards and product labelling		X	X

Source: “X” from the 2012 SAPP Needs Assessment Study on Energy Efficiency in the SAPP, “Y” from Author

ANNEX 4-4

Energy Efficiency Processes

	Customer Group								
EE and Load-shifting Measure	*	**	***	****	^	^^	^^^	>	>>
	Supply-side				Demand-side			Other	
Optimise generation dispatch	x	x							
Optimise energy trading in Power Pool	x								
Regional trading of NegaWatts[1]	x				x				
Demand response for peak lopping					x				
Regional Integrated Resource Plan (IRP) (least cost development plan)	x								
Generation rehabilitation		x							
Encourage local co-generation (CHP)		x			x	x			
Transmission system loss reduction – technical & non tech.			x						
Distribution system loss reduction – technical & non tech.				x					
Power factor correction			x	x	x				
Energy Efficiency (EE) Obligation				x					
Meter projects (Smart meters, Automated Meter Reading, Prepayment meters, improve meter coverage)				x	x	x	x		
Tariff setting principles								x	
Report KPIs and set targets	x	x	x	x				x	
Minimum standards of equipment efficiency		x	x	x	x	x	x	x	
National EE programmes with quantitative targets		x	x	x				x	
EE lighting regulations					x	x	x	x	
Improve building insulation / glazing (building standards)					x	x	x	x	
Energy label programmes					x	x	x	x	
Time of Use (ToU) tariffs					x			x	
EE lighting					x	x	x		
EE household refrigerator programme							x		
Refrigerated beverage vending machine programme					x	x			
Solar Water Heating and heat pump programme					x	x	x		
Distributed generation (e.g. PV)					x	x	x		
Motor change-out programme					x				
More efficient cooling (air conditioning)						x	x		
Provision of operating reserves and balancing services by energy intensive industries	x				x				
Energy audits					x	x			
Capacity building in implementing, monitoring and evaluating EE projects									x
Sharing best practice (in loss reduction / EE)									x
Public awareness campaign					x	x	x		x

Customer group:

* System Op., planning, trading
** Generation
*** Transmission
**** Distribution and supply

^ Industrial
^^ Commercial
^^^ Residential

> Regulation, policy standards, tariffs
>> Education and information dissemination

Source: PPA Energy. (2012). *Needs Assessment Study on Energy Efficiency in the Southern African Power Pool*. Final Report August 2012 commissioned by the European Union Energy Initiative-Partnership Dialogue Facility (EUEI-PDF) EUEI PDF on behalf of the Southern African Power Pool (SAPP).

[1] "Negawatts", short for negative watts, means a reduction in demand, typically at peak times, as an incentivised alternative to increasing generation to meet demand

ANNEX 4-5

Regional Processes related to Access to Electricity

Subject	Processes
Different Approaches to Rural Electrification	Models for scaling up access in rural areas; centralized, decentralized and combinations/hybrid models.
Alternatives to government-led RE	Private sector operators bidding for large regional concessions, electricity cooperatives buying at wholesale from a national utility and local and regional power companies working with a national utility.
Off grid Business Models	Technology solutions and business models for low-cost offgrid alternatives, e.g. SHS, PicoPV, Village grids
Stand-Alone Photovoltaic (PV) Solutions:	How scale up PV-powered homes, schools, clinics & enterprises. Technique, prices, viable business models, interest of international investors, etc
Low-Cost Solutions for Electrification	How reduce costs by adopting new technical standards
Rural Electrification Agencies and Funds	How unleashing multiple private actors in RE bring additional capital, higher efficiency, and new actors. Solutions/roles played by REA/REF:(i) RE through PPP, independent distributors, and either centrally planned tendering (top-down) or (bottom-up) call for proposals; (ii) REA/REF financing still used to extend the national utility grid, although laws and regulations allow RE through new actors or utilities; and (iii) mixture of the two.
Off-grid lighting and micro-energy technologies	How complement rural electrification programs, e.g. Lighting Africa, GIZ/EnDev programs, pico PV Lighting, hybrid mini-grids for Africa, hybrid village grids, etc
Access Planning	How improve planning for electrification and energy access scale-up. Traditional master planning exercises, Sector-Wide Planning Processes (SWAPs), integrated resource planning (IREMP) and other ways to introduce dynamic planning for realizing economies of scale and resource mobilization.
Prepaid and Smart Meters for Rural Electrification	How efficiently manage dispersed rural electricity customers, e.g. bill collection, low consumption, and non-technical losses.
Financing Connection Charges for Grid Scale-Up	How deal with high connection charges; connection subsidies, cross subsidies, deferred payment, credit schemes and cost recovery through billings.
Mini-Grids and Regulation	Regulatory issues for connected and isolated mini-grids, e.g. levels and structures for retail and wholesale sale of electricity, automatic adjustment clauses, technical/commercial quality standards of service, and light-handed regulation.
PV for Community Services	Maintenance, ownership, and funding of “low” but not “no” maintenance” solar PV for community services such as water pumping, schools, and health clinics in remote areas.
Peri-Urban & Urban Access	How meet increasing demands for electricity among the urban poor and urban slum communities. Low cost and densification.
Promoting Productive Use of Electricity	Awareness raising, facilitating access to electrical appliances through demonstrations and financing, and business training.
Gender	Integrating Gender into Energy Operations
International Funding for Renewables and Carbon	How access innovative financing mechanisms for renewable energy development and access scale up, including carbon finance, small scale CDM and climate funds,
Performance based approaches to electrification	E.g. Output-Based Aid (OBA), Results-Based Financing (RFB),etc to increase electricity access.
Software Tools for Designing and Evaluating Hybrid Mini-Grids	Software tools for developers, banks, REAs, and regulators to assess prospective projects from a technical, economic, and financial perspective, e.g. the HOMER model, simple spreadsheet models

Source: Author: from discussions within the framework of the Africa Electrification Initiative.

ANNEX 4-6

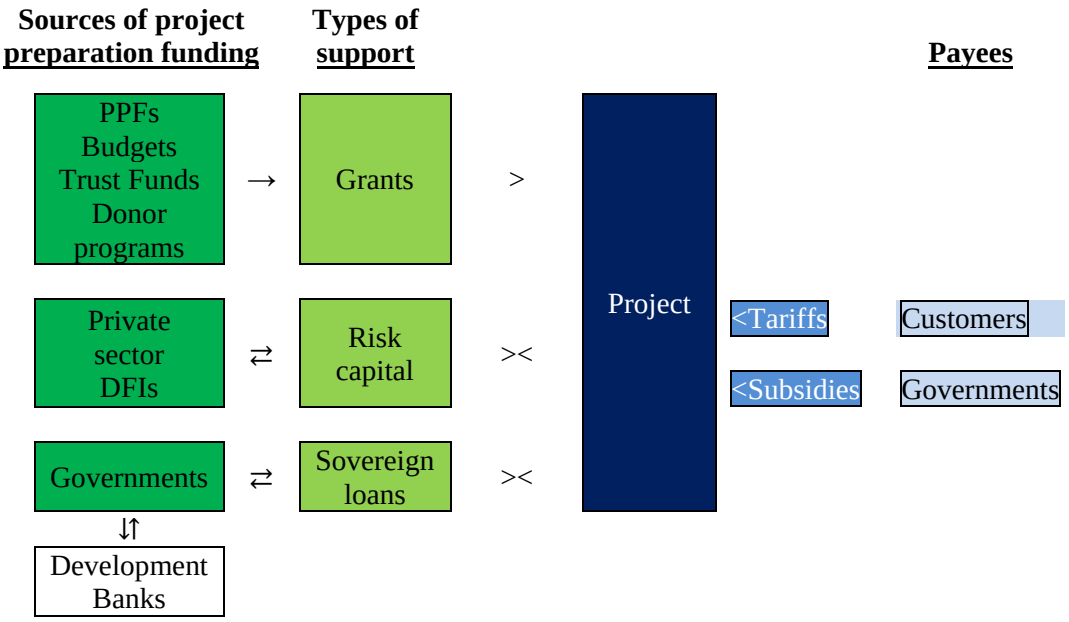
Project Preparation Facilitation

A recent ICA Report[1] highlights inadequate project preparation funding as a key constraint to infrastructure development in Africa. The support provided by project preparation facilities (PPFs) is highly fragmented due to a large number of such facilities.

The ICA study initially identified 67 potential sources of funding for project preparation, including national public-private partnership (PPP) units. Excluding the latter, a more detailed analysis revealed a core group of 17 facilities, of which 12 are currently operational (although in varying need of replenishing).

Africa Infrastructure Project Preparation	Global Infrastructure Project Preparation	Africa infrastructure (General)	Global Infrastructure (General)
COMESA-PPIU	AFFI-TAF	EU-AITF	ESMAP
DBSA-EIB PDSF	PPIAF	AWF	PIDG-TAF
ECOWAS PPDU	InfraVentures	SEFA	
NEPAD IPPF	DEVCo		
NEPAD PPFs			
SADC PPDF			
InfraCo Africa			
USAID AIP			

PPFs are, however, just one source of funding for project preparation. There are also budgetary support, funding from trust funds and development agency programmes, etc:



The report found that the most significant support gaps are the mid-to-late stages of (i) private sector–originated projects, both support to governments when negotiating with sole-sourced private sector sponsors[2]; and support to private sector sponsors who have obtained the rights to develop projects, and have undertaken early stage development work at their own risk; (ii)

[1] *Assessment of Project Preparation Facilities for Africa*, November 2012, by Cambridge Economic Policy Associates Ltd in association with Nodalis Conseil

[2] Many PPFs will not support governments, when dealing with unsolicited, sole-sourced proposals.

mega/transformative projects in the power sector, including dams and connecting HV transmission projects, and (iii) Public sector originated PPPs. Governments are familiar with early stage development of traditional public sectors, but less so with establishing the prerequisites for a PPP.

The report points to the needs for co-ordination around a combined funding approach, especially regarding large transformative projects, which cannot be developed solely by PPF resources. It is suggested that PPF funds should be used to facilitate initial project development activities with other resources being used for subsequent preparations. The report high lights the need for African budgetary resources and support from new donors as well as traditional ones.

ANNEX 5-1 Challenge Funds Catalogue

	Challenge Fund			
	Financial Deepening Challenge Fund	Business Linkages Challenge Fund	Innovations Against Poverty	ProPoor Innovation Challenge
Development Stage	Seed	Seed	Seed	Seed
Approach	Open Call	Open Call	Open Call	Open Call and Selective
Management Arrangements	Independent Fund Manager	Independent Fund Manager	Independent Fund Manager	Donor
Target Beneficiaries	National Corporates, International Corporates	NGOs, SMEs, National Corporates,	NGOs, SMEs, National Corporates,	Civil Society (MFIs)
Type of Assistance	Grants	Grants	Grants	Grants for Technical Assistance
Size of Fund (GBP)	10,000,000+	10,000,000+	2,000,000-10,000,000	2,000,000-10,000,000
Number of Grants	16-50	50+	50+	50+
Size of Grants (GBP)	250,000-1,000,000	250,000-1,000,000	0-50,000, 50,000-250,000	10,000,000+
	Civil Society Challenge Fund	Africa Enterprise Challenge Fund	Enterprise Challenge Fund	Food Retail Industry Challenge Fund
Development Stage	Seed, Start-up, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling
Approach	Open Call and Selective	Open Call and Selective	Open Call and Selective	Open Call and Selective
Management Arrangements	Independent Fund Manager	Independent Fund Manager	Independent Fund Manager	Independent Fund Manager
Target Beneficiaries	Civil Society	SMEs, National Corporates, International	SMEs, National Corporates, International	National Corporates, International Corporates
Type of Assistance	Grants and Technical Assistance	Grants	Grants	grants
Size of Fund (GBP)	10,000,000+	10,000,000+	2,000,000-10,000,000	2,000,000-10,000,000
Number of Grants	50+	50+	16-50	16-50
Size of Grants (GBP)	50-250,000, 250,000-1,000,000	50-250,000, 250,000-1,000,000	50-250,000, 250,000-1,000,000	50-250,000, 250,000-1,000,000
	Enterprise Innovation Challenge Fund	Grand Challenges Canada	COOP Africa Challenge Fund	Grand Challenges Explorations Initiative
Development Stage	Seed	Seed, Expansion/Scaling	Start up of business cooperatives	Seed
Approach	Open Call	Open Call	Open Call	Open Call
Management Arrangements	Independent Fund Manager	Independent Fund Manager	Independent Fund Manager	Donor
Target Beneficiaries	SMEs, National Corporates, International	Civil Society, SMEs, National Corporates,	National Corporates	Civil Society, SMEs, National Corporates,
Type of Assistance	Grants	Grants	Grants	Grants
Size of Fund (GBP)	10,000,000+	10,000,000+	500,000-2,000,000	10,000,000+
Number of Grants	16-50	50+	50+	6-15
Size of Grants (GBP)	50-250,000, 250,000-1,000,000	0-50,000, 250,000-1,000,000	0-50,000	50-250,000
	Financial Education Fund	UASDF Off-Grid Energy Challenge	Sawaed Programme	Business Innovation Facility
Development Stage	Seed	Seed, Expansion/Scaling	Seed, Start up, Expansion/Scaling	Seed, Start up, Expansion/Scaling
Approach	Selective	Open and Selective	Selective	Selective
Management Arrangements	Independent Fund Manager	Donor	Donor	Independent Fund Manager
Target Beneficiaries	Civil Society, SMEs, National Corporates,	National Corporates	SMEs, National Corporates, International	SMEs, National Corporates, International
Type of Assistance	Grants	Grants	Grants	Technical Assistance
Size of Fund (GBP)	2,000,000-10,000,000	1,500,000 ($2,400,000)	500,000-2,000,000	2,000,000-10,000,000
Number of Grants	6-15	Phase 1:6, Phase 2:18	Not known	50+
Size of Grants (GBP)	0-50,000, 50-250,000	60,000 ($100,000)	0-50,000, 50-250,000	N/A

ANNEX 5-1 Challenge Fund Catalogue (cont'd)

	Responsible and Accountable Garment Sector	Development Innovation Ventures	Girls Education Challenge	Grand Challenges for Development Initiative
Development Stage	Seed, Start up, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling
Approach	Open and Selective	Open Call	Open Call	Open Call
Management Arrangements	Independent Fund Manager	Donor	Independent Fund Manager	Donor
Target Beneficiaries	Civil Society, SMEs, National Corporates,	Civil Society, SMEs, National Corporates,	Civil Society, SMEs, National Corporates,	Civil Society, SMEs, National Corporates,
Type of Assistance	Grants	Grants	Grants	Grants
Size of Fund (GBP)	2,000,000-10,000,000	10,000,000+	10,000,000+	10,000,000+
Number of Grants	6-15	50+	50+	50+
Size of Grants (GBP)	50-250,000, 250,000-1,000,000	50-250,000, 250,000-1,000,000	250,000-1,000,000, 1,000,000+	50-250,000, 250,000-1,000,000
	Afghanistan Business Innovation Fund	Construction Ideas Fund	Nordic Climate Facility	Mobile Money for the Unbanked (MMU) Fund
Development Stage	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling
Approach	Open and Selective	Open Call	Open and Selective	Open and Selective
Management Arrangements	Independent Fund Manager	Independent Fund Manager	Donor	Independent Fund Manager
Target Beneficiaries	SMEs, National Corporates, International	Civil Society, SMEs, National Corporates,	Civil Society, SMEs, National Corporates,	National Corporates/International Corporates
Type of Assistance	Grants	Grants and Technical Assistance	Grants	Grants
Size of Fund (GBP)	2,000,000-10,000,000	2,000,000-10,000,000	Phase 1-3: 15,000,000	2,000,000-10,000,000
Number of Grants	6-15	6-15	50+	16-50
Size of Grants (GBP)	50-250,000	0-50,000, 50-250,000	Typcically 330,000	50-250,000, 250,000-1,000,000
	mFarmer Initiative Challenge Fund	mWomen Innovation Fund	Mobile-Enabled Community Services (MECS)	Demo Environment
Development Stage	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed, Expansion/Scaling	Seed
Approach	Open and Selective	Open and Selective	Open and Selective	Open and Selective
Management Arrangements	Independent Fund Manager	Independent Fund Manager	Independent Fund Manager	Donor
Target Beneficiaries	National Corporates, International Corporates	Civil Society, SMEs,National Corporates,	National Corporates, International Corporates	NGOs, SMEs, Research Institutions
Type of Assistance	Grants	Grants	Grants	Grants
Size of Fund (GBP)	500,000-2,000,000	500,000-2,000,000	2,000,000-10,000,000	0-25,000, 50,000 - 160,000
Number of Grants	1-5	6-15	16-50	16-50
Size of Grants (GBP)	50-250,000, 250,000-1,000,000	50-250,000, 250,000-1,000,000	0-50,000, 50-250,000, 250,000-1,000,000	0-50,000, 50,000-250,000

ANNEX 5-2

Assessment of the African Development Bank by the Australian Government

RESULTS AND RELEVANCE	
1. Delivering results on poverty and sustainable development in line with mandate	Strong
a) Demonstrates development or humanitarian results consistent with mandate	Strong
b) Plays critical role in improving aid effectiveness through results monitoring	Strong
c) Where relevant, targets the poorest people and in areas where progress against the MDGs is lagging	Satisfactory
2. Alignment with Australia's aid priorities and national interests	Strong
a) Allocates resources and delivers results in support of, and responsive to, Australia's development objectives	Strong
b) Effectively targets development concerns and promotes issues consistent with Australian priorities	Strong
c) Focuses on crosscutting issues, particularly gender, environment and people with disabilities	Satisfactory
d) Performs effectively in fragile states	Strong
3. Contribution to the wider multilateral development system	Strong
a) Plays a critical role at global or national-level in coordinating development or humanitarian efforts	Strong
b) Plays a leading role in developing norms and standards or in providing large-scale finance or specialist expertise	Strong
c) Fills a policy or knowledge gap or develops innovative approaches	Strong
ORGANISATIONAL BEHAVIOURUR	
4. Strategic management and performance	Strong
a) Has clear mandate, strategy and plans effectively implemented	Strong
b) Governing body is effective in guiding management	Satisfactory
c) Has a sound framework for monitoring and evaluation, and acts promptly to realign or amend programs not delivering results	Strong
d) Leadership is effective and human resources are well managed	Strong
5. Cost and value consciousness	Satisfactory
a) Governing body and management regularly scrutinise costs and assess value for money	Strong
b) Rates of return and cost effectiveness are important factors in decision making	Satisfactory
c) Challenges and supports partners to think about value for money	Satisfactory
6. Partnership behaviour	Satisfactory
a) Works effectively in partnership with others	Strong
b) Places value on alignment with partner countries' priorities and systems	Satisfactory
c) Provides voice for partners and other stakeholders in decision making	Satisfactory
7. Transparency and accountability	Strong
a) Routinely publishes comprehensive operational information, subject to justifiable confidentiality	Strong
b) Is transparent in resource allocation, budget management and operational planning	Very strong
c) Adheres to high standards of financial management, audit, risk management and fraud prevention	Satisfactory
d) Promotes transparency and accountability in partners and recipients	Satisfactory

ANNEX 5-3

EXIM Bank financed dams/ Chinese construction

Year	Country	Dam	Cost	MW
2008	Botswana	Dikgatlhong Dam	$250mn	5000
2008	DRC	Grand Inga Dam	$50-80bn	39000-50000
2008	Gabon	Grand Poubara Dam	$622mn	400
2007	Ghana	Bui Dam	$600mn	400
2007	Guinea Bissau	Saltinho Dam	$60mn	
2007	Mozambique	Mphanda Nkuwa Dam	$2bn	1350
2007	Sudan	Merowe Dam	$2bn	1250
2007	WAPP			
2006	Nigeria	Mambilla Dam	$1.4bn	2600
2003	Zambia	Lower Kafue Gorge Dam	$600mn	750
2002	Ethiopia	Tekeze Dam	$224mn	100
2002	Morocco	Ithane Dam	$50mn	

CENTRE FOR CHINESE STUDIES

ANNEX 6-1

SWECO Proposed Priority Energy Projects for Angola, Botswana, Tanzania, Uganda and Lesotho

Priority	Country	Area	Project	Note
1	Tanzania	T&D	132 kV Makambako – Songea Transmission Line and Electrification of the Area	Swedish finance, for UD decision
1	Tanzania	Generation	Rehabilitation of Hale Hydro Power Station	Under preparation for Swedish credit financing
1	Uganda	T&D	Western Transmission Line Mbarara – Kasese – Fort Portal	Swedish finance, for UD decision
1	Botswana	T&D	Integration of Morupule B and Mmamabula Power Stations	NIB interested to finance implementation
1	Botswana	T&D	330 kV Bonazazi link	NIB interested to finance implementation
1	Lesotho	Generation	Muela Hydro Project	Swedish /Nordic financing, PES and NIB?
2	Tanzania	System Control & Operation	Distribution - Dar-es-Salaam SCADA/DMS System	
2	Tanzania	T&D	Rehabilitation of Same substation	Secure supply to Simanjiro rural area
2	Tanzania	T&D	Grid connection study of Ruhudji Hydro Power Plant	
3	Tanzania	T&D	Co-ordination of Transmission part of Rusumo Falls project	
3	Tanzania Mozambique	T&D	Eastern Transmission Line Corridor	
3	Tanzania	T&D Tanzania)	North West Project System in Tanzania	Large potential for power reduction in rural areas export from Tanzania to Uganda
4	Uganda	Transmission	The Interconnection Masaka (Uganda – Kyaka (Bukoba,	Facilitate increased power

Source: SWECO. 2008. "Desk Study över möjliga energiprojekt for en riktad Afrikasatsning år 2008-2009".

ANNEX 7-1

Funds/Initiatives of Potential Interest for Sweden

Organisation/ initiative	Access to electricity	Generation[1]	Renewable energy	Energy efficiency "Nega-watt	Private equity	Investments	Guarantees	Grants	Trans. Advice	Grid	Non-grid
Regional Partnership/Investment Initiatives											
NEPAD	X	X	X	X		X			X	X	X
PIDA	X	X	X	X		X			X	X	X
Regional Investment Initiatives, Energy Water Nexus											
CIWA			X						X		
NBI		X							X	X	
OKACOM		X							X		
Pungwe River		X							X		
Supporting Private Sector Investments											
AECF REACT			X			X		X	X		
NCF			X	X				X			
POWER AFRICA	X	X	X	X	X	X			X	X	X
SEFA		X	X	X	X	X		X	X		
AREF		X	X	X	X	X					
PPIAF									X		
PIDG											
GAP		X	X		X	X			X	X	
International Financial Institutions											
WORLD BANK							X				
Trust Funds	X	X	X	X		X		X	X	X	X
AFREA			X					X	X		
AEI									X		
AGAT									X		
EU	X	X	X	X		X		X	X	X	X
EIB	X	X	X	X		X	X		X	X	X
AfDB							X				
Trust Funds	X	X	X	X		X		X	X	X	X
Other Initiatives											
SE4ALL	X	X	X	X	X	X		X	X	X	X
Energy+	X	X	X	X		X		X	X	X	X

[1] Generation includes all sources, not only renewables