



- BURUNDI
- KENYA
- RWANDA
- TANZANIA
- UGANDA

A map of the African continent is shown in white against a dark blue background. The East African Community (EAC) region, including Burundi, Kenya, Rwanda, Tanzania, and Uganda, is highlighted in a teal color. The Red Sea and Indian Ocean are also visible.

STRATEGY ON SCALING UP ACCESS TO MODERN ENERGY SERVICES

IN ORDER TO ACHIEVE
THE MILLENNIUM DEVELOPMENT GOALS

The strategy was prepared with support from European Union Energy Initiative Partnership Dialogue Facility (EUEI PDF), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and United Nations Development Programme (UNDP).



FOREWORD

The objective of the Regional Strategy for Scaling Up Access to Modern Energy Services is to enable at least half of the East African population to access modern energy services by 2015. Its focus is achievement of the Millennium Development Goals (MDGs) and poverty reduction. Such specific focus allows it to have demonstrable results that touch on the daily lives of the majority of East Africans.

The Strategy is built on the following four simple and achievable targets :

1. Access to modern cooking practices for 50% of traditional biomass users;
2. Access to reliable modern energy services for all urban and peri-urban poor;
3. Access to electricity for all schools, clinics, hospitals and community centres; and
4. Access to mechanical power within the community for all productive services

The Strategy has the support of the East African Community (EAC), local stakeholders, government, energy organizations and development partners. This multi-stakeholder ownership is important because the goals of the Strategy are also aligned with them and in particular those of many development partners as well the aspirations of the international community generally. The set of targets are consistent with the commitments under the New Partnership for African Development (NEPAD) and the African Union Forum of Energy Ministers of Africa (FEMA).


This report on the EAC Strategy provides a concise guide that outlines the current energy access situation and planned direction to the target date of 2015. It also specifies the issues that need to be addressed to achieve the four targets. The report further highlights the existing gaps in the provision of modern energy services and draws our attention to the enor-

mous task that lies before us if the majority of East Africans are to have a realistic chance of meeting the MDGs.

Four regional service lines have been identified as key to the realization of increased access to modern energy services. Briefly these are: Policy harmonization; Capacity building of public and private sectors; Formulation of support formulas; and Strategic coordination and project management. They are in line with the mandate of the EAC as outlined in the Treaty for the Establishment of the East African Community. The EAC Secretariat is committed to achieving the targets set which are expected to trigger huge multiple activities for scaling up of existing services as well as introduction of new business models.

Clearly, achievement of the targets of the Strategy requires the involvement of all stakeholders including the private sector. It requires innovative, high impact, low cost and scalable technologies and business models. It is particularly crucial that all Partner States of the EAC give greater priority to implementing the Strategy in rural, peri-urban and slum areas in a multi-sectoral process that reflects the multidisciplinary nature of energy.

On behalf of the EAC Secretariat, I wish to express our gratitude to the Partner States, development partners and the consultants. I commend this Report, which serves as an invaluable reference for promoting accelerated provision of modern energy services in our region which have a critical impact in the achievement of the Millennium Development Goals and overall poverty reduction.



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TABLE OF CONTENTS

Executive Summary	7
PART I. BACKGROUND: ENERGY, POVERTY, AND THE MDGs IN THE EAST AFRICAN COMMUNITY	12
1. ENERGY ACCESS AND THE MDGS IN THE EAC	13
1.1 The EAC development context	13
1.1.1 Socio-economic context	13
1.1.2 The role of energy in poverty eradication strategies	16
1.2 The EAC and the MDGs	18
1.3 Poverty reduction and access to energy services	18
1.3.1 Energy poverty	18
1.3.2 Link between energy services and MDGs	20
1.3.3 Energy challenges of MDG households	22
2. ENERGY ACCESS SITUATION IN THE EAC	23
2.1 Energy resources: available but fractured and underdeveloped	23
2.1.1 Deteriorating biomass resources	23
2.1.2 Electricity generation resources insufficiently diversified	24
2.1.3 Opportunities from ongoing electricity utility restructuring	25
2.1.4 Energy supply management	25
2.2 The energy access gap	25
2.2.1 Current levels of energy access in the EAC	25
2.2.2 Programs to increase the level of energy access	26
2.2.3 The projected gap by 2015	28
2.3 Existing market demand: an opportunity to scale up	29
2.3.1 Market demand for improved cook stoves	30
2.3.2 Market demand for urban and peri-urban electricity	31
2.3.3 Market demand from schools, clinics and hospitals	31
2.3.4 Market demand for community-level motive power	32
2.4 Core strengths and emerging opportunities in the energy sector	32
3. CHALLENGES AND OPPORTUNITIES TO SCALE UP ENERGY SERVICES	33
3.1 Mainstreaming energy access into national development planning and budgeting	33
3.2 Developing pro-poor energy policies and regulatory frameworks	34
3.3 Strengthening national capacity to deliver energy services for the poor	34

3.4 Identifying high-potential business models	35
3.4.1 Constraints to Target 1 (increasing access to modern cooking practices)	39
3.4.2 Constraints to Target 2 (increasing access for urban and peri-urban poor)	40
3.4.3 Constraints to targets 3 and 4 (grid extension and other low-cost options in rural areas)	42
3.5 Actions needed at the national and regional level	44
PART II. THE EAC ENERGY ACCESS STRATEGY	45
4. ENERGY ACCESS STRATEGY AND EAC OBJECTIVES	46
4.1 Vision	46
4.2 EAC core objectives	47
4.3 Strategy Targets	48
4.4 Contribution to achieving the MDGs	50
4.5 Guiding principles	51
5. REGIONAL IMPLEMENTATION FRAMEWORK	53
5.1 Regional service lines	54
5.1.1 Supporting policy harmonization at the regional and national level	54
5.1.2 Building the capacity of public and private sector actors to implement the strategy	54
5.1.3 Supporting formulation and implementation of investment programs to expand energy access (soft loans, grants, private sector investment...)	54
5.1.4 Strategic coordination and programme management, including promotion of exchanges and dissemination of best practices (Knowledge Management)	54
5.2 Regional seed fund	55
5.3 Implementation Framework	55
5.3.1 Capabilities at the national level	57
5.3.2 Capabilities at the regional level	57
5.3.3 Preparatory activities at the regional level	57
5.3.4 Funding overview of regional implementation framework	59
6. THE INVESTMENT PROGRAM FOR THE STRATEGY	60
6.1 Strategic framework	60
6.1.1 Scaling up through incremental change	60
6.1.2 Which business models will be most effective?	60
6.1.3 Mitigating risks and overcoming past obstacles	64

6.2 National investment programs	65
6.2.1 Soft funding for programs to transform the enabling environment	66
6.2.2 Scaling-up loan funds for investment in hard costs of energy services	66
6.2.3 Preliminary investment framework for target 1-4	66
6.2.4 Target 1	68
6.2.5 Target 2	69
6.2.6 Target 3 and 4	70
6.2.7 Sources of finance	71
6.2.8 Preparatory activities at the national level	72
REFERENCES	74
APPENDICES	75

LIST OF TABLES, FIGURES, BOXES

TABLES

1.1 Demographic Overview, 2005	14
1.2 GDP Per Capita and Poverty	14
1.3 Selected Indicators of Development in EAC Countries	15
1.4 EAC Per Capita Energy Consumption Compared with Other Countries	19
1.5 Causal Linkages between Energy and Achieving MDGs	21
2.1 Charcoal Consumption in the EAC	24
2.2 LPG Imports in EAC Countries	24
2.3 Current Levels of Energy Access in EAC	26
2.4 Cooking Fuel Expenditures	30
2.5 Share of Social Service Institutions Electrified in EAC	31
3.1 Need for New Business Models	38
3.2 Constraints Facing ICS Distributors and Manufacturers	40
3.3 Constraints to Increasing Access of the Urban and Peri-urban Poor	41
3.4 Constraints to Electricity Provision in Rural Areas	43
4.1 Impact of Achieving the Energy Targets	50
6.1 Potential Business Models for Increasing Energy Access	61
6.2 Sample Risk Mitigation Plan	65

FIGURES

2.1	Projected Gap in Electrification and Modern Cooking Practices	28
2.2	Current Annual Energy Expenditures by EAC MDG Households, by Income Group	29
2.3	Ability to Pay for Energy Services, by Income Group	30
2.4	Willingness to Pay for Energy, by Urban Population Group	31
3.1	Components Needed to Address Energy Issues	36
3.2	Methodology to Identify Sustainable Business Models	37
3.3	Interventions to Create an Enabling Environment for Increasing Energy Access	39
5.1	Scale Up Requires a Results-driven Process	53
5.2	Overview of Regional Implementation Framework	55
5.3	Coordination between Regional and National Entities in Energy Access Strategy Implementation	56
5.4	Preparatory Activities at the Regional Level (2-year plan)	58
5.5	Ongoing Activities at the Regional Level: High Priority Items (4-year plan)	59
6.1	Business Model Prioritization Matrix	61
6.2	Business Model Prioritization Matrix for Target 1	62
6.3	Business Model Prioritization Matrix for Target 2	63
6.4	Business Model Prioritization Matrix for Targets 3 and 4	64
6.5	Overall Investment Plan	68
6.6	Investment Plan for Target 1: Modern Cooking Services	69
6.7	Investment Plan for Target 2: Urban and Peri-urban Electrification	70
6.8	Investment Plan for Targets 3 and 4: Social Service Electrification and Motive Power and Heating for Communities	71
6.9	Potential Sources of Investment	72
6.10	Preparatory Activities at the National Level	73

BOXES

1.1	Millennium Development Goals to be Reached by 2015	13
1.2	The Need for Energy Services	20

EXECUTIVE SUMMARY

I. Background: Development of the EAC Energy Access Strategy

Poverty reduction policies and programmes often fail to take account of the concept of energy poverty and the role that energy plays in economic and social development and in the satisfaction of such basic needs as food, health, and education. By its very nature, energy affects all sectors of development. Neglecting its role—as a resource, a collective service, and a factor of production—can impede the formulation and implementation of development policies and programmes and the achievement of the internationally agreed Millennium Development Goals (MDGs). (See box.)

While no MDG relates directly to energy, access to energy services is an essential input to achieving all MDGs, particularly those related to income poverty, health, education, and women's empowerment. For example, efforts to improve gender equality (MDG3) will be hindered if women continue to face drudgery burdens related to collecting scarce fuel sources and exposure to harmful indoor air pollution resulting from domestic cooking practices. Similarly, eradicating poverty and hunger (MDG1) requires energy inputs such as electricity and fuels to generate jobs, industrial activities, transportation, commerce, micro enterprises, and agriculture output. Most staple foods must be processed, conserved, and cooked, requiring energy from various fuels. Unboiled water and indoor air pollution from traditional fuels and stoves are just some of the ways

that lack of energy contributes to poor child and maternal health (MDGs 4 and 5), and electricity is needed to attract teachers to rural areas and to provide illumination for study (MDG2).

In the East African Community (EAC) countries—Kenya, Uganda, and Tanzania—more than 81 percent of the population lives without access to modern energy services such as illumination, power for grinding, refrigerated storage, and clean fuels for cooking, and poverty is prevalent and persistent. Less than 30 percent of households use liquefied petroleum gas (LPG) or an improved cook stove; less than 40 percent of urban, and less than 5 percent of rural, households have access to electricity; and less than 10 percent of schools, clinics, and hospitals in rural areas have access to grid electricity or a sufficient alternative power supply to meet their needs.

In August 2005, the EAC Energy Ministers recognized that the lack of energy services could form a severe bottleneck to achieving the MDGs by 2015 and that urgent action was needed to move beyond the region's 'business-as-usual' approach to energy service delivery. They committed to the development of a regional strategy to scale up access to modern energy services by promoting investment in cost-effective technologies that are high impact, low cost, and scaleable (HILCS). The Ministers endorsed the following four targets that the Strategy would focus upon:

- provide access to modern cooking practices for 50 percent of the population that currently uses traditional cooking fuels;

- provide access to reliable electricity for all urban and peri-urban poor;
- provide access to modern energy services such as lighting, refrigeration, information and communication technology, and water treatment and supply for all schools, clinics, hospitals, and community centres; and
- provide access to mechanical power for heating and productive uses within the community for all communities.

These targets are consistent with and build on commitments already undertaken by the African continent as a whole in 2001 under the New Partnership for African Development (NEPAD) and in 2005 at the Forum of Energy Ministers of Africa (FEMA).

The EAC Regional Strategy for Scaling Up Access to Modern Energy Services is an ambitious initiative to enable at least half the population to have access to modern energy services by the year 2015. This means increasing the 2005 access levels at least ten-fold, thus enabling 9.6 million more households (approximately 48 million people) and 23,000 extra localities to access modern energy services.

MILLENNIUM DEVELOPMENT GOALS TO BE ACHIEVED BY 2015

1. **Eradicate extreme poverty and hunger:** Reduce by half the proportion of people who live below the national poverty line and reduce by half the malnutrition level of children under 5.
2. **Achieve universal primary education:** Achieve universal primary education for all by 2015.
3. **Promote gender equality and empower women:** Eliminate gender disparities at all levels by 2015.
4. **Reduce child mortality:** Cut down by two-thirds the mortality rate of children under 5 by 2015.
5. **Improve maternal health:** Reduce the maternal mortality rate by three-quarters by 2015.
6. **Combat HIV/AIDS, malaria, and other diseases:** Halt and reverse the spread of the HIV/AIDS epidemic, malaria, and other diseases.
7. **Ensure environmental sustainability.** Halve, by 2015, the proportion of people without access to drinking water and safeguard the sustainability of the environment; integrate environmental sustainability into policies and programmes; and achieve improvement in the lives of urban slum dwellers.
8. **Consolidate a global partnership for development.**

II. Meeting the MDGs by Scaling Up Energy Access

Business-as-Usual Not Good Enough

Current practices will not address the growing demand for modern energy in time to meet the MDG goals by 2015, leaving significant populations unserved and underserved. Under current energy access practices, over 70 percent of the EAC population will remain without access to clean cooking fuels or improved cook stoves in 2015. Additionally, if electrification programs follow current plans and investments, the urban electrification gap will remain above 50 percent and the rural gap will remain above 90 percent in 2015. Current rural grid extension programs will likely leave about 90 percent of schools, clinics, and community centres without connection to the electricity grid. And without improved access to motive power for mechanical loads such as mills, presses, and water pumps, the economic potential of rural areas will remain unlocked. The EAC population most important to meeting the MDG goals (that is, the poorest 80 percent of the population)

currently spends US\$1.2 billion per year on inferior energy services such as cooking with charcoal and fuelwood, using dry cell batteries, and relying on candles and kerosene for lighting. This represents a significant market demand that can be utilized to scale up access to modern energy services provided policy and business constraints are addressed.

A Regional Approach

The EAC energy access targets can be largely met by fully realizing the potential of the region's natural resource endowment. The region has significant untapped energy resources, including biomass, hydropower, and geothermal, solar, and wind energy sources, as well as fossil fuels (including natural gas and coal deposits). The EAC countries also have a clear commitment to poverty alleviation, as is demonstrated in various regional and national development strategies and poverty reduction strategies. What has been missing is a plan for providing access to modern energy services on a widespread regional basis.

Regional cooperation can improve the efficiency and effectiveness of national programs and help to overcome the policy and business constraints to scaling up of modern energy services by governments and markets. However, EAC governments should simultaneously make expanding energy access for poverty reduction purposes a national development priority backed by strong political commitment and decentralized delivery mechanisms. Specifically, they should:

- a) mainstream energy access into national development and poverty reduction strategies, as well as national budget making processes;
- b) develop pro-poor and gender-responsive policies to ensure energy services are delivered to those most in need;
- c) build national capacity to deliver modern energy services for the poor; and
- d) target investment in proven systems and develop new business models for scaling up energy services.

The regional approach to planning and to mobilizing funds for increased energy access provides economies of scale and enables national governments to achieve more than they might otherwise achieve on their own.

Four Service Lines

The Strategy identifies four key service lines necessary to achieve scale up.

- a) policy harmonization at the regional and national level: creating a forum for regional policy discussions;
- b) regional capacity building: building the institutional capacity of key institutions that will have regional impact;
- c) investment formulation: assisting fund mobilization for national investment programs; and
- d) strategic coordination and program management: actively managing attainment of the targets through effective feedback and timely application of seed interventions.

These service lines comprise core activities that are within EAC's regional mandate and which further support activities to be done at national level. They should have a catalytic effect on

investment at the national level by:

- improving the national policy and budget regime for energy access;
- building national investment programmes through demonstration of results achieved; and
- benchmarking national progress against a measurable regional trend.

III. Implementing the Energy Access Strategy

The EAC Secretariat will work closely with national policymakers to facilitate an energy access scale up. While most of the funding for implementation will come from national investment programs, the EAC Secretariat will invest in targeted catalytic activities. Implementation of market interventions will be carried out by national institutions.

Program Coordination Unit

The coordination of regional and national activities will take place through a Program Coordination Unit (PCU) composed of technical staff reporting to a desk officer within the EAC Secretariat.

The PCU will have linkages to the EAC Energy Committee through the Renewable Energy Working Group at the regional level as well as the Ministries responsible for energy and the Multi-sectoral Working Groups at the national level.

Needed Investment

The total capital expenditure for scaling up existing and new energy access business models is estimated to be \$2.7 billion over the eight years—with \$1.6 billion from the end users themselves and a little more than \$1 billion will need to come from subsidies extended by governments and donors. In order to trigger this level of capital expenditure, it is estimated that \$216 million will be needed in support from government programmes, \$291 will be needed in loan guarantees from development banks, and approximately \$48 million in regional support from the EAC. The total cost is thus estimated to be \$3.2 billion, of which half will be paid by households and businesses by switching their energy expenditures to improved services.

	Capital Expenditures (US\$ million)			Programatic Support by Donors (US\$ million)	Loan Guarantees by Development Banks (US\$ million)	EAC Funding (US\$ million)	Total Funding (US\$ million)
	End User Contribution	Govt & Donor Subsidy	Total				
Target 1	258	4	262	20	29	13	324
Target 2	741	740	1,481	10	70	8	1,569
Target 3 and 4	611	308	919	186	192	11	1,308
Overarching						16	16
TOTAL	1,610	1,052	2,662	216	291	48	3,217

The EAC Energy Access Strategy represents a credible plan to meet EAC energy and development targets by scaling up existing and new business models, obtaining development loans, and obtaining programmatic support to ensure an enabling environment. Most importantly, a coordinated regional approach will ensure that each of the investors benefits from the complementary cofinancing effects of the other investors.

PART I

BACKGROUND: ENERGY, POVERTY, AND THE MDGs IN THE EAST AFRICAN COMMUNITY

1 ENERGY ACCESS AND THE MDGS IN THE EAC

The East African Community (EAC) Partner States have made a strong commitment to economic growth, poverty alleviation, and meeting the Millennium Development Goals (MDGs) by 2015 as a key component of a broader development vision for a vibrant regional economy as outlined in the EAC Development Strategy. Although access to energy services is not an MDG in itself, it impacts the success of these policies and provides fundamental support for the achievement of all the MDGs. The EAC Partner States—the Republic of Kenya, the United Republic of Tanzania, and the Republic of Uganda—were among the more than 180 countries at the United Nations Millennium Summit in 2000 that adopted the MDGs and set out a shared vision of development targets to be achieved by 2015. (See Box 1.1 for a list of the eight MDGs and their associated targets.)

MILLENNIUM DEVELOPMENT GOALS TO BE REACHED BY 2015

1. Eradicate extreme poverty and hunger: Reduce by half the proportion of people who live below the national poverty line and reduce by half the malnutrition level of children under 5.
2. Achieve universal primary education: Achieve universal primary education for all by 2015.
3. Promote gender equality and empower women: Eliminate gender disparities at all levels by 2015.
4. Reduce child mortality: Cut down by two-thirds the mortality rate of children under 5 by 2015.
5. Improve maternal health: Reduce the maternal mortality rate by three-quarters by 2015.
6. Combat HIV/AIDS, malaria, and other diseases: Halt and reverse the spread of the HIV/AIDS epidemic, malaria, and other diseases.
7. Ensure environmental sustainability. Halve, by 2015, the proportion of people without access to drinking water and safeguard the sustainability of the environment; integrate environmental sustainability into policies and programmes; and achieve improvement in the lives of urban slum dwellers.
8. Consolidate a global partnership for development.

BOX 1.1

1.1 THE EAC DEVELOPMENT CONTEXT

1.1.1 SOCIO-ECONOMIC CONTEXT

The prevalence of extreme poverty—living on less than the equivalent of US\$1 per day—in East Africa is one of the most pressing challenges to achievement of the EAC's development vision. Although there have been signs of more positive

financial performance in recent years, a closer look at the poverty and development situation in the region reveals a much less encouraging picture. According to most economic performance indicators, the EAC—with a population of more than 100 million people, more

than 20 million households (Table 1.1)—remains one of the poorest regions in the world. The GDP growth experience of the individual countries has varied, but regional poverty and GDP data show the difficulty the region faces in shifting its development trajectory. (See Table 1.2.)

TABLE 1.1 DEMOGRAPHIC OVERVIEW, 2005 (MILLIONS OF HOUSEHOLDS)

	No. of Households (millions)			
	EAC TOTAL	Kenya	Tanzania	Uganda
Urban	6.4	2.9	2.9	0.7
Rural	13.8	4.3	4.8	4.7
TOTAL	20.2	7.1	7.7	5.4

Sources: UNDESA 2005; UNDESA 2004.

TABLE 1.2 GDP PER CAPITA AND POVERTY

Country/Region	GDP Per Capita (US\$ 2004)	Population Below Income Poverty Line		
		(% below \$1 per day, 1990-2002)	(% below \$2 per day, 1990-2002)	(% below national poverty line, 1990-2001)
Kenya	480	23	59	52
Tanzania	311	20	60	36
Uganda	244	82	96	44
EAC	345	38	70	44
Brazil	3,284	8	22	17
South Africa	4,813	7	24	N/A

Source: World Bank 2004.

With a combined GDP of \$16.1 billion and a population of over 100 million, the EAC faces the challenge of both meeting economic growth targets and ensuring sufficient economic participation to reduce the proportion of people living in extreme poverty (EAC 2006). Similarly,

the Human Development Index (HDI) ratings for the EAC countries are between 0.4 and 0.5, putting them within the lowest quartile globally (UNDP 2005b). (See Table 1.3.)

The persistence of poverty in the region is influenced by a wide range of factors in

addition to economic performance, including the lack of gender equality and access to basic social services such as clean water, food security, and basic health care. The relationship between access to these basic social services and poverty is well documented.

TABLE 1.3 SELECTED INDICATORS OF DEVELOPMENT IN EAC COUNTRIES

Indicators	Kenya	Tanzania	Uganda	EAC
Life expectancy at birth (years)	48	46	49	47
Infant mortality (per 1,000 live births)	78	78	80	79
Child Malnutrition Prevalence (% of children under 5)	22	29	23	25
Population without access to improved water source (%)	57	68	52	60
Illiteracy (% of population age 15+)	16		31	26
HIV Prevalence (Adults 15-49 years of age)	7	9	4	7
Human Development Index	0.491	0.430	0.502	

Sources: World Bank 2005b; WHO 2005; UNDP 2005b Country Reports.

Efforts to address the various poverty dimensions in the EAC also face a range of aggravating factors that threaten to exacerbate the severity of poverty across the region, including:

- **HIV/AIDS Epidemic.** Although HIV prevalence in the EAC has declined in recent years to 6–8 percent, the epidemic continues to take a particularly heavy toll on the region’s economy and could erode key achievements in economic and social development (WHO 2005). The epidemic strains the already inadequate and ill-equipped health system, leaves behind millions of orphans, and tends to rob society of its most productive members in their 20s, 30s, and 40s.

- **Increased Urbanization.** The majority (68 percent) of the population in the EAC currently lives in rural areas. Unemployment and the lack of basic services in these

areas have contributed to increasing urbanization in all three countries, with the proportion of EAC residents living in urban areas growing from 20 percent in 1990 to 32 percent in 2005 (UNDESA 2005). This trend is projected to continue for the foreseeable future (projected to be 38 percent urban by 2015) and puts significant pressure on the infrastructure capacity of urban areas to accommodate the influx (UNDESA 2005). Increased urbanization could also place significant pressure on urban slum areas already excluded from basic services such as access to clean water, electricity, and basic health care.

- **Population Growth.** Population growth rates are on the rise in all three EAC countries, with Uganda showing a particularly high growth rate. The total EAC population rose from 67 million residents in 1990 to over 101 million in

2005 and is expected to reach 132 million by 2015 (UNDESA 2005). Regional increases in social spending have not kept up with the increased demand for social services associated with this population growth.

- **Growing Income Disparity.** The EAC has seen steady increases in income inequality, with some populations benefiting from economic growth and others increasingly left behind. Income distribution is highly unequal in all three countries, with the richest 20 percent of the population earning 45 percent or more of GDP and the poorest 20 percent in each country earning less than 7 percent (UNDP 2005b). Most severely disadvantaged are those living in rural areas, where the economy tends to be dominated by low-productivity subsistence agriculture. In each country, GDP increases have resulted primarily from

growth in the services and industrial sectors; the agricultural sector, in which the majority of the EAC labour force works, has seen much lower rates of growth.

• **Gender Equality/Women's Empowerment.** Women of the EAC face a wide range of challenges including discrimination, low social status, lack of economic self sufficiency, greater risk of HIV/AIDS infection, and a large discrepancy in the education received by boys and girls. Women remain vastly underrepresented in national parliaments and among local authorities. As a population group, women are particularly vulnerable to the impacts of poverty. Most importantly, women tend to be charged with time-consuming domestic drudgery tasks (firewood collection, food processing and preparation, etc.) that have life-long detrimental impacts on literacy, economic productivity, and fertility rates, and can entrench the cycle of poverty.

• **Environmental Sustainability.** Many of the EAC region's natural ecosystems are undergoing conversion, degradation, and decline without proper actions at the national and regional level to address the associated risks to poverty reduction efforts. Examples include uncontrolled expansion of agricultural land, the erosion of soils and a decline in their fertility, falling quality and availability of water, unregulated encroachment and degradation of wetlands, encroachment of forest reserves, and severe deforestation.

• **Globalization.** As the EAC region continues efforts to meet economic growth targets, access to global markets

can play a major role in the development of EAC economies. While trade among EAC countries is high, the region's current participation and future ability to engage in international markets remains low.

1.1.2 THE ROLE OF ENERGY IN POVERTY ERADICATION STRATEGIES

Poverty reduction strategies are beginning to recognize in rhetoric, if not yet in their specific plans, the role of energy. Commitments have been made at the international, regional, national, and local levels. Increasingly, poverty reduction strategies are incorporating the globally accepted Millennium Development Goal framework.

At the International Level

There is an overall consensus that energy services help to reduce poverty and to stimulate economic development. This consensus was catalysed via a variety of events, mainly the Millennium Summit in 2000 and the World Summit on Sustainable Development in 2002. As a result of these events, several initiatives launched by large development actors have taken account of energy, such as those by the World Bank and the European Union (the European Union Energy Initiative), and there is growing international recognition that energy strategies can contribute to achieving development targets, particularly the MDGs. This international consensus provides the needed impetus to achieve the MDGs, as expressed in numerous international fora. The Paris Declaration on Aid Effectiveness was endorsed in March 2005 by more than one hundred

countries committing themselves to improving their foreign assistance. In July of that year, the Group of Eight industrial countries pledged to increase their levels of Official Development Assistance (ODA). In September 2005, participating countries made a strong commitment at the UN World Summit to develop MDG-based national development strategies by 2006. Thus the MDGs are providing new development momentum and creating the opportunity for both the international community and individual countries to review and revise policies. To be effective, however, the policies must be accompanied by financing and action.

At the EAC Regional Level

Heads of State from Kenya, Uganda, and Tanzania launched the first EAC Development Strategy in 1997; it was aimed at re-launching East African cooperation. The second EAC Development Strategy (2001–2005) widened the range of development areas and activities and was implemented with reasonable success. The third EAC Development Strategy was launched in June 2006 and focuses on the establishment and completion of the East African Common Market, essentially a single investment area whose aim is to be more attractive to growing trade with outside partners.

The third EAC Development Strategy (2006–2010) outlines energy consumption and rural electrification issues in a chapter entitled 'Infrastructure, ICTs, and Energy'. This document recognizes the environment and gender dimensions

of energy poverty and the region's reliance on biomass. Specific energy intervention goals in the third strategy include harmonizing energy policies and regulations and preparing an Integrated Master Plan comprising renewable and non-renewable sources of energy (EAC 2006).

At the National Level

EAC member countries have agreed that their Poverty Reduction Strategy Papers (PRSPs) should encompass MDG-based development strategies. PRSPs establish a three- to-five-year framework for poverty reduction programs and strategies and connect these efforts with national budgeting processes. In countries with existing PRSPs, a parallel process is necessary to align the PRS with the achievement of MDGs and national MDG reporting processes. In the EAC region, discussions on energy and national development goals are mostly dominated by economic growth and, to a lesser extent and more implicitly, income poverty. An examination of the PRSPs of the three EAC countries found a number of similarities in how they treat energy:

- **Income Poverty and Energy.** EAC PRSPs elaborate on the linkages between energy and macro-economic development (MDG1), but tend to focus on meeting rural electrification needs.

- **Link with Other MDGs.** All three EAC PRSPs draw upon the nexus between energy access and income poverty (MDG1), but differ in their mention of energy access in relation to health, education, gender, and environment MDGs. The Tanzania PRSP focuses on the relationship between energy access and MDG1, but does not draw a connection with other MDGs.

- **Benchmarking and Budget Allocation.** The Tanzania and Uganda PRSPs do not set energy-access-related benchmarks and fail to outline explicit allocation of their national budgets for energy. The Kenya PRSP sets benchmarks and allocates 15.42 percent of the national budget to energy but fails to set a timeline for reaching the expressed energy goals. The EAC PRSPs do include a significant representation of energy-related targets, initiatives, and operating principles. (See Appendix A.) However, an analysis of the PRSPs demonstrates that additional steps are required if EAC countries are to accomplish energy access goals to meet the MDGs by 2015. Thus, while the EAC PRSPs do create a context within which further energy access work can be done, a solid strategy to accomplish the energy access requirements is missing.

At the Local Level

Given the nature of rural energy service delivery, improving energy access in the

EAC requires national governments to fully commit to expanding energy access for poverty reduction purposes by making it a national development priority and supporting decentralization of energy service delivery mechanisms. Rural energy interventions executed in a centralized, top-down manner can result in coordination problems that impede the delivery of energy services.

By moving towards a decentralized institutional approach and shifting the authority to plan local energy interventions from central institutions such as national energy boards to district and local-level committees, EAC governments can help to accelerate rural energy access. Decentralizing the delivery of energy services will require a commitment to developing local capacities for planning, management, and monitoring of energy interventions at all levels—community, district, and central. It may also require organizing consultations and dialogue among sectoral agencies, beneficiaries, and other stakeholders and collecting/managing local data to establish a baseline and local monitoring of performance. If undertaken, these concerted efforts to decentralize the delivery of energy services can lead to a strong sense of program ownership among communities and can accelerate the delivery of energy services for poverty reduction.

1.2 THE EAC AND THE MDGS

An examination of the risk factors underlying the region's MDG status reveals region-wide impediments to poverty eradication that threaten the achievement of MDG targets by 2015 (UNDP 2006; UNDESA 2006).

MDG1: Eradicate Extreme Poverty and Hunger

Persistence of extreme poverty and lack of consistent economic growth in the EAC region places the achievement of MDG1 at considerable risk.

MDG2: Achieve Universal Primary Education

Education systems in the EAC countries face public expenditure constraints, poor curricula, and a lack of teachers in rural areas required for the achievement of MDG2.

MDG3: Promote Gender Equality and Empower Women

Higher drop-out rates of girls before they reach secondary school directly impact the economic power of women in EAC. Additionally, many families consider the opportunity cost of sending girls to school to be high and they are often required to stay home to help with domestic chores. Early marriage and pregnancy are additional factors limiting the level of education attained by girls in EAC countries.

MDG4: Reduce Child Mortality

Child mortality continues to rise within the EAC region largely due to poor access to health services and lack of awareness of health issues.

MDG5: Improve Maternal Health

Poor access to health services and the impact of HIV/AIDS and other diseases directly impacts the health of mothers.

MDG6: Combat HIV/AIDS, Malaria, and Other Diseases

The prevalence of HIV/AIDS, malaria, and other infectious diseases strains the already inadequate and ill-equipped health system, leaves behind millions of orphans, and tends to rob society of its most productive members in their 20s, 30s and 40s. At present, the adult prevalence of HIV/AIDS is about 6.7 percent in Kenya, 8.8 percent in Tanzania, and 4.1 percent in Uganda (EAC 2006).

MDG7: Ensure Environmental Sustainability

Regional exploitation of forest resources for fuel and agricultural expansion, the need for rural capacity to manage water systems, and a general lack of involvement of communities in environmental management threaten the achievement of MDG7.

1.3 POVERTY REDUCTION AND ACCESS TO ENERGY SERVICES

1.3.1 ENERGY POVERTY

Energy poverty can be defined as the lack of sufficient choice that would give access to adequate, affordable, effective, and environmentally sustainable energy services that could support economic and human development (Reddy 2000). Energy poverty is highly correlated with poverty and, in fact, the supply and availability of energy has a profound bearing on living standards and human well being.

The relationship between energy and poverty is strong, and has been documented to flow in both directions. Low access to, and limited use of, modern energy services, along with dependence on traditional biomass, are highly correlated with poor health and gender inequality. For example, heavy reliance on cooking with fuelwood, animal dung, and crop residues on an open flame is associated with higher

incidence of respiratory diseases due to indoor air pollution and places a large time burden on women and children responsible for collecting fuel. Conversely, access to improved cook stoves and clean cooking fuels can provide the same energy service—heat for cooking—while significantly decreasing indoor air pollution and reducing the burden on women and young girls who collect biomass.

Because the majority of East Africans live in rural areas and rely on agricultural activities, traditional biomass currently meets a large portion of the region's household cooking and heating needs. Traditional biomass, including fuelwood, charcoal, and animal waste, constitutes

more than 70 percent of the EAC energy mix and is used as a primary source of cooking fuel by close to 84 percent of the region's households (EAC 2006). At present, less than 3 percent of the EAC rural population and 32 percent of the urban population is connected

to national electricity grids (EAC 2006). Per capita electricity and commercial energy consumption in the EAC is substantially lower than in South Africa, for example (Table 1.4).

TABLE 1.4 EAC PER CAPITA ENERGY CONSUMPTION COMPARED WITH OTHER COUNTRIES

Country	Electricity consumption per capita (kWh) 2001 (Modi 2005)	Commercial energy consumption per capita (kg oil equivalent, 2000) (UN Common Database)
Uganda	66	26
Kenya	140	96
Tanzania	85	41
Brazil	2,122	717
South Africa	4,313	2,649

Contrary to popular belief, expenditures among poor energy consumers on inefficient and low-quality energy sources are surprisingly high. The EAC poor spend proportionately more on meeting energy needs than the rich and generally lack access to efficient, affordable, and clean modern energy such as solar, micro hydro, or liquefied petroleum gas (LPG). Most estimates suggest that families in rural areas of the EAC spend a large portion of already low monthly

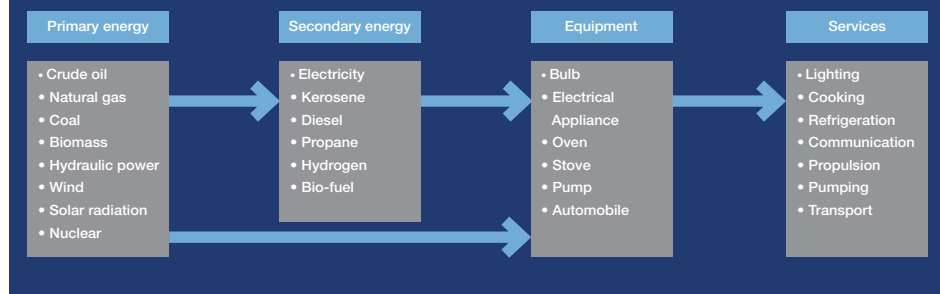
income on poor quality and unreliable energy services, representing over one-third of household budget (Modi 2005). If they could instead spend the money on modern, more efficient services, they would benefit substantially. From the perspective of the consumer, it is the availability and affordability of modern energy services (illumination, power for grinding, heat for cooking), not merely the source of energy itself that is important. (See Box 1.2.) To

ensure that a lack of adequate energy does not become a bottleneck to achieving the MDGs, urgent action is needed to move beyond the 'business-as-usual' approach to energy. If approached as an integrated part of MDG strategies, access to energy services can be an important instrument in helping promote economic growth, social equality, and environmental sustainability (UNDP 2005a).

BOX 1.2

THE NEED FOR ENERGY SERVICES

Modern Energy Services are the desired and useful products, processes, or services that result from the use of energy, such as illumination for home or business use; heat for cooking; power for transport, water pumping, and grinding; and cooling for refrigeration. These services are the last link in the 'energy chain' encapsulated in the diagram below. The idea considers the supply of the end service and the satisfaction of human needs, rather than looking at the energy source or the production, transportation, or distribution technology used.



Source: Adapted from UNDP 2004.

1.3.2 LINK BETWEEN ENERGY SERVICES AND MDGS

Access to modern energy services can help to increase incomes by improving productivity, creating employment, and providing access to markets. Scaling up access to modern energy services can also have a positive multiplier

effect on non-monetary poverty factors such as public health, clean water and sanitation, transportation, and many other development sectors.

The primary aim of the Millennium Development Goals is to reduce by half the number of people living in poverty

by meeting time-bound and quantified targets addressing extreme poverty's many factors. Although the MDGs do not mention energy needs explicitly, access to modern energy services is inextricably linked to the achievement of each goal (Table 1.5).

TABLE 1.5 CAUSAL LINKAGES BETWEEN ENERGY AND ACHIEVING MDGS

MDG	Energy Linkages
1. Eradicate Extreme Poverty and Hunger	Energy inputs such as electricity and fuels are essential to generate jobs, industrial activities, transportation, commerce, micro enterprises, and agriculture outputs. Most staple foods must be processed, conserved, and cooked, requiring energy from various fuels.
2. Achieve Universal Primary Education	To attract teachers to rural areas, electricity is needed for homes and schools. After-dusk-study requires illumination. Many children, especially girls, do not attend primary schools in order to carry wood and water to meet family subsistence needs.
3. Promote Gender Equality and Empower Women	Lack of access to modern fuels and electricity contributes to gender inequality. Women are responsible for most household cooking and water boiling activities. This takes time away from other productive activities as well as from educational and social participation. Access to modern fuels eases women's domestic burden and allows them to pursue educational, economic, and other opportunities.
4. Reduce Child Mortality	Diseases caused by unboiled water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child disease and mortality.
5. Improve Maternal Health	Women are disproportionately affected by indoor air pollution and water and food-borne illnesses. Lack of electricity in health clinics, lack of illumination for nighttime deliveries, and the daily drudgery and physical burden of fuel collection and transport all contribute to poor maternal health conditions, especially in rural areas.
6. Combat HIV/AIDS, Malaria, and Other Diseases	Electricity for communication such as radio and television can spread important public health information to combat deadly diseases. Health care facilities, doctors, and nurses, all require electricity and the services that it provides (illumination, refrigeration, sterilization, etc.) to deliver effective health services.
7. Ensure Environmental Sustainability	Energy production, distribution, and consumption has many adverse effects on the local, regional, and global environment; these effects include indoor, local, and regional air pollution; local particulates; land degradation; acidification of land and water; and climate change. Cleaner energy systems are needed to address all of these effects and to contribute to environmental sustainability.
8. Develop a Global Partnership for Development	The World Summit for Sustainable Development called for partnerships between public entities, development agencies, civil society, and the private sector to support sustainable development, including the delivery of affordable, reliable, and environmentally sustainable energy services.

Source: Adapted from UNDP 2005.

1.3.3 ENERGY CHALLENGES OF MDG HOUSEHOLDS

While energy poverty is rarely the first driver considered with respect to any of the MDGs, it is a crucial underlying obstacle for many income, health, and education-related improvements. In order to address energy poverty, it is essential to focus on the ‘MDG households’—essentially the extreme poor whose difficult living conditions are the focus of the MDGs. Distinct populations within the EAC face differing energy service needs and will be best served by a wide range of energy access strategies. These distinct populations include:

- **Urban and Peri-urban Poor (approximately 3 million households)**—

Energy challenges faced by these populations tend to focus on electricity connection, persistent electricity load shedding, and use of inefficient charcoal and wood stoves.

- **Inhabitants of Urban Informal Settlements (approximately 2 million households)**—

The energy challenges of these populations are closely linked to the nature of their living conditions: lack of lighting in alleys creates unsafe passage after dark, use of charcoal stoves causes harmful indoor air pollution in small non-ventilated areas, and the use of kerosene for lighting can easily cause fires that spread rapidly through settlements.

- **Nomadic Pastoralists (approximately 2 million households)**—

Given the nature of the nomadic lifestyle, pastoralists require options for lighting, motive power, and cooking that are compact and mobile.

- **Conflict-affected Peoples**

- **(approximately 140,000 households)**—

Energy challenges faced by these populations include the delivery of lighting, cooking, and motive power in a setting that tends to have a short time horizon and an uncertain future.

- **Inhabitants of Rural Areas (approximately 12 million households)**—

Energy needs of rural populations are largely correlated with low population density and reliance on agriculture and fishing, including clean cooking fuels, motive power for agriculture processing, energy for irrigation and water pumping, and electrification of schools, clinics, and community centres.

At present, a large portion of EAC urban populations and nearly all rural populations in the region do not have access to modern energy services. Without improving access to modern energy services, EAC countries will continue to face extreme poverty and inequality for most inhabitants as well as risk not meeting any of the MDG targets by 2015.

2 ENERGY ACCESS SITUATION IN THE EAC

Issues about energy access in the EAC region entail three dimensions: the availability of resources, the varying levels of access by different population groups, and current levels of demand. Despite many problems, EAC countries have some core strengths and emerging opportunities to address access issues.

2.1 ENERGY RESOURCES: AVAILABLE BUT FRACTURED AND UNDERDEVELOPED

Current biomass cooking patterns and electricity supply in the EAC are inefficient and unreliable, and can cause environmental degradation.

2.1.1 DETERIORATING BIOMASS RESOURCES

The environmental impacts of biomass-based cooking fuels are accumulating in each EAC country. Poor watershed management and heavier urban loads are leading to land degradation, which for rural women translates to increasingly long daily treks to look for fuelwood.

Diminishing biomass resources have reached critical levels in Kenya and face significant decline in Tanzania and Uganda.

- In Kenya, biomass resources account for 68 percent of primary energy consumption and 90 percent of energy consumption of rural households. The demand for fuelwood and other biomass in Kenya is estimated at 34.3 million metric tonnes. Although biomass is the largest source of energy, reliable data and information

on the resource base as well as on the level of demand for different uses is not well documented (UNDP/GVEP 2005). Heavy dependence on biomass contributes to deforestation and is a considerable environmental threat, with deforestation rates estimated at 3-4 percent annually.

- In Tanzania, 90 percent of households use biomass as a major source of energy equal to an annual consumption of 14 million metric tonnes. Deforestation in Tanzania is estimated at 2 percent annually.
- In Uganda, biomass accounts for 93 percent of total energy consumption. According to the Ugandan Bureau of Statistics, 97 percent of the population use charcoal and firewood for cooking. Annual consumption of biomass is estimated at 20 million metric tonnes annually. This is above sustainable yield levels and contributes to an annual deforestation rate of approximately 1 percent.

Urbanization and land degradation cause cooking fuel to be increasingly

scarce and expensive in urban areas. In Tanzania and Uganda, urban customers typically use firewood for cooking. As wood resources become scarce in the urban periphery, customers switch to charcoal (as in the case of Kenya's major cities). As biomass resources become scarce, the costs of cooking fuel are likely to rise.

The charcoal industry uses unsustainable practices. Charcoal is a primary by-product of biomass produced and used in all EAC countries. The charcoal industry is particularly significant in Kenya, where there are over 200,000 charcoal producers and charcoal contributes over 32 billion Ksh (US\$400 million) to the economy every year. The charcoal industry is almost entirely unregulated, illegal, and uses unsustainable practices. Development of a regulated and sustainable charcoal industry would benefit producers, consumers, the government, and the environment alike. Table 2.1 shows charcoal consumption and deforestation rates in the EAC countries.

TABLE 2.1 CHARCOAL CONSUMPTION IN THE EAC

	Kenya	Tanzania	Uganda
Annual Charcoal Consumption (million metric tonnes)	2.4	1.1	3.1
Average Cost	20 Ksh/kg, \$0.27/ kg	715 Tsh/kg, \$0.53/ kg	200 Ush/kg, \$0.11/ kg
Deforestation rate (% annual)	3-4	2	2

Sources: UNDP and GTZ 2005; UNDP and GVEP 2005; Uganda-BSRC 2005; TATEDO 2005; GOK, Ministry of Energy 2002; Sparknet 2004.

Although indoor cooking fires are the main cause of high death rates from respiratory disease, the growth rates of improved cook stove use have been low in urban areas and very low in rural areas. Traditional cooking practice in the EAC involves the burning of firewood or charcoal on a three-stone fire. Improved cook stoves (ICS) are the usual improvement on this cooking

practice. Urban populations typically purchase a portable metal Jiko at local markets. Rural populations have the option of building a clay ICS as part of their ventilated kitchen.

LPG is emerging as a viable option in many areas, driven by oil companies and local distributors. Although the cost is much higher than fuelwood or charcoal

stoves, LPG offers a cleaner, safer, more efficient cooking option that is growing in the EAC market. LPG distributors are providing smaller, 6 kg canisters and bicycle delivery service in a few urban areas to address the needs of poorer households. The typical cost of LPG for household cooking remains more than triple that of traditional biomass in urban areas. Table 2.2 shows the volume and cost of LPG imports.

TABLE 2.2 LPG IMPORTS IN EAC COUNTRIES

	Kenya	Tanzania	Uganda
LPG imports (tonnes, 2003)	50,000	5,500	3,461
Average Cost	\$1.58 per kg	\$0.89 per kg	\$1.75 per kg

Sources: AFREPREN 2004; Uganda-BSRC 2005; ESMAP 2006; TaTEDO 2005.

2.1.2 ELECTRICITY GENERATION RESOURCES INSUFFICIENTLY DIVERSIFIED

The electricity sector faces similar challenges, as grid-connected power generation is insufficiently diversified to provide reliable electric service and key distributed generation resources are not being developed to capacity due to inadequate risk management approaches at the national level. For

off-grid communities reliant on diesel generators for power, diesel fuel prices have risen drastically in recent years and may continue to rise, meaning that power access for small and micro enterprises and social services has become less viable.

Lack of generating capacity poses challenge to service. The EAC region is characterized by a heavy reliance on

hydro power. Uncertainty over resource fluctuations prevented planners from diversifying capacity in a timely manner. Current droughts have led to load shedding, which has reached emergency levels in Uganda and Tanzania (Uganda-AERDP 2004; Kenya National Energy Policy).

Domestic generation resources are not being developed to potential.

Although significant domestic generation resources exist, many are not developed to potential, especially smaller resources that typically would be developed as cogeneration schemes. Uncertainty about grid offtake capacity limits the size of power purchase agreements—a tendency that has had dire consequences during the current hydro shortages. A more aggressive generation diversification policy and other risk management approaches could justify the contracts necessary to unlock these resources. Additionally, there is great potential to improve electricity availability through energy efficiency and demand-side management measures in industrial, domestic, and public sectors. This is often the cheapest cost per kW of increased electricity availability.

2.1.3 OPPORTUNITIES FROM ONGOING ELECTRICITY UTILITY RESTRUCTURING

Across the EAC, national power utilities are undergoing restructuring to varying

degrees. In Uganda, generation and distribution have been deregulated and fully unbundled. In Tanzania, TANESCO remains under state control. In Kenya, 30 percent of the generation that until recently was entirely state owned has been sold to the public through an Initial Public Offer (IPO). Currently, distribution functions are still dominated by the state, whose overall shareholding has declined from 51 percent to 49 percent. Discussions are ongoing to further restructure the distribution functions to allow for greater efficiency by splitting into zones and allowing generators to sell directly to some specified large customers. Effective electricity regulation is required to ensure that consumers can have access to cost-effective energy and that electricity supply is a sustainable and commercially viable business that can attract investors.

2.1.4 ENERGY SUPPLY MANAGEMENT

Although energy supply is not a major focus of this document, efforts to

improve access to modern energy services for poverty reduction must be accompanied by the efficient management of supply-side issues, particularly those related to the use of biomass and water resources in the EAC.

At present, many hydropower and biomass resources in the region are being consumed at unsustainable rates, and could jeopardize the realization of the four energy access targets by 2015 that are the focus of the energy strategy detailed in Part II of this document. Therefore, an important component of this concurrent work should involve ensuring that the energy access scale-up strategy is merged with other supply-side regional strategies, such as the East Africa Power Master Plan, and national strategies and initiatives addressing the sustainable use of energy resources.

2.2 THE ENERGY ACCESS GAP

2.2.1 CURRENT LEVELS OF ENERGY ACCESS IN THE EAC

The energy access situation in the EAC is grim. Less than 30 percent of households in the region use LPG or an improved cook stove. Only 43 percent of the urban poor, and 30 percent of the peri-urban, households

and 5 percent of rural households currently have access to electricity. Less than 10 percent of schools, clinics, and hospitals in rural areas have access to grid electricity or a sufficient alternative power supply to meet their needs. Less than 10 percent of rural communities have access to grid

electricity; some rural businesses use off-grid systems for motive power, but most are constrained to manual and unimproved methods. Table 2.3 details the energy access rates for each of the key services needed to meet the MDG goals, as they pertain to major population segments within the EAC.

TABLE 2.3 CURRENT LEVELS OF ENERGY ACCESS IN EAC, BY ENERGY CHALLENGES AND POPULATION SEGMENTS

Energy Challenge	Target Group	Target Size	Current Number with Access	Current Level of Access (%)
Use of modern cooking practices by 50% of those who at present use traditional biomass for cooking, including reducing indoor air pollution to safe levels, and increasing the sustainability of biomass-derived fuels production.	Urban poor	6.4 Million Households	3.0 Million Households	47%
	Rural poor	13.8 Million Households	1.5 Million Households	11%
Access to reliable modern energy services for all urban and peri-urban poor	Urban poor	4.7 Million Households	2.0 Million Households	43%
	Urban slums	1.7 Million Households	0.5 Million Households	30%
Energy services such as lighting, refrigeration, information and communication technology, and water treatment and supply for all schools, clinics, hospitals, and community centres.	Schools	41,838	1,848	4%
	Clinics	9,550	401	4%
	Hospitals	717	38	5%
Access to mechanical power for heating and productive uses within the community for all communities.	Rural communities	22,165	955	4%

Source: Team analysis.

2.2.2 PROGRAMS TO INCREASE THE LEVEL OF ENERGY ACCESS

The many energy access programs in place in EAC countries together do not provide a coherent plan to reach the energy access targets needed to meet the MDG goals. Current plans under way fall into two broad categories: disseminating modern cooking practices and expanding electricity access. Listed below are examples of each.

Existing programs and strategies to disseminate modern cooking practices generally involve either improving cook stoves or expanding

the use of liquid petroleum gas.

Improved cook stoves. Numerous programs have targeted increased dissemination and adoption of improved cook stove technologies, including rural stationary clay and metal charcoal cook stoves. These programs have iterated and refined the technologies to ensure greater adoption and have developed the production and business skill capacity of private entrepreneurs. Although many have demonstrated successful results, significant scale up across the region has not occurred. Programs that have targeted increased use of improved cook stove include the following:

- Uganda has engaged in a rural improved cook stove program in Bushenyi province, providing 120,000 improved cook stoves (at a total cost of approximately \$250,000), and in Rakai province, providing 50,000 improved cook stoves.
- Kenya has supported the private sector to serve 225,000 households, 9,000 institutions, and 1,000 private entrepreneurs (at a cost of approximately \$1.2 million), partnering with UNDP, GTZ, and USAID, among others.
- Tanzania supports producers and encourages the use of improved cook stoves through the GTZ-partnered Probec Program.

Liquefied petroleum gas. Expansion of LPG has been driven by the private sector in the EAC. The high cost of equipment, the lack of equipment standardization, and the limited distribution network, have all contributed to keeping LPG adoption low. LPG penetration has been greatest in Kenya, with nearly 11 percent of urban households utilizing the technologies. Activities to further the adoption of LPG technologies in the EAC include the following:

- Throughout the EAC, oil companies have engaged in marketing and disseminating LPG technologies, with prospective growth to 1.3 million households by 2015.
- In Kenya, the Ministry of Energy is pursuing regulatory reforms to encourage and mandate LPG equipment standardization.
- In Kenya, the Shell Foundation program is mobilizing 80,000 women entrepreneurs to encourage LPG use in rural and urban areas.

The EAC region has a wide array of programs and strategies to *expand electricity access*. They include the following:

Regional

- East Africa Power Master Plan: Regional agreement among Kenya, Tanzania, and Uganda to interconnect electric grids and create a common power market with the benefits of lower cost electric power and increased reliability.

Kenya

- Kenya's Rural Electrification Program: \$14 million government program, seeking to increase national

electrification to 26 percent by 2015, including 6 percent of rural households.

- Ministry of Energy's Strategic Plan: 4 year, \$250 million program to upgrade existing infrastructure and conduct geothermal exploration.
- Government of Kenya's solar project for schools: \$2.5 million program running from 2005 to 2009, providing solar photovoltaic systems to 25 schools per year.
- Government of Kenya's Energy Sector Recovery Program funded by the World Bank: \$153 million to upgrade the existing grid infrastructure and system.

Tanzania

- Tanzania's Rural Electrification Master Plan: Currently in development with a variety of donors and to be run by TANESCO with plans to increase the number of new connections per year from 40,000 to 100,000.
- Government of Tanzania: \$100 million program to increase natural gas generation capacity.
- Government of Tanzania's Energy for Rural Transformation Program: This \$80 million project, to be presented to the World Bank Board in 2007 for funding, has a target of 300,000 new urban and rural connections.
- UNDP solar program: Solar PV system and microfinance program piloted in Mwanza province.
- SIDA solar program: \$5 million country-wide program for solar PV system dissemination.

Uganda

- Uganda's Rural Electrification Strategy and Plan: Put in place by the Ministry of Energy and Mineral Development

(MEMD) in 2001, the Electrification Strategy and Plan provides policy guidelines for rural electrification. Currently under review by MEMD, it contains targets to connect 400,000 consumers to the grid by 2012 in order to attain a rural electrification rate of 10 percent.

- The Rural Electrification Fund (REF): The Ugandan government established the REF as a financial mechanism for subsidizing initial capital investments by service providers in commercially unviable areas. The main objective of the REF is to promote the equitable coverage of rural electrification in Uganda through the increased provision of access to electricity for economic, social, and household uses.
- The Rural Electrification Board (REB) and Rural Electrification Agency (REA): The Ugandan government established the REB and REA to handle rural electrification in the process of privatizing distribution by concession to Umeme Limited. Umeme operates the existing distribution network, including a footprint of 1 km within which to extend grid connection. REB and REA are in charge of electricity needs of populations living outside of this footprint.
- Government of Uganda's Energy for Rural Transformation (ERT) program: Funded by the World Bank, the ERT will be implemented in three phases stretching over ten years, with the first phase deploying \$49 million. The program aims to develop Uganda's energy and information communication technologies (ICT) sectors in a way that makes a significant contribution

to rural transformation and to global environmental protection by reducing greenhouse gas emissions. The Ministry of Energy and Mineral Development is the lead agency, with sectoral linkages to the ministries of agriculture, health, education, water and environment, and finance planning and economic development, as well as to local governments. The Uganda Communications Commission implements the ICT component and the Private Sector Foundation offers business advisory services. In 2006, the program was switching from an approach of private sector concessions to community-based mobilization and demonstration of demand for productive uses.

- Grid extension program in Kabale district: This SIDA-supported program includes a \$1.57 million pilot program (completed) and follow-up plans for a scale-up to \$10 million, for which a consultant has been procured to handle the design stage.

- Rural electrification in the West Nile District: A distribution concession was awarded to West Nile Rural Electrification Company (WENRECO), which first installed a 1.5 MW heavy fuel generator (in operation since 2005) and is now developing a 3.5 MW mini hydro generator.
- Cogeneration scheme using bagasse at Kakira Sugar Works funded by the GEF: This project has a goal of generating approximately 12 MW by October 2007.
- Kisiizi Hospital mini hydro plant: In coordination with the ERT, the hospital is expanding its mini hydro plant from 60 KW to 294 KW to better serve the energy needs of the surrounding community.

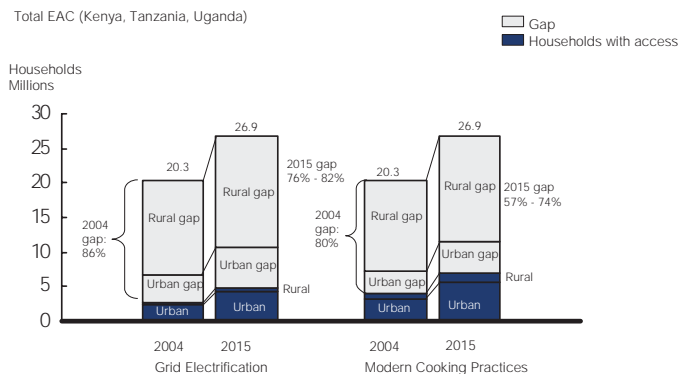
2.2.3 THE PROJECTED GAP BY 2015

In spite of the many programs in place to provide energy access, the gap between those who are served and those who are not is expected to persist substantially through 2015. Current

programs and plans to increase energy access will not keep up with population growth and urbanization rates. If the sales volume of ICS manufacturers continues to grow at a rate of 7 percent per year, the gap for cook stoves will remain above 70 percent in 2015 (Figure 2.1). While LPG is emerging as a safer and cleaner alternative cooking fuel, current market share is low and growth is impeded by the higher cost of this service.

If distribution utilities expand the number of urban grid connections according to current plans and investments, the urban electrification gap will remain above 50 percent in 2015 due to urbanization. If rural electrification programs continue current funding levels, the rural electrification gap will remain above 90 percent by 2015. Unless decisive action is taken to push national strategies further, the lack of energy access stands to play a major role in impeding achievement of the MDGs.

FIGURE 2.1 PROJECTED GAP IN ELECTRIFICATION AND MODERN COOKING PRACTICES



Assumptions: electricity, cookstoves and LPG growth rates between 5% (conservative) and 10% (ambitious)

2.3 EXISTING MARKET DEMAND: AN OPPORTUNITY TO SCALE UP

The underserved populations of the EAC represent a significant market force. **The EAC population most important to achieving MDG goals (that is, the poorest 80 percent of the population) spends \$1.2 billion per year on inferior energy services.** These include cooking with fuelwood or charcoal on traditional stoves and using

kerosene, dry cell batteries, and candles instead of electricity. End user demand for improved energy services can play a major role in the energy access scale up. Typical EAC households in rural areas spend \$10 per year on fuelwood and \$43 per year on lighting sources such as kerosene, candles, and batteries. Urban households typically spend \$96

per year on charcoal for cooking and \$430 per year on lighting sources such as kerosene, candles, and batteries. Figure 2.2 shows current annual energy expenditures by MDG households at various income levels.

FIGURE 2.2 CURRENT ANNUAL ENERGY EXPENDITURES BY EAC MDG HOUSEHOLDS, BY INCOME GROUP

MDG HOUSEHOLDS REPRESENT A POTENTIAL MARKET OF 16 MILLION HOUSEHOLDS AND \$1.1 B/YEAR

	Urban/Peri Urban	Rural (millions of households)	Total
Wealthiest 25%	1.6 HH / \$410 M	3.4 HH / \$425 M	5.1 HH / \$835 M
Mid 50%	3.2 HH / \$377 M	6.9 HH / \$230 M	10.1 HH / \$676 M
Poorest 25%	6.4 HH / \$157 M	3.5 HH / \$98 M	5.1 HH / \$255 M
	} \$1.1 B		

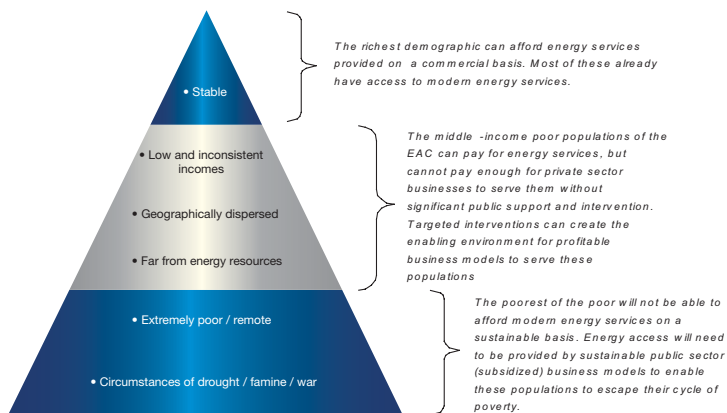
Note: MDG Household can be defined as a household of, on average, 5 individuals living in what can be described as extreme poverty, or those whose livelihoods are the main focus of the MDGs.

While MDG households represent a significant economic force, this alone does not mean that private sector companies will easily serve their needs. The middle-income poor populations of the EAC can pay for energy services, but cannot pay

enough for private sector businesses to serve them without significant public support and intervention. Targeted interventions can create the enabling environment for profitable business models to serve these populations. The poorest of the poor will not be able

to afford modern energy services on a sustainable basis. Energy access will need to be provided by sustainable public sector (subsidized) business models to enable these populations to escape their cycle of poverty (Figure 2.3).

Source: Team analysis

FIGURE 2.3 ABILITY TO PAY FOR ENERGY SERVICES, BY INCOME GROUP**MDG HOUSEHOLDS REPRESENT A SIGNIFICANT MARKET — BUT NOT ALL SEGMENTS CAN BE SERVED BY PROFITABLE BUSINESS MODELS**

In addition to households, social services provide key market demand for energy services. Funding for energy services from the operating budgets of schools, clinics, and households are a key public sector resource for pro-poor energy access.

The support that is provided by the public sector to enable these business models goes beyond capital subsidies and loan

guarantees. In fact, the soft funding that is needed to build institutional capacity, raise awareness, and provide sufficient outreach is an essential requirement to meeting market demand.

2.3.1 MARKET DEMAND FOR IMPROVED COOK STOVES

While urban households spend more for cooking fuel, rural households typically

spend significant time seeking firewood. Land degradation and poor watershed management lead rural women to spend on average 6 hours per day collecting fuel wood. Inhabitants of arid and semi arid areas (about 10 percent of the EAC population) spend even longer (Table 2.4).

TABLE 2.4 COOKING FUEL EXPENDITURES

	Kenya	Tanzania	Uganda
Urban Collection Time (hrs/day)	2.5	3	3
Urban Expenditure (\$/year)	34	128	128
Rural Collection Time (hrs/day)	4.5	6	6
Rural Expenditure (\$/year)	11	10	10

2.3.2 MARKET DEMAND FOR URBAN AND PERI-URBAN ELECTRICITY

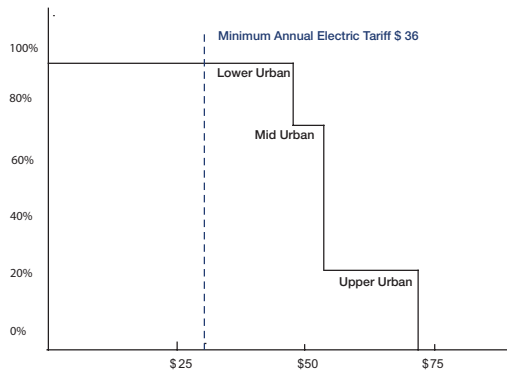
At present, only 27 percent of urban households within the EAC region are connected to the electricity grid. Since households that do not have grid electricity purchase candles, kerosene,

and dry cell batteries for lighting, it is possible to confirm that, even for the lowest income quartile of the urban population, average energy expenditures are higher than the minimum electric tariff. Using Tanzania data, Figure 2.4 shows that even the poorest urban population segment ('lower urban' on the graph) has

energy expenditures of \$49—well above the \$36 per year that is the minimum annual electric tariff. The 'mid-urban' (25-75 income percentile) and 'upper urban' (the wealthiest percentile) spend even more on average.

FIGURE 2.4 WILLINGNESS TO PAY FOR ENERGY, BY URBAN POPULATION GROUP

GRID ELECTRICITY IS AFFORDABLE FOR NEARLY ALL URBAN INCOME SEGMENTS (Tanzania)



Demonstrated Annual Willingness to Pay for lighting (expenditure on candles, kerosene, and dry cell batteries).

2.3.3 MARKET DEMAND FROM SCHOOLS, CLINICS, AND HOSPITALS

Municipal and cooperative models for community-driven mobilization of rural grid development are just emerging. Increasingly, governments in all EAC

countries are providing direct budgetary support to be managed at the municipal level. Ideally, these local-level authorities are the most aware of the needs and optimal development trade-offs to be made in their communities. Several initiatives are under way to promote

capacity building at the municipal level to make sustainable energy choices, and to incorporate strong decision making practices. Only a fraction of schools, clinics, and hospitals have access to electric supply (Table 2.5).

TABLE 2.5 SHARE OF SOCIAL SERVICE INSTITUTIONS ELECTRIFIED IN EAC

	Kenya	Tanzania	Uganda	Total EAC
Share of Social Services Electrified	6.6%	3.1%	2.2-3%	3%

Note: Estimates are based on distribution company data on the approximate number of rural households that are electrified, the total number of villages and/or parishes, calculations of the number of households comprising villages, and the number of social services per village.

Sources: Kenya Health Information System; TaTEDO 2005; Uganda-BSRC 2005.

2.3.4 MARKET DEMAND FOR COMMUNITY-LEVEL MOTIVE POWER

The majority of small farmers, pastoralists, and fishing enterprises in the EAC do not benefit from modern technologies and business practices that could increase

their incomes. Were the latent potential of the EAC's rural economies to be unlocked, the energy demand would likely be comparable to regional benchmarks such as South Africa. Inadequate business development knowledge impedes the development of potential agricultural

processing and light industry that could utilize modern energy services. Likewise, women's many drudgery tasks, including grinding grains, hauling water, and pressing seed oils, that could be facilitated through motive power are typically done manually using traditional methods when power is not available.

2.4 CORE STRENGTHS AND EMERGING OPPORTUNITIES IN THE ENERGY SECTOR

The EAC region boasts significant strengths that it can draw on to overcome its energy access challenges. The market power of demonstrated capacity to pay for energy services indicates that there are significant, if latent, markets for sustainable provision of modern energy services. Abundant energy resources including hydro power and biomass have yet to be developed. The private sector is well developed in key industries, including manufacture of improved cook stoves and distribution of off-grid solar photovoltaics.

Moreover, some trends may provide opportunities for the EAC member states to adopt new energy access approaches. Increasing decentralization of governance to the municipal level will enable rural communities to allocate funding to priority needs, including energy access. If municipalities are made aware of the role of energy and their options, they are more likely to take responsibility for bringing access to their communities.

Improvements in regulatory and policy regimes provide a better environment for energy markets to develop.

In Uganda, the establishment of a Rural Energy Agency will enable the efficient distribution of rural electrification subsidies. In Kenya, the pending reform of the grid code should provide a more stable environment for off-grid providers of electricity access and their customers. Integrated planning programs such as the PRSP process and the Tanzanian Mkukuta process encourage ministries and civil society to work together to identify priorities. This multi-sectoral approach is more likely to incorporate energy access in the planning and budgeting of social services including health, education, water supply, and agricultural extension.

In summary, the energy situation of the EAC is characterized by sufficient resources to supply energy services. However significant populations remain

unserved, and current programs will be insufficient to meet this demand in time to meet the MDGs by 2015. In fact, under the current 'business as usual' scenario, the gap for cook stoves will remain above 70 percent in 2015.

Additionally, if electrification programs follow current plans and investments, the urban electrification gap will remain above 50 percent and the rural gap will remain above 90 percent in 2015. Finally, current rural grid extension programs will likely leave more than 90 percent of rural schools, clinics, and community centres without connection to the electricity grid in 2015.

As these populations represent a significant market demand, policy and business constraints holding back governments and markets from scaling up services must be addressed. The key constraints and opportunities for introducing energy access interventions are discussed in chapter 3.

3 CHALLENGES AND OPPORTUNITIES TO SCALE UP ENERGY SERVICES

In August 2005 EAC energy ministers endorsed the four targets and mandated the EAC Secretariat to develop a regional strategy to scale up access to energy services (discussed in chapters 4 through 6). In the process, they recognized that to scale up, they must first:

- mainstream energy access issues into MDG-based national development and poverty reduction strategies and align these strategies with the national budget making process;
- develop pro-poor energy policies and regulatory frameworks to attract required investments from all sources, including ODA, the private sector, and national revenue; and
- build national capacity to deliver modern energy services for the poor and unserved.

These three prerequisites will provide the conditions and much-needed impetus for the implementation of the proposed innovative business models that are low cost, that result in high impact (with respect to energy needs to meet the MDGs), and that are scaleable.

3.1 MAINSTREAMING ENERGY ACCESS INTO NATIONAL DEVELOPMENT PLANNING AND BUDGETING

The intention of the EAC energy ministers to obtain a greater proportion of the national budget for financing increased energy access in their respective countries has significant implications for national policy, planning, and budgeting processes. Additional budgetary expenditures will not be granted unless there are persuasive arguments to do so in the face of other competing and pressing national priorities. At present, it is difficult to make these arguments without solid evidence that the investments will bring commensurate national economic and social benefits. There is no energy MDG, only a tacit recognition that energy is a prerequisite

to meet MDG goals on poverty reduction, health, education, agriculture, and environment. The resulting low profile of energy access issues is perpetuated by the lack of cross-sectoral institutional mechanisms that would permit a greater appreciation of the role of energy in social and economic development. This in turn leads to a failure to include energy access in national policy and planning.

At the 2005 UN Summit, countries made a strong commitment to develop MDG-based national development strategies by 2006; this was followed by the Paris Declaration on aid effectiveness and a promise of increased ODA¹. These recent

developments provide an excellent opportunity for EAC member countries not only to put the MDGs at the core of their development strategies but also to redress the situation and begin the systematic process of mainstreaming energy access into national policy, planning, and budgeting processes.

This process is underway in Kenya, where the establishment of multi-sectoral working groups on energy access resulted in a national action plan. The action plan recognizes the obligation of the government as a signatory of the Millennium Declaration to meet the MDGs, which in turn will not be possible without energy as a supporting input.

¹The Paris Declaration 2005 is available at <http://www.aidharmonization.org/ah-wh/secondary-pages/Paris2005>.

More importantly, the Kenya action plan recognizes that the MDGs will only be met through innovative ways of providing and scaling up energy access. The action plan provides the Ministry of Energy with the basis for influencing policy development and budget expenditures, provided the Ministry continues with a multi-sectoral approach to addressing energy issues. National multi-sectoral institutional structures and the mainstreaming process

can be reinforced at the regional level by introducing energy access considerations into EAC technical sectoral committees. This will facilitate regional efforts to harmonize EAC member policies and regulatory frameworks and will be conducive to energy access through a multi-sectoral approach. Critical energy issues common to all countries in the region—including persistent drought compromising hydropower production,

rising oil prices, a widening gap between urban and rural income, and increasing disparity in accessing social services—have highlighted the role and importance of expanding energy access for the poor and unserved in national development. These issues underscore the importance of mainstreaming energy access into broader policy, planning, and budgeting processes.

3.2 DEVELOPING PRO-POOR ENERGY POLICIES AND REGULATORY FRAMEWORKS

Current energy policies in the region focus largely on the provision of a specific technology or fuel type without examining the energy services they provide. Policies are needed not toward promoting specific technologies but rather toward supporting a diversity of energy technologies and service delivery models that are easily accessible by the poor. This necessitates analyzing and developing alternative policy options in three key areas.

- Macro-economic issues. EAC countries need to understand and analyze the impact of macro-economic policies such as energy pricing, subsidies, and taxation and the impact of increases in oil prices on the poor, the national

economy, and attainment of the MDGs. Such analyses will greatly aid multi-stakeholder groups in generating meaningful discussions and arriving at a consensus to make informed policy choices.

- Pro-poor energy policies and reforms. EAC countries need to develop pro-poor energy policies and reforms by ensuring institutional and fiscal decentralization of public institutions and creating enabling conditions for rural communities, private entrepreneurs, and microfinancing institutions to work at sub-national and local level.
- Policies to promote synergies. In order to promote rapid expansion of modern energy services for the

poor and unserved, EAC countries need to develop policies that create synergies among various sectoral policies in combination with local productive uses and enterprises, local energy resources, technical improvements in production, efficiency improvements in use, and sustainable land-use practices, to mention a few. This entails formulating enabling policies for entrepreneurship and business development that allow implementation of new and innovative business models, as well as policies to minimize financial risk to credit institutions, energy entrepreneurs, and energy users.

3.3 STRENGTHENING NATIONAL CAPACITY TO DELIVER ENERGY SERVICES FOR THE POOR

Strengthening capacities to deliver energy services for the poor requires a) mainstreaming energy access into MDG-based national development strategies and/or poverty reduction strategies at the national level; b) developing

capacities to define and implement pro-poor and gender-responsive energy policies among government and non-governmental stakeholders; and c) developing the capacity of local administration, communities, micro

enterprises, financial institutions, and the private sector to deliver energy services.

At the national level, the need is to develop government capacities to set a vision and targets for expanding energy

access, conduct MDG-based energy needs assessments and costing to estimate the energy investment required, analyze financing options, formulate performance-based national budgets, organize cross-sectoral dialogue and negotiation for budget allocation, formulate pro-poor energy policies, develop energy access programmes, and analyze cross-sectoral synergies. In addition, national capacity is required to engage in multilateral negotiations relating to energy and climate change issues.

At the sub-national and local levels, the need is to develop capacity to define and implement pro-poor rural energy policies among local government and

non-governmental stakeholders. It is also important to develop capacity of local administration to deliver energy services, including communities, NGOs, micro enterprises, financial institutions, and other private sector actors such as promoters, manufacturers, and wholesalers and retailers of energy equipment and devices. Most important is establishing decentralized institutional mechanisms for energy service delivery at the sub-national and local levels that is well integrated within the local governance structure.

Also needed at the local level is capacity to understand and analyze the implications of energy interventions on various social issues, as well as technical

capacity to expand access to modern energy services, implement energy systems, and diversify energy use for value-added products and services; entrepreneurial capacity to initiate energy business ventures for productive use of energy services; business management skills to access finance from traditional and non-traditional financing institutions and sell value added end-products for income generation; marketing skills to link with external markets for products. In addition, the capacity of entrepreneurs and the local private sector needs to be developed and/or strengthened so they can import or transfer new energy technologies from outside the country if needed.

3.4 IDENTIFYING HIGH-POTENTIAL BUSINESS MODELS

In order to close the energy access gap, EAC countries need to overcome formidable, but manageable challenges. To do this, it is vital that energy access be considered a priority in national MDG strategies, the PRSPs, and budget allocation frameworks. National strategies that articulate a credible plan for energy access scale up are needed to guide the efforts of the many programs, policies, investors, and stakeholders necessary for a scale up to be successful. Moreover, these national programs are necessary to ensure that key impacts (for example, on the environment or on women) are actively managed. Clear national strategies are also needed to ensure that resources are made available during budgetary allocation processes.

A credible plan must address a number of issues, including the lack

of business models, difficult business and policy environments, and the lack of investment funds. Each of these areas currently faces constraints (Figure 3.1). Developing a plan must include addressing the lack of business models that can provide energy access services in a sustainable way.

Where these businesses do exist, they in many cases face a business and policy environment that makes it difficult for them to grow. End users who are unaware of the benefits of modern energy or do not have the skills and capabilities to derive full economic benefit from the service are unlikely to make good markets. Regulatory environments that contain conflicting or unclear policies and incentives make it difficult for businesses to make commitments and

do not adequately protect consumers. Government institutions that are siloed, or bound to traditional budgeting, are unlikely to make necessary funds available for the energy component of health, education, or other community services. Typical banking services in the EAC, including multilateral financial institutions operating in the region, offer interest rates that are unaffordable for most small and medium enterprises (SMEs) or micro enterprises.

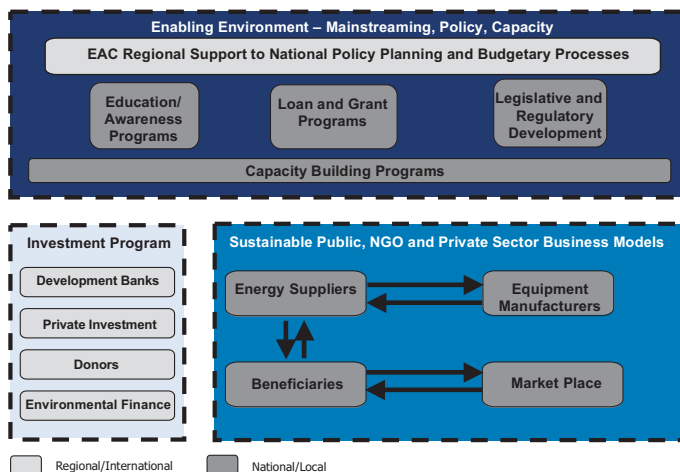
Significant investment is required both to finance private sector activities and to fund the programs necessary to create the enabling environment. Households will need to finance kitchen modifications and investments in LPG. Social services will need to finance grid

connection fees and wiring costs. ICS manufacturers will need working capital to expand their operations more than ten-fold. While some of this may be provided by private investment, typical interest rates to

small businesses are over 30 percent. For some businesses and households, loans may not be available at all and would need to be provided through programs. Likewise, government budgets do allocate resources to

some of the needed programs, but in many cases existing allocations will be insufficient to achieve the needed goals. The needed investments to overcome the constraints are addressed in chapter 6.

FIGURE 3.1 COMPONENTS NEEDED TO ADDRESS ENERGY ISSUES: ENABLING ENVIRONMENT, INVESTMENT, AND APPROPRIATE BUSINESS MODEL

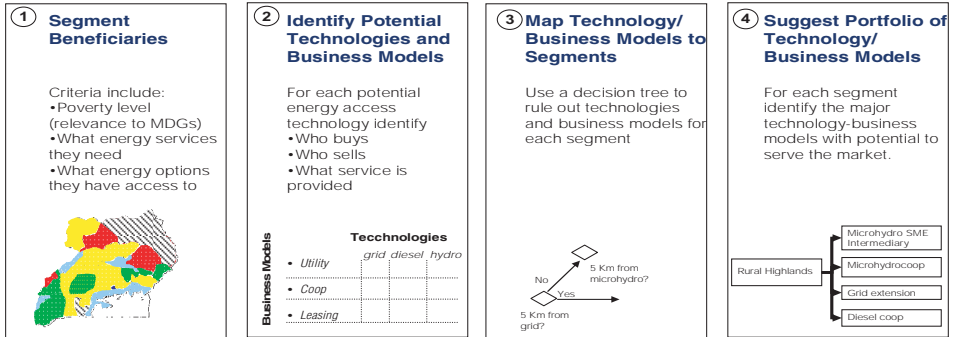


New business models are needed to target key MDG populations that are left out of existing approaches. Some EAC populations already have sustainable business models in place that need only be scaled up. Other populations require new approaches. Where new approaches are needed, the challenge to scale up is the greatest.

To evaluate the potential scale-ability of energy access business models it is essential to identify who the key MDG-related population segments are; to understand their energy needs, especially as they relate to changing their MDG status; and to evaluate what energy resources and economic opportunities are available to them.

A decision tree can then be used to identify the lowest cost technologies and business models likely to be viable in each context (Figure 3.2). When taken as a whole, these segments create a snapshot of the portfolio of business models that together have a realistic shot at meeting the needs of the entire EAC scale-up.

FIGURE 3.2 METHODOLOGY TO IDENTIFY SUSTAINABLE BUSINESS MODELS



The results of this analysis show that new business models are needed for major population segments within the EAC. Reaching nomadic and conflict-affected populations will be particularly difficult for

expanding the use of modern cooking practices. The urban slums, or informal settlements, need new approaches to electrification. The majority of rural populations are not likely to be served

by the existing rural electrification approaches. The highlighted areas in Table 3.1 identify areas for which lack of sustainable business models is a primary constraint to scale up.

TABLE 3.1 NEED FOR NEW BUSINESS MODELS

Challenge	Target Population	Technology/ Business Model	Status
Access to modern cooking practices for 50% of traditional biomass users	Urban (32%)	Improved cook stove commercial sales	Commercial with constraints
	Rural (58%)	Local artisan construction	Successfully piloted
	Nomadic and Conflict affected (10%)	New approaches needed	New approaches needed
Access to reliable modern energy services for all urban and peri-urban poor	Urban poor (73%)	Distribution utility	Commercial with constraints
	Informal settlements (27%)	New approaches needed	New approaches needed
Access to electricity for all schools, clinics, hospitals, and community centres and Access to mechanical power and heating for all communities for productive uses	Close to grid (10-15 %)	Rural electrification agency	Commercial with constraints
		Municipal or cooperative- based grid extension	Mixed experiences
	Close to micro hydro (5%)	Community- or SME-driven micro hydro	Mixed experiences
	Remote (80-85%)	Community-driven minigrids	Mixed experiences
		Ministry-driven social service electrification	Mixed experiences/ New approaches needed
		SME-driven off grid	Mixed experiences
		Other off-grid business models	New approaches needed

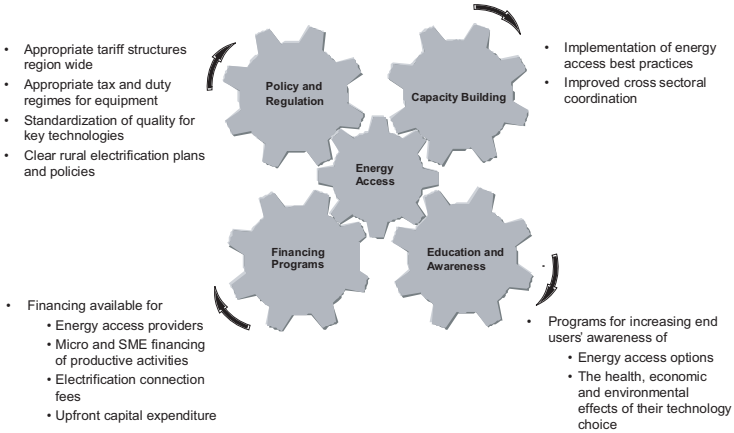
Energy access providers lack an enabling environment conducive to growth. For the high priority business models that currently exist, a survey of these businesses reveals a set of common constraints to scaling up in the EAC. These constraints result from market failures in four areas:

- a customer base that values and can use the energy access services,
- institutions that have high-performing capabilities needed to provide energy access services,
- availability of financing programs, and
- a policy and regulatory environment that creates a safe environment for

consumers and a stable environment for business growth.

Many of these challenges are self-reinforcing, creating a vicious cycle of non-performance. Fortunately, these constraints can be mitigated through targeted market interventions (Figure 3.3).

FIGURE 3.3 INTERVENTIONS TO CREATE AN ENABLING ENVIRONMENT FOR INCREASING ENERGY ACCESS



Following is an analysis of the status of needed business models and the types of constraints they find within the business and policy environment.

3.4.1 CONSTRAINTS TO TARGET 1 (INCREASING ACCESS TO MODERN COOKING PRACTICES)

About 50 percent of the population can be reached if the ICS industry is scaled up, but rural, nomadic, and

displaced populations remain difficult to reach. The improved cook stoves industry is making inroads in the urban areas of the EAC. Rural populations, however, are unlikely to use the metal Jikos provided by the ICS industry due to expense and size. Promising approaches include GTZ's rural cook stove program, which empowers local artisans to craft stationary clay cook stoves for less than \$2. Nomadic populations cannot use the

stationary cook stoves and do not typically buy the metal Jikos. Similarly, people living in refugee or internally displaced camps are unlikely to invest in permanent improvements to their temporary homes. These groups may be best reached through NGOs or government agencies that work with their communities.

Lack of end user awareness and SME finance are key constraints to growth of ICS distributors. (See Table 3.2.)

TABLE 3.2 CONSTRAINTS FACING ICS DISTRIBUTORS AND MANUFACTURERS

Business Model	Enabling Environment Constraints
Contracting and training of local artisans (transitioning to independent local artisans)	<p>Education and Awareness</p> <ul style="list-style-type: none"> • Low level of understanding of the benefits of improved cook stoves and the harmful effects of traditional cook stoves. High incidence of reversion to traditional three-stone stove. • Inadequate local awareness of cook stove design methods. <p>Institutional Capacity</p> <ul style="list-style-type: none"> • Inadequate sustainable fuel wood resource management to prevent environmental degradation. <p>Policy and regulation</p> <ul style="list-style-type: none"> • Lack of certification of artisans to ensure that quality ICSs are built.
ICS manufacturers/ distributors	<p>Availability of finance</p> <ul style="list-style-type: none"> • Limited operating capital for manufacturing, maintaining inventory, and extending distribution channels. <p>Institutional Capacity</p> <ul style="list-style-type: none"> • Charcoal production insufficiently regulated for sustainable development. <p>Education and Awareness</p> <ul style="list-style-type: none"> • Low level of understanding of the benefits of improved cook stoves and the harmful effects of traditional cook stoves. High incidence of reversion to traditional three-stone stove.
LPG distributors	<p>Policy and regulation</p> <ul style="list-style-type: none"> • Lack of LPG equipment standards and regulations prevent widespread adoption. <p>Financing</p> <ul style="list-style-type: none"> • Inadequate financing for start-up costs of LPG usage (tanks and stoves)

3.4.2 CONSTRAINTS TO TARGET 2 (INCREASING ACCESS FOR URBAN AND PERI-URBAN POOR)

Commercial models exist for urban electrification, but incentives are not sustainable for some populations. If current trends continue, by 2015, about 8 million households living in urban and peri-urban areas will not have access to reliable electricity. In the EAC energy access vision, households in urban areas have access to electric services as paying customers of electric utilities. This vision is reasonable, as these households currently spend over \$50 per year on average for inferior services

such as kerosene and candles.

Distinct urban population segments face different challenges in achieving access to electric service. Currently, households with grid connections lack reliable service due to frequent power outages. Poor households in areas serviced by the grid have not connected because the upfront connection costs (about \$200) and the cost of household wiring for unequipped houses (\$100–\$500) are beyond their budgetary capacity. Inhabitants of informal settlements face greater challenges because the utility may not be able to construct posts near their residence and because informal lifestyles (lack

of address, frequent moves, erratic income, lack of credit history, past delinquencies) are difficult to reconcile with traditional utility customer service and payment practices.

Urban distribution utilities must have an incentive aligned with electrification of low-margin, poor-beneficiary segments if they are to scale up in urban areas. For most of the urban poor, the electric distribution utilities could offer a reasonable commercial business model to provide service. However, since EAC electric utilities face heavy demands for financial performance, they have not prioritized outreach

to this low-paying and troublesome customer segment. The demands on EAC utilities are exacerbated by the current environment of insufficient generation resources. As many poor households would be likely to pay the minimum electric tariff, they would have a minor (in some cases negative) impact on the utilities' near-term financial performance. The incentive structure for distribution utilities must be realigned if they are to scale up pro-poor electrification.

In large informal settlements such as Kibera in Nairobi, the challenges of providing grid distribution services require

radically new approaches. In the case of urban slums, conventional utility business practices are incompatible with the constraints of the slum. Here, locally based community distribution intermediaries may be a useful partner to fill a customer service gap the utilities cannot breach. Alternatively, utilities may take a leadership role in developing and adopting innovative practices particularly targeted at reaching these populations. This segment represents 27 percent of the target, and includes some of the populations most at risk of not meeting the MDGs by 2015.

In order to unleash the capacity of

electric utilities to provide reliable energy access to the urban poor, four things must happen (Table 3.3):

- electricity generation must be diversified to provide reliable electric service from national grids;
- the upfront cost to end users of new connections to the electric grid must be financed over time;
- member states must make a commitment to providing electricity to low-income and informal urban communities; and
- utilities must develop or learn new practices to serve the growing urban population of informal settlements.

TABLE 3.3 CONSTRAINTS TO INCREASING ACCESS OF THE URBAN AND PERI-URBAN POOR

Business Model	Enabling Environment Constraints
Utility-based grid expansion to urban and peri-urban populations	<p>Policy and regulation</p> <ul style="list-style-type: none"> • Policy does not require utilities to achieve connection of 100% of customers in distribution area. • Policies do not mandate sufficient diversification of generation resources to ensure reliability. <p>Financing</p> <ul style="list-style-type: none"> • Inadequate financing mechanisms to cover the cost of connection and wiring. • Inability of lower-income households to manage variable incomes to afford monthly tariff. <p>Institutional capacity</p> <ul style="list-style-type: none"> • Insufficient managerial and operational capacity of utilities to expand connections quickly and at low cost. • Heavy system losses in some countries (with as much as 30–40% in total losses) constrain the availability of capital. • Utilities do not have payment mechanisms (such as prepayment meters) to affordably serve very poor households with erratic incomes.
Utility implementation of new approaches to reach inhabitants of informal settlements	<p>Education and awareness</p> <ul style="list-style-type: none"> • Low levels of awareness of beneficiaries about safety of grid as well as of kerosene lamp use and grid maintenance requirements. <p>Institutional capacity</p> <ul style="list-style-type: none"> • Utilities lack awareness and training of innovative best practices for electrification of informal settlements. • Physical conditions of informal settlements make safety and maintenance of infrastructure extremely difficult. • Widespread expansion of grid distribution in informal settlements requires commensurate cross-sectoral programs to manage an influx of new populations, including sanitation and water management programs.

3.4.3 CONSTRAINTS TO TARGETS 3 AND 4 (GRID EXTENSION AND OTHER LOW-COST OPTIONS IN RURAL AREAS)

Rural grid extension programs are likely to only reach 10 percent of schools, clinics, and hospitals included in the target. Rural grid extension agencies in the EAC maximize the grid extension services they can provide with the limited subsidy funds they have available. This leads them to focus on the communities and villages that are nearest the electric grid and on communities that already have a demonstrated economic base to repay the investment. Even with optimistic scenarios for scaling up grid electrification programs, such as a three-fold increase in current grid electrification programs, the population densities and geographical dispersion of these countries limit grid electrification to between 5 and 15 percent of target villages.

While the electric grid is a long-term option for all communities, in the MDG timeframe, the utilities do not have the incentives or the customer base to make it a sustainable business model for about 90 percent of the targeted social services.

Micro hydro resources are a low-cost option for about 5 percent of communities near a suitable resource. Micro hydro provides an environmental, low-cost technology option for communities that are within close proximity to a suitable resource. All of the EAC countries have excellent micro hydro resources. Existing understanding of potential resources suggests that up to 1,500 villages may be within the required range. The economic viability for micro

hydro systems relies on existing or developed productive use of the electric power. For that reason, the business models most likely to successfully implement micro hydro systems are community-driven systems where a cooperative or municipality invests in and manages the power system. Small or medium enterprises such as dairies or tea plantations may also be drivers of micro hydro development to meet their industrial need and then provide electricity to the surrounding community.

For the 80-90 percent of communities that are out of reach of the electric grid and micro hydro resources, off-grid solutions powered by diesel, solar, wind, biofuels, or biomass will be the low-cost option. For these populations, the existing business models have only reached limited numbers of beneficiaries. In order for these business models to flourish, EAC governments will need to make focused efforts.

- Capacity in municipal and cooperative organizations to drive power system implementation must be successfully built up. Past experiences in this area have been mixed, with many systems falling into disarray or disuse.
- Programs to improve local-level business profitability through value chain improvement must be replicated and expanded. Positive experiences by NGOs within the EAC suggest that these efforts could drive provision of off-grid systems for SMEs.
- Programs by education and health ministries to provide electricity to clinics, schools, and hospitals must be expanded and mainstreamed.

Across the EAC, some such programs have provided systems that have fallen into disuse; in others, the systems have persisted in a sustainable basis.

- Government driven extension programs to mobilize women's cooperatives and small businesses to purchase energy systems for productive uses must be implemented. International studies of productive uses of electricity suggest that if tied to income generation, small businesses and women's cooperatives can pay back an investment in off-grid power systems. These studies suggest that a program that contracts local energy promoters to train end users may be a successful approach.

Inadequate productive-use demand constrains the ability to provide electricity in rural areas (Table 3.4). For rural communities, the lack of economic activity inhibits the ability to afford electric service. This forms a vicious cycle as electricity is also a major input to many forms of improved agriculture, industry, and commerce, which are needed to enhance income generation. As the unit cost for electrification is much higher in communities where there is not a community electric system, this dynamic impacts social services as well as users of motive power. Providing electricity and motive power in rural areas will require breaking this cycle. Interventions that are linked to the creation of productive uses and rural SME business development will be the most effective means to address this constraint.

TABLE 3.4 CONSTRAINTS TO ELECTRICITY PROVISION IN RURAL AREAS

Business Model	Enabling Environment Constraints
Utility-based grid connection	<p>Education and Awareness</p> <ul style="list-style-type: none"> • Inadequate demonstrated demand for income-generating applications of electricity. <p>Financing</p> <ul style="list-style-type: none"> • Lack of available funds and subsidies for grid extension programs. • Lack of SME finance for end users to invest in machinery for productive uses in newly electrified areas. <p>Institutional Capacity</p> <ul style="list-style-type: none"> • Few successful models for governance and management of community-driven grid extension, such as cooperative or municipal-based grid extension agencies. • Inadequate planning for energy needs in social services budgets. • Insufficient exploration of models for social services to generate income via energy.
Community- driven micro hydro	<p>Policy</p> <ul style="list-style-type: none"> • Inadequate regulatory environment to allow sales of electricity to surrounding communities. <p>Financing</p> <ul style="list-style-type: none"> • Few resources for financing capital cost of micro hydro developments. • Need to focus on both the productive end uses (roughly 15–20% of installation costs) as well as the micro hydro itself. Re-payment of installation costs occurs when approximately 60% of the generation capacity is utilized and such utilization rates can take 3–4 years to attain. <p>Institutional Capacity</p> <ul style="list-style-type: none"> • Few successful models for governance and management of community-driven micro hydro development, such as cooperative or municipal based grid extension agencies • Lack of a ready supply of affordable turbine parts.
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	<p>Financing</p> <ul style="list-style-type: none"> • Subsidies need to be targeted to those areas where unlocking productive uses is not an option. For areas with the ability to unlock productive uses, transitioning from subsidies to sustainable models is needed. <p>Institutional capacity</p> <ul style="list-style-type: none"> • Need for demonstration of effective performance contracting models. • Need for increased capabilities for ministries to work cross-sectorally to identify energy needs. • Linkages to cost savings in other energy applications (e.g., efficient stoves reducing fuel wood consumption) have not been fully implemented. <p>Policy and regulation</p> <ul style="list-style-type: none"> • Need for regulation of quality and service provided by remote power systems that are on the market. Independent appraisals of equipment quality have revealed serious deficiencies.
Community driven off-grid generation (solar, wind, diesel)	<p>Financing</p> <ul style="list-style-type: none"> • Few financing programs for community-based electrification programs. • Microfinance interest rates of 20–35% constrain adoption of distributed solar and wind systems. • Short repayment terms for microfinance loans (e.g., extending 2–3 year repayment terms to 5 years increases adoption). <p>Institutional capacity</p> <ul style="list-style-type: none"> • Lack of awareness among municipalities of energy access options. • Lack of awareness in municipal driven energy programs of the need for women's input in the decision making process.
Off-grid SME-driven minigrids	<p>Education and awareness</p> <ul style="list-style-type: none"> • Small rural businesses often do not have the business development knowledge to ramp up their activities, capture more value from their markets, and provide value added services to increase their incomes. • Inadequate market access for selling surplus produce. • Rural businesses that are able to scale up their activities often are not aware of the energy access options and relative costs and benefits. <p>Financing</p> <ul style="list-style-type: none"> • Inadequate financing programs for energy services for SMEs.
Off-grid energy-promoter-driven systems	<p>Institutional Capacity</p> <ul style="list-style-type: none"> • Immature commercialization of bio-fuels like jatropha. • Immature commercialization of multi-functional platforms to provide motive power for women's drudgery and income generating tasks. <p>Education and awareness</p> <ul style="list-style-type: none"> • Need for increased awareness of productive uses through community-based mobilization. • Inadequate awareness of the benefits of bio-fuels for consumption and production.

3.5 ACTIONS NEEDED AT THE NATIONAL AND REGIONAL LEVEL

Meeting the energy access goals will require transforming the existing markets several times over. National strategic frameworks are needed to guide the scale-up process to ensure both success and sustainability. While the poverty reduction strategies provide a good foundation, they do not adequately address the issues related to energy access scale up. National strategies tasked with providing focused management of the energy access scale-up targets are essential. New business models will need to emerge to serve populations that cannot be sustainably served by existing players. Likewise,

the business environment will need to overcome constraints in improving regulatory regimes, creating the requisite financing programs, increasing end user awareness, and building institutional capacity.

EAC member states will need support in key areas if they are to successfully accomplish these tasks:

- assistance in changing their policy framework, including mainstreaming energy access in national policies, elaborating ambitious investment strategies, and making targeted

changes to the policy regime in support of specific business models;

- institutional capacity building to carry out key functions including R&D in new business models, building end user awareness, cross sectoral approaches, and implementation of best practices;
- investment programs to effectively leverage support from donors and development banks to put needed financing programs in place; and
- data collection and analysis to develop baselines and track progress as well as to provide monitoring and evaluation.

PART II

THE EAC ENERGY ACCESS STRATEGY

4 ENERGY ACCESS STRATEGY AND EAC OBJECTIVES

Poverty is a very serious challenge in the EAC, and the region will not achieve the MDGs by the year 2015 unless at least half of the rural, peri-urban, and urban poor are provided with access to modern energy services. The analysis of obstacles and opportunities demonstrated that the prospect of reaching this objective is greatly increased through regional cooperation efficiently and creatively addressing the challenge of drastically scaling up access to energy services. The EAC Energy Access Strategy commits the EAC and the Partner States to achieving this ambitious objective.

In order to ensure that this objective is met, and that the MDGs are achieved by 2015, EAC should specifically target populations in rural, peri-urban, and urban poor areas whose living conditions are the most difficult, notably those with the highest level of poverty and the lowest rate of access to social and productive basic infrastructures.

4.1 VISION

Current poverty reduction policies and programmes often fail to take account of the concept of energy poverty and the all-important role of energy even though it lies at the centre of each process of economic and social development and determines the satisfaction of mankind's fundamental needs (food, health, education, etc.). Energy is indeed a resource, a collective service, and a factor

of production; by its very nature, it affects all sectors of development. As a consequence, this oversight may become an impediment to the formulation and implementation of development policies and programmes and the achievement of the MDGs.

The decision by EAC Partner States to address the challenge of scaling up access to energy services should be

based both on the benefits that will directly result from such investment programmes and on their expected contribution to the satisfaction of the EAC population's fundamental development needs. EAC Partner States are therefore confronted with the daunting task of refocusing their policies and programmes aimed at scaling up the development initiatives required to achieve the MDGs.

The regional energy access strategy seeks to engage EAC Partner States in an ambitious initiative to scale up access to modern energy services in East Africa to support the achievements of the Millennium Development Goals. Its objective is to enable at least half the population to have access to modern energy services by the year 2015. This means enabling 9.6 million more households (approximately 48 million people) and 23,000 extra localities to access modern energy services. This initiative entails increasing ten-fold the 2005 energy access figures. (See Appendix B for detail.)

The objective of the regional strategy is in accordance with the commitments already taken under the New Partnership for African Development

(NEPAD) and, more recently, at the Forum of Energy Ministers of Africa (FEMA) during the Millennium Summit in September 2005.

The Energy Access Strategy departs from the business-as-usual approach by focusing on energy service options that have potential to be high impact,

low cost, and scaleable (HILCS) so that their achievement by 2015, through low cost technologies, will foster the economic development needed to achieve the more ambitious long-term development goals.

As such, these targets provide a crucial first step up an 'energy ladder' leading to a long-term energy access vision for the EAC that is complementary with the commitment made by the EAC at the World Summit on Sustainable Development (WSSD) affirming a long-

term vision of grid connected electricity and liquid fuels for all in the EAC by 2025, as outlined in the East African Power Master Plan.

The strategy is also a continuation of successful actions already undertaken by the EAC that aimed at reducing the cost of energy and increasing access to the energy services required to secure people's welfare and stimulate economic growth (e.g., EAC Power Master Plan). It also builds on the achievements of the national policies and programmes

that, more recently, have made energy access a growing priority.

Also, EAC now commits, through the strategy, to supporting Partner States in creating the necessary conditions for a rapid scale up of access to energy services for the most vulnerable populations of the region to fully benefit from the opportunities offered through access to energy services at an affordable price and with good quality services.

4.2 EAC CORE OBJECTIVES

The EAC Energy Access Strategy is consistent with three objectives core to the EAC's regional mission, as identified in its founding treaty (EAC 1999).

(1) To strengthen regional integration by sharing experience and best practices, developing cross-border cooperation, to foster capacity building at the national and regional level.

This objective will enable the EAC to better capitalize on national complementarities, to provide value to the expertise and experience accumulated at the national level, and to strengthen the capacities needed to formulate and implement MDG-based policies and programmes.

(2) To promote harmonized policy and institutional frameworks (PRSPs, MDG monitoring framework, etc.), integrating access to energy services as one of the national priorities with a view to ensuring human development and achieving the MDGs.

The existence of such frameworks, resulting from a multi-sectoral formulation process that fully reflects the multidisciplinary nature of energy, will result in the increase of financial resources to fund investment programmes required for the scaling up needed for the achievement of the MDGs by the year 2015.

In addition, harmonizing Partner States' policy frameworks will contribute to the establishment of a regional market needed to facilitate the mobilization of the required investment, thereby creating the enabling environment for increased support from development partners, donors, and the private sector.

(3) To develop, on the basis of national and local policy frameworks, energy investment programmes, based on sustainable business models that focus on poverty reduction in rural and peri-urban areas and the achievement of the MDGs.

Such programmes will focus on the development of productive activities, including adding value to agropastoral products through processing, modernising basic social services (healthcare, education, water, etc.), and improving living conditions, with a specific focus on the situation of women who are disproportionately affected by all aspects of poverty, most particularly health problems arising from burdensome chores such as wood-gathering and water-drawing, etc.) and air pollution.

These specific objectives contribute to the EAC goals as defined in the Treaty, especially:

- promotion of sustainable growth and equitable development of Partner States including rational utilization of the region's natural resources and protection of the environment;
- strengthening and consolidating the long-standing political, economic, social, cultural, and traditional ties

by Partner States and associations between the people of the region in promoting a people-centred mutual development;

- enhancing and strengthening

participation of the private sector and civil society;

- mainstreaming of gender in all its programmes and enhancement of the role of women in development; and

- promotion of good governance including adherence to the principles of democratic rule of law, accountability, transparency, social justice, equal opportunities, and gender equality.

4.3 STRATEGY TARGETS

In order to achieve the targets of the regional energy access strategy, namely to enable at least half of the rural, peri-urban, and urban poor to have access to modern energy services by the year 2015, Partner States will need to formulate and implement investment programmes capable of bridging the gap that currently exists between the effective rate of access to energy services and the rate of access that is required for the achievement of the MDGs. They will also need to mobilize the combination of partners and actors capable of complementing the role and contribution from national institutions and budgets.

Moreover, the regional strategy must also build on and pursue the regional objectives that have already been endorsed:

(1) At the continental level, the New Partnership for Africa's Development (NEPAD) 'set the objective of increasing the African population's rate of access to energy from 10 percent to 35 percent over the next twenty years, representing 60 to 300 million people to be covered over the next 20 years' (NEPAD 2001).

(2) At the sectoral level, the Forum of Energy Ministers of Africa (FEMA), held during the Millennium Summit in New York in September 2005 (BUMBA 2005), committed to working together

to fulfil the following aims over the next ten years in order to enable Africa to achieve the MDGs:

- 50 percent of Africans living in rural and peri-urban areas and using traditional biomass for cooking should have access to improved stoves and kerosene or efficient-gas cookers in order to cut internal pollution;
- 50 percent of urban and peri-urban populations should have access to reliable modern energy services that enable them to meet basic needs such as lighting, communication, and small production-related activities; and
- 50 percent of schools, clinics, and community centres in rural areas should have access to modern energy services for lighting, refrigeration, information and communication, etc. The centres must also be equipped with productive energy capacity.

Consistent with these prior agreements, the EAC Energy Access Strategy has the following targets:

Target 1: Provide access to modern cooking practices for 50 percent of the population that currently uses traditional cooking fuels.

In this target, modern cooking practices are defined as practices that minimize

environmental impact, require less than one hour per day to collect cooking fuel, and do not emit in excess of a safe level of indoor air pollution.

Cooking practices that meet these criteria include the use of improved cook stoves, LPG stoves, and biogas stoves, but do not include traditional three-stone fires or unimproved stoves. In the case of improved cook stoves that burn either charcoal or fuelwood, additional programs are needed to ensure that the use of the fuel is environmentally sustainable. Similarly, in situations where fuel is burnt indoors, programs to ensure that sufficient ventilation is available to reduce air pollution are needed to fulfil the targets.

Target 2: Provide access to reliable electricity for all urban and peri-urban poor.

Target 2 includes in its definition of urban and peri-urban poor the inhabitants of major cities, urban slums, the unincorporated surroundings of major cities, and the inhabitants of the provincial capitals. In the EAC, all of these areas are electrified by electric grid, although many households do not have connections. This target focuses specifically on:

- improving the reliability of grid-provided electricity by reducing outages, and
- connecting to the electric grid households and small businesses that currently do not have connections.

Target 3: Provide access to modern energy services such as lighting, refrigeration, information and communication technology, and water treatment and supply for all schools, clinics, hospitals, and community centres.

This target focuses on rural areas, as these services exist in urban and peri-urban areas and provincial capitals typically have access to the electric grid. The emphasis of Target 3 is on:

- rural electrification at the community level,
- distributed electrification of social service institutions in non-electrified communities,
- building the capacity of government budgets to fund electricity services for the social services they operate, and
- providing non-electrical energy sources, including LPG, solar, motive power, etc.

Each social service will be provided with adequate energy services to achieve a standard level of service. This level of service will be defined as a first step in formulating the policy and programme. A secondary focus of this target is the urban institutions that have not connected to nearby electric grids. This secondary focus benefits both from initiatives in Target 2, which focuses on improving the reliability

and access to electricity in urban areas, and from initiatives focused on improvements in government budgeting for energy needs.

Target 4: Provide access to mechanical power for heating and productive uses within the community for all communities.

The spirit of Target 4 is to enable productive uses that are closely linked to MDG 1 as well as to reducing women's drudgery, which is linked to MDG 3 (as well as the other MDGs, all of which link to benefits in income generation). While there are many income-generating activities that only require lighting or ICT improvements, a significant portion of income-generating and drudgery-reducing needs of the EAC's agrarian rural communities require more power. Therefore, mechanical power is here defined as sufficient power to run mechanical loads such as mills, presses, and water pumps.

This type of power can typically be provided through grid electricity, community minigrids, hydro or wind-driven shafts, and diesel or biodiesel engines. Solar PV and small wind-driven generators tend not be economical for these applications; however, their use is not excluded.

In addition to mechanical power, Target 4 includes efficient heating technologies such as efficient dryers, boilers, and kilns that are needed for many rural industries.

As with Target 3, Target 4 focuses on rural areas, since all urban, peri-urban, and provincial headquarter communities in the EAC have grid electricity at the community level. A community is

difficult to define in some parts of the EAC. More difficult still is establishing a baseline of how many communities have access to some sort of decentralized motive power (e.g., a diesel generator). The first implementation step must be to establish these baselines.

Since Target 4 must serve to enable income generation, it specifically targets income-generating entities. In the poor segments of the rural areas, these are primarily micro enterprises, SMEs, and women's cooperatives. When Target 4 is met, these entities should have a mechanism either to acquire their own power system or to link to a shared system within the community to provide the power or the services required to increase their incomes. Several business models could provide this mechanism and will be developed during the first phase of the strategy implementation. Development of these business models is a first key component of the implementation strategy.

The focus of Target 4 is on:

- rural electrification at the community level,
- distributed power supply for income-generating rural entities (including micro enterprises, SMEs, and women's cooperatives), and
- development of the business structures necessary to increase incomes in rural areas.

Table 4.1 quantifies the effect achieving these targets could have.

TABLE 4.1 IMPACT OF ACHIEVING THE ENERGY TARGETS

Target	Population Focus	Energy Service	Access to Energy in 2004: Actual		Goal: Additional Number to Be Reached	Goal: Percent of Category
			no. reached	% of category		
Target 1	Urban poor	LPG, ICS	3.0 million	47%	2.7 million households	73%
	Rural poor	ICS	1.5 million households	11%	6.1 million households	56%
	Nomadic and Conflict	ICS	0.2 million households	11%	0.9 million households	56%
Target 2	Urban poor	Electricity	2.0 million households	43%	5.3 million households	100%
	Urban slums	Electricity	0.5 million households	30%	2.2 million households	100%
Target 3	Schools	Standard level of service	1,848 schools	4%	46,545 schools	100%
	Clinics	Standard level of service	401 clinics	4%	10,323 clinics	100%
	Hospitals	Standard level of service	38 hospitals	5%	750 hospitals	100%
Target 4	Rural communities	Electricity or other form of motive power and heating	955 communities	4%	23,240 communities	100%

4.4 CONTRIBUTION TO ACHIEVING THE MDGS

Implementation of the regional strategy, and the resultant considerable increase in the rate of access to energy services, will be reflected by the acceleration of the development process in EAC Partner States. This impact will be measured by the following success indicators related to the MDGs:

Indicator 1: By 2015, 55 percent of the total population in the region will have access to LPG or improved stoves and to sustained biomass supply. This is the equivalent of an additional 50 percent of

the population that currently does not have access to modern cooking practice.

Contribution: [MDGs 3, 5, 7]

Indicator 2: By 2015, 100 percent of urban and peri-urban households will be provided with an electricity service. Contribution: [MDGs 1, 4, 5, 6]

Indicator 3: By 2015, 100 percent of the rural population of EAC member countries will live in a locality where social service centres are equipped with modern energy services for the

running of essential infrastructure such as drinking water; health centres; primary, secondary, and professional schools; computer services; and internet access.

Contribution: [MDGs 1 to 6]

Indicator 4: By 2015, 100 percent of administrative headquarters and localities with more than 3,500 inhabitants will be equipped with mechanical power and heating technology.

Contribution: [MDGs 1 to 6]

4.5 GUIDING PRINCIPLES

Implementation of the EAC Energy Access Strategy must be fulfilled in ways that are consistent with the overall development vision of the region, including environmental sustainability and gender equality. The following principles have been identified to guide the implementation of the strategy:

- **Subsidiarity:** This principle requires that issues handled at regional level be only those on which regional action can be more effective than national action.
- **Cohesion, consultation, and cooperation:** These are particularly important because of the cumbersome nature of investments, the stakes involved in accessing a regional market, or the complementarities of situations between importing and exporting countries. This includes co-operation with other sub-regional institutions.
- **A multi-sectoral approach:** Energy programmes will identify development needs and services and coordinate other sectoral investments to ensure the requisite equipment—before a market is put in place. Past experience has shown that single-sector programmes have had limited impact on the dynamics of development and have restricted multiplier effects.
- **Technological neutrality:** Energy programmes will endeavour to uphold technological neutrality, meaning that the technology used in any given circumstance will be the one that is likely to be best in the long-term according to local and national contexts. This neutrality will be applied, in particular, when comparing centralized and decentralized solutions and mobilizing renewable energies that require costly investments. It also entails taking account of externalities when making comparative analyses of technical solutions.
- **High-impact, low-cost, scaleable business models:** To reach the MDGs, priority will be given to developing high-impact energy services that are low cost relative to energy conventional solutions.
- **Public-private partnerships:** Such partnerships will cover technical aspects, management systems, mobilization of funds, and risk-taking, especially financial risk. It is highly important that public actors (state, public institutions, regional and local authorities, etc.) as well as private actors (national and local entrepreneurs, financial institutions, associations and co-operatives, NGOs, etc.) be mobilized. This will entail setting up appropriate regulatory frameworks and a transparent incentive.
- **Environmental conservation and sustainable development:** The energy access scale up should promote sustainable environmental practices by evaluating the environmental impacts of energy usage, including impacts on deforestation, climate change, watershed management, and biodiversity, taking timely action to introduce sustainable practices and promoting policy-making processes that incorporate environmental impacts in decision making.
- **Gender equality:** The energy access scale up should support gender equality by, for example, relieving women's workload, creating income-generating opportunities for women, incorporating women in decision-making bodies and processes, and considering women's needs with respect to access to social services including health care and education.
- **Security of supply for the economy and reduced economic vulnerability to external factors, particularly increases in oil prices:** This fundamental principle in all programmes is very important in the current context of rising oil prices.
- **Optimal use of available financial resources and mobilization of additional resources:** Multilateral and bilateral official development assistance, national financing, and mobilization of private funds. This will be done by seeking complementarities between regional and national funding sources and by prioritizing 'high impact/ low cost' solutions.
- **An enabling environment:** National governments must take an active role in creating an environment conducive to scaling up energy access. Resources should be allocated to fund key programs needed to mitigate risk, reduce constraints, and address market failures.

Implementation of the regional strategy in ways that are consistent with these principles, and that build on lessons learned from other regional initiatives (Appendix C), should enable Partner States to create enabling political and institutional conditions for the formulation and implementation of national policies and programmes

necessary for the achievement of the MDGs, as well as NEPAD and FEMA objectives.

Creating a coherent policy framework that targets development and poverty alleviation and treats energy as a national priority is another sine qua non for raising the financial means required

to achieve the ambitious targets. These means will come from national budgets and be supplemented by contributions from development partners.

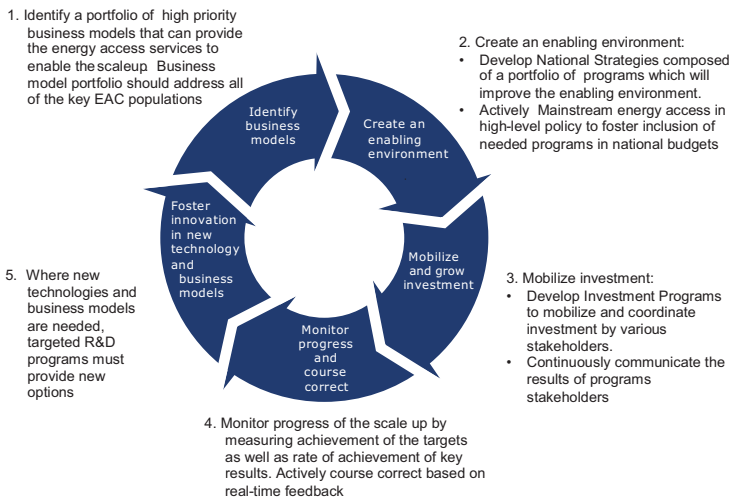
Finally, monitoring progress toward the MDGs will confirm the effectiveness of these programmes as they are being implemented.

5 REGIONAL IMPLEMENTATION FRAMEWORK

The EAC Secretariat can play a catalytic role in coordinating, facilitating, monitoring, and communicating the progress of the scale up. These activities are encompassed in a programme management cycle consisting of five steps (shown in Figure 5.1).

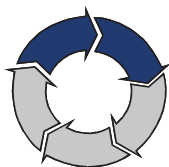
- identify which of the existing business models have greatest impact;
- create an enabling environment for scale up of these business models by developing national strategies and actively mainstreaming energy access in high-level policy;
- mobilize investment in programs to support energy access by demonstrating to investors that programs have been successful and that risks have been mitigated;
- actively manage attainment of the targets through effective feedback and timely course corrections; and
- foster innovation in new technologies and business models.

FIGURE 5.1 SCALE UP REQUIRES A RESULTS-DRIVEN PROCESS



5.1 REGIONAL SERVICE LINES

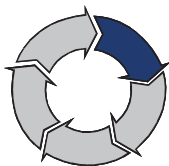
Under the Energy Access Strategy, the EAC will provide four key service lines to member states that support the scale up at each phase of the program management cycle. These service lines comprise core activities that are within the EAC's regional mandate and that support additional activities to be done at the national level. The four service lines are:



5.1.1 SUPPORTING POLICY HARMONIZATION AT THE REGIONAL AND NATIONAL LEVEL

Assisting policy formulation at the national level includes:

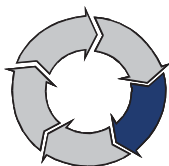
- developing a regional strategy to inform and support national strategies;
- supporting the establishment of cross-sectoral working groups to develop national strategies;
- helping to formulate national policies and investment strategies;
- providing guidance in needed programmatic activities;
- facilitating policy working groups for regional policy harmonization; and
- creating a clearinghouse for objective information needed for policy reforms.



5.1.2 BUILDING THE CAPACITY OF PUBLIC AND PRIVATE SECTOR ACTORS TO IMPLEMENT THE STRATEGY

Building the institutional capacity of key institutions that will have regional impact includes:

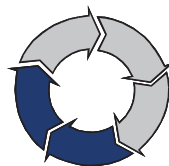
- creating a partnership with regional centres of excellence that can provide the services needed;
- building institutional capacity in key areas central to energy access scale up;
- providing training for participants in the energy access strategy; and
- maintaining a regional knowledge management system.



5.1.3 SUPPORTING FORMULATION AND IMPLEMENTATION OF INVESTMENT PROGRAMS TO EXPAND ENERGY ACCESS (SOFT LOANS, GRANTS, PRIVATE SECTOR INVESTMENT...)

Assisting national investment programs involves:

- helping to formulate national investment programs;
- supporting national programs in the development of project proposals;
- identifying cofinancing as needed to catalyze investment; and
- communicating with stakeholders regarding results achieved, mitigation of risks, and cofinancing efforts.



5.1.4 STRATEGIC COORDINATION AND PROGRAMME MANAGEMENT, INCLUDING PROMOTION OF EXCHANGES AND DISSEMINATION OF BEST PRACTICES (KNOWLEDGE MANAGEMENT)

Actively managing attainment of the targets through effective feedback and timely application of seed interventions encompasses:

- data collection and analysis regarding target baselines and progress;
- tracking of key population segments and business models as they scale up;
- program management; and
- monitoring and evaluation.

The Regional Action Plan for the EAC strategy involves a series

of preparatory activities followed almost immediately by the launch

of the first three service lines.

5.2 REGIONAL SEED FUND

In order to catalyze national investment programs, the EAC Secretariat will manage a seed fund designed to invest in pilots and demonstrations that will pave the way for larger interventions. These activities will directly target the constraints faced

by the business models discussed in chapter 3.

The result of the seed fund's investments will be to demonstrate the effectiveness of key interventions in promoting energy access scale up. This phase is expected to start

within the first year, last for four years, and disburse funding to national implementing institutions to achieve key results. Resources for the seed fund will come from EAC member states and external partners.

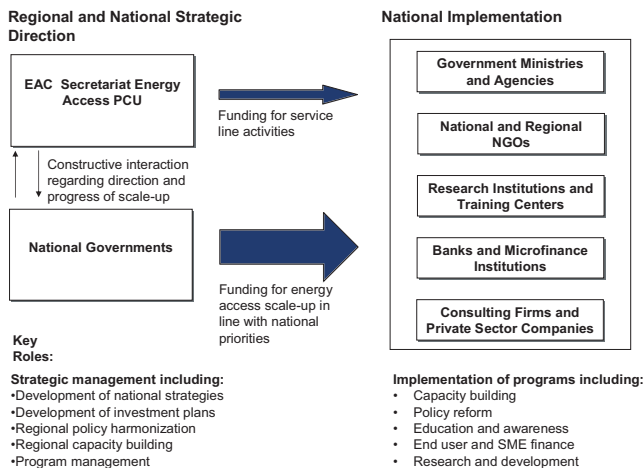
5.3 IMPLEMENTATION FRAMEWORK

The EAC Secretariat will work closely with national policymakers to push the national strategies necessary to facilitate an energy

access scale up. While most of the funding for implementation will come from national investment programs, the EAC Secretariat

will invest in targeted catalytic activities. Implementation of market interventions will be carried out by national institutions.

FIGURE 5.2 OVERVIEW OF REGIONAL IMPLEMENTATION FRAMEWORK

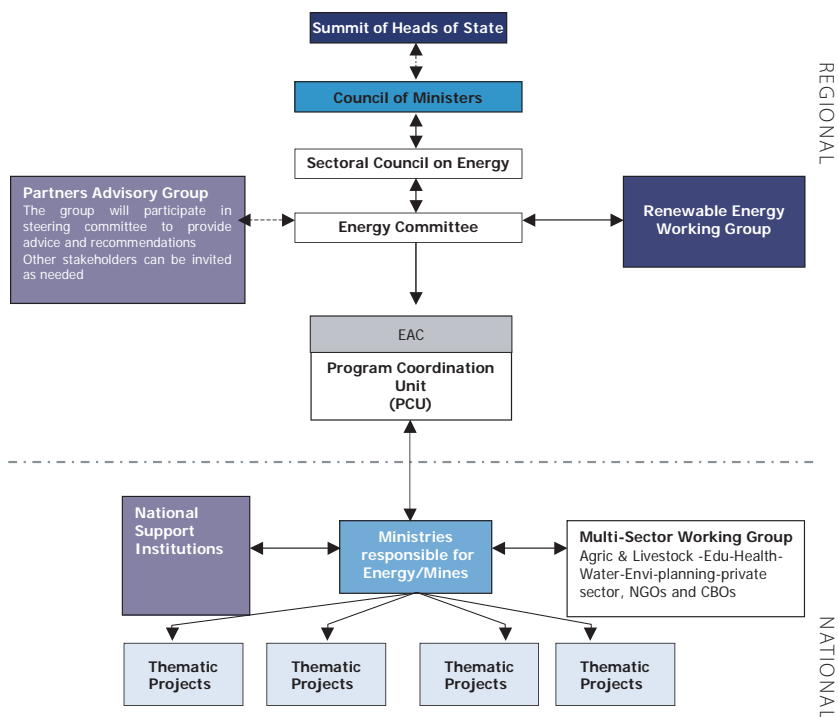


The coordination of regional and national activities will take place through a Program Coordination Unit (PCU) composed of technical staff reporting to a desk officer within

the EAC Secretariat. At the Regional level, the PCU will have clear linkages to the EAC Energy Committee through the Renewable Energy Working Group. At the national level, the PCU will link

with the ministries responsible for energy and multi-sectoral working groups. (Figures 5.2 and 5.3).

FIGURE 5.3 COORDINATION BETWEEN REGIONAL AND NATIONAL ENTITIES IN ENERGY ACCESS STRATEGY IMPLEMENTATION



5.3.1 CAPABILITIES AT THE NATIONAL LEVEL

The EAC region hosts a rich community of institutional capabilities that have the capacity to implement the interventions needed to scale-up energy access. These include:

- national support institutions such as government ministries and agencies, including newly formed rural energy agencies and electricity regulatory boards, as well as cross-sectoral ministries;
- cross-sectoral working groups;
- national and regional NGOs;
- research institutions and training centres;
- banks and microfinance institutions; and
- consulting firms and private industry.

While many institutions will undertake activities focused within their own country, some institutions will be given a mandate by the EAC Secretariat to become Regional Centres of Excellence. These select institutions will conduct activities to be leveraged by the region as a whole. In some cases, institutions within the region may not have the capacity necessary to complete the needed study or program. In these cases, entities

from outside the region may be brought in as partners to complete key activities.

5.3.2 CAPABILITIES AT THE REGIONAL LEVEL

The EAC Secretariat will immediately build capacity to complete the tasks required by the energy access scale up. Playing this catalytic role will require the EAC Secretariat to build the following capabilities:

- strategic planning and program development,
- fund mobilization,
- programme management, including:
 1. [budgeting](#)
 2. [knowledge sharing](#)
 3. [training](#)
 4. [collection and analysis of management information](#)
 5. [resource allocation adjustments](#)
 6. [communication of results to stakeholders, and](#)
- monitoring and evaluation.

5.3.3 PREPARATORY ACTIVITIES AT THE REGIONAL LEVEL

The first steps are to develop the institutional capacity at the regional





level to implement the scale-up program. This includes building key institutional capacities at the Secretariat level and supporting key institutions within the region that will be responsible for implementing many of the interventions.

Key outcomes from the preparatory phase include:

- development of national strategies, action plans, and investment programs;
- fund mobilization for national investment programs;
- completion of the surveys required to establish baselines for each of the targets;
- launching and management of the catalytic fund;
- development of monitoring mechanisms for all segments of the EAC scale up; and
- completion of memoranda of understanding (MOUs) with regional centres of excellence and other key stakeholders.

This phase will start immediately and is estimated to last for two years and cost \$3.7 million (Figure 5.5). The preparatory activities will be funded through EAC member states and external partners.

FIGURE 5.4 PREPARATORY ACTIVITIES AT THE REGIONAL LEVEL (2-YEAR PLAN)

	Service Line	Preparatory Activities *	Expected Cost	Notes
	1. Policy Harmonization	<ul style="list-style-type: none"> Establishment of cross sectoral working groups to define national strategies Study of regional budgetary frameworks and opportunities Institutional support of key stakeholders including (energy committee) to provide support for the formulation of MDG based policies and investment programmes 	<ul style="list-style-type: none"> 100 K 100 K 100 K 	<ul style="list-style-type: none"> 1.1 1.2 1.3
	2. Capacity Building	<ul style="list-style-type: none"> Establishment of PCU in the EAC Secretariat including organizational structure, physical plant and hiring of key staff Completion of MOUs with regional centers of excellence Setting up of pilot regional knowledge information system Formulate/implement a regional capacity building action plan 	<ul style="list-style-type: none"> 1600 K 50 K 100 K 100 K 	<ul style="list-style-type: none"> 2.1 2.2 2.3 2.4
	3. Formulation of Investment Programs	<ul style="list-style-type: none"> Establishment of national investment program working groups including national treasuries and regional banks Mobilisation of potential partners and donors to finance implementation of Regional Action Plan. 	<ul style="list-style-type: none"> 200 K 250 K 	<ul style="list-style-type: none"> 3.1 3.2
	4. Strategic Coordination / Programme Management	<ul style="list-style-type: none"> Study on baselines, targets and indicators for each of the four targets Study to refine service line portfolio Development of RFPs for each of the service line funded proposed activities Complementary studies as needed to detail feasibility of support services 	<ul style="list-style-type: none"> 500 K 100 K 200 K 300 K <hr/> <ul style="list-style-type: none"> 3700 K 	<ul style="list-style-type: none"> 4.1 4.2 4.3 4.4





*Further explanation and funding rationale for each activity are provided in Appendix E.1. The notes are indexed according to the number in the "Notes" column above.

In order to support the national investment programs, the EAC Secretariat will fund ongoing activities across the four service lines. These interventions directly target the constraints faced by the five existing

business models and nine experimental business models identified in this strategy. A detailed investment preliminary program with sample activities over the first four years is presented in Appendix D. High-

priority activities from the preliminary program are summarized in Figure 5.6. It is expected that equal funding will be needed during the second four years, allowing for an eight-year estimate of cost.

FIGURE 5.5 ONGOING ACTIVITIES AT THE REGIONAL LEVEL: HIGH PRIORITY ITEMS (4-YEAR PLAN)

Service Line	Ongoing Activities*	Expected Cost	Notes
 1. Policy Harmonization	<ul style="list-style-type: none"> Policy reforms to include rural ICS programs in budgets (Target 1) 	• 300 K	1.1
	<ul style="list-style-type: none"> Regional standardization of LPG and ICS specifications (Target 1) 	• 300 K	1.2
	<ul style="list-style-type: none"> Pro-poor policy agenda for urban and rural distribution utilities including tariff and taxation review and service mandates (Targets 2, 3, 4) 	• 600 K	1.3
 2. Capacity Building	<ul style="list-style-type: none"> Performance contracts to scale up rural stove artisan programs (Target 1) 	• 2,500 K	2.1
	<ul style="list-style-type: none"> District-level capacity building in biomass management and energy access provision (Targets 1, 3, 4) 	• 460 K	2.2
	<ul style="list-style-type: none"> Capacity building with utilities on how to best engage informal settlements (Target 2) 	• 300 K	2.3
 3. Formulation of Investment Programs	<ul style="list-style-type: none"> Formulation of working capital funds for ICS distributors (Target 1) 	• 360 K	3.1
	<ul style="list-style-type: none"> Formulation of a financing mechanism for upfront cost of grid connections (Target 2) 	• 360 K	3.2
	<ul style="list-style-type: none"> Formulation of direct budgetary support for social services energy budgets (Target 3) 	• 300 K	3.3
	<ul style="list-style-type: none"> Formulation (and reorientation) of off-grid rural energy funds (Target 4) 	• 480 K	3.4
 4. Strategic Coordination / Programme Management	<ul style="list-style-type: none"> Data collection and analysis regarding target baselines and progress 	• 600 K	4.1
	<ul style="list-style-type: none"> Tracking of key population segments and business models as they scale up 	• 1,700 K	4.2
	<ul style="list-style-type: none"> Program management 	• 600 K	4.3
	<ul style="list-style-type: none"> Impact monitoring and evaluation 	• 200 K	4.4
		Total High Priority:	9,100 K
		Total over 8 years:	48,000 K

*Further explanation and funding rationale for each activity are provided in Appendix E.2. The notes are indexed according to the number in the "Notes" column above.

Service line activities are expected to start within the first year, last for eight years, and disburse \$48 million in eight years to achieve key results primarily through national implementing institutions. The service lines will be resourced through the EAC member states and external partners. The result of the ongoing service line activities will be to enhance investment at the national level in key interventions to promote energy access scale up. The key national-level interventions are described in chapter 6.

5.3.4 FUNDING OVERVIEW OF REGIONAL IMPLEMENTATION FRAMEWORK

This chapter described a range of support services that the EAC Region will provide to Member States in support of National Initiatives that will directly implement the scale up. These included a regional preparatory phase (including launch of the Program Coordination Unit) and Regional Ongoing Activities grouped into four Service Lines. The Regional Preparatory phase is estimated

to require \$3.7 million over two years, and the Regional Ongoing Activities (including the Regional Seed Fund) are estimated to require \$48 million over eight years (starting in year 2). Thus the total regional initiative is expected to require \$52 million over nine years. This funding will efficiently support and catalyze National Initiatives, which will also require funding. The National Initiatives, and their funding requirements, are detailed in chapter 6.

6 THE INVESTMENT PROGRAM FOR THE STRATEGY

The EAC Secretariat has developed a credible plan to meet the energy access targets. This plan builds on business model constraints to scale-up identified in chapter 3 as well as a number of promising solutions to energy access challenges presented in Appendix F. A strategic framework is used to prioritize and stage actionable interventions.

6.1 STRATEGIC FRAMEWORK

6.1.1 SCALING UP THROUGH INCREMENTAL CHANGE

While there are many promising approaches to choose from, it is not clear which ones can achieve the manifold scale up needed to meet the targets. Nor is it clear which ones will achieve the greatest possible result from the limited resources of national budgets and donor partners.

In the face of this uncertainty, the EAC must adopt a risk-adjusted approach to business-model scale up. In this approach, promising business models are targeted based on the best available information. Improvements are made to the enabling environment to support these businesses, mitigating risks to growth and investment. Investments in these approaches are

made at a level consistent with their capacity to succeed given the current risks. As the businesses grow, the cycle repeats, mitigating new risks and enabling greater investment. The improved environment is expected to produce step-changes in the scale of energy access provision rather than the constant growth rates that characterize the 'business as usual' scenario.

To support this business-model-centred approach, the strategic framework must answer two questions:

1. What entities and business models will be most effective in meeting the energy service targets?
2. What programs are needed to mitigate risks and overcome past obstacles?

6.1.2 WHICH BUSINESS MODELS WILL BE MOST EFFECTIVE?

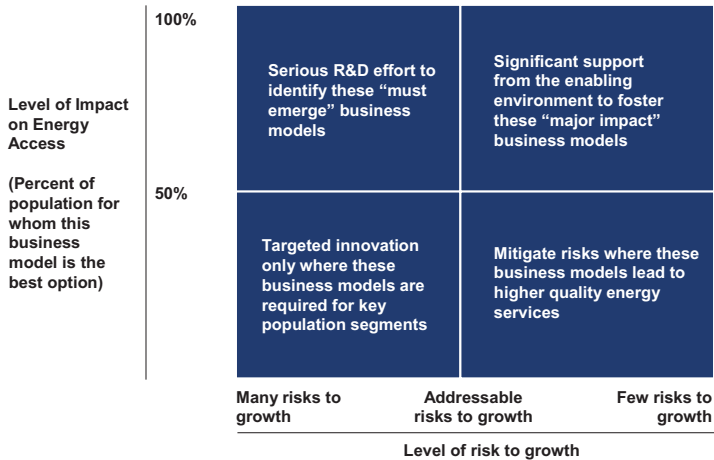
Based on the analysis of constraints to scale up of observed business models for each target in chapter 3, the Strategy has prioritized the scale up of five key existing business models and innovation in approximately nine emerging business models. Of the existing five existing business models, three serve major populations. Of the nine emerging business models, at least two must emerge to have high impact if the EAC is to meet the targets. This assessment is summarized in Table 6.1.

To arrive at this portfolio, a matrix was used to identify the relative impact of potential business models against relative risk to scale up (Figure 6.1).

TABLE 6.1 POTENTIAL BUSINESS MODELS FOR INCREASING ENERGY ACCESS

	Business Model	Strategic Importance
Scale-up	Improved cook stove commercial sales	Major impact
	Local artisan ICS construction	Major impact
	LPG suppliers	
	Distribution utility	Major impact
Innovation	Rural electrification agency (grid)	
	NGO models for ICS dissemination	
	Urban slum electrification intermediaries	Major impact--Must emerge category
	Distribution utility slum outreach	
	Municipal or Cooperative based grid extension	
	Community or SME-driven micro hydro	
	Community driven minigrids	Major impact--Must emerge category
	Ministry-driven social service electrification	
SME driven off grid		
Energy promoter-driven off grid systems		

FIGURE 6.1 BUSINESS MODEL PRIORITIZATION MATRIX



In the analysis of the constraints to scale up in chapter 3, key population segments were assessed based on their energy needs and available resources. All known potential business models were tested for viability in each key population segment. Many potential business models and technologies were excluded based on this test, resulting in a preliminary weighted portfolio of potential business models. For many populations, new business models will need to be developed.

For more established business models, the action plan can move directly to interventions that will enable and sustain their growth (right side in Figure 6.1). For experimental business models with little track record, research and development is needed to establish their viability (left side). These may be business models that have been implemented in other regions, but not in the EAC, or business models that have inherent challenges that must be

addressed prior to investment. In areas where R&D is needed, there may be many potential business models in the strategy's portfolio. As clear winners emerge, investment in R&D for the others will become less necessary.

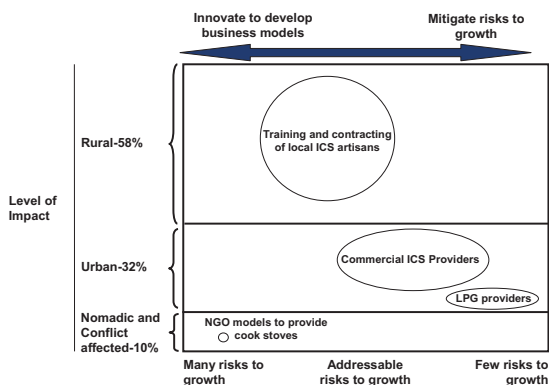
The strategy depends on the major-impact business models that serve large population groups (upper right). Where innovation is needed for major population segments (upper left), business models must emerge or the strategy will be threatened. Targeted investment should also be made in interventions that have relatively low impact on the population. This is the case with high-risk business models that are the only option for small but MDG-relevant populations (lower left). This is also the case with lower-risk business models that can provide higher-quality energy services but only to select populations positioned to take advantage of them (lower right).

For Target 1, commercial ICS distribution was ruled out for the rural areas because people in these areas typically will find the stove costly and they generally prefer to have larger stationary clay stoves. Stationary clay stoves were ruled out for nomadic populations and communities living in refugee or internally displaced camps because these populations generally will not invest in stationary technologies. Moreover, these populations are difficult to reach by commercial entities. The resultant weighted portfolio of business models for Target 1 include:

- commercial ICS for urban populations,
- training and contracting of local artisans for rural populations, and
- NGO-intermediated models for nomadic and conflict-affected people left out from the other models.

The relative impact and level of development of these models are illustrated in Figure 6.2.

FIGURE 6.2 BUSINESS MODEL PRIORITIZATION MATRIX FOR TARGET 1

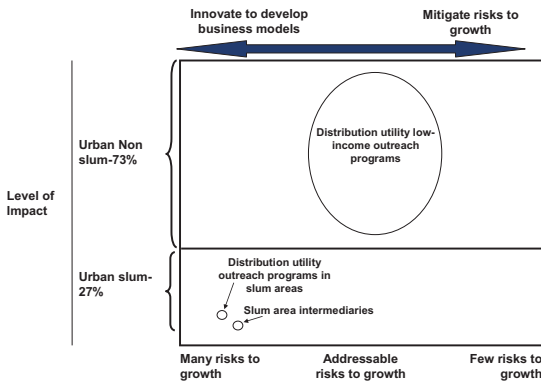


For Target 2, distribution utilities have not scaled up electricity access, but are still considered the best option compared to stand-alone generation alternatives. For urban poor but non-slum populations, significant constraints have prevented the scale up of energy

access, thus utilities are estimated to have major addressable risks to growth. For populations living in urban slum areas, traditional practices are even less useful and innovation is needed to meet these needs. Thus the resultant portfolio includes (Figure 6.3):

- mitigation of financial and reliability risks for distribution utilities in urban-non slum areas, and
- innovation in new practices for distribution utilities in slum areas.

FIGURE 6.3 BUSINESS MODEL PRIORITIZATION MATRIX FOR TARGET 2



For Targets 3 and 4, grid extension and micro hydro were ruled out for 80 to 85 percent of the population. In these communities, the level of commercial activity is insufficient to support a sustainable grid extension within the MDG timeframe. For this majority, new approaches are needed to develop viable business models for off-grid generation. These approaches for provision of off-grid energy systems will foster exactly the productive

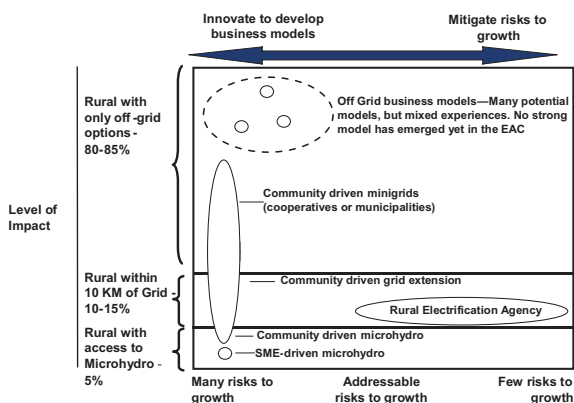
activities needed to enable the step up to grid extension in the following timeframe. The resultant weighted portfolio includes (Figure 6.4):

- mitigation of risks for rural electrification agency based grid extension,
- innovation in SME-driven and community-driven micro hydro,
- innovation in community-driven models (cooperatives and municipality

driven approaches). This would also include rural electrification agency models that work with the community-based groups, expanding the impact of the rural electrification agency model; and

- innovation in rural off-grid approaches including ministry-driven social service electrification. These would include models that use technologies such as multi-functional platforms.

FIGURE 6.4 BUSINESS MODEL PRIORITIZATION MATRIX FOR TARGETS 3 AND 4



6.1.3 MITIGATING RISKS AND OVERCOMING PAST OBSTACLES

Once the portfolio of business models has been identified, the core point of leverage national strategies have is to implement and manage a set of programs to enable them. The purpose of the nine business models that require innovation will be to facilitate the emergence of high-potential approaches. For the five existing

business models, the purpose will be to mitigate risks to growth. For both sets, the programs can include:

- policy and regulatory reform,
- institutional capacity building,
- beneficiary education and awareness programs,
- financing programs, and
- innovation and technology development programs.

Chapter 3 discussed the constraints facing each business model. Appendix G maps these constraints to programs that can be implemented to mitigate the constraints. As with all programs, these programs should be implemented on a results-oriented basis, where funding for initiatives is gradually increased based on demonstrated results achieved. A sample program is demonstrated in Table 6.2.

TABLE 6.2 SAMPLE RISK MITIGATION PLAN

Business Model	Goal	Constraints Identified	Programs Needed
Improved cook stove commercial sales	Improve environment for scale up	Insufficient working capital	Financing: Working capital program targeting ICS SMEs
		Inadequate end user awareness of ICS benefits	End-user awareness programs in ICS benefits
		Indoor air quality health risks	End user awareness programs in kitchen ventilation (combine with previous)
			Study of kitchen ventilation options
		Environmental sustainability	Sustainable charcoal initiatives

6.2 NATIONAL INVESTMENT PROGRAMS

National investment programs shall be developed to provide the needed investment to scale up the fourteen identified high-impact, low-cost, scaleable business models that together can meet the targets and address the needs of all major population segments. The total capital expenditure expected to accompany the scale up of the energy access business models is approximately \$2.7 billion over the eight years. While a significant portion of this investment will come from the end users and businesses themselves, substantial soft financing and targeted subsidies will be needed to unlock their capacity to invest. Accompanying this investment, significant funding for supporting programs will be required to ensure that the investments result in sustainable changes in energy access service provision. Appendix H

provides a summary of the total funds required by the EAC Energy Access Strategy and their uses for capital expenditure, supporting programs, and loan guarantees.

This investment will be used in two ways. First, for each of the identified business models, it will fund programs (soft costs) targeted at mitigating the constraints in the enabling environment identified in chapter 3. These include building institutional capacity, educating and building awareness in end users, improving the regulatory framework, and providing the needed research and development in innovative approaches and technologies. Each of these programs will accomplish concrete goals that can demonstrate improvement in the enabling environment. Loan guarantees used to secure investment

in financing programs are an additional form of soft costs.

Second, for investment in equipment (hard costs), concessionary loan and grant programs will be made available on a massive scale, such that all of the beneficiaries as well as the businesses and agencies identified in the targets will have access to a source of finance that will help them to grow. The loan programs will vary in their terms and conditions based on the borrower. In some cases, as in electrification for social services, the energy service will be subsidized. The specific terms of each loan and grant program will be developed in the detailed program formulation.

This section provides an initial guideline for the national investment programs that will be developed

on a country-by-country basis over the upcoming year. Specifically, it provides a description of the needed activities for each target, categorized by business model. It also provides a high-level estimate of the cost of these activities. These activities fall into three categories: programmatic activities, scaling up loan funds, and preparatory activities.

6.2.1 SOFT FUNDING FOR PROGRAMS TO TRANSFORM THE ENABLING ENVIRONMENT

To create an enabling environment for investment, key programs in the areas of institutional capacity building, education and awareness, policy reform, and finance must be carried out at the national level. The EAC Secretariat expects to be able to complete national investment programs detailing the specific programs to be implemented and to mobilize funds for their first phase over the course of two years. The goal of the national programs will be to directly target the constraints faced by the high-potential business models to accomplish the initiatives.

The EAC Secretariat expects the market interventions to be implemented over the following six years to achieve key transformations of the business and policy environment. In principle, end users will not pay for soft costs; rather these will be funded through public funding from different sources (see section 6.2.7). These interventions will be funded through EAC member states and external partners such as UNDP, the Global Village Energy Partnership, the European Union, SIDA, and GTZ.

6.2.2 SCALING-UP LOAN FUNDS FOR INVESTMENT IN HARD COSTS OF ENERGY SERVICES

The EAC strategic focus on business models encourages investment by creating financeable opportunities. These opportunities include consumer loan funds that beneficiaries can use to pay for long-term investments in household wiring or kitchen improvement, micro and SME finance for businesses to invest in machinery, working capital for small ICS manufacturers to grow their operations, and project finance for utilities and project developers to expand generation and distribution infrastructures. Credit enhancement will be needed based on the relative risks associated with each finance category. All types of credit enhancement and financing costs are grouped here under the category of 'loan guarantees'. In principle, end users will pay for capital expenditure; however, targeted subsidies will be available.

National investment programs partnering with development banks and financing institutions will be developed to efficiently channel this investment. The EAC expects member states to be able to launch national investment programs within two years and EAC members will disburse the total financing needed over six years to beneficiaries and energy services businesses. These loan funds will be developed in partnership with development banks and financing institutions. Partners may include the African Development Bank, the East African Development Bank, the World Bank, and the IFC.

6.2.3 PRELIMINARY INVESTMENT FRAMEWORK FOR TARGETS 1-4

Chapter 5 gave an overview of Regional Implementation Activities in the Strategy, describing a \$52 million regional effort to support National Initiatives. This section discusses National Initiatives that will directly implement the scale up and help the region reach 100 percent of the targets by 2015. In addition, a National Preparatory phase, estimated to cost \$1.8 million, is envisioned as well. Thus the total funds required fall into four categories:

- Regional Preparatory: funds to start up activities at the regional level in the first two years;
- Regional Ongoing: funds to enable the four regional service line activities after the first year and through the following eight years;
- National Preparatory: funds to start up activities at the national level in the first two years (also organized along the four regional service lines); and
- National Ongoing: funds for supporting programs, loan guarantees, and capital subsidies.

A significant portion of the cost of conversion to new energy choices is expected to be borne by end users, who purchase the systems as part of a sustainable delivery mechanism. This end user contribution is a fifth source of funds:

- End User Purchases: payments by end users for all or part of their energy equipment (cook stove, generator or grid connection).

The total funds included in the Strategy are summarized in the following table:

Category of Activities	\$ Thousands	Duration
Regional Preparatory	3,700	Over 2 years
Regional Ongoing	48,048	Over 8 years
National Preparatory	1,860	Over 2 years
National Ongoing	1,555,560	Over 8 years
End User Purchase	1,609,395	Over 9 years
Total	3,218,563	Over 9 years

This section focuses on the National Initiatives and End User Purchase line items. A detailed walk-through of the comprehensive funding program is presented in Appendix I.

To scale up sustainable energy access in the EAC, about \$2.7 billion in capital expenditure must be deployed over eight years. If these services are provided through the high-impact, low-cost business models identified in the previous section, over 60 percent of these resources can come from beneficiary investment in their own energy services. However, many end-user investments, as well as accompanying business investments, will need to be financed. It is estimated that about \$291 million

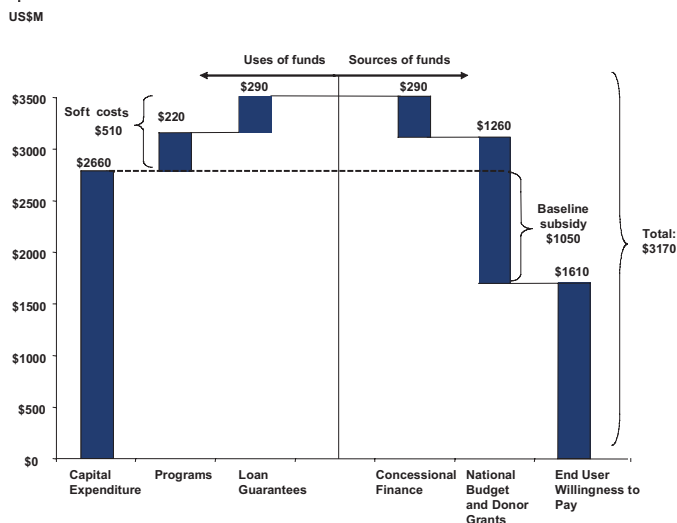
in loan guarantees will be needed to secure \$1.6 billion total funds lent over the eight years, and approximately \$216 million in programmatic support will be needed to achieve an enabling environment suitable to growth (Appendix H.)

These figures are based on a composite of supporting programs focusing on the fourteen high-impact, low-cost scaleable business models discussed above; together, they can meet the targets for 2015 and address the needs of all major population segments within the EAC.

Figure 6.5 represents a proposed balance sheet for the overall program. On the left side, the uses of funds are represented. The uses of funds consist

of capital expenditure and soft costs, with soft costs broken down into the cost of programs (such as capacity building, education and awareness, policy reforms, and R&D) and the cost of soft finance (loan guarantees) needed to secure the loan funds that are used to finance almost the full amount of the capital expenditure. The sources of funds will include concessional finance providers (including development banks and social investors), donor grants and national budgets, and end users who are willing to pay to improve their quality of life. End user willingness to pay is established based on current energy expenditure demonstrated by households in the EAC.

FIGURE 6.5 OVERALL INVESTMENT PLAN



Note: The funds represented here are on-time funding levels made over the nine-year period. They typically do not include operating costs which are funded as part of sustainable business models. A detailed methodology can be found in Appendix J.

6.2.4 TARGET 1

To meet the targets for access to modern cooking services, the EAC estimates that it will need to catalyze a total capital expenditure of \$262 million on clean, safe cooking technologies. In order to unlock the ability of end users and businesses to make these investments, approximately \$20 million in programmatic interventions and \$29 million in loan guarantees will be required. The programmatic funding will be spent on beneficiary education and awareness programs (\$14.3 million), institutional capacity

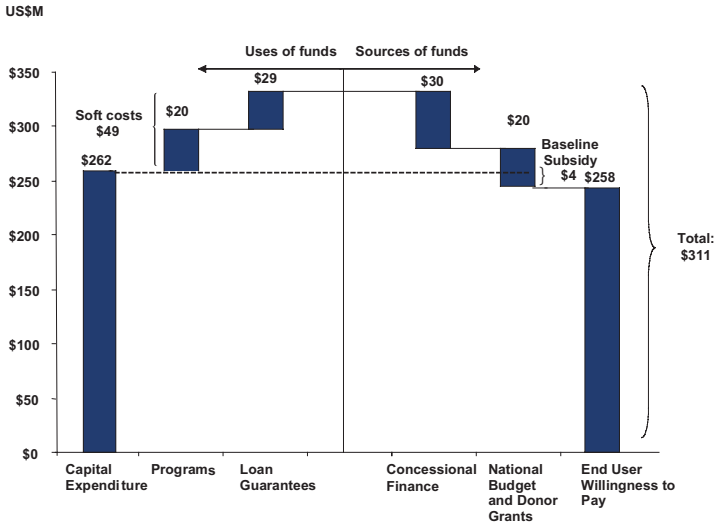
building programs (\$5.1 million), and policy standardization (\$1 million). The concessional loans will be used to fund ICS SME working capital, LPG start-up loans, and kitchen renovation loans. Subsidies are expected to be needed for exceptional populations, including nomadic and conflict-affected peoples (\$4 million).

Overall, the ratio of soft costs (programs and loan guarantees) to hard costs (capital expenditure) for Target 1 is 19 percent. This is a composite of the rural programs, which have a high soft cost

ratio due to the difficulty of creating lasting behavioural change in remote rural areas, and the urban programs, which are based on commercial business models that can grow with less hands-on support.

The total soft and hard costs needed to achieve this target are estimated at approximately \$6 per individual. The relative scale of these investments is represented in Figure 6.6, and further detail is given in Appendix K.

FIGURE 6.6 INVESTMENT PLAN FOR TARGET 1: MODERN COOKING SERVICES



6.2.5 TARGET 2

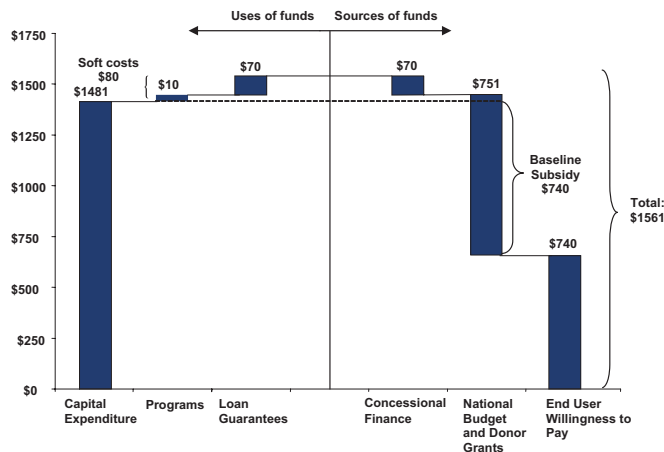
Over the eight years until 2015, the EAC Energy Access Strategy will use \$10 million in programmatic funding and \$70 million in concessional loan guarantees to catalyze \$1.5 billion in beneficiary investment in electrification of urban/peri-urban households and informal settlements. The programmatic funding will be spent on beneficiary education and awareness programs (\$0.2 million),

institutional capacity building programs (\$8.4 million), and policy reforms (\$1.6 million). The concessional loans will be used to fund new grid connections, house wiring, ready boards (prewired platforms used to reduce household wiring costs), and prepayment meters.

Overall, the ratio of soft costs (programs and loan guarantees) to hard costs (capital expenditure) for Target 2 is 5 percent. This ratio is low compared

to the other targets, because these interventions target well-established agencies (urban distribution utilities) and the business model for grid connected electricity provision is well understood. The total soft and hard costs needed to achieve this target are estimated at approximately \$42 per individual. The relative scale of these investments is represented Figure 6.7, and further detail is given in Appendix K.

FIGURE 6.7 INVESTMENT PLAN FOR TARGET 2: URBAN AND PERI-URBAN ELECTRIFICATION



6.2.6 TARGETS 3 AND 4

Over the eight years until 2015, the EAC Energy Access Strategy will use \$186 million in programmatic funding and \$192 million in concessional loan guarantees to catalyze \$919 million in investment in social service electrification and motive power and heating technologies. The programmatic funding will be spent on beneficiary education and awareness programs (\$58 million), institutional capacity building programs (\$19 million), policy reforms (\$3 million), research and development (\$24 million), and targeted operating subsidies for social services. The concessional loans will be used to fund

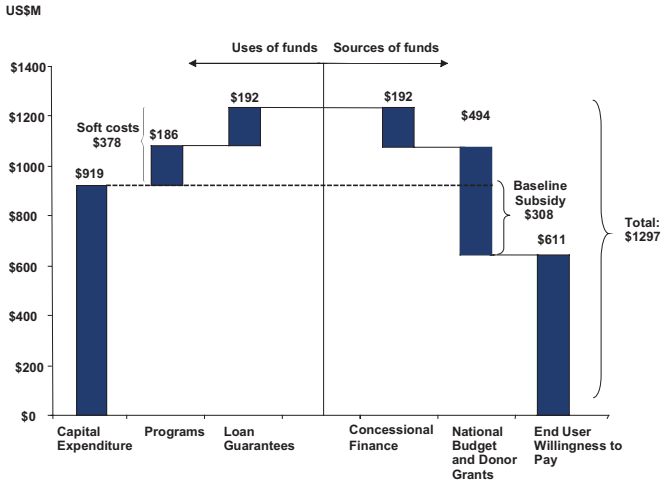
grid extension programs, investments in productive uses equipment, micro hydro installations, and rural off-grid solar, wind, and diesel programs. A \$308 million subsidy will fully support capital investment in hardware for social services and will cover 40 percent of the capital costs of community electrification through grid extension or off-grid systems.

Overall, the ratio of soft costs (programs and loan guarantees) to hard costs (capital expenditure) for Targets 3 and 4 is 52 percent. This ratio is a composite of approaches including grid extension, micro hydro, and off-grid installations that relate directly

to the business models identified in the previous section. Grid extension and micro hydro have relatively low soft-cost ratios, because of their high capital cost per community. Programs that require mobilization at the community level have higher associated soft costs, as well as lower associated hard costs due to the economies of off-grid power systems.

The total soft and hard costs needed to achieve this target are estimated at approximately \$14 per individual. The relative scale of these investments is represented in Figure 6.8, and further detail is given in Appendix K.

FIGURE 6.8 INVESTMENT PLAN FOR TARGETS 3 AND 4: SOCIAL SERVICE ELECTRIFICATION AND MOTIVE POWER AND HEATING FOR COMMUNITIES



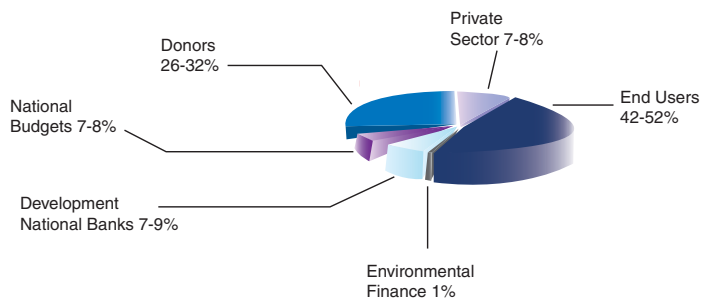
6.2.7 SOURCES OF FINANCE

Investment is expected to come from a consortium of key players, including national governments, donors, development banks, environmental investors, the HILCS businesses themselves, and end users switching their energy expenditure to improved services (Figure 6.9). A result of the coordinated regional approach is that each of these investors will benefit from the complementary cofinancing effects of the other investors. Public funds—including donor finance, development

finance, and earmarked national budget funding—will be allocated to cover the needed soft costs of scale up including programs and loan guarantees. End users and the private sector will make most of the investment in capital expenditure, with the help of extensive financing programs. The balance of capital expenditure will be provided by targeted subsidies. The emphasis on building capacity in institutions to provide sustainable outreach and finance to end users will enable the strategy to leverage a high level of end

user participation in funding capital costs. While some proforma subsidy levels have been included here, final decisions on the level of subsidy to be deployed should be decided over the course of the national investment programs. Additionally, flexibility remains to develop the specific financial mechanisms to be used in the roll out. This proforma investment program can provide a clear guideline for all stakeholders in the establishment of tailored national investment programs.

FIGURE 6.9 POTENTIAL SOURCES OF INVESTMENT







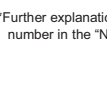
6.2.8 PREPARATORY ACTIVITIES AT THE NATIONAL LEVEL

Several immediate activities are needed at the national level to prepare for the scale-up process. These include

creating national energy access strategies, convening multi-sectoral groups to drive the policy reform process, and developing national investment programs along the lines

described in this chapter. These proposed activities are described in Figure 6.10.

FIGURE 6.10 PREPARATORY ACTIVITIES AT THE NATIONAL LEVEL (2 YEAR PLAN)

	Service Line	Preparatory Activities*	Expected Cost	Notes
	1. Policy Harmonization	<ul style="list-style-type: none"> • Support to EAC Partner States in formulating energy access policies and investment strategies to meet the MDGs: <ul style="list-style-type: none"> – access to energy is recognised as a priority in the PRS, and in the budget formulation process – to undertake MDG based needs assessments in each country. 	• 900 K	1.1
				1.2
				1.3
	2. Capacity Building	<ul style="list-style-type: none"> • Key activities focusing on institutional & technical support for capacity building of Multisectoral Groups To foster cross sector consultations leading to mainstreaming energy access issues & energy-poverty nexus in national policies (PRSP) 	• 300 K	2
	3. Formulation of Investment Programs	<ul style="list-style-type: none"> • Assist in formulating investment programmes, based on MDG-based needs assessment, including identification of sustainable business models and baseline for each target 	• 210 K	3
	4. Strategic Coordination / Programme Management	<ul style="list-style-type: none"> • Complementary studies as needed to detail feasibility of support services 	• 300 K	4
			• 1710 K	

*Further explanation and funding rationale for each activity are provided in Appendix E.3. The notes are indexed according to the number in the "Notes" column above.

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APPENDICES

A. Energy References in EAC PRSPs	76
B. EAC Energy Access Targets Quantified	78
C. Lessons Learned from Previous Programmes and Pilot Projects	80
D. Detailed Investment Programme to Achieve EAC Energy Access Strategy	83
E. Notes to Regional Preparatory, Regional Ongoing, and National Preparatory Budgets	86
F. Promising Approaches	88
G. Addressing Constraints to Achieving the Energy Access Targets	91
H. Summary of Funds Required by the EAC Energy Access Strategy	96
I. Funds Required by the EAC Energy Access Strategy, by Activity Category	97
J. Methodology Used to Develop National Investment Programs	100
K. Detailed Regional Service Line Budget	112
L. EAC Energy Access Strategy Workshop Final Report	116

APPENDIX A: ENERGY REFERENCES IN EAC PRSPS

Energy References in the Kenya PRSP (Kenya 2004)

Targets

- 40% electrification of rural population by 2020
- Increase rural access by 1% per annum from 3.8% to 8% by 2006
- 10% increase in K CJ stove adoption, 5% increase in maendeleo stove adoption, by 2006
- Installed capacity of solar energy increased by 10% per year
- Increase LPG consumption from 32,000 m/tons to 50,000 m/tons by 2006

Operating Principles

- Increase availability, reliability, and affordability of energy
- Expand private sector participation in generation and distribution of electricity
- Harness traditionally under-utilized solar energy in various applications, including alternative grid extension for electricity provision, telecommunications repeater facilities, water heating, crops drying, refrigeration, and water pumping
- Support the popularization of wind power
- Favour a policy promoting sustainable wood resource management and

efficient harvesting and end-use technologies

Initiatives

- Strengthen regulatory capacity of existing agencies
- Reduce government's direct equity in Kenya Power and Lighting Company from 51% to 39%
- Restructure Kenya Electricity Generating Company (KenGen) to enable, and private public partnerships to mobilize, investments for enhancing generation capacity
- In partnership with the private sector and NGOs, develop a framework to provide incentives for solar energy users
- Streamline rural electrification by creating the Rural Electrification Authority (REA)
- Upgrade slums and low-cost housing to include provision of electricity distribution points

Energy References in the Uganda PRSP (IMF 2005)

Targets

- 10% coverage of households by the rural electrification fund by 2012 through grid extension, independent power producers, and solar or renewable energy

- Participation of 40% of the biggest fifty electricity consumers in energy audits to reduce load shedding

Operating Principles

- Establish commercially viable tariffs, with subsidies to domestic consumers being unjustifiably inequitable
- Enable private sector participation in the energy sector, including rural electrification, and foster private sector led investments
- Subsidize investments in infrastructure for rural electrification rather than financing infrastructure outright
- Base subsidies on financial and economic soundness of a project, sound environmental impact statements, positive social returns, and equitable electricity distribution

Initiatives

- Increase generating capacity through private investors
- Implement the rural electrification strategy
- Government to monitor unit costs and socio-economic returns to rural electrification
- Promote improved stoves and energy efficiency
- Improve managerial efficiency and negotiate favourable terms for export of electricity

- Implement an energy awareness campaign

Energy References in the Tanzania PRSP (Tanzania 2000)

Targets

- Reduce the proportion of the population depending on biomass energy for cooking from 90% in 2003 to 80% in 2010
- Increase contribution of solar, wind, biomass, and coal for electricity generation from 0.5% in 2003 to 3% by June 2010
- Liberalize the power sub-sector by 2010
- Negotiate, conclude, and sign at least three Production Sharing Agreements (PSA) by June 2010

Operating Principles

- Ensure the provision of reliable and affordable energy to consumers
- Promote rational and efficient use of power
- Promote indigenous energy sources and diversify energy sources
- Ensure regular and reliable supply of essential utilities including energy, water, and sanitation in urban areas
- Ensure sustainable natural resource use to ensure energy supplies are maintained (forests, water catchments, and charcoal industry)

Initiatives

- Update the power systems master plan, expedite implementation of the power projects, and finalize restructuring of the power sub-sector

- Issue guidelines and regulations to enforce a reduction of energy losses in transportation, transmission, and distribution
- Privatize generation and distribution
- Promote on-shore and offshore petroleum exploration
- Promote coal electricity for generation and thermal applications
- Implement rural energy master plan with focus on extending rural electrification schemes, developing renewable and alternative sources of energy, and developing grid connections to unconnected areas.

APPENDIX B: ENERGY ACCESS TARGETS QUANTIFIED

Appendix B shows EAC energy access targets quantified in millions of people, households, and communities. The figures highlighted in the Vision for the strategy (Section 4.1) are shown shaded. As shown in the 'methodology' row, the figures are based on current census data, UN population growth figures, and average household size of 5 people per household. The 'access objective' target is incremental to current access figures.

	Population Focus	Energy Service	Pop 2004 (HH, Institutions or Communities)
Methodology:			Based on 5 people per household
Target:			
Usage of modern cooking practices by 50% of those who at present use traditional biomass for cooking, including reducing indoor air pollution to safe levels, and increasing the sustainability of biomass-derived fuels production.	Urban poor (M HHs)	LPG, ICS	6.44
	Rural poor (M HHs)	ICS	11.65
	Nomadic and Conflict (M HHs)	ICS	2.14
	Total Target 1		20.22
Access to reliable modern energy services for all urban and peri-urban poor	Urban poor (M HHs)	Electricity	4.73
	Urban slums (M HHs)	Electricity	1.72
	Total Target 2		6.44
Energy for services such as lighting, refrigeration, information and communication technology, and water treatment and supply for all schools, clinics, hospitals and community centres.	Schools	Standard level of service	41,838
	Clinics	Standard level of service	9,550
	Hospitals	Standard level of service	717
	Total Target 3		52,104
Access to mechanical power and heating technologies within the community for all communities for productive uses.	Rural communities (Total Target 4)	Electricity or other form of motive power	22,165

Pop 2004 (M)	Access level 2004 (HH)	Access level 2004 (M)	Access level 2004 (%)	Pop 2015 (HH, Institutions or Communities)	Access Objective 2015 (HH)	Access Objective 2015 (M)	Access Level 2015 (%)
From census data	Based on census data and analysis	Based on 5 people per household	From census data and analysis	Based on census data and UNESA pop growth estimates	As stated in targets	Multiplied by 5 people per household	Divided by total 2015 population
32.22	3.0	15.1	47%	10.04	2.66	13.3	73%
58.23	1.5	7.6	11%	13.79	6.13	30.7	56%
10.68	0.2	1.2	11%	2.34	0.94	4.7	56%
101.12	4.8	23.9	24%	26.17	9.73	48.7	62%
23.63	2.0	10.1	43%	7.35	5.3	26.7	100%
8.59	0.5	2.6	30%	2.69	2.2	10.9	100%
32.22				10.04	7.5	37.6	100%
	1,847.6		4%	48,393	46,545		100%
	401.0		4%	10,724	10,323		100%
	37.5		5%	788	750		100%
				59,905	57,618		100%
	954.5		4%	24,194	23,240		100%

APPENDIX C: LESSONS LEARNED FROM PREVIOUS PROGRAMMES AND PILOT PROJECTS

Target Segment	Key Lessons	Previous Approaches
<p>Rural</p> <ul style="list-style-type: none"> • Approximately 10.1 million rural households using traditional biomass • Approximately 38% of total EAC households 	<ul style="list-style-type: none"> • Success depends on a combination of performance contracting of trainers and enabling artisans to provide services to rural populations as a sustainable business. • Enhancing education and awareness of the benefits of improved cook stoves is necessary for increased adoption of improved cook stoves. • Efforts to ensure quality of the improved cook stoves are needed to ensure long term utilization of the technologies. 	<ul style="list-style-type: none"> • GTZ's NGO-led training of artisans on a pilot basis in Bushenyi and in Rakai, Uganda. Technologies used include stationary, clay improved cook stoves. The business model involves supporting NGOs to train sub-county coordinators who select artisans to train at the parish and village levels.
<p>Urban</p> <ul style="list-style-type: none"> • Approximately 5.4 million urban households using traditional biomass • Approximately 20% of total EAC households 	<ul style="list-style-type: none"> • Program results have demonstrated that awareness creation is vital for increasing sales of improved cook stoves and therefore production. • Emphasis on productive uses is core to the programs and has focused on hotels, food processing, solar drying, and firewood baking ovens. • The benefits of small scale programs can be lost without continued and larger scale implementation especially for education and awareness campaigns to drive demand for improved cook stoves. • Sustainable biomass programs have not been able to overcome the 30-50% price premium for sustainable products to spur widespread demand for sustainable charcoal. 	<ul style="list-style-type: none"> • GTZ has funded commercial activities in a sustainable manner in Kenya. Capacity building has centred on production skills, quality control, marketing, and business skills. Technologies used have included fire wood saving stoves and charcoal improved cook stoves. • TaTEDO implemented a program for the Ministry of Energy and Minerals in Tanzania to disseminate efficient charcoal stoves. The program supported private/public partnerships and focused on increasing public awareness and building production and business skill capacity of entrepreneurs. • ESD-Africa's sustainable charcoal program has sought to sensitise populations to the need for sustainable charcoal sources. The program has first targeted hotels then will focus on the general public and seeks to encourage the installation of more efficient kiln technology.
	<ul style="list-style-type: none"> • Private sector LPG providers have been very reluctant to adopt standards related to equipment, citing safety issues. 	<ul style="list-style-type: none"> • Private sector companies have been improving distribution of LPG.

Target Segment	Key Lessons	Previous Approaches
<p>Pastoral nomads and conflict affected</p> <ul style="list-style-type: none"> • Approximately 4.4 million pastoral nomads and conflict affected households using traditional biomass • Approximately 17% of total EAC households 	<ul style="list-style-type: none"> • For unique segments, customized approaches are necessary. 	<ul style="list-style-type: none"> • The beneficiary target has not been distinctly targeted with known programs.
<p>Urban and peri-urban</p> <ul style="list-style-type: none"> • Approximately 40 million people • Approximately 30% of total EAC population 	<ul style="list-style-type: none"> • National utilities are best positioned to address urban and peri-urban populations but require additional capacity. • Appropriate planning of an energy mix, despite differential costs of generation in good times, helps prevent acute crises due to over-reliance on a single source (as seen with the current drought). 	<ul style="list-style-type: none"> • World Bank and other donor programs in Tanzania will leverage national utilities for urban and peri-urban electrification while leveraging non-utility actors for rural electrification. • UMEME in Uganda is implementing a program to rigorously monitor and reduce system losses to improve the sustainability of distribution operations. • KPLC in Kenya has actively reduced system losses and is beginning to pilot prepayment meters. • Ministries of Energy in all three countries are looking into a broader range of generation capacity through a sensible energy mix (hydro, geothermal, thermal, etc.).
<p>Informal settlements</p> <ul style="list-style-type: none"> • Approximately 10 million people • Approximately 8% of total EAC population 	<ul style="list-style-type: none"> • Ability to pay for grid connections may not be the most significant issue, given the current energy spend of informal settlement populations. • Governance and accessibility to informal settlement populations remains a key issue. • Widespread expansion of grid distribution in informal settlements requires commensurate cross-sectoral programs to manage an influx of new populations, including sanitation and water management programs. 	<ul style="list-style-type: none"> • KPLC has conducted limited electrification of the 'frontier' regions of the informal settlements. • Tanesco has introduced prepayment meters in some locations. • KPLC is beginning to pilot prepayment meters.

Target Segment	Key Lessons	Previous Approaches
<p>Potential grid connections</p> <ul style="list-style-type: none"> • Approximately 3,000-7,000 social services • Approximately 1,000-3,000 villages 	<ul style="list-style-type: none"> • Uganda's program of private concessions to electrify rural areas has not generated sufficient private sector interest and has resulted in switching to a community-based approach. • Adequate program management to rapidly change tactics and modify approaches is necessary for successful implementation. Uganda's program originally emphasized private sector concessions and had difficulty shifting gears as uptake was low 	<ul style="list-style-type: none"> • Energy for Rural Transformation (ERT) program established in Uganda and under development in Tanzania • All three countries' national utilities undertake assessments of areas with high demand and productive use potential to determine areas for prospective grid extension.
<p>Potential micro hydro connections</p> <ul style="list-style-type: none"> • Approximately 3,500-5,000 social services • Approximately 1,500-2,000 villages 	<ul style="list-style-type: none"> • Community mobilization is vital for developing micro enterprise centres and the productive uses which sustain the operations and maintenance of micro hydro sites 	<ul style="list-style-type: none"> • ITDG and other donors have piloted programs to install micro hydro as well as micro enterprise centres.
<p>Other Target 3 and 4</p> <ul style="list-style-type: none"> • Approximately 17,000-19,500 villages 	<ul style="list-style-type: none"> • Government funded programs face budgetary and political pressures which threaten sustainability. • Schemes relying on diesel generators have fallen into disuse due to high cost and accessibility of diesel. 	<ul style="list-style-type: none"> • The Government of Kenya's solar program for schools has provided access to 25-30 schools a year for a four year period. • UNDP's Mwanza pilot programs for microfinance solar schemes have met with success and similar programs are being rolled out more broadly in Tanzania by SIDA.
	<ul style="list-style-type: none"> • Kenya's innovative PV Market Transformation Initiative faced difficulties finding intermediaries to take the financing. • Market demand has not yet enabled pure-play solar and wind turbine companies to emerge successfully. • Previous experiences with bad solar equipment have generated resistance to the technology in some areas, requiring better regulations over equipment quality. 	<ul style="list-style-type: none"> • Kenya's PVMTI program provided financing of solar programs. • The solar and wind turbine businesses of companies like Chloride Exide and Davis & Shirliff are growing.
	<ul style="list-style-type: none"> • While demonstrations have been established, questions about sustainability highlight the need for customisation to local communities and their productive uses. 	<ul style="list-style-type: none"> • Multi-functional platforms have been demonstrated in the EAC by organizations like TaTEDO.

APPENDIX D: DETAILED INVESTMENT PROGRAMME TO ACHIEVE EAC ENERGY ACCESS STRATEGY

PROPOSED ACTIVITIES AND NEEDED INVESTMENTS TO ACHIEVE TARGET 1:

Scale Up Activity	Capital Expenditure	Program Cost	Loan Guarantees (and Total Loan Funds)
Rural households switch to ICS	\$12 Million to build 6 Million \$2 clay cookstoves	\$12.4 M to scale up artisan training pilot \$1.4 M for awareness campaign for rural kitchens \$4.6 M for municipal biomass management programs	
Urban households switch to ICS	\$16 Million to buy 2.7 Million \$6 metal jikos	\$0.5 M for awareness campaign for urban areas \$0.5 M for regional quality standards for ICSs	\$0.5 M in loan guarantees for \$16 M Working capital fund for ICS distributors
Urban households switch to LPG	\$130 Million to buy 1.3 Million \$100 LPG tanks and stoves	\$0.5 for regional standardization of LPG sockets	\$16.3 M in loan guarantees for \$130 M loan fund for LPG setup
Urban households upgrade Kitchen ventilation	\$100 Million to install 2 Million \$50 low cost renovations for Kitchen ventilation	\$0.1 M for R&D in low cost design of Kitchen ventilation	\$12.5 M in loan guarantees for \$100 M Loan fund for Kitchen renovation to increase ventilation
Nomadic and conflict affected peoples adopt ICSs	(\$4 Million to subsidize 1 Million \$4 discount jikos for populations in extreme hardship)	\$0.4 Million for NGO training programs for nomadic areas	
High level estimate of the investment needed	\$262 Million + \$4 M subsidy	\$20.4 Million	\$29.3 M in Loan Guarantees (and \$246 M in Loan Funds)

PROPOSED ACTIVITIES AND NEEDED INVESTMENTS TO ACHIEVE TARGET 2:

Scale Up Activity	Capital Expenditure	Program Cost	Loan Guarantees (and Total Loan Funds)
Distribution utilities connect urban and peri-urban households	<p>\$534 M for grid connections, household wiring, ready boards, and pre-payment meters</p> <p>\$534 M for a proforma 50% subsidy on new grid connections (Similar to SADC)</p>	<p>\$0.8 M for policy reforms to improve the energy mix</p> <p>\$0.8 M for policy reform to mandate 100% coverage of poor households by utilities</p> <p>\$0.8 M for capacity building for the utilities to expand the grid more quickly, and reduce grid connection costs</p> <p>\$0.6 for monitoring and enforcement programs to deal</p>	<p>\$48 M in loan guarantees for \$961 M in loan funds to finance new grid connections, house wiring and ready boards</p> <p>\$2.7 M in loan guarantees for \$107 M in loan funds to finance pre-payment meters</p>
Distribution utilities connect informal settlement households	<p>\$413 M for grid connections, household wiring, ready boards, and pre-payment meters</p> <p>\$413 M for a proforma 50% subsidy on new grid connections</p>	<p>\$7 M for capacity building for utilities to best engage informal settlements</p> <p>\$0.2 M for education and awareness programs for communities</p>	<p>\$18 M in loan guarantees for \$369 M in loan funds to finance new grid connections, house wiring and ready boards</p> <p>\$1.1 M in loan guarantees for \$43 M in loan funds to finance pre-payment meters</p>
High level estimate of the investment needed	\$740 M + \$740 M Subsidy	\$10 M	\$70 M in loan guarantees (and \$1, 481 M in Loan Funds)

PROPOSED ACTIVITIES AND NEEDED INVESTMENTS TO ACHIEVE TARGET 3 AND 4:

Scale Up Activity	Capital Expenditure	Program Cost	Loan Guarantees (and Total Loan Funds)
Grid extensions for populations within proximity (roughly 3,000 villages)	\$307 M for grid extension	\$1.0 M in multi-ministry policy reform programs to better address energy needs of social services in budgets	\$31 M in loan guarantees for \$307 M in loan funds for grid extension finance programs
	\$46 M for productive uses investments	\$6 M for capacity building in cooperative and municipal institutions to drive grid connection \$4.4 M for productive uses programs	\$17 M in loan guarantees for \$46 M in loan funds for productive uses financing
Community driven mini-hydrors (roughly 1,500 villages)	\$162 M for micro-hydro installations	\$ 3 M for development of cooperative or municipal institutions to provide mobilization for and management of micro-hydro initiatives \$4.4 M for productive uses programs	\$16 M in loan guarantees for \$162 M in loan funds for financing micro-hydro installations
	\$22 M for productive uses investments	\$3 M for regional production or procurement of technological inputs, such as turbine parts \$1 M for policy reforms to allow micro-hydro sites to distribute electricity using low cost materials/ designs	\$8 M in loan guarantees for \$22 M in loan funds for productive uses financing
Off Grid systems provided for communities in remote areas	\$62 M subsidy for direct budgetary support for social services energy budgets to install new power systems (or engage in performance contracts which will install systems)	\$0.5 M for demonstration of effective, sustainable performance contracting provision \$1 M for multi-ministry capacity building to deal with the issues of social services running side businesses to finance their energy services \$1 M for regulatory oversight of equipment standards to ensure high quality solar PV systems or wind turbines \$79 M for four years of direct budgetary support for annual energy spend for schools, clinics and hospitals	
	\$54 M for off-grid generation by communities	\$9.3 M for capacity building in municipalities regarding energy access options and programs, including effective women's participation	\$20 M in loan guarantees for \$54 M in loan funds for financing rural/ off grid programs
	\$70 M for productive uses investments	\$21 M for productive uses programs	\$26 M in loan guarantees for \$70 M in loan funds for productive uses financing
	\$70 M for off-grid generation by SMEs	\$27.9 M for business development programs to improve profitability of rural business	\$26 M in loan guarantees for \$70 M in loan funds for financing rural/ off grid programs
	\$70 M for productive uses investments		\$39 M in loan guarantees for \$104 M in loan funds for productive uses financing
High level estimate of the investment needed	\$611 M + \$308 M Subsidy	\$186 M	\$192 M in Loan Guarantees (and \$857 M in Loan Funds)

APPENDIX E: NOTES TO REGIONAL PREPARATORY, REGIONAL ONGOING, AND NATIONAL PREPARATORY BUDGETS

Explanatory Notes	
Note	Explanation
General	The preparatory activities will run for two (2) years from the onset then followed by coordination period for six years. The Programme budget is for a period of four years with a review of the programmes at year five which will dictate the rest of the term. In the absence of radical changes the current figures will double with marginal increase.

E.1 Notes to Preparatory Activities at the Regional Level (Figure 5.5)	
1.1	Each country will receive 35K for establishing a X-sector working group which shall contain no less than 8 members comprising of eight priority sectors in MDG related poverty reduction. Agriculture, health, environment, education, water, energy and Ministry of Planning must be included
1.2	This will involve consultancies and analysis with a few consultative workshops especially with the X-sector Working group. It will also involve 3 in country activities and the cost is estimated to be 100K during the two year preparatory period.
1.3	Regional meetings and workshops will be supported to formulate MDG based policies and investment programmes to acceptable level of detail. This will also support sourcing of professional facilitation to the workshops.
2.1	The PCU is major instrument of the implementation of the strategy. Its operationalization includes recruitment of staff and office support facilities including computers and accessories and staff time for a period of 10 years. It is proposed a manager and a deputy will oversee a four programme unit answerable to the Programmes Officer of the Secretariat (define Weggoro's office) the costs of running the unit is estimated at 1.6K per year.
2.2	50K will be used by the PCU to analyze the capacity needed for support by regional centres of excellence and development of the appropriate MOUs.
2.3	The PCU is expected to set up a knowledge management system complete with a tracking system and the support facilities needed for knowledge products generation.
2.4	Identify regional centres of expertise and create opportunities for training, exchanges, and knowledge sharing.
3.1	This activity will include formulation of TORs for the National Investment Programme Working Groups, setting up the three groups in the three capitals and their operationalization. The budget will take care of the attendant travel associated with this activity for the regional staff.
3.2	The mobilization of partners will include sensitization workshops, high level consultations and support winning for the process and clarification of the implementation action plan for the partners and donors
4.1	This is major activity that entails regional surveys analysis rationalizing the targets and indicators for each of the four targets. Activities could be both regional and in country activities.
4.2	The service lines are a priority and the must do include analysis and refining the service lines to fully identify what sub activities are needed to be accomplished.
4.3	Formulation of TORs, Consultancies, reviews and Validation activities can also include political support mobilization.
4.4	As needed and can include validation workshops and related activities

E.2 Notes to Ongoing Activities at the Regional Level (Figure 5.6)	
1.1	The 300K will address the policy issues and the reform process to basically mobilize the national budgetary support for the scaling up agenda on ICS. The reforming process is a consultative process best supported by consultants and regional harmonization of the national outcomes
1.2	The PCU will spearhead a regional standardization involving the three national bureau for standards in establishing a technical committee to review specifications and codes of practice for ICS. The budget will support the regional experts and consultants to move around as necessary.
1.3	This budget line is expected to review and mainstream a pro poor policy agenda for the region. Review of the national legislations and eService mandates of the utilities will be a highly consultative multi-stakeholder process including a tariff analysis of the three countries to establish a pro-poor indicator and the attendant mandates to mainstream the policy . included in this category is the taxation regime review with a view to closely identify the pro poor benefits of policy reform. The budget will also support an off the grid tariffication study to identify the elements of the decentralized schemes and service costing for Multi-functional Platforms.
2.1	Support consultancies and consultations in the three capitals and the regional aspect of the fund management.
2.2	Piloting in 90 Constituencies/(can be district based) each will require \$1,700 per year over three years to support target-based extension staff, modelled on the Sida supported Train and Visit Program (pilot for three years and transition to national in fourth year) The X-sector Working group will deliberate on the best placed extension support needed to support the biomass multiplication at this grass root planning level.
2.3	Informal settlements hold the bulk of the poor in the urban areas. The funds will support utilities study how best to engage informal settlements in all major towns of east Africa especially targeting access to grid, increased uptake and reducing attendant losses- create a win - win situation of the power in slum areas.
3.1	Support Consultancies, validation workshops and mobilization.
3.2	Support Consultancies, validation and mobilization.
3.3	Increased energy use for social transformation requires the priority non energy sectors represented by the X-sector working group are factored in budget support for delivery of services. The figure will support studies in the three Partner States and be used for formulation.

E.3 Notes to Preparatory Activities at the National Level (Figure 6.10)	
1	The 900 K will be 150K per country per year for the first two years. This will primarily be support for participation and data collection and analysis.
1.2	This includes participation in PRSP processes and budget formulation as well as data collection and analysis. The X-sector group is factored in this activity line.
1.3	the MDG needs in the period will require close observation to ensure that the process is on track. This activity will also benchmark the MDG needs to the resource mobilization.
2	The X-sector group will be in country and comprise at least an eight member group representing at least 8 priority sectors. The support will include consultancies, workshops and seminar support. The non energy sector data and information and policy analysis will be crucial in deciding the energy access. the cost estimate are based 100K per country for two years.
3	The main activity is consultancies and validation workshops and baseline surveys and any other activity decided by the PCU and the X-sector Workgroup. The Cost is 70K per country to cover two years.
4	Activities include baseline surveys, validation and high level discussions and dialogue support at 50K per country per year.
4.1	Baseline surveys in the countries, analysis, consultative process validation and progress reviews.
4.2	Set up a tracking system to ensure the business models are realizing the primary goal of the scaling up strategy.
4.3	Track progress in each country towards meeting the goals and make course corrections through capacity building, advisory services, and targeted investments.
4.4	This is basically an impact monitoring programme modelled on UNDP impact or outcomes based monitoring and evaluation.

APPENDIX F: PROMISING APPROACHES

Promising approaches provide solutions to the business model constraints identified in chapter 3. The promising approaches presented here combine technologies and business models to overcome the hurdles that face traditional approaches.

ELECTRICITY IN URBAN SLUMS, CAPE TOWN, SOUTH AFRICA (USAID 2005)

Problem:

Electricity connections in the urban slums of Cape Town characterized by illegal connections, non-payment, and theft of power. Additionally, the electricity provider had a history of poor service to the area and was not well received within the slums.

Solution:

Phambali Nombane Energy (PN Energy) was started in 1994 as a pilot project by a joint venture between ESKOM, Electricité de

France (EDF), and East Midlands Electricity of the United Kingdom. The project established PN Energy as a community-based distribution company to electrify the Khayelitsha slum on the outskirts of Cape Town. PN Energy's goal was to dramatically improve the quality and reliability of service by installing prepayment meters to assist households to stay within their budgetary means and providing subsidy and finance for connection fees and 'ready-boards' to eliminate the need for internal wiring.

Impacts:

The number of connections in Khayelitsha (pop: 700,000) increased by 60,000 between 1994 and 2003. Over time, access to better electric service lead to noticeable upgrading of homes and economic improvements. Project officers estimate that electrification improved people's lives by 15–20 percent. The project dramatically reduced theft and supply costs for the utility, reducing non-payment from 70 percent in 1994 to 5 percent in 1998.

IMPROVED COOK STOVES, KENYA (ITDG N.D.)

Problem:

In Kenya, nearly 93 percent of the population used firewood or charcoal for cooking and only 4 percent of the population utilized improved cooking technology. Lack of access to improved cooking technology or alternatives to biomass is damaging to the health of household members exposed to dangerous levels of particulate matter from burning biomass, prolongs the

time spent cooking, and contributes to deforestation—a particularly significant concern in Kenya.

Solution:

Working with several local organisations such as Kenya Energy and Environment (KENGO), the GTZ Special Energy Programme (1984–1995) worked on early interventions aimed at developing the capacity for national production

and dissemination of improved wood and charcoal cook stoves in Kenya. The programmes worked with a number of stakeholders, including NGOs (especially women's groups), government ministries, and local communities. The programme introduced first charcoal stoves such as the ceramic Jiko, then wood-burning stoves, and worked with the existing NGO network to provide training to women's groups and individuals on their production.

Impacts:

A recent survey of stove production centers, including those supported by GTZ throughout the programme, showed a significant and sustained rise in demand and supply of a

variety of improved cook stoves. The experiences of the stove producers and programme stakeholders provide the basis for current efforts by GTZ and partners to improve the efficiency and quality of stoves from

existing production centers and to expand practices to underserved areas.

Note: GTZ is an example of many NGOs that participated in the dissemination of the ceramic jikos in Kenya.

ELECTRICITY IN RURAL SCHOOLS, SOUTH AFRICA (IEA 2003)

Problem:

Except in areas where grid extension is economically feasible, rural schools in South Africa lack access to electricity, thereby limiting the operating hours of the school, the educational technology that can be employed, and the teachers that will work under existing conditions.

Solution:

In parallel to grid extension efforts, the South African government, together with the electric utility Eskom, developed a program to install photovoltaic (PV) systems, including lights and

audio visual (AV) equipment, in 1,000 schools in remote areas of South Africa where grid extension is simply uneconomic. The project was funded by the European Commission, as their contribution to an existing government programme, the Reconstruction and Development Programme (RDP). The EU Commission worked with the Department of Education (DoE) and Eskom to identify schools and oversee the installation of the systems and provide initial technical assistance operations and maintenance training of local staff. After the first year, the

maintenance and repair costs of the system were handed over to the DoE.

Impacts:

The provision of PV systems to the schools has a direct and positive impact on the students by extending study hours, especially during pre-exam periods and during the day on rainy days. The installation of the systems also impacts the respective communities, through adult education and communal use, for instance for functions or for entertainment using the AV equipment.

ELECTRICITY IN RURAL HEALTH CENTERS AND CLINICS, MOZAMBIQUE (IEA 2003)

Problem:

Health centers and clinics in rural areas of Mozambique lack access to lighting and refrigeration limiting their capacity to perform basic surgeries, refrigerate necessary vaccines and provide an attractive living environment for doctors and other hospital staff.

Solution:

Since 1995, Mozambique has been implementing a Health Sector Recovery Programme, and in 1997 the Government of Mozambique received a grant from

Norway towards the cost of a Health Sector Recovery Programme project, "Solar Energy for Rural Health Facilities". The project consists of photovoltaic electrification of approximately 250 rural health facilities, in all 10 provinces in Mozambique. Every health centre is to be composed of 4 independent subsystems; one health centre lighting system, one vaccine refrigeration system, and two staff house systems. Relevant training of clinic staff of the maintenance organization of the Ministry of Health is included in the delivery.

Impacts:

Monitoring of installed systems has yielded positive results overall in terms of the functioning of the lighting and refrigeration systems and the satisfaction of the hospital staff with the quality of their living quarters. After the initial phase, a supervisor for the installation of remaining systems was appointed by the Ministry of Health and tasked with overseeing project installations, training and monitoring.

ACCESS TO MOTIVE POWER: THE MULTIFUNCTIONAL PLATFORM, MALI (IEA 2003)

Problem:

Many isolated villages in Mali do not have access to basic energy services. One of the greatest needs in rural areas is motive power for processing agricultural products and pumping water. Lack of access to motive power results in long, arduous work days and low productivity and limits income-generation opportunities.

Solution:

The Multifunctional Platform (MFP) was introduced as a pilot program in 1999 by UNDP in cooperation with the government of Mali. After the initial installations proved successful, the government developed a program to help 500 rural villages install an MFP. The government provides business development support for the projects through needs assessments and feasibility studies that are used to determine whether a village can run a platform system profitably and to

help formulate a viable business plan. In addition, the government supports effective management of the enterprise by providing training to the system operators in basic literacy, business skills, record keeping, and accounting, as well as training to local artisans in maintenance and repair of the systems. Once a platform system has been installed, the government then monitors its operations for two years to ensure that it can be managed as an independent, economically sustainable business enterprise.

Impacts:

Monitoring of villages where the MFP was installed during the pilot phase exhibited numerous positive impacts, including the following:

- increased productivity,
- increased time for rest and physical recuperation,
- increased consumption of food

due to increased time freed for food preparation,

- increased capacity to earn extra income (sale of cash crops, commerce, processing of shea butter or rice milling),
- better health through safe water from boreholes, and
- increased education levels (schooling of young girls who are released from time-intensive activities, training and literacy classes for women).

Monitoring of installed systems has shown positive results overall in terms of the functioning of the lighting and refrigeration systems and the satisfaction of the hospital staff with the quality of their living quarters. After the initial phase, a supervisor for the installation of remaining systems was appointed by the Ministry of Health and tasked with overseeing project installations, training, and monitoring.

APPENDIX G: ADDRESSING CONSTRAINTS TO ACHIEVING THE ENERGY ACCESS TARGETS

CONSTRAINTS - TARGET 1: INCREASING ACCESS TO MODERN COOKING PRACTICES

Key segment	Constraints:					Incremental environmental costs	
	Appropriate business models	Rationale	Education & Awareness	Policy & Regulation	Capacity Building		Funding & Financing
Rural	<ul style="list-style-type: none"> ~6.5 million rural ICS are needed Artisans can be trained to build ICS at a profit 	<ul style="list-style-type: none"> NGO led education and awareness programs, followed by private entrepreneurs acting as artisans to build stationary, day, firewood NGO raises education & awareness, and builds technical capacity, while properly aligned incentives make it sustainable 	<ul style="list-style-type: none"> Need to improve understanding of benefits of ICS and harmful effects of traditional cookstoves, social marketing would increase demand Moderate – ICS already routinely found in urban and peri-urban areas, sold by street vendors; social marketing could increase demand 	<ul style="list-style-type: none"> Certify artisans to ensure quality, ICS are built for rural populations Need to train trainers/artisans with the skills to build rural ICS Need to build capacity for sustainable firewood resources 	<ul style="list-style-type: none"> ~\$250K pilot programs need to be funded more widely to roughly \$15-\$25M for entire EAC 	<ul style="list-style-type: none"> None 	
Urban	<ul style="list-style-type: none"> ~1.1 million urban ICS are needed Demand is strong Producers need operating capital to increase capacity Sustainable charcoal sources are needed, but are at a 30% premium 	<ul style="list-style-type: none"> ICS manufacturer private sector model for sale of metal charcoal ICS producers already exist Productive and profitable private sector firewood and charcoal ICS producers already exist 	<ul style="list-style-type: none"> Need to establish national or regional policies for production of charcoal 	<ul style="list-style-type: none"> ICS manufacturers need additional production capacity to fully meet the existing demand 	<ul style="list-style-type: none"> Operating capital constraints limit production capacity and inventory Lack of financing prevents buying ICS before capital is available Limited subsidy for sustainable charcoal 	<ul style="list-style-type: none"> Sustainable charcoal commands 30%-50% premiums over non-sustainable sources 	
Pastoral nomads	<ul style="list-style-type: none"> ~2 million pastoral HH need mobile, charcoal ICS 	<ul style="list-style-type: none"> Government partial subsidy for procurement of urban-type metal ICS 	<ul style="list-style-type: none"> Social marketing campaign needed to inform targeted population 	<ul style="list-style-type: none"> Need to foster support for subsidy and determine best design for nomads 	<ul style="list-style-type: none"> Training of communities to properly use ICS and understand how to repair 	<ul style="list-style-type: none"> Mobilization of government/donor funds for partial subsidy 	<ul style="list-style-type: none"> None

CONSTRAINTS - TARGET 2: URBAN AND PERI-URBAN ELECTRIFICATION

Constraints:

Key segments	Findings	Appropriate business models	Rationale	Education & Awareness	Policy & Regulation	Capacity Building	Funding & Financing	Incremental environmental costs
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Urban/ peri-urban	<ul style="list-style-type: none"> Lack of cost-reflective tariffs, system losses, and generation disruption all contribute to sub-optimal urban/peri-urban electrification 	<ul style="list-style-type: none"> Distribution company based grid connection expansion, strategically prioritizing those communities with greatest willingness to pay and working to full access 	<ul style="list-style-type: none"> Utilities have capacity to continue urban / peri-urban electrification Utilities already relied on to perform connection expansion under existing large donor electrification programs 	<ul style="list-style-type: none"> Social marketing/ outreach about safety, maintenance, and ability/ willingness to pay 	<ul style="list-style-type: none"> Issue of differentiated tariffs needs review and modification to ensure optimal urban/ peri-urban electrification rates based on cost-reflecting tariff structures 	<ul style="list-style-type: none"> Need to strengthen existing distribution company operations and management capacity Technical issues of pre-pay meters and "ready boards" for lower income segments 	<ul style="list-style-type: none"> Limited government subsidies to finance connection fees for end users 	<ul style="list-style-type: none"> None
Informal settlements	<ul style="list-style-type: none"> Hundreds of thousands of households with no electricity, and difficult conditions for providing connections 	<ul style="list-style-type: none"> Community based intermediary to informal settlement communities 	<ul style="list-style-type: none"> Particular issues require community mobilization and special outreach, but still hold private sector potential Current energy expenditures hold promise for efficiency/affordability gains 	<ul style="list-style-type: none"> Social marketing/ outreach about safety, maintenance, and ability/ willingness to pay 	<ul style="list-style-type: none"> Land rights may need clarification; Regulations for mandate of community based companies & interactions with utilities Cross-sectoral efforts to mitigate risk of community growth (e.g. water, etc.) 	<ul style="list-style-type: none"> Build capacity in the informal settlements to conduct outreach, operations, etc. Technical issues of pre-pay meters and "ready boards" 	<ul style="list-style-type: none"> Limited government subsidies to finance connection fees for end users 	<ul style="list-style-type: none"> None

CONSTRAINTS – TARGET 3: ELECTRIFICATION OF SOCIAL SERVICE INSTITUTIONS

Key segments	Constraints:				Incremental environmental costs			
	Findings	Appropriate business models	Rationale	Education & Awareness		Policy & Regulation	Capacity Building	Funding & Financing
Grid accessible – rural (urban covered in Target 2)	<ul style="list-style-type: none"> At best – 10% of populations are accessible 	<ul style="list-style-type: none"> Utility company expansion of grid based on community demonstration of productive uses 	<ul style="list-style-type: none"> Ability to pay needed to cover high installation costs – social services a byproduct 	<ul style="list-style-type: none"> Raise awareness of link between productive uses & ability to pay for electricity for social services 	<ul style="list-style-type: none"> Develop process for communities to petition distribution & utility companies to influence expansion 	<ul style="list-style-type: none"> Coops need to create business plan, operate businesses, & maintain social service consumption 	<ul style="list-style-type: none"> Partial gov't subsidy for utility expansion 	<ul style="list-style-type: none"> None
Micro-hydro accessible	<ul style="list-style-type: none"> At best – 10% of populations have accessible micro-hydro sites 	<ul style="list-style-type: none"> Cooperative driven model for generation and micro-enterprise ventures 	<ul style="list-style-type: none"> Collective investment in installation and productive uses needed, with social service electrification a byproduct 	<ul style="list-style-type: none"> Raise awareness of benefits of micro-hydro, productive uses of electricity, and support for social service consumption 	<ul style="list-style-type: none"> Standardize micro-hydro installations Reduce regulatory barriers to selling electricity to communities Establish regulatory framework for social service connections 	<ul style="list-style-type: none"> Coops need to create business plan, operate businesses, & maintain social service consumption 	<ul style="list-style-type: none"> Partial gov't subsidy for micro-hydro installation Private sector or gov't investment in micro-enterprise centers 	<ul style="list-style-type: none"> None
Solar and/or wind accessible	<ul style="list-style-type: none"> Majority of populations would have potential, but with limited loads 	<ul style="list-style-type: none"> 1) Private sector model for higher affordability segments 2) Gov't subsidy for lower income communities (e.g., Pastoralists) 	<ul style="list-style-type: none"> 1) Robust private sector solar market exists 2) Subsidy needed in areas where productivity improvement is unlikely 	<ul style="list-style-type: none"> Need to raise understanding of proper use and maintenance of systems to ensure long duration 	<ul style="list-style-type: none"> Regulations must enforce high quality standards for solar and wind equipment to ensure positive experiences to drive scalability 	<ul style="list-style-type: none"> Build local capacity to maintain systems in rural areas Development of limited productive uses (e.g. cell phone charging) 	<ul style="list-style-type: none"> Gradation of donor/ gov't subsidies to ensure strategic use of limited funds Linkages to institutional stove & fuel savings to finance elec. Challenges leveraging productive use business models 	<ul style="list-style-type: none"> None

CONSTRAINTS – TARGET 4: MOTIVE POWER FOR ALL COMMUNITIES

Key segments	Constraints:					Incremental environmental costs
	Appropriate business models	Rationale	Education & Awareness	Policy & Regulation	Capacity Building	
Grid accessible – rural (urban covered in Target 2)	<ul style="list-style-type: none"> At best ~10% of populations are accessible Cooperative-based demonstratio n of productive uses to ensure affordability 	<ul style="list-style-type: none"> Ability to pay needed to cover high installation costs 	<ul style="list-style-type: none"> Raise awareness of link between productive uses & ability to pay for electricity as well as sound business management practices 	<ul style="list-style-type: none"> Develop process for communities to petition distribution & utility companies to influence expansion 	<ul style="list-style-type: none"> Coops need to create business plans, operate look for additional, sound investment opportunities 	<ul style="list-style-type: none"> Partial gov't subsidy for utility expansion & micro-enterprise centers Private sector investment in enterprises None
Micro-hydro accessible	<ul style="list-style-type: none"> At best ~10% of populations have accessible micro-hydro sites Cooperative driven model for micro-enterprise ventures 	<ul style="list-style-type: none"> Collective investment in installation and productive uses needed 	<ul style="list-style-type: none"> Raise awareness of benefits of micro-hydro for productive uses of electricity Build business knowledge 	<ul style="list-style-type: none"> Standardize micro-hydro installations Reduce regulatory barriers to sell electricity to communities Introduce governance regulations for cooperatives to prevent cartels 	<ul style="list-style-type: none"> Coops need to create business plans, maintain systems technically, operate businesses, and look for additional, sound investment opportunities 	<ul style="list-style-type: none"> Partial gov't subsidy for micro-hydro installation Private sector or gov't investment in micro-enterprise centers None
Generator/ MFP option	<ul style="list-style-type: none"> Generators/ MFPs are the most widespread option Diesel ranges from \$1-\$1,25/L Biodiesel roughly \$2/L currently 	<ul style="list-style-type: none"> Some areas have higher potential productivity gains (with roads to access markets, etc.) 	<ul style="list-style-type: none"> Raise awareness biofuels potential for income & fuel Increase understanding of productive uses 	<ul style="list-style-type: none"> Provide incentives for large scale commercial biofuel ventures Quality standards for MFPs 	<ul style="list-style-type: none"> Build local technical capacity for running MFPs Build local business knowledge 	<ul style="list-style-type: none"> Gov't subsidies to encourage biofuel production (price of which is 100% of diesel) Private investments for diffusion of MFPs in high affordability areas Gov't programs for lower potential areas

APPENDIX H: SUMMARY OF FUNDS REQUIRED BY THE EAC ENERGY ACCESS STRATEGY

This table below provides a summary of the total funds required by the EAC Energy Access Strategy, and their uses for capital expenditure, supporting programs, and loan guarantees. Additionally, the table provides the total funds needed per capita, and breaks these figures out into public funds provided and funds that end users contribute to improve their quality of life. These are the total funds to be spent over the course of the eight-year strategy, to put in place a sustainable mechanism for long-term energy access by the end of the period. These funds do not include fuel, replacement, or other operating costs which will be purchased by end users on a commercial basis.

Unit	\$M	\$M	\$M	\$M	\$M	\$M	M	\$	\$	\$
Source of Funds	End Users	Donors/ Govs	Donors/ Govs	Development Banks	Donors/ Govs/ Dev Banks	All Sources		End User and Public Funds	Public Funds	End Users
Use of Funds	Capital Expenditure (End User)	Capital Expenditure (Subsidy)	Programs	Loan Guarantees	Regional Funding	Total Funding	Population Served	\$/Capita (Total)	\$/Capita (Public Funds)	\$/Capita (End User)
1	258	4	20	29	13	324	49	6.7	1.4	5.3
2	741	740	10	70	8	1,569	38	41.8	22.0	19.7
3&4	611	308	186	192	11	1,308	77	16.9	9.0	7.9
Over arching					16	16	115	0.1	0.1	-
Total	1,610	1,052	216	291	48	3,217	115	28.0	14.0	14.0

APPENDIX I: FUNDS REQUIRED BY THE EAC ENERGY ACCESS STRATEGY, BY ACTIVITY CATEGORY

The funds required by the EAC Energy Access Strategy fall into four categories:

- **Regional Preparatory:** Funds to start up activities at the regional level in the first two years.
- **Regional Ongoing:** Funds to enable the four regional service line activities after the first year and through the following eight years.
- **National Preparatory:** Funds to start up activities at the national level in the first two years. These are also organized by the four Regional Service Lines.
- **National Ongoing:** Funds for supporting programs, loan guarantees, and capital subsidies

A significant portion of the cost of conversion to new energy choices is expected to be borne by end users, who purchase the systems as part of a sustainable delivery mechanism. This end user contribution is a fifth source of funds:

- **End User Purchases:** Payments by end users for all or part of their energy equipment (cook stove, generator or grid connection)

The total funds included in the strategy are summarized in the following table:

	\$ thousands	
Regional Preparatory	3,700	Over 2 years
Regional Ongoing	48,048	Over 8 years
National Preparatory	1,860	Over 2 years
National Ongoing	1,555,560	Over 8 years
End User Purchase	1,609,395	Over 9 years
Total	3,218,563	Over 9 years

Regional Preparatory Activities sum up to \$3.7 million over the first two years (2008 and 2009). They consist

of the items detailed in the following table. The establishment of the PCU will cost \$1.6 million over two years

during the ramp-up period. After that it will have annual costs of \$1.6 million.

Service Line	Activity	\$ thousands
Capacity Building	• Completion of MOUs with regional centres of excellence	50
	• Establishment of PCU in the EAC Secretariat including organizational structure, physical plant, and hiring of key staff	1,600
	• Formulate/implement a regional capacity building action plan	100
	• Setting up of pilot regional knowledge information system	100
Formulation of Investment Programs	• Establishment of national investment program working groups including national treasuries and regional banks	200
	• Mobilization of potential partners and donors to finance implementation of Regional Action Plan.	250
Policy Harmonization	• Establishment of cross-sectoral working groups to define national strategies	100
	• Institutional support of key stakeholders including (energy committee) to provide support for the formulation of MDG-based policies and investment programmes	100
	• Study of regional budgetary frameworks and opportunities	100
Strategic Coordination and Program Management	• Complementary studies as needed to detail feasibility of support services	300
	• Development of RFPs for each of the service line funded proposed activities	200
	• Study on baselines, targets, and indicators for each of the four targets	500
	• Study to refine service line portfolio	100
Total Regional Preparatory		3,700

Regional Ongoing Activities are broken out by service line in the following table. A detailed program has been developed for the first four years. After this period, a review of progress will be held and a new plan developed for the second four years. It is anticipated that the

funding needs for the second half will be approximately the same as the first half although the allocations and emphasis will vary. The table shows both the four-year plan and the eight-year plan. Each of the service line budgets is doubled except for Strategic Coordination and

Program Management. This service line consists of operations costs of the PCU for which two years were included in the Regional Preparatory Activities. For that reason, only seven years of service line 4 are included in the Regional Ongoing category.

Service Line	4-Year Plan (\$ thousands)	Time Period	Tranches	8-Year Plan (\$ thousands)
Policy Harmonization	9,140	over 8 years	08-11, 12-15	18,280
Capacity Building	6,709	over 8 years	08-11, 12-15	13,418
Investment Formulation	2,750	over 8 years	08-11, 12-15	5,500
Strategic Coordination and Program Management	3,100	over 7 years	09-11, 12-15	10,850
Total Regional Ongoing	21,699	over scale-up period		48,048

National Preparatory activities require funding of \$1.9 million. They consist of the activities detailed in the table below:

Service Line	Activity	(\$ thousands)
Capacity Building	<ul style="list-style-type: none"> Key activities focusing on institutional and technical support for capacity building of multisectoral groups to foster cross sector consultations leading to mainstreaming energy access issues and energy-poverty nexus in national policies (PRSP) 	450
Formulation of Investment Programs	<ul style="list-style-type: none"> Assist in formulating investment programmes, based on MDG-based needs assessment, including identification of sustainable business models and baseline for each target 	210
Policy Harmonization	<ul style="list-style-type: none"> Support to EAC Partner States in formulating energy access policies and investment strategies to meet the MDGs:—access to energy is recognised as a priority in the PRS, and in the budget formulation process—to undertake MDG based needs assessments in each 	900
Strategic Coordination and Program Management	<ul style="list-style-type: none"> Complementary studies as needed to detail feasibility of support services 	300
Total National Preparatory		1,860

National Ongoing activities require funding of \$1.6 billion over eight years. These figures include programs, loan guarantees, and capital subsidies. These funds are broken out by target in the table below:

	(\$ thousands)
Target 1	52,432
Target 2	819,259
Targets 3 & 4	683,869
Total National Ongoing	1,555,560

APPENDIX J: METHODOLOGY USED TO DEVELOP NATIONAL INVESTMENT PROGRAMS

OVERARCHING COMMENTS

Investments are one-time costs.

The soft funds are used to create an enabling environment for commercial or sustainable public business models to meet energy access needs on a permanent basis. Therefore, the program funds described in this Strategy are one-time costs, spent over the course of the nine-year period until 2015. Likewise, the concessional loan guarantees are expected to fund the first purchase of the capital expenditure items. Loan funds will be needed on an ongoing basis for replacement or expansion of capital equipment. As the loan recipients develop credit relationships and history with local lending institutions, and as the markets grow and become more predictable, it is expected that the guarantee needed for these loan funds will decline. Loan guarantees beyond 2015 are not included in this analysis.

Operating costs are not included.

Operating costs for fuel and maintenance must be borne sustainably

as part of a business model or else the energy service will fall into disuse. For that reason, only business models which have sustainable incentives for ongoing operating costs are supported. That being the case, it is not necessary to show ongoing operating costs as part of the sources and uses of funds for the Strategy. Payment for operating costs could be considered an additional 'end user contribution'; however, in all cases these costs are either less than current energy expenditure or are offset by income generation enhancement. The exception is in the case of one of the business models for target 3: public provision of energy services to public schools, clinics, and hospitals. In this business model, sustainable operations take place when the budgetary authorities sufficiently fund and manage energy budgets for these institutions. In the Strategy, funds for these institutions (including operating costs) are sourced through the donor/government contribution of the Strategy,

coupled with policy development work. At the end of the nine-year period, the objective is that full responsibility for these energy budgets will be transferred to the respective budgetary authorities as part of standard infrastructure maintenance.

Costs are incremental to services that are already provided.

The funds included in this strategy are incremental of services already provided. They do not include repair, maintenance or replacement of services for populations that are already served. They do include funds for service provision efforts that are planned but not completed yet. For example, communities that are included in rural electrification plans, but which do not yet have service are included as part of the strategy. One element of the strategy is to support these plans so that they are more likely to reach their targets successfully.

USES OF FUNDS

Target 1

Capital Expenditure. The following chart demonstrates how capital expenditure figures were calculated for improved cook stoves (ICSs). For example, the 6.1 million rural households will each buy a clay cook stove that will cost them \$2. Thus the total capital expenditure

will be \$12.2 million. In some cases, assumptions were made by the team based on best available knowledge. Issues such as cannibalization of ICS markets by LPG were taken into consideration. Government bulk purchases were assumed to achieve price discounts over commercial

purchases. In the chart below, the shaded cells represent key assumptions. Non-shaded cells are derived from the target requirements, demographic data, and formulas that derive from shaded assumptions.

Target 1:

Capital Expenditure	Relevant Unit	Unit Cost (\$)	Number of units to meet target (Millions)	Percent that choose option	Total cost (\$M)	Rationale
Rural clay cookstoves	HH	2	6,1	100%	12	GTZ Uganda program benchmark for unit cost
Urban Metal ICSs	HH	6	2,7	100%	16	Field visit benchmark for urban jikos
LPG tanks and stoves	HH	100	1,3	100%	130	Field visit benchmark for LPG tank and stove initial set up, 1.3 M would be a tenfold scale up in LPG. Assumed that LPG will cannibalize ICS
Kitchen renovation	HH	50	2,7	75%	100	Team assumption of low cost kitchen modification that could be developed
Nomadic ICSs	HH	4	0,9	100%	4	Gov't bulk purchase could reduce market price of jikos by 30%
Total Capital Expenditure					262	

Programs. The following chart describes how supporting programs (one component of soft costs) to enable ICS business models were calculated. For example, current successful rural ICS pilots cost \$2 per HH to put commercial systems in place for sustainable (commercial) provision of ICS. Since 6 million rural households must be reached to meet the target, the total estimated soft costs are \$12

million. These are only estimates—actual requirements may be greater due to factors such as reaching more remote or even poorer populations or less due to factors such as increased efficiency and improved awareness and demand for ICS. Where possible, demographic data are used to scale the size of the programs (as in the case of Municipal Biomass Programs, which will scale up the number of

municipalities trained). For each business model, environmental impact mitigation and safety programs are included in the supporting programs. For example, since urban ICS usage maintains a reliance on charcoal as a key fuel, biomass management programs in rural municipalities are funded to ensure that charcoal is produced in a sustainable manner.

Business Model	Programs	No. of Users	Unit	Unit Cost (\$)	Programme Cost (\$ thousands)	Benchmark
Performance contracting of local artisans (transitioning to independent local artisans)	Scale up artisan contracting and training pilot	6	M HHs	2	12,392	Uganda/GTZ Program
Performance contracting of local artisans (transitioning to independent local artisans)	Awareness campaign for rural areas (integrated kitchens)	14	M HHs	0.10	1,379	Reach out to all households. Team assumption on media costs.
ICS manufacturers/distributors	Municipal biomass management programs	2,324	Municipalities	2,000	4,648	10 communities per municipality. Team assumption on cost.
ICS manufacturers/distributors	Awareness campaign for urban areas (smokehoods, lpg, ICS)	5	M HHs	0.1	533	Reach out to all households. Team assumption on media costs
ICS manufacturers/distributors	Regional quality standards program for ICSs	1	Policy dialogue process	500,000	500	Team assumption
LPG distributors	Regional standardization of LPG sockets	1	Policy dialogue process	500,000	500	Dalberg assumption
ICS manufacturers/distributors	R&D in kitchen ventilation	1	Research Centre Programme	100,000	100	Dalberg assumption
Performance contracting of NGOs to disseminate cook stoves in conflict affected and nomadic areas	NGO training programs for nomadic areas	1	NGO training program	400,000	400	Dalberg assumption (200 K each for Kenya and Uganda)
Total					20,452	

Loan Guarantees. The chart below shows how the loan guarantee requirement is calculated for Target 1. For example, ICS manufacturers will need working capital loans to scale up their operations to meet growth targets. Each stove is priced at \$6. For one manufacturer to produce 100 stoves that it will sell in 3 months, it will need a loan of up to \$600. It can then repay the loan in 3 months when the customers have bought the merchandise. Since the EAC will require 2.7 million stoves to meet the targets, this is \$16 million

in loan funds that will be required. Commercial or SME banks will make the loans to manufactures. They will need funding to help them make the loan to the SME to offset risk and operating cost. In the long run, this relationship can turn into a commercial client relationship and no guarantee will be needed. The guarantee will consist of three components:

1. Offsetting operating costs: Since the ICS manufacturer is an SME it

will require a small loan, especially in the early years (ideally it will grow quickly). Small loans require high operating costs of banks.

2. Offsetting bank risk. Since the ICS manufacturer probably does not have credit history or assets, it represents a risky investment. Banks will require a guarantee fund to cover the costs of non-payment.
3. Offsetting SME interest rate: The ICS manufacturers may not be

willing or able to borrow money at a commercial interest rate. A concessionary or even zero interest rate may be needed to meet the needs of these SMEs.

Based on these factors the loan guarantee is estimated at 25 percent of the loan principal, which is a relatively high loan guarantee. This

is consistent with similar programs conducted by development banks. This is however only a high-level estimate, and development of specific programs would require much more detailed program development by the banks themselves. Since the ICS manufacturers can turn over inventory in about 3 months, the loan term is

0.25 years. The total loan guarantee is \$500,000, which is the total amount to be lent (\$16 million) multiplied by the loan term (0.25) multiplied by the guarantee (0.25). The total amount is divided by two because, over the course of the loan, typically half of the principal has been paid back and half is outstanding.

Business Model	Loans	Unit Amount	Number of Units (millions)	Loan Term	Annual Loan Guarantee/ Fee Percentage	Total Loan Funds Lent (\$ thousands)	Total Loan Guarantee Needed (\$ thousands)	Rationale
ICS manufacturers/ distributors	ICS working capital	\$6	2.7	0.25	25%	15,987	500	Field visit finding: ICS manufacturers can turn over inventory in 3 months, SME finance assumed to require 25% guarantee per year
LPG distributors	LPG	\$100	1.3	1	25%	130,000	16,250	LPG users would be high risk, difficult to aggregate, would require 25% guarantee
ICS manufacturers/ distributors	Kitchen ventilation	\$50	2.0	1	25%	99,918	12,490	Poor households would be high risk, difficult to aggregate, would require 25% guarantee
Total						245,905	29,239	

Subsidies. For Target 1, only the nomadic and conflict-affected market segment is predicted to need a subsidy for capital expenditure. This subsidy is estimated to be \$3.7 million, which is a discounted bulk government purchase price per stove (\$4) multiplied by the number of households needed to reach the target (0.9 million). The operating costs of distributing the stoves and educating end users are considered in the previous category 'Programs'.

Target 2 Capital Expenditure. The following chart demonstrates how capital expenditure figures were calculated for Modern Electricity Services for urban poor and urban slum populations. As with ICS, the columns in the chart are multiplied to give the total cost for each category of capital expenditure. The current grid connection cost is assumed to cover utility costs for line-to-door extension in urban areas. It is assumed that supporting

programs will be successful in finding improvements that will lower the cost of grid connections by 25 percent, down to \$150 per household. For many capital expenditure items in Target 2, only portions of the market segment will need certain items. In these cases, team estimates were made based on best available knowledge. In urban slums, readyboards are expected to be the norm, whereas in urban poor areas, household wiring renovations and pre-wired houses are more common.

Target 2:						
Capital Expenditure	Relevant Unit	Unit Cost (\$)	Number of units to meet target (Millions)	Percent that choose option	Total cost (\$M)	Rationale
Urban poor						
Grid connections	HH	150	5.3	100%	801	Improvements in low-cost connections cut cost of connection 25% (originally \$200)
Household wiring	HH	200	5.3	10%	107	Field visit benchmark for avg household wiring costs; assume 10% will need household wiring
Ready boards	HH	20	5.3	50%	53	Field visit benchmark for ready board costs; assume 50% use ready boards
Prepayment meters	HH	40	5.3	50%	107	Field visit benchmark for prepay meter costs; assume 50% use prepay meters
Total Capital Expenditure					1,068	
Urban slum						
Grid connections	HH	150	2.2	100%	326	Improvements in low-cost connections cut cost of connection 30% (originally \$200)
Household wiring	HH	200	2	0%	-	Slum dwellings not suitable for household wiring improvements
Ready boards	HH	20	2	100%	43	Field visit benchmark for ready board costs; assume 100% use ready boards
Prepayment meters	HH	40	2.2	50%	43	Field visit benchmark for prepay meter costs; assume 50% use prepay meters
Total Capital Expenditure					413	

Programs. The following table shows how the program costs for Target 2 were derived. For example, policy reform to reduce dependence on hydro resources, while minimizing

dependence on expensive thermal generation, is necessary to ensure that utility-based electricity provision is sustainable. To that end, a regional policy reform process is

recommended, which is estimated by the team to cost \$100,000 per year over the course of the eight-year strategy.

Business Model	Programs	No. of Users	Unit	Unit Cost (\$)	Programme Cost (\$ thousands)	Rationale
Utility-based grid outreach to urban and peri-urban populations	Policy reform to improve the energy mix	1	Policy dialogue process	800,000	800	100 K/ yr for region
Utility-based grid outreach to urban and peri-urban populations	Policy reform to mandate 100% coverage to connect poor customers	1	Policy dialogue process	800,000	800	100 K/ yr for region
Utility-based grid outreach to urban and peri-urban populations	Capacity building for the utilities to expand the grid more quickly, and get grid connection cost down to \$150/ connection	3	Utilities	266,667	800	100 K/ yr for region
Utility-based grid outreach to urban and peri-urban populations	Monitoring and enforcement programs to deal rigorously with system losses	3	Utilities	183,333	550	Three years of staff time, after that should pay for itself
Utility and community-based distribution company expansion of the grid to informal settlements	Capacity building for utilities on how to best engage informal settlements	3	Utilities	2,333,333	7000	1,000 K/ yr after R&D
Utility and community-based distribution company expansion of the grid to informal settlements	Education and awareness programs for communities about safety, maintenance, and the economics of utility power (e.g., comparing current and potential energy spend)	2	M HHs	0.10	217	Team assumption per HH outreach cost
Total					10,167	

Loan Guarantees. The following table shows how the loan guarantee amounts for Target 2 were derived. For Target 2, the loan customers are

the national utilities, who on-lend to customers in the form of small fees attached to their electric bills. These loans are expected to be relatively

low risk, and therefore are estimated to require only a low guarantee percentage (5%).

Business Model	Loans	Loan Term (years)	Annual Loan Guarantee/Fee Percentage	Total Loan Funds Lent (\$ millions)	Total Loan Guarantee Needed (\$ thousands)	Rationale
Utility-based grid outreach to urban and peri-urban populations	Fund to finance new grid connections, house wiring and ready boards	2	5%	961	48,054	Fund administered by utility should be relatively secure (5% guarantee needed)
Utility-based grid outreach to urban and peri-urban populations	Fund to finance pre-payment meters	1	5%	107	2,670	Fund administered by utility should be relatively secure (5% guarantee needed)
Utility and community-based distribution company expansion of the grid to informal settlements	Fund to finance new grid connections, house wiring and ready boards	2	5%	369	18,474	Fund administered by utility should be relatively secure (5% guarantee needed)
Utility and community-based distribution company expansion of the grid to informal settlements	Fund to finance pre-payment meters	1	5%	43	1,087	Fund administered by utility should be relatively secure (5% guarantee needed)
Total				1,481	70,284	

Subsidies. For Target 2, subsidies are estimated at 50% of the total cost for grid connections (\$740 million). This is consistent with current urban electrification programs in the EAC.

Targets 3 and 4

Capital Expenditure. The table below details how the capital expenditure requirements were calculated for Targets 3 and 4. These targets were calculated together because in rural areas, the availability of electric power for social services and for enterprises are often interlinked. (It is often more cost effective to provide systems scaled to meet all of a community's needs than to outfit individual systems for each building.) The team followed a decision tree to estimate which

systems would be used in which communities.

- Communities that were in reach of the grid are assumed to get grid (13%).
- Communities not in reach of grid but near micro hydro, get micro hydro (6%).
- The most organized 20% of rural communities can (with support) implement community-led mini-grid systems (20%).
- The rest (61%) have their enterprise systems provided by distributed generation equipment, and their social services provided by Ministry-led programs (also with distributed generation equipment).

For grid extension regional benchmarks of \$100,000 per km are used. It is

assumed that the communities that qualify for grid extension are on average within 1 km of the grid.

For micro hydro, an actual system in Kenya costing \$110,000 is used as benchmark for a system that can serve three nearby communities.

For community-driven systems, a unit cost (\$12,000) was developed by creating a hypothetical portfolio of small, medium, and large villages with capacity between 10 and 30 KW and including industrial heating equipment.

For Ministry-driven systems, a unit cost (\$3,000) was developed by creating a hypothetical portfolio of clusters of social services (e.g., two schools and one clinic) based on actual ratios of social services

in the EAC. These systems range from 1-10 KW and include heating loads consistent with the social services needs.

In addition to the generation equipment, significant investment is needed in equipment for product uses activities. Unit costs for this

type of equipment are estimated at \$15,000 per community based on existing community microenterprise centres in Kenya.

Targets 3 and 4					
Capital Expenditure	Relevant Unit	Unit Cost (\$)	No. of Units to Meet Target	Total Cost (\$ millions)	Rationale
Grid extension	communities	100,000	3,067	307	Assumes that current expansion plans could be tripled (with strong gov't support)
Community-driven micro hydro	communities	110,000	1,476	162	For each identified site, three villages are served
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	clusters	2,885	21,457	62	
Community-driven off-grid generation (solar, wind, diesel)	communities	11,579	4,648	54	
Off-grid SME-driven minigrids	communities	10,000	6,972	70	
Off-grid local energy agent driven	communities	3,000	7,204	22	
Cost of productive uses machinery (including heating loads)-grid	communities	15,000	3,067	46	All villages except those with MFPS need additional productive use capital expenditure: Cost of productive use based on Kenyan Micro hydro Village Case Study, then doubled to include heating
Cost of productive uses machinery (including heating loads)-micro hydro	communities	15,000	1,476	22	«»
Cost of productive uses machinery (including heating loads)-community driven-off grid	communities	15,000	4,648	70	«»
Cost of productive uses machinery (including heating loads)- off grid SME-driven	communities	15,000	6,972	105	«»
Total Capital Expenditure				919	«»

Programs. The table below derives the cost of enabling programs to support the development of sustainable business models to provide energy access in rural areas for social services and income generation activities. As

often as possible, programs are scaled by the number of communities that need to be served, as in the case of capacity building for cooperative and municipal institutions. In this case, the number of communities served (3,000) relates

to the decision tree in the previous section on Capital Expenditure. This is the same for all of the programs that scale by number of communities in this section.

Business Model	Programs	
Grid Extension	Multi-ministry policy reform programs to better address energy needs of social services in budgets	
Grid extension	Capacity building in cooperative and municipal institutions, energy access options and programs, and including effective women's participation	
Grid extension	Productive uses programs	
Community-driven micro hydro	Capacity building in cooperative and municipal institutions, energy access options and programs, and including effective women's participation	
Community-driven micro hydro	Productive uses programs	
Community-driven micro hydro	Regional production or procurement of technological inputs, such as turbine parts	
Community driven micro-hydro	Policy reforms to allow micro hydro sites to distribute electricity using low-cost materials/ designs	
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	Direct budgetary support for social services energy budgets	
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	Demonstration of effective, sustainable performance contracting provision	
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	Multi-ministry capacity building to deal with the issues of social services running side businesses to finance their energy services	
Ministry-driven performance contracting of off-grid generation (solar, wind, diesel)	Regulatory oversight of equipment standards to ensure high quality solar PV systems or wind turbines	
Community driven off-grid generation (solar, wind, diesel)	Capacity building in cooperative and municipal institutions, energy access options and programs, and including effective women's participation	
Community driven off-grid generation (solar, wind, diesel)	Productive uses programs	
Off-grid SME-driven minigrids	Business development programs	
Off-grid local energy agent driven	Pilot energy agent programs	
Off-grid local energy agent driven	R&D in MFP model	
Off-grid local energy agent driven	R&D in bio-fuels/ bio-diesel	
Total		

No. of Users	Unit	Unit Cost (\$)	Programme Cost (\$ thousands)	Rationale
10	Year	100,000	1,000	100 K / year for region
3,067	communities	2,000	6,133	\$2000/ community leadership
1,476	communities	3,000	4,428	\$3000/ community members
1,476	communities	2,000	2,952	\$2000/ community leadership
1,476	communities	3,000	4,428	\$3000/ community members
1	R&D program	3,000,000	3,000	Team assumption
10	Year	100,000	1,000	100 K / year for region
			78,891	4 years of annual energy spending for all social services, assuming annual spending of \$200 for schools, \$500 for clinics, and \$7000 for hospitals
1	Demonstration pilot	500,000	500	Team assumption
1	Policy dialogue process	1,000,000	1,000	100 K / year for region
1	Policy dialogue process	1,000,000	1,000	100 K / year for region
4,648	communities	2,000	9,296	\$2000/ community leadership
6,972	communities	3,000	20,916	\$3000/ community members
6,972	communities	4,000	27,888	\$4000/ intensive community programs
7,204	communities	3,000	21,613	\$3000/ community members
1	R&D program	1,000,000	1,000	100 K / year for region
1	R&D program	1,000,000	1,000	100 K / year for region
			186,045	

Loan Guarantees. The following table shows how the loan guarantee amounts for Targets 3 and 4 were derived. For grid extension, a loan guarantee to a utility over 10 years would be relatively low risk and only require an estimated 2 percent loan guarantee. Micro-hydro systems developed under a secure cooperative structure would likewise be relatively secure. To fund

community driven off-grid systems, community organizations would take out loans from a rural energy fund to be set up in each country. The community organizations would likely have no credit history and few assets, and would be relatively high risk requiring a high loan guarantee (25 percent). Similarly, SMEs that purchase off-grid generation systems,

or productive uses equipment, will also require a high (25 percent) loan guarantee. These SMEs would also be funded through the rural energy funds or other SME finance partners. As with the other targets, these loan guarantee figures are high-level estimates and actual figures may vary based on program development by participating banks.

Business Model	Loans	Unit Amount (\$)	No. of Units	Loan Term (years)	Annual Loan Guarantee/ Fee Percentage	Total Lent (\$ millions)	Total Loan Guarantee Needed (\$ thousands)	Rationale
Grid extension	Grid extension finance programs	100,000	3,067	10	2%	306,656	30,666	Fund to national agency should be relatively secure (2% guarantee needed)
Community-driven micro hydro	Finance programs for rural / off grid	110,000	1,476	10	2%	162,360	16,236	Fund to local utility should be relatively secure (2% guarantee needed)
Community-driven off-grid generation (solar, wind, diesel)	Finance programs for rural / off grid	11,579	4,648	3	25%	53,818	20,182	SME finance assumed to require 25% guarantee per year
Off-grid SME-driven minigrids	Finance programs for rural / off grid	10,000	6,972	3	25%	69,719	26,145	SME finance assumed to require 25% guarantee per year
Off-grid local energy agent driven	Finance programs for rural / off grid	3,000	7,204	3	25%	21,613	8,105	SME finance assumed to require 25% guarantee per year
Grid extension	Productive uses programs	15,000	3,067	3	25%	45,998	17,249	SME finance assumed to require 25% guarantee per year
Community-driven micro hydro	Productive uses programs	15,000	1,476	3	25%	22,140	8,303	SME finance assumed to require 25% guarantee per year
Community-driven off-grid generation (solar, wind, diesel)	Productive uses programs	1,5000	4,648	3	25%	69,719	26,145	SME finance assumed to require 25% guarantee per year
Off-grid SME-driven minigrids	Productive uses programs	15,000	6,972	3	25%	104,579	39,217	SME finance assumed to require 25% guarantee per year
Total						856,603	192,247	

Subsidies. A 40% subsidy is estimated to be required for rural energy systems including both grid extension and off grid systems.

Sources of Funds

Development Banks. Funding from development banks is primarily in the form of concessional loans. The development bank contribution is calculated as equal to the loan guarantee amount. Development banks will provide the majority of the loans, which are repaid and therefore not illustrated in the investment diagrams.

Donors and Governments. Donor and Government funding is combined on the investment diagrams. Donors and

Government funding is calculated as the sum of the cost of the supporting programs and the capital subsidies.

End Users. End user contribution is calculated as the total capital expenditure left after capital subsidies are subtracted. In all cases, this is less than current energy expenditures or is offset by income generation potential.

Environmental Finance. Environmental finance is not displayed on the investment diagrams but is an important potential source of finance. Environmental finance can be expected to fund the incremental cost of environmental technologies. The environmental finance contribution can be calculated by summing the

cost of all of the supporting programs and loan guarantees targeted towards business models that lead to carbon-offsetting energy choices.

Private Sector. Private sector investment is not displayed on the investment diagrams but is also an important source of finance. Given that the majority of the capital expenditure and ongoing operations costs are going to be spent purchasing goods and services from the private sector, it is clear that the private sector will need to grow to be able to meet this demand. This will include companies investing in their own production capacity, as well as debt and equity players investing in these companies.

APPENDIX K: DETAILED REGIONAL SERVICE LINE BUDGET

Table K.2 below comprises a preliminary proposed costing of the budget needed for the regional service line activities. These activities are costed for the first four years. The eight year plan is expected to continue the funding at approximately the same level, but activities will be modified in the second phase based on feedback and reprioritization. Some line items have a null budget. In these cases, funding for the item is combined with a previously listed program that applies to another target. The item title is retained as a placeholder to signify that the previous activity relates to both targets. The total budget is US\$ 21.7 million for the first four years. Over eight years, it would amount to \$48 million, as shown in Table K.1.

K.1 REGIONAL ONGOING FUNDING: EIGHT-YEAR SUMMARY

Service Line	4-year plan (\$ thousands)	Full 8-year plan (\$ thousands)	Time Period	Tranches
Policy Harmonization	9,140	18,280	over 8 years	08-11, 12-15
Capacity Building	6,709	13,418	over 8 years	08-11, 12-15
Investment Formulation	2,750	5,500	over 8 years	08-11, 12-15
Strategic Coordination and Program Management	3,100	10,850	over 7 years	09-11, 12-15
Total Regional Ongoing	21,699	48,048	over scale up period	

K.2 REGIONAL ONGOING : 4 – YEAR BUDGET BY SERVICE LINE

Budget Category	Service Line	Priority	Target	Activity	Total (\$ K)
Regional Ongoing	Capacity Building	High	1	• Capacity building: Performance contracts to scale up rural stove artisan programs	2,500
				• Capacity building: Constituency- level capacity building in biomass management and energy access provision	459
			2	• Capacity building: Capacity building for utilities on how to best engage informal settlements	300
			3	• Capacity building: Capacity building in municipalities regarding energy access options and programs	0
		High Total			3,259

Budget Category	Service Line	Priority	Target	Activity	Total (\$ K)		
Regional Ongoing	Capacity Building	Normal	1	• Capacity building: Education and awareness campaign in urban areas in health, environmental and economic benefits of ICS and kitchen ventilation	250		
				• Capacity building: Improvements in kitchen ventilation	100		
				• Capacity building: Education and awareness campaign for LPG	0		
						• Capacity building: NGO training programs for nomadic areas	250
						• Capacity building: Capacity building program for constituencies for sustainable charcoal production	0
				2		• Capacity building: Education and awareness programs for communities about safety, maintenance, and the economics of utility power (e.g. comparing current and potential energy spend)	250
						• Capacity building: Study of capacity building for community-based distribution companies	100
						• Capacity building: Monitoring and enforcement programs to deal rigorously with system losses	250
						• Capacity building: Scaling up of successful pre-payment meter pilot programs	200
						• Capacity building: Study to understand the capacity constraints of utilities to expand the grid more quickly	100
				3		• Capacity building: Productive uses programs	0
						• Capacity building: Regional production or procurement of technological inputs, such as turbine parts	250
						• Capacity building: Local capacity building	0
						• Capacity building: Education and awareness in communities to ensure women's participation in energy service procurement to sufficiently address issues of gender equality	0
						• Capacity building: Demonstration of effective, sustainable performance contracting provision	250
						• Capacity building: Multi-ministry capacity building to deal with the issues of social services running side businesses to finance their energy services	250
						• Capacity building: Business development programs	250
						• Capacity building: Development of cooperative or municipal institutions to provide mobilization for and management of grid extension initiatives	250
						• Capacity building: Pilot energy agent programs	250
						• Capacity building: R&D in bio-fuels/ bio-diesel	100
						• Capacity building: R&D in Multifunction Platform (MFP) model	100
						• Capacity building: Productive uses programs	250
				Normal Total			3,450
			Capacity Building Total				6,709

Budget Category	Service Line	Priority	Target	Activity	Total (\$ K)
Regional Ongoing	Investment Formulation	High	1	• Investment formulation: Loan fund for working capital for ICS SMEs	360
			2	• Investment formulation: Pilot fund to finance new grid connections and house wiring	360
			3	• Investment formulation: Formulation and/or reorientation of off-grid rural energy funds	480
				• Investment formulation: Direct budgetary support for social services energy budgets	300
		High Total			1,500
		Normal	1	• Investment formulation: Subsidy for cook stoves for NGO programs	1,000
			2	• Investment formulation: Funding of ready-boards to mitigate costs of internal wiring	250
			3	• Investment formulation: Financing programs	0
				• Investment formulation: Finance programs	0
				• Investment formulation: Finance programs	0
		Normal Total			1,250
	Investment Formulation Total				2,750
	Policy Harmonization	High	1	• Policy Harmonization: Quality standards program for ICSs	150
				• Policy Harmonization: Regional standardization of LPG sockets	150
				• Policy Harmonization: Policy reforms to include rural ICS programs in budgets	300
			2	• Policy Harmonization: Pro poor policy agenda for urban distribution utilities including tariff and taxation review and service mandates for utilities achieve 100% coverage	300
			3 & 4	• Policy Harmonization: Pro poor policy agenda for rural energy access policies including tariff and taxation review and service mandates for coverage	300
		High Total			1,200

Budget Category	Service Line	Priority	Target	Activity	Total (\$ K)
Regional Ongoing	Policy Harmonization	Normal	1	• Regional quality standards program for ICSSs	500
				• Regional standardization of LPG sockets	500
			2	• Policy Harmonization: Policy reform to improve the energy mix of generation capacity to mitigate risks of over-reliance on a single source and improvements in the management of supply uncertainty	100
				• Policy reform to improve the energy mix	800
				• Policy reform to mandate 100% coverage to connect poor customers	800
			3	• Policy Harmonization: Policy reforms to allow micro-hydro sites to distribute electricity using low cost materials/ designs	100
				• Policy Harmonization: Regulatory oversight of equipment standards to ensure high quality solar PV systems or wind turbines	100
				• Policy Harmonization: Multi-ministry policy reform programs to better address energy needs of social services in budget	250
			3 & 4	• Policy reforms to allow micro-hydro sites to distribute electricity using low cost materials/ designs	1,000
				• Regulatory oversight of equipment standards to ensure high quality solar PV systems or wind turbines	1,000
			All	• Assist in formulating investment programmes, based on MDG-based needs assessment, including identification of sustainable business models and baseline for each target	675
				• Complementary studies as needed to detail feasibility of support services	450
				• Key activities focusing on institutional & technical support for capacity building of Multisectoral Groups To foster cross sector consultations leading to mainstreaming energy access issues & energy-poverty nexus in national policies (PRSP)	1,350
				• Support to EAC Partner States in formulating energy access policies and investment strategies to meet the MDGs:–access to energy is recognised as a priority in the PRS, and in the budget formulation process–to undertake MDG based needs assessments	315
					Normal Total
		Policy Harmonization Total			9,140
	Strategic Coordination and Program Management	High	All	• Strategic Coordination: Data collection and analysis regarding target baselines and progress	600
				• Strategic Coordination: Tracking of key population segments and business models as they scale up	1,700
				• Strategic Coordination: Program management	600
				• Strategic Coordination: Impact monitoring and evaluation	200
				High Total	
		Strategic Coordination and Program Management Total			3,100
Grand Total					21,699

APPENDIX L : EAC ENERGY ACCESS STRATEGY WORKSHOP FINAL REPORT

REGIONAL MEETING ARUSHA, TANZANIA 30-31 OCTOBER

For full report, please contact:

East African Community Secretariat

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I. INTRODUCTION

1. In the framework of the implementation of the draft regional strategy to improve access to modern energy services in East African Community,
 4. Delegates from the following countries were in attendance:
 - Kenya
 - Tanzania
 - Uganda
 5. The following development partners were also in attendance:
 - United Nations Development Programme
 - GTZ
 - World Bank
 - European Union Energy Initiative
2. The EAC Regional Meeting was held in Arusha, Tanzania from 30-31 October, 2006 at the Arusha International Conference Centre.
3. The objective of the workshop was to review the draft regional strategy on energy access and continue to provide guidance to the East African Community Secretariat in the finalization and approval of a regional energy access strategy. (EUEI) Partnership Development Facility (PDF)
6. Representatives of the EAC Secretariat, private sector, and NGOs also participated in the Workshop.
7. A full list of Workshop participants is appended (Annex 1).
8. The suggested agenda (appended as Annex 2) was unanimously approved.

II. WORKSHOP DAY ONE

1. Opening address: Dr Cheluget, EAC Deputy Secretary General (Annex 3)
Dr. Cheluget welcomed participants to the workshop and focused the importance of access to modern energy services to economic development and meeting the MDGs. It was emphasized that a regional strategy will help EAC countries mobilize investments and coordinate scale-up activities. Dr. Cheluget mentioned that the EAC Secretariat is about to launch third EAC development strategy which prioritizes energy as one of the key instruments that will allow EAC to meet the development targets and the MDGs. He also stressed the importance of recognizing the health, education, and gender dimensions of energy poverty. Finally, Dr. Cheluget emphasized that the EAC is looking to the scale-up strategy to lay the foundation for sustainable economic and social development.

2. Workshop Objectives: Dr. Weggoro (Annex 4)

The EAC Scale-Up strategy is based on the principal that access to energy services is critical to social and economic development efforts. The main objective of this workshop was to seek stakeholder views and comments on the direction taken by the EAC on energy access issues as outlined in the draft document. This will include discussion of specific activities, investment models, etc. presented in the draft strategy document. Highlights of Dr. Weggoro's speech include:

- In order for the regional and national development strategies to be met, key development agendas need to be put in place. Energy is a prerequisite to achievement of these agendas.
- This strategy should provide framework to scale up energy services through national levels filtering through to local levels.
- The views of this EAC workshop will be presented at the next council of ministers.
- Energy issues are currently a high priority on the International agenda. First, the focus of the 14th and 15th session of the Commission for Sustainable Development (CSD) is on energy issues. Secondly, the REPN for the 21st century report indicates there has been increase in energy investment, particularly in renewables where investment has grown from US\$ 30b in 2004 to US\$ 38b in 2005. Also, biomass use has increased by 250%, biodiesel is up by 52%, photovoltaics are up by over 50%, etc. This analysis also recognized non-western countries making progress in these areas, including Brazil, China, and Uganda.
- The aim of this strategy is to reach at least 50% of EAC population - about 50 million people - with modern energy services.

3. Morning Presentations

The following presentations were made during the morning of 30 October, all of which are appended in full:

Energy Access Scale Up Draft Report: Context and Policy Framework: Laurent Coche, UNDP (Annex 5)

This presentation covered the following main topics:

- Importance of a multi-sectoral approach
- Difficult to currently measure the poverty impact of energy services
- A "business as usual" approach will not be sufficient to meet the MDGs
- There is a clear need to emphasize mainstreaming energy access as a national development priority
- Cross-sectoral consultations will improve the ability of countries to get finance ministers on board – also will help to attract more resources.
- Need to make an effort to not talk about energy sources (natural gas, coal, biomass, etc.), but should be focus on the services needed in each country to reduce poverty and meet the MDGs
- The target of the EAC Scale-Up strategy is to reach 9.6 million households (50 million people) by 2015.

Deliberations focused on the following main topics:

- Definition of modern energy services, which can be found on page 13 of the document.
- Background of the document's production (consultations, assumptions, data sources, etc.)
- Energy supply/source information is not adequately reflected in current version of the document - sustainability, availability, affordability, etc.

- Key assumptions taken into consideration in the document's production, such as the assumption that an EAC 'household' contains an average of 5 people.

Business Models and Investment Programme: April Allderdice, Dahlberg Consultants (Annex 6)

The consultant began by describing the methodology by which the business models were identified and investment programme was established. The key challenge is that the successful business models already delivering modern energy services in the EAC are not scaling up. The key topics discussed include:

- Each business model was analysed to identify four key categories of constraints to scale-up: policy & regulatory, insufficient capacity, end user knowledge/awareness, and insufficient financing.
- Target 1: In rural areas, clay stoves are preferred as they are low-cost and locally manufactured. In urban areas, metal jikos and LPG are preferred. Nomadic and conflict affected areas will be very difficult to reach (less than 1M people) - metal jikos have been used, mostly through NGO-driven approaches.
- Target 2: Focus is on capacity building for the distribution utilities. Increased Urban Grid connections are possible, but financing for up-front costs are needed to do so. Utilities have no incentives to connect urban and peri-urban poor, so we need to assist utilities to expand to the se areas. This target has a relatively low soft cost level, but does include a 50%

subsidy for grid connection costs.

- Targets 3 & 4: Focus is on the need for productive activities to enable communities to afford modern energy services. There is a need to unlock productive activities and provide energy budgeting support as two keys to recovering costs for off-grid power. Communities needing off grid solutions are the areas that have the least number of successful business models, requiring quite a bit of R&D investment immediately. We have included about a 40% subsidy for the purchase of off-grid system capital costs.
- Overall Investment Plan: the overall package is about 3.2 billion dollars. A significant portion of this comes from end-users, making it a sustainable market-based program.

Deliberations focused on the following:

- Soft costs are higher for rural energy programs because these interventions will require behavioural change (e.g. improved cook stove programs).
- Whether or not the urban electrification target (100% by 2015) is too ambitious. It was emphasized that this target came directly from the EAC.
- Request for a budget break down per country. The model used for the regional investment programme could be used for a national level strategy, but would require some tweaks to fit domestic situations.
- Concerns with how much the rural poor can be expected to contribute. It was emphasized that the "end user contribution" specifically refers to the

consumer's willingness to pay. The issue of affordability vs. willingness to pay was discussed during country break out session.

- Institutional commercial stoves were ignored in Target 1 because the focus is on the household. Target 4 has been modified to include heating technologies for communities, such as a large stove for a community bakery.
- The strategy document does not specify technologies for off grid systems because the desire is to make the strategy flexible enough to let communities determine their own energy service priorities.

Presentation of Regional Framework, including EAC Service Lines: Laurent Coche, UNDP (Annex 5)

The objective of the EAC regional approach to improving access to energy is mobilize the region to speed up what countries are already doing. Most importantly, the regional approach will add value in the four service lines:

1. Policy harmonisation at regional and national level
2. Capacity building of public and private sector actors to implement the strategy
3. Formulation and implementation of investment programs to expand energy access (soft loans, grants, private sector investment...);
4. Strategic coordination and programme management, including promotion of exchanges and dissemination of best practices (Knowledge Management);

Next steps and challenges on a Regional Level:

- Set up the programme coordination unit in EAC secretariat
- Institutional support and capacity building of key actors
- Setting up of pilot regional knowledge information system
- Formulate/implement a regional capacity building strategy
- Mobilization of potential partners – right now it's just UNDP, GTZ – need more (ADB, World Bank, Sida, etc.

Next Steps and challenges at the National Level:

- Support to EAC partner states in formulation of energy access policies and investment strategies
- Key activities focusing on institutional capacity building of national multi-sectoral working groups

Deliberations focused on the following topics:

- It is recognized that financing of the initiatives will be a major challenge. Strong leadership is needed from the EAC and the individual countries to give the donors confidence in supporting energy access programs.
- There was a request to for the EAC to look at cross-border infrastructure strategies both within and outside of the East Africa region. It was emphasized that the strategy document purposely does not deal with grid connection issues as these tend to be addressed by other documents such as power pools, master plans, etc.

- It was requested that the Multi-Sectoral Working Group include the Private Sector and NGOs/CBOs. This topic was discussed further during country break out sessions and has been noted in the draft strategy document.
- It was emphasized that the strategy document does not address coordination and budgeting for resources as these would depend on country-level structures and priorities.
- Capacity building needs were assessed based on key assumptions from similar interventions in other regions such as ECOWAS.

Country Break-Out Groups (National workshops) to address key questions Each country was convened after lunch to examine country-specific issues as they relate to the following set of key questions provided:

- Please confirm that the three components of the enabling framework are sufficient conditions to support the business models for scaling up.
- Review/comment on the constraints (education and awareness, loans and grants, institutional capacity, standards and regulation) to scaling up the business models by target and population segment.
- Among the 13 proposed business models, which should be given priority? Are there additional business models that should be considered?
- There are about 50 proposed interventions in the action plan. Which are the core interventions to meet all of the targets?
- Do you feel that the proposals for

capacity building are adequate? What further interventions, programs and resources are needed in-country to implement these programs?

- Is the proposed institutional framework suitable to reinforce your country's institutional framework? Other than the proposed multisectoral working groups, are there any viable alternatives to promoting energy access dialogue at the national level?
- What are the key next steps needed to implement the EAC energy access strategy?

Kenya Working Group Key Findings:

- The role of efficient energy markets should be amplified in the document.
- The importance of data and information management should be better highlighted. This issue was further discussed in Day Two under the Capacity Building service line.
- Sustaining the current political will is very important. This topic was discussed during Day Two deliberations as a separate issue.
- Availability and affordability of energy supplies is a large constraint not adequately addressed in the document – has a clear focus on demand-side.
- The team agreed to prioritize business models in the following order: rural households switch to ICS, urban households switch to LPG, distribution utilities connect to urban and peri-urban households, grid extension for populations within proximity.
- The full strategy document needs to be summarized in a short version that

can be used in a round of discussions with key persons – PS, Heads of Utilities, etc. Energy, Planning, Finance, Agriculture, Health, Water, Education.

- It was recommended that the Multi-Sectoral working group include National Economic and Social Working Group (NESC), the private sector, NGOs, etc.
- There is a clear need for the Ministry of Energy to play a lead role in coordination and planning.

Tanzania Working Group Key Findings:

- The institutional framework/arrangements need to be clarified in relation to the enabling environment. The group agreed that the three components capture the macro-level picture in Tanzania.
- As energy policy is concerned, the issue of energy diversification is not a constraint in Tanzania.
- The group proposed changing wording under the heading of financing institutional capacity. For example, topics should read "insufficient financing", not "lack of financing" as funding mechanisms already exist.
- It was recognized that for the Tanzania situation, the key constraints to scale up are: awareness and education,

financing, capacity, and strategies.

- The group does not feel that the issue of affordability is clearly reflected in the document. This issue was discussed in detail during Day Two under the topic of subsidy targeting.
- For Target 1, the working group prioritized business models in the following order: Training and contracting of local ICS artisans, Commercial ICS Providers, LPG Providers, Ngo models to provide cook stoves.
- For Target 2, the group recognized Distribution utility low-income outreach programs and Distribution utility in slum areas as priority areas.
- The group agreed that priority business models for Targets 3&4 will depend on the geographic location being addressed.
- It was emphasized that Supply-Side issues are not adequately addressed in the current strategy document.
- The team suggested that the private sector and NGOs be included in the multi-sector working group.

Uganda Working Group Key Findings:

- Under target 1, the proposed end user contribution of \$2 per stove may be a constraint to scale up. The group proposed examining potential models for cost-sharing.

- Recognized that sustainable management of biomass supply is not adequately addressed in the document.
 - There is a need to incorporate gender issues under the cook stove business models.
 - The group recognized that the logistics and infrastructure of the LPG supply chain is a key constraint.
 - The strategy document does not seem to consider the ability of people to pay for electricity over the long run.
 - Awareness of local leaders to buy into the program could be a constraint.
 - Agreed that the MFP projects should be given priority under Target 4.
 - Suggested including energy farming as a potential business model for scaling up access.
 - Also suggested including private sector and NGOs in the multi-sector working groups.
4. The Imperative of Overcoming Energy Poverty in Africa: an Action Plan. (Ralph Karhammer, World Bank)

This presentation focused on the key constraints from the donor perspective to scaling up access to modern energy services in Africa (Annex 4). The World Bank is now seeking donor buy-in to this Action Plan approach.

III. WORKSHOP DAY TWO

1. The second day of the Arusha Workshop was opened by the Chairman welcoming participants back to the facility. The agenda for the second day was amended based on a summarized list of key

issues that came out of Day One and presented to the full group of participants. A full list of the issues raised during day one has been amended (Annex 7).

2. Key Issues Raised in Day One – the session began with a short review of the key issues raised on 30 October, as follows. These issues were grouped would form the basis of the morning’s discussions.

Policy Harmonization	Capacity Building	Implementation of Investment Programmes	Strategic Coordination
<ul style="list-style-type: none"> How to influence the PRS and Budgeting processes Targeting subsidies and affordability Generating and sustaining Political will Quality harmonisation 	<ul style="list-style-type: none"> Capacity Building – all levels – including education and awareness Institutional Arrangements: clarifying national, regional, and including NGOs, CBOs, etc. 	<ul style="list-style-type: none"> Decentralized planning – community energy planning Financing coordination and approaches to donors National Implementation Strategies 	<ul style="list-style-type: none"> Data and information management, coordination, monitoring & evaluation Research and Development of energy data production to inform the strategy
<p>Additional issues to be taken into consideration:</p> <ul style="list-style-type: none"> Supply Gender 			

Deliberations regarding this summary of key issues included:

- Gender – there seems to be too much emphasis on women. We should not leave out the men in this document.
- Request to add both quality and standardization of the technologies to the Policy Harmonization column of issues to discuss – agreed.
- Request to add monitoring and evaluation to the “Data and Information Management” bullet under strategic coordination – agreed.

3. The individual countries split up themselves into four equal groups according to interest and/or specialization to address the recognized constraints under each service line category, as presented above. The specific task of each group was to develop an exhaustive list of options for addressing each issue as well as a number of key steps that need to be taken within the next six months to implement the strategy document.

4. Key Findings of Service Line Working Groups are as follows:

Policy Harmonization

How to influence the PRS and budgeting processes:

- Energy needs to be a higher priority with more visibility
- Prioritize energy in PRS including an M&E strategy
- Need to articulate the energy benefits as they relate to the MDGs
- Cost the access strategy at the national level
- Include energy specialists in the PRS process

- Recast Scale-Up document language so it is useable by other sectors
- Capacity building for policy and advocacy needs
- Important to have energy officers at local levels
- Need to have energy users included in advocacy efforts

Targeting subsidies and affordability

- Cost all energy services to derive tax/subsidy needs
- Need to factor environmental costs into costing calculations
- Criteria for targeting subsidies at the national level
- Need to review current tax regimes
- Link energy access strategies with income generating strategies (e.g. link energy with agriculture sector strategies)
- Enhance linkage between energy access strategy and other existing EAC energy strategies

Generating and sustaining political will:

- Expectations of each country should be made clear to Heads of State and should be updated regularly with single-page briefings
- Permanent Secretaries should be included in this process
- Need to conduct policy audits
- Policy harmonization among donors is critical
- Make sure energy access is on the agenda of opposition party leaders

Capacity Building

- Create awareness about scale-up strategy at all levels
- Create and disseminate a simplified

version of the strategy report

- Identify key institutions that can play a role in scaling up
- Develop training curriculum for universities and technical institutions
- Financial plan with concrete proposals for capacity building
- Identification of energy access “champions” at the regional and national levels

Investment Programme Implementation

- Define fund allocation principals and priorities
- Integrated planning and implementation
- Guidelines for investment and financing packages
- Inventory existing programmes for mainstreaming and scaling up
- Building capacity at local level in energy investment planning
- Identification of energy supply sources and cost implications
- Formation of regional investment planning committees
- EA energy fund framework

Strategic Coordination

- Baseline survey to capture available data (socioeconomic data, primary energy, equipment, services, etc.)
- Harmonize energy management information systems
- Energy Access website
- Data coordination starts with ministries, feeds into EAC
- Energy issues included in national censuses
- Production of annual energy statistical book
- Research and Development Priorities: continuous impact

assessment, sustainability of supply, types of technologies needed under HILCS framework

5. Key recommendations for activities to be undertaken over the next six months to implement the EAC strategy include the following, as documented in Annex 11:

Policy Harmonization

- Initiate sensitization and awareness efforts at the regional and national levels
- Seek initial funding for first six month activities
- Mainstream the strategy document in national policy processes
- Establish the PCU and ensure that it is properly staffed and funded
- Establish energy working committee
- Undertake comprehensive supply side assessment

Capacity Building

- Create awareness about scale-up strategy at all levels
- Create and disseminate a simplified version of the strategy report
- Identify key institutions that can play a role in scaling up
- Develop training curriculum for universities and technical institutions
- Draft a Capacity Building financial plan with concrete proposals
- Identification of energy access “champions” at the regional and national levels

Investment Programme Implementation

- Define fund allocation principals and priorities
- Create a framework for integrated

planning and implementation

- Develop guidelines for investment and financing packages
- Undertake inventory of existing programmes for mainstreaming and scaling up
- Initiate capacity building at local level in energy investment planning
- Undertake resource assessment for energy supply sources and cost implications
- Formation of regional investment planning committees
- Develop EA energy fund framework

Strategic Coordination

- Initiate a Baseline Survey
- Undertake impact assessment of energy services
- Identify and fully cost R&D activities
- Draft detailed data monitoring and evaluation plan

The above issues and recommendations were discussed by each country individually with the objective of producing a six-month workplan specific to the domestic situation. Each plan can be found in Annexes 8-10.

Closing Remarks: Dr. Weggoro

We need to distinguish between a strategy, a plan, and a programme. We hope that the draft document will be taken to the energy committee next month. It is recognized that the final approval is expected by the end of November, therefore work plan activities presented today cannot be undertaken until the beginning of January, 2007. Before beginning implementation, detailed workplans must be prepared and should involve more people. We will also be looking at the supply-side issues

upon implementation. In response to questions of how to mobilize funding, we will plan to mobilize funding at a regional level. We will sit together and decide how the strategy will be funded at a later date. The capacity to implement this strategy is crucial to success. We cannot say that we are fully prepared to implement at this time. But, the EAC is putting together an institutional arrangement that will see an increase in staff and costs as well as a Senior Energy Officer. We also expect to discuss this strategy with other partners, including ADB, UNDP, GTZ, etc. It is important to take into consideration proposed activities at the national level, because in the end those will build a national outlook.

CONCLUSIONS DAY ONE

The EAC Scale Up Strategy Document adequately captures the energy access needs and constraints faced in the region, with the exception of the following which will be addressed in the next draft:

- Energy supply/source information is not adequately reflected in current version of the document
- End user contribution should focus on ability to pay rather than willingness to pay
- Gender and environment dimensions of energy poverty should receive more attention
- Wording under the heading of financing institutional capacity should be changed to read "insufficient financing", not "lack of financing" as funding mechanisms already exist for many business models.
- Add Private Sector and NGOs/CBOs to the Multi-Sectoral Working group under the existing Institutional Framework

CONCLUSIONS DAY TWO

Workshop participants identified a list of key recommendations for activities to be undertaken over the next six months to implement the EAC strategy, categorized according to the four EAC service lines as follows.

Policy Harmonization

- Initiate sensitization and awareness efforts at the regional and national levels
- Seek initial funding for first six month activities
- Mainstream the strategy document in national policy processes
- Establish the PCU and ensure that it is properly staffed and funded
- Establish energy working committee
- Undertake comprehensive supply side assessment

Capacity Building

- Create awareness about scale-up strategy at all levels

- Create and disseminate a simplified version of the strategy report
- Identify key institutions that can play a role in scaling up
- Develop training curriculum for universities and technical institutions
- Draft a Capacity Building financial plan with concrete proposals
- Identification of energy access "champions" at the regional and national levels

Investment Programme Implementation

- Define fund allocation principals and priorities
- Create a framework for integrated planning and implementation
- Develop guidelines for investment and financing packages
- Undertake inventory of existing programmes for mainstreaming and scaling up
- Initiate capacity building at local level in energy investment planning

- Undertake resource assessment for energy supply sources and cost implications
- Formation of regional investment planning committees
- Develop EA energy fund framework

Strategic Coordination

- Initiate a Baseline Survey
- Undertake impact assessment of energy services
- Identify and fully cost R&D activities
- Draft detailed data monitoring and evaluation plan

Based on the above regional recommendations, each individual country has drafted a six-month road map (or workplan) identifying activities to be taken on a national level including a timeline, assignment of duties, and identification of potential funding sources. These draft road maps have been appended (Annex 6).

RECOMMENDATIONS

1) Approval of the EAC Strategy Document upon incorporation of the requested changes as captured in

Conclusions of Day One.

2) Establish the EAC Project Coordination Unit as recommended in

the draft strategy and ensure that is properly staffed and funded.



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