GGCA
Global Gender and Climate Alliance

UNDP

Gender and Climate Change Capacity Development Series – Africa

Module 3 – Energy

Working Draft

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CONTENTS

I. PURPOSE OF THE TRAINING MODULE

IA. Rationale

The United Nations Development Programme (UNDP) has developed training modules and policy briefs on gender and climate change themes of specific relevance to the Africa region, including overall climate change issues, adaptation, finance, agriculture and food security, and energy and technology. These knowledge packages are expected to assist in capacity-building efforts in the Africa region on gender and climate change and on broader issues of sustainable development. These materials draw on work being undertaken in partnership with other members of the Global Gender and Climate Alliance (GGCA) and complement existing GGCA training modules, resource guides, and related knowledge products. Their preparation has been made possible by contributions from the Government of Finland and the Government of Denmark. (For more detail, see the introduction to module 1).

This third module in the series deals with gender issues in the production and use of energy, and sustainable energy technologies.

IB. Module structure and method

This module provides basic information and learning tools needed to understand, advocate and influence climate change polices at the regional, national, and community levels so that they integrate gender perspectives. It focuses on gender and energy, and covers the following themes:

- Gender-differentiated aspects of rural energy production, use and distribution in Africa
- Climate stress on the energy sector and the gendered results of these changes

Box 1: Key to pictures and icons

	Activity or exercise
	Link to other modules
	PowerPoint / video presentation
	Readings
	Important information
	Timing indication
	Internet link

- The need and options for the integration of gender perspectives in energy policy and the development and deployment of sustainable energy technologies

The module starts by outlining its learning objectives and what users are expected to understand upon conclusion of the training (part II). The key messages of the module are presented in part III followed by parts IV and V which examine the nexus between gender, energy and technology including the gender-based constraints that women face in energy production and use, as well as the impact of climate change on the energy sector. Part VI presents tools and options for bridging the identified gender barriers.

Case studies and other learning tools, including handouts, video and group activities, are included to help facilitate use of the module. In addition, the module employs seven pictures and icons to help make it user friendly (box 1). The module also includes references to other thematic modules in this series. Both the facilitators and participants are encouraged to consult the other modules in this series.

Training based on this module can be delivered in three sessions:

Session 1: Part II and IV (1 hour)

Session 2: Part V (1 hour)

Session 3: Part VI (1 hour)

Total estimated session time: 3 hours

The Learning tools section offers a breakdown of time for different activities.

II. LEARNING OBJECTIVES

- Understand the gender dimensions of rural energy production, distribution and use in Africa
- Identify gender barriers in the energy sector that contribute towards the poverty of women (time and resource poverty) as well as health risks
- Identify responses to address the various gender barriers in the energy sector in order to achieve greater gender equity, reduced emissions and energy security

III. KEY MESSAGES

- Energy is key to development, poverty alleviation and achievement of the Millennium Development Goals.
- The impact of climate change on the energy sector in Africa is yet to be thoroughly studied, but what studies there are show that the sector is already undergoing tremendous external stress and changes.
- Energy tends to be equated with electricity but most households in Africa do not have access to electricity; in Africa, many countries rely on biomass and fuel wood, and their collection and management is the responsibility of women.
- Women and men play very different gender-defined roles in energy production, distribution and utilization in households, communities and the market.
- Women are time-poor and disproportionately exposed to health risks associated with some forms of energy production.
- Climatic stresses on forest resources is increasing the burden on many women, forcing them to travel even longer distances to fetch fuel wood.
- There are several small-scale technologies that can improve rural energy production.
- Improved, modern energy services can improve the socio-economic status of women — they reduce the time and effort involved in household chores and the health risks associated with current energy practices.
- Introducing cleaner, more efficient and renewable sources of energy can also bring training, employment and entrepreneurial opportunities for women and men.
- For these reasons, empowering women and girls and drawing on their needs and knowledge is necessary for energy development, energy security and reduced emissions.
- Incorporation of gender perspectives in energy projects, policy and planning is key to ensuring their effectiveness.

IV. THE GENDER FACE OF ENERGY

Learning objective: Understand the gender dimensions of rural energy production, distribution and use in Africa

1. While not much has been written about the impact of climate change on the energy sector in Africa, major sources of energy in the continent are sensitive to the effects of climate change (IPCC 2007). Some studies, for instance, state that recurrent droughts are creating a power crisis in East Africa, a region that derives close to 80 percent of its electric supply from hydropower (Karekezi et al., 2009) (paragraphs 11 and 12).

2. The formal energy sector in Africa is severely limited in its reach and functioning (Karekezi et al. 2009; IPCC 2007). In sub-Saharan Africa, only an estimated 51 percent of urban populations and a mere 8 percent of the rural population has access to electricity, compared with 99 percent and about 80 percent respectively in northern Africa (IPCC 2007). Other exceptions to the situation in sub-Saharan Africa include South Africa, Ghana and Mauritius. Extreme poverty and the lack of access to other fuels mean that 80 percent of the overall African population (and 80 percent of sub-Saharan Africa) relies primarily on biomass to meet domestic needs. In Kenya, Tanzania, Mozambique and Zambia, for example, nearly all rural households use wood for cooking and over 90 percent of urban households use charcoal. This dependence on biomass has deleterious results on both people and the environment: for instance, the loss of vegetation, and health problems associated with the carrying of fuel wood and indoor pollution. The rise in urbanization and energy demands, and volatile oil prices, further compound the energy situation in Africa (IPCC 2007).

3. There is a strategic interest in curbing the energy sector's contribution to climate change. But energy also has strategic social and economic implications, such as for economic growth (paragraph 10). Energy is a key factor in poverty alleviation. Women bear a disproportionate weight of the world's poverty, representing 70 percent of those who live on a dollar a day (World Bank 2009). Like many other sectors, therefore, energy too has a gender face (paragraphs 4 to 8).

4. Energy, however, is often thought of in terms of the formal power sector i.e., electricity and fuel for the operation of heavy machinery and automobiles, by and large considered as men's work. Men and women are affected differently by energy policies wherever their home, work and community roles differ. For example, in many societies, electrical energy for use in households and public facilities is considered dangerous. Boys are expected to face and master these dangers. While girls are encouraged to get acquainted with electricity step by step, they are not exposed to more advanced knowledge about it. In Lao, for instance, men are considered to be responsible for the technical side, and the investments in thermal insulation of homes, boilers, and hot water installations. Electrical installation, plumbing, and installation of heating systems are male domains (GGCA 2009). Such stereotypes often lead to women being excluded from training and employment opportunities and discussions about energy plans and policies (Women Watch 2009; ENERGIA 2007).

5. Energy use in business and entrepreneurships also has a gender dimension. Table 1 shows female participation in firm ownership, management, and the workforce, focusing on manufacturing firms. Women have lower access to finance and energy-related services than men in many African countries. The World Bank Group's Enterprise Survey, for example, shows that women-headed businesses generally face more impediments in accessing grid electricity, compared to men. Experiences in Ethiopia, Ghana, Kenya, Tanzania and Zambia suggest that women entrepreneurs also face greater discrimination in the form of delays in obtaining electrical connections and the expectation that they will pay bribes to get them (Alstone et al. 2011).

Table 1: Female participation in firm ownership, management, and the workforce

Economy	Percent of firms with female participation in ownership	Proportion of permanent full-time workers that are female (%)	Proportion of permanent full-time non-production workers that are female (%)*	Percent of firms with a female top manager
Sub-Saharan Africa	32.1	24.4	7.2	15.2
Angola	56.6	50.7	20.8	13.5
Botswana	55.3	41.1	13.4	16.4
Burkina Faso	19.2	21.5	6.4	11.3
Malawi	58.3	30.6	8.8	21
Congo DR	38.9	18.7	6.7	13.7
World	35.7	31	10.1	18.5

Source: Adapted from World Bank (2011a).

6. The reality of gender-based roles in energy generation, utilization and distribution in many developing countries, is the opposite of the prevalent idea that it is a male-dominated field. Energy is the primary responsibility of women, especially in rural communities, where most energy is derived from traditional biomass fuels such as wood, charcoal and agricultural wastes (Carr et al. 2010, ENERGIA 2007). Women face a range of gender-specific problems in relation to their roles in the production and utilization of energy services (see paragraph 13). There are a number of factors that account for this:

   - Women and men have different energy needs linked to their gender roles;
   - Women bear the main burden of biomass collection;
   - Women are poorer than men (both in resources and time);
   - Women are generally disadvantaged in terms of ownership and access to land, natural resources, credit, information and decision making, at all levels.

7. Lack of recognition of the role of women in the energy sector often leads to 'gender-blind' energy policies as well as their financing and execution. For example, the Clean Development Mechanism, one of the major global climate funds, has been subjected to critique for deemphasizing investments in small-scale projects that benefit women and poor communities, in favor of large-

scale projects that are likely to garner a larger number of Certified Emission Reductions, a type of carbon credit issued for emission reductions achieved by Clean Development Mechanism projects (UNDP 2010, Karlsson 2010). At the same time, some finance mechanisms including the Climate Investment Funds and Global Environmental Facility are working to become more gender-responsive. Some large infrastructure projects designed to promote cleaner, more efficient forms of fossil fuels and renewable energy can bring many opportunities for gender equality when designed properly. For example, energy projects can offer new skills training, increased employment and entrepreneurship opportunities for women, as well as more equitable benefit sharing at the community level.

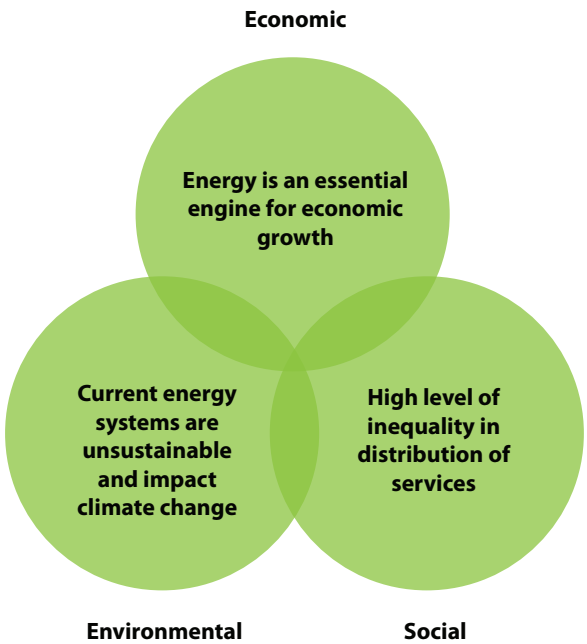
8. The Human Development Report (2011) observes that "women often show more concern for the environment, support pro-environmental policies and vote for pro-environmental leaders, their greater involvement in politics and in nongovernmental organizations could result in environmental gains, with multiplier effects across all MDGs" (UNDP 2011). Further, women play a crucial role in ensuring the efficiency and sustainability of responses to climate change (Carvajal-Escobar et al. 2008). More specifically, women can help policy makers formulate programs to help increase access to grid and off-grid sources of electricity (Alstone et al. 2011). The failure to consider gendered interests and needs could, therefore, limit the effectiveness of not just energy programmes and policies, but all development activities that involve energy use.

V. GENDER BARRIERS IN ENERGY

Learning objective: Identify gender barriers in the energy sector that contribute towards poverty of women (time and resources) as well as health risks

9. The energy sector poses complex social, environmental and economic challenges. Energy is a social challenge in that there are high levels of inequality in its access and consumption (see paragraphs 2-6). It is an environmental challenge because excessive energy use could aggravate climate change. And it is an economic challenge because limitations in energy supply can constrain economic growth. The three combine to make energy a fundamental challenge to sustainable development (UNDP 2011; see figure 1).

Figure 1: Energy as a sustainable development challenge



Source : (UNDP 2011).

10. Grid-based electrical power does not reach many rural and poor urban communities in developing countries, nor do they receive adequate distribution of gas or other cooking and heating fuels (UNDP 2011). This training module focuses primarily on these communities. At present, only 24 percent of the people have access to electricity in sub-Saharan Africa and 25 countries are in a state of power crisis. Worldwide, about 1.5 billion people (more than 1 in 5) lack access to electricity and about 3 billion people (40 percent of the global population) rely on wood and charcoal as their primary source of energy (IEA 2011; UNDP HDR 2011; UNDP 2011; World Bank 2010; Toulmin 2009).

Table 2: People without electricity				
	Without Electricity		Relying on traditional use of biomass for cooking	
	Population (million)	Share of Population	Population (million)	Share of Population
Africa	587	58%	657	65%
Nigeria	76	49%	104	67%
Ethiopia	69	83%	77	93%
DR of Congo	59	89%	62	94%
Tanzania	38	86%	41	94%
Kenya	33	84%	33	83%
Other sub-Saharan Africa	310	68%	335	74%
North Africa	2	1%	4	3%
Developing Countries	1314	25%	2662	51%
World	1317	19%	2662	39%

Source: IEA (2011).

11. As the figures in table 2 show, the reliance on traditional biomass energy resources in Africa (mainly among rural households) is considerably high, even by developing country standards. In Ethiopia, DR Congo, Tanzania and Uganda, for example, biomass accounts for up to 93 to 95 percent of the total energy consumed (IEA 2007; 2011), with a similar pattern in many countries in the region. Although more research remains to be done on the effects of climate change on the energy sector in Africa, this dependence on biomass means that climate change and variability will most likely affect the sector adversely. In East Africa, for instance, one study notes that varying rainfall patterns have led to severe droughts which affected hydro-electric power generation in the region while excessive flooding contributes to the rapid build-up of silt in hydropower dams, affecting the amount of water available for electricity generation (Karekezi et al. 2009). It is to be noted also that other anthropogenic factors such as land use and deforestation worsen the situation. For example, around four hectares of forest (roughly twice the size of Rwanda) are felled or burnt in Africa each year (Toulmin 2009).

12. Sources of energy other than biomass, such as hydropower (especially for East Africa), are also prone to the adverse impacts of climate change. Karekezi et al. note that among the challenges facing East Africa's power sector is the recurrence of droughts: "the intensity of droughts is now so severe that their occurrence almost cripples the region's power sector" and that "this often leads to unprecedented power crises that have become a common feature of the region's power sector" (Karekezi 2009; see box 2).

Box 2: The Impact of drought-related power crisis on the cost of electricity in Uganda

In Uganda, electricity generation from hydro accounts for about 50% of all electricity generated. Lake Victoria dropped by at least 6 feet over a period of 3 years, resulting in reduced power generation at the Kira and Nalubale hydropower stations. This made it necessary to acquire alternative sources of energy, an exercise which increased operation costs across the board, though the impact varied across industry.

Power shortages were of particular concern to the industrial sector given industry's huge demand for electricity for its operations. The electricity supply shortage had a negative impact on GDP growth which dropped from an average of 6.5 per cent over the past 10 years to 5 per cent in 2005/2006. Turning to emergency electricity plants in Uganda led to increased power tariff: in 2005, the domestic tariff was UShs216.90 per kWh, when emergency electricity generation was at its peak the tariff rose to UShs426.10 per kWh, a 96 % increase. This had negative impacts for low income users who were forced to either reduce their consumption of electricity or to stop using it altogether (Karekezi et al. 2009).

13. Two gender-specific problems that rural women face as producers and users of energy are health and time-poverty.

    First, gendered roles in society often ascribe the responsibilities for collecting fuel and water to women and girls. Women carry greater loads than men but have a lower intake of calories because custom usually dictates that men receive more food and water (WHO 2011; UNDP 2011; Dankelman 2010). For example, a family of five needs about 100 liters of water weighing 100 kg each day to meet its minimum needs. Women/girls would need to walk to the water source two or three times each day. The physical burden involved carrying out these responsibilities often can pose a serious strain on women's health since carrying heavy loads over long periods of time causes cumulative damage to the spine, the neck muscles and the lower back, thus leading to early ageing of the vertebral column (WHO 2011). Indoor pollution is also a related and big health problem for women and girls. Inefficient burning of biomass indoors releases high levels of black carbon and accounts for nearly 2 million deaths per year, mainly of women and children in the poorest communities in the world (IPCC 2007; WHO 2011). Poor nutrition by women vis-à-vis their work load also means that they could be prone to increased prevalence of anemia, pregnancy and delivery problems, and increased rates of intrauterine growth retardation, low birth weight and perinatal mortality (WHO 2011).

    Second, women and girls spend considerable time in gathering fuel and water as well as cooking and other household chores, which raises another gender-relevant dimension of poverty: time poverty (see box 3). Rural women are 'time poor', in the sense that their ability to engage in

other productive activities (such as education) is constrained by the time expended on energy production activities like the collection of firewood (World Bank 2006). This is, among others, evidenced by the difference in literacy rates and school enrolment levels for men and women. For example, two third of all adult illiterates are women (UNESCO 2008). In sub-Saharan Africa, similarly the school enrolment rate for girls is 85 per 100 boys for primary school, and 83 and 71 respectively for secondary and tertiary education (UN DESA 2010). Since women collect firewood and water largely by foot, a scarcity of natural resources caused by climate change will increase their time poverty as women will be forced to travel farther to collect these resources (World Bank 2009; see modules 1 and 2).

Sisters of the Planet - Martina (video link) (see appendix B: Learning tools)

Box 3: Time poverty

Time poverty is a concept that has been developed to analyse time allocations of individuals and the opportunity cost of the same for their welfare. Conceptually, time poverty can be understood as the fact that some individuals do not have enough time for rest and leisure after taking into account the time spent working, whether in the labour market, for domestic work, or for other activities such as fetching water and wood. Put differently, those who work long hours have to make hard choices about what they allocate their time for, which has implications for the welfare of both individuals and the household. Unlike consumption or income, where economists assume that "more is better," time is a limited resource—more time spent working in paid or unpaid work-related activities means less leisure, and therefore higher time poverty.

Source: World Bank (2006: 6)

14. The dire situation for women as managers of energy production can be considerably improved by access to modern forms of energy. Reliable and efficient energy sources are essential for basic household needs such as lighting, cooking and heating, clean water and sanitation, and for other national development goals including mechanical power, transport and telecommunication services (Ouédraogo 2011). Increasing access to clean and reliable off-grid energy sources is an alternative way to improve the lives of millions, although this depends on the expansion of grids and the quality of grid-based electricity access (e.g., improved reach, fewer service interruptions and better quality power) (Alstone et al. 2011). "Although access to more modern energy alternatives will not necessarily lead to greater equality in gender roles, it can at least relieve some of the most burdensome and unhealthy aspects of their daily lives and expand the development options available to women, their families and their communities" (ENERGIA 2011).

On a larger scale, energy policies could catalyze national development and play a vital role in poverty alleviation and mitigation of the ill effects of climate change (IEA/UNDP/UNIDO 2010; Ouédraogo 2011). The 2010 World Energy Outlook has underscored the significance of the nexus between energy and poverty, and states that lack of access to modern energy services must be overcome if the MDGs are to be achieved. Specifically, MDG 1, the goal of eradicating extreme poverty and hunger by 2015 may not be achieved without progress on access to modern energy services (IEA 2010; see box 4).

Box 4: The importance of modern energy sources in achieving the MDGs

Goal 1: **Eradicate extreme poverty and hunger.** Access to modern energy facilitates economic development by providing more efficient and healthier means to undertake basic household tasks and means to undertake productive activities more generally, often more cheaply than by using the inefficient substitutes, such as candles and batteries. Modern energy can power water pumping, providing drinking water and increasing agricultural yields through the use of machinery and irrigation.

Goal 2: **Achieve universal primary education.** In impoverished communities children commonly spend significant time gathering fuelwood, fetching water and cooking. Access to improved cooking fuels or technologies facilitates school attendance. Electricity is important for education because it facilitates communication, particularly through information technology, but also by the provision of such basic needs as lighting.

Goal 3: **Promote gender equality and empower women.** Improved access to electricity and modern fuels reduces the physical burden associated with carrying wood and frees up valuable time, especially for women, widening their employment opportunities. In addition, street-lighting improves the safety of women and girls at night, allowing them to attend night schools and participate in community activities.

Goals 4; 5; and 6: **Reduce child mortality; Improve maternal health; and combat HIV/AIDS, malaria and other diseases.** Most staple foods require cooking and reducing household air pollution through improved cooking fuels and stoves decreases the risk of respiratory infections, chronic obstructive lung disease and lung cancer (when coal is used). Improved access to energy allows households to boil water, thus reducing the incidence of waterborne diseases. Improved access advances communication and transport services, which are critical for emergency health care. Electricity and modern energy services support the functioning of health clinics and hospitals.

Goal 7: **Ensure environmental sustainability.** Modern cooking fuels and more efficient cookstoves can relieve pressures on the environment caused by the unsustainable use of biomass. The promotion of low-carbon renewable energy is congruent with the protection of the environment locally and globally, whereas the unsustainable exploitation of fuelwood causes local deforestation, soil degradation and erosion. Using cleaner energy also reduces greenhouse-gas emissions and global warming.

Goal 8: **Develop a global partnership for development.** Electricity is necessary to power information and communications technology applications.

Source: IEA (2010).

15. Examples of low-carbon energy technologies that can be utilized in modernizing rural energy include solar photovoltaic panels, small hydro systems, wind turbines, and generators fuelled by plant oils or biofuels (including biogas, biodiesel and bioethanol) and improved cooking stoves. These technologies can be used to provide electricity in off-grid or underserved areas (Karlsson et al. 2010; see box 5). Other simple yet consequential off-grid lighting devices such as pressure lamps and candles could also used along with the latest advances in clean energy technology (such as solar, LED, and advanced batteries) to provide safe, efficient, affordable alternatives to fuel-based lighting (Alstone et al. 2011, see figure 2).

Box 5: Modern fuels and technology options

Cooking, heating, food processing

- Liquefied petroleum gas (LPG) or kerosene
- More efficient stoves or solar cookers
- Biomass briquettes
- Biogas or bioethanol produced in biomass digester

Mechanical power for water pumping, household and commercial enterprises, and transportation

- Windmills, water mills or solar pumps
- Electrical grid
- Motors run on liquid fuel (gasoline, diesel or biofuel)

Lighting, communications, refrigeration, and health, education and social services

- Electrical grid
- Diesel generators
- Wind turbines
- Hydro-electric generators
- Solar photovoltaic panels
- Hybrid generating systems
- Pressurized lamps
- Hurricane lamps
- Tin lamps that have uncovered wicks and are often manufactured "locally" out of reclaimed containers
- Candles

Source: ENERGIA (2011); Alstone et al. (2011).

Figure 2: Fuel-based off-grid lighting technologies

Pressure lamp | Hurricane lamp | Tin lamp | Candle

Source: Alstone et al. 2011.

VI. INCORPORATING GENDER PERSPECTIVES IN ENERGY

Learning objective: Identify policy responses to address the various gender barriers in the energy sector in order to achieve greater gender equity and energy security

16. Basic technology such as electricity for lighting and cooking is still a luxury for rural women. Properly developed and deployed sustainable energy technologies could provide the twin benefits of effective climate change responses (both mitigation and adaptation) and improved livelihoods of the poor in general and rural women in particular (Karlsson et al. 2011). Sustainable renewable energy options such as geothermal, small hydropower and wind are considered 'ideal' for Africa because these resources are widely available, hence they should also be effectively employed (Karekezi et al. 2009). Such options are not only environmentally friendly but also more amenable for adaptation responses to the impacts of drought (which could be climate change related) on the power sector (Karekezi et al. 2009).

17. Mainstreaming gender into energy projects and energy planning process requires an appreciation of not only the different energy needs of women but also the contributions of women to climate change responses. It would lead to high quality, effective, gender-sensitive energy project planning processes. Women should be involved in the design and production of locally appropriate energy technologies (Karlsson et al. 2011). There are two aspects of project planning where gender concerns can be incorporated. These are energy technology projects which specifically promote a particular type of technology, and integrated projects which include energy as a component of a larger development process. Box 6 discusses these two areas in more detail. There are also a set of gender analytic tools that have been developed specifically for energy and technology planning (see PowerPoint presentation).

Box 6: Energy project planning situations for gender mainstreaming

There are at least two different project planning situations in which gender, technology and energy can come together: (i) energy technology projects, and (ii) Integrated development projects, in which energy is a component.

Energy technology projects: These are projects which focus on the dissemination and adoption of one or two particular types of technology, such as solar home systems, improved stoves or decentralized mini-grids. In some ways, such projects can be thought of as supply driven; the purpose is to promote certain kinds of energy technology for the good of a given population. In this case, the main question that arises from a gender point of view is, to what extent will this technology, or these technologies, bring about positive gender impacts? How can the project affect household health, decision-making and time poverty? How can women and men benefit from new training, employment, entrepreneurial and community benefit sharing? An energy technology project does not necessarily have to be initiated in the energy sector; for example, smokeless stoves could be initiated as a health sector project.

Integrated development projects: Integrated development projects try to assist communities to develop over a broad range of sectors of which energy may be just one, and in which energy may be just a component necessary for achievements in other sectors. The gender-energy question then becomes, what are the energy components necessary to achieve overall goals, including gender goals, and how can these energy requirements best be satisfied? Variations on this model are women's development projects, where the target is clearly women. The question addressed here is the extent to which energy hinders the achievement of the gender goals and how energy can be used to further women's development.

Gender Analytical Tool (PowerPoint presentation)

Box 7: Gender audit of energy policy in Botswana

The Botswana Technology Centre, in consultation with the Energy Affairs Division of the Ministry of Minerals, Energy, Water Resources and other stakeholders, executed a gender audit of Botswana's national energy policies. Botswana is the first country where such an audit was held. The audit showed that although there is a common understanding of the different roles of women and men in Botswana, the knowledge of the relationship between gender, energy and poverty was still limited. This has resulted in gender-blindness of the energy policies and programmes, and a lack of consultation with household residents and women in particular, in developing the energy policy. The audit also showed a lack of gender-disaggregated data and a general lack of association between energy services and the MDGs. Based on this audit and follow-up trainings, the awareness in the government and of the Botswana Power Corporation staff has increased. The corporation recently started a groundbreaking gender mainstreaming programme for rural electrification. The audit also led to a pilot project for collecting gender-disaggregated data, and strengthening gender expertise in the country's energy sector.

Source: Wright and Gueye (2009) cited in Dankelman (2010).

18. Climate change financing focusing on the energy sector should complement the broader developmental goals including gender parity, poverty eradication and sustainable development (UNDP 2011). This holds true for the major public climate finance mechanisms funding energy programmes, as well as private sector sources of energy and technology financing. Mitigation financing schemes need to include opportunities to focus on projects that benefit poor and marginalized communities, including women. This should be true also for the NAMAs under the UNFCCC process (Schalatek 2009). At the very least, gender and social impact assessments need to be undertaken during programme and project design and reviewed during funding approval processes (UNDP 2011). Where possible, existing and future carbon financing possibilities should expand women's access to energy by encouraging small-scale projects (such as improved stoves) to qualify for financing and streamlining the application process to reduce the associated transactional costs.

Group exercise (see appendix B: Learning tools)

VII. CONCLUSION

Women, particularly among the poor and rural communities who do not to have access to energy sources such as electricity, play a pivotal role in energy production, distribution and utilization. This is especially the case in Africa where many countries in the region are over-reliant on biomass as a source of energy, more so than most developing countries. Biomass collection is the primary responsibility of women; yet women are time-poor and overly exposed to health risks associated with energy production. Furthermore, climatic stresses on forest resources could potentially exacerbate this situation by forcing them to travel longer distances to fetch fuel wood.

Energy is key to development, poverty alleviation and achievement of the MDGs. Access to better energy services can also improve women's socio-economic status, reducing the time and effort involved in household chores, giving them time to avail of other social services such as education, and improving their health conditions. The introduction of cleaner, more efficient and renewables sources of energy can also bring new training, employment and entrepreneurial opportunities for women and men.

The empowerment of women and girls is necessary for energy development and energy security; gender perspectives need to be incorporated in energy projects, policy and planning to ensure their effectiveness and sustainability.

Energy policies need to be carefully designed in ways that benefit both women and men. All concerned — governments, civil society, the donor community, the private sector and individuals — should seek to understand the gender-differentiated needs and responsibilities of men and women, make gender-aware policy and programming decisions, and give women greater voice in decision-making at all levels.

APPENDIX A: CASE STUDIES

Case study 1: Photovoltaic project for rural electrification (Uganda)

The Uganda Photovoltaic Pilot Project for Rural Electrification (UPPPRE) was designed as a three-year pilot project, funded by UNDP/GEF, with a goal of promoting the use of solar photovoltaic technology in Uganda. The project aimed at overcoming financial, social, and institutional barriers that hinder the widespread dissemination of this technology. The strategy was to establish viable financial and institutional mechanisms for offering solar photovoltaic systems on a commercial basis to households, businesses and communities.

The project, which started in 1998, focused on rural areas, and areas on the outskirts of cities, that were projected to remain off the national electric grid for a period of at least five years. The project has led to installations by solar companies of 576 solar home systems and 42 institutional systems. Some of the institutional systems have been installed in collaboration with the Ministry of Health and local government agencies to provide clinic lighting and vaccine refrigeration.

During the implementation stage, special efforts were made to encourage women entrepreneurs to purchase solar systems by offering credit through a women's bank. These efforts have not been very successful, however, because of high interest rates, short repayment schedules and collateral requirements.

Source: UNDP (2001).

Case study 2: Use of low cost fuel-efficient wood stoves by women in Daudu (Nigeria)

The forests around the Daudu community that once provided the sole source of fuel wood for cooking are now in serious decline. The open wood stoves commonly used in the community consume a lot of wood especially on windy days when the wood burns faster. The need for fuel wood is increasing with high population growth, but the area around the community is so deforested, that there is a serious problem and demand cannot be met. In 2010, during a focus group discussion with staff from Greenwatch Initiative, some women in Daudu were asked what they thought could be done to improve this situation. One woman suggested the use of closed chamber wood stoves which would block the wind during cooking and therefore use less wood. Fifteen women of Daudu volunteered to try the new technique and following a pilot testing phase, the volunteers were unanimous at how little wood was used and how fast the food cooked. The low cost fuel-efficient wood stoves are constructed by arranging either mud blocks or stones in a crescent shape, leaving an opening for the fuel wood. Only small openings are made so as to reduce heat loss from the stove. This cooking device takes the women about 30 minutes to construct and requires no monetary cost except for the time used and the water needed in securing the joints. News of this low cost stove is spreading quickly to neighboring villages by women who see how effective the stove is and the reduced amount of fuel wood needed for cooking. One woman confirmed that while cooking with the new device, her food burned because she failed to check it soon enough, thinking that it would require a longer time to

cook as with the old open woodstoves. One important lesson learned, however, is that these stoves need to be kept dry and should not be built where they are exposed to rain, as they can be easily washed away.

Source: NEST (2011).

Case study 3: Efficient biomass stoves (Kenya)

Over 95 percent of about 20,000 institutions (schools, colleges, hospitals) in Kenya use fuelwood as the main source of energy for cooking and heating. In 1996, with support from GEF's Small Grants Programme (SGP) implemented by UNDP, the Renewable Energy Technology Assistance Program (RETAP) was established to assist 20 schools in Mt. Kenya with planting wood lots in their schools and installing energy-efficient stoves in their kitchens. Each school used on average 160 tonnes of non-renewable wood per year. A revolving credit fund was successfully established (with $50,000 from SGP) to facilitate the purchase of the stoves, with loan repayments made within two years from the savings on firewood purchases.

Based on the success of the SGP pilot, the UNDP/GEF-funded programme Market Transformation for Efficient Biomass Stoves for Institutions and Medium-Scale Enterprises in Kenya was implemented from 2007 to 2010 with funding of $1 million (including an additional $200K for the revolving fund). Over a four-year period, the project sold and installed approximately 1,500 institutional stoves to more than 1,000 schools, small and medium enterprises (and households, and planted 500,000 trees. The revolving credit facility has expanded by four-fold and Rural Technology Enterprise (RTE) was spun-off as a private sector company and registered MFI that fabricates and installs EE stoves.

In 2010, RETAP, UNDP and United Nations World Food Programme (WFP) have signed a memorandum of understanding to supply stoves to marginalized communities. This programme will be partly financed by the Japanese-supported Africa Adaptation programme implemented by UNDP, WFP and United Nations Industrial Development Organization, and partly by the WFP school feeding programme. Building on lessons from the GEF Market Transformation project, the Government of Kenya is exploring options to scale up this approach via utilization of a proposed allocation from the World Bank's Strategic Climate Fund's Scaling Up Renewable Energy Program (SREP) in Kenya.

The programme could also benefit from the support of the United Nations Capital Development Fund/UNDP Clean Start Programme, which aims to develop the capacity of macro-finance institutions to enter the low pollution, energy-efficient stoves' market (2011). The preparation of a Programme of Activities (PoAs) to access carbon finance to further scale up the programme will also be considered.

One of the greatest successes of the RTE/RETAP project has been its ability to gradually grow, from a small-scale operation into a prominent operation specializing in fabricating and installing energy-efficient stoves. When an operation starts small, it is able to consolidate its gains and to learn from its mistakes and make adjustments along the way (Matiru and Schaffler, 2011).

Source: UNDP (2011).

Case study 4: Sustainable energy solutions (Mauritius)

The Government of Mauritius has a long-term vision for transforming Mauritius into a sustainable island nation. An important part of this vision is to increase the country's use of renewable energy and to promote energy efficiency (EE) measures, both of which would help to reduce dependence on fossil fuels and to achieve energy security. The Government has recently adopted a "Long Term Energy Strategy, 2009-2025," which seeks to diversify the country's energy supply, improve energy efficiency and modernize the energy infrastructure.

UNDP is supporting the Government of Mauritius to implement its national energy strategy through a mix of assistance for the enactment of critical (upstream) policies and institutional structures, together with targeted initiatives to facilitate investments in renewable energy and EE measures at the community and household (downstream) levels. These initiatives demonstrate the effectiveness of a comprehensive and holistic approach to energy security through a combination of macro-, meso- and micro-level interventions.

Source: UNDP (2011).

APPENDIX B: LEARNING TOOLS

Task 1: Sisters of the Planet (Martina) (plenary)

Learning objective: Understand the different ways in which gender roles in society determine the ways in which women experience the impacts of climate-induced resource scarcity

Sisters of the Planet - Martina (Uganda) (video)

10 minutes (video presentation); 20 minutes (group discussion and reflection)

Notes to the facilitator

Encourage a discussion on the take-away message of the video presentation.

Encourage a discussion on the question "How does climate change impact men and women in energy production, distribution and consumption?"

Encourage the participants to discuss experiences of the gender-energy nexus in their local contexts.

Task 2: Gender-proofing NAPAs (Breakout groups and plenary)

Learning objective: Understand the challenges and opportunities of NAPAs in incorporating gender perspectives in the adaptation to climate change

Gender-proofing NAPAs

20 minutes (group breakout discussions); 15 minutes presentation of findings (three presentations of five minutes each); 20 minutes plenary discussions

NAPA Burundi (2007: 54-55) "Capacity Building to Promote Energy-Wood Saving Techniques"

NAPA Gambia (2007: 73-74) "Briquetting and Carbonization of Groundnut Shells"

NAPA Sierra Leone (2008: 58-60) "Promotion of the use of renewable energy (solar energy) and improvement of energy efficiency and conservation in Sierra Leone"

Notes to the facilitator

1) Divide the participants into three groups; give the groups one reading each.
2) Appoint a leader in each group.
3) Ask the groups to use the information on the above-cited materials and do a gender analysis on the relevant projects and present a revised version after incorporating gender perspectives (encourage use of the Gender Analytical Tool discussed in Part VI)
4) Finally, ask the participants to discuss they have learned from the assignment.

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