COMPENDIUM OF ABSTRACTS

SARDC VIRTUAL CONFERENCE ON SHARING EXPERIENCES OF GENDER AND RENEWABLE ENERGY INNOVATIONS

10-11 November 2021

INTRODUCTION

The energy sector is one of the main drivers of economic development in the Southern African Development Community (SADC), as shown in the regional development plan for 2020-2030, the Regional Indicative Strategic Development Plan (RISDP). The plan places emphasis on energy as an important factor of regional integration and socio-economic development. Gender equity and equality are a main area of focus in the integration agenda and SADC Member States have supported the fundamental principle that women and men must be engaged at all levels and in all areas of socio-economic development. The nexus between gender and energy, therefore becomes imperative as both are important factors to the development of the region. Access to affordable, reliable and modern energy is critical in addressing development challenges which include gender inequalities, where women are the most disadvantaged.

Women are in most cases responsible for household chores and this particularly occupies most of their time collecting firewood for cooking, heating and lighting needs. Women and girls are found travelling long distances to carry water for drinking, cooking and other tasks which take up most of their time and can be a threat to their wellbeing. These duties can be lifted and the lives of women made easier through access to Renewable Energy Technologies (RETs) and other innovations.

In recognition of the challenges that befall women, in particular, as a result of lack of access to renewable energy, the Southern African Research and Documentation (SARDC) through its Beyond Inequalities Gender Institute organized a conference which was aimed at providing a platform for various stakeholders to share innovations in the renewable energy sector that advance gender equality. The conference brought together stakeholders in the renewable energy sector to discuss success stories, innovations, experiences, challenges, lessons learned and how to carry forward efforts at mainstreaming gender in renewable energy services.

We present in this report a compendium of abstracts of the presentations shared by various stakeholders during the conference held virtually on 10-11 November 2021.

Conference Objective

Equality for women and men can be accelerated through sharing knowledge and experiences that lead to adoption of innovative practices in the use of appropriate energy technologies.

Expected Results of the conference

- ⇒ Contribution to the reduction of gender inequality in the energy sector;
- ⇒ Strategic linkages with stakeholders are established to advance innovations; and effective practices; and
- ⇒ Recommendations for policies, practices, and research areas to advance the objective.

OFFICIAL OPENING

WELCOME REMARKS

BY SARDC EXECUTIVE DIRECTOR, MUNETSI MADAKUFAMBA

Munetsi Madakufamba began by welcoming the participants to the two-day virtual conference on "Sharing Experiences of Gender and Renewable Energy Innovations". He revealed the purpose of the conference as one meant to contribute to the advancement of gender equality through sharing knowledge and experiences that can lead to the adoption of innovative practices in the renewable energy sector. The conference had been necessitated by the fact that lack of access to renewable energy affects women and men disproportionately. Women, in most cases, are responsible for household chores and this significantly occupies most of their time, for example when collecting firewood for cooking, heating and other needs. These daily household chores for girls and women could be made easier if households had access to Renewable Energy. Through improved access to modern clean energy services, both women and men can have time to engage in other activities such as income-generating projects and can improve their health, status and living conditions.

Madakufamba emphasised the critical role that the renewable energy sector plays in creating space and equal opportunities for women and men to reach their full potentials and contribute to sustainable development. It is thus important that stakeholders and citizens in particular are encouraged, motivated and empowered to come up with innovative ideas that can improve their wellbeing. He called on participants to share practical innovations that could help stimulate debate on areas that are yet to be explored in ensuring gender equality is achieved in the energy sector, as well as opportunities for upscaling and replication across the region. The Executive Director stated that SARDC, as a regional knowledge resource centre, through its beyond inequalities gender institute was ready to assist and work with various stakeholders to ensure targets for access to renewable energy is achieved and that gender is mainstreamed to ensure equality for sustainability.

Out of a population of about 370 million people just over a third of that have access to electricity. As for women who constitute more than half of the population of most SADC Member States, they find themselves facing disproportionate challenges associated with access to modern sources of energy compared to men. Access to energy is therefore gendered, with women in most countries in the region experiencing energy poverty differently and more severely than men. This is partly due to the fact that women and girls are, to a large extent, responsible for household and community activities, including energy provision in most SADC countries.

To this end, said Madakufamba, the SADC region has made the political decision and commitment to mainstream gender and promote the empowerment of women in policies and development initiatives. However, what remains a challenge is the transition from political will to concrete actions due to a number of factors which include lack of capacity or enforceable legislation to mainstreaming gender. This is precisely what the project on "Mainstreaming Gender in Renewable Energy Sector" seeks to address through this conference. Broadly, it is hoped that through this effort,

the SADC Member States can be encouraged to create conditions that promote gender mainstreaming in the renewable energy sector. This is because promoting gender mainstreaming in renewable energies would not only contribute to advance human development, but also to achieve the Sustainable Development Goals (SDGs) and to ensure that women are afforded opportunities to enjoy their rights which are equally human rights.

REMARKS BY SACREEE EXECUTIVE DIRECTOR, KUDAKWASHE NDHLUKULA

The Executive Director of the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) outlined the role that his institution is playing to promote use and access to renewable energy in the southern African region. SACREEE was established by the SADC Member States in 2015 to contribute towards increased access to modern energy services and improved energy security across the SADC region through the promotion of market-based uptake of Renewable Energy (RE) and Energy Efficiency (EE) technologies and energy services. He said that the issues to do with gender and RE were one of the activities that the SACREEE is pursuing as women and girls are often the most vulnerable groups without access to renewable energy. He said that in the SADC region, women are more concentrated in the informal sector as compared to their male counterparts, and this lack of imbalance is due to lack of financing, lack of appropriate training and education in RE technology, lack of awareness, institutional support and restrictive cultural and social norms that view energy related businesses as work for men.

In this regard, the SACREE business plan 2019-2023 covers gender mainstreaming in order to address these issues.

REMARKS BY EACREEE EXECUTIVE DIRECTOR, GODDY MUHUMUZA

The East African Centre for Renewable Energy and Efficiency (EACREEE) is a centre of excellence mandated by the East African Community (EAC) to advance renewable energy and energy efficiency in the region. EACREEE's mandate is premised on five main themes with respect to renewable energy and energy efficiency, namely; (i) regional policy harmonization, (ii) capacity building, (iii) research, development and innovation, (iv) knowledge management, and (v) investment promotion. Muhumuza explained in his remarks that the EAC is a home to about 169 million citizens of whom 50.4 percent are women and girls. About 78 percent of the EAC Population lives in rural areas.

There is high dependence on biomass and low levels of electricity access in the EAC Partner States. Per capita consumption of electricity in the EAC Countries is very low compared to Sub-Saharan Africa as a whole (480 kWh/capita/year). Grid electricity access is still limited to urban and peri-urban areas. The EAC Partner States are endowed with abundant renewable energy resource potentials which include 13.4 GW of large-scale hydro, 4 GW of small scale (<10MW), 15.8 GW of geothermal, at least 1 GW of wind and solar irradiance levels between 4-6.5 kWh/m2/day. The region has abundant organic wastes such as waste from sisal production in Tanzania suitable for commercial scale biogas applications, bagasse from sugar factories, sawdust from lumber mills, and by-products of tea and coffee industries throughout the EAC Partner states which can be used for power generation especially cogeneration.

He explained that more than 95 percent of population in most of the EAC Partner States with exception of Kenya do not have access to clean cooking. Energy poverty affects greatly the women and youth since they travel long distances and spend many hours to access firewood for cooking. Access to renewable energy could support the women and youth to focus on other economic activities that can improve their income and dignity. The East African Community (EAC) Secretariat launched on 17th September 2018 the Gender Policy that seeks an inclusive community which guarantees equal rights and opportunities for women and men, boys and girls. The policy further aims at strengthening the mainstreaming of gender concerns in the planning and budgetary processes of all sectors in the EAC Organs, Institutions and Partner States. In closing, he reiterated that EAC was ready to work with SADC in advancing access to RE for women and girls.

KEYNOTE ADDRESS AND OFFICIAL OPENING BY DEPUTY MINISTER OF MINERAL RESOURCES AND ENERGY OF SOUTH AFRICA, HON DR NOBUHLE NKABANE

The Honourable Minister began by noting that renewable energies offer diverse opportunities for the citizens of southern Africa, particularly marginalized groups such as women and girls and that these opportunities could only be accessible if there is equitable distribution and access to RE services for all. Access to RE services is at the centre of economic development in southern Africa and the region should embrace the opportunities that it brings. According to the IRENA report, RE sector has the potential to create new jobs and …

The sector requires policy support from Member States and regional institutions in order to fully explore its benefits and advantages for women and men. She said that the conference was coming at the right time as gender and renewable energy discussions need to be interrogated more to achieve sustainable development.

ABSTRACTS

PRODUCTIVE END USE OF ENERGY PROMOTES ECONOMIC EMPOWERMENT FOR WOMEN

Biography: SNV is a not-for-profit international development organisation that makes a lasting difference in the lives of people living in poverty by helping them raise incomes and access basic services. Their focus on only three sectors and have a long-term, local presence in around 24 countries in Asia, Africa and Latin America. In the energy SNV's work on biogas markets applies decades-long expertise to specific local market conditions. They have also established a track record in introducing improved cookstoves and off-grid electricity solutions. The organisations approach is anchored in market research. Based on the organisation's local know-how and as appropriate, it combines demand creation, technical and business advice for entrepreneurs, incentives to distribute quality products, support to government agencies to run market-based energy programmes and advice to improve enabling environments. The organisation also offers early-stage grants and results-based financing to help de-risk commercial investments and incentivise companies to engage in underserved areas. Alongside, they also advocate for more funding for decentralised energy services, for the removal of regulatory barriers to make the energy sector more attractive to business investors and for national quality standards. In the energy sector, SNV works closely with the marginalised groups in various communities which are women and the youth.

Abstract

SNV Netherlands Development Organisation Operates in 3 sectors Agriculture, Energy and WASH. The main work in the Energy Sector is centred around the promotion of access to energy through use of clean and efficient technologies such as bio-digesters, clean cooking and heating and off-grid electricity. While energy is a stand- alone sector it is also considered is a key enabler to production in most if not all productive sectors of world economies.

SNV has been implementing projects in the Energy Sector and some key successes have been recorded from a number of projects that we have implemented;

1. Zimbabwe Domestic Biogas Project – The Biogas Project was a Pilot implemented to promote the use of Biogas as an alternative source of clean energy. The main uses of the Biogas being promoted were for cooking, heating and refrigeration. A total of 122 digesters were constructed during the life of the project with most being used primarily for cooking. The use of the digester was also extended for refrigeration for household purposes and also milk chilling for the households that were involved in Dairy. While Biogas has many productive uses, cooking was used as an entry point for each household because of its numerous advantages to women. Use of Biogas meant that women's' wellbeing and health was addressed through the elimination of exposure to unhealthy fumes such as smoke from fire, time previously allocated to fetching firewood could be dedicated to more productive areas of their livelihoods and in addition reduced use of firewood would also protect the environment. The Biogas Project was run from 2013 to 2015. During this period a number of Biogas Masons and

Quality Controllers were trained for sustainability of the initiative and these have continued to be available for constructions.

2. Green Innovations Project – The Green Innovations a component of GIHUB Phase II and III Project was implemented by SNV with support from the Embassy of Sweden through UNICEF and the main objective of the component was to facilitate more greening of the country as well as see increase in the number of Green JOBS in the private sector and NGOs. The other objective is to contribute towards the creation of a gender responsive enabling legal framework for climate change adaption and mitigation in Zimbabwe through the provision of a model for youth involvement. This project saw a total of 20 youth benefiting from grants worth USD5,000 after a careful selection process with a deliberate effort being made to encourage young women participation. While the project promoted innovations in the green jobs sector a number of the projects were also considered under the Energy Sector. One innovation developed to address the plight of women was **The Production of Briquettes from Recycled Materials**. The briquettes were produced using recycled farm waste mostly dried maize cobs and recycled paper while another innovation the chick brooder would benefit directly from the innovations. The briquettes are multi-purpose and could be used for cooking or in cook stoves or for heating of poultry through the chick brooder. Chicken heating is critical for poultry production and usually producers' resort to inefficient sources of energy like use of firewood and infrared lights. Poultry production is an industry that is generally dominated by women and such an innovation will go a long way in addressing energy needs.

3. Sustainable Energy for Rural Communities Project was implemented in Gwanda South with the main objective of increasing access to energy through Solar. The communities, particularly women were encouraged to start up Energy Kiosks. Energy kiosks were small businesses that were set up to provide a range of services such solar products sales, device charging and battery rentals. While the projects main objective was to address access to energy the women benefited from Economic Empowerment through these energy enterprises. A number of products were introduced that were targeted for women with some being solar water pumps and solar fridges. Demand for these products increased as they also offered an opportunity for women to engage in self-empowerment projects such as agriculture production in their small gardens as well as catering businesses.

4. Currently SNV is implementing the Opportunities for Youth Employment Project (OYE) in Zimbabwe and Zambia that seeks to create employment for 10,000 youth in Zimbabwe. The target sectors are Energy, Agriculture and Green Jobs. To date young women have expressed interest in being solar sales agents because the opportunity allows the young women to attend to other household responsibilities while they also generate income while innovations like mobile solar water pumps will benefit young women immensely buy enabling an easy way of fetching water and can also be used productively offering a water pumping service to others.

Biography: The Civic Forum on Human Development (CFHD) is a network-based organization formed in 1995 with the core mandate to foster positive communication, dialogue and consensus building involving civil society organizations and stakeholders for improved housing, service delivery and local economic development in rural and urban local authorities of Zimbabwe. The organisation later rebranded in 2012, to respond to demand for a strong human development focus for helping to build strong communities, institutions and policy development processes to transform human development processes towards addressing needs and priorities of vulnerable communities from the local to the national level. Their vision is to help initiate Inclusive and just societies where the rights of citizens are recognized and local institutions are empowered to drive their own development. They seek to achieve this through the transformation of all systems and processes that contribute positively to human development based on respect for people's participation, human rights, empowerment, service delivery and responsible policies.

Civic Forum on Human Development (CFHD)-Energy Planning and Management

In Zimbabwe energy planning and management has been practiced at the national level through the Ministry of Energy and Power Development (MoEPD) using a top bottom approach. The role of sub-national structures such as rural and urban local authorities has largely been insignificant and these have been the recipient of energy projects, plans and priorities approved at the national level. The energy generated from developed sites has been exported out of the communities that are the custodians of the surrounding physical environment without much direct benefit and this has seen the rural energy poor remaining poor without adequate access to modern energy technologies. This paper seeks to have a bottom up approach in energy planning so that the rural energy poor may have improved livelihoods. This can be achieved through capacity development of local structures and actors involved in local energy planning and management.

The launch of the national renewable policy in March 2020 provides opportunities and strategic avenues for the participation of previously excluded groups in energy planning and management at the district and community level. The local authorities need to address the issue of energy access as an equally important area just like health, education and any other critical issues that are deemed necessary. Equipping local authorities together with other stakeholders such as traditional leaders, community-based organisations and civic society organisations with skills to develop renewable energy action plans is crucial if Zimbabwe is also to achieve national targets sets in the National Development Strategy 1 and the vision 2030.

CFHD has been working with 4 Rural District Councils in the development of participatory District Renewable Energy Action Plans (DREAPs). The DREAPs are an indicator of what is required to meet basic energy access for rural households. The DREAPS commit the local communities towards the protection of their physical environment particularly against

deforestation. The energy management component focuses on working with women on how to efficiently use the energy they have, in this case efficient use of firewood to help women cut on the time spent fetching the firewood and also reducing the number of trees that are harvested to get the firewood. Such initiatives include use of energy saving cookstoves and rocket tobacco barns. The excessive use of firewood of causing environment damage and the effects of such negatively impacts women and children.

Energy planning and management has been largely left for the individuals to find own solutions and hence energy consumption in Zimbabwe at large is bringing negative impacts and the future looks uncertain on what people (especially women) would do in accessing energy. Inclusion of women in planning and management of energy is very important in advancing gender equality. Rural societies have a number of specific characteristics which do not apply to urban societies and hence the need to come up with energy planning and management that is also specific to the rural needs.

Biography: Basanta Gautam has been working as the Project Manager at Arbonaut Ltd. in Helsinki, Finland since 2008. His fields of interest focus on climate change, forestry and nature-based solutions using state-of-the-art technologies. Mr. Gautam has climate change and renewable energy related project experience from Uganda, Nigeria, Nepal etc.

Biomass Pellet industry: a clean energy solution for Nepal

Nepal is one of the most vulnerable countries in terms of climate risk. The concept by Arbonaut aims at reducing greenhouse gas emissions of Nepal and creating employment, revenues, good health, well-being and foster gender equality in the local communities in Sarlahi and Mahottari districts of Nepal. Over 90 percent of rural households in Nepal use firewood for cooking, heating etc. The use of firewood produces CO2 gas, harmful fine particles and other gases. The proposed solution i.e. replacing firewood from indoor kitchens with pellets improves air quality and decrease number of respiratory infections, especially to women and children. Hence Arbonaut will establish a biomass pellet factory, which will produce a total of 20000 tons of pellets annually from renewable biomass. The biomass will be collected from forest under-story bushes and grasses and waste by-products of agriculture, sawmills, sugar and ply factories. A start-of-the-art technology (e.g. LiDAR) will be used to map available raw materials. Only 50% of the available raw materials will be collected to produce pellets leaving remaining 50% on the ground for nutrient cycling, biodiversity and local livelihood. The produced pellets will replace use of coal and firewood in Nepal. Coal represents 4% of the energy use in Nepal whereas firewood represents over 70%. The concept tests a new and clean energy type in Nepal, which is in line with national bio-energy policy, and has a large replication potential. The concept mitigates the climate change by replacing use of fossil fuel energy by biomass energy. The project contributes to the emissions reduction aspiration of Nepal in line with the Nationally Determined Contributions (NDC), by removing the highly flammable biomass from the forests and using advanced forest fire management system. The proposed biomass pellet industry is expected to become a viable business after 3 years – also for local people, who will have an opportunity to get 10% equity share of the industry and employment opportunity (around 200 local people are expected to be employed by the industry).

The project is funded by the Nordic Climate Facility (NCF) Grant financed by Nordic Development Fund (NDF) and being implemented by Arbonaut Ltd. in Finland (Lead), together with Bakas Renewable Energy Ltd. in Nepal.

GENDER AND RENEWABLE ENERGY INNOVATIONS FOR SOCIO-ECONOMIC EMPOWERMENT

Biography: The Southern Africa Power Pool (SAPP) was created in August 1995 at the Southern African Development Community (SADC) summit held in Kempton Park, South Africa, when member governments of SADC (excluding Mauritius) signed an Inter-Governmental Memorandum of Understanding for the formation of an electricity power pool in the region under the name of the Southern African Power Pool. The ministers responsible for energy in the SADC region signed the Revised Inter-Governmental Memorandum of Understanding on 23 February 2006.

The SAPP is governed by four agreements: the Inter-Governmental Memorandum of Understanding which enabled the establishment of SAPP; the Inter-Utility Memorandum of Understanding, which established SAPP's basic management and operating principles; the Agreement Between Operating Members which established the specific rules of operation and pricing; and the Operating Guidelines, which provide standards and operating guidelines. The SAPP has twelve member countries represented by their respective electric power utilities organised through the SADC.

The SAPP has four working committees: The Environmental Sub-Committee, the Markets Sub- Committee, the Operating Sub-Committee, the Planning Sub-Committee and the Markets Sub-Committee under a Management Committee which in turn reports to the Executive Committee. The Coordination Centre Board governs the activities of the SAPP Coordination Centre. The SAPP coordinates the planning and operation of the electric power system among member utilities. The SAPP provides a forum for regional solutions to electric energy problems as espoused in its Vision and Mission statement.

Abstract

Title: Organisational Projects and Innovation to Enhance Socio- Economic Empowerment through Renewable Energy Access

The SAPP has among other interventions, identified plausible solutions to increase access to electricity services in the SADC region. This is against the background that electricity is a driver for socio-economic development as well as addressing the gender inequality that exists due to its limited access.

Expansion of the SAPP Generation and Transmission Capacity

SAPP through its Project Advisory Unit (PAU), is tasked with the preparation of projects to bankability for implementation. This is achieved through the preparation of the required studies such as technical feasibility and environmental and social impact assessment (ESIA). These projects are as espoused in the list of priority projects, approved by the SADC Energy Ministers and the SAPP Pool Plan and adopted for implementation. The projects are ranked based on the following:

- Category 1 project: Project to integrate a non-operating member to the SAPP network.
- Category 2 project: Project to relieve transmission congestion by adding capacity.
- Category 3 project: Project to connect new generation infrastructure to load centers.

These projects were identified to have significant regional impact in ameliorating the power deficit and include the following generation and transmission projects, respectively: Angola, Namibia; Kolwezi – Solwezi; Malawi – Zambia; Mozambique – Zambia; Zambia – Tanzania and Luapula; Mphanda Nkuwa and Batoka Gorge Hydropower projects.

The ESIA process, as guided by the SAPP Environmental and Social Management Framework (ESMF), addresses gender aspects by aiming to formulate projects that analyse the roles and needs of women and men and their vulnerability. This aids to ensure equitable participation in and equally benefit from the resources, services, capacity building and other activities offered by the project. The response to gender is embedded in all stages of the project cycle: project preparation, design, implementation, and monitoring and evaluation. In addition, special gender consideration for project affected parties that suffer from loss of livelihoods and/or property especially for female and child headed households are taken into consideration.

SAPP Electricity Market Structure

SAPP has through the years progressed in an evolutionary manner to open the market for more trading through new products. In this way SAPP through its market development achieved a gradual implementation of competitive power markets, slowly moving SAPP from being a cooperative pool to a more competitive pool while keeping its focus on the regional context. This has proven to be an effective methodology for the region that is also supported by many of the successful international experiences. SAPP further intends to connect to the East African Power Pool, to optimise the availability of the electricity in the two power pools.

Needs Assessment Study on Renewable Energy Proposals in SAPP

The SAPP has currently electricity generation from thermal (coal), hydropower, nuclear and gas. In terms of the generation mix, thermal (coal) tops the list with 62%, hydropower 21%, distillate 4.4%, nuclear 3%, Wind 3%, solar 3.9%, gas 1.5% and biomass and landfill at 0.1%. This situation is not sustainable since coal fired power stations produce greenhouse gases like carbon dioxide which result in climate change. The SAPP has realised the need to increase the contribution of renewable energy in line with general global thinking of reducing the carbon foot-print. Increasing renewable energy's contribution will also result in the increase in primary energy diversification and increase in the security of supply. A study conducted on the impact

of renewable energy on the SAPP revealed that the infrastructure and market platform are generally adequate to support the penetration of renewable energy into the system.

Centre For Gender And Community Development in Zimbabwe

Biography: The Centre for Gender and Community Development in Zimbabwe (CGCDZ)is a non-governmental organization which was legally registered and established on the 1st of September 2016 (Trust Number: MIS 0001171). CGCDZ's mandate is to uplift and improve the living conditions of poor and marginalized communities (men, women &youths) with a special focus on women in projects utilizing local resources through economic empowerment, citizen participation and climate change, mitigation and adaptation. Although CGCDZ is a gender sensitive organization, it focuses mostly on women recognizing that they are the key drivers of economic growth mostly in emerging market countries, Zimbabwe included. CGCDZ takes community centred and community led initiatives as the basis for all interventions and livelihood activities. This enables the initiatives to contribute towards mainstream development processes. CGCDZ also intends to build a centre which will become the hub of all its activities. The centre will provide market linkages for our community partners' products and skills, and also an income generation facility through provision of conference and boarding facilities.

CGCDZ realizes and understands that it does not have all the technical, financial and human skills to accomplish its mandate and therefore places great importance on the development and nurturing of partnerships at community, district, provincial, national and international levels. This enables the organization to take advantage of the competencies and experiences of other organizations to achieve maximum impact in its interventions.

Title: Promoting Women Smallholder Farmers Socio-Economic Empowerment and Gender Equality Through Energy Technologies Project.

Gender based inequalities, structural barriers and discriminatory social norms along the food production value chain impede women smallholder farmers' socio-economic empowerment. Although rural women constitute the larger percentage of labour force and contribute to food and nutrition security at the household level, they face a number of challenges due to multiple roles mostly unpaid work.

Survey results from a research conducted by CGCDZ in 2019 indicated power imbalances against women in the energy sector and those women who fail to contribute income at household level. Economic hardships coupled by the outbreak of COVID-19 movement restrictions and lack of energy technologies to lessen women's workload in Zimbabwe generally and rural areas specifically had a bearing on increased women abuse. It is against this background that CGCDZ endeavour to promote women smallholder farmers' socio-economic empowerment and gender equality through advancing energy technologies. CGCDZ coined the term community partners referring to beneficiaries. The organization adopts a participatory approach and partners' engagement to programming as an ownership and sustainability plan post funding.

In an effort to promote women smallholder farmers socio-economic empowerment and gender equality the CGCDZ adopted activities related to capacity development sessions that included men and women discussing gender equality, energy technologies infrastructure development and initiating village lending and saving schemes to enable women raise income and assets.

CGCDZ particularly work with smallholder farmers in rural areas where the pressures of earning a living with little resources has led to deforestation for charcoal production. Degraded soils from monoculture maize fields fed with costly fertilizers and pesticides had made farming hard and unproductive. CGCDZ's training in regenerative agriculture focuses on farming a more varied set of crops, improving soils with compost fertilizer, biochar from waste charcoal dust and 'no-dig' mulching techniques, using natural pest control, and watering from new water harvesting tanks and drip irrigation kits has helped improve the income of women in society.

CGCDZ with support from a philanthropist assisted 10 vulnerable households segregated 7 female and 3 males to light their homes through the solar home systems project. The identified households had suffered discrimination and exclusion due to their status as internally displaced persons. Sustainable energy for smallholder women farmers has enabled gender equality through improving household income. The project aims on renewable energy technologies and services for irrigation, drying and cooling of smallholder women farmers in horticultural value chains. This was adopted to lessen the burden of women who carried long distances to fetch water for irrigation purposes.

Biography: Africa GreenCo Group via its operating entity GreenCo Power Services Limited acts as an intermediary offtaker and service provider, purchasing power from renewable IPPs and selling that electricity to utilities and private sector offtakers (i.e. commercial and industrial users) and markets of the SAPP. GreenCo will mitigate the risk of purchaser default through an ability to secure alternative buyers or through short-term trading on the SAPP electricity markets. Its mission is addressing creditworthiness to increase generation and growth of renewable energy markets through partnerships and innovative solutions. Through its participation in competitive power markets, GreenCo aims to promote cross-border power transactions and a more dynamic and liquid short-term power market. Through its activities, GreenCo will increase the supply of, and demand for, finance for energy projects, and mobilise private sector capital more quickly towards critical and transformative capacity addition.

Title: 25MW solar PV generation facility in Sesheke, Western Province of Zambia, to the Ilute Solar PV Project

GreenCo being a woman led start up upholds and values the provision of more energy access for girls and women empowerment. The voices and participation of women is pivotal because they have valuable knowledge and practical experiences that contribute to building the resilience of community.

Their commitment to gender equality will incorporate and take cognisance of gender mainstreaming matters within the organization as well as ensuring that gender considerations are appropriately addressed by the companies with which it contracts, including independent power producers with whom we enter power purchaser agreements with. GreenCo acknowledges the meaningful participation, upskilling and empowerment of women in the energy sector.

Affordable and clean energy from alternative renewable green economy sources is at the heart of what GreenCo does. To expand energy access, it is crucial to enhance energy efficiency and to invest in renewable energy. GreenCo, aims to do this by scaling up affordable clean energy; reducing the cost of renewable energy and by reducing credit risk for new renewable energy transactions. Additionally, they embark on the utilisation of regional power pools such as the SAPP to expand market opportunities and to eradicate the requirement for fiscal support for new generation projects.

GreenCo is pleased to announce the news of their first project. The selection of the winning developer and the award of the tender to develop, engineer, construct and operate a 25MW solar PV generation facility in Sesheke, Western Province of Zambia, to the Ilute Solar PV Project ("Ilute Solar"), a consortium comprising Western Solar Power Limited (formed by Buffalo Energy and the founders of Western Power Company), Serengeti Energy Limited (formerly responsibility Renewable Energy Holding) and China Energy Co., Ltd, a subsidiary of China Energy Engineering Corporation. This collaboration between GreenCo and Ilute Solar is yet another milestone in the realization of transformative developments in Zambia's

electricity sector; one that will see the private sector play an increasingly important role in developing new affordable and green power in a commercially and environmentally sustainable manner, through the innovative approach to risk allocation and capital deployment that GreenCo has espoused which reduces reliance on sovereign fiscal support to bring new generation capacity online.

The organisation seeks to ensure that environmental, social and gender policies are adhered to throughout the operation of our solar pilot project. GreenCo is committed to promoting gender equality, having a proactive reach to vulnerable groups, community engagement and environmental/social awareness.

The status of women has improved in many ways over the years. However, inequalities still remain across the country. The energy sector is an area where imbalance and the undue burden on women is still prevalent. There is now an increasing appreciation in international development discourses of the role of energy as a conduit for redressing historic gender inequities. Gender inequality hampers a country's ability to make use of the full spectrum of capabilities of a population, and it restricts the opportunities of younger generations to excel. Women constitute 52% of the Zambia's population but at the same time face severe difficulties in fully participating in various local and national development processes and programmes.

GreenCo being women-led has its ambitions to hire more female employees to require a proactive approach in overcoming the shortage of qualified applicants. The organisation has reached out directly to universities in and around Zambia to identify promising female engineering and legal students to enrol in our corporate internship program. Further, two female interns, who are recent graduates in engineering and law respectively, have been engaged for a 12-month period.

Over time, users realize the benefits of the cleaner options in energy, which can influence their decision-making. The low rate of access to energy, to clean cooking fuels, education and technologies, call for an innovative approach to find solutions to current challenges. GreenCo is technology open when it comes to renewable power and seeks to provide affordable green energy. GreenCo is aware of the positive effects of biomass communities, if the right bio mass is used, as it can generate base load power. GreenCo also seeks to engage with Civil Society Organisations and views this as key to recovering from setbacks in areas such as time poverty, access to energy, clean cooking, women empowerment, pollution and overall contribution and development to these communities.

There are benefits of renewable energy to social services which affect:

Transport

Wood fuel has become scarce, women travel long distances to fetch it hence spending a lot of time which could be used in other beneficial activities. Expanding the renewable share of transport energy will require innovation that supports biofuels, electric vehicles, renewable electricity generation, and active mobility and the phasing out of fossil fuels for transport.

Education

Lack of access to electricity affects the education of both the boy and the girl child since they are not able to study after the dark and the communities might have a challenge in recruiting qualified teachers. Studies on electrification programmes have demonstrated positive impacts

on education of both boys and girls. There is some evidence that the positive impacts are larger for girls since electrification since it reduces the time spend on daily chores like fetching water and collecting fuelwood which increases girls' opportunities for schooling as well as for after-school study.

Health

Women in Zambia assume the role of caretaker while maintaining their roles of providing food and maintaining the household. This places a heavy burden on women suffering from ailments such as HIV/AIDS. Lack of access to clean water, sanitation, and hygiene facilities have profound impacts women's security and safety, as well as increasing prevalence of disease, which the risk experienced throughout the country, will be exacerbated by climate change. Cooking on firewood has health implications on women and children due to inhalation of polluted air from the fumes. During firewood collection women and girls are vulnerable to sexual and gender-based violence as well as an increased risk of snake bites. The long walks and heavy loads can also lead to persistent back pains and pose a risk to pregnant women. Further, women are exposed to open flames and smoke which results in respiratory problems and cataracts – the leading cause to blindness in developing countries. The World Health Organisation (2016) estimates that about 4.3 million people die prematurely every year from exposure to smoke from traditional cook stoves and open fires. Men on the other hand are more exposed to hazardous work on energy infrastructure such as electrical wiring and chemical handling with risks of injuries.

With their new project underway, GreenCo recognises the importance of stakeholder input and participation. GreenCo is developing mechanisms to promote the input and participation of important stakeholders in the design, development and implementation of energy infrastructure, including civil society organizations.

Biography: The United States Agency for International Development (USAID) Southern Africa Energy Program (SAEP), a Power Africa initiative, works to advance energy policy and regulatory reform and accelerate investment to increase power generation and access to electricity throughout the region. SAEP is USAID's flagship implementing mechanism for Power Africa in the Southern African region. As part of Power Africa, SAEP works to contribute to Power Africa's continent-wide goals of increasing new power generation by 30,000 megawatts and increasing new connections by 60 million by 2030.

SAEP integrates social and gender considerations into the planning, programming, and execution of activities to: i) increase access by women to modern electricity services to enhance social and economic opportunities; ii) increase female employment opportunities at utilities and government agencies; and iii) increase the number of women trained in electricity reform and associated fields.

A Gender Success Story - Lighting the Way to Women's Economic Empowerment in Zambia

Teresa inside her shop in Chadiza from which she sells, amongst others, pay- as-you-go solar home systems. Photo: USAID Southern Africa Energy Program

Teresa lives in Chadiza, a small town in Zambia's Eastern Province, where she runs a one-stop- shop that offers not only drinks, food, and toothpaste, but also pay-as-you-go (PAYGO) solar home systems (SHS). Through her business savvy and an opportunity provided by SHS Company, VITALITE, Teresa has significantly improved her own economic well-being, as well as that of her community. In Zambia, where only four percent of the rural population has access to electricity, private sector SHS companies are expanding their reach to accelerate the delivery of off-grid connections. The United States Agency for International Development (USAID) Southern Africa Energy Program (SAEP), a Power Africa initiative, supports SHS companies by training employees to improve SHS sales and increase connections.

Along with sales training, VITALITE requested SAEP's support to promote gender equality in its operations. SAEP conducted a gender mainstreaming workshop in Lusaka, Zambia, in April 2019 for VITALITE's human resources, sales, and marketing teams to integrate gender into their work and attract more women to become sales agents, which could create economic opportunities, especially for women in rural areas. SAEP and VITALITE then visited rural communities like Chadiza to meet with customers and sales agents. This is where Teresa's potential for growth came to light.

Teresa was a PAYGO client frustrated with the long distances and time spent traveling to purchase top- ups for her SHS. She wanted to do her own top-ups and sell to her neighbors and one-stop-shop clients. She wanted to become a sales agent. VITALITE was impressed by Teresa's enthusiasm and keen eye for business, so they hired her as an SHS sales agent in Chadiza. Today, Teresa runs her house, shop, and next-door tavern on an SHS from VITALITE. Plus, as a VITALITE sales representative, she is now a literal source of light for her community. Teresa is a role model and a prime example of women as key drivers of innovative and inclusive solutions.

Teresa likes the SHS so much that she bought and is paying for a system for her child and grandchildren. "They [grandchildren] were so excited when they heard they were getting solar. Now they can study at night without worrying", mentioned Teresa. She credits her success as a sales agent to the network she gained through distributing mosquito nets as a volunteer for a local health initiative combating malaria. Teresa believes volunteering helped her earn trust among the community and is happy to use that to provide electricity via SHS products.

DOROTEIA HIPOLDINA DOS SANTOS ISAÍAS

Biography: More than 10 years of experience in the subjects of gender and energy. Graduated in Educational Physics in 2008, where defended her thesis with the theme: Gender Disparity in Physics Teaching. In 2010 concluded her Masters in Physics. Lecturer at the Department of Physics at the Eduardo Mondlane University-Mozambique since 2008. She is focal point of gender issues in the Physics department since 2009. Participation in several seminars, conferences and trainings about gender insertion in science, inside and outside the country. Participation in projects developed by UNESCO and other non-governmental organizations as well as institutional ones, related to gender issues. Currently she is doing her PhD on energy technologies for pumping irrigation water. She is open to learn more and contribute to the reduction of gender inequalities in access to renewable energies among others.

Title: Gender Challenges in Access to Renewable Energy for Irrigation in Developing Countries: An Example from Mozambique

In rural areas of developing countries as well as in urban areas of poor countries, energy supply is still far from optimal. The population depends mainly on wood, biomass and agricultural waste to meet their basic needs. In irrigation systems, energy is also needed. Unfortunately, most small- scale farmers either practice rain fed agriculture or have diesel oil as one of the most used fuels to pump water for irrigation. However, this dependency does not always bring good results. The practice of rain fed agriculture limits, among other things, the diversity of crops both for food and for marketing. On the other hand, the use of diesel oil, depending on the location, causes problems related to reliability and availability, in addition to the high costs often applied. Mozambique, one of the poorest countries in the world, is located on the east coast of Southern Africa on the Indian Ocean. In the country, the irrigation potential has been estimated at about 3.1 million ha, while other sources give 3.3 million ha. About 40% of the 800,000 km² of Mozambique's territory is arable land. And of that percentage only 10% is cultivated, of which only 1% is in the hands of commercial agriculture. The remaining 99% of cultivated land is in the hands of subsistence farmers and is spread over about 4.0 million small farms of 1 to 10 ha. In Mozambique, women represent 52% of the population and, of this number, 72.2% live in rural areas. Both women and girls are among the groups most affected by poverty. Mozambican women represent the largest force employed in agriculture, however, their participation in the whole chain of the sector is still very low compared to that of men. Although Mozambique has a great potential in terms of renewable energy for irrigation, the beliefs and customs existing in various regions, the limitation of access to credit lines, education and political issues, make it difficult for women to access these energy resources. As a consequence, they make crop irrigation ineffective and consequently cause low crop yields. Thus, this study aims to encourage farmers to use modern technologies to meet the water requirements for irrigation. Additionally, recognizing the gender inequalities in access to modern energy services, the study aims to contribute to the access to renewable energy for both men and women without discretions. Overcoming these limitations and ensuring equal access to opportunities related to renewable energy in irrigation will contribute to the massification of these technologies for irrigators, their families, their communities and the country as a whole. For energy transitions to occur at 100%, it is necessary to overcome these and many other obstacles that do not allow women to grow at all levels equally with men.

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