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Energy Supply as a Catalyst for Sierra Leonean Women's Economic Empowerment

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Abstract

This paper analyses the nexus between energy supply and women's economic empowerment in Sierra Leone. Energy supply plays a critical role in the economic empowerment of Sierra Leonean women. The country is highly dependent on energy supply for economic growth. Sierra Leone faces a long-standing challenge regarding energy supply, particularly with electricity supply, which has crippled the economic growth of the country and, in particular, the economic empowerment of women, whose traditional gender roles are contingent on energy supply. The lack of energy supply has affected health, educational development, and other social structures. Past and present governments have not paid attention to this issue, mainly because of a gender-blind policy approach in the energy sector. The method used to collect data is based on a desk review of available literature. Data were obtained mainly through web searches. The aim of this paper is to assess qualitative data from women and energy use in the country, by reviewing documents from the Ministry of Energy and energy projects implemented in the country, as well as policy documents and other research work on energy in Sierra Leone. The paper argues that effective integration of the gender dimension in the sector is crucial for the implementation of SDG 7 to ensure access to affordable, reliable, sustainable, and modern energy for all. The paper further argues that sustainable energy can create opportunities not just for women but for men and other vulnerable groups in the country. Findings indicate that there is a lack of recognition of the critical role women play in household income generation through their small and medium scale enterprises by the use of energy in the country; however, because of the patriarchal nature of Sierra Leonean society, women are rarely considered in energy governance across the country.

Keywords

Energy Supply, Women's Economic Empowerment, Gender Roles,

Household Income, Small and Medium Scale Enterprises

1. Introduction

Energy supply includes all productive, subsistence, and leisure activities. The efficiency and effectiveness of the activities and women's quality of life are affected by both the quality and quantity of energy available. Women and men are equal stakeholders in benefiting from energy use. However, women and men do not have equal access to energy—the same energy service may impact women and men differently, driving distinct social and economic outcomes for both sexes.

The gendered division of labour in Sierra Leone creates different energy needs, as do different perceptions of the benefits depending on one's gender. Energy poverty hinders social and economic development, and even more so the economic empowerment of women. According to the International Energy Agency (IEA) (2014), unreliable power supply has been identified by African enterprises as the most pressing obstacle to economic growth of businesses, ahead of finance.

Women represent half of the potential human capital in the world, yet in most societies, women are underrepresented in all spheres of life in the society and in labour markets, despite the fact that over the past three decades, more than half a billion women have joined the world's workforce[1].

In the energy sector, gender inequality is perhaps more pronounced than in many other sectors of the economy.

In 2015, the adoption of the 2030 Agenda for Sustainable Development signaled a renewed mandate for achieving gender equality as indispensable to the Sustainable Development Goals (SDGs), both as a stand-alone goal (SDG 5) and as a cross-cutting imperative across the Agenda, including SDG 7 on affordable, reliable, sustainable, and modern energy for all. This reflects the growing recognition that the gender-energy nexus involves more than a focus on the role of women and girls as primary energy managers at the household level; instead, attention should be directed to the interaction of gender equality considerations with renewable energy, energy efficiency, and circular economy initiatives more broadly (UNIDO, 2016).

The energy sector has evolved as innovative technologies and approaches emerge, climate change adaptation and mitigation become even more critical, and production and consumption patterns change. The SDG 7 targets call for: by 2030, ensure universal access to affordable, reliable, and modern energy services, increase substantially the share of renewable energy in the global energy mix, and double the global rate of improvement in energy efficiency (UN).

Although there is a lot of research on gender issues and women's empowerment, there is still an untapped link between women and energy. Gender has been examined in many ways in international development programmes, from mater-

[1]Government of Sierra Leone enhancing energy access, environmental and social management framework November 2020 EDSA.

nal health to sexual and gender-based violence to education of the girl child, among others. To some extent, some of the basic needs have been met; development programming has pivoted to focus on skills training, microfinance and access to credit, support for female entrepreneurs, and other development strides with the sole aim of increasing the economic empowerment of women. Other programmes tackle systemic gender issues such as land rights and property laws, political participation, and equal access laws. However, less attention, research, or discussion is given to the topic of access to energy and its impact on women's economic empowerment.

The UN launched its Sustainable Energy for All (SE4A) initiative and declared 2014-2024 the Sustainable Energy for All Decade. Likewise, in 2013, former US President Barack Obama launched Power Africa, an initiative to double the number of people with access to power in sub-Saharan Africa, where two thirds of the population are currently without access[2]. Similarly, in Asia, the Asian Development Bank launched the Energy for All Partnership, which aims to provide access to safe, affordable, and reliable modern energy for an additional 100 million people in the region[3]. There are two well-accepted narratives related to economic growth. First, vast gender inequalities remain throughout the world and are closely related to poverty and inequality. Second, exploration into the relationship between these two narratives has been limited. What is missing is the linkage between energy access and women's economic empowerment. "Energy is very important in women's daily lives, especially for serving food for families, lighting for teaching their children at night, and energy for small food industries… Cooking small businesses are the major challenges facing women around access to energy… For the women in my country, a change that would allow them to be financially independent would have the most impact in their lives".[4]

The main discourse of this paper is under what context gender equality rises with access to energy; what are the channels through which this change occurs, and how significant are the economic benefits to women in Sierra Leone? Can the government and development partners in the energy sector reap more meaningful results by targeting energy development programmes that enhance benefits for women, and if so, how? The researcher believes that while there are many areas critically important for the government, women's economic empowerment and energy access programmes are an underexplored area for women's economic empowerment. The aim of this paper is for policymakers and researchers on energy to have a critical look at energy access initiatives with a greater impact on women in Sierra Leone. To investigate this energy nexus, the researcher analyses a combination of quantitative and qualitative data and the policy framework on energy in Sierra Leone. The researcher's quantitative analysis uses both global, sub-regional indicators and national survey data to understand the complex relationship between energy and economic opportunity for women in Sierra Leone. The paper

[2]O'Dell et al. (2015). Women's Energy and Economic Empowerment.
[3]Energy efficiency policy of Sierra Leone 2016.
[4]—Dr. Nurzainah Ginting, Indonesia.

concludes by proffering recommendations to accelerate benefits to stakeholders in the energy sector through a "gender lens" approach in policy formulation, implementation, monitoring, and evaluation of energy access programmes.

2. Objectives of the Study

Sierra Leone is a highly patriarchal society where women are largely underrepresented in all spheres of life, with 52 percent of the population being women[5]. Efforts to empower women in the energy sector are still far-fetched. The main objective of this paper is that women's access to sustainable energy is a prerequisite for economic empowerment. The paper outlines the various areas of sustainable energy and how women use energy in their economic activities, and thus, if there had been a policy focus on women's access in the energy sector, it would have had a far-reaching positive impact on women's economic empowerment.

3. Methodology

This paper is a review of the energy policy in Sierra Leone and, as such, is based on a desk review of available literature. Data was obtained mainly through web searches and is presented primarily to raise awareness and for policy discussion.

4. Backgrounds to Energy Supply in Sierra Leone

Sierra Leone currently has 99.9 MW of installed power capacity for a population of approximately 8,605,718, with a rural population of 56 percent. The total area is 72,300 km^2. Very few people have access to electricity in the country[6]. To augment the country's energy needs, a cocktail of interventions is being pursued. Thermal generation, hydroelectricity, and solar energy generation are employed in different parts of the country[7].

The Ministry of Energy is the custodian of electricity and is responsible for sector policy and coordination. The ministry handles matters related to electric power supply, including that from hydroelectric schemes, and nominally renewable energy matters related to solar and wind energy. The Ministry of Agriculture and Food Security handles biomass issues (plant and animal-driven matter), especially fuel wood. Petroleum marketing is done by the Ministry of Trade and Industry (MTI). The Ministry of Finance (MF) also plays a significant role in the importation and storage of petroleum products. There are gray areas, like the Chinese lights, touch lights, relating to the marketing and sales of several energy products. The wider energy sector in Sierra Leone is, however, within the purview of various ministries.

Although Sierra Leone has various forms of energy potential, including biomass from agricultural waste, hydro, and solar power, it remains vastly underutilized. Energy consumption by women is dominated mainly by that generated from fuel

[5]Statistics Sierra Leone mid-term population census 2019.
[6]Statistic Sierra Leone mid-term population census 2019.
[7]Sierra Leone Ministry of Energy, energy infrastructure info@moe.gov.sl.

wood biomass, accounting for about 80 percent of their energy source. Imported petroleum products, the next most significant energy source, are primarily for power generation and account for 13 percent of energy consumption, and about 27.5 percent of the total population in the capital city. Statistics show that only 4.9 percent of the rural population had access to electricity in 2021[8]. The power sector is small, with less than 150 MW of energy capacity, connecting 270,000 customers, with the cost of electricity heavily subsidized by the government. The entire country lacks a stable and reliable public power supply and most domestic demand, mostly from women, remains significantly unmet. The current electricity supply is challenged not only by generation capacity but also by transmission and seasonal variation and is disseminated using inadequate and aging transmission and distribution networks. It is delivered at a very high cost, with Sierra Leone having one of the highest electricity tariffs in the sub-region. There are numerous waterfalls for hydropower and abundant sunlight for solar power generation, with an estimated hydro project potential of more than 1000 MW, while solar opportunities are above 240 MW. The major hydropower facility, the Bumbuna Dam, with a peak of 500 MW during the rainy season, has a reduced output of 8 MW in the dry season. The government has demonstrated a strong commitment to expanding and sustaining the energy sector despite many major challenges over the years, but this is yet to yield the desired result. The enactment of relevant legislative reforms laid the foundation for the restructuring of the sector, creating the electricity and water regulatory commission (EWRC) in 2014; unbundling the national power authority (NPA) into electricity generation and transmission (EGTC) and electricity distribution and supply authority (EDSA) in 2015; and enabling the development of independent power producers (IPP) projects. The EWRC focuses mainly on regulatory aspects of the sector and sets tariffs for consumers and tariffs between EGTC and IPP, while EGTC focuses on electricity generation and transmission. EDSA holds a monopoly as the single buyer from IPPs and the single seller to consumers.

Other initiatives undertaken by the government include the establishment of a rural renewable energy project to support increased access to rural energy resources, a rural electricity board and rural electricity fund to promote and make electrification widely available in all regions, and a renewable energy empowerment project to develop a knowledge base of existing renewable energy policies. Additionally, the Cote D'Ivoire-Liberia-Sierra Leone-Guinea (CLSG) interconnection project, under the West Africa Power Pool (WAPP) programme, aims to provide an increased supply of electricity to these countries to meet the growing demand and will create an incentive for hydropower potential that exists in Sierra Leone. While the overall objective of the government has been to provide energy in sufficient quantities to all the regions in the country, there has been inadequate investment and limited private sector participation in the energy sector. The government has therefore embarked on various reforms focused on improving gov-

[8]Sierra Leone energy situation, Energypedia (2023).

ernance and regulation to encourage private sector participation in the sector but without a gender lens. The national electricity act enables the participation of IPPs in power generation and distribution. The public-private partnership (PPP) unit in the office of the president has developed a standard power purchase agreement to simplify and expedite negotiations with investors in the energy sector and plans to establish a feed-in tariff to harmonise the sale of power from various IPPs into the WAPP and the national grid. The government is also providing special financial incentives to investors in the renewable energy sector and intends to promote the use of liquefied natural gas and liquid petroleum gas. The government is inviting private independent power producers to enter and support the government in achieving this goal.

Sierra Leone offers investment opportunities in several segments of the energy industry, including wind energy, hydro, solar energy, and bioenergy. The government of Sierra Leone is also seeking infrastructure investment to support the expansion of energy distribution and transmission networks. Sierra Leone has good access to natural resources necessary for energy production, such as viable wind speeds and sunshine for renewable wind and solar projects. The country is also well positioned to support hydroelectric power, with high rainfall levels at 2,500 mm/year. The many rivers with numerous waterfalls and the abundant sunlight for solar energy create considerable capabilities for power generation.

The energy sector in Sierra Leone is facing a wide range of challenges compared to any other country in the sub-region. The main modern energy sources/carriers are electricity, which is thermal and hydro, and fossil fuels (petroleum products), solar (radiant energy), and traditional biomass (wood, charcoals, and cow dung). Wind energy has not been researched yet, although there is huge potential for renewable energy in the country after solar. Biomass energy (fuel wood, charcoal, cow dung) is widely used in the country, even among the most affluent in society, since it is easily accessible and affordable. Biomass energy is widely used in households, mostly by women, to perform their traditional gender roles of cooking, heating, baking bread in ovens, and drying fish for their livelihoods and other economic activities.

In recent times, the country has been plagued by serious blackouts, which have grossly affected women's economic activities. However, the USA International Development Finance Corporation (DFC), in collaboration with the government, has announced a significant investment of up to four hundred and twelve million dollars. This financing aims to tackle the issue of rolling blackouts and expand Sierra Leone's power system through renewables. DFC's approval of a new loan of up to $ 292 million to the Western Area Power Generation Project, based in Freetown, marks a pivotal moment in Sierra Leone's journey to a reliable energy supply[9]. These investments will aid in the development and upgrade of the power plant's infrastructure, fostering consistent power availability across the country. Moreover, DFC will provide up to $ 120 million in political risk insurance to at-

[9]Sierra Leone energy situation, Energypedia (2023).

tract investment, further enhancing the sustainability and sociability of the project. To fortify this financial package, a $ 40 million loan from the ECOWAS Bank for Investment and Development (EBID) underscores the collaborative effort towards energy transformation in Sierra Leone. If successfully implemented, Sierra Leone's pursuit of a sustainable energy future is assured with this significant investment in laying the groundwork for reliable and affordable electricity, a cornerstone of women's economic development. It is no gainsaying that if the government is committed to providing clean, affordable, and sustainable energy solutions that will propel national development, the energy project, especially in the western area and the capital city, will be a catalyst for revolutionizing the nation's energy landscape because of its transformative potential, promising progress, prosperity, and a brighter future for Sierra Leonean women's economic empowerment[10].

Some of the challenges of electricity supply in the country are an ineffective workforce in generating much-needed revenue in the sector. There are 1,500 workers at EDSA and EGTC serving a customer base of 370,000. Between 2018 to 2024, the sector owed the Turkish Karpower a cumulative balance of Nle 701,703,953.74 (US$ 18 million)[11].

Overall energy consumption in Sierra Leone

The country relies on 80% biomass (mainly for cooking), wood, and charcoal; 13% petroleum products (mainly for transportation, lighting, and private energy generation; all petroleum products are imported). Grid-connected electricity accounts for the remaining energy. Most of the energy is used in households[12].

Renewable energy: the country possesses vast potential in renewable energy in the form of biomass from agricultural wastes, hydro, and solar power, which remain vastly untapped[13]. According to the Renewable Energy Statistics 2017 report, there is a total capacity of 88 MW of renewable energy in the country, of which 56 MW is hydropower and 33 MW is biomass energy[14].

Biomass is the major renewable energy source in Sierra Leone's households, which women largely rely on for cooking, food processing, food preservation, and drying of fish simply because of their gender roles in society. The forest and by-products from the farming system have provided the main source of fuelwood used. Some of the challenges are that the rate of forest depletion exceeds the replenishment rate and deforestation has intensified due to the demand and scarcity of alternative energy. This has increased the workload of women not just at the household level but also for their economic and/or business activities. Having clean fuels and technologies for cooking, e.g., non-solid fuels such as natural gas, ethanol, or even electric technologies, makes this process more efficient for women, saving

[10]ECOWAS Energy Efficiency Policy (EEEP); ECREEE, September 2012.

[11]Status of gender mainstreaming in the energy sector access in Sierra Leone, regional validation workshop for the ECOWAS policy for gender mainstreaming energy access, Ministry of Energy, https://www.ecreee.org/.

[12]Mainstreaming of energy policy within sustainable development goals in Sierra Leone, June 27th to 29th, 2016, Addis Ababa, Ethiopia.

[13]UNDP (2012) national energy profile of Sierra Leone.

[14]ibid.

both time and energy. This also comes with massive health benefits for women and children. The use of solid fuels for cooking, such as charcoal, crop waste, or animal dung, is a primary risk factor for deaths and other health hazards for women due to indoor pollution. Traditional biomass is an important energy source not only for women but also for bread bakers in Sierra Leone, who are mostly men.

Fossil Fuels: After biomass, imported petroleum products are the next largest source of power in Sierra Leone at approximately 13%. Petroleum product importation has been done through refined products like petrol, diesel, marine fuel oil, and kerosene due to the absence of a domestic refinery. The petroleum products are consumed mainly in the transport and residential sectors. Sierra Leone imports all its petroleum products. There has been an increase in the importation of petroleum products over the years. Petroleum products consumption averaged 184,290 toe per annum[15].

Solar energy

Solar energy is abundant because of high radiation in the country. Solar energy is now widely used across the country; the potential, however, remains largely untapped.

Hydro Power

In Sierra Leone, hydropower is a major source of energy, holding great promise for the country, which possesses several rivers that could be harnessed for electricity. The country has a potential for 2000 MW of hydropower. That estimates hydropower potential to about 5000 MW, covering 300 sites nationwide. However, most of the others affected by are water flow rate variation between the rainy season and the dry season. Yiben II, Bekongor III, Kambatibo, Betmai III, Yiben I, and Bumbuna Falls are the most alternative in terms of generation cost[16].

Electric power sector

The ministry of energy has responsibility for the entire electricity sector, covering the harnessing of the country's considerable hydropower potential, the most notable of which is the Bumbuna Hydroelectric Power (BHEP).

Turkey's Karpowership, one of the world's largest operators of floating power plants and part of the Karadeniz Energy group, signed deals in 2018 and 2020 to provide electricity to Sierra Leone's state power utility in the capital city of Freetown. The company has made similar deals with several African countries that are struggling with electricity supply. The company has deployed around 65 MW of power generation capacity to Sierra Leone since 2020 and has been supplying 80% of its electricity needs in Freetown. The Karpowership supply is one of the three sources of electricity to the city—the other two include the country's Bumbuna hydro dam, located in the northern part of the country, and power from an interconnection with Ivory Coast, which also supplies Guinea and Liberia (CLSG). The Karpowership supply is mostly needed during the dry season when water levels at the Bumbuna hydro dam are low. Dependence on the Karpowership is reduced

[15]UNDP (2012), National energy profile of Sierra Leone.
[16]Sierra Leone energy situation, Energypedia (2023).

during the rainy season. Between April and May 2024, Sierra Leone's capital, Freetown, was hit by power cuts after Turkey's Karpowership switched off the electricity supply due to an unpaid debt of about $ 40 million. This outstanding amount was accrued because the government subsidizes more of the cost the ship charges per kilowatt/hour. The government had to spend more on subsidies because it charges consumers in the weak local Leone currency, one of the worst performing against the dollar in which the government pays the Karpowership provider.

Women's Participation and Leadership in the Energy Sector in Sierra Leone

There has been very little research work on women in the energy sector in Sierra Leone, the Barefoot women solar training centre which is being supervised by the Ministry of Energy. The aim of the Barefoot women training centre is to train women in rural electrification by using the solar home PV system. The Barefoot training centre is made up of women who have never been to school; the women have the ability to carry out rural electrification in various communities across the country.

5. Women-Energy and Economic Empowerment Nexus

With a gender lens approach to the energy success programme, the millions of dollars the government is spending on energy access initiatives in the country can have a greater impact on women's economic empowerment. The paper observed that there are two well-accepted narratives related to economic growth. First, in Sierra Leone, there are vast gender inequalities throughout the country that are closely linked to poverty and the marginalization of women. Second, access to modern energy enables women's economic advancement. Until recently, however, exploration into the relationship between the two narratives has been limited. In the energy arrangement in Sierra Leone, what is missing is the linkage between energy access and women's economic empowerment. Under what context does gender equality rise with access to electricity, what are the channels through which this change occurs, and how significant are the economic benefits to women? Can the Ministry of Energy and the government reap more meaningful results by targeting energy development programmes that enhance benefits for women, and if so, how? In this paper, the researcher explores these questions. The researcher further notes that while there are many areas critically important for women's economic empowerment in the country, energy access programmes are an underexplored lever for women's economic empowerment. The researcher further stated that there is an untapped link between gender and energy. He examined that in many ways, in the new direction government programmes—from Free Quality Education (FQE), maternal health, and gender-based violence, Hands Off our Girls campaign, the five game changers, the GEWE Act of 2022, and other efforts aimed at economic empowerment; other programmes tackle systemic gender issues such as the three Gender Acts of 2007, the Sexual Offenses Act of 2012 amended in 2019, political participation, and women's access to justice. Noticea-

bly less prevalent in this discussion, however, is the topic of access to energy and its impact on women and girls. In parallel, reliable, affordable energy is increasingly recognized by the international community as an enabler of growth.

In Sierra Leone, a large number of women do not have access to reliable and affordable modern energy services, as well as access to clean cooking facilities. In 2011, the global initiative of "Sustainable Energy for All" (SE4All) was established to address these problems. However, in Sierra Leone, energy for all will not be attained unless women's energy needs are better understood and addressed by both policy and action. Gender analysis in other sectors is increasingly providing evidence that a focus on investing in women has significant benefits. For example: Investing in women is one of the most effective ways to drive economic growth because women tend to invest their assets in their families and communities; economically empowered women result in healthier families, more educated children, and a more effective voice in the country; women farmers could achieve potential yield increases of 20 - 30% if they had the same inputs as men farmers, moving a large proportion of women out of poverty and increasing food security[17], especially with the Big-5 Game Changer of the government, wherein energy access is one of the pillars. In the context of energy access, there is a need for the government to incorporate a more gendered approach that will lead to greater equality between women and men in the impact of modern energy services, and transform traditional female/male roles and relations by empowering women when they have improved access to, or participate in the delivery of, modern energy services nationwide.

Economic empowerment: gender inequalities are strongly connected to poverty, limited security, and limited access to opportunities. At the same time, poverty alleviation is closely linked to economic empowerment, as well as control over and access to resources and technologies, including the energy sector. In these terms, women's economic participation in the energy sector through business development offers multiple benefits[18]. It not only contributes to the economic advancement of women and their communities, but also challenges inequalities, gender norms, and traditions by enhancing women's economic independence and self-confidence. At the same time, the development of clean energy technologies also impacts interlinked areas of development, including health, education, environmental protection, and climate change.

6. The Link between Energy, Poverty and Gender

In Sierra Leone, poverty is usually referred to as a lack of access to income, empowerment, basic opportunities, and services. These circumstances are often inextricably linked to gender inequalities and social exclusion[19]. In this context, the recognition of energy as a critical enabler of poverty alleviation and a prerequisite for the achievement of multiple SDGs has marked a revolutionary shift. Modern

[17]Sierra Leone energy situation energypedia.
[18]Energy efficiency policy of Sierra Leone, 2016.
[19]Ibid.

energy services and technologies can contribute to releasing people from the vicious cycle of poverty and transform lives by opening socio-economic opportunities, including improving women's conditions, meeting their basic and productive needs, and increasing income through energy business development and livelihood opportunities. However, the lack of modern energy solutions and services still affects nearly half of the country's population, particularly in rural communities. In addition, the impacts of energy poverty are differentiated by gender. Not recognizing women's energy needs and failing to apply a gender lens to energy policies and actions contribute to perpetuating poverty, drudgery, and gender inequality[20].

7. Energy Needs for Sierra Leonean Women

Women in Sierra Leone use various forms of energy for different purposes.

For Domestic use

For Cooking

For Home lighting

Domestic water distribution

Watching movies, television, radio

Food processing

Refrigeration and food preservation

For Agricultural uses

Watering of crops and/or irrigation

For the use of agricultural and farming equipment

Food processing, preservation, and storage

Drying of agricultural products

For marine and freshwater uses

During Fish processing

Outboard machines are used on the high seas for fishing.

Fish preservation

Transportation of fish

Transportation of agricultural products, including fruits and vegetables

Transportation of livestock and dairy products

Women owned SMEs

Use in cookery and restaurants

Cooling of drinks

Preservation of foods

Conclusion

The paper concludes that the government of Sierra Leone has invested significantly in energy implementation programmes, but has not used gender-differentiated indicators to measure the economic impact on both sexes. There have been significant investments in solar and rural electrification across the country; however, gender-disaggregated results are rarely captured, which impedes the ability

[20]Gender, energy and policy: a review of energy policies in East and Southern Africa.

to understand effective design. On the energy outlook of the country, the energy demand for both women and men is increasing geometrically while the supply remains inadequate, insecure, and irregular[21]. This has greatly impacted women's economic activities negatively; the mix has hitherto been dominated by the use of fossil fuels, which are fast depleting and environmentally unfriendly. It is clear that energy deficiency limits women's economic empowerment, hence their heavy dependency on traditional biomass, which is accompanied by challenges of ill health and environmental degradation. The government has not been able to find a feasible solution to address the energy concerns of women as a crucial pre-condition for their economic empowerment and environmental protection.

The paper found that women are under-represented in energy intervention and decision-making arrangements throughout the country; this has negative impacts on women's economic empowerment. Women and energy are inseparably linked; at the basic household level, women are the collectors, managers, and consumers of energy sources, including the collection of fuel woods and biomass on the one hand, and consuming electricity—they are the primary users of Chinese lights and natural gas. Consequently, women remain directly exposed and vulnerable to health and environmental hazards with limited opportunities for their education and income generation. In summary, the paper identified some of the barriers women in Sierra Leone face in the energy sector, mainly: practical and social barriers; lack of knowledge, ownership, and control over productive resources; restrictions on decision-making; education and information barriers. Most traditional institutions set up in the energy sector lack women in the energy profession, with existing institutional mechanisms not being women-friendly.

The key gender issues in the energy sector in Sierra Leone identified are as follows:

- The absence of sex-disaggregated data and empirical research data on women and energy;
- Lack of awareness and understanding of the gender, energy, and economic development nexus;
- The existence of huge social biases and gender inequality not only in the energy sector but also in all spheres of life in the country;
- Women's lack of knowledge regarding the use of conservation of renewable energy;
- Under-representation and the absence of women in the energy sector and intervention in the decision-making process;
- The lack of relevant case studies that could identify directions for policy and decision-making in the energy sector in the country.

Recommendations

Some of the recommendations in this end on women and economic empowerment in the energy arrangements in the country are that the government should

[21]The Republic of Sierra Leone, Ministry of Energy and Water Resources, National Energy Policy and Strategic Plan, Energy for Poverty Alleviation and Socio-Economic Development.

look at the following: control over and access to modern sustainable energy services; number of women's enterprises using clean fuels and improved energy technologies; number of women engaged as clean energy technology/service providers and entrepreneurs; reductions in time spent in cooking and fuel collection; use of time saved; reductions in indoor air pollution; increases in the number of clean cookstoves and productive energy technologies sold, disseminated, and used. In addition, commitments both at national and local levels on gender equality, and other economic sectors that are important to women, i.e., water, food and agriculture, and health, among others, are to.

Set minimum standards that ensure a basic level of energy services as a public good, by targeting the most vulnerable groups, with special attention to women's needs.

Scale up targeted investments to increase women's opportunities for enterprise development.

Government should develop the capacity of energy institutions on how to work with gender mainstreaming approaches in planning, implementing, financing, monitoring, and reporting—for example, through the use of tools such as gender audits and needs assessments, gender-aware budgets, and the collection and use of sex-disaggregated data and gender-sensitive indicators to inform policy and program planning and monitor impacts.

Ensure the effective participation of civil society organizations, the media, and women at all levels of decision making in the energy sector, including in local councils and government institutions.

Promote organizational strategies that support gender parity and diversity in energy organizations, including through scholarships, mentorship, and leadership programs targeted at women professionals and female students at universities offering science, technology, engineering, and mathematics (STEM) programs, and in the energy sector in every school and university nationwide. In addition, energy policies and plans need to be gender responsive, with greater attention to women's awareness raising and participation in the design, implementation, monitoring, and evaluation in the sector. The government of Sierra Leone should also provide scholarships for girls and female students in every tertiary institution wishing to enter the energy sector.

There is a need for women to be encouraged not only at the conservation levels but also facilitated and promoted at the entrepreneurship and policy decision-making levels. In the area of renewable energy technologies, the government must develop skills with the inclusion of women's perspectives and their needs and concerns through a consultative process, while at the same time undertaking needs assessments. The search for a resource pool of gender experts in the energy sector must be launched for periodic knowledge sharing and capacity-building initiatives.

Mass advocacy and awareness campaigns need to be launched not only by the government but also by civil society organizations and the media; school curricula

and the media must highlight women's current and potential roles in the energy sector and join social responsibility for energy conservation. A special budgetary allocation by the Ministry of Finance should be dedicated to promoting and addressing specific women's needs and concerns, including sponsoring research work in the sector.

For the smart green stove: social impact, this will improve the working conditions and health status of women by reducing indoor air pollution and the associated respiratory illness caused by smoke and intense heat. It reduces cooking time because more efficient stoves mean more time available for women to do other economic activities. This will help improve health through better stoves and require less effort in gathering and carrying firewood.

Energy services are essential for socio-economic development, since they yield social benefits and support income and employment for women. Government reforms to the energy sector should protect women, who are the most vulnerable in the country, by taking gender inequalities into account.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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