Policy-making Prospects and Challenges of the Climate Change and the Urban Energy Sector in Zimbabwe

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Abstract

This article explores and analyses the development and interplay of the energy sector and climate change with the sole focus on opportunities and problems for policy-making to control climate change in urban Zimbabwe. There is a gap between energy sector and climate change policies in urban areas of Zimbabwe, as energy policies are being addressed separately from climate change policies and governance. Metropolitan areas, such as Harare and Bulawayo, are affected by climate footprints of the energy sector related to climate change. Currently, there is a dearth of literature on energy-climate nexus and frameworks to augment policy direction towards combating climate change in the country. The study adopted qualitative methods to collect data from residents, municipality officials and selected companies. Findings from the study show that urban communities in Zimbabwe are confronted with energy deficit and climate change-induced problems like high temperatures and heat islands. The article also concludes that the synergy between climate change policy and energy necessitates the attainment of Sustainable Development Goals (SDG) numbers 7 and 13 in urban Zimbabwe. Hence, there is need for robust policy frameworks to form resilient and sustainable energy systems.

Keywords: *climate change, energy, policy, technology, Zimbabwe*

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INTRODUCTION

The enduring burden of climate change in Zimbabwe has been echoed in numerous studies recently by scholars (Chikodzi *et al.*, 2013; Gutsa, 2014; Murombo *et al.*, 2019) and, in project reports by Mtisi and Prowse (2012) and the UNDP (2017) and by national development organisations (Brazier, 2015) but still, its inexorable connection with the energy sector is less understood. Since 2000, the energy sector in Zimbabwe and, perhaps in Southern Africa, has emerged as one of the less understood major economic sectors, more, particularly that of the environment in climate change science.

Zimbabwe is a country burdened by climate-induced disasters (CINDs), including drought, floods and extreme temperatures. However, action against climate change in Zimbabwe is not new but scholars often lament that the interventions against CINDs are weak (Brazier 2015, 2017). This has been shown by the government of Zimbabwe's slow and unpreparedness response to climate change adaptation. This was despite debates being constantly held in the Parliament of Zimbabwe wherein the parliamentarians of Zimbabwe African National Union-Patriotic Front (ZANU-PF) and the Movement for Democratic Change (MDC) clashed over the issue of climate change response and preparedness with minimum action being taken. Action against climate change by the government tends to have a strong rural bias, neglecting urban areas, equally increasingly hotbeds for extreme temperatures, due to heat islands. In this regard, the ruling ZANU-PF party, that has dominated politics in Zimbabwe for decades, has had a rural bias in their policies and other activities for appeasing rural voters. Tsabora (2019) argues that there is need for insights that can be drawn concerning strategies and methodologies that must be embraced by the energy sector to confront environmental and climate change impacts.

Whilst the energy sector has huge potential to the national economy on the rise, the Zimbabwean government and relevant stakeholders have shunned climate change and its associated impacts on investments until recently (Brazier, 2017). Zimbabwe is currently struggling with a persistent energy crisis that has been exacerbated by a drawn-out economic meltdown (Murombo, 2019; 205). The Southern Africa Power Pool estimates show that erratic power supplies, electricity outages and scarcity of petroleum products

are now the order of the day. Despite being under the bedevilling effects of inorganic urbanisation are facing significant impacts from climate change, both now and into the future. These impacts, according to Chikodzi *et al.* (2013) and Brazier (2015), have dire consequences for; livelihoods, public and personal health and assets and, quintessentially, the disruption of socio-economic well-being, especially for the urban poor, informal settlements. Besides, climate change impacts range from an increase in extreme weather events, such as droughts and floods to hotter temperatures, with hunger, droughts, poverty and diseases (Goz, 2016; Goz, 2017; Tsabora, 2019). Climate change is resulting in the loss of lives and ecosystems and degradation, declining water resources and water quality and damaged infrastructure (Murombo, 2019; Brazier, 2017). As a developing nation, Zimbabwe is bound to feel the depredations of climate change the most. Energy and climate are under intense pressure by rapid population growth in urban Zimbabwe.

Climate change has greatly impacted the energy sector in many ways, such as reduced usage of non-renewable sources of energy, on hydro-power the drying up of rivers and rapid recession of lakes and dams, for instance, the situation of Kariba dam in 2019 (Madzvamuse and Matonho, 2011; Dzvimbo, Monga and Mashizha, 2017). Moreso, there is a reduction of capacity for energy production from hydropower as most urban households in Zimbabwe are increasingly becoming dependent on firewood. This has led to environmental degradation as clearing of forests for various energy productions, such as charcoal continue to be on the increase. There has been great encroachment into the natural forests and woodlands. Furthermore, the cost of affordable bioenergy for domestic consumption has increased with use of gas and other unsustainable energy options. Africa is currently experiencing the fastest urbanisation rate at approximately 3-5% annually and urban Zimbabwean cities are no exception to the trend.

Across the world, over half of the seven billion people now live in urban areas. Recent research has observed that by 2050, more than 70% of the Zimbabwean population will be residing in urban areas (Brazier, 2015; Murombo *et al.*, 2017). This will compromise the sustainable future of cities and, therefore, cities and towns need to invest efforts in inappropriate energy

mixes and green infrastructure (Calvert and Simandan, 2010). Drawing lessons from urban Zimbabwe, this article examines the relationship between climate change and the energy sector in Zimbabwe in line with the policies that have potential and capacity to bridge the gap between the energy sector and climate change. It also provides opportunities that can be embraced for low-carbon developments in urban areas of Zimbabwe. The article singles out reforms required to move urban Zimbabwe towards a climate-resilient and low-carbon sustainable economy. The study provides policy strategies that must be embraced by the energy sector to confront the climate change disaster. The energy sector in Zimbabwe has cross-cutting issues that need imminent redress. Given that the national energy sector is entangled in the frameworks that encourage the use of fossil fuels, there is an urgent need to rapidly institute energy-climate policies to reduce its use to avert the climate change phenomenon.

THE CONTEXT OF ZIMBABWE URBAN CLIMATE AND ENERGY

According to the Energy Regulatory Act [Chapter 13:23] section 4, the 'energy industry' are 'persons in Zimbabwe who, in the private or public sphere, are concerned with the generation, procurement, distribution, transportation, transmission and production of energy to consumers thereof ' (Eberhard *et al.*, 2017). The energy sector in Zimbabwe is gaining momentum owing to its centrality in the country's industrial development (Gutsa, 2014; Tsabora, 2019).

The Ministry of Energy and Power Development has overseen the performance of energy parastatals and is responsible for energy issues in Zimbabwe. These range from policy-formulation, performance-monitoring and regulation of the energy sector and research, development and promotion of new and renewable sources of energy. The Ministry has the mission to provide an enabling environment where adequate, reliable, affordable and sustainable energy is made available to all, in an efficient manner and to be a provider of world-class energy services. The Government of Zimbabwe (GoZ) (2015) concurs that the Power Development Department is one of the technical departments of the Ministry and its strategic goals are centred on the effective administration of utilities under the Department's purview namely

Zimbabwe Electricity Supply Authority (ZESA) Holdings (Pvt) Ltd group of companies and its subsidiaries: Zimbabwe Power Company (ZPC), Zimbabwe Electricity Transmission and Distribution Company (ZETDC), ZESA Enterprises (ZENT) and Powertel, the Rural Electrification Fund (REF), Zimbabwe Electricity Regulatory Authority (ZERA) and the Zambezi River Authority (ZRA), that is a bilateral body owned by Zimbabwe and Zambia.

Energy is an integral input to socio-economic activities in the urban areas of Zimbabwe. Nevertheless, production, distribution and consumption exert unbearable pressure on the atmospheric environment. Research by the International Energy Agency 1990-2016 observed that the energy sector is the biggest emitter of greenhouse gases (GHGs) (Calvert and Simandan, 2010). Current energy production and consumption methods in Zimbabwe and particular urban areas contribute largely to climate change. Moreso, in the case of Harare, the capital city of Zimbabwe, energy consumption practices in domestic cooking, tobacco-curing, brick-making and in other industrial activities, are adversely impacting the urban climatic environment and perhaps limited to nearby rural areas. However, a vast majority of core investment by urban areas, through local authorities and other stakeholders, does not include climate measures. Most cities, today, continue to construct energy-hogging infrastructure, dispose of waste without utilising it as a power source and ignore distributed generation and renewable energy options.

Climate change is interwoven with everything, *inter alia*, energy security and sustainability, food and water security, social upliftment (water, shelter, culture, livelihood and property), economic development, international and local law and governance (GoZ, 2009; Greiber *et al.*, 2009). Climate change in Zimbabwe is manifesting in extreme weather events, such as persistent droughts and cyclones as vividly illustrated recently by Cyclone Idai.

The energy sector in Zimbabwe is facing a plethora of challenges in meeting the quantity, quality and reliability of energy. Mutasa (2019) observes those institutional arrangements governance issues, lack of research institute, funding constraints and inadequate human resources capacity, the overlap of the mandate of various institutions.

CONCEPTUAL FRAMEWORK

Climate change is the long-term shift from the normal climatic conditions, e.g. wind, rainfall quantity and humidity measured over a long period of about 30 to 35 years that is attributed to human activity or natural variability that alter the atmospheric composition, for example, an increase in the amount of atmospheric greenhouse gases like carbon dioxide leading to global warming (Hardy, 2003; IPPC, 2009; Murombo *et al.*, 2019). According to the Intergovernmental Panel on Climate Change (IPCC, 2007), change in the state of the climate can be identified by changes in the mean and/or variability of its properties and that persist for an extended period, typically decades or longer. Climate change can also be attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is in addition to natural climate variability observed over comparable periods (UNFCCC, 2018; Mashizha, Dzvimbo, Monga and Ncube, 2017; Matamanda *et al.*, 2017).

In its simplest sense, 'policy' refers to a broad statement that reflects future goals and aspirations and provides guidelines for carrying out those goals. 'Policy' entails 'the product of political influence, determining and setting limits to what the state does' (Hill, 1993: 47). Simply put, when the state opts for a course of action to solve a social problem and adopts a specific strategy for its planning and implementation, it is known as a public policy (Anderson 1975). Policy scientists argue that public policy is best conceived in terms of a process (Rose, 1976; Anderson, 1978; Jenkins, 1978). Jenkins (1978) made an argument when he said: 'policy-making is best conveyed by describing it as a process, rather than as a single, once-for-all act'. This process involves negotiation, bargaining and accommodation of many different interests, eventually giving it a political flavour. Policy-making is a complex dynamic process involving a series of actions and inactions of varieties of groups with varieties of interests at different stages. It is, however, worth stressing non-official groups also play a very active role in policy-making. A policy framework is critical in guiding state practice and legislative objectives.

RESEARCH METHODOLOGY

The study adopted qualitative methods to collect data from residents, municipality officials and selected companies. The materials were also drawn

from larger published and unpublished papers on energy and climate from the year 2000 to date. Desk reviews of published and grey literature were used to identify and characterise the energy challenges, policy and institutional frameworks and climate change. A review of written policy documents, policy briefs, statutes and select reports was done. Content analysis was deployed to analyse secondary data on the interactions of the energy sector and climate change and the use of evidence by policy-makers on climate change-related writings. These documents were also reviewed for the quality of their references, bias and clarity. Secondary data were collected from the various policy documents, with a special focus on challenges and prospects for making policies to grapple with climate change. Another reference is made to summary reports, such as that of the United Nations Secretary General's Advisory Group on Energy and Climate Change (AGECC) and the International Energy Agency's World Energy Outlook 2010 chapter on energy poverty. Both of these reports include recommendations and specific targets for household energy in the context of climate change and sustainable development. Interviews were also carried out with policy-makers to evaluate their ability to access/use climate change research.

RESULTS

Crafting policies that facilitate climate-sensitive energy systems entails understanding of the Zimbabwean political economy of energy and climate policy-formulation. Packages of policies are required to promote clean energy access. This includes electricity for productive uses and a full range of technical solutions, such as off-grid and mini-grid renewables, energy efficiency and clean cooking. Energy and climate policy reforms must take cognisance of other sectors like waste management to improve efficiency and reduce carbon emissions (Calvert and Simandan, 2010; Millner and Dietz, 2015). Sectors, such as transport, explosive manufacturing, consumption and construction activities and big sources of carbon, also require reform to improve efficiency and reduce carbon emissions. Greater Harare, for example, is facing solid waste management failure through ineffective waste control, filling landfills with mountains of garbage, the largest source of deadly methane gas which causes global warming, urban temperatures rise. Crucially, the policy objective must be to achieve climatologically sustainable energy development.

Zimbabwe's policy provisions on energy are embodied in the National Energy Policy. According to Gutsa (2014) and GoZ (2017), the policy calls for the ministry responsible for energy and power to 'develop and review integrated electricity energy resource master plans to increase the proportion of electricity generated from renewable energy resources for environmental sustainability'. Applicability, acceptability, affordability, accountability and availability are the main policy goals and objectives are guided by the five. Of interest to climate change, the 'Acceptability' principle emphasises the need for environmental sustainability of energy products and services they need to protect the physical environment and ensuring the acceptable environmental and social impact of energy production, transportation, distribution, supply and use (GoZ, 2017; Tsabora, 2019). However, it is noteworthy that the current climate policy does not mention climate change, opting to perhaps cover it under environmental considerations or factors.

The climate change policy framework provides insights into the state's agenda concerning climate change mitigation and adaptation. However, the Zimbabwe climate change policy framework lacks mainstreaming of the energy sector imperatives for mitigation and adaptation. Millner and Dietz (2015) assert that for climate change policy-integration to be a reality, there is need for policy-makers to place more emphasis on climate change issues in the planning and execution of general and sector-specific policies. Indeed, a climate change policy document must give backing to the actual laws that are set to promote and achieve objectives in the policy framework (Gutsa, 2014; Tsabora, 2019).

The National Climate Change Response Strategy was crafted by the Zimbabwe government in 2014 to create a sound and comprehensive platform to confront climate change (GoZ, 2016; Mashizha *et al.*, 2017; Tsabora, 2019) as it seeks to mainstream climate change in all the key sectors of the economy; to promote resource use efficiency and less carbon-intensive pathways in all economic activities and develop a climate change resilient energy infrastructure. Tsabora (2019) asserts that climate change issues used to be covered marginally by policies, such as the National Policy and Programme on Drought Mitigation enacted in 2015, the Draft Disaster Risk Management Policy and Strategy crafted in 2011, the Second Science,

Technology and Innovation Policy of 2012, the Water Policy revised in 2013, the Agriculture Marketing and Pricing Policy of 2012 and the Small, Micro and Medium Enterprises Policy that was crafted in 2002.

The National Climate Change Response Strategy document stood as the most important one in roping in the energy sector as it acknowledges the importance of the energy sector and its critical connection to climate change. Murombo (2019) argues for climate change-based approaches, including, but not limited, to the promotion of renewable energy and other action plans to 'green' the energy sector. Strategies for confronting the climate change phenomenon in the energy sector are identified in the document, as the introduction of policies and regulatory frameworks for renewable energy, energy conservation and energy efficiency; strengthening energy planning, research and development and promoting low-carbon energy provision and use. However, Tsabora (2019) observed that there is a lack of technical detail and specificity of the energy policy framework that hinders strides against climate change imperatives.

The National Adaption Plan (NAP) was introduced by the Ministry of Water Resources Development and Climate (MWRDC) to urban authorities to reduce their vulnerability to climate change impact and facilitate the integration of climate change adaptation into their planning processes. The NAP is a flexible process that builds on the country's existing adaptation activities and helps integrate climate change into national decision-making. This is a strategic process for the country in shaping its Climate Policy, implementation of the Climate Change Response Strategy and exploring ways of up-scaling development as it supports domestic decision-making.

The National Climate Policy (NCP) was drafted in 2016 by the government of Zimbabwe. The NCP endorses the need for the 'mainstreaming' six of climate issues in all sectors of the economy, including energy, agriculture, industrial processes, waste, land-use, land cover and forestry. This remains to be seen as yielding positive outcomes as the government is not doing enough in terms of funding new projects which can actually counter climate change. Corruption and bad governance continue to erode derail the implementation of the NCP. Until the government and policy-makers realise the urgency for

the need for implementation and finding other innovative projects support CC and adaptation and mitigation, a well-informed citizenry will be armed.

THE ENERGY SITUATION IN URBAN ZIMBABWE

Urban Zimbabwe is facing energy poverty and/or crisis that is forcing it to rely heavily on non-renewable energy forms. This is unsustainable in the face of the rapidly changing climate. The primary energy sector is dominated by conventional fuels: coal, with total reserves of 10.6 billion tonnes, of which half a billion are proven, petroleum of which about 1.5 billion litres of finished distillates are imported every year and hydroelectric power with a total potential of 4,200 MW mainly on the Zambezi River (GoZ, 2018). Electricity generation is about 49%, hydropower and 51% coal whilst the contribution of other abundant renewable energy resources, such as solar and waste energy, is negligible.

Energy options in Zimbabwe comprise hydroelectricity, coal and renewable sources. The source can be renewable or non-renewable. Renewable sources include solar, wind, water, wood and other, biomass while non-renewable sources include petroleum (oil, paraffin, diesel, petrol, kerosene, jet fuel), nuclear and coal. Zimbabwe has untapped unlimited access to several renewable sources of energy. There is need to turn to renewable energy sources like solar, wind and distributed small hydropower plants, rather than rely on traditional unsustainable forms of producing energy. Besides, the country recently discovered that it is endowed with considerable reserves of natural gas, that is less polluting than coal, but no sustained efforts have been made yet to exploit these other energy sources. This "clean energy" contributes zero pollution to the water bodies and the atmosphere as renewable energy technologies are clean sources of energy with a much lower environmental impact than conventional energy technologies.

Non-renewable energy sources, such as coal and petroleum provide thermal electricity in Zimbabwe. Much of Zimbabwe's electricity is generated at the Kariba Dam Hydroelectric Power Station and most petroleum products are imported from within Southern Africa, and sometimes, from as far as the Middle East. Such energy has disadvantages in that it produces smoke which pollutes the air. Burning of fuel sources that contain carbon, hydrogen and

oxygen, produces carbon dioxide, carbon monoxide, soot and sulphur dioxide which also pollute the air. The major sources of electricity in Zimbabwe are coal-fired thermal and hydropower plants all owned by ZESA Holdings through the Zimbabwe Power Company.

To enhance efforts against climate change there is need to invest in a low-carbon economy, for example, promoting energy efficiency and the uptake of green products (Dzvimbo *et al.*, 2019; Winkler, 2016). Climate imperatives of sound policy frameworks require that the development of the sector must operate in a manner that the physical environment is cushioned from climate change (climate action). Central Business Districts (CBDs) should also embrace greening that has become a modern concept being adopted world-wide.

Service station "solarisation " is one of the strides to climate-proof urban communities of Zimbabwe. Total Zimbabwe is the first energy company in Zimbabwe to have commissioned a project to solarise service stations across the country, many of that are in urban centres. Commissioned sites include Total Westgate (Harare), Total Simon Mazorodze (Harare), Total Emerald Hill (Harare), Total Hillcrest (Bulawayo), Total Rusape 1 and Total Clonsilla (Gweru).

Zimbabwe's urban areas are becoming hotbeds of the climate footprint of household technologies. Nearly 25% of global CO_2 emissions are attributed to energy and fuel use by the residential sector (Morlot *et al.*, 2019; International Energy Agency, 2019), including grid-electricity and household coal, oil, gas, liquefied petroleum gas (LPG), *inter alia*, for cooking and heating. The adoption of cleaner household energy technologies to reduce climate change represents a major opportunity that has not been adequately explored by the energy boards in Zimbabwe. The usage of LPG has phenomenally increased in urban areas of Zimbabwe over the last five years (Chikodzi *et al.*, 2013). Lack of adequate existing electricity distribution infrastructures or natural gas has caused the increased use of LPG for cooking, transport, heating or industrial applications. Morlot *et al. (*2019) denote that LPG is increasingly recognised today as a clean-burning fuel energy option for minimising GHG emissions and offering an immediate, cost-effective and low-carbon energy solution,

compared to biomass, fuel oil and, in many countries, electricity. As a low-carbon, low-polluting fuel, LPG is recognised by governments around the world for the contribution it can make towards improved indoor and outdoor air quality and reduced greenhouse gas emissions. As global decision-makers continue to debate on the effects of climate change and seek ways to reduce GHG emissions, LPG can offer significant near-term solutions to the world. When combined with other environmental, cost and performance advantages, it is clear that LPG is an ideal clean energy for a low-carbon world (UNDP, 2017).

According to GoZ (2016), ZERA is committed to ensuring the safe use of LPG in homes and workplaces. LPG is also among the lowest carbon-emitting fuel sources for cooking in many regions of the world. Urban Zimbabwe is lacking coherent policy frameworks to deliver clean cooking energy solutions at the scale required and the policy-makers must have an action plan for clean cooking with an ambitious goal to have at least 85% of the population using LPG and at least 50% using improved biomass cook stoves by 2030. Cooking with biomass, notably wood and charcoal with household cook stoves, is also contributing to net deforestation on the fringes of urban areas of Zimbabwe with a decline in area of about 0.5% per year (Mtisi and Prowse, 2012).

Heavy dependence on biomass and related deforestation increases black carbon and methane emissions, for example, from charcoal production and moreso, it limits natural carbon removal by forests and land. The study observes that residents of St Mary's suburb in Chitungwiza, 25 kilometres outside Zimbabwe's capital Harare, nearby urban forests to fetch wood for cooking. Hence, 20% of the urban households which do not have access to electricity and rely mainly on firewood for their energy needs. In this regard, serious systematic analysis of challenges and opportunities is needed by policy-makers, local and national governments and other actors from both the public and private sectors, with special consideration for climate and energy health sectors of investment opportunities, hence, providing universal access to clean, modern household energy is of paramount importance.

A national climate change policy is a prerequisite for Zimbabwe to access funding from the Global Environmental Facility and other sources of Climate

Change Funds (Madzvamuse and Matonho, 2011). The rate at which the climate is affected is alarming. As such, it is imperative to take into account the excessive environmental damage engendered by energy production, distribution and consumption. This should also include the end-user. Stakeholders, particularly the Government of Zimbabwe, must work on proposals that will lead to the creation of a Climate Action Fund (CAF)., taking advantage of policy proposal loopholes without taking into account the damage accrued to the climatic environment. Parliamentarians must initiate debates around the creation of climate pool funds to curb climate change. Focusing on the electricity utility sector ZESA, restructuring and adjustment of tariffs to improve revenue, should not only improve the financial performance of the utility sector but help in setting up the CAF.

Insurance solutions to climate change are significant in bolstering early action in the face of a climate change disaster and, thus, speed up rebuilding critical infrastructure and recover and restore livelihoods so that people and communities can rebound. The Global Facility for Disaster Reduction and Recovery and the World Bank, with other partners, are developing climate change insurance solutions and providing finance to help vulnerable countries proactively manage disaster risks through a portfolio of financial instruments. For a relief effort, rapid access to funds can also make the difference by enabling early action.

The energy sector is facing the regulatory bottlenecks that are inhibiting energy investments that ensure the sustainability to put in check the economic risks of climate change. Most importantly, the statistics alone justify the need to regulate the energy sector in a manner that seeks to tackle its significant contribution to GHG emissions and, consequently, to climate change. The energy sector is regulated by the Zimbabwe Energy Regulatory Act, that is administered by the Ministry of Energy and Power Development, working through the Energy Regulatory Board and ZERA. ZERA has broad powers to 'regulate the procurement, production, transportation, transmission, distribution, importation and exportation of energy derived from any energy source' (GoZ, 2017; GoZ, 2018). Unfortunately, when it comes to climate change in urban areas the current regulations, they are void as the regulatory provisions of the Zimbabwe Energy Regulatory Act are uniformed with the

climate change notion regardless of the fact the licensing regime created by the Act. It is important to note that the Act can accommodate a robust climate change-based approach in the licensing regime (Tsabora, 2019 and Mutombo, 2019). Tsabora (2019) opines that regulations are made to govern license terms and conditions applicable to the sector of the energy industry concerned with the exploitation of the energy source in question. The licensing terms and conditions can promote climate adaptation and mitigation but are biased towards energy security in practice. With Zimbabwe in a permanent state of the energy crisis, it would not be surprising for the government to ignore climate change considerations and seek to promote imperatives for energy sector expansion and increased production.

The Environmental Impact Assessment (EIA) is very important for all energy sector activities. The Environmental Management Act calls for the adoption of EIA in the energy sector for petroleum production, storage and distribution; oil and gas exploration and development; pipelines; oil and gas separation, processing, handling and storage facilities and oil refineries (Murombo, 2019). As such, ZERA must allow players in the energy sector that can adopt clean technologies or other strategies and methods of energy production in a manner that promotes climate adaptation and climate change mitigation. However, there are regulatory and responsibility overlaps between the environmental management authorities and the energy regulatory authorities.

DISCUSSION

The national climate and energy policy frameworks in Zimbabwe are not averse to the establishment of a licensing system based on the need to achieve climate adaptation and climate change mitigation.

Although the ramifications of climate change on the energy sector are complex and multi-dimensional, there is need for sustainable synergies between the climate and energy sectors. UNFCCC (2015) and UN (2015) in the Paris Agreement and the 2030 Agenda for Sustainable Development, called for sustainable energy and climate change to the hub of policies. The World Energy Council (WEC) (2014) briefing made important observations that, 'climate change presents increasing challenges for energy production and transmission as a result of extreme weather events, temperature increase and

changing precipitation'. Cuts in GHG emissions in urban Zimbabwe can be achieved through a variety of measures. These include cutting emissions from fossil fuel extraction and conversion, switching to lower carbon fuels, improving energy efficiency, increasing use of renewable and nuclear, introduction to carbon capture and storage (CCS) and reducing final energy demand.

There is an inevitable and strong connection that exists between the energy sector and climate change. As evidence shows in urban Zimbabwe that the energy policy relegates climate and/or the ecological environment considerations to the margins and so does the climate change policy to energy. Therefore, policy provisions governing energy issues in urban communities of Zimbabwe should operate in tandem with the provisions of climate change policies. Climate change must be mainstreamed into relevant policies and sectors paying much regard to energy and climate relation. As such, the systems approach between the energy sector and climate actions in policy thrusts must be tightened to ensure there is an energy factor in climate change policy. This entails the need for an EIA. GoZ (2017) and Murombo (2019) proffer that the energy sector activities require environmental impact assessments under the Environmental Management Act. The Environmental Management Act states that activities, requiring an EIA in the energy sector, are petroleum production, storage and distribution; oil and gas exploration and development; pipelines; oil and gas separation, processing, handling and storage facilities and oil refineries.

Various players are required to enhance institutional capacity to confront climate changes in urban areas of Zimbabwe. There is need for collaboration between energy and power departments and environment authorities. As part of the strides to overcome the energy-related greenhouse gas emissions, the government must require direct annual reporting from all energy departments. Moreso, there is need for an integrated energy plan that takes into account environmental considerations, whilst incorporating environmental considerations in the supply, transformation and end-use of energy (Madzvamuse and Matonho, 2011; Chikodzi, 2013).

There is need for new actors to actively facilitate policy options that can affect policy change. These must be, *inter alia*, businesses, governments and international financial institutions to affect a critical role in transitioning to huge use of geothermal, wind, hydropower, solar and biomass power (Mickwitz, 2009). For instance, the participation of civil society in public discussions and decision-making to positively affect demand and change in energy policies.

Cross-cutting sectoral policies for clean energy access are lacking in urban Zimbabwe. Gutsa (2014) and Murombo *et al.* (2019) observe that the alignment of policy across sectors that impact climate and energy directly or indirectly is needed to ensure consistency and coherence. In another example of alignment, compact urban development policies and the use of smart meters can both work to reduce the electricity requirements in buildings, lowering investment costs needed to generate power and deliver better access and economic growth in urban areas (OECD, 2017).

Griffin (2017) succinctly proffer that it is imperative to consider pricing carbon as an indispensable tool for policy frameworks tailored to incentivise private investment in sustainable energy. This tax measure sends a powerful signal to the market for climate-friendly-energy in urban Zimbabwe and could potentially be replicable in rural areas as well. The government must consult with stakeholders about the possibility of implementing a carbon tax.

To deliver on policy actions for climate change there is need to put into focus on Sustainable Development Goals (SDGs) 7 and 13. According to UNDP (2017) Sustainable Development Goal 7 (SDG-7) provides an aspirational goal for energy that needs to be firmly integrated into macroeconomic, energy and climate policies and to deliver on the full range of SDGs at the same time as clean energy access. The longstanding challenge to date is of aligning the SDGs on climate action, access to affordable and clean energy and economic growth (UNDP, 2017). While the Sustainable Development Goals call for access to affordable, reliable energy, climate change action may require measures to promote renewable energy sources that are not necessarily affordable, especially, in the context of Zimbabwe but reform of fossil fuel subsidies.

CONCLUSION AND RECOMMENDATIONS

Given the centrality of energy to climate change and of climate change to policy, the article proffers insights on how the energy portfolio can enable a transition from fossil-heavy industry to a low-carbon energy economy in urban Zimbabwe. Urban communities of Zimbabwe continue to face the challenge of energy sector-climate disconnection. Urban areas must plan for and aggressively fight against climate change and energy sector soundness is no exception. The robust energy sector can unlock sustainable economic growth that saves the urban climate from changing and, building resilience in urban communities. The energy factor in climate change needs to be mainstreamed in the licensing processes of the energy sector in climate change action. Delivering this requires not only attention to policy, but political contours from both domestic and international stakeholders and funds to ease the process. This implies that beyond policy and efficiency there are other ways to reduce and facilitate energy-related climate change. All policy thrusts must work towards attaining climate change objectives.

While the current emphasis of many efforts by the government and other stakeholders to deal with climate change is on mitigation, there is need to shift focus to energy-climate nexus in policy-making. In this line, the study denoted the underlying core principles of climate change policy drawing from an integrated and holistic understanding of the energy sector and climate change in urban Zimbabwe. Under the impact of economic stress, the livelihoods of the urban households are eroded as they depend on vulnerable natural resources and their depletion as a result of climate change will lead to continued abject poverty and set back the country's efforts to achieve sustainable development.

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