Climate Change and Energy in Zimbabwe: Towards a Low Carbon Energy Industry

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Climate Change Law in Zimbabwe: Concepts and Insights

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1. Introduction: Climate Change, Energy and Low Carbon Economy

Zimbabwe is currently struggling with a persistent energy crisis that has been exacerbated by a drawn out economic meltdown. Unplanned electricity outages and scarcity of petroleum products are now the order of the day.\(^1\) Electricity shortages have been a perennial challenge for the whole region of Southern Africa since 2008.\(^2\) As far as petroleum products are concerned, the country has been battling for the past several years to fend off a virtual drying up of fuel stations and reserves. Bottlenecks in procurement, growing vehicular population, and state control of procurement have largely contributed to the shortages. With increasing pressure to take steps towards developing climate change mitigation and adaptation policies and plans, the country has to be strategic. Zimbabwe needs its forests to provide the sinks for greenhouse gases, while the

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\(^1\) The ‘energy crisis’ is used here to refer to the erratic supplies, and occasional absence, of energy, especially electricity and liquid fuels. In May 2019 the Zimbabwe Electricity Transmission & Distribution Company attributed these shortages to ‘demand and supply mismatch, due to low water levels at Kariba Power Station, generation constraints at Hwange Power Station and limited imports.’ Available at [https://zetdc.co.zw/2019-load-shedding-programmes/](https://zetdc.co.zw/2019-load-shedding-programmes/)

\(^2\) The Southern Africa Power Pool estimates that peak demand in Zimbabwe will rise to 2 287 MW.
majority of rural people rely on the forests for 94% of their energy needs. Most of its electricity is generated from coal and hydropower. This is a challenging context within which to reconcile climate change imperatives while guaranteeing energy security and expanding access. Any commitments to legally mandate domestic climate action should be considered against the backdrop of this social, economic, and cultural context— and not international trends per se. Law must be developed and function in context.

The major sources of electricity in Zimbabwe are coal-fired thermal and hydropower plants all owned directly or indirectly by a state-owned enterprise, ZESA Holdings through the Zimbabwe Power Company. Due to constrained supplies driven by economic challenges and failure to invest into new capital projects, Zimbabwe also imports electricity from South Africa, Namibia and Mozambique. Most of its petroleum products are imported from within Southern Africa and sometimes from as far as the Middle East. An emerging biofuels industry contributes a small percentage of liquid fuels. This status quo creates a trilemma for the country—it needs energy in order to steer the economy on a recovery path, yet energy development is hamstrung by economic slowdown, and there is international pressure to act on climate change. The economic costs of the current energy crisis are exponential.

This makes it urgent to research the causes of the current energy crisis, and attempt to unravel the role that the legal regulatory framework is playing and could play in ameliorating or exacerbating the situation. However, more critical for this chapter are the implications of this current energy crisis on Zimbabwe’s policies and strategies to implement climate change mitigation and adaptation actions. Given the persistent shortages, what possibilities are there for the country to even consider shifting from fossil fuels to low carbon renewable sources? Can the economy sustain growth of a renewable energy sector, and at what cost to the economic recovery

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3 This is often understated, but a study has demonstrated that even rural electrification has had limited impact because of patriarchal roles and gender dynamics that see women still using fuelwood for cooking despite electrification; see Chipango (2018), p. 210.

and stabilisation programme? What can Zimbabwe possibly do to move towards Sustainable Development Goal 7 (affordable and clean energy) without compromising Goal 3 (good health and well-being) and Goal 13 (climate action)? Sourcing energy from affordable and clean sources that do not threaten health and well-being while promoting climate action is a complex task that requires extensive funding, institutional strength and an enabling legal environment. Over-ambitious climate change policy and action plans can inadvertently constrain further use of fossil fuels and increase the cost of capital energy projects.

Zimbabwe, like many African countries, has unlimited access to several renewable sources of energy but these have largely remained untapped. The central thesis of this chapter is that the Zimbabwean energy crisis can be ameliorated if the government, instead of pinning hopes on traditional unsustainable forms of producing energy, turns to renewable energy sources like solar, wind and distributed small hydropower plants. In addition, the country recently discovered that it is endowed with considerable reserves of natural gas, which is less polluting than coal, but no sustained efforts have been made yet to exploit these other energy sources.

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5 Several studies have highlighted the need for renewable electrification programmes to be economically sustainable and affordable for the targeted rural communities, see Karekezi and Kithyoma (2002), p. 1082, (noting that, ‘In the near to medium term future, greater emphasis on electrification of rural households is unlikely to succeed and would not address the needs of the rural poor in sub-Saharan Africa. What are urgently needed are technologies that can quickly increase incomes to the rural poor in sub-Saharan Africa. Energy technologies that are primarily designed to generate electricity are unlikely to be best candidates primarily for reasons of cost.’).

6 Constitutionally protected as a human right by s73 of the Constitution of Zimbabwe.

7 South Africa is currently experiencing this phenomenon where its ambitious climate change policies and strategies are being used to block any further development of coal-fired power plants, see Earthlife Africa Johannesburg v Minister of Environmental Affairs [2017] 2 All SA 519 (GP); Earthlife Africa Johannesburg v Minister of Environmental Affairs Case No 21559/18 (ZAGP) (pending second appeal against the first decision when the Minister had considered a climate change impact assessment report.); Groundwork Trust v Minister of Environmental Affairs Case No 54087/18 (ZAGP) (challenge to Ki-Power coal baseload IPP project); Groundwork Trust v Minister of Environmental Affairs Case No 61561/18 (ZAGP) (court challenge to ACWA Khanyisa Power IPP coal baseload project.) For further litigation against new coal build projects and the ‘Life After Coal Campaign’ in South Africa, see Centre for Environmental Rights, Pollution and Climate Change at https://cer.org.za/programmes/pollution-climate-change/litigation

resources.\(^9\) Gas has been touted (not without controversy) as the bridging fuel that will enable that transition from fossil fuels to low-carbon climate friendly energy sources.\(^{10}\) Despite the equivocation of this ‘bridging’ potential of gas, it is argued that Zimbabwe has failed to harness its gas resources to meet its energy needs.

The legal framework for the energy industry has not been facilitative. On the contrary, the current energy laws may be entrenching fossil fuels and large hydropower by stifling investments in the energy market.\(^{11}\) While investment in low carbon renewable energy is growing globally, the inflows into Zimbabwe are still low. The political-economic and actual costs of providing infrastructure for a modern energy mix remains far from ideal.\(^{12}\) Yet there is hope in the new political dispensation’s call to open the country for business. However, such political calls should manifest in economic reforms that demonstrate a commitment not only to attracting, but also to protecting, the security of investments into the country.\(^{13}\) The Transitional Stabilisation Plan provides for ambitious short-term activities in the energy industry to ensure that energy drives the economy. It provides that:

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\(^9\) The discovery of about 600m\(^3\) of coalbed methane gas in Lupane, Hwange, Chiredzi and Beitbridge; although encouraging, it is doubtful if the country currently has the necessary financial resources to exploit these resources.

\(^{10}\) Several studies argue, based on empirical studies, that while natural and shale gas have less carbon, their methane emissions are higher than coal and oil and therefore should not be preferred; see Howarth (2014); Stephenson et al., (2012); Zhang et al., (2016); Mittal, et al., (2016); McGlade et al., (2018).

\(^{11}\) A core claim of this chapter is that the legal frameworks for the energy sector in Zimbabwe are still narrowly focused on a centralised energy system run by a public utility that does not provide incentives for private sector participation. As Bazilian and others write, ‘While there are no fundamental technical obstacles preventing universal energy access, there is, however, a lack of effective institutions, good business models, transparent governance, and appropriate legal and regulatory frameworks.’ Bazilian et al., (2012), p. 1. (emphasis added)

\(^{12}\) Zimbabwe’s investment climate and policy uncertainty remain a concern in 2019. This is compounded by an unpredictable financial system that prevents any long-term financial planning.

\(^{13}\) In October 2018 the government developed the Transitional Stabilisation Programme, Reforms Agenda October 2018-December 2020, which ‘outlines policies, strategies and projects that guide Zimbabwe’s social and economic development interventions up to December 2020, simultaneously targeting immediate quick-wins and laying a robust base for economic growth for the period 2021-2030.’

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Investments to maximise domestic generation capacity at the lowest social, environmental and economic cost from all sources will be pursued. This includes upgrading the transmission infrastructure to ensure that electricity generated is delivered to consumers with minimal losses.

The Rural Electrification Fund will be strengthened to ensure empowerment of rural communities through extension of the electricity grid to rural service centres, business centres, growth points, households, schools and clinics.14

What remains conspicuous in this programme is the focus on fossil-based15 and hydropower sources,16 especially for the electricity sector, which is the main focus of this chapter. Huge investments are planned in new thermal power or upgrading of existing thermal power plants. Hydropower17 remains part of these short- to medium-term plans, but there is unambitious talk of new renewables such as solar, wind,18 biomass and biogas.19 To complement the Transitional Stabilisation Programme’s energy agenda, the government also recently launched a Renewable Energy Policy,20 and efforts are underway to develop a climate change statute to promote a low-carbon energy mix supported economy.

This chapter begins by putting the energy crisis into its social, economic and political contexts, then proceeds to outline the policy environment and analyse the legal framework. Finally, it seeks to present emerging renewable sustainable energy technology as a possible solution to the crisis and also a pathway to implement Zimbabwe’s climate change agenda. The chapter demonstrates the regulatory causes of this apparent failure to exploit renewable energy sources and advance climate change objectives.

15 Hwange Unit 7 and 8; 3 Small Thermals (Harare, Munyati, Bulawayo).
16 Itself likely to face serious challenges from climate change; see Berga (2016), p. 316.
17 Batoka Hydro-Electric Scheme; Kariba South expansion; Tugwi Mukosi; Manako (Osborne) Mini Hydro Electric Power; and the Odzani Mini Hydro Electric Power.
18 Rufaro and Harava Solar projects; and Rooftop Solar Energy (Bulawayo, Harare and Kwekwe); There are plans to use US$50 million from the Rural Electrification Fund, to support of rural based community solar mini grid systems. See GoZ (2018), p. 39, this latter is a positive strategy given the potential of decentralised rural energy to promote rural development, subject to variable conditions; see Deichmann et al., (2011), p. 225-226.
19 Despite its potential, biogas remains underexploited to produce electricity in Sub-Saharan Africa; see Dasappa (2011), pp. 210-211; Parawira (2009), p.191.
20 GoZ (2019).
It concludes that while there has been noticeable policy incubation on the climate change and energy front, Zimbabwe has not developed a mature enabling legal environment for promoting renewable energy as a pathway to a low-carbon, climate-friendly energy mix.

2. Problem Context: Climate Change and Energy in Zimbabwe

Chapters 2 and 3 have provided an extensive context of Zimbabwe's climate change situation from the vulnerabilities, risks, expected impacts and the required governance frameworks to propel an effective mitigation and adaptation programme.\(^\text{21}\) In the energy industry, with a focus on the electricity supply sector, reliance on imports and a failure to expand the generating capacity over the years coupled with poor maintenance of existing plants have proved very costly to Zimbabwe. Somewhat comforting is data that shows that Zimbabwe’s carbon emissions have gone down from 16.25Mt in 1990 to 10.33Mt in 2016.\(^\text{22}\) This is mostly attributable to the economic slowdown. Any economic growth will see an increase in the carbon footprint.

Outdated coal technology has meant that the major electricity generating plant at Hwange has become an inefficient major source of greenhouse gas emissions.\(^\text{23}\) The Kariba hydropower plant has also been operating below installed capacity for several years. Coal contributes 55.4%, hydro 42.3%, and biofuels 1.7% to the country’s electricity generating capacity.\(^\text{24}\) The government has pinned its hopes on expanding these existing primary sources to increase capacity whilst kick-starting a renewables sector. From a climate change adaptation angle this strategy is futile. There is double jeopardy in that coal must be phased out in the transition to low-carbon sources, while hydropower will be impacted badly by climate change.\(^\text{25}\) This is exemplified by the decreasing output from

\(^{21}\) The literature on climate change in Zimbabwe and adaptation pathways is also growing, see for example Chikodzi, et al., (2013), p. 36, detailing the potential of small-hydro in South-Eastern Zimbabwe and an empirical survey of adaptation strategies; Chanza (2018); Rurinda et al. (2014); Duvenage, et al., (2013); Mtisi and Prowse (2012); and Brown, et al., (2012), p. 1-40.


\(^{23}\) GoZ (2014), p. 43.


Kariba hydropower plant due to low water levels impacting electricity availability for both Zambia and Zimbabwe. The IPCC aptly cautions that:

Hydropower holds a double relationship with climate change. On the one hand, it contributes to the avoidance of greenhouse gas emissions from the burning of fossil fuels. On the other, water availability and hydropower generation are likely to be affected by changing rainfall patterns, which can reduce the flow of rivers.\textsuperscript{26}

This paradox is complicated further by the social and environmental impacts of dam construction for large hydropower. Therefore a strategy that focuses beyond coal and hydro is necessary for Zimbabwe’s electricity supply sector. This is particularly the case given the failure to harness gas for cooking and heating and the continued reliance on biomass for cooking and heating by the majority of households in most of Southern Africa.

Be that as it may, security of supply and reliability of electricity has always been a problem, especially during peak demand periods in winter and during plant maintenance. Supply pressure has also been building up due to expanded grid access under access to energy and electrification programmes implemented by many countries in Southern Africa without a relative increase on the supply side\textsuperscript{27}– by increasing the generation capacity. The availability factor of existing generating capacity has shrunk while concurrently becoming aged and an inefficient greenhouse gas emitter. However, the Zimbabwean energy crisis is not merely a repercussion of expansion of grid access\textsuperscript{28} with suppressed supply capacity. Quite to the contrary, there are other variables that have fuelled the energy crisis, chief of which is the failure to mobilise enough investment into energy infrastructure, and sub-economic tariffs. Otherwise, before the economic crises – prior to 2000 – the country was able to meet its energy needs.

Africa, and indeed, Zimbabwe, is not energy poor – what we suffer from is the inability to mobilise financial resources to convert rich primary resources into usable capital. It is the paradox of poverty in the midst of plenty. The construction of additional power plants and deployment of


\textsuperscript{28} Zimbabwe electrification stood at 44% in 2019; see GoZ (2017), p. 9.
alternative sustainable energy sources have been very slow. This is despite investment inflows and revenues generated from economic activities and resource extraction. This is the historical and developmental context within which the Zimbabwean energy crisis and its climate change ambitions must be understood.

2.1 The Electricity Energy Sector in Zimbabwe

As at March 2019 Zimbabwe needed a peak of 1,700MW (down from 2,200MW in 2016), and an installed capacity of 2,300MW, 95% of which is owned by the Zimbabwe Power Company, a state-owned utility. In 2016 installed capacity was 1,940MW which in operated at 40% capacity to produce 845MW. In August 2019 production fell to 528MW. The shortfall had to be met through imports from South Africa, Mozambique, and Namibia. The current electricity shortages therefore sets in when the country is struggling under a debilitating historical and current foreign debt. In this regard, the problem is not only shortage of generation capacity, but more importantly shortage of foreign currency with which to pay for the imports. The foreign currency shortage is attributable to reduced exports and lack of foreign investment flowing into the country. Of late, the country has also not been able to access balance of payment support from the Breton Woods institutions, due to its perceived economic delinquency. The government disputes the allegation of mismanaging the economy and blames all problems on the unofficial economic sanctions allegedly imposed by the United States and Britain, after the controversial land reform programme. Key challenges with the electricity sector are

29 South African Power Pool (SAPP) commented in 2015 that the region ‘ran out of generation surplus capacity in 2007/8 due to inadequate investments in both generation and transmission infrastructure over the last 30-years.’ Available at https://www.esi-africa.com/wp-content/uploads/2015/05/Lawrence-Musaba.pdf; see also Wright et al., (2018), p. 49.


31 This is as at 22 August 2019, a far cry from the peak demand of 1,700 MW, see ZESA Holdings, Power Generation Statistics, available at http://www.zesa.co.zw/

32 Get Invest, ‘Zimbabwe Energy Sector’ available at https://www.get-invest.eu/ market-information/zimbabwe/energy-sector/; These statistics have recently (August 2019) worsened due to the country’s inability to service its import debt and further constrains on Kariba hydropower plants.


34 Zimbabwe has a huge foreign debt and recently had to print money to raise money to settle IMF debts.
however historical and predate the geopolitical sparring.\footnote{35 See Kayo (2002), p. 963, highlighting the challenges that has bedevilled Zimbabwe’s power supply sector since the 1990s.}

These issues require detailed research that is beyond the scope of this book; suffice it to state that these political and economic problems have partly driven the energy crisis and the current structure of the energy market. Furthermore, without a resolution of these governance issues, it will be difficult to push for the transposition of good energy and climate change policies into effective hard laws. Energy projects are by nature long term and require long term political and financial commitment by a consistent government supported by enthusiastic private sector investors. With this we explore the adequacy of the current policy environment on climate change and energy, not only to empower the government, but also to charm investors into the industry.

3. The Policy Environment

3.1 Policies on Climate Change and the Environment

The key policy on climate change is the National Climate Policy of 2017. A detailed discussion of this policy is presented in Chapter 3, therefore in this Chapter the policy is analysed in relation to the extent to which it provides a framework to promote renewable energy and a transition from an electricity industry that relies heavily on fossil fuels and hydroelectric power.

Among its underpinning principles the National Climate Policy contains some that can inform the design of legislation on low-carbon and renewable energy.\footnote{36 GoZ (2017), p. 3.} For example,\footnote{37 Ibid.} the principle of building resilience through adaptation and mitigation programmes points towards energy systems and a market that can nurture resilience and enable energy users to adapt to the impacts of climate change. There is also the principle that calls for the adoption of a low carbon development pathway which is aligned to the transition to low carbon energy sources. Lastly, there is a principle that calls for the adoption of new and emerging technologies and innovations that can support mitigation and adaptation, providing a context within which to design a renewable energy legal framework that promotes certain viable renewable energy and carbon capturing technologies.
The National Climate Policy appropriately demonstrates awareness of the linkages between climate change and economic development – both in terms of positive linkages and negative causal effects.\textsuperscript{38} An acknowledgement of these linkages is important and will guide the rate at which carbon intensive energy sources will be phased out. Economic development is premised on the supply of affordable and reliable energy and for now fossil fuels in Zimbabwe provide that affordable energy. Climate action in the energy industry should not therefore unduly constrain the supply of energy for economic development. This requires the government to ensure synergy, especially among environmental, energy, and climate change policies.

Chapter 2 of the National Climate Policy provides for policy positions on climate change adaptation. Six specific sectors are identified: water, agriculture,\textsuperscript{39} health, forestry and biodiversity, infrastructure and human settlements.\textsuperscript{40} The energy sector is quite understated in the adaptation section of the policy. Does this imply that the country has no plans to take measures to adapt to climate change in, or by using, the energy sector? This is a grave omission when it is remembered that Zimbabwe obtains 49% of its electricity from hydropower, and the policy is completely silent about the role of water in the provision of energy and potential impacts of climate change on water as a primary source of energy.\textsuperscript{41}

The health sector is also discussed without reference to the effects of reliance on fossil fuels and to how the sector could provide the impetus to energy sources that are not detrimental to health. It is only under the infrastructure section where the policy states that the country will ‘develop a climate resilient hydro-energy infrastructure that incorporates anticipated reductions in river runoff, higher evaporation, and increases in climate variability.’\textsuperscript{42} The policy provides further that the country will ‘promote research in the climate-energy-economic nexus, including assessment of the impacts of climate variability and change on the production of energy from climate-sensitive sources (such as hydropower and solar).’\textsuperscript{43} While this is encouraging, it is argued that energy issues should have

\textsuperscript{39} GoZ (2017), p. 5.
\textsuperscript{40} Ibid., p. 7.
\textsuperscript{41} Hamududu and Killingtveit (2012), Mukheibir (2007), p. 6-7.
\textsuperscript{42} GoZ (2017), p. 7.
\textsuperscript{43} Ibid.
been included and aligned to health sector and water concerns as energy is not an infrastructure issue only. Adaptation policy objectives should demonstrate the need to deal with the social justice and equity of measures to be adopted. Achieving a socially just adaptation plan has been noted to be a challenge.  

Chapter 3 of the policy is dedicated to climate change mitigation and low carbon development, almost wholly focused on the energy industry. An impression is immediately created that mitigation will happen largely in the energy sector, yet there are many such opportunities in all sectors of the economy. However, the focus on mitigation within the energy sector by the climate policy reiterates the sentiments in the Nationally Determined Contributors (NDCs) was a missed opportunity within which the climate policy could have guided the second NDC communication in 2020. The underlying policy objective as far as mitigation is concerned is to ‘mainstream climate change in the energy, industrial processes, waste, agriculture and land-use, land-use-change and forestry sectors.’ The policy provides in detail the objectives for the energy sector. These include promoting ‘renewable energy and adoption of energy efficient technologies and practices across all socio-economic sectors of the economy and the built environment’; promoting ‘research and development, innovation and deployment, and adoption of robust, gender-sensitive, green technologies,’ and promoting ‘cleaner fossil fuel technologies and access to clean and affordable energy.’

Thankfully, Zimbabwe’s Intended Nationally Determined Contribution (INDC) of 2015 categorically makes the commitment undertaken therein subject to article 4 of the United Nations Framework Convention on Climate Change (UNFCCC). It is encouraging though that the National Climate Policy emphasises the need for technology transfer and information sharing, two key preconditions under the UNFCCC for developing countries to implement mitigation measures. However, the policy does not go far enough in highlighting the importance of

45 GoZ(2017), p. 9. This is understandable given that the energy industry is the biggest single source of greenhouse gas emissions and in Zimbabwe the source of 60.7% of emissions.
46 Ibid.
47 Ibid., p. 10.
transfer of renewable energy and clean coal technologies without which a transition to a low carbon energy systems is virtually impossible. It is important for any climate change policy to reiterate the need to promote access to clean coal and renewable technologies which are mostly owned by the developed countries and remain expensive, inaccessible \(^{49}\) and costly to import and localise.

Surprisingly, before the development of the climate policy, Zimbabwe developed a National Climate Change Response Strategy.\(^ {50}\) In terms of the strategy focus was going to be on seven pillars: Adaptation and Disaster Risk Management; Mitigation and Low Carbon Development Strategies (LCDS); Capacity; Governance framework; Finance and Investment; Technology development and transfer, including infrastructure; Communication and advocacy; and Information management and dissemination.\(^ {51}\) One may also add energy policy development – with a focus on the electricity sector. In an ideal world a policy should precede the formulation of a strategy. The relevant component of the strategy is sectoral strategies on physical and social infrastructure dealing with ‘energy’, where the strategic commitment is to:

(a) Introduce policies and regulatory frameworks for renewable energy, energy conservation and energy efficiency.

(b) Strengthen energy planning, research and development.

(c) Promote low carbon energy provision and use.\(^ {52}\)

Some of these strategic objectives have been taken further in the policy and current efforts to develop principles for a climate change act and the development of a model bill. If the National Climate Policy is not explicit on the need to promote renewable energy, it is expected that the policies on energy will address these issue head-on.

3.2 Policies on Energy

The National Energy Policy was published in 2012 and is a key instrument in promoting the use of renewable energy for climate change mitigation. A fundamental policy statement states that:

*The country is endowed with a variety of renewable and fossil energy resources*

\(^ {50}\) GoZ (2014).
\(^ {51}\) Ibid., p. iii.
\(^ {52}\) Ibid., p. 46.
which need to be exploited in a sustainable manner. Regional cooperation is essential for the development of large-scale hydropower resources. Small-scale hydropower projects may not make a significant impact on national requirements but they help to develop skills and to speed up access for remote communities that are not likely to be connected to the national grid in the foreseeable future.\textsuperscript{53}

The national energy policy acknowledges at the outset the availability of renewable sources of energy and the need to exploit non-renewable sources in a sustainable manner. The policy has five broad objectives:

1. Increase the access of all sectors of the economy to affordable energy services through the optimal use of available energy resources and the diversification of supply options (applicability, availability, acceptability and affordability principles).

2. Stimulate sustainable economic growth by promoting competition, efficiency and investment in the sector (applicability and accountability principles).

3. Improve the institutional framework and governance in the energy sector to enhance efficiency and the delivery of energy services (accountability principle).

4. Promote research and development in the energy sector (applicability principle).

5. Develop the use of other renewable sources of energy to complement conventional sources of energy (applicability and acceptability principles).\textsuperscript{54}

It is clear that Zimbabwe has a policy aimed at promoting renewable energy and the diversification of sources that could propel a gradual shift from fossil fuels and heavy reliance on big centralised hydropower. The policy is informed and grounded in fundamental principles of sustainable energy and development. These include the principles of access to affordable, reliable and sustainable energy. With specific reference to renewable energy, the policy objectives are to 'Increase usage of and investment in renewable energy; Promote renewable energy as an environmentally friendly form of energy; Diversify supply options; and

\textsuperscript{53} GoZ (2012), p. ii.
\textsuperscript{54} Ibid., p. 7.
Increase access to modern energy in rural areas. Appropriate strategies which include developing a framework for Independent Power Producers (IPPs), and Public-Private-Partnerships (PPPs) are laid out in the policy. Importantly, the policy also includes tapping into the Clean Development Mechanism (CDM), and creating incentives to attract investment. The CDM is an underutilised opportunity within the international climate change regime for developing countries to enable technology transfer and secure the assistance of developed parties to the UNFCCC.

Mitigating greenhouse gas emissions from the energy industry is key to achieving any climate change mitigation objectives, therefore Zimbabwe’s policy should be closely aligned to this reality. The policy notes that the majority of rural Zimbabweans rely on biomass (traditionally used) for cooking and heating energy needs. This is well-known to be an environmental and health risk. Therefore rural electrification to promote access whilst concomitantly ensuring the cleaner energy forms are affordable is the greatest challenge. There are areas where the learning curve for Zimbabwe can be faster. For example, efforts to promote cleaner methods of biomass burning can be prioritised. Bagasse and sugar cane ethanol provide a low-hanging fruit that can be expanded; Hippo Valley and Triangle Estate have already generated 75.5MW for their own use and an excess of 10MW is sold to the grid.

A national energy policy that anchors sustainable energy and dovetails into the global climate change regime is what Zimbabwe needs to properly target its climate change objectives without compromising access to energy and economic growth. While policy pronouncements and documents are good, it is only when such policies are translated into legal mandates on the basis of which the state can be held accountable that the transition to low carbon energy can be expedited. Initiatives and actions driven by policy per se may never be sufficient. It is in this context that in addition to the climate change and energy policies Zimbabwe must have a robust legal framework that speaks to its policy to promote diversification of energy

55 Ibid., p. 27.
56 Ibid.
58 Rural people meet 94% of their heating needs by using fuelwood. GoZ (2012), p. 1, Six million tonnes of fuelwood are burnt annually when the country’s forest can sustainably only provide 4.6 million tonnes. Ibid., p. 22.
60 GoZ (2012), p. 23.
sources and deployment of energy sources that are aligned to its climate change mitigation objectives.

4. The Legal Regulatory Environment

4.1 Energy Legislation

Zimbabwe has legislation on the energy industry that enables both policy development and technical regulation. The typical regime is one which empowers the ministry responsible for energy to direct and develop policy while technical legislation provides enough power, independence and authority to regulatory agencies to implement the policy as embodied in law. Zimbabwe, like other countries, has moved towards an integrated energy regulatory structure where there is a single apex regulator that works in consultation with the government. The regulator is responsible for all three sectors – electricity, gas and liquid fuels – with specific technical legislation for each.

The central regulator, the Zimbabwe Energy Regulatory Authority (ZERA), was established by the Energy Regulatory Authority Act. The ideal energy regulator should be preoccupied with technical regulation while the government executive remains responsible for policy-making. This ensures autonomy and independence which section 4(4) provides for.

4.1.1 Mandate, functions and authority of ZERA

The Energy Regulatory Authority Act does not have a specific ‘objects’ clause. As far as the electricity sector is concerned, the Electricity Act, which was amended by the Energy Regulatory Authority Act, remains the statute that provides for some of the regulatory objectives of ZERA. The Electricity Act provides that the objectives of ZERA (as the ‘Authority’)

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63 Section 4 (4) ‘Subject to this Act, the Authority shall not, in the lawful exercise of its functions under this Act, be subject to the direction or control of any person or authority.’

64 Section 31 (a) and (b) of the Energy Regulatory Authority Act substituted ‘Commission’ by ‘Authority’ and then repealed s5 to s16 of the Electricity Act. Section 4 which sets out the objects of Electricity Act remains intact.

65 Electricity Act [Chapter 13:19].
Act are:

(a) to create, promote, and preserve efficient industry and market structures, and to ensure the optimal utilisation of resources for the provision of such services;

(b) to maximise access to electricity services, by promoting and facilitating consumer connections to distribution systems in both rural and urban areas;

(c) to ensure that an adequate supply of electricity is available to consumers;

(d) to ensure that the prices charged by licensees are fairly sufficient to allow the licensees to finance their activities and obtain reasonable earnings for their efficient operation;

(e) to ensure safety, security, reliability, and quality of service in the production and delivery of electricity to consumers;

(f) to ensure that regulation is fair and balanced for licensees, consumers, investors, and other stakeholders in the electricity sector.\(^66\)

Section 4(1) (a) to (c) and partly (e) carry some policy components, in addition to enabling technical regulation. Parts (d) and (f) are explicitly technical regulatory objects. It is submitted that blurring the policy-making and regulatory functions can be bad for ZERA’s independence and autonomy as a regulator.\(^67\) Ministerial consultation provisions are sufficient to create synergy but giving the authority some policy-making powers defeats the separation of functions between the executive and the regulator.

The generic functions of ZERA are provided for in section 4(1) of the Energy Regulatory Authority Act, most of which repeat the functions in the sectoral energy legislation.\(^68\) It is interesting to note that the Energy Regulatory Authority Act goes beyond the Electricity Act in empowering ZERA to promote renewable energy. Renewable energy is thereby put at the convergence of climate change and energy discourse. Section 4(1) (i)

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\(^{66}\) Electricity Act, s4 (1) 2002. Apparently most of the emphasised aspirations have not been achieved mainly due to reasons beyond the control of ZERA.

\(^{67}\) Contrast with s4 (1) of the Petroleum Products Act [Chapter 13:22].

\(^{68}\) Electricity Act, s4 and s4 Petroleum Act.
expressly provides that ZERA shall ‘promote, identify and encourage the employment and development of sources of renewable energy’. The Act also mandates ZERA ‘to ensure the maximisation of access to energy by all consumers that is affordable and environmentally sustainable’. Broadening the environmental mandate, ZERA is empowered ‘to assess, promote studies of and advise the Minister and licensees on the environmental impact of energy projects before licensing’. 

The functions of ZERA both under the constitutive Act and sectoral legislation do not expressly refer to the need to promote or collaborate with government departments responsible for climate change. This is not a major flaw given that the functions have adequate provisions that task the regulator to consider the environmental implications of its decisions as well as their environmental soundness. Climate change is an integral appendage of environmental considerations in view of the broad definition of ‘environment’ in the Environmental Management Act.

4. 1.2. Licencing regime for energy sources and electricity market liberalisation

In order for the energy industry to be a space to undertake effective climate change mitigation and adaptation measures, it is necessary for the regulatory authority to have enough flexibility in exercising this ultimate function. Licensing decisions are the hallmark of an energy regulator and they provide it with the opportunity to promote or to make it cost-ineffective to deploy certain types of energy sources. Through the process of licencing, the regulator can insist on impact assessments that may include climate change assessment and evaluation of the carbon footprint

69 Energy Regulatory Authority Act, s4(1)(m).
70 Ibid., s4(1)(q); although this could possibly conflict with the environmental impact assessment provision in the Environmental Management Act [Chapter 20:27], s97 - s108.
71 Section 1 of the Environmental Management Act defines ‘environment’ as (a) the natural and manmade resources physical resources, both biotic and abiotic, occurring in the lithosphere and atmosphere, water, soil, minerals and living organisms whether indigenous or exotic and the interaction between them; (b) ecosystems, habitats, spatial surroundings or other constituent parts whether natural or modified or constructed by people and communities, including urbanised areas, agricultural areas, rural landscapes, and places of cultural significance; (c) the economic, social, cultural or aesthetic conditions and qualities that contribute to the value of the matters set out in paragraphs (a) and (b).’ This certainly includes climate change and global warming, these being the consequences of air pollution.
on each proposed energy project provided the legislation empowers it to do so.

ZERA is charged with authorising the ‘generation, procurement, distribution, transportation, transmission and production of the energy source for gain or reward’ of declared sources of energy.\textsuperscript{72} ZERA has the authority to make regulations prescribing ‘the environmental, … standards to be observed in relation to the extraction, production, refining and distribution of the energy source [being licenced].’\textsuperscript{73} Similar regulations have been made in relation to the blending of liquid fuels.\textsuperscript{74}

Similarly, ZERA can promulgate regulations to ensure that low carbon energy sources are given preference when granting generation licences. Thus the regulator can design a quota system geared towards a gradual transition to an energy mix that recognises climate change as a problem and incentivises renewable sources. When a licence application is received in terms of section 10, section 11 authorises the regulator to grant such a license subject to terms and conditions that are prescribed, or that the authority ‘may reasonably determine in the circumstances’. These should be read with sections 47, 53 to 54 of the Electricity Act which provides for the technical considerations of licences and the setting of tariffs.

These are provisions that the regulator should use to insist on clean coal technologies, to give an upper hand to renewable sources, and generally to align energy development projects to the country’s climate change objectives as provided in the Climate Change Policy, the Strategy and the INDCs. Arguably, however, the regulator should not get involved too much in promoting one technology over the other – this being a policy decision that the ministry should take.

Although the legislative framework for ZERA is recent, it lacks specific incentives to promote entry into the electricity industry by the private sector, and incentives for the adoption of clean energy technologies.\textsuperscript{75} One is left with the impression that this body cannot adequately promote emerging technologies given its limited regulatory role or without comprising its regulatory neutrality in relation to various energy technologies. Indeed, the Ministry of Energy and Power Development should lead any government

\textsuperscript{72} Energy Regulatory Authority Act., s7.
\textsuperscript{73} Energy Regulatory Authority Act., s7 (3)(b).
\textsuperscript{74} Petroleum (Mandatory Blending of Anhydrous Ethanol with Unleaded Petrol) Regulations, 2013 as amended by Statutory Instrument 125 of 2015.
\textsuperscript{75} There are no clear tariff-setting principles that ZERA could use to implement incentives for renewable energy, for example a feed-in tariff.
efforts to develop emerging sustainable energy resources.\textsuperscript{76} Ultimately, in making its decision the regulator is guided by government policy and should consider energy security and reliability concerns.

In addition to the Energy Regulatory Authority Act, the Electricity Act provides detailed guidelines for the licensing and regulation of the generation, transmission, distribution and supply of electricity to the whole of Zimbabwe.\textsuperscript{77} It is noteworthy that before this new framework was created in 2002, there existed the Zimbabwe Electricity Supply Authority (ZESA), which was a traditional parastatal that fulfilled all the four functional areas of electricity supply, from generation to distribution (vertically integrated monopoly).

The current regulatory framework coincided with the unbundling of the old parastatal into separate business units, namely, the Zimbabwe Power Company (ZPC) focusing solely on generation, the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) responsible for transmission and distribution, and PowerTel (Pvt) Ltd., the public data service provider.\textsuperscript{78} It was argued by some, including the Reserve Bank of Zimbabwe, that the hasty unbundling of the power utility led to unnecessary duplication of activities and costly overheads that have crippled the profitability of the whole electricity holding company.\textsuperscript{79} It can be argued that some restructuring exercises which developing countries rush into may be detrimental to the efficiency of public utilities.\textsuperscript{80}

\textsuperscript{76} Electricity Act., s35. The Minister can give policy directions to the ZERA relating to the policy the Authority has to observe in the exercise of its functions including, in particular, directions relating to tariffs chargeable by licensees.

\textsuperscript{77} Electricity Act., Parts VIII, IX and X.

\textsuperscript{78} The company’s focus is on providing support communication services, not only to electricity companies but also to the general public and government departments.

\textsuperscript{79} RBZ (2006), p. 38.

\textsuperscript{80} This includes the economic structural adjustments programmes often required by the IMF and World Bank. Most of these models do not work in African economies. See generally Gender and Economic Adjustment in Sub-Saharan Africa, Findings, African Region Number 19 (1994), available at http://www.worldbank.org/afr/findings/english/find19.htm; see also Shah (2013); and Colgan (2002) who rightly notes that, ‘...World Bank and IMF structural adjustment in Africa have led to greater social and economic deprivation, and an increased dependence of African countries on external loans. The failure of structural adjustment has been so dramatic that some critics of the World Bank and IMF argue that the policies imposed on African countries were never intended to promote development. On the contrary, they claim that their intention was to keep these countries economically weak and dependent.’
While fairly coherent and easy to understand, some of the substantive provisions of the Electricity Act show that the legislation is inadequate as a tool to promote emerging climate friendly renewable energy technologies. The Act does not clearly articulate the regulatory objectives in relation to low carbon energy or the justifications for the continued restrictive regulation of the electricity industry in Zimbabwe. There is no express determination to promote renewable energy sources or to open the electricity sector to private enterprise. Indeed, provisions for promoting competition\(^{81}\) are included, but without guidance on how such competition is to be promoted. Market entry and price regulation remain serious obstacles to private sector penetration of the electricity energy sector in developing countries.\(^{82}\)

Often, certain industries are regulated because of the perceived ‘public interest’\(^{83}\) or ‘essential’\(^{84}\) nature of the services they provide to society. Coupled to this is the non-competitive nature of some services rendered by these industries, for instance the provision of electricity to a small country that can be done more profitably by a single utility than a dozen. This traditional design of the electricity industry has led to legal instruments that entrench fossil based energy and are ill-suited to promoting distributed and small-scale low carbon renewable energy. The result is a single government-controlled utility like ZESA Holdings whose dominance is a ‘natural monopoly.’\(^{85}\)

The viability and cost-competitiveness of renewables like solar, wind, and biofuels mean that the private sector can play a meaningful role in

\(^{81}\) Electricity Act., s(4)(2)(a) – ‘(a) promote and implement competition and private sector participation, when and where feasible’ read with the Energy Regulatory Authority Act, s4(1) (g) and (h) – ‘(g) to maintain and promote effective competition within the energy industry; (h) to promote encourage the expansion of the energy industry and the advancement of technology relating thereto.’

\(^{82}\) Murombo (2015), p. 163.

\(^{83}\) Phillips and Brown (1993), p. 51 and 89, for a history of the origins of the public interest doctrine; see also Bosselman et al. (2006), p. 5.

\(^{84}\) The provision of water, electricity and health services are among those treated as essential service in Zimbabwe. Thus employees in most of these sectors are prohibited by law from engaging in industrial action.

\(^{85}\) Bosselman et al.,(2006), p. 6 define this term as ‘conditions...where a single firm can provide a good or service at a lower average cost than two or more firms. To capture these economies of scale, a single firm is often awarded a monopoly franchise to provide service, but then regulators must prevent the franchised monopoly from earning excess profits at the expense of the consumer.’
making the industry competitive in the near future. In the Zimbabwean context, where these sources still contribute less than 1% of electricity generation, the economic competitiveness remain suppressed. Climate change imperatives and the need to promote security of supply provides an opportunity for Zimbabwe to open the electricity sector to private sector investors.

One of the major causes of the predicament of the Zimbabwe power utility, is the failure to operate profitably even with the insufficient power that it is able to generate locally. This can be attributed to the rate regulation provisions of the Electricity Act and the efficiency of operation and maintenance as stated above. The Act provides that at the time a utility is applying for a license, it must provide information on the proposed tariff and the method of establishing the tariff. The most restrictive provision, however, is section 53 (1) which provides that:

> [n]o prices or tariffs in connection with the provision of an electricity service or operation of an electric power system by a licensee or proposed license shall have effect unless such prices or tariffs have been approved or, in the case of any service determined by the Commission after consultation with the Minister, fixed by the Commission in terms of this section.

In a highly inflationary economic environment, this requirement for consultations and approvals from political appointees can be, and has been, very damaging to the operations of Zimbabwe’s power utility. The discretion of ZERA is unfortunately limited, and the Minister has de facto power to regulate tariffs.86 The uneconomic rates historically charged by Zimbabwe’s power utility have since seen it operating at a loss for many years, and failing to make any capital investments into new generation capacity or upgrades.87 Most of the proposed capital build projects are largely off schedule due to the failure to mobilise funds for them.

This creates an opportunity for foreign and private sector investment

86 This is done through guidelines to be used by the regulator in determining tariffs. Under s53 (3) (a) to (e), the authority is bound to have regard to, among other factors, the licensee’s ability to recover the full costs of its business activities, including a reasonable return; the need to provide ‘incentives for the continued improvement of the technical and economic efficiency with which the services are provided; …protecting consumers while keeping them informed about the cost their consumption imposes on the licensee’s business;…avoiding undue discrimination between customers and customer categories; phasing out or substantially reduce cross subsidies’.

87 Ibid.
into low carbon electricity sources. It is submitted that one good solution is for energy development to focus more on emerging low carbon renewable energy sources, especially solar and wind power. This is especially compelling in the case of Zimbabwe given the current drive towards rural electrification.\textsuperscript{88} It is necessary to discuss these sources of energy in detail to properly defend the argument that Zimbabwe must consider focusing more on emerging sustainable energy sources and cut down on coal-fired thermal plants.

\section*{4.2 Environmental and Climate Change Legislation}

Zimbabwe does not have legislation specific to climate change. The National Climate Policy, Climate Change Strategy and the INDC are the explicit climate change instruments. An urgent question, therefore, is whether the country needs climate specific legislation or whether existing environmental and other cognate legislation is sufficient to mandate actions on climate change mitigation and adaptation. Some argue that a climate change act is necessary, while others argue that such an act will just add to legislation that is ineffectively implemented and enforced. What is the existing legislation that could serve the purposes of a specific climate change statute?

If it is acknowledged that climate change is a result of global warming which is caused by the emission of certain greenhouse gases into the atmosphere, then it follows that legislation to control the emission of such gases could be sufficient. In Zimbabwe, air pollution and the emission of harmful gases is regulated under the Environmental Management Act,\textsuperscript{89} which provides an overarching framework for environmental

\textsuperscript{88} In 2002 the government enacted a new statute called the Rural Electrification Act whose objective is to facilitate the provision of grid electricity, and to a limited extent solar, to rural and outlying areas. The statute established a fund funded partly from an electricity levy and government allocations. In order to get connected the rural communities also pay about 60\% of the transmission cost and bear the total cost of actual supply (paying electricians and cabling of buildings, metering, etc.). The initial costs of the projects often prove very expensive and the delivery of service by the Rural Electrification Agency (REA) is hampered by lack of transport, and shortages of fuel and human resources.

\textsuperscript{89} Environmental Management Act [Chapter 20:27]. With effect from 7 April 2006, this Act repealed the Atmospheric Pollution Prevention Act [Chapter 20:03], the Hazardous Substances and Articles Act [Chapter 15:05] and the Noxious Weeds Act [Chapter 19.07] all of which would be relevant to addressing the impacts of climate change.
regulation and management. Section 4(2) provides internationally accepted principles of environmental management that are key to addressing environmental problems, including climate change. Relevant principles include participatory decision-making, integrated environmental management, the precautionary principle, the principle of prevention and sustainable development, the polluter-pays principle, and special treatment of sensitive environments. Could it be argued that, for example, the polluter-pays principle can be used to address the question of loss and damage in climate change law?

Among other duties of the minister responsible for environmental affairs, is ‘to regulate the management of the environment and to promote, co-ordinate and monitor the protection of the environment and the control of pollution’. Furthermore, the minister has a duty ‘to ensure that persons or institutions that are responsible for causing environmental harm will meet the cost of remedying that harm’. Apart from imposing duties on the minister, the Act also establishes the Environmental Management Agency, tasked, among other things, with the duty ‘to formulate quality standards on air, water, soil, noise, vibration, radiation and waste management’, and ‘to regulate and monitor the discharge or emission of any pollutant or hazardous substance into the environment’.

The Agency may also ‘recommend to the Government the conventions which the country may join, and incorporate their provisions into national law’, including such conventions and treaties as the UNFCCC, the Kyoto Protocol and the Paris Agreement.

More specifically, the Environmental Management Act provides for the regulation of air pollution and a licencing system. The Standards and Enforcement Committee shall recommend to the Environmental Management Board the adoption of ‘ambient’, ‘occupational’ air quality standards and ‘emission standards for various sources’ as well as ‘criteria and guidelines for air pollution control for both mobile and stationary sources’ or ‘ any other air quality standards.’ Any person who causes

90 Environmental Management Act., s5 (1) (a).
91 Ibid., s5 (1) (g).
92 Ibid., s10 (1) (a).
93 Ibid., s10 (1) (b) (iii).
94 Ibid., s63 to s68.
95 Ibid., s63 (1) (b); Example include the Environmental and Natural Resources Management (Prohibition and Control of Ozone-Depleting Substances and Ozone-Depleting-Substance-Dependent Equipment) Regulations, Statutory
pollution exceeding prescribed standards is guilty of a criminal offence and liable to a fine, and an obligation to compensate for loss suffered or costs incurred in remedying and restoring the environment. Emitting a prescribed substances without a licence issued by the Board is an offence.

Similarly, the Water Act provides for the regulation of water use and the control of water pollution, including the construction and management of dams. There is legislation on disaster management and civil protection as well as on agricultural practices and forest management that could be deemed relevant to climate change.

What is clear is that environmental legislation provides a foundation for the regulation of one of the underlying causes of climate change, namely the emission of greenhouse gases. What is equally clear is that existing environmental legislation is very specific to controlling air pollution as a discreet environmental problem. Climate change is much broader than air pollution. The mitigation of, and adaptation to, the impacts of climate change requires a multi-sectoral approach and multi-disciplinary regulation for which existing legislation is insufficient. The handling of Cyclone Idai in March 2019 demonstrates how environmental law is necessary, but inadequate, to deal with the impacts of climate change.

Similarly, environmental legislation in Zimbabwe does not sufficiently regulate the production of energy, particularly electricity. The choice of primary energy stock and the licencing of generators by ZERA, as well as policies on renewable energy, are not subject to environmental scrutiny. Environmental Impact Assessments (EIAs) are indeed required for licensable activities, but that is not the only control mechanism necessary to implement an effective climate change mitigation regime. Arguably, environmental laws could very well be an obstacle to the adoption of certain climate change mitigation measures. Indeed, as Tomain argues:

*When we speak of energy, we are also speaking about the natural resources*

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96 Ibid., s63 (2).
97 Ibid., s63 (3).
98 Water Act [Chapter 20:24].
100 For a detailed analysis of the integration necessary between environmental (and therefore climate change) law with energy laws, see Murombo (2015), p. 323 et seq.
used in its production—energy and natural resources are inextricably linked throughout the fuel cycle from exploration to extraction to end use and disposal. …Energy laws, policies and regulations, then, should not ignore the environmental effects that occur throughout the fuel cycle.\textsuperscript{101}

It is important, therefore, for the Renewable Energy Policy and the National Climate Policy to lead to legislation that creates effective regulatory synergy between the environment, climate change and energy. Synergy is necessary at the institutional level, in terms of standards setting and in terms of implementation of impact assessment and licencing procedures. Disaster management legislation should be aligned to land use planning and a climate liability regime.

We should conceive of a low carbon energy industry (a sustainable energy system)\textsuperscript{102} as one that promotes sustainable and renewable sources without compromising the energy security needs of the most vulnerable, whose resilience needs to be strengthened.\textsuperscript{103} A sustainable energy system in Zimbabwe therefore requires more specific environmental and energy legislation than already exists.

**5. Potential for low carbon renewable energy in Zimbabwe**

Zimbabwe has access to renewables ranging from solar and wind to biomass and biofuels.\textsuperscript{104} Various capital build electricity projects are proposed to increase generation capacity.\textsuperscript{105} While noble, the projected costs for these plants are beyond the financial capacity of the power utility, unless it enters into joint ventures, or private international capital is allowed to play a role. This assumes economic feasibility and acceptable business risk.\textsuperscript{106} From a climate change perspective, the proposed larger generation capacity projects\textsuperscript{107} are all coal thermal or hydropower plants. This puts

\begin{itemize}
\item \textsuperscript{101} Tomain (2011), p. 12--13.
\item \textsuperscript{102} Mitchell and Woodman, p. 572.
\item \textsuperscript{103} Murombo (2015), p. 336, further explores sustainable energy systems building on the theories of Mitchell C (above).
\item \textsuperscript{104} For a detailed study of the potential of these sources, see Makonese (2016).
\item \textsuperscript{105} According to the SAPP, several new capacity projects were supposed to have been completed by 2014 (Batoka, Gokwe North, Lupane, Western Power Station, Hwange Station No 7 and 8). All these projects are still behind schedule in 2019.
\item \textsuperscript{106} Recently the Minister of Energy and Development threatened that over 30 IPPs who had failed to consummate their projects risk losing their licenses; see Groenendaal (2019).
\item \textsuperscript{107} Western Power Station, Gokwe North and Hwange No 7 & 8.
\end{itemize}
the country’s environment at the risk of increasing its greenhouse gas emissions and makes it difficult to meet its INDCs.

Hydropower, while cleaner than coal, is not necessarily environmentally neutral. It involves dam construction that displaces many communities\textsuperscript{108} and disrupts riverine ecosystems. In the case of shared watercourses, a number of issues arise regarding transboundary environmental harm and co-management issues\textsuperscript{109}. The use of hydropower may also compromise the duty of public utilities to ensure reliability of supply, in times of droughts as well as floods. However, hydropower remains the major preferred energy resource in Africa along with coal and gas.

African countries face a plethora of challenges and constraints in ensuring energy for sustainable development, not only in terms of the regulatory frameworks, but also of other factors – especially infrastructure – that impact delivery of energy. This is not only the task of developing countries like Zimbabwe; the global community has a role to play in capacity building, as well as technology transfer and financial support in line with the UNFCCC.

Zimbabwe has substantial solar radiation sources given its geographic position\textsuperscript{110}. However, there is a continuing aversion to solar projects by the power utility, as well as the private sector, which has been explained in the following terms:

\textit{ordinary solar home system energy outputs are low: they cannot provide power for cooking, heating or productive purposes such as welding, grinding maize or charging batteries commercially. They can provide limited power for lighting, radio, TV, communication, and relatively small-scale pumping and}

\textsuperscript{108} An example is the Three Gorges Dam in China which displaced over 1.2 million people (Tullo, 2009) For the controversy around the Belo Monte hydropower scheme in Brazil, see Bratman (2014,) Carvalho (2006); World Commission on Dams (2000), p. 310, where it is curtly asserted that, ‘dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable. In too many cases an unacceptable, and often unnecessary and high price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.’

\textsuperscript{109} For instance, the Zambezi and Kariba Dam are managed by the Zambezi River Authority, an intergovernmental institution with Zimbabwean and Zambian officials.

\textsuperscript{110} GoZ (2019), p.16 states that ‘Solar potential of sixteen (16) to twenty (20) MJ/m2/day in Zimbabwe is vastly unexploited.’; see also Ziuku et al., (2014), p. 226, demonstrating Zimbabwe’s potential for CSP.
refrigeration, as well as other small-scale end uses.\textsuperscript{111}

These constraints on solar have seen it play only a limited role in developing countries where, unfortunately, the bulk of solar energy is abundantly available throughout the year.\textsuperscript{112} It is submitted that the reasons given in by Krause and Nordstrom can easily be overcome through effective awareness campaigns in the development and implementation of rural electrification projects as well as urban renewable energy projects. This should be accompanied by appropriate financial incentives to reduce the initial costs of solar installations.

Other potential alternative energy sources in Zimbabwe include wind, methane gas, nuclear and biofuels. These are not touted as solutions to the current energy crisis, but they could be used to complement and supplement thermal and hydropower. Instead of continuing to pour investments into thermal stations, the government could redirect its efforts towards facilitating the deployment of emerging clean energy technologies like solar and wind.\textsuperscript{113} But the issue of cost\textsuperscript{114} and the scale of application are most important; these technologies generally remain more expensive than existing technologies, and only a few developing countries have managed to deploy renewable energy in their energy mixes.

In developing countries, the shift to new forms of energy must be done carefully, and with the full participation of intended beneficiaries. All too often renewable energy projects are developed by governments and donor agencies and offered to communities as packages with little post-project technical support.\textsuperscript{115} One critic appropriately summed up the whole paradox as being born of disorganisation and inadequate planning by implementing agencies.\textsuperscript{116} One may add that, while the law

\begin{enumerate}
\item[113] Wind energy development has been proved not to be very suitable because of the slow wind speeds in most parts of Zimbabwe, hence the assertion that these other forms of energy could be used to supplement reliable sources. See African Windpower and Powervision web \url{http://homepages.enterprise.net/hugh0piggott/african36/index.htm} (for information on research and wind technology development in Zimbabwe; the technology is there but other factors militate against large scale use of wind energy).
\item[114] Kaygusuz (2012), pp. 1120, 1124.
\item[116] Makapo (1997) notes that, ‘[p]rojects conceived without carefully consulting the intended recipients and beneficiaries face serious acceptance problems and fail prematurely due to abandonment. The priority needs of
\end{enumerate}
can be used to force technology and expedite the shift towards use of sustainable energy resources, the law itself must be embraced by the intended beneficiaries.

Absence of an appropriate enabling legal regulatory framework per se cannot be blamed for the failure of Zimbabwe to fully harness renewable energy sources. Most of the constraints are well-documented.\textsuperscript{117} Cost and affordability are serious limitations, but these could be ameliorated by the removal of government subsidies on traditional conventional sources and their redirection to new sustainable sources within a bounded timeframe.\textsuperscript{118} However, such steps could impact the climate resilience of communities who have hitherto afforded access to energy through government subsidies, for example under the rural electrification programme. Internalisation of the external environmental cost of fossil energy sources would be necessary, with the government absorbing the true cost of such accounting. All such strategies towards low carbon renewable energy require legal reforms. Thus Ottinger rightly submits,

\begin{quote}
to effectuate these alternatives, legal structures to promote them are indispensable. Much attention has been given to new energy technologies and the means of technology transfer and capacity building. Very little attention has been given to the legal frameworks essential to their implementation.\textsuperscript{119}
\end{quote}

Developing appropriate policies is a precursor to designing effective renewable energy and climate change laws. It is thus encouraging that Zimbabwe recently launched a targeted policy on renewable energy, in addition to the climate change policy and strategy.

5.1 Renewable Energy Policy.

The Ministry of Energy and Power Development published a National Renewable Energy Policy in March 2019. Its broad vision is to ‘provide

\begin{quote}
new energy technologies and the means of technology transfer and capacity building. Very little attention has been given to the legal frameworks essential to their implementation.\textsuperscript{119}
\end{quote}

\begin{quote}
for model legislation to promote energy efficiency and renewable energy in selected, see Murombo\textsuperscript{(2016b)}, p. 330.
\end{quote}

\textsuperscript{117} GoZ \textsuperscript{(2019), p.17-18}; See generally Murombo \textsuperscript{(2016a)}; Reddy and Painuly \textsuperscript{(2004)}; Verbruggen et al., \textsuperscript{(2010)}; and Mulugetta et al., \textsuperscript{(2000)}

\textsuperscript{118} However, caution should be taken to find replacement policies for communities cushioned by such subsidies during the transition.

\textsuperscript{119} Ottinger \textsuperscript{(2005), p. 103}; for model legislation to promote energy efficiency and renewable energy in selected, see Murombo\textsuperscript{(2016b)}, p. 330.
energy access to all in a sustainable manner by increasing the mix of renewable energy sources.\textsuperscript{120} In summary, the new policy,  

\textit{aims to promote investment in the renewable energy sector by providing specific incentives. It recommends providing National Project Status to all the renewable energy projects. It encourages the Ministry responsible for Energy to recommend renewable energy projects on case-to-case basis to the Ministry responsible for Finance for according Prescribed Asset Status so as to unlock Insurance and Pension funding. It also recommends specific incentives for promoting third party sale of power. Further, it recommends reduction in licensing fees and relaxations in licensing requirements for renewable energy projects. Favourable tax incentives and rebates are also recommended in the NREP in addition to the existing Statutory Instruments.}\textsuperscript{121}

The policy sets out a plan to deploy renewable energy and also provides that the ministry shall use feed-in-tariffs and competitive bidding\textsuperscript{122} procurement methods depending on the need and amount of energy to be procured.

Specific renewable energy targets are provided in the policy. By 2025 the policy targets 16.5\% of total generating capacity or 1 100MW from renewable sources. This goes up to 2 100MW by year 2030.\textsuperscript{123} The policy correctly identifies, as the first objective, the development of ‘a strong institutional and regulatory framework for promoting up-take of renewable energy.’ This acknowledges the role that a clear and effective legal framework can play in promoting renewable energy sources. Further strategies include a policy direction to the regulator to ‘come up with the mandatory Renewable Purchase Obligations (RPOs) in the form of regulations/orders within a period of six months from the date of notification of the policy’.\textsuperscript{124} This is to be complemented by transmission company created ‘green corridors’ on the grid to enable interconnection.

The renewable energy targets are set taking into consideration Zimbabwe’s INDCs and the ability of utilities to despatch and pay for the power. In terms of incentives the policy provides that renewable energy

\begin{itemize}
\item \textsuperscript{120} GoZ (2019), p. 19.
\item \textsuperscript{121} Ibid., p.7-8.
\item \textsuperscript{122} Ibid., p. 26-28.
\item \textsuperscript{123} Ibid., p. 20; of the 2 100MW sources will contribute as follows: Small Hydro 150MW, Grid Solar 1 575MW, Wind 100MW, Bagasse and other sources, 275MW. Over 250,000 solar water heaters are targeted and 8 000 biodigesters.
\item \textsuperscript{124} Ibid., p. 23.
\end{itemize}
projects shall be awarded a National Project Status (NPS) to facilitate exemption from customs and general excise duties for the importation of renewable energy technologies. Legislation that shall provide a framework of incentives include the Finance Act, Income Tax Act, Value Added Tax Act and Value Added Tax Regulations, Customs and Excise Duty Act and Customs and Excise General Regulations.\(^\text{125}\) There are no specific policy provisions on how these statutes will be used to create incentives – possibly this being a task to be co-created with the Ministry of Finance and the Zimbabwe Revenue Authority. In addition, the policy proposes reduced licencing fees for renewable energy sources.

The policy highlights the importance of off-grid systems, especially for rural and remote areas.\(^\text{126}\) Off-grid systems can provide a faster way to expand access to electricity for inaccessible areas where it is not cost-effective to extend the grid. This is the case with many mountainous and remote rural areas in Zimbabwe. These systems include mini- and micro-grid systems. The policy provides for a framework under which the government will provide financial support through grants or loans\(^\text{127}\) for the development of these off-grid systems. The Rural Electrification Fund (REF), which is currently responsible for rural electrification, is expected to play a key role in championing off-grid systems in rural areas.

A Green Energy Fund of Zimbabwe is proposed which will be managed by the REF during the first year, after which the Infrastructure Development Bank (IDBZ) will take over. The regulator is tasked to assess the maturity and commercial viability of the various renewable energy sources every five years. Institutionally, the policy proposes the setting up of a Nodal Agency, within the Ministry of Energy and Power Development, to manage the renewable energy procurement programme.\(^\text{128}\)

Implementing the renewable energy policy is one way by which Zimbabwe can make progress towards its climate change objectives. It is apt that the renewable energy policy was framed within the context of existing INDCs and the climate change policy objectives. Policy alignment and integration are key to ensuring that steps taken to mitigate greenhouse emission do not adversely affect economic development. Promoting social, environmental and economic sustainability is key in the process of


\(^{126}\) Ibid., p. 36-37.

\(^{127}\) Ibid., p. 37.

\(^{128}\) Ibid., pp. 34-35.
developing integrated energy and climate change policies.

The real challenges will be seen when it comes to implementing this policy. This particularly relates to the detailed design of the fee-in-tariff and the competitive bidding process and the potential effects of such regulations on the viability of existing utilities and the long-term sustainability of the cost of procuring renewable energy. By comparison, South Africa has implemented one of the most successful renewable energy procurement programme that has seen growth of independent power producers (IPPs) between 2012 to 2018.\footnote{The South Africa Renewable Energy Independent Power Producers Procurement Programme has to date procured 6 400MW of electricity from 102 IPPs, of which 4 065 MW is online. From the first procurement Window 1 to Window 4, prices have fallen with wind decreasing from an average bid price of 151c/kWh to 68c/kWh and solar PV from 329c/kWh to 82c/kWh. (see Department of Energy, South Africa, IPP Office, available at \url{https://www.ipp-renewables.co.za} )} Zimbabwe can learn from the pitfalls and successes of the South African programme.\footnote{These include the pushback from the entrenched fossil fuel interests, see for example \textit{Coal Transporters Forum v Eskom Holdings Limited} (42887/2017) [2019] ZAGPPHC 76 (26 March 2019).} Extensive studies exist that can provide lessons as Zimbabwe proceeds to design regulations and implementing mechanisms for its renewable energy programme.\footnote{See generally Eberhard (2014); Eberhard et al. (2016).} It will also be critical to understand the mechanisms of the renewable energy fund at a time when the IDBZ is also crafting a climate finance facility. Integration of all these areas aimed at climate adaptation and mitigation will be crucial.

6. Conclusion.

It clear that any efforts to introduce renewable energy technologies to developing countries like Zimbabwe come with challenges. Promoting low-carbon energy while trying to meet the sustainable development goal of providing access to affordable energy and dealing with poverty and development is complex. Energy is indispensable for the attainment of the Sustainable Development Goals of eradication of poverty, access to affordable energy, and climate change action. Model solutions and projects have to be contextualised and modified to suit the social, economic and political environment of each country. This requires enhanced efforts
at the international level to support the movement towards sustainable energy with technology transfer and funding. Climate change is a push factor that can expedite the adoption of low carbon energy sources.

Governments have an important role to play in creating incentives for private investment in sustainable energy projects. This can be done through the formulation of dynamic and flexible legal and regulatory frameworks, the removal of subsidies and allowing energy utilities to charge commercial rates, while cushioning the poor. Zimbabwe’s energy laws and institutions are not yet fully enabled to promote renewable, sustainable energy technologies. The regulatory framework is heavily state-centred and leaves little room for private investment. However, the Renewable Energy Policy, together with the National Climate Policy, provides a good foundation for the amendment of energy laws or the development of specific renewable energy and climate change legislation that can promote the twin objectives of access to clean energy and low carbon development.

The international climate change regime under the UNFCCC and the Paris Agreement provide a good context within which Zimbabwe can harness global technology to implement its renewable energy programme. Advantage should be taken of the Clean Development Mechanism and the global climate change funds. Without progressive legal and regulatory frameworks, little progress will be made, but the frameworks need to be complemented by many other economic and policy interventions. Above everything else such laws and policies must resonate with the country’s social and economic realities.

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