# SOCIOECONOMIC IMPLICATIONS OF ENERGY POVERTY IN SOUTH AFRICAN POOR RURAL HOUSEHOLDS

# Kola Olusola Odeku, University of Fort Hare Edson Meyer, University of Fort Hare

### **ABSTRACT**

Energy is vital to human existence and as such, all sources of modern energy are significant in driving socioeconomic activities of households for domestic or entrepreneurship purposes. However, resource-poor rural households in South Africa are so poor to the extent that they cannot afford to buy or source for modern energy for their various needs and uses. It is against the backdrop of this lack of access to modern energy that this article examines the potential danger of lack of access to modern day energy services and its implication for resource-poor households. The article also looks at the benefits of having access to modern energy and the challenges being encountered in providing modern energy services to the resource-poor and proffers potential solutions to these challenges.

**Keywords:** Modern Energy, Rural Poor, Rural Households, Denial and Deprivation, Interventions And Access.

### INTRODUCTION

Today's South African households, particularly those in the rural areas who are resource-poor and live below the poverty line mostly rely on traditional energy sources such as the cutting and fetching fuelwood from the forest to meet their energy needs for both domestic and entrepreneurial activities (Action, 2014). This source of traditional fuel is both time consuming and dangerous, especially for women and young girls who are vulnerable to attacks when they trek for miles to go to the forest to cut and collect fuelwood for their household energy usage (Oluwole et al., 2012). The lack of access modern source of energy is known as energy poverty which has remained one of the critical challenges facing South Africa today (Zulu & Richardson, 2013).

Even though there is no singular accepted definition of energy poverty, there are generally several acceptable definitions. For example, Shonali et al. (2013) defined energy poverty

"In terms of a lack of access to adequate, reliable, affordable and clean energy carriers and technologies for meeting energy service needs for cooking and those enabled by electricity to support economic and human development."

Energy poverty is also described as the absence of sufficient choice in accessing adequate, affordable, reliable, clean, high-quality, safe and benign energy services to support economic and human development (Margaret & Skutsch, 2002). According to Petrova & Sarlamanov (2012) "Energy poverty can be defined as a condition where a household is unable

to access energy services at the home up to a socially-and materially-necessitated level. As such, it is often considered synonymous with some definitions of 'fuel poverty' although this concept is often used in reference to issues of low energy affordability, rather than the broader problems that predicate inadequate energy access" (Bouzarovski, 2012). These definitions and descriptions show situations of denial, deprivation and hopelessness.

In order to escape from poverty, rural households need modern energy for their domestic and income-generating activities (Kaygusuz, 2011). Undoubtedly, access to modern energy would have remarkable and profound impact on economic, social, and environmental development of the rural households (Barnes, 2010). Most of the rural areas were denied access to energy during apartheid government (Marquard, 2006). As a matter of fact, energy was weaponized during apartheid government and the entire black areas which were predominantly located in remote rural areas were deliberately denied access to energy. Though the democratic government which came into power in 1994 has continually been striving to provide access to energy and bridge the energy gap, a lot of rural areas inhabited by the majority black people are still without energy. It is vital for everyone in South Africa, including the resource-poor in rural areas to have access to modern energy services because of its numerous benefits (Barnes, 1996). Energy is required for all household uses such as lighting, cooking, heating (Rehfuess, 2006). Energy is also needed for local agricultural activities such as irrigation, tilling, harvesting and post-harvest processing which supplies rural industry uses for such as mechanical energy, milling and process heat (Kaygusuz, 2011). For supply of clean portable drinking water, energy is also an essential tool required to drive the engines that supply water to the rural households (Brew-Hammond, 2010). As a matter of fact, energy is needed for virtually all socioeconomic goods, amenities and activities.

Historically, apartheid laws deliberately deprived black majority access to modern energy during the apartheid regimes. However, interestingly, now that the black majority is in the helm of the affairs in South Africa, there is still a lot to be done to make modern energy accessible to the poor who needed it most.

The lack of access to modern energy by the poor impedes development for many people all over the world. The international community has sought to intervene in order to address this growing concern by strategically asserting that come 2030, there should be access to modern energy by the majority of the people in the world (Pachauri et al., 2013). And this would be achieved through massive investments in total rural electrification and universal access to clean energy by 2030. The target is improved access to modern cooking fuels and this "Alone can avert between 0.6 and 1.8 million premature deaths annually in 2030 and enhance wellbeing substantially" (Pachauri et al., 2013).

#### LITERATURE REVIEW

Fundamentally, in this post-apartheid era, the lack of access to energy sources, particularly modern energy in rural areas of South Africa is disturbingly worrisome and of great concern (Hanyane & Naidoo, 2012). South Africa has taken some steps toward making access to modern energy available to the previously denied black majority but those who have benefited from these steps are few, hence the need to broaden access to modern energy through substantive use of technologies (Hanyane & Naidoo, 2012). This proposition is strongly advanced mainly due to the importance of modern energy for human, social, health and socioeconomic development and growth and for clean environment (Conger & Donnellan, 2007). Presently, the rate of the deployment of modern energy to the rural areas in South Africa has been remarkably

very slow and there is need to accelerate deployment of, and access to modern energy if the country wants to escape from poverty, lack of opportunity and unemployment which currently dominate the rural South Africa (Delina, 2017).

Existing literature has shown that for there to be radical socioeconomic emancipation in South Africa, there is need for continuous and unhindered access to regular electric energy services particular for households in the rural areas (Omorogbe & Ordor, 2018). Undoubtedly, this will drive socioeconomic development in the rural areas and the overall benefit will be poverty alleviation and widespread prosperity in the resource-poor rural areas. There is however, a concern that the extending of modern day energy, particularly electricity through expansion and extension of grids to the rural areas is expensive and will drain government funds (Urpelainen, 2014). Studies have suggested that the government and service providers should continue to explore alternative energy sources for rural areas such as solar, winds, biomass and so on (Urmee et al., 2009). To achieve this, it is imperative that government should implement existing policies on alternative energy for purposes of making available unhindered access to modern energy (Murombo, 2015). The implications of access to modern energy resonate perfectly well with regard to its potential to drastically reduce poverty and inequality that are prevalent in South Africa (Butler, 2017). Apart from the income-generating activities, access to modern day electricity also has positive implications on education and well-being of the rural dwellers (Chaurey et al., 2004). For this reason, the argument for broad access to energy services in the rural areas is fundamentally imperative for the stride for the poverty eradication and reduction of social inequality in South Africa (Roberts, 2001). According to Kaygusuz (2010) poverty should be the focus of a range of specific public policies, aimed not only at mitigation, but also at eradication. Lack of access to modern sources of energy aggravates poverty, particularly in the rural areas, where opportunities are scarce. The establishment of public policies aimed at the eradication of poverty should include the expansion of access to energy, in particular to electricity, taking into account, mainly, social interrelations.

In South Africa, majority of the people in the rural areas are living in abject poverty and the concern is that the number of people living below the poverty line is increasing on a daily basis in absolute numbers if not as a percentage (Clancy & Skutsch, 2002). Most people in rural areas also have energy poverty. Poverty is multidimensional and has devastating impact and effect wherever it is found (Calvo & Dercon, 2007). Poverty has is also inherent and entrenched in energy and that is why there is been terms coined as energy poverty with different meanings and dimensions in terms of the way it operates by ravaging household (Golooba-Mutebi & Hickey, 2010). Against this context, Cecelski, 2003 has observed that "Poverty means, among other things, limited access to energy sources. The poor use energy and other scarce resources to eke out livelihood strategies. Poverty influences and determines which source of energy chosen in a household. It is also one element that can enhance or detract from survival strategies of the poor" (Cecelski, 2003).

According to Clancy & Skutsch (2002) "Poverty is not static but rather a dynamic process: people can move out of, or into, poverty. This needs to be taken into account when policies and strategies are being designed to help people lift themselves out of poverty." Poverty reduction presupposes that rural dwellers should be provided with all amenities that will make them escape the poverty trap. Access to modern energy is one of the services that can make this realisable (Kao et al., 2004).

Kaygusuz (2010) observed that "Without access to modern energy, communities are dependent on traditional biomass such as fuelwood, charcoal and animal waste for cooking and

heating." This is the reality in most rural households in South Africa. It will take conscious government intervention such as implementing policies that drive the delivery of modern energy to the rural areas to address this problem (Chambers, 2014). However, because of the meagre income of the rural dwellers, large chunk of their income are spent on food and other necessaries, thereby leaving them with little or nothing to spend on energy sources (Sachs, 2005). The consequences of this is that if there is no demand for electricity provided by service providers, it becomes uneconomical for the power providers who have set up the infrastructure needed to supply the energy (Kaygusuz, 2011). This might prevent the power providers from providing further services, thus, having dire consequences on enterprises and businesses such as spaza shops and farmers (Fakira, 1994). Undoubtedly, this will create a ripple effect of a vicious circle of energy poverty in the community. In order to break this vicious circle of energy poverty, there is need for the government to embark on job creation and income earning activities in the rural areas (Graziani, 2011). This will enable the rural dwellers to increase their purchasing power which would invariably allow them to have enough income to purchase food and energy for their usage (Davis, 1998).

As part of overall benefits of modern energy, particularly electricity, it been asserted as a source of lighting, as it provides opportunities for extended working hours, consequently resulting in improved income generation (Ayres & Warr, 2010). Further, street lighting and lighting in community centres can open the way for adult education which usually takes place in the evenings when adults are back from their day jobs (Clancy & Skutsch, 2002). In addition, the disperse nature of dwellings in the rural areas presupposes that the people will be vulnerable particularly to invaders and thieves, hence, lighting of the whole village through street lights is a step towards warding off intruders because they will not be able to practice their nefarious activities (Sibanda, 2018).

Rural dwellers and households need constant and sustainable energy which will aid socioeconomic activities and at the same time environmental-friendly (Smith et al., 2014). This is why this article strongly advocates for renewable energy and energy efficiency which have been labelled by many scholars and generally characterized as "win-win" options which is also known as sustainable energy development (Mol, 2007). The overall objective of this this type of energy is to produce a clean environment and at the same time alleviate poverty in the rural settings (Cecelski, 2003).

While it is the responsibility of the government to provide energy structures and services to get rural dwellers connected to modern energy services, the beneficiaries (the resource-poor) should not be left out of the discussion (Barnes & Floor, 1996). As a matter of fact, it is important to for the government to discuss with them about how they would want the issues of energy poverty to be addressed in order for them to maximise the benefits (Bird & Hernández, 2012). Participation by the resource-poor will undoubtedly help shape policy and strategy that would make access easier and sustainable and at the same time achieve the desired outcome of poverty reduction and unemployment in the rural areas (Cecelski, 2003).

Fundamentally, "*Modern*" forms of energy are a necessary input for economic development and the elimination of poverty (González-Eguino, 2015). The substitution of inanimate energy for human energy has proven to be an essential element in removing drudgery and increasing well-being (Cecelski, 2003).

Energy needs are of no limit and as a matter of fact these needs have been broadly and explicitly defined to include "Household uses, such as cooking, lighting, space heating, and other appliances; for agricultural uses, such as tilling, irrigation, and postharvest processing;

and for rural industry uses, such as milling and mechanical energy and process heat (Sovacool, 2014). Energy is also an input to water supply, communications, commerce, health, education, and transportation in rural areas" (Cecelski, 2003). Because of the overall and holistic importance of energy to human existence and well-being, it is essential that all efforts must be made to make access available, affordable and sustainable (Kaygusuz, 2007). Denial, deprivation and restriction of access to modern day energy should be discouraged and damned.

Because of the significance of energy to human kind, the aspect of energy poverty has increasingly become a widely recognized societal challenge among pundits, scholars and government (Bouzarovski & Petrova, 2015). There is a renewed interest to tacking energy poverty and deprivation head-on by entering the debate on how to improve and strengthen access to energy using available structures and interventions.

Any challenge relating to energy deprivation and poverty in households are usually commonly described using the term 'energy poverty' and this seems to have been accepted by scholars when it comes to energy discourse (Fisher & Maginnis, 2005). The concept of energy poverty resonates perfectly with developing countries and South Africa is no exception (Du Toit, 2004). The term energy poverty has therefore traditionally been used to capture problems and challenges of inadequate or lack of access to energy (Bouzarovski & Petrova, 2015).

There is a very strong link between energy and energy services. Access to energy is also linked to general well-being of the people and critically have tremendous impact in almost every aspect and area of human life such as improving economic activities of the rural dwellers to well secured environment where there is lighting and improved child literacy because of constant supply of electricity day and night (Oparaocha & Dutta, 2011).

At the international level, the status of energy has even been elevated to the extent that it has been critically emphasized that "Without energy services, the resource-poor are cut off from basic amenities. They are forced to live and work in unhealthy and polluted conditions. Furthermore, energy poverty directly affects the viability of forests, soils and rangelands." Denial, deprivation or lack of access to energy is considered as an obstacle to the Sustainable Development Goal (SDG). Therefore, in order to change this pathway, it "Will require genuine political commitment to set goals/targets for energy poverty alleviation and then to initiate immediate action to see that these are met. It is in this context that the United Nations Secretary General, Ban Ki Moon launched the target of universal energy access by 2030" (Oparaocha & Dutta, 2011).

### **Overarching Benefits Enabling Access to Modern Energy Services**

Although there have been various write-ups on the potential benefits of modern energy services to human beings, when it comes to provision, delivery and attribution of these services, there seems to be a huge challenge as this is quite apparent in most of the rural households in South Africa-they are the faces of poverty (Shonali et al., 2013). Undoubtedly, access to modern energy will enable viable economic activities and entrepreneurships in the rural areas. This will invariably create income-generating activities for the rural dweller. For instance, it is undisputable that agricultural activities are prevalent in the rural areas because of the vast mass of land available for farming. With access to energy, industry using the products produced from the farms can process the agricultural products through food processing and modern day agroindustry that uses energy to power their technologies, equipment and machineries (Fluck, 2012).

While energy is an enabler for this, it is equally important to point out that there are other drivers which should complement access to energy services such as access to finance and

infrastructure (Singh et al., 2015). With regard to domestic energy uses, availability of access to modern energy services to rural areas will make life easier, safer and make the rural areas more attractive (Action, 2007). For example, access to modern energy services will lessen the stress of trekking or walking long distance to the forest in order to cut wood for energy (Odoi-Agyarko, 2009). Similarly, access to energy, particularly rural electrification would provide more employment opportunities and income generating ventures which might encourage young people to stay in the rural areas and work instead of migrating to urban areas to look for jobs. Furthermore, there are serious health implications of burning wood for energy indoors such as the emissions of noxious gases which may lead to death (Fullerton et al., 2008). According to Kaygusuz (2010) "The most serious consequence of burning biomass in the home is the risk of respiratory and lung disease. According to the World Health Organization, 1.6 million premature deaths occur each year as a result of indoor smoke inhalation, and more than half of these deaths occur among children under five years of age. As a result of population growth, this problem will continue to worsen." Burning of wood for fire is also a source of environmental pollution as smoke being released will invariably pollute the environment and cause environmental hazards to other residences in the area (McGranahan, 1993).

The mere fact that there is currently still an existence of energy poverty in South Africa indicates that there is not overwhelming political by the government to curb this challenge. Though various policies and measures have been introduced to address the problem, the problem still remains that of political will to accelerate implementation in order to make rural people energy sufficient (Ahuja & Tatsutani, 2009). Worse still, most of the existing structures and processes that have been introduced within the energy sector are short of functioning effectively and efficiently to benefit the poor (Clancy & Skutsch, 2002). The intensity at which the government continues to implement energy policy that benefits the urban dwellers at the expense of the rural dwellers is apparent because most of the elites and government officials live in the urban cities and look after themselves (Lipton, 1977). Even, an attempt to massively deploy renewable energies, primarily for electricity generation has been met with many stumbling blocks such as lack of means to buy the technology for energy by rural poor, thefts of the energy supply technology are rampant in the rural areas, making rural household vulnerable (Smillie, 2019). Therefore, the rural poor have not been benefiting widely as expected post 1994 in South Africa" (Clancy & Skutsch, 2002).

At the international level, particularly with regard to energy for development, "The United Nations (1954) articulated the supply of electricity as a means of achieving "Development first" since it improved the economic status of populations living in rural areas by increasing human productivity and welfare" (Benjamin & Sovacool, 2012).

The provision of modern energy specifically in developing countries will be catalyst to mitigate and minimize the impact and effect of poverty, ill-health and pollution, inequality, deforestation, climate change, and environmental degradation (Benjamin & Sovacool, 2012).

# The Role of Municipality in Providing Access to Off-Grid Energy Sources

In South Africa, many people live in the remote rural areas where there is no access to grid for electricity (Azimoh et al., 2016). The energy available mainly in the rural area are offgrid energy sources (Gupta, 2006). Municipalities have adopted pro-poor indigent support programmes to ensure that resource-poor households that are unable to pay for certain basic services such as water, electricity, sanitation and refuse removal have unhindered access to these basic services. Under this programme, rural households can apply for indigent status with their

respective municipalities. Successful applications of households which meet specific criteria would result in their receiving free or greatly-reduced basic service rates. Also, as part of these programmes, off-grid energy is provided by 44 district and 8 metropolitan municipalities (SSA, 2018). The district municipalities are also subdivided into 205 local municipalities.

According to the 2018 Statistics South Africa report, the extent to which municipalities provide off-grid energy sources including renewable energy such as solar energy to resourcepoor households is very encouraging. This is said against the backdrop that households in the rural areas require energy for at least three main tasks, namely: cooking, heating and lighting. Undeniably, it is only electricity that is ideal source to be used to perform all these three major domestic tasks. However, most of the households are located in remote rural areas and as such, have no access to the power grid and in most cases most of these rural dwellers do not have the means to afford other forms of energy. For this lack and deprivation, municipalities have been known to step in to provide these services to the rural dwellers under The Free Basic Alternative Energy Policy (FBE) which mandates municipalities to select suitable off-grid energy sources for purposes of providing access to these indigent households. Some of the energy sources available under FBE are paraffin, liquid petroleum gas, bio-ethanol gel (or fire gel). Most of these municipalities are known to be servicing indigent households with at least one form of off-grid energy source. According to the 2018 Department of Statistics South Africa maps below show which municipalities are providing off-grid energy sources such as paraffin, candles, fire gel and solar energy.

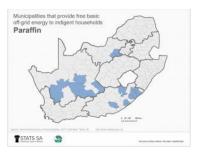


FIGURE 1
FREE BASIC ALTERNATIVE ENERGY POLICY (FBE) IS PARAFFIN

According to the 2018 Department of Statistics South Africa Map 1 shows that "over 86 500 indigent households (2.5% of the 3.5 million indigent households nation-wide) benefit from free paraffin in 20 municipalities. These municipalities are clustered in Eastern Cape and Northern Cape, with two municipalities in North West."



FIGURE 2
FREE BASIC ALTERNATIVE ENERGY POLICY (FBE) IS SOLAR

According to the 2018 Department of Statistics South Africa Map 2 shows that "there were 22 municipalities providing free solar electricity systems. About 113 200 households (3,2% of the 3,5 million indigent households nation-wide) benefitted from this service."

According to the SSA, the increase in the use of solar energy is to enhance South Africa's energy mix by increasing clean energy's contribution to 30% by the year 2025. Interestingly, nowadays, the costs of producing photovoltaic panels required for solar energy have continued to decline exponentially which had made it more affordable and this has motivated the provision of solar energy as a service to poorer households an attractive option. With this, it is expected that in time, solar energy will hopefully replace paraffin and fire gel (Tester et al., 2012).

# **METHODOLOGY**

The article is generally based on a review of available literature, in particular those relating to the issues of energy poverty, socioeconomic implications and consequences of energy deprivation and denial (Buzar, 2007). The article also utilised the Department of Statistics South Africa Maps and data to articulate the provision of off-grid energy by the municipalities in order to increase the number of access to energy (Aliyu et al., 2018). Literature was rigorously reviewed for the purposes of discussing the inherent issue of lack of access to modern energy, consequences of this lack, challenges to interventions that have been put in place to resolve the lack and proffered sustainable solutions.

#### RESULTS AND DISCUSSION

This article showcases the problem of lack of access to modern energy by households in rural remote South Africa. It demonstrated that apartheid policy of deliberate denial and out-right deprivation of access to modern energy from the black majority pre-1994 caused irreparable damage to the socioeconomic activities of rural dwellers in South Africa and made them perpetual undeveloped and segregated. Post-1994, the democratically elected black majority was confronted with the legacy of the apartheid policy that denied the majority black access to energy. Against the backdrop of realisation of the imminent problem and in the quest of mainstreaming the majority black South Africans access to energy services particularly in the neglected rural South Africans, post 1994 witnessed the roll out of policies, measures, strategies and various initiatives to provide and deliver electricity services to the rural poor. These interventions have led to both successes and failures. Successes in the sense that there have been cautious attempts to make access to modern energy possible despite the fact that majority of the rural dwellers incomes may not be able to afford modern energy such as electricity even if the services are provided, hence the introduction of the FBE for indigents and rural poor in South Africa. These interventions are mainly in form of off grid energy resources as power grids are still not often provided in the rural remotes areas. This is understandable considering that most of the rural areas are in remote areas with sparse population where people build houses far away from one another. In order for the municipalities to deliver modern day services to the rural disadvantaged rural areas, most of them have adopted the off-grid energy sources to meet the requirements of indigent rural dwellers. However, it is pertinent to point out that some failures have been observed due to some types of the off grid energy being provided by the municipalities such as paraffin, candles and fire gel. An example is Figure 1 where "Over 86 500" indigent households (2.5% of the 3.5 million indigent households nation-wide) were given free paraffin in 20 municipalities. These municipalities are clustered in Eastern Cape and Northern

Cape, with two municipalities in North West." Even though these alternative off-grid energy sources are useful, if they are not properly handled they can result in devastating negative outcomes. For example, the careless use of candles in the rural households have resulted in fire outbreaks which have led to loss of homes and lives. However, some municipalities have made remarkable attempts to provide renewable energy such as solar. Solar is not harmful to the household and the environment. Deployment and the use of renewable energy is currently the focus of the government because of the importance to the environment and the fact that renewable energy initiatives is a form of energy for electricity that is cheap and clean. As such, this will help indigent households to have access to modern day energy and improve the standard of living of the rural dwellers. Municipalities are tapping into this and that is why according to the 2018 Department of Statistics South Africa report three metropolitan municipalities in Gauteng (Johannesburg, Tshwane and Ekurhuleni) have joined the initiative, providing free solar home systems to almost 57 200 households. Similarly, nationwide, Figure 2 shows 22 municipalities provide free solar electricity systems to their communities. About 113 200 households (3.2% of the 3.5% million indigent households nation-wide) benefitted from this service. This is remarkable and as such, these initiatives are strongly recommended to other municipalities.

This article points out that in the present post-apartheid era, many poor households in the rural areas still depend heavily on wood for traditional fuels and other biomass fuels for most of their household and income-generating activities. Considering that the rural dwellers often have to travel for miles to cut and fetch woods in the forest, this poses a painful difficulty and it is time-consuming, energy sapping and very risky. These energy deprivation and challenges are factors that are peculiar to rural dwellers. This lack of access has disproportionate them in all aspects of socioeconomic activities and well-beings. Lack of access to modern energy hade denies them the route and pathway to escape from poverty and unemployment. Access to energy will undoubtedly avail students longer time beyond daylight for studies and this will have positive impact on education. The act of delivery of quality education includes availability of electricity to illuminate and light the class rooms when it is dark in the day and at home during studies. Burning of traditional fuels and wood in the household is a source of toxic pollution and substances which affect respiration and general health well-being of people.

The UN is fostering universal access to modern energy in order to achieve the desired result of the SDG. In the words of Omorogbe & Ordor (2018), "The recognition of access to energy in the sustainable development goals encapsulates the universal and fundamental role of energy in human existence. Access to affordable, reliable sustainable, and clean energy is only realizable upon the convergence of a multiplicity of factors-political, economic, technological, socio-cultural, and legal, to mention a few."

Over and above, unhindered sustainable access modern energy will undoubtedly translate into sustainable livelihoods, improved health and ability to use electricity for education, all of which are remarkable benefits for rural dwellers as a whole.

### RECOMMENDATIONS

Access to modern energy can be improved through the intensification of the role out of massive modern energy infrastructure that will reach remote and land locked areas. The benefit of this is that those who live in these areas would have access to modern energy and it will have positive impact whereby rural people's standard of living would be improved. This can only become feasible if energy is affordable and as such, in this regard, aspects of energy incentive

and subsidy should be improved. Over and above, aaccess to energy would be pathways through which rural households would be able to attain and fulfil their socioeconomic and material activities and needs hence the need to intensify the drive for broad access to modern energy. Fighting energy requires the corporation of the government, the people and service providers. To this end, there is need for continuous rolling out of policy and strategy that would make this realisable. Government should continuously strive to target those that are in need of modern energy, make energy accessible and available to them as this will improve their income earning activities and their livelihoods. To achieve this, there should be massive investment in energy infrastructure technologies which would be affordable and meet the poor people energy demands and reduce their energy vulnerability and drudgery.

#### **CONCLUSION**

Fundamentally, modern energy is essential for everyone to live a decent life, and as such, all human beings should have access to modern energy services regardless of where they reside. Rural dwellers in South Africa are however still facing the problem of lack of provision and access to energy. This is mind boggling as there have been interventions that have been put in place since the beginning of post 1994, but it seems that delivery is slow. Because of the overwhelming benefits of modern energy, it is imperative that the government, in particular the municipalities, step up to the task by ensuring that rural dwellers have unhindered access to modern energy. Slow implementation is causing problems such as the migration of rural dwellers to urban area where they have ample access to modern energy services. The provision and access of electricity in the rural areas will definitely be a strong motivating factor to make people, especially the young population to stay back in the rural areas because they will be able to engage in socioeconomic activities within the rural communities.

#### **ACKNOWLEDGEMENT**

This work benefitted immensely from Eskom Tertiary Education Support Programme (TESP). The Fort Hare Institute of Technology under the able leadership of Prof E Meyer is thanked for their associateship.

# **REFERENCES**

- Action, P. (2007). Poor people's energy outlook 2013-energy for community services. Retrieved from https://www.developmentbookshelf.com/doi/abs/10.3362/9781780441023.001
- Action, P. (2014). Poor people's energy outlook 2014-key messages on energy for poverty alleviation. Retrieved from https://doi.org/10.3362/9781780445892.001.
- Ahuja, D., & Tatsutani, M. (2009). Sustainable energy for developing countries. Retrieved from <a href="https://journals.openedition.org/sapiens/823">https://journals.openedition.org/sapiens/823</a>.
- Aliyu, A.K., Modu, B., & Tan, C.W. (2018). A review of renewable energy development in Africa: A focus in South Africa, Egypt and Nigeria. *Renewable and Sustainable Energy Reviews*, 81(2), 2502-2518.
- Ayres, R.U., & Warr, B. (2010). The economic growth engine: How energy and work drive material prosperity. Edward Elgar, Cheltenham, UK.
- Azimoh, C.L., Klintenberg, P., Wallin, F., & Karlsson, B. (2016). Electricity for development: Mini-grid solution for rural electrification in South Africa. *Energy Conversion and Management*, 110(15), 268-277.
- Barnes, D.F., & Floor, W.F. (1996). Rural energy in developing countries: A challenge for economic development. *Annual review of energy and the Environment*, 21, 497-530.
- Barnes, D.F. (2010). The challenge of rural electrification. Retrieved from https://www.taylorfrancis.com/books/e/9781936331697/chapters/10.4324/9781936331697-8.

- Bird, S., & Hernández, D. (2012). Policy options for the split incentive: Increasing energy efficiency for low-income renters. *Energy Policy*, 48, 506-514.
- Bouzarovski, S., & Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty—fuel poverty binary. *Energy Research & Social Science*, 10, 31-40.
- Bouzarovski, S., Petrova, S., & Sarlamanov, R. (2012). Energy poverty policies in the EU: A critical perspective. *Energy Policy*, 49, 76-82.
- Brew, H.A. (2010). Energy access in Africa: Challenges ahead. Energy policy, 38(5), 2291-2301.
- Butler, A. (2017). Contemporary South Africa. Palgrave, Macmillan, Education. *Current Opinion in Environmental Sustainability*, 3(4), 265-271.
- Buzar, S. (2007). When homes become prisons: The relational spaces of post socialist energy poverty. Retrieved fromhttps://journals.sagepub.com/doi/abs/10.1068/a38298.
- Calvo, C., & Dercon, S. (2007). Vulnerability to poverty. Retrieved from <a href="https://ora.ox.ac.uk/objects/uuid:e427db48-53f9-4ff9-a01e-2492685958d7">https://ora.ox.ac.uk/objects/uuid:e427db48-53f9-4ff9-a01e-2492685958d7</a>.
- Chambers, R. (2014). Rural development: Putting the last first. Retrieved from <a href="https://www.taylorfrancis.com/books/9781315835815">https://www.taylorfrancis.com/books/9781315835815</a>.
- Chaurey, A., Ranganathan, M., & Mohanty, P. (2004). Electricity access for geographically disadvantaged rural communities—technology and policy insights. *Energy policy*, *32*(15), 1693-1705.
- Clancy, J.S., & Skutsch, M. (2002). The gender-energy- poverty nexus. Finding the energy to address gender concerns in development. DFID Project CNTR998521 Technology and Development Group University of Twente and Simon Batchelor, Gamos Ltd, UK.
- Conger, R.D., & Donnellan, M.B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, *58*, 175-199.
- Davis, M. (1998). Rural household energy consumption: The effects of access to electricity evidence from South Africa. *Energy Policy*, 26(3), 207-217.
- Delina, L.L. (2017). Accelerating sustainable energy transition (s) in Developing Countries: The challenges of climate change and sustainable development. Retrieved from <a href="https://www.taylorfrancis.com/books/9781315182995">https://www.taylorfrancis.com/books/9781315182995</a>.
- Du Toit, A. (2004). Social exclusion'discourse and chronic poverty: A South African case study. Retrieved from <a href="https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-7660.2004.00389">https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-7660.2004.00389</a>.
- Fakira F. (1994). Energy for microenterprises. Retrieved from <a href="https://open.uct.ac.za/bitstream/handle/11427/22669/Fakira\_1994.pdf?sequence=6">https://open.uct.ac.za/bitstream/handle/11427/22669/Fakira\_1994.pdf?sequence=6</a>.
- Fisher, R.J., & Maginnis, S. (2005). Poverty and conservation: Landscapes, people and power. IUCN, Cambridge, UK.
- Fluck, R.C. (2012). Energy in farm production. Elsevier, London, UK.
- Fullerton, D.G., Bruce, N., & Gordon, S.B. (2008). Indoor air pollution from biomass fuel smoke is a major health concern in the developing world. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 102 (9), 843–851.
- Golooba, M.F., & Hickey, S. (2010). Governing chronic poverty under inclusive liberalism: The case of the Northern Uganda Social Action Fund. *The Journal of Development Studies*, 46(7), 1216-1239.
- González, E.M. (2015). Energy poverty: An overview. Renewable and sustainable energy reviews, 47, 377-385.
- Graziani, G. (2011). Eliminating the glass ceiling how micro-financing empowers women and alleviates the effects of poverty in developing countries. Retrieved from <a href="https://stars.library.ucf.edu/etd/2042/">https://stars.library.ucf.edu/etd/2042/</a>.
- Gupta, A., Saini, R.P., & Sharma, M.P. (2006). Modelling of hybrid energy system for off grid electrification of clusters of villages. Retrieved from <a href="https://ieeexplore.ieee.org/abstract/document/4147979">https://ieeexplore.ieee.org/abstract/document/4147979</a>.
- Hanyane, B., & Naidoo, G. (2012). Progress and challenges of service delivery in South Africa since 1994. *Mediterranean Journal of Social Sciences*, 3(12), 163-182.
- Kao, R.W.Y., Kao, K.R., & Kao, R.R. (2004). An entrepreneurial approach to stewardship accountability: Corporate residual and global poverty. World Scientific Publishing Company, London, UK.
- Kaygusuz K. (2007). Energy for sustainable development: key issues and challenges. Energy Sources, 2(1), 73-83.
- Kaygusuz, K (2011). Energy services and energy poverty for sustainable rural development. *Renewable and Sustainable Energy Reviews*, 15(2), 936-947.
- Kaygusuz, K. (2011). Energy services and energy poverty for sustainable rural development. *Renewable and Sustainable Energy Reviews*, 15, 936–947.
- Lipton, M. (1977). Why poor people stay poor: A study of urban bias in world development. Retrieved from <a href="https://openresearch-repository.anu.edu.au/handle/1885/114902">https://openresearch-repository.anu.edu.au/handle/1885/114902</a>.

- Marquard, A. (2006). The origins and development of South African energy policy. Retrieved from <a href="https://scholar.google.co.za/scholar?hl=en&as-sdt=0%2C5&q=Marquard%2C+A.+%282006+%29">https://scholar.google.co.za/scholar?hl=en&as-sdt=0%2C5&q=Marquard%2C+A.+%282006+%29</a>.
- McGranahan, G. (1993). Household environmental problems in low-income cities: An overview of problems and prospects for improvement. *Habitat International*, *17*(2), 105-122.
- Mol, A.P.J. (2007). Boundless biofuels? Between environmental sustainability and vulnerability. Retrieved fromhttps://onlinelibrary.wiley.com/doi/full/10.1111/j.1467-9523.2007.00446.x.
- Murombo, T. (2015). Regulating energy in South Africa: Enabling sustainable energy by integrating energy and environmental regulation. *Journal of Energy & Natural Resources Law*, 33(4), 320-348.
- Odoi-Agyarko, A.O. (2009). Household energy, coping strategies and health effects in the Bongo district of Ghana. Retrieved fromhttp://ir.knust.edu.gh/handle/123456789/301.
- Oluwole, O., Otaniyi, O.O., Ana, G.A., & Olopade, C.O. (2012). Indoor air pollution from biomass fuels: a major health hazard in developing countries. *Journal of Public Health*, 20(6), 565-575.
- Omorogbe, Y., & Ordor, A. (2018). Ending Africa's Energy Deficit and the Law: Achieving Sustainable Energy for All in Africa. Oxford University Press, Oxford, UK.
- Oparaocha, S., & Dutta, S. (2011). Gender and energy for sustainable development. *Current Opinion in Environmental Sustainability*, 3(4), 265-271.
- Pachauri, S., & Rao, N.D. (2013). Gender impacts and determinants of energy poverty: Are we asking the right questions? *Current Opinion in Environmental Sustainability*. 5, 205-215.
- Pachauri, S., van Ruijven. B.J., Nagai, Y., Riahi, K., van Vuuren, D.P., Brew-Hammond, A., & Nakicenovic, N. (2013). Pathways to achieve universal household access to modern energy by 2030. Environmental Research Letters, 8(2), 1-7.
- Rehfuess, E. (2006). Fuel for life: household energy and health. Retrieved from <a href="https://apps.who.int/iris/bitstream/handle/10665/43421/9241563168">https://apps.who.int/iris/bitstream/handle/10665/43421/9241563168</a> eng.pdf.
- Roberts, B.J. (2001). Chronic and transitory poverty in post-apartheid South Africa: Evidence from KwaZulu-Natal. *Journal of Poverty*, 5(4), 1-28.
- Sachs, J. (2005). The end of poverty: How we can make it happen in our lifetime. Penguin UK.
- Sibanda, D. (2018). Urban land tenure, tenancy and water and sanitation services delivery in South Africa. Retrieved from http://etd.uwc.ac.za/handle/11394/6051.
- Singh, R., Wang, X., & Mendoza, J.C. (2015). Electricity (in) accessibility to the urban poor in developing countries. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1002/wene.148.
- Smillie, I. (2019). Mastering the machine: Poverty, aid and technology. Routledge, New York, USA.
- Smith, M.T., Goebel, J.S., & Blignaut, J.N. (2014). The financial and economic feasibility of rural household biodigesters for poor communities in South Africa. *Waste Management*, 34(2), 352-362.
- Sovacool, B.K. (2012). The political economy of energy poverty: A review of key challenges. *Energy for Sustainable Development*, 16, 272-282.
- Sovacool, B.K. (2014). Defining, measuring, and tackling energy poverty. Oxford University Press, Oxford, UK.
- Tester, J.W., Drake, E.M., Driscoll, M.J., & Golay, M.W. (2012). Sustainable energy: Choosing among options. The MIT Press, Cambridge, London, UK.
- Urmee, T., Harries, D., & Schlapfer, A. (2009). Issues related to rural electrification using renewable energy in developing countries of Asia and Pacific. *Renewable Energy*, 34(2), 354-357.
- Urpelainen, J. (2014). Energy for Sustainable Development, 2014-ElsevierGrid and off-grid electrification: An integrated model with applications to India. *Energy for Sustainable Development*, 19, 66-71.
- Zulu, L.C., & Richardson, R.B. (2013). Charcoal, livelihoods, and poverty reduction: Evidence from sub-Saharan Africa. *Energy for Sustainable Development*, 17(2), 127-137.