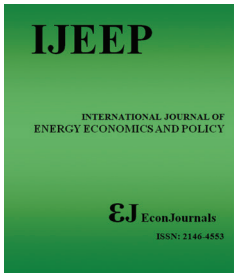

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Renewable Energy Development: Opportunities and Barriers within the Context of Global Energy Politics

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ABSTRACT

This paper resonate current debate on renewable energy developments (RED) with emphasis on opportunities, barriers and related issues within the context of global energy politics. Energy is a strategic commodity that is required to meet basic needs of the society. A sizeable portion of primary energy demand is met through conventional fossil fuels which are a finite resource, but RED is an important step towards environmental, social and economic development. It is central to environmental protection, social security, economic prosperity, increase access to clean, efficient energy and provide a basis to address sustainable development needs. RED enables the exigencies of the present generations to be met without compromising the ability of future generations to meet their own needs. Thus, this paper lend a voice to the current debate and provide a framework to comprehend the opportunities and challenges associated with RED. It include investment in renewable energy infrastructure, institutional governance, technological innovation, legislation, country specific economic needs, subsidies, lack of coherent energy policy, poorly conceptualize climate change policy framework and increasing global population.

Keywords: Renewable Energy Development, Sustainable Development, Environmental Policy, Energy Conservation, Sustainable Energy
JEL Classifications: 013

1. CONTEXTUALIZING RENEWABLE ENERGY DEVELOPMENT (RED)

The term renewable energy development (RED) is rapidly gaining currency in this context (Martinez et al., 2016), and has steadily found its way into the globally negotiated commitments of the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, Climate Change (Kuzdmko et al., 2016) and more recently, the Paris Agreement (Lockwood, 2013). Quite profoundly, the concept of RED has been integrated by economic development policy scholars, researchers and international organizations into the global energy, environmental and climate politics (Pegels et al., 2018). What is particularly interesting in this context is the quality of energy to environmental, social and economic development process (Sen and Ganguly, 2017). The current economic literature and policy debate on RED is anchored largely to satisfy the energy resource conservation and development of the present generations without compromising the ability of future generations to meet their own needs (Falkner, 2014). Thus, this paper has been organized and discussed in 4 sections. Section one provide an overview of the concept of RED, while section two discusses the three pillars of sustainability. Sections three and four outlined opportunities and barriers to RED respectively, while conclusion is highlighted in the final section.

RED is anchored on the principle of sustainable use of energy that is central to environmental, social and economic development that increases access to clean, affordable and efficient energy, and provide a basis to address multiple environmental, economic and development needs (Hess, 2014). It resonate the dominant debate that is connected to economic prosperity, social security and environmental issues that contribute to sustainable development

(Bluhdorn and Welsh, 2007; Najam and Cleverland, 2003). With the countless problems posed by heavy dependent on non-renewable energy in the last 40 years, the issue of sustainable energy remain unsolved and does not appear that there is a credible solution is in sight (Harich et al., 2012). Accordingly, Harich et al. (2012) succinctly opined that the global ecological footprint is at 50% overshoot and rising, but proposes that the problem of RED is solvable through the root cause analysis by striking at the root of the problem.

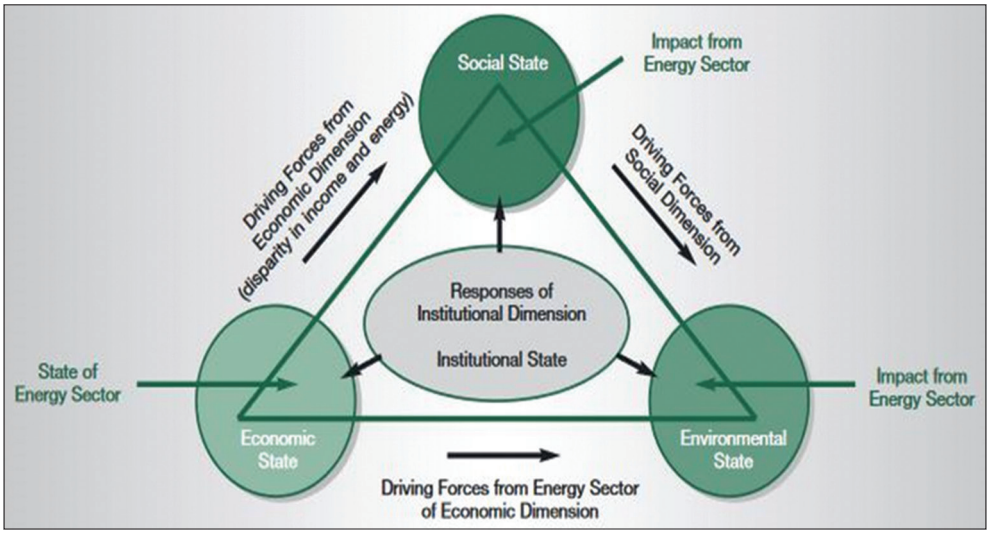
Fossil fuels are a finite resource (Raza et al., 2015), if human lease on the planet earth must be renewed, it is important to focus on RED in the coming decades (Nunez, 2019). Whenever there is a decrease in oil prices, alternative energy becomes less desirable. Correspondingly, when oil price increases, alternate energy like solar power, hydro and wind energy become good alternatives to oil and gas (Pasqualetti, 2011; Sen and Ganguly, 2017). Unfortunately, RED has been a mere rhetoric for several decades (Vanderheiden, 2011), to certain degree, an elusive concept (Sovacool et al., 2016) and an indispensable element to poverty reduction (Hess, 2014). It is, therefore, important to identify the RED paths that do not lead to a sustainable future in view of the current reality and population growth (Nakicenovic, 2000; UN, 2018) and recognise the RED pathway that offer mechanism for sustainable development (REN21, 2019). RED is critical to human development, central for job creation, economic competitiveness, resource empowerment, and more fundamentally, to the survival and prosperity of human society (Falkner, 2014). Sustainable future is not achievable with current policies and prevailing development trends that promote dependence on non-renewable energy. It is undoubtedly the most critical link to sustainable development, the environment and economic development (Hess, 2014). Subsequently, Jefferson (2000) argued that RED is the most critical between environment and development. The legitimate needs of developing countries for environment and socioeconomic development can be met through RED (Bluhdorn and Welsh, 2007).

RED require a rapid movement situated within a broader horizon of energy sector governance, policy framework, technological development and innovative approaches and not from a business as usual scenarios. However, the quest is severely constrained by several factors including lack of coherent energy management policy, country specific economic needs and circumstance, investment in renewable energy infrastructure, access to technology, poorly conceptualize climate change policy framework and increasing global population (Chu and Majumdar, 2012; Anderson, 2000). Unfortunately, well over 80% of global energy demand is supplied by fossil fuels (Hughes, 2012; UN, 2018). This is consistent with the views expressed by REN21 (2020) that fossil fuels are in record high demand in today's global economy and account for 79.7% of total final energy consumption in 2017 alone. The use of fossil fuels is responsible for the increasingly rapid global warming which destabilizes regional climates, affecting living systems around the planet, threatening food security and increasing the frequency and intensity of severe weather. Consequently, Martinex et al. (2016) takes a holistic views at the ongoing development and maintained that controlled consumption of natural resources coupled with the conservation of energy resources for future generations is critical to boost RED. Crucially, Martenix et al. argued that the World Energy Council developed the concept of "energy trilemma" which provides a comparative ranking of countries' abilities to provide stable, affordable and environmentally sensitive energy system, while also highlighting current challenges within the framework of three dimensions of energy security, energy equity and environmental sustainability. Moreover, the International Atomic Energy Agency (IAEA) developed the Indicators for Sustainable Energy Development (ISED) model (Vera et al., 2005) with other international organisations on three conceptual dimensions of economic, social and environmental dimensions depicted in Figure 1 below.

2. THE THREE PILLARS OF ENERGY SUSTAINABILITY

This paper uses the three pillars of energy sustainability as a conceptual framework to examine the opportunities and barriers

Figure 1: Interrelationship among three pillar of sustainability dimensions of the energy system



Source: Vera et al. (2005)

to RED. Some scholars and growing literature (Vera et al., 2005; Ghosh, 2008; Harich, 2010; Afgan, 2010; Gannon et al., 2015) tightly linked RED to three closely related but distinct components termed the pillar of sustainability as environmental, economic and social dimension (Vera et al., 2005; Mareddy, 2017). All three pillars have to be aptly linked for sustainable development to be resolved (Harich et al., 2012), a change in one dimension of the pillars significantly affect the others (see Figure 1 below). To this end, Mareddy (2017) vigorously supported the views that if environmental sustainability is not solved, it become practically impossible to achieve efficiency in the other pillars of sustainability (economic and social) because they are dependent to a greater extent on the environmental system. He maintained that economic growth and social dimension achieved in a way without taking into account the environmental concerns is sustainable in the long run (Mareddy, 2017). Little wonder therefore, climate change has been described as a cipher for a global ecological crisis that calls into question the long-term sustainability of existing economic trends, particularly those that concern energy production and consumption (Falkner, 2014).

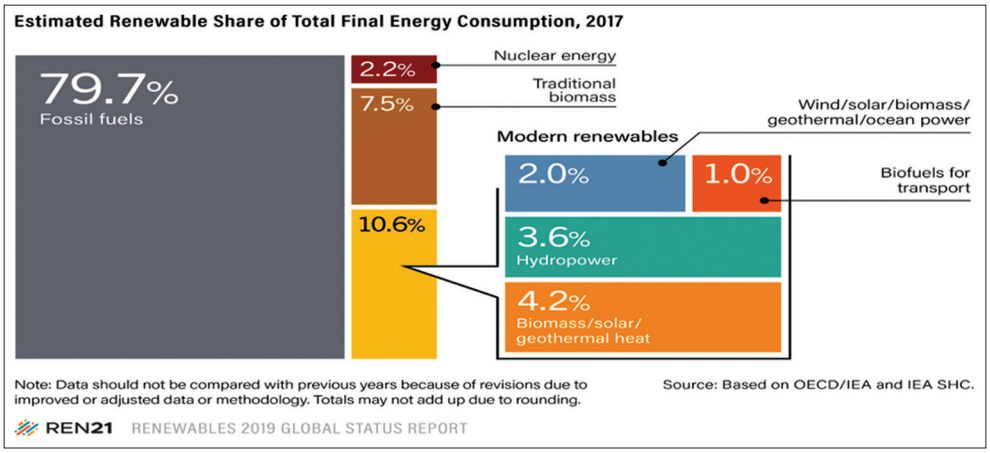
The economic dimension is an integral part of sustainability (Ganon, 2015). However, RED is an important motor of macroeconomic growth and development (safeguard and sustain resource) that profit cost savings to create long term sustainable values (Mareddy, 2017). Against this backdrop, economic systems need a redesigned to support sustainable energy (Pegels et al., 2018). Ultimately, attaining RED is critical to long term economic growth and protecting productivity to meet social and development needs of the society (Falkner, 2014). That explains the strong argument that RED needs careful integration of the three constituents, environmental, economic, and social needs in order to increase standard of living in the short term (Vera et al., 2005) and a net gain or equilibrium among human, natural, and economic resources to support future generations in the long term (Mareddy, 2017).

It is important to highlight the links between environment and social development in order to make development choices that will be economically efficient, socially equitable and responsible, and environmentally sound (Vera, 2005; Mareddy, 2017). The social dimension define sustainable energy as a prerequisite for the fulfilment of many basic human needs and services such as jobs, standard of living and equal opportunities and wellbeing by understanding what people need from the places they live and work. Sadly, the continue use energy to meet the basic needs and enhance standard of living without recourse to sustainable development has led to increase global ecological footprint. That said, social dimension is topical to sustainable development because it is closely linked with welfare, safety, equality, health and nutrition which is central to social and economic stability (Najam and Cleverland, 2003; Vera et al., 2005). RED emphasises renewable energy (solar, wind, hydropower, geothermal and biomass) which is environmental friendly (Pasqualetti, 2011) as opposed to non-renewable energy such as hydrocarbon, coal, oil, and natural gas which is fast depleting (Chu and Majumdar, 2012).

RED (solar energy, wind energy, geothermal energy, and tidal energy) offer long term and widely considered route for sustainable development (Nakicenovic, 2000; (Chu and Majumdar, 2012). It provides opportunity to address environmental, social and economic development including extending investment in basic energy access to more than 2 billion people worldwide who are currently unable to access the modern forms of energy (UN, 2018). Currently, 26.5% of the world's total energy is generated by renewable energy, including 16.4% from hydroelectric power plants, 5.6% from wind power plants, 2.2% from biomass plants and meagre 1.9% from solar power plants, and 0.4% from other renewable power plants (EEA, 2020). This is consistent to the data obtained from REN21 (2020) which shows that in 2017 global total final energy consumption as follows: fossil fuels 79.7%, modern renewables (wind/solar/biomass/geothermal/ocean power, biofuels and hydropower) 10.6%, nuclear energy 2.2% and traditional biomass 7.5% (see Figure 2 below). According to IEA (2019), RED is reshaping energy markets around the world, but there is still a long way to go. This prompts the argument by Kuzemko et al. (2016) that the question of production and use of energy is a subject worthy of critical examination to avoid any economic pitfall.

Environmental, social and economic development contribute to overall impact and strengthen social stability and increase the overall standard of living of the people (Vera et al., 2005). Nonetheless, environmental sustainability is concern with the rates

Figure 2: Global Renewable Energy Share



Source: Renewable Energy Policy Network for the 21st Century (2019, p. 31)

of renewable resource conservation, management and protection, to halt non-renewable resource depletion that has continued indefinitely (Mareddy, 2017). Obviously, this is congruent to the views expressed by Harich (2012) that if environmental sustainability cannot be continued indefinitely then they are not sustainable. Energy is crucial to the global economy, but Lockwood (2013) noted that energy intensity needs of modern economies are gradually failing, due mainly to poor policy implementation and/or the lack of political will to implement policy. Thus, development policy connotes that energy wasting practices must be directly replaced by a sustainable development model (Sovacool et al., 2016). In the current phase of global energy consumptions, there is over dependency on non-renewable energy at the expense of renewable energy which pose a huge question mark on the concept of energy sustainability (Pegels et al., 2017).

3. OPPORTUNITIES TO RED

Most industrialized countries are increasingly using legislation, policy guidance and institutional reform to drive RED (Hughes, 2012). For instance, deliberate carbon pricing and incentives to capture, promote and develop sustainable energy reflect the best policy (Rogge et al., 2017). In the US there are range of policy drivers to boost RED such as production tax credit and investment tax credit which make renewables even easier to implement from a cost perspective view. To achieve sustainable development without damaging climate system Sen and Ganguly (2017) argued that financial grants, subsidies and tax holidays can be used to incentivize corporations' capacity to invest in cleaner technologies.

The key policies that support RED are to encourage energy efficiency, remove associated barriers and accelerate the use of renewable energy to advanced sustainable development (Burke and Stephens, 2018). Crucially, Kuzemko et al. (2016) opined that RED can be achieved through policy and regulatory mechanism, technological innovation and transfer, international cooperation and removal of subsidies for conventional energy which represents key policy framework of the EU. Pegels et al. (2018) succinctly maintained that without appropriate and predictable energy policy, political rules and decisions it is hard to anticipate a long-term investment in energy. Impediments to RED require strategic policy to overcome otherwise the problems will persist, and make its realization almost certainly impossible (Rogge and Reichardt, 2016). The success or otherwise of energy policy and regulation require governments to play a proactive role (Kuzemko et al., 2016), seek international cooperation, collaborate with other organisations and coordinate with non-state actors to nurture a process of transformation to bring about change at the required scale and speed (Pegels et al., 2017).

In Germany, RED has changed so dramatically not least in terms of the sustainable energy growth as a result of political institutions, institutional governance, proper coordination and goal oriented relationship between policymakers and management (Wassermann et al., 2012; Kuzemko et al., 2016). Over the past decades, German green political support has been vital in underpinning RED governance decisions particularly in a bid to phase out nuclear power. Germany decision to exit the nuclear energy in 1991 and invest heavily in renewable energy technologies signal high degree shift of discretional with a long term policy framework on energy sustainability (Pegels et al., 2008). Subsequently, wind-power production capacity increased to 4,444 megawatts, up from 2,875 megawatts at the end of 1998. Little wonder that the progress achieved by Germany electricity towards renewable energies (Wassermann et al., 2012), largely hinged upon a policy design that promote research and development and coherent overarching policy which combined feed-in tariffs and priority access to the grid, as well as specific long-term expansion targets (Rogge et al., 2017). This is consistent with the views expressed by Kuzemko et al. (2016) that Germany and Denmark see renewable energy as the preferred form of policy direction to manage renewable generation that is pivotal to energy sustainability (Wassermann et al., 2012).

Governments around the world are instituting policies aimed at increasing RED that mandate a certain percentage of energy from renewable sources and corporations are making a difference too, purchasing record amount of renewable power in 2018 (Nunez, 2019; REN21, 2020). In 2008, the UK government adopted the Climate Change Act, regarded as ground-breaking piece of legislation designed for energy efficiency and renewable energy that emphasizes energy sustainability. Wind and solar energy achieved a 5% of renewable energy to electricity reaching a 30%, consequently indicate that renewables contribute to a sizeable part of the UK electricity mix. As a result of increase renewable generation, the UK low carbon electricity generation increased to a record high of 56% in the third quarter of 2018, compare to 54% during the same period of 2017, due to increased renewables generation (EEA, 2020). Overall, 20% of the UK electricity comes from renewable energy but struggle to make any impact on greenhouse gases. Compare to the rest of the EU, UK still has the lowest consumption rate of renewable energy of 8.2% which indicate a woeful 24th place out of 28 position ahead of last place Luxemburg with 5%. Sweden has the highest from renewable sources in 2015 in EU with 54%, Finland 40% and Latvia 39% (EEA, 2020). The energy intensity of the world's industrialized economies has been declining steadily at an average annual rate of 1.1%, while the energy intensity of the non-OECD economies has been declining, on average, even faster (IEA 2019).

RED is an indicator of economic efficiency, environmental efficiency and social efficiency (Vera et al., 2005). Non-renewable energy (coal, oil and natural gas) account for approximately 80% of world primary energy consumption, whereas in 2013 renewable energy (nuclear, hydropower, biomass, wind and solar power) accounted for just 22% of the global energy mix, up from 21% in 2012 and 18% in 2007 respectively. Only a fraction, about 10% of total global energy in use is generated from renewable energy sources because many of them (solar, wind, biomass, geothermal and hydropower) are currently expensive to harness (Nunez, 2019). Accordingly, renewables made up 26.2% of global electricity generation in 2018 (IEA 2019). Non-renewable energy has dominated the world's energy mix for decades and expected to remain so for some time (Lockwood, 2013; UN 2018). Conversely, the IEA (2014) projected that renewable energy could account for over a quarter of global electricity generation by 2020 owing to the rapid deployment of wind and solar energy, as well as new hydro in Germany and Demark. Overwhelmingly, the somewhat

technological gained has not ameliorated the global energy options, but the global community must continue to push for RED (Chu and Majumdar, 2012; Roy et al., 2017).

The US, China and Germany are the leading wind energy producers in the world (Pasqualetti, 2011). Cumulative wind capacity around the world from 2001 to 2017 increased to more than 539,000 megawatts from 23,900 mw, over 22 fold (Nunez, 2019;). Meanwhile, 11% of energy consumed across sectors in the US in 2018 was from renewable sources and 17.1% of US electricity generated in 2018 was from renewables, but expected to rise to 24% by 2030 (IEA, 2019). Similarly, Brazil renewable energy sources with 81.9% installed capacity represent 87.8% of the country›s total production in 2018, water was the highest source of energy with 63.7% of total energy produced. This call for a sustained collaboration between development agencies and government for domestic policies and broader policy on environment for finance and lending for renewable energy to promote sustainable energy (Pegels et al., 2017). Historically, majority of energy finance loan for developing countries of Sub-Saharan and Asia (Brazil, Ghana, Indian, and Nigeria) are for large scale fossil fuel, natural gas and tradition energy infrastructure projects with little funding committed to renewable energy technologies (Jefferson, 2000).

According to Sen and Ganguly (2017) renewable energy technologies are growing continuously and being deployed rapidly, though it share of global energy consumption is significantly marginal. Historically, technological innovations are the main drivers of change (Pegels et al., 2018), and governance is greatly important in distributing the benefits of new technologies more broadly across society (Kuzemko et al., 2016). Technologies hold great promises to energy sustainability and their deployment is not occurring well enough to spur development and transform the pace of renewable energy. While new technologies hold great promises (Jefferson, 2000), it is important to capture the complex dynamic between energy technology and energy use (Roy et al., 2017). But their development and diffusion is not occurring quickly enough or at a large enough scale to meet the challenge of sustainability (Jefferson, 2000). There should be deliberate attempts by governance to create rules, incentives, institution and political interventions such as feed-in tariffs for renewable energy to drive energy sustainability through technological innovation because governance is at the heart of sustainable energy (Bhattacharyya, 2017). RED technology is not a single isolated invention but like a “genre” of invention (Roy et al., 2017). Renewable technologies are specifically tailored to the resource endowments needs (Jefferson, 2000) that makes technological choice an important decision with long-term lock-in consequences. Thus, he postulated that the emergence of new technologies makes it possible to introduce new rungs on the energy ladder and to gain even greater efficiencies and environmental acceptability.

The transformation towards energy sustainability is a profound renovation of environmental, economic and social structures as well as technological, policy and institutional governance (Pegels et al., 2017) which is central, sufficiently canvassed and well documented in this paper. Hence, Rogge et al. (2017) argued that transformation can be understood as dynamic processes of structural change in the way energy is produced and used, and have historically taken place over long time horizons. Technology assumed that costs could be brought down beyond a certain threshold, the adoption of alternative or improved sustainable energy technology would become self-sustaining (Roy et al., 2017).

There is a paradigm that emphasizes reliance on markets supported by technology which encourages private sector participation, competition, and market-led innovation to provide energy services at lower cost (Anderson, 2000), with regulation designed mainly to promote and protect market entry opportunities along with financial sustainability (Cunningham, 2017). However, conflict is often rife with technological development with economic rivals disputing the course of development and resistance coming from those on whom the costs of change are to be imposed (lost jobs, regional decline and environmental externalities) (Kuzemko et al., 2016). Realistically, technological innovation, market instruments and managerial perfection is fundamental to achieving sustainability, but empirical experience reveals there are limitations to such approaches. Another emerging paradigm in the past decade is the focus on technology at the detriment of other important social, cultural, political, and behavioural factors (Gunningham, 2017). However, Anderson (2000) argued that beyond technologies, patterns of development, structural economic shifts, population growth, and lifestyle choices have a profound impact on sustainable energy development. At the same time, there is growing recognition that energy transformation must ultimately be market-led, so much more that the requisite capital flows necessary can be found in the private sector.

4. OTHER OPPORTUNITIEES TO RED

Other opportunities of RED can be conceptualize from the perspective of the European Union (EU) energy policy thrust. The EU Emissions Trading System (EU-ETS) and policy framework provides roadmap towards sustainable energy, and more importantly reinforces climate diplomacy (Youngs, 2017). The climate and energy policy strategy of the EU are very ambitious with a binding renewable energy target for 2030 of at least 32% of final energy consumption that promise to strengthen its presence in global energy policies. Nonetheless, Pegels et al., (2018) succinctly maintained that EU-ETS demonstrates sturdy political raft in the context of highly developed government capacities in global climate and energy policies. Interestingly, the ghosts of the Copenhagen summit have been laid to rest. The original target of at least 27% set in 2014 was revised upwards in 2018 as follows: at least 40% cuts in greenhouse gas emissions, 32% share for renewable energy and at least 32.5% improvement in energy efficiency (EEA, 2020). The review to at least 40% is to enable EU move towards a low carbon economy and implement its international commitments under the Paris Agreement for which the US who hitherto a signatory pulled out of the deal. However, the lack of progress in the transport sector in EU limit the chances to achieve the 2020 target on renewable energy and energy efficiency (REN21, 2019).

The share of renewable energy sources in gross final energy consumption of EU increased from 16.7 % in 2015 to 17.6 % in

2017, and increased further to 18.0 % in 2018 (EEA, 2020). The EU is a "sui generis" actor in energy policy that relies heavily on a regulatory approach to energy questions (Youngs, 2017). RED scenarios are designed to offer policy guidance on managing, for example, an orderly transition from today's energy system, which relies heavily on fossil fuels, towards a more compatible sustainable development (Goldemberg et al., 1998). EU regulations require Member States to develop long term strategies to ensure affordable energy for consumers, low carbon economy, increase security of energy supplies, reduce dependence on energy imports, create new opportunities for economic growth, environmental and health benefits.

5. BARRIERS TO RED

There are some policy barriers and setbacks to RED that impede transfer of technology (Rogge et al., 2017), which are often the case in developing countries, particularly in sub-Saharan African and Asia. Curiously, however, energy policy is fragmented, highly politicised, complex and inconsistent in many countries because the state has not participated actively and strategically (Bhattacharyya, 2017). Thus, IEA (2019) noted that market conditions including proximity to demand and resources availability, policy decisions, country specific regulations and financial support are also some of the factors that militate against RED. More profoundly, Pegels et al. (2017) noted that the political will is lagging far behind from the central government particularly in developing countries to champion the needed reform. There is somewhat inherently weak and poor political and institutional governance that debase the opportunity to strive in a manner that affect RED (Rogge and Reichardt, 2016). Nonetheless, it has long been recognised by political scientists that policy change is a process that will evolve over time (Lockwood, 2013). Consequently, Sovacool et al. (2016) clearly opined that policy discussions reflect a frustration with both the slow pace of development and political dimension.

Ehresman and Okereke (2015) argued that lack of coordination and political will at national, regional and international levels have been a major obstacles since the 1980s when the first climate change agreement was initiated. Furthermore, the Paris Agreement negotiated in 2016 was hailed at a time as a landmark agreement to support the UNFCCC initiative to promote and decarbonise the global energy system (Rogge et al., 2017). Unfortunately, the USA pulled out of the Agreement during its implementations claiming it was a bad deal.

It is within the historical complexity of the global energy politics such as the US action on the Paris Agreement and the EU backtracking that RED dilemma exists. Simply put that the crisis currently brewing between the US and Iran on the nuclear deal hinges around the global energy politics which is detrimental to RED. Explanations on the role of global energy politics has been deeply enmeshed in a slow rate of progress to date, however there continue to be less political will and little political space to attempt a robust solution (Lockwood, 2013). There is also the problem of securing politically sustainable policy change in the case of public interest reform entrenched in the underlying policy problem (Falkner, 2014). Moreover, it has long been recognised in political science that policy change is a process over time (Lockwood, 2013), crucially including an implementation phase post-adoption. Consequently, Lockwood (2013) question the role of policy makers and bureaucrats to implement policy in a manner it was intended, without being distorted or undermined by the interests of those bureaucrats and politicians, instead, prefer to concentrate on the easy form of energy.

Lorenzoni et al. (2008) contended that there is emerging evidence of lack of robust political will and leadership failure in national, regional and international policy making. Accordingly, Lorenzoni et al. (2008) maintained that there is a divergent views about national government's weak positioning and emerging global concern which affirm that the prospect of RED is a mirage. Falkner (2014) noted that the concept of environmental governance, denotes the diverse and complex institutional arrangements have been created at the global level, (examples, UNFCCC, Kyoto Protocol, Sustainable Development Goals) in order to steer human societies in the direction of greater sustainable development. That is why the sustainable energy policy debates is anchored on RED, innovative technology, access to energy, political reform and institutional and governance (Chen, 2008; Anex, 2000). Regrettably, there is no serious explanation on how the existing institutional governance and policy guidelines can be improved upon to tackle the problem head-on (Falkner, 2014).

The profound shift in energy governance have been going on for decades (Bluhdorn and Welsh, 2007), hence the focus on subsidies for renewable. Unfortunately, the broader structure of the energy market has not changed (Youngs, 2017), current level of green energy sit idle and unable to get into the grid (Helm, 2011). Basically, the Europe's grid cannot absorb sufficient amount of renewable generated power to meet the EU's target (Youngs, 2017; EEA, 2020). However, the push by most EU nations for low carbon-neutral by 2050 was abandoned in June 2019 in Brussels after a fierce resistance from Poland, Czech Republic, Hungary and Estonia (East European countries). Poland lead the opposition to ensure a transition to a climate-neutral EU by 2050, with support from the Czech Republic and Hungary because Poland derive 80% of its electricity from coal. There was also a non-committal stance from Estonia in addition to three and half states which lead to the scrap of 2050 emission target commitment.

A sustainable energy future may be out of reach because leading economies like the US, Canada and China have no clear energy policy strategies. RED is more deliberate and intentional than a practice (Sovacool et al., 2016) and the policy that regulate the way energy is produced and use affect the economy (Bluhdorn and Welsh, 2007). The EU seems to have a clear futuristic policy and guidelines on energy consumption, sustainability and climate change (Lockwoiod, 2013). In fact, RED is dynamic and a complex process, centred on deliberate energy policy and technological innovation that have the capability to contribute to sustainable development (Pegels et al., 2018). Little wonder that institution such as the EU have better policies framework that promote RED within a wider context of global energy politics driven by technologies, innovation, incentives and governance (Lockwood, 2013).

6. OTHER BARRIERS TO RED

Other challenges to RED include competition from fossil fuels, lack of investment in renewable energy, fewer subsidies compared to traditional fuel and high initial capital investment amongst others. Statistics from the REN21 (2019) revealed that in 2017 alone global subsidies in place in at least 115 countries for fossil fuel consumption was $300 billion representing 11% ($270 billion) compare to the previous year, this amount doubled the estimated support for renewable energy. This prompted the action of the EU to prescribe policies on energy that promote new innovations, rather than questioning the political and institutional conditions that make the adoption of sustainability policies likely within certain contexts (Kuzemko et al., 2016). Furthermore, Rogge et al. (2017) argued that the industrial economies of US and China have for a long time been locked into fossil fuels based energy through a process of technological and institutional co-evolution that may not change sooner, ultimately driven by path dependent increasing return to scale.

Curiously, however, RED presents significant obstacles of varying degree including lock-in into high carbon (Roy et al., 2017), as well as path dependencies and resistance to change that require strategic policy to overcome (Rogge et al., 2017). The current path of energy development which emphasizes non-renewable energy which largely involve the use of petrol, kerosene and diesel are key elements that threatened renewables. But Falkner (2014) succinctly affirmed that if the 20th century was about energy, then the 21st century could very well be about energy governance and management. Whereas the absence of appropriate global governance undoubtedly pose a significant barrier (Savacool et al., 2016). Accordingly, Kuzemko et al. (2016) expressed deep concern about limited application of governance with emphasis on enabling niche, but noted that there is too little policy to influence any change in sustainable energy.

The threat of disruptive climate change and lack of clear cut policy and institutional governance in most developing countries has thrown the spotlight on the central role in shaping the future relationship between human society and its natural environment. Threats to energy security and sustainability include war, conflicts, sabotage and political instability endemic in most developing countries (Middle East, Africa, Asia and South America). The manipulation of energy supplies, competition over energy sources, attacks on supply infrastructure, sanction, terrorism, technological transfer and innovation, energy conservation and efficiency, constitute a serious threat to RED.

Technologies are constantly improving and occurring but not wide enough basis, and not at a rapidly developing pace to match the scale of challenges. This is in addition to such actions where government delegated too much responsibilities to the extent that they have little or no authority to meet legally binding target. The market liberal ideas and institutions suggest there is limited role for the state in a manner that negatively influences energy policy. For example, German, India and China still depend heavily and promote coal as a form of energy (Kuzemko et al., 2016), but coal as a source of energy from India and China constitute a threat to energy sustainability. Moreover, German coal industry still employs a significant number of people which has help to slow the attainment of energy sustainability (Kuzemko et al., 2016). Besides barriers posed by coal, there are also a broader coalitions such as fragmented policy, technology and governance that continue to mount sustained attacks on energy sustainability.

7. CONCLUSION

The key issues in this paper is the development pattern that relate to energy conservation, opportunities and barriers that affect RED. Sustainable energy is complex because of the economic conditions of different countries particularly in developing countries which can be overcome through strategic energy policy and framework. The reality is that we are in an era of bounded rationality where policy is immensely central, institutional governance and technological innovation are key driver where energy paradigm is brought to consciousness to reflect national, regional and international perspectives. For such a shift to occur, the RED debate need to move to the international stage, accompanied by much higher commitment, financial support and public awareness.

If global awareness and support is not forthcoming, it may be impossible to implement many of the policies discussed in this paper. There is, therefore, the need for a new narrative within a wider context that include energy supply security and social and economic development, often informed by geopolitical ideas. Finally, there is not yet a widely shared sense of urgency in the face of lack of competitive actions that require a major reorientation mainly in developing countries to RED in all areas of social, economic and political decision, increase political awareness and improve policy consistency.

REFERENCES

Afgan, N.H. (2010), Sustainability paradigm: Intelligent energy system. Sustainability Journal, 2(12), 3812-3830.

Anderson, D. (2000), Energy and economic prosperity. In: World Energy Assessment: Energy and the Challenge of Sustainability. New York: UNDP Bureau for Development Policy. p393-409.

Bhattacharyya, S.C. (2017), Energy access and development. In: Andreas Goldthau: The Handbook of Global Energy Policy. Hoboken, New Jersey: Wiley Blackwell. p225-227.

Bluhdorn, I., Welsh, I. (2007), Eco-politics beyond the paradigm of sustainability: A conceptual framework and research agenda. Environmental Politics, 16(2), 185-205.

Burke, M.J., Stephens, J.C. (2018), Political power and renewable energy futures: A critical review. Energy Research and Social Science, 35, 78-93.

Chu, S., Majumdar, A. (2012), Opportunities and Challenges for a Sustainable Energy Future. Vol. 488. Equitable Building, New York: Macmillan Publishers Ltd., p294-303.

Daly, H., Farley, J. (2011), Ecological Economics. 2nd ed. Washington, DC: Island Press.

Ehresman, T.G., Okereke, C. (2015), Environmental justice and conceptions of the green economy. International Environmental Agreements: Politics, Law and Economics, 15(1), 1327.

European Environment Agency. (2020), Share of Renewable Energy in Gross Final Energy Consumption in Europe. Available from:

https://www.eea.europa.eu/data-and-maps/indicators/renewable-gross-final-energy-consumption-4/assessment-4. [Last assessed on 2020 Mar 01].

Falkner, R. (2014), Global environmental politics and energy: Mapping the research agenda. Energy Research and Social, 1, 188-197.

Gannon, P., Anderson, A., Spengler, J.W., Plumb, C. (2015), Exploring Contemporary Issues in Sustainable Energy. 122nd ASEE Annual Conference and Exposition, June 14-17.

Ghosh, N. (2008), The Road from Economic Growth to Sustainable Development: How was it Traversed? Chakala, Mumbai: Takshashila Academia of Economic Research Ltd. p1-18.

Goldemberg, J. (2000), Rural energy in developing countries. In: World Energy Assessment: Energy and the Challenge of Sustainability. New York: UNDP Bureau for Development Policy. p367-384.

Gunningham, N. (2017), Regulation, economic instruments and sustainable energy. In: Andreas Goldthau: The Handbook of Global Energy Policy. Hoboken, New Jersey: Wiley Blackwell. p305-321.

Harich, J. (2010), Change resistance as the crux of the environmental sustainability problem. System Dynamics Review, 26(1), 35-72.

Harich, J., Bangerter, P., Durlacher, S. (2012), Solving the Sustainability Problem with Root Cause Analysis. Ecosystem Services Partnership Conference, Portland, Oregon US, July 31 to August 4.

Helm, D. (2011), What next for EU energy policy? In: Barysch, K. Green, Safe, Cheap: Where Next for EU Energy Policy? London: Centre for European Reform.

Hess, D.J. (2014), Sustainability transitions: A political coalition perspective. Research Policy, 43, 278-283.

Hughes, D. (2012), The Energy Sustainability Dilemma: Powering the Future in a Finite World. New York: Cornell University Ithaca.

International Energy Agency. (2014), Renewable Energy Market Report. Available from: https://www.evwind.es/2014/08/28/international-energy-agency-iea-renewable-energy-market-report/47154. [Last assessed on 2020 Feb 15].

International Energy Agency. (2019), World Energy Outlook: The Gold Standard of Energy Analysis. Available from: https://www.iea.org/topics/world-energy-outlook. [Last accessed on 2020 Mar 02].

Jefferson, M. (2000), Energy policies for sustainable development. In: World Energy Assessment: Energy and the Challenge of Sustainability. New York: UNDP Bureau for Development Policy. p415-447.

Kuzdmko, C., Lockwood, M., Mitchell, C., Hoggett, R. (2016), Governing for sustainable energy system change: Politics, contexts and contingency. Energy Research and Social Science, 12, 96-105.

Lockwood, M. (2013), The political sustainability of climate policy: The case of the UK climate change act. Global Environmental Change, 23, 1339-1348.

Lorenzoni, I., O'Riordan, T., Pidgeon, N. (2008), Hot air and cold feet: The UK response to climate change. In: Compston, H., Bailey, I., editors. turning Down the Heat: The Politics of Climate Policy in Affluent Democracies. London: Palgrave Macmillan.

Mareddy, A.R. (2017), A. Environmental Impact Assessment: Theory and Practice. Butterworth-Heinemann. Oxford, United Kingdom: Elsevier.

Martinex, A., Valero, S., Senabre, C., Velasco, E. (2016), Sustainability as a Paradigm of Energy Policy. International Conference on Renewable Energies and Power Quality (ICREPQ'16). Madrid (Spain), 4th to 6th May.

Najam, A., Cleveland, C.J. (2003), Energy and sustainable development at global environmental summits: An evolving agenda. Environment, Development and Sustainability 5, 117-138.

Nakicenovic, N. (2000), Energy scenarios. In: World Energy Assessment: Energy and the Challenge of Sustainability. New York: UNDP Bureau for Development Policy. p333-364.

Nunez, C. (2019), Renewable Energy Explained. National Geographic. Available from: https://www.nationalgeographic.com/environment/energy/reference/renewable-energy. [Last assessed on 2020 Feb 03].

Pasqualetti, M.J. (2011), Social barriers to renewable energy landscapes. The Geographical Review, 101(2), 201-223.

Pegels, A., Vidican-Auktor, G., Lutkenhorst, W., Altenburg, T. (2018), Politics of green energy policy. Journal of Environment and Development, 27(1), 26-45.

Raza, W., Saula, H., Islam, S.U., Ayub, M., Saleem, M., Raza, N. (2015), Renewable energy resources current status and barriers in their adaptation for Pakistan. Journal of Bioprocessing and Chemical Engineering, 3(3), 1-9.

Renewable Energy Policy Network for the 21st Century. (2019): Renewables 2019 Global Status Report. Available from: https://www.ren21.net/gsr-2019/chapters/chapter_01/chapter_01. [Last assessed on 2020 Jan 05].

Rogge, K.S., Kern, F., Howlett, M. (2017), Conceptual and empirical advances in analysing policy mixes for energy transitions. Energy Research and Social Sciences, 33, 1-10.

Rogge, K.S., Reichardt, K. (2016), Policy mixes for sustainability transitions: An extended concept and framework for analysis. Research Policy, 45, 1620-1635.

Roy, J., Dasgupta, S., Chakravarty, D. (2017), Energy efficiency: Technology, behaviour and development. In: Andreas Goldthau: The Handbook of Global Energy Policy. Hoboken, New Jersey: Wiley Blackwell. p282-302.

Sen, S., Ganguly, S. (2017), Opportunities, barriers and issues with renewable energy development a discussion. Renewable and Sustainable Energy Reviews, 69, 1170-1181.

Sovacool, B.K., Bazilian, M., Toman, M. (2016), Paradigms and poverty in global energy policy: Research needs for achieving universal energy access. Environmental Research Letters, 11(6), 1-6.

UNDP. (2000), World Energy Assessment: Energy and the Challenge of Sustainability. New York: United Nations Development Programme.

United Nations. (2018), Shaping our Future Together. Available from: http://www.un.org/en/sections/issues-depth/population/index.html. [Last assessed on 2019 Dec 12].

Vanderheiden, S. (2011), The politics of energy: An introduction. Environmental Politics, Routledge Taylor and Francis Group, 20(5), 607-616.

Vera, I.A, Langlois, L.M., Rogner, H.H., Jalal, A.I., Toth, F.L. (2005), Indicators for sustainable energy development: An initiative by the International Atomic Energy Agency. Natural Resources Forum, 29, 274-283.

Wassermann, S., Hauser, W., Klann, U., Nienhaus, K., Regg, M., Rhiel, B., Roloff, N., Weimer-Jehle, W. (2012), Renewable Energy Policies in Germany: Analysis of Actors and New Business Models as a Reaction to the Redesign and Adjustment of Policy Instruments.

Youngs, R. (2017), The EU's global climate and energy policies: Gathering or losing momentum? In: Andreas Goldthau: The Handbook of Global Energy Policy. Hoboken, New Jersey: Wiley Blackwell. p421-434.