



Energy Reforms in the Developing world: Sustainable Development Compromised?

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ABSTRACT

Energy sector reforms with an emphasis on electricity growth have been taking place extensively and rapidly worldwide. Particularly, motivated chiefly by classical economics' standpoint of efficiency and market considerations, reforms have been made in the developed North. Models of reforms in the North have in turn been replicated in developing countries. However, questions arise as to whether the models used are suitable for the mostly rural and socioeconomically disadvantaged economies in the South. It is argued in this paper that a sustainability focused mode of reforms guided by futures studies is needed for such economies. Reforms taking place in Kenya and neighbouring countries are in particular examined from a sustainable future perspective; and appropriate improvements and further research are recommended.

Keywords:

Sustainable growth; electricity reforms; energy future; developing economies; Kenya;

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1. Introduction

Development growth and human prosperity are heavily dependent on adequate supply, security, and efficient use of energy. With the growth, there is an ever rising demand for energy and challenges of ensuring adequate resources of the energy. Equally important is the need to ensure that the energy is obtained and used responsibly with low or minimal impacts on lives and nature. Progress in general therefore makes it necessary to constantly reform energy sectors in an effort to meet the energy demand and challenges. The oil shocks of the 1970s, which brought about unprecedented threats to energy security worldwide, are a particular example of challenges that can be faced. The challenge of oil shocks was in fact so critical that it forced a worldwide re-evaluation of the dependency on fossil fuels as a dominant energy source. Similarly, concern for environmental degradation and climate change arising from use of fossil fuels, has been another challenge

forcing search for alternative energy options from the late 1970s.

Electricity being the most versatile, efficient, and widely used form of energy has so far been given greatest attention in energy reforms. Therefore, electricity reforms have been almost synonymous with energy reforms, and for this reason approaches to electric power reforms are of particular interest in this paper. For decades, debate has been going on in respect of approaches and impacts of electricity supply industry reforms that have been taking place since the 1980s (see, for example, Pollitt [1], UNECA and UNEP [2], and Wamukonya [3]). As noted by Williams and Ghanadan [4], a major contention has been the applicability of models of reforms that are basically driven by economics, without sufficient attention to other critically important dimensions of inclusive development. The development envisaged here is one that is essential for sustainable growth of economies, especially for developing countries. Specifically, the

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reforms being undertaken need to satisfy the requirements of sustainable development, which according to Drummond and Marsden [5], Davidson [6], Holling [7], and Roseland [8], balances economic, social, and environmental interests of economies.

For developing countries, economic growth is undoubtedly of great importance as it is for developed economies. Electricity reforms specifically targeting the economic dimension of development are therefore of special significance for industrialized and non-industrialized countries. However, it should be borne in mind that poverty, uneven distribution of national income, and other social ills are some of the challenges facing developing countries that require critical attention alongside economic pursuits. For example, in comparison to affluent urban populations, rural and poor urban residents suffer high poverty levels and overpopulation ([9], [10] and [11]) Reforms need to recognize and make provision for such social imbalances; and social considerations that are important in institutional structuring need to be taken into account (see e.g. Roy [12], Helm [13, Reddy [45], and Dubash [14]). Reforms in energy sectors require not only technological (economic) transformations but also institutional restructuring that take into full account social inclusion, as pointed out by Hvelplund and Lund [15]. In addition, the technological innovations that take place in the reforms should fully cater for present and long term (future) social needs ([16] and [17]).

From the works of Byrne and Mun [18], Bouille *et al.* [19], and Florio and Florio [20] among others, early power sector reforms largely ignored the considerable electricity supply related environmental degradation. This is despite the increasing environmental impacts associated with dominant fossil fuel and nuclear power generation. Interest in the use of renewable energy and energy efficiency technologies which could reduce environmental degradation was secondary to the pursuit of economic efficiency—achievable by use of any technologies regardless of environmental consequences. Most notably, in developed economies there was wide availability of non-renewable resources like coal. This made it very attractive financially to generate power with non-renewable technologies. Following the same trend, fossil-fuel technologies were used to a large extent in developing countries as part of reforms that were replicated from the developed world {see e.g. Karkia *et al.* [21], Reddy [22] and Mwasumbi and

Tzoneva [23]}. The replication was done notwithstanding the fact that fossil-fuel resources have to be imported in most developing economies. The relatively high abundance of renewable energy resources in the economies was also not taken into account.

As energy reforms with a sustainable development focus are considered, it is important to bear in mind that the development is concerned about inter-generational equity. Therefore, the reforms like the development need to be informed by a futures philosophy. This derives from the Brundtland Commission Report (WCED [24]) conception of sustainable development, which was supported by among others Simon [25], Mebratu [26] and Jabareen [27]. According to the conception, sustainable development ensures that the needs of present generations are met without compromising the ability of future generations to meet their own needs. From this standpoint, a futures pathway is important for guiding energy sector reforms. Taking this into account, futures studies would be especially useful for the energy reforms. It is noted by Futures scholars including Bell [28] and Inayatullah [29]), and Wangel [30] that the studies systematically explore probable and desirable future positions and pathways from the present to those positions. Other Futures analysts like Dreborg [31], and Vergragt and Quist [33] see sustainable development as an optimum form of development for the world, and in particular for under-developed societies.

Initial electricity reforms models were largely designed with industrialized economies in mind; and the countries that pioneered in the reforms include England and Wales, some states in the USA, and Norway. Chile which is a developing country was also a pioneer and stands out among the early reformers [34]. The most common models entailed restructuring power sectors through vertical and horizontal unbundling, takeover of some or all the unbundled units by the private sector, deregulation, and encouraging competition among players in the sector. From an economics perspective, reforms that were undertaken had generally positive impacts in industrialized countries; including freedom of choice of suppliers, and better overall quality of services [35].

On the other hand, the dominant models were introduced to developing nations and some countries in transition, mostly by the World Bank as part of their

power sectors strengthening strategies. The main objectives of reforms in these countries were to tackle poor management of power utilities, contain perverse shortages of investment that led to severe power shortages and poor infrastructure maintenance, and address failure to recover costs arising from electricity under-pricing [36]. As such, the reforms were broadly aimed at improvement of economic performance, and at the inception of first reforms economic efficiency was uppermost in the reform agenda. Issues like social and environmental wellbeing that are key for sustainable development in low income developing countries were not given much attention [37].

Resulting from the reforms that were applied in developing countries there were indeed recorded gains in efficiency of operations and financial soundness of some power utilities; and in a few cases electricity access expansion was realized as part of a social equity goal [38]. However, at the same time there were significant negative impacts. As Mebratu and Wamukonya [39] and UNECA and UNEP [40] observe, the latter impacts included deterioration of socio-economic conditions through: 1) Raising of prices and making power increasingly unaffordable to large sections of populations which are made up of the poor, 2) Focusing more attention on urban power supplies and not giving necessary priority to electricity access to rural areas where majority of people in developing countries live 3) Job losses for power utility employees, 4) Increase in the use of power generation plants running on fossil fuels with resulting increases in greenhouse gas emissions.

Overall, the people most affected by the adverse consequences of the reforms were the dominant populations in developing countries –largely made up of the poor in rural areas and economically deprived urban dwellers. Similarly, it was recognized that social factors require attention in developed economies' energy sector reforms. For example, studies by Lund and Hvelplund [41] have underscored the need for employment creation as a social contribution to economic reforms taking place in developed world energy sectors. Therefore, for all countries involved in electricity reforms, and particularly in developing economies, it became evident that the initial approach to reforms had to be reconsidered. Factors other than economics, including to a large extent social considerations, were given more weight in later versions of reforms.

One critical aspect of electricity supply policy that could ensure social inclusion is the design of electricity tariffs at end-user (retail) and bulk supply (generation or transmission) levels. This is as shown in studies by e.g. Cecelski *et al.* [42], Waddle [43], and Cunha J. and P. Pereira [44]. The tariffs need social protection mechanisms that could cushion poorer members of society from pricing that makes electricity unaffordable to the members. To achieve the protection, tariff levels should not be left entirely to market forces as expected in full liberalization that comes from ideal electricity reforms. In this scenario, a regulator is needed for regulation of the tariffs. Such regulators have been increasingly established as part of energy reforms undertaken by national governments or sub-national governments especially in developing countries (see e.g. Rygg-[45] and Bouille *et al.* [46])

An extensive examination of the wide subject of electricity reforms is outside the scope of this paper. The focus here is on those aspects of the reforms having a bearing on the development of energy that could improve the socio-economic conditions of the large populations in rural and poverty-laden urban areas, particularly with regard to provision of electricity to the populations. Towards this end, Kenya has been selected for study, and the main questions that will be addressed by the paper are: 1) *Do electricity supply industry reforms and energy policies guiding the reforms in Kenya give due recognition to importance of energy provision for sustainable development?*, and 2) *What elements of reform require strengthening for enhancement of sustainability?*. It is recognized that electrification leading to sustainable development can only succeed when undertaken as part of integrated energy growth, including non-electrical forms of sustainable energy. Therefore sustainable rural energization (holistic provision of energy), where electrification is a major component, is the broad vision targeted by this paper.

Case study evidence that is examined in the paper is especially drawn from Kenya, and partial evidence is obtained for comparison purposes from Tanzania, Rwanda and Malawi. These countries were selected by purposive sampling to fit in with other work that the main author of the paper did in Africa. Through a qualitative approach, the evidence was collected and analyzed during field research that the author undertook. The research was mainly carried out in the indicated

east-central African countries; and it involved data obtained from a broad spectrum of stakeholders including actors involved in policy, commercial, professional, research, and community development. Personal interviews were the main means for data acquisition, and further data was obtained through text analysis from academic and grey literature, as well as from other information dissemination sources.

Based on an interpretive research approach, the data collection and analyses were informed by a desire to avoid reductionism as much as possible, and attain wholeness generally targeted by the interpretive research tradition. Quantification as used widely in reductionistic methods has therefore been largely circumvented. By keeping the size of the unit of analysis small it has been possible to carry out valid qualitative evaluations without the aid of quantitative methods.

2. Why Rethinking of Reforms and Rural Electrification is Imperative

For a clearer understanding of why a new approach to reforms in developing countries is needed, and the key role of rural electrification in the required reforms, three main theoretical perspectives are examined: Institutional change for economic enhancement, incorporation of social and environmental elements in reforms for balanced development, and fostering sustainable development through appropriate rural electrification. A futures study perspective for energy policies that could support suitable electricity reforms is also considered.

2.1. Institutional Change for Economic Enhancement

The primary goal of the institutional transformation behind the reforms was a gearing up of economic or productive efficiency within the electricity sectors. Following Newbery [47], in the developed economies, the need for raising the level of efficiency was acutely felt in the wake of the oil crises of the 1970s. As a result of the crises, there were huge increases in energy prices and there was requirement for better deployment of the excess capacity that was invested in fossil fuel facilities. At the time, the electricity supply industry was dominated by vertically integrated state-controlled utilities, the performance of which was increasingly found wanting. The same arguments apply to developing nations, where the power industry was fashioned along the lines of the industrialized counterparts. However, in addition to the problems

faced in the advanced economies, utilities in developing countries faced problems of outright mismanagement; shortage of investments for system expansion, operations and maintenance; and uneconomic pricing of electricity leading to under-recovery of costs and shortage of revenue.

From an economics theory point of view, it was reckoned that necessary reforms in the power sectors could be achieved through privatization, competition and regulation; as noted by among others, Dubash [48], Byrne and Mun [49], and Florio and Florio [50]. By privatizing power utilities, it was expected that among other improvements private sector level of discipline would be introduced, dependence of the utilities on public funding would be removed, political controls would be minimized, and electricity users would have greater freedom of choice of suppliers. Furthermore, competition would increase efficiency by providing incentives for better performance and survival in the market, and a clear beneficiary of the competition would be the electricity user through better prices and quality of services.

Overall, efficiencies in the power sectors would be stepped up by enhanced regulation, as better standards and quality of power supply would be formulated and enforced by regulators. This would be especially important due to entry into the sectors of a greater number of players, and more diversified interests among the players. Regulation would be particularly necessary for two groups of players: power utilities and electricity consumers. While on one hand power utilities would require regulatory protection for their large and sunken investments, and would need guarantees of fair competition; on the other hand electricity users would require fair pricing, quality of services assurance, and a general first line of electricity related arbitration.

It is from the above ideals that electricity reforms models were designed, and the models were applied across the board in most countries, starting with the industrialized ones, and then with little modification to countries in transition and developing ones. It is easily understandable that the reforms worked well in the industrialized economies, as the advanced level of market dynamics there could easily fit in with models that are narrowly focused on free market principles. The reality is however different in developing countries, where public interest is still way above private interest. This is why in most African countries, and generally in developing countries, no single case of electricity reforms has been fully implemented according to this model [3].

2.2. Incorporation of Social and Environmental Elements

In most developing countries, public interest is synonymous with the welfare of the majority who are generally poor people or low income earners. For instance, in the case of sub-Saharan Africa and South East Asia where there is the highest concentration of least-developed economies, the percentage of people living below 2 US Dollars (USD) per day is close to 80 per cent [51]. Therefore, for such countries the social equity dimension of development is critical and any reforms that have a bearing on development need to address the plight of the socially disadvantaged bulk of their populations. With this in mind, electricity reformers have increasingly incorporated regulatory mechanisms for enabling creation of safety nets for the poor, to cushion them against the impacts of power sector reforms [52].

As issues of the poor are addressed, the fact that there are strong inter-linkages between the poor and the environment requires attention [53]. The environment is one of the most important resources for poor people. For example, from the environment the people can and do obtain most of their basic energy requirements; for example woody biomass and its bi-products constitute the leading source of energy for cooking in developing countries. From the environment, some key renewable energy sources like hydro-power, wind-power, and bio-energy could be obtained. With this in mind, by proper design of electricity and energy reforms generally, optimization could be achieved in the use of the environment for the benefit of the poor and whole economies. Simultaneously, negative impacts that occur with wrong use of the environment could be redressed by for example finding alternatives to traditional biomass energy use and lessening pressure on forest and other biomass resources. Sustainable or alternative forms of energy would not only be a relief for the environment, but their production could provide a major input into employment opportunities that could alleviate poverty among rural and similar populations. Overall, sustainable development potential could be realized with small people-centered sustainable energy sources like small-hydro power facilities in decentralized grids [54].

In view of the importance of incorporating social and environmental elements into electricity reforms, there is concurrence with Dubash [55] that a sustainable development approach to the reforms should be adopted.

Acosta *et al.* [56] and Nilsson *et al.* [57] also argue from a futures studies perspective that a desirable future is where energy policies target achievement of sustainable development; and indirectly they advocate for electricity reforms guided by such policies. The context of sustainable development envisioned is where proportionate attention is given to economic growth, social advancement, and environmental soundness. This is as envisaged by theorists like Drummond and Marsden [58], Davidson [59], and Atkinson *et al.* [60]; and from their theoretical works sustainable development is understood synonymously with sustainability. The view of electricity or energy in purely economic terms is contested by David Nye [61], who stated:

Electrification is not an implacable force moving through history, but a social process that varies from one time period to another and from one culture to another.

2.3. Rural Electrification for Sustainable Development

Low income developing countries generally have scanty availability of electrical power and other forms of modern energy, with rural and poor urban sections of the countries being most severely affected. While rapidly industrializing countries like China have electrification levels of nearly 100 per cent, the low income ones that are mostly in sub-Saharan Africa have national averages of about 30 per cent and less than 14 per cent in rural areas [62]. This is in spite of the fact that the largest proportion of populations in the low income economies is rural. Therefore, rural electrification, especially using off-grid renewable energy sources could be a major input into socio-economic development in the economies. As such, meaningful electricity reforms should have service to rural residents as a key objective.

One of the main reasons why rural electrification in poor countries is so grossly inadequate is the common tendency of providing power from central grids, even when such a supply approach is clearly uneconomical due to the large distances involved. Because of the concentration of economic activities in urban centres, first priority in electricity provision is usually given to these centres. As a result, the central grid has good coverage of areas where the centres are located; and conversely, the farther the distance from the urban setups the lower the level of supply of power. The level of access to electricity is therefore very low in rural areas and the large populations in these areas

substantially have no electricity services. Additionally, similar populations living in impoverished urban habitats are equally affected.

The low availability of electricity in rural areas has particularly been noted by The World Bank [63] which also indicates that where off-grid supplies have been given there has been a tendency of generating power from oil-based fuels like diesel, which are imported into the countries and transported to generation sites at very high costs. Overall, therefore, the feasibility of electrifying rural areas through off-grid systems and energy resources available within rural localities is being increasingly sought; and in addition use of other rural resources like human and industrial capital is being explored. Electricity reforms that aim at sustainable development accordingly need to take these considerations into account.

When considering rural electrification for developing countries, account should be taken of the fact that rural dwellers are mostly poor and form the majority of national populations. These rural residents have therefore low electricity requirements of the order of less than one KW per household on average (see e.g. Zomers [64], and Barnes [65]). The electric power that the residents need is mostly for lighting and for powering small appliances like radios and battery chargers. Only in a few cases are the residents able to afford electricity for productive uses (e.g. pumping of water for domestic purposes and irrigation, and chaff or fodder cutting). Because of the low power requirements it is possible to utilize low-level technologies such as solar PV for meeting the requirements. Off-grid solutions are therefore appropriate for the residents, and costly central grid extensions are unnecessary. It is noteworthy that studies by e.g. Cust *et al.* [66] have shown a high willingness to pay (WTP) for off-grid energy technologies among the residents, compared to WTP for central grid extensions —which could in any case be unthinkable due to very long distances to nearest points to the grid.

The Alliance for Rural Electrification [67], among others, observes that the pursuit of localized electrification can be largely directed towards exploitation of renewable energy sources, chiefly solar energy, wind power, small hydropower, bio-energy, and geothermal energy. Given that these renewable forms of energy (renewables) have minimal local and global environmental impacts, they are useful for not only providing energy that can be perpetually replenished,

but also for ecological protection; thus ensuring overall sustainability. As such, the renewables are where possible deployed for rural electrification together with local labour and management. Rural industrial resources that include for example manufacture of power supply equipment, and power produced by local industries, could also be used. Ultimately, electrification carried out with such use of local or rural resources contributes considerably to sustainable development; and electricity reforms aligned to the development require a strong energy localization element.

Sustainable development in rural areas requires adequate energy inputs not only from electricity, but also from other sources as well. Electricity is important for enabling productive uses such as water pumping, irrigation and grain milling which spur socio-economic development. However, heat and mechanical forms of energy have greater priority especially for basic livelihoods in homes. From this standpoint, for achievement of sustainability rural electrification should be part of an integrated energy intervention strategy — embracing all important forms of energy. Recognizing this need for total energy provision, development analysts (e.g. Bawakyillenuo [68]) advocate for rural energization rather than rural electrification. At the national policy level, some countries have also seen the need for carrying out electricity reforms as part of national energy policy reforms where rural energization is targeted. The level of success of electricity reforms towards attaining sustainability could therefore be gauged through the extent to which non-electricity energy reforms complement electricity reforms.

2.4. Pursued Versus Ideal Energy Policy Futures

Corporate and institutional development strategies are increasingly employing futures studies methodologies in their planning processes. The strategies have gradually shifted to back-casting from forecasting methods that rely on probable scenarios for facilitation of selection of the most likely future, and taking action on the basis of the selection, (see e.g. Robinson [69]). According to Dreborg [70], and Vergragt and Quist [71], among others, back-casting is a futures study process that aims at minimizing uncertainties of possible futures. Instead of leaving the future to chance, in the back-casting method decisions are made on what a desirable future should be, then strategies are systematically worked out to achieve the future. Therefore, it can be seen that the method provides the genesis of what is popularly

referred to as a corporate vision—a future goal that the corporate entity strives to achieve through strategic planning. Furthermore, as Sardar [72] and Vergragt and Quist [73] argue, futures studies such as back-casting are strongly anchored on current actions for shaping the near or distant future. Therefore, the methods can achieve better results since actions that can be taken at present are relatively within human control, and sustainability or sustainable development which is premised on long time horizons would be easier to attain.

Energy policies and investment projects have long planning horizons and considerable complexities which make them amenable to back-casting processes ([74] and [75]). As a result, there is an increasing number of energy policies with visions and planning processes based on the back-casting concept. In addition, incorporation of a sustainability objective in energy policies is a growing practice. Ostergaard and Sperling [76] have especially noted that at the global scale unsustainable energy demand and carbon emissions need to be addressed, through among other things an appropriate planning framework. Back-casting which is becoming increasingly common could provide the required framework. However, Nilsson *et al.* [77] and others have noted that political factors in energy policy-making have been responsible for policy designs and implementations that are not fully in conformity with back-casting expectations. Major aspects of energy policies like electricity reforms have consequently been less than ideal seen from a futures studies viewpoint. Evidence of this is provided in the next section, specifically in the case of Kenya.

3. Reform Approaches in Specific Countries and Enabling Energy Policies

3.1. Electricity reforms in Kenya and other African countries

Although as indicated by Karekezi and Kimani [78] low income countries of Africa have adopted electricity reforms differently, common trends have been observed. Following Gratwick and Eberhard, [79]; UNECA and UNEP [80] and Wamukonya [81] it has been noted that the general pattern of reforms includes components implemented in different sequences according to national preferences; and in certain cases some components or elements are omitted. The elements to a large extent include: Energy policy establishment or

review; enactment of enabling electricity legislation, setting up an energy or electricity regulatory body and framework; restructuring of national power utility (usually vertically integrated) and a management contractor may be involved; entry of private participation into the power supply industry, especially in power generation (by Independent Power Producers or IPPs); upward adjustment of power tariffs; and setting up a rural electrification or energy body. Depending on which elements are implemented and the extent of implementation, the reforms undertaken can contribute proportionately to sustainable electrification and development, or sustainability. In the remainder of this section, implementation of reforms in the study countries is analyzed with a focus on finding out how well the reforms could contribute to sustainability.

Tables 1 and 2 give a summarized picture of the electricity reforms that have been undertaken by Kenya, which is the main study country; and the three other east-central African countries that are included for comparison purposes. The latter three countries are Malawi, Rwanda, and Tanzania. In the tables, approximate comparisons are made of the levels of measures taken towards the reforms. Specifically in Table 1, a breakdown of the electricity reform elements is given, and it is seen that Kenya has implemented the highest number of elements, while Malawi has the least number. Although Rwanda and Tanzania have done less than Kenya, they have elements that are likely to foster rural energy sustainability to a greater degree than Kenya has. Examples of these elements are: 1) Integration of electricity regulation with regulation of utilities in other economic sectors, for example water; and 2) Having an independent body responsible for electricity and other forms of energy in rural areas. To a small extent, Rwanda's rural energy sustainability is likely to be eroded by relatively high power tariffs, which are highest among the four countries studied. Absence of an independent body for rural electrification or energy is also a downside for Rwanda (see Note 2 in Table 1 for an explanation of this factor).

On the specific aspect of sustainability, the four countries are compared in Table 2. In these comparisons, it is evident that Kenya has had the best achievements in measures for national power capacity expansion and reduction of capacity deficits. The country has also done best in promotion of large-scale renewable energy use for national power demand fulfillment, in part employing a Feed-in Tariff strategy.

Table 1: Key elements of electricity supply industry reforms
(Authors compilation)

	KENYA	MALAWI	RWANDA	TANZANIA
1. Energy policy formulation				
a. Original made within the last ten years	X	X	X	X
b. Revised once in the last ten years	X			
c. Revised twice in the last ten years			X	
2. Legislative framework setting	X	X	X	X
a. Original made within the last fifteen years			X	
b. Revised at least once in the last fifteen years				
3. Restructuring of national power utility	X	X	X	X
a. Internal reorganization done	X			
b. Unbundling to separate bodies done	X	X	X	X
c. Private sector allowed in power supply	X		X	X
d. Private power generation achieved	X		X	X
e. Management contract established				
4. Regulatory framework setting (Note 1)		X		
a. Solely for electricity	X			
b. For energy generally				X
c. For water and electricity			X	
d. For utilities generally				
5. Rural electrification and sustainable energy (Note 2)				
a. Rural electrification in energy ministry		X		
b. Rural electrification by national utility			X	
c. Separate body for rural electrification	X			X
d. Large-scale renewables (less large hydro)	X		X	
e. Rural electrification with renewables	X		X	X

1. Where regulatory reforms involve as many energy forms as possible, and where non-energy utilities are included as the regulators' mandate, higher levels of sustainability could be expected
2. Rural electrification in a government ministry could suffer from bureaucratic barriers; and if included in national power utilities commercial interests of the utilities could override electrification efforts. Standalone bodies for electrification are therefore more desirable. Similarly, electrification would lead to greater sustainability if renewables are used and small-scale technologies are given priority alongside the large-scale ones.

Table 2: Levels of attainment from measures towards sustainable electrification and development
(Authors compilation)

ACHEVEMENT OF POLICY MEASURES	MAGNITUDE			
	Kenya	Malawi	Rwanda	Tanzania
Power capacity deficits reduction	XXX	X	XX	X
Electricity tariffs increase	XX	X	XXX	XX
Electricity access expansion in rural areas	XX	X	XXX	XX
Off-grid power development	XX	X	XX	XX
Inclusion of renewable energy in total electricity supply mix*	XXX	X	XX	X
Application of renewables Feed-in tariffs	XXX	N/A	XX	XX
Deployment of rural people and resources for power provision	XX	X	XX	XX
Development of complementary non-electricity renewables	XX	X	XXX	XX

KEY: X = Low, XX = Medium, XXX = High

*Besides large hydropower contribution

However, the renewable energy sources are to a very large extent used for power fed into the central grid. If the same level of attention had been given to small-scale renewable resources, the highest power benefit would have been gained by rural areas where the resources are largely found. For Rwanda and Tanzania, there are also intensive efforts to meet national power demand needs, but Rwanda is more successful in this respect. Use of renewable resources is additionally more pronounced in Rwanda.

Overall, specific stimulus for sustainable rural electrification and development is indicated by a) achievements of measures towards electricity access expansion; b) use of rural people and resources for direct benefit of rural dwellers; and c) development of non-electricity forms of renewable energy. In all these respects Rwanda has the best rating followed by Kenya and Tanzania at nearly the same level, and Malawi trails all the other countries.

3.2. Enabling Energy Policies with Specific Reference to Kenya

The study done for this paper revealed that for Kenya and East-Central African countries, substantial energy policies for enabling electricity reforms were largely absent when the reforms commenced. As indicated at the beginning of this paper, the reforms were mainly informed by dictates of external influences, such as World Bank prescriptions for energy sector reforms in developing countries. Increasingly comprehensive energy policies were designed and implemented in the course of electricity reforms, in part to anchor the reforms in a policy framework. This is why energy policy reviews are included as part of electricity reforms described in the preceding subsection of the paper. Energy policies have continued to grow as reforms have progressed. After start of Kenyan electricity reforms in 1997, the first fully fledged energy policy was enacted in 2004 [82] and the latest (2014) policy is in the last stages of formulation [83].

As the Kenyan energy policies have evolved, they have gradually embraced a vision with a growing sustainable development objective, and from analysis of their intent they seem to have been guided by a futures studies perspective. However, the sustainability aspect of energy policy visions appears to be partially blunted, largely by some continuing outdated planning practices that do not conform to futurist (futures studies') ways of thinking, and political distortions. Evidence in support of this contention includes:

3.2.1. *The Right Vision followed by a Slow or Skewed Implementation characterized the 2004 Kenya energy*

Drawing from the 2004 Government of Kenya policy document [84], the vision was: *To Promote Equitable Access to Quality Energy Services at Least Cost While Protecting the Environment*. Even without explicitly saying so, the vision had a sustainability focus, through intention of pursuing integrated social (equitable), environmental, and economic goals. However, two years after the enactment of the policy (in 2006), a report that reviewed planning for implementation of the policy had a statement from the minister in-charge of national planning saying:

“While we are proud of the progress that has been made, we are aware that our policies and planning processes have not been able to fully integrate all the dimensions of sustainable development. There has been a tendency to focus more on economic development and comparatively less on social and environmental dimensions. Yet, if we are to achieve the Millennium Development Goals (MDGs), an adequate level of integration is critical” (UNEP [85]).

Another part of the UNEP report implicitly indicates that traditionally there has been an absence of a Futures Studies perspective of planning, especially in relation to energy policy. In particular, the revelation was in the statement:

“There are considerable weaknesses in Kenya’s energy planning with no systematic attempts to undertake integrated processes. Most energy projections in Kenya, with the exception of electricity have relied on historical growth” (UNEP [86]).

3.2.2. *Some sustainability focus gains were lost*

in the 2014 incoming energy policy, and in other government strategies. According to the policy document [87] the vision is: *Affordable Quality Energy for All Kenyans*. Although the vision is strong on the economic dimension of development, and has an element of social equity, it is silent on the environmental aspect of development. It may be rightly argued that the mission statement and body text of the policy have important considerations for strengthening sustainability and a Futures Study perspective. For example, the policy underscores stakeholder participation in policy making. Additionally, decentralized planning and development processes are emphasized, and use of more environment-friendly technologies is targeted.

However, the policy's main thrust is accelerated expansion of energy supply, with its key objective being provision of adequate electricity for industrial development. Large-scale renewable energy and fossil-fuel technologies are expected to be the main source of power. Little consideration is given to sources of energy that could spur socio-economic development for the underprivileged majority of people, who heavily rely on biomass and other small-scale technologies. Environmental concerns are also given low level priority.

While the 2014 energy policy is undergoing finalization processes, a short-term strategy for rapidly up-scaling the current national power production by three-folds is underway. The politically-driven strategy, like the proposed 2014 energy policy, is substantially economics-centred; and aims at raising the national power capacity by 5000 MW within the period 2013 to 2016 [88]. Importantly, the additional capacity is expected to be installed during the term of the current government, while implementation of the major national projects for which the capacity is designed will take much longer. Critics therefore argue that there will be stranded capacity and investments immediately after completion of installation of the additional power. What has become clear is that no systematic studies have been done for the strategy. Furthermore, the futures studies' approach to energy planning and policy making that has been gaining ground in the country is in this strategy largely disregarded for political expediency.

4. Discussion

In summary, the analysis done indicates that initially electricity reforms in developing countries were largely based on market considerations and were mostly prescribed in the context of international development assistance. During implementation of electricity reforms in under-developed countries it was found necessary to reshape the reforms to cater for sustainable development requirements that have a much lower priority level in the developed world. Elements of the reforms such as rural electrification with a strong social focus and that are mindful of environmental concerns were gradually but in a limited way prioritized. At the same time, need was appreciated for energy policies for guiding sustainability targeted reforms for energy generally and electricity in particular. Therefore, as electricity reforms progressed, design and implementation were done for energy

policies that follow a path to sustainability, as advocated by futures and other studies.

In the particular case of Kenya, electricity reforms have been undertaken as part of wider energy sector reforms and have progressed relatively rapidly. Most attention has, however, been directed towards meeting the fast rising national power demand, and significant electricity price rises have been implemented as part of electricity reforms. Nonetheless, the price increments have not been sufficient to meet power investment demands. Upward adjustments in prices to cater for the required investments have generally been opposed by stakeholders. Power users and those concerned about their wellbeing, have particularly been apprehensive of reduced power affordability and resulting erosion of socio-economic standards for the general population. Implicitly, there has been concern that the reforms would have negative consequences for sustainability, especially in the social dimension of sustainable development.

Again for Kenya, rural electrification and renewable energy have been given increasing attention in efforts towards expanding electricity access. However, grid-based electricity supply has been the main means of electrification delivery, requiring large investment capital at the expense of off-grid electrification. Additionally, renewable energy has been promoted, but with low priority being placed on small-scale technologies. Low prioritization of the technologies which are appropriate for sustainable rural electrification and development has been a significant factor in slow growth of sustainability.

Overall, the electric power reforms in Kenya which have been implemented and are ongoing are certainly comprehensive. This is particularly true in respect of fulfillment of power capacity needs for industrial development. From this perspective, Kenya provides important lessons for other countries of sub-Saharan Africa and specifically for Tanzania, Rwanda, and Malawi considered in this paper. The importance being placed by Kenya on rural electrification and renewable energy is also noteworthy. Nonetheless, the Kenyan energy policies and strategies that are shaping electricity reforms are heavily skewed towards the economic aspect of sustainability. Energy policies and strategies could benefit significantly through reforms' lessons from the other countries that have been studied. In particular, the countries have addressed social and environmental concerns of sustainability, and there are useful lessons for Kenya in this regard.

It is also evident that in Kenya small-scale renewable technologies, and off-grid electrification, are of secondary importance despite their capacity for accelerating sustainable development. Therefore, Kenyans could learn from countries like Rwanda which have prioritized the technologies and the off-grid approach to electrification. The lessons include: i) A proportionate mix of on-grid and off-grid electrification approaches; ii) A wide application of small-scale renewable energy sources that are available in rural areas and compatible with off-grid electrification; and iii) Concrete strategies for government supported biomass technology application strategies. It is acknowledged that Rwanda's example is not yet a best practice case, but the example is an indicator for Kenya to seek and apply electricity reforms that more soundly support sustainable development.

Kenya's electricity supply industry reforms provide a good indication of attempts at replicating models of such reforms as found in many countries of the developed world. The Kenyan reforms also serve as an example for those seeking to make models focused on economic efficiency more compatible with sustainable development. Clearly, the endeavour to align the models with sustainability is not an easy one and many trade-offs are required. To a large extent, due to challenges of the alignment, Kenya is still way behind in achieving electrification that can spur sustainable development. For achievement of the sustainability goal, the country will need to elevate the level of priority of sustainability-driven rural electrification and related energy enhancement strategies. This will require a scale-down of the current high prioritization of national power capacity expansion, which is at the expense of sustainable electrification that could serve the majority population residing in rural and poorer parts of urban areas. Rwanda, which has a modest level of electricity reforms, has some lessons that could benefit Kenya in the reorientation of the prioritization.

It is also evident from the findings of this paper that there is critical need for policies and institutions that could support energy growth with a sustainable development end-goal. In the case of Kenya, there is a dynamic growth of energy policies and institutions generally. However, sustainability seems to be a peripheral consideration in pursuit of the growth. A similar situation exists for the other countries explored in this paper, but Rwanda is doing better than all the others. In all cases, it is deemed important for a clear strategy for creation and implementation of

sustainability targeted policies and institutions. National governments with support from the international development community and local NGOs should spearhead the strategy at country level. Then, where there are sub-national governments, such as in Kenya, the national strategies could be replicated at the local government level. In the latter case, local NGOs and grass-roots organizations should be deeply involved in the strategy making and implementation.

5. Conclusion

Of great importance is the need for Kenya energy policy makers to fully adopt and keep on the track of a policy making approach informed by futures studies. Political pursuits that are forcing the policy making away from the approach would need avoiding or minimization. In the work done for this paper, the scope was not wide enough to cover energy policy practices in a sufficiently large number of countries to facilitate generalization of findings. Nonetheless, from anecdotes that the authors have encountered in their work, it can be surmised that political distortions in energy policy making process are not unique to Kenya. Further research is recommended for confirmation or giving other observations about the assumption; and subject to the confirmation, what has been suggested for Kenya could be extrapolated to the general case. On the other hand, we agree with Nilsson *et al.* [89] that futures studies should also be developed sufficiently to be able to take into account unavoidable political interests in the policy making. Policies and strategies guided by the studies would be more robust if inevitable political factors are duly acknowledged and internalized.

This paper has mostly been based on evidence of successes and failures in electricity industry reform measures that have been undertaken in the study countries. It is recommended that further research is done to fully evaluate impacts of the measures. Outcomes of the research could give a stronger indication of successes and failures of the reforms and modifications needed to achieve a higher level of sustainability, and appropriately inform energy policy making. Nevertheless, the pointers provided in the paper could provide important inputs for policy and academic work relating to electricity supply industry reforms in a Kenyan and sub-Saharan Africa context. Furthermore, energy policy making needs to be studied more broadly to find out the extent to which futures studies' perspectives have been adopted. Such

research could enable advancement of adoption of futures studies' approaches to a greater extent than is the case at present. The research could also facilitate adjustment of analytical processes in the studies to take into account unavoidable factors like political influences in energy policy making.

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