Private Investment in Renewable Energy Sector in Africa: An Economic Analysis

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April 2016

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Abstract

African countries still lack a huge amount of energy that is necessary to increase economic growth, alleviate poverty, and sustain economic development (energy insecurity). Public investment in energy sector is still limited to supply household and private sector with their energy needs. Only private investment in renewable energy can play a major role in filling this gap. By applying SWOT analysis, this study illustrates the major threats and weaknesses (challenges) faced by the private investment in renewable energy sector in Africa vis-à-vis the main opportunities and strengths (benefits) these investments can get. Finally, it ends with some suggested solutions that can help at improving conditions of this vital sector and attracting more private investments to it.

Key Words: Private Investment, Renewable Energy, SWOT Analysis.

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الملخص

تعاني الدول الأفريقية من نقص هائل في إنتاج الطاقة اللازمة لزيادة النمو الاقتصادي، وتخفيف حدة الفقر، ودعم التنمية الاقتصادية. كذلك لا تزال الاستثمارات الحكومية في مجال الطاقة لا تلبي احتياجات كلٍ من القطاع العائلي والقطاع الخاص من الطاقة. ومن ثم، يمكن أن يلعب الاستثمار الخاص في مجال الطاقة المتجددة دوراً كبيراً في سد هذه الفجوة. وتسعى هذه الدراسة، من خلال تطبيق تحليل SWOT، إلى توضيح التحديات الرئيسية التي تواجه القطاع الخاص في قطاع الطاقة المتجددة في أفريقيا، والفرص التي يمكنه الحصول عليها. كذلك، تقترح الدراسة عدداً من الحلول التي يمكن أن تساعد في تحسين مناخ الاستثمار في هذا القطاع الحيوي، وجذب المزيد من الاستثمارات الخاصة إليه.

الكلمات الدالة: الاستثمار الخاص، الطاقة المتجددة، تحليل SWOT.

I. Introduction

Many cases have proven that energy can be a strong driver for both GDP growth and economic development. For example, energy from coal and investment in the biofuel sector has been major contributors to the industrial revolution and economic development in Britain and Brazil, respectively. Also, increased provision and use of energy services is an indication of enhanced economic development. For example, per capita energy consumption in the United States was nearly 13 times greater than that in India in 2012[1].

During the past decade, Africa witnessed positive demographic trends, accelerated economic growth, increasing urbanization, improving political environment and increasingly welcoming business climate. All these factors increased development prospects and spurred energy demand. For instance, demand for energy in sub-Saharan Africa (SSA) grew by around 45% from 2000 to 2012[2]. Besides, electricity demand is going to reach double its value over the period 2010 and 2035 as a result of 3.8% average annual rise in GDP of Africa over the same period[3].

Still Africa has the world's lowest electricity access rates. In 2013, electricity access rates were 43% for whole Africa and 32% for SSA compared to 86%, 95%, and 92% for Developing Asia, Latin America, and Middle East, respectively. In the same year, rural electrification rates reached 26% for whole Africa and 17% for SSA compared to 78%, 85%, and 79% for Developing Asia, Latin America, and Middle, respectively (see table (1)).

This critical situation is exacerbated by African governments' failure to boost energy generation, increase distribution capacity, and maintain energy infrastructure. In addition, low per capita incomes, inefficient and costly forms of energy supply worsen energy affordability; electricity prices are very high by world standards, and major African industries (such as mining) are sometimes negatively affected [4].

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[1] Roland Berger Middle East, Turkey and Africa: **Power in Africa- Future and Key Challenges** (Munich: Roland Berger Strategy Consultants, May 2013), p. 4.
[2] **Ibid**, p. 5.
[3] International Energy Agency (IEA): **Africa Energy Outlook 2014- A Focus on Energy Prospects in sub-Saharan Africa** (Paris: IEA, 2014), p. 48.
[4] Dambudzo Muzenda: **Increasing Private Investment in African Energy Infrastructure**, Paper presented at Ministerial and Expert Roundtable of the NEPAD-OECD African Investment Initiative (Johannesburg: OECD, 11-12 November 2009), p. 44.

Table (1): Electricity Access Rates around the World in 2013

Region	Population without Electricity (Millions)	Electrification Rate (%)	Urban Electrification Rate (%)	Rural Electrification Rate (%)
Developing countries	1,200	78%	92%	67%
Africa	635	43%	68%	26%
North Africa	1	99%	100%	99%
sub-Saharan Africa	634	32%	59%	17%
Developing Asia	526	86%	96%	78%
China	1	100%	100%	100%
India	237	81%	96%	74%
Latin America	22	95%	98%	85%
Middle East	17	92%	98%	79%
Transition Economies & OECD*	1	100%	100%	100%
World	1,201	83%	95%	70%

*OECD = Organization for Economic Cooperation and Development
Source: IEA: **World Energy Outlook 2015 - Electricity Access Database**, at: http://www.worldenergyoutlook.org/resources/energydevelopment/energyaccess database, Visited on: 2/2/2016.

This energy insecurity situation is in marked contrast with the abundance of different renewable energy resources in many African regions. For instance, there is excellent solar energy across all of Africa, over 300 giga watts of hydro power capacity is available in many African countries, wind energy can be exploited in coastal areas, and geothermal energy can be utilized in the East African Rift Valley. Hence, these resources can play a major role in meeting Africa's increasing demand for energy[1].

However, Africa's power generation still rely heavily on fossil fuels. Coal, oil and gas collectively account for 81% of total power generation, while hydropower accounts for 16%. These shares vary greatly by region,

[1] International Renewable Energy Agency (IRENA): **Africa Power Sector: Planning and Prospects for Renewable Energy- Synthesis Report** (Abu Dhabi: IRENA, 2015), p. 7.

depending on the availability of natural resources. For example, 94% of electricity generation in South Africa is from coal, 68% of the power generation in North Africa is from natural gas, and 50% of the energy generation in SSA (without South Africa) is from hydropower[1].

There are many advantages for exploiting renewable energy resources in Africa. First, they can put an end to the reliance of many African countries on expensive and volatile imports of fossil fuels such as oil. Second, these resources can provide affordable, secure/clean, sustainable and cheap supplies of energy where they are in high demand[2]. Third, renewable energy projects can be an avenue for Africa to better exploit the economic opportunities offered by international carbon markets. Last, renewable energy technologies are deployable in a decentralized manner; which suits rural and distant regions that can't get connected to grids[3].

Therefore, to bring the electrification access rates in Africa to levels comparable to those of developed countries, the current status of renewable energy sector requires a huge amount of investments. While public investment is still limited in this part, only the private investment can play a major role in filling this gap. Thus, promoting private investment in renewable energy technologies and off-grid power generation is crucial to accelerate the renewable energy deployment in a region where it is much needed[4].

So, to understand how private investment works and how it can be effectively promoted and mobilized through some public initiatives, this paper aims at applying SWOT analysis to illustrate the main drivers and barriers faced by the private investors in renewable energy sector in Africa. Accordingly, this study is structured as follows: section II provides an overview of current status of renewable energy projects in the continent. Then, sections III and VI demonstrate the challenges (threats, weaknesses) and benefits (strengths, opportunities) private investors face while engaging

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[1] Roland Berger Middle East, Turkey and Africa: **op. cit.**, p. 9.

[2] Renewable energy technologies can be competitive with traditional sources of energy (fossil fuels) in terms of costs. For example, wind power can deliver electricity at a cost below US $ 69 for a megawatt hour (Mwh) compared to US $ 67 for a megawatt hour for coal.

[3] United Nations Environment Programme Finance Initiative (UNEP): **Financing Renewable Energy in Developing Countries - Drivers and Barriers for Private Finance in sub-Saharan Africa** (Geneva: UNEP, February 2012), pp. 10-11.

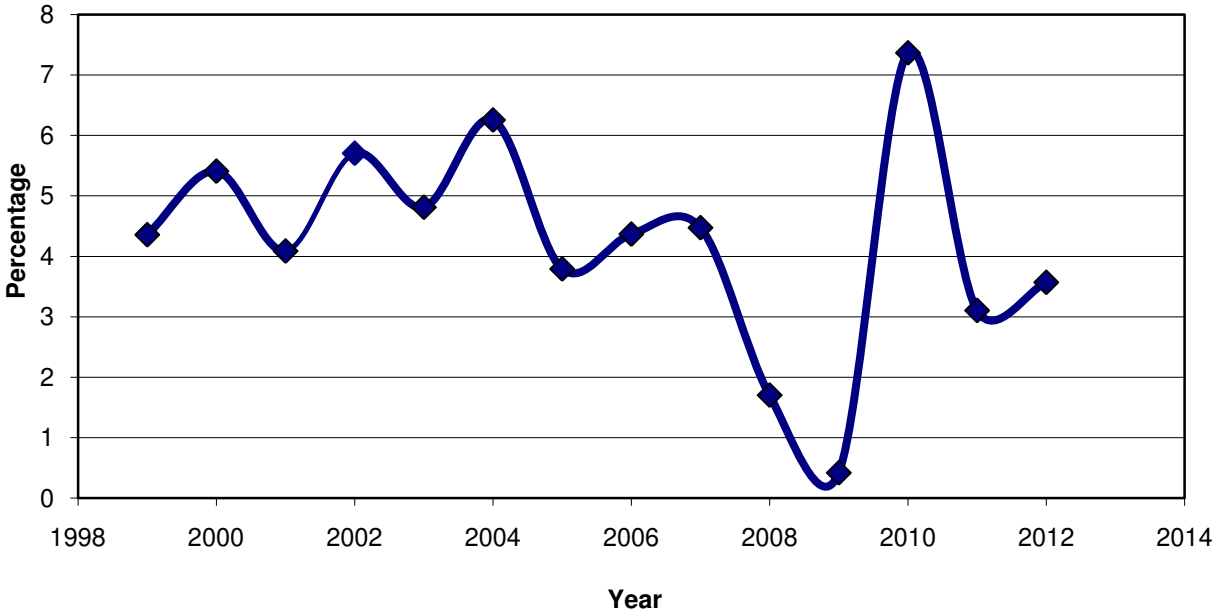
[4] Morgan Brazilian et al: Energy Access Scenarios to 2030 for the Power Sector in sub-Saharan Africa, **Utilities Policy**, Vol. 20, Issue 1, March 2012, p. 3.

in the renewable energy sector in Africa. Finally, section V presents some key solutions and a number of recommendations that can help at improving conditions of this vital sector and attracting more private investments to it.

II. Current Trend of Renewable Energy Projects in Africa

Although electricity access rate in Africa is the lowest in the world, the region has witnessed considerable growth in electricity generation since 1998 (about 4 % as an average annual growth rate). Fortunately, more than 60% of all new electricity generated has come from renewable sources (see figure (1)).

Figure (1): Total Electricity Net Generation in Africa from 1998 till 2012
(Annual Growth Rate %)



Source: Researcher's calculations from data of United States Energy Information Administration, Region Statistics, at: https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=12&cid=r6,&syid=1998&eyid=2012&unit=BKWH, Visited on 19/2/2016.

However, there is excessive dependence on hydroelectricity and neglect for other renewable energy technologies, which may suit many African countries with only scarce hydrological and fossil fuel resources. For example, in 2012, the share of Non-Hydro Renewable Electricity Net Generation from total electricity net generation and total renewables electricity net generation reached 0.96% and 6% respectively (see table (2) and figure (2)). This can result in serious environmental damage as well as conflicts within and between African countries, particularly in the case of large-scale dams. These projects can also get exposed to drought due to global climate change[1].

Table (2): Share of Renewables Electricity Net Generation in Africa from 1998 till 2012 (%)

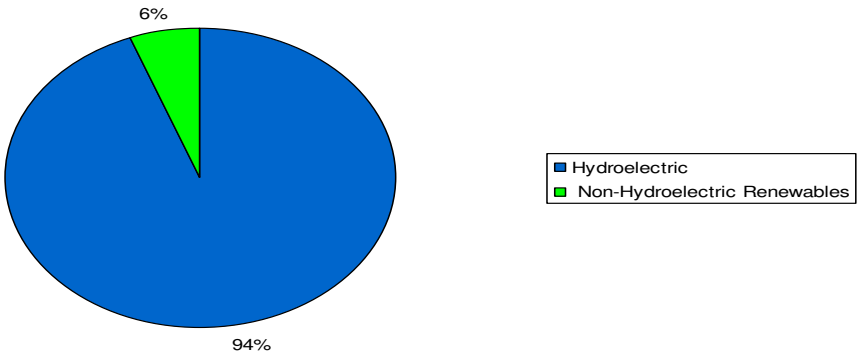
Source / Year	Total Renewable Electricity Net Generation (% of total electricity generation)	Total Non-Hydro Renewable Electricity Net Generation (% of total electricity generation)	Hydroelectricity Net Generation (% of total electricity generation)	Total Non-Hydro Renewable Electricity Net Generation (% of total renewable electricity)	Hydroelectricity Net Generation (% of total renewable electricity)
1998	16.40857945	0.407468882	16.00111056	2.483267265	97.51673273
1999	18.56439878	0.452767542	18.11163124	2.438902264	97.56109774
2000	18.35274075	0.58874099	17.76399976	3.207918632	96.79208137
2001	19.24288581	0.6391527	18.60373311	3.321501286	96.67849871
2002	18.64272623	0.577787762	18.06493847	3.099266462	96.90073354
2003	17.55541217	0.667628679	16.88778349	3.802979234	96.19702077
2004	17.56334899	0.732441278	16.83090771	4.170282551	95.82971745
2005	17.28748366	0.706431022	16.58105263	4.086372756	95.91362724
2006	17.2983094	0.815304196	16.4830052	4.713201605	95.2867984
2007	16.88382433	0.742392641	16.14143169	4.39706447	95.60293553

[1] UNEP: **op. cit.**, p. 19.

Source / Year	Total Renewable Electricity Net Generation (% of total electricity generation)	Total Non-Hydro Renewable Electricity Net Generation (% of total electricity generation)	Hydroelectricity Net Generation (% of total electricity generation)	Total Non-Hydro Renewable Electricity Net Generation (% of total renewable electricity)	Hydroelectricity Net Generation (% of total renewable electricity)
2008	16.93115479	0.798137021	16.1330127	4.714014083	95.28595597
2009	17.50593983	0.88988951	16.61604527	5.083357527	94.91661363
2010	18.15135518	0.992613785	17.1587414	5.46853816	94.53146184
2011	17.76339884	1.035235182	16.72816365	5.827911602	94.1720884
2012	17.55158851	0.967579141	16.58400937	5.512772477	94.48722752

Source: United States Energy Information Administration, Region Statistics, at: https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=12&cid=r6,&syid=1998&eyid=2012&unit=BKWH, Visited on: 19/2/2016.

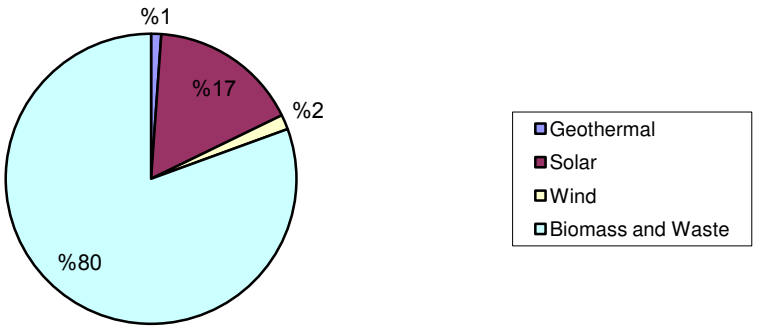
Figure (2): Share of Hydro and Non-Hydro electric Renewables in Africa in 2012 from Total Renewables Electricity Net Generation



Source: Researcher's calculations from data of United States Energy Information Administration, Region Statistics, at: https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=12&cid=r6,&syid=1998&eyid=2012&unit=BKWH, Visited on: 19/2/2016.

According to figure (3), the share of geothermal, solar, and wind sources from Total Renewables Electricity Net Generation in Africa in 2012 was very modest when compared to the share of biomass and waste sources (about 80%). Also, as table (3) shows, this type of non-hydroelectric renewables electricity is generated only in a handful of African countries despite potentially large wind, sun radiation or biomass resources. These countries include Kenya, Egypt, Morocco, Ivory Coast, Senegal, Ethiopia, and Cape Verde.

Figure (3): Share Non-Hydro electric Renewables in Africa in 2012 from Total Renewables Electricity Net Generation



Source: Researcher's calculations from data of United States Energy Information Administration, Region Statistics, at: https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=12&cid=r6,&syid=1998&eyid=2012&unit=BKWH, Visited on: 19/2/2016.

Table (3): Total Non-Hydroelectric Renewables Electricity Net Generation in African Countries in 2012 (Billion Kilowatt-hours)

Country	Total Non-Hydroelectric Renewables
Kenya	1.931
Egypt	1.497
Morocco	0.728
Sudan and South Sudan	0.51
Mauritius	0.505
South Africa	0.446
Tunisia	0.201
Uganda	0.1
Ivory Coast	0.066
Cameroon	0.064
Zimbabwe	0.063
Senegal	0.049
Ethiopia	0.045
Tanzania	0.032
Gabon	0.009
Cape Verde	0.007
Togo	0.005
Eritrea	0.002
Benin	0.001

Source: United States Energy Information Administration, Region Statistics, at: https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=6&pid=alltypes&aid=12&cid=r6,&syid=1998&eyid=2012&unit=BKWH, Visited on: 19/2/2016.

It is also worth mentioning that private sector participation in renewable energy projects in SSA takes mainly the form of Independent Power Producers (IPPs)[1]. Two famous examples for these projects are Renewable Energy Independent Power Producer Programme in South Africa and the Azura-Edo Power West Africa power plant in Nigeria. Concerning their existence and success, Castellano et al's survey has shown that the private renewable energy projects in SSA operate mainly in wind, solar or hydro fields, and they perform slightly better than their public counterparts in terms of final cost percentage of original budget[2].

[1] These projects are established entirely by the private sector, and the generated energy is sold to the market through power-purchase agreements. These agreements typically cover capital costs, return on investment, marginal operating costs, and a broad range of risks.

[2] Antonio Castellano et al: **Brighter Africa: The Growth Potential of the sub-Saharan Electricity Sector** (Johannesburg: McKinsey & Company, February 2015), p. 25.

III. Challenges faced by Private Investors in Renewable Energy Sector in Africa

There are many types of costs that face private investments in renewable energy sector in Africa and discourage private actors from getting involved in these investments. The barriers (problems) that result in these costs can be classified into **three** main groups: financial, regulatory, and capacity barriers[1].

High costs of renewable energy projects, limited access to finance (external funding), and financial risks are three main **financial problems** that face private investments in renewable energy in Africa. To establish renewable energy projects, **huge costs** for feasibility studies and tendering procedures are incurred; sometimes they reach 4% of the total investment costs. Also costs of importing inputs in landlocked African countries are enormous. As a result, the average electricity generation cost in SSA amounts to US$ 0.18 per kilowatt-hour; which is much higher than that found in South Asia of US$ 0.04 per kilowatt-hour, and in East Asia of US$ 0.07[2]

With respect to **access to finance**, energy projects' share of domestic banking loans in a lot of African countries is very limited[3]. Even when these loans are made available, they are often offered with high interest rates. Also, poor international credit ratings of most African countries limit the access of private investors to international financial markets. Even financial instruments (shares and bonds) of power projects are generally not attractive to African institutional investors[4].

Potential private investors in renewable energy projects may also encounter many **financial risks**. First, the revenues earned from operating

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[1] Dambudzo Muzenda: **op. cit.**, p. 46.

[2] Mafalda Duarte et al: **Financing of Sustainable Energy Solutions**, Committee of Ten Policy Brief, Nº 3 / 2010, October 2010, p. 4, at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/C-10%20Note%203%20English%20(final)_for%20posting.pdf.

[3] For example, in 2006, the infrastructure loans' share of total bank loans reached about 24% in Cape Verde, 20% in Niger, and less than 10% in some other SSA countries. For more details, refer to: Jacqueline Irving & Astrid Manroth: **Local Sources of Financing for Infrastructure in Africa-A Cross-Country Analysis**, Policy Research Working Paper, No. 4878 (Washington D. C.: The World Bank (WB), March 2009), p. 18.

[4] Karim Dahou et al: **Deepening African Financial Markets for Growth and Investment**, Paper presented at Ministerial and Expert Roundtable of the NEPAD-OECD African Investment Initiative (Johannesburg: OECD, 11-12 November 2009), p. 24.

renewable energy projects barely cover its average operating costs in the short and medium terms. Second, low per capita incomes in many African countries make the consumers' demand for renewable energy very elastic; thus any increase in the prices of renewable energy services may stop payments for these services and impel consumers to increase their demand for fossil fuels[1]. Third, investors often face exchange rate risk related to currency depreciation/devaluation in many African countries; hence profits shrink when they are converted from local currencies to foreign ones. Fourth, high inflation rates in many African countries that can affect negatively energy projects in their different stages[2].

In 2006, many countries in Africa started the implementation of power sector reform laws, the corporatization of power state owned enterprises, and the operation of IPPs[3]. However, various **regulatory problems** related to biddings, procurements & hiring, tariffs, and contracts are still there. For example, biddings are frequently cancelled, postponed or disputed; this discourages interested private actors from spending time and money on these bids. Also, some African countries place bureaucratic procurements & hiring procedures that hamper the operations of private energy companies[4].

Concerning tariffs, some countries set them at very high rates making it very unattractive to investors; as they may not have the chance to recover the incurred costs in the future[5]. Another major risk is the stalling of utilities contracts; circumstances may change during the lifetime of a project in many SSA countries, and these essential services may stop. Also, there is a risk arises when regulatory agencies start to interfere with the private company's operations. Similarly, there is the risk of Nationalization, expropriation, and policy changes. Furthermore, disharmonized regional regulatory frameworks pose problems for renewable energy projects that work across borders[6].

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[1] For example, in Malawi, a 25% increase in electricity prices impelled consumers to increase their demand for coal, though its production was illegal. For further details, see:
Kate Bayliss and Terry McKinley: **Privatizing Basic Utilities in sub-Saharan Africa: The MDG Impact**, United Nations Development Program (UNDP) Policy Brief No. 3 (New York, NY: UNDP, January 2007), p. 3.

[2] UNEP: Financing Renewable Energy…, **op. cit.**, p. 45.

[3] Anton Eberhard et al: **Africa Infrastructure Country Diagnostic Underpowered: The State of the Power Sector in sub-Saharan Africa**, Background Paper No. 6, WB, June 2008, p. 16.

[4] UNEP: Financing Renewable Energy…, **op. cit.**, p. 12.

[5] A private investor wants to be assured that tariffs can be alleviated in case costs increase, or change their procurement source when it is needed.

[6] **Idem**.

As for **capacity problems**, many African countries suffer from **weak institutional capacity**; most public officials lack skills to manage Public Private Partnerships (PPPs), and most local judicial systems do not have the capacity to handle complex contracts or disputes in energy infrastructure field[1]. In some countries, there are **multiple government bodies** dealing with the energy sector; thus leading to discord and replication of functions. Also, a lot of African countries don't have suitable measures to tackle **energy capacity problems**[2] and **funding gap**[3]. Another capacity problem faced by private investors is the **lack of long-term planning and coordination** among ministries and different bodies dealing with energy[4].

IV. Benefits for Private Investors in Renewable Energy Sector in Africa

The risk-return profile of a renewable energy project, considered by private investors, is the key determinant of whether to undertake it or not. Concerning the (financial) return of any energy investment, it depends on **two main** factors: the financial profitability of the technology applied, and its competitiveness with other technologies[5].

Generally, at the start of the energy project, electricity generation from renewable sources is more expensive than from conventional sources. However, over the project life-cycle, costs for renewable energy generation tend to steadily decrease. Renewable energy is also relatively quick and cheap to deploy on a small scale compared with fossil fuels. Besides, certain renewable energy technologies have become competitive with conventional forms of power generation in some African regions[6]. For example, solar photovoltaic generation is expected to be fully competitive

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[1] An econometric analysis by the WB showed that infrastructure projects' cancellation rates are higher by 9 percentage points in SSA than any other region in the world because of weak institutional capacity. For further details, refer to:
Clive Harris & Kumar V. Pratap: **What Drives Private Sector Exit from Infrastructure? Economic Crises and Other Factors in the Cancellation of Private Infrastructure Projects in Developing Countries**, WB Gridlines, Note No. 46, March 2009, p. 2.

[2] Consumers in African countries need to be aware of the importance of economizing power.

[3] For example, some government departments do not pay their electric bills. Also, due to weak law enforcement, utilities collect only 70% to 90% of their bills, and vandalism is often left unpunished.

[4] United Nations Industrial Development Organization (UNIDO): **Module 2: The Energy Sector in Africa**, Training Manuals on Sustainable Energy Regulation and Policymaking for Africa, p. 7.
http://www.unido.org/fileadmin/media/documents/pdf/EEU_Training_Package/Module2.pdf

[5] UNEP: **Private Financing of Renewable Energy: A Guide for Policymakers**, December 2009, p.3.

[6] UNEP: Financing Renewable Energy…, **op. cit.**, p. 25.

with coal-fired generation in South Africa[1]. Also, in windy locations, wind-based generation delivers electricity at a lower cost than coal-based generation[2].

According to a survey conducted by Baker & McKenzie in 2013[3], private investors pointed that one of the major investment drivers for establishing renewable energy projects in Africa is their attractive (financial) returns. Another **five investment drivers** listed in this survey are as follows[4]:

1. The need for global diversification as traditional markets decline; African energy markets meet this need.

2. The certainty of increasing energy demand in Africa.

3. The accelerating African economic growth.

4. The desire to gain foothold and experience in future profitable African energy markets.

5. The renewables' sustainability in many African regions; strong wind and solar resources act as a strong driver for renewables deployment.

Furthermore, regional agencies and international cooperation programmes have started recently to offer financial and technical support for private renewable energy projects in Africa. They consider renewables to be sustainable and clean source for power generation. This regional and international consolidation can represent another significant factor for enticing private investors to this field in many African regions[5]. For example, the African Renewable Energy Fund (AREF) has been established to offer capital support to private sector renewable energy

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[1] PV Magazine: **South Africa: Grid Parity within Sight, but Refit Needs to Be Implemented Soon**, 2010, at: http://www.pv-magazine.com/news/details/beitrag/south-africa--grid-parity-within-sight--but-refit-needs-to-be-implemented-soon_100000754/#axzz3zrUgfRlk, Visited on: 11/02/2016

[2] Bloomberg: **Wind Turbine Prices below 1 Million Euros a Megawatt**, 2011, at: http://www.bloomberg.com/news/articles/2011-02-07/wind-turbine-prices-fall-below-1-million-euros-per-megawatt-bnef-says, Visited on: 11/02/2016.

[3] The survey included 140 senior business (renewable energy projects) executives across the world.

[4] Baker & McKenzie: **The Future for Clean Energy in Africa** (Chicago, IL: Baker & McKenzie, 2013), pp. 10-11.

[5] http://www.afdb.org/en/news-and-events/article/african-renewable-energy-fund-aref-launched-with-100m-committed-capital-and-anchor-investments-from-afdb-and-sefa-12901/, Visited on: 14/02/2014.

projects (small-to-medium-scale projects) in SSA[1]. Since its launch in March 2014, AREF has been investing capital in grid-connected renewable energy projects; small hydro, wind, geothermal, solar and biomass projects[2]. Also, there is Africa-EU Renewable Energy Cooperation Programme (RECP); it acts as market information provider and financial facilitator for African and European investors who are interested in undertaking medium-scale renewable energy projects in Africa[3].

V. Suggested Solutions for Mobilizing Private Investments for African Renewable Energy Sector

Private sector is not only a source of finance to African renewable energy investments but also a main source for the technology, expertise, and skills that are necessary for most African governments to run renewable energy projects successfully[4]. However, as demonstrated in section 3, private actors face many challenges in renewable energy sector in Africa. Thus, some reforms in regulatory frameworks and incentive structures are essential to alleviate these barriers and attract more private actors to renewable energy generation at an appropriate level. These reforms can be summarized in the following **three steps**[5]:

1. Improving the risk-return profile of renewable energy relative to traditional sources of energy. African governments can achieve this by phasing out fossil fuel subsidies and introducing feed-in tariffs for renewable energy suppliers. This step is also essential for increasing reliability and trustworthiness in government reforms to energy sector from the perspective of private actors.

2. Using international climate finance efficiently and effectively. For example, there are resources made available by developed countries

[1] AREF's headquarter is in Nairobi and it is the first dedicated SSA renewable energy fund. The African Development Bank (AfDB) and its Sustainable Energy Fund for Africa (SEFA) are AREF's main sponsors. For more details, refer to:
Berkeley Energy: **Africa Renewable Energy Fund (AREF)**, Information Note presented at IRENA Project Navigator Workshop (Cape Verde: Berkeley Energy, September 2014), pp. 1-5.

[2] Cynthia Okoroafor: **What Makes Renewable Energy in Africa Attractive to Big Investors?**, 29 September 2015, at:
http://venturesafrica.com/what-makes-renewable-energy-in-africa-attractive-to-big-investors/, Visited on: 14/02/2016.

[3] http://www.africa-eu-renewables.org/wp-content/uploads/2015/09/RECP-Private-Sector-Fact-File.pdf, Visited on: 14/02/2016.

[4] OECD: **OECD Principles for Private Sector Participation in Infrastructure** (Paris: OECD, 2007), p. 7.

[5] UNEP: Financing Renewable Energy…, **op. cit.**, pp. 48-50.

to developing countries in the form of bilateral or multilateral official development assistance to support using clean (renewable) sources of energy. Also, there are resources that can be mobilized through international carbon markets, particularly through the Clean Development Mechanism and other crediting mechanisms under international law.

3. Reducing political and regulatory risks in African countries by carrying out political, economic and social reforms; such as addressing culture of corruption, establishing standards of transparency in public administration, and improving law enforcement.

VI. Conclusion

Though Africa suffers from low electricity access rates (especially in rural areas), it still enjoys abundance in renewable energy resources that can enable African countries to meet their increasing energy demand and their accelerating growth rates. A lot of evidences in other developing and emerging economies show that private investments can play a major role at improving renewable energy sector in African countries.

To mobilize these investments, African governments need to address the different barriers that private actors face in renewable energy sector; financial, regulatory, and capacity barriers. This can be achieved by taking various reform steps; such as phasing out fossil fuel subsidies, introducing feed-in tariffs, establishing standards of transparency in public administration, and improving law enforcement. Furthermore, African governments need to intensify the benefits and incentives these private actors shall get from engaging in energy sector. This can be done by exploiting international resources made available by developed countries to developing countries in the form of bilateral or multilateral official development assistance to support using clean sources of energy.

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