IMPACT OF THE UNBUNDLING ON RENEWABLE ELECTRICITY: EVIDENCE FROM KENYA

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Overview

Electricity market reform has gained momentum globally since 1980s, despite of the untested hypothesizes (Jamasb et al. 2005), one of which is unbundling. African countries since 1990s embrace the electricity market reform in parallel with the renewable electricity development. Substantial previous theoretical and empirical research has found no unambiguous evidence of positive effects of unbundling on consumers' welfare or prices exists, nor is there evidence on investment incentives in energy markets (Iimi 2003, Bolle & Breitmoser 2006, Pollitt 2008, Gratwick & Eberhard 2008, Malgas & Eberhard 2011, Bremberger et al. 2012, Gugler et al. 2013). However, few research has analyzed the impacts of unbundling on renewable electricity in Africa (UNIDO 2005, Owino & Morton 2010), given that the sector reform is a set of policies involving not only unbundling, and streamlining both sets of policies of unbundling and renewable electricity is a multi-dimensional challenge (Pollitt 2012). Notwithstanding, the unbundling inevitably interferes with renewable policies (UNIDO 2005).

Therefore, it becomes critical to examine the impact of unbundling on renewable electricity so as to reflect on the reform and figure out the hurdles in renewable electricity promotion, especially for the Sub-Saharan African countries where electricity access rate is the lowest in the world, 35 per cent in average and 19 per cent for rural regions (IEA 2014), and where renewable electricity has a profound role to play in achieving many of the Sustainable Development Goals (SDGs).

Against this backdrop, the paper chooses Kenya as a case study country to examine the impacts of unbundling on renewable electricity. Besides the reason that it is regarded by UNIDO as one of the best examples in illustrating the relations between these two sets of policies, Kenya is selected also because it is in transition with multiple generation (including the incumbent state-owned utility and Independent Power Producers, hereafter IPPs) and single buyer, a typical model for many African countries (Eberhard et al. 2016), and the leading Sub-Saharan African country on exploring geothermal and wind for electricity.

The hypothesis to be testified in this paper is that, after vertical unbundling, a country increases renewable electricity as long as it is the cheapest energy source and it can afford the investments costs. It is raised up based on the attribute of renewable energy financing. The development of renewable energy needs sufficient financing from various sources (Donovan 2015). This paper through the Kenyan case identifies whether the generation utilities after unbundling prefer the energies with low cost, and whether these energies with low cost are RE.

The paper is organized as follows. The section two depicts the earlier literature and conceptual framework, and raises up the hypothesis. The section three analyzes the case of Kenya on electricity sector reform and renewable policies, provided as the justification of studying relations of these two sets of policies in Kenya. The section four illustrates the changes in the structure of power generation and the results from interviews. In the section five, discussion and policy analysis are derived. The final section concludes the paper.

Methods

Empirical case study, with data from literature review on published documents, and key informant interviews conducted in Nairobi, Kenya and World Bank Headquarters in Washington DC, USA. The data are processed by the software Atlas.ti 7.

Results

First, from the statistical facts, after the unbundling in Kenya in 1990s, renewable energy, especially geothermal, has become the dominant resource for electricity generation, with 48 per cent in 2016. And if include hydro as renewable, 87 per cent of generated electricity were from renewable sources in 2016. However, in terms of installed electricity capacity in 2016, renewable energy (28 per cent) is still lower than conventional energy (37 per cent) and hydro (35 per cent). Among the 28 per cent of installed renewable electricity capacity, Kenya Electricity Generation Company (KenGen) hosted 21 per cent of geothermal electricity and 1 per cent of wind power, while IPPs, namely one geothermal project OrPower4, operated 6 per cent of geothermal electricity. And KenGen hosted all the 35 per cent of hydroelectricity. Therefore, in the context of Kenya, statistics reveal that the local renewable resources (geothermal, wind and hydro) are the most economical for electricity generation compared with the imported resources (nuclear and coal). However, exploring the local resources require more capital investment than the imported ones.

Second, based on the practical facts, after unbundling, the generation utilities chose the energies with the lowest cost in Kenya where the renewables, namely geothermal, wind and hydro, are the low cost ones. Therefore, the unbundling has helped to the promotion of renewable electricity in Kenya. However, it also reveals two challenges might impeding the future renewable electricity development: 1) the financing challenge for the IPPs, especially the new entrants, in comparison with the incumbent state-owned utility; 2) the joining mechanism challenge faced by the IPPs for whom the International Competitive Bidding (ICB) and Feed-in-Tariff (FiT) policy seemed to be ineffective.

Third, relative problems and potential solutions to solve the two challenges are analyzed and discussed on three aspects: 1) the necessity of streamlining the current legal and regulatory framework in the Kenyan electricity sector with the new Constitution; 2) the debate on unbundling reform and gaming among World Bank Groups (WBG), Government of Kenya (GoK) and the vested interest groups in Kenya; 3) the importance of mobilizing the international and private financiers to co-invest on renewable IPPs.

Conclusions

Though promoting the renewable electricity is not the primary goal for unbundling, the ripples of the unbundling reform in electricity sector have spread to renewable electricity. The paper proves the hypothesis that in Kenya both incumbent state-owned and IPPs for generation choose renewable energies, such as geothermal, wind, and hydro, because they are the lower cost energies in comparison with conventional energies, leading to the conclusion that the unbundling in Kenya promotes the development of renewable electricity. This also implies as long as institutional and financial challenges are solved the unbundling will further accelerate the renewable electricity penetration. It requires future research on how to advance the IPPs' investment with resistances from incumbent state-owned utilities, and on looking for appropriate unbundling models in the hybrid energy markets.

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