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Kenya's lessons from two decades of experience with independent power producers

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ABSTRACT

Adequate, secure, and competitively priced electricity is vital for powering economic growth and development. Privately funded, independent power producers (IPPs) are now making an important contribution to meeting overall power needs in developing countries, including in Africa. Our aim in this article is to explore what may be learned from Kenya's experience with IPPs and what lessons might be applied to other developing countries. We consider how Kenya's IPPs measure up to their public counterparts in terms of reliability and costs and possibilities for scale-up. Kenya's two decades of experience with power sector reform and IPPs makes it possible to compare changing policies, sector unbundling, regulatory frameworks, planning, and investment over a relatively long period. Kenya is also host to IPPs with different technology bases, which allow for an evaluation of their relative costs and reliability. Finally, the mix of directly negotiated and competitively bid projects facilitates a comparison of procurement practices. While power sector reform in Kenya created an enabling environment for IPPs, probably more important was the development of effective planning, tendering, and contracting capabilities, which attracted investment at competitive prices. The challenge for Kenya and other developing countries is to maintain and sustain these capabilities within clear policies that provide regular opportunities for the private sector to contribute to meeting power deficits.

1. Introduction

Most African countries have insufficient electricity to power economic development and to extend access to all of their population. Traditionally, governments and public utilities have funded new power generation capacity, but not at the rate required. Independent power producers (IPPs), or privately funded electricity generation projects, are now complementing these sources and are present in 20 countries across the continent (Eberhard et al., 2016).[1] Kenya has more experience with IPPs than most countries in Sub-Saharan Africa. Between 1996 and the end of 2015, the country developed 12 IPP projects for a total of approximately 1106 megawatts (MW) (worth over US$2.3 billion in investment) and more are in development. After almost two decades, IPPs account for 28 percent of installed generation and 23 percent of production (see Fig. 1 for a visual representation of the structure of the Kenyan electricity sector). Most of the IPPs procured since 1996 are medium-speed diesel/heavy fuel oil (MSD/HFO), and Kenyan authorities have gained considerable expertise in running and awarding international competitive bids (ICB) (Kapika and Eberhard, 2013). More recently, however, the procurement of new geothermal and wind power has occurred via less transparent channels, and with less than optimal results (Eberhard et al., 2017).

Our aim in this article is to explore what may be learned from Kenya's experience with power sector reform and IPPs and which factors are important in facilitating private investment in power. Further, we consider how IPPs measure up to their public counterparts in terms of reliability and costs. After briefly outlining our methodology and the article's limitations, we provide a short overview of the drivers for IPPs across Sub-Saharan Africa. This is followed by a description of the development of Kenya's power sector since 1996, its current structure, planning processes, and capacity. Prices, performance data, and funding sources are also presented. In subsequent sections, the analysis

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[1] Independent power producers and independent power projects are used interchangeably and are characterized as independent (non-utility/state-financed) electricity generation. Projects typically have a long-term power purchase agreement (PPA) with the utility and are financed with non-recourse loans. Further definition is provided in the methodology section below.

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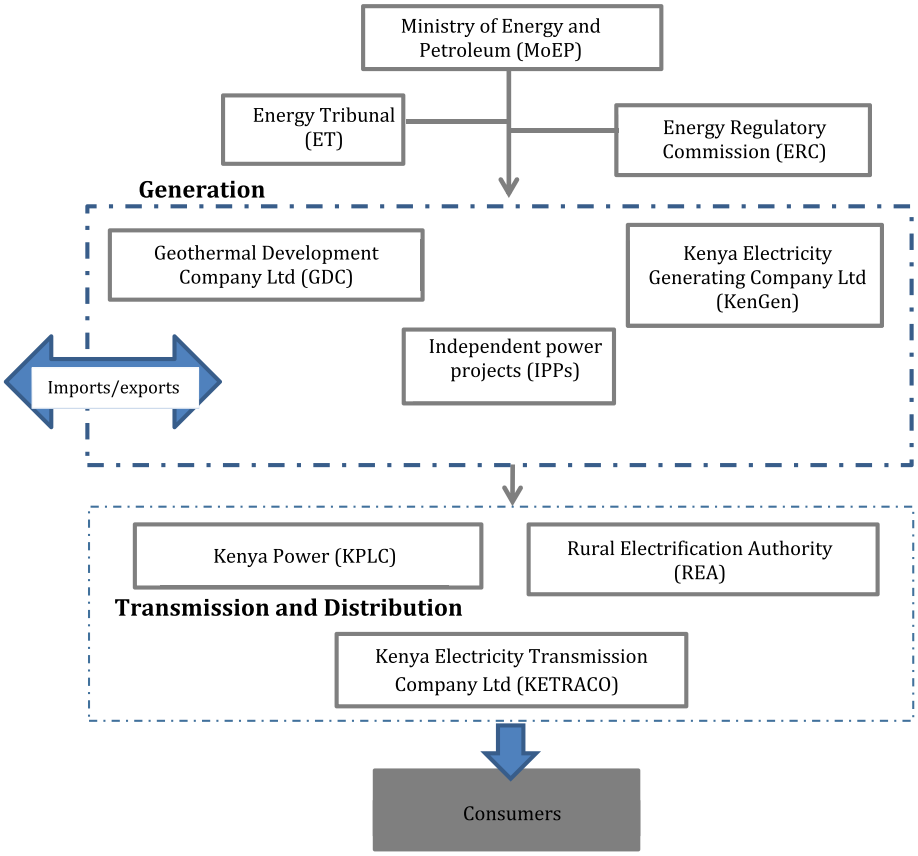

Fig. 1. Overview of Kenya's electricity sector.

focuses on mechanisms for the procurement and funding of capacity, and sketches future plans that have been made public. Findings are offered related to the different IPP typologies based on the type of procurement, ownership and financing structures, technologies, and risk mitigation measures.

In the conclusion, we assess the factors that have contributed to and detracted from power generation development in Kenya. We then consider what policy lessons may be drawn from Kenya for other countries seeking to ramp up their power generation capacity using private capital.

2. Methodology

All of the IPPs discussed are greenfield, grid-connected installations of 5 megawatts (MW) or more, that have reached financial close, are under construction, or are in operation. A significant amount of data on these installations was collected and analysed, spanning nearly 20 years (1996–2016). To gather project data, authors started with a series of World Bank databases, including the Private Participation in Infrastructure (PPI) database, and databases prepared by AidData and the Energy Information Administration (EIA), among others. These data were complemented by information on individual projects gathered from various primary and secondary sources, including up to 20 interviews with project sponsors and stakeholders at Iberafrica, Tsavo, OrPower4, Rabai, Triumph, Gulf, Kinangop, as well as present and former personnel at KenGen, Kenya Power and Lighting Company (KPLC), the Energy Regulatory Commission (ERC), and the World Bank. Unless otherwise indicated, all information was given anonymously, at the request of the stakeholder. All data was reconfirmed by at least two sources to ensure the robustness of data on each project and the sector more generally, with all participating stakeholders reviewing the findings. Data gathered include information concerning the composition of investments by source, the terms of IPP contracts (which remain mostly confidential) and the size, composition, and types of investment.

It is important to note that IPPs are not uniform. Although the typical IPP structure is understood as a privately sponsored project with nonrecourse or limited recourse project financing, IPPs in Sub-Saharan Africa do not always follow this model (Eberhard et al., 2016). Instead, governments typically hold some portion of equity or debt, bringing IPPs closer to a model of a public-private partnership (PPP) than that of the more traditionally conceived IPP. For the purposes of this analysis, IPPs are defined as power projects that are, primarily, privately developed, constructed, operated, and owned; have a significant proportion of private finance; and have long-term power purchase agreements with a utility or another off-taker.

2.1. Limitations of this article

Our focus is on power generation, as opposed to transmission or distribution. In many markets globally, transmission and distribution are considered natural monopolies and therefore not open to competition. Generation, although historically considered part of an integrated monopoly, has come to be seen as a place where producers can compete in an organized market. That makes the generation sector much more suitable for IPPs as opposed to other segments in the value chain. Furthermore, it is easier to fund generation projects (than transmission and distribution) as they are specific and easier to manage. A detailed discussion of the environmental externalities attached to specific power generation technologies, which pose growing concern, lies outside the purview of this article.

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