

ABSTRACT

As the costs of PV equipment and Levelised Cost of Electricity (LCOE) of distributed PhotoVoltaic (PV) generation continue to decline, more customers of municipal utilities in South Africa are opting for distributed self-generation based on rooftop PV, thereby lowering their electricity costs while also enhancing the reliability of supply. This trend results in municipalities experiencing a decline in sales (and revenue), due to the fact that the revenue is primarily coupled to the volume of electricity consumption/sales. Using the City of Ekurhuleni (CoE) as a case study, this study addresses the critical concern over revenue erosion by conceptualising a responsive business model in relation to the increasing adoption of distributed PV generation, with a core motivation of safeguarding municipal revenue from electricity-services. The study collected secondary and primary data from the CoE, as well as secondary data from published academic sources and publicly available online reports.

Data on registered small-scale embedded generation (SSEG) show a growing trend in distributed PV penetration as the related LCOE approached and subsequently dipped below grid-parity in 2013/14. The data were further analysed to determine the city's losses in sales and subsequent loss in revenue. The study also analysed the potential maximum sales likely to be lost should all of the 8500 large customers decide to install distributed rooftop PV.

The results show that the CoE could potentially experience a 30.13% loss of its annual revenue (up to R3.736 billion equivalent) based on current electricity tariffs. A responsive business model option envisages the CoE entering the distributed rooftop PV electricity market by playing alternative roles, such as financing, owning/operating, and installation of the distributed PV systems on its customers' premises. The model further envisages the issuance of green certificates and green-tariffing at discounted rates. The study recommends further research aimed at developing more possible business models for municipal electricity utilities

Keywords: business model, distributed PV generation, levelised cost of electricity (LCOE), municipal electricity utilities, photovoltaic (PV) penetration,