Access to modern energy services especially in developing countries is an urgent issue. Globally, 1.3 billion people do not have access to modern energy and the services associated with it. Sub-Saharan Africa is one of the regions with profound lack of modern energy access. The objective of this paper is to understand the role that residues obtained from agricultural practices could be utilised in providing electricity for use in West African countries. Selected countries include: Ghana, Nigeria, Senegal and Togo. The study utilized methods developed by Mendu et. al. 2012, Mabee et. al. 2010, Ackom et al., 2013, to estimate electricity production from agricultural residues in the selected countries. This study considered competing utilization of residues for animal fodder, bedding and nutrient recycling in the region. Findings show bioelectricity from residues could supply $0.6 \times 10^6 - 1.5 \times 10^6$ MWh (Ghana), $4.5 \times 10^5 - 13 \times 10^5$ MWh (Nigeria), $0.5 \times 10^6 - 1.2 \times 10^6$ MWh (Senegal) and $0.2 \times 10^6 - 1.3 \times 10^6$ MWh (Togo). This could help bring increased electrification from a renewable energy source to the countries especially in the farming communities where the residue abounds thus ensuring good prospect for improved quality of life, poverty alleviation and sustainable development.