



Linking the open source, spatial electrification tool (ONSSET) and the open source energy modelling system (OSeMOSYS), with a focus on Sub-Saharan Africa

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In September 2015, the United Nations General Assembly adopted Agenda 2030, which comprises a set of 17 Sustainable Development Goals (SDGs) defined by 169 targets. “Ensuring access to affordable, reliable, sustainable and modern energy for all by 2030” is the seventh goal (SDG7). While access to energy refers to more than electricity, the latter is the central focus of this work. According to the World Bank’s 2015 Global Tracking Framework, roughly 15% of world population (or 1.1 billion people) lack access to electricity, and many more rely on poor quality electricity services. The majority of those without access (87%) reside in rural areas. This paper presents results of a Geographic Information Systems (GIS) approach coupled with open access data and linked to the Electricity Model Base for Africa (TEMBA), a model that represents each continental African country’s electricity supply system. We present least-cost electrification strategies on a country-by-country basis for Sub-Saharan Africa. The electrification options include grid extension, mini-grid and stand-alone systems for rural, peri-urban, and urban contexts across the economy. At low levels of electricity demand there is a strong penetration of stand-alone technologies. However, higher electricity demand levels move the favourable electrification option from stand-alone systems to mini grid and to grid extensions.