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Postprint

This is the accepted version of a paper presented at *22nd International Sustainable Development Research Society Conference. 13-15 July.*

Citation for the original published paper:

Selvakkumaran, S., Silveira, S. (2016)

Exploring synergies between climate and electrification goals – the cases of Ethiopia, Kenya and the Democratic Republic of Congo (DRC).

In: *Exploring synergies between climate and electrification goals – the cases of Ethiopia, Kenya and the Democratic Republic of Congo (DRC)*

N.B. When citing this work, cite the original published paper.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-185430>

Exploring synergies between climate and electrification goals – the cases of Ethiopia, Kenya and the Democratic Republic of Congo (DRC)

Partners to the UNFCCC have been asked to make their pledges and contribute to climate change mitigation through Intended Nationally Determined Contributions (INDCs). Funds have been allocated to support developing countries implement climate mitigation and adaptation measures. Meanwhile, the global sustainable development agenda has also been approved, including energy and climate goals. In other words, we would expect that INDCs explore the synergies between climate and development agendas. In 2012, Ethiopia, Kenya and the Democratic Republic of Congo (DRC) had electrification levels of 26.6%, 23% and 18% respectively. This also means the three countries had populations of 70 million, 35 million and 60 million with no access to electricity. The electricity access targets of Ethiopia, Kenya and the DRC for 2030 are 75%. The objective of this paper is to analyze how these countries improve energy access in a context of climate change mitigation. The analysis explores (i) the electricity mix aimed for, (ii) the expected GHG emissions from electricity generation until 2030, and (iii) electrification and related metrics. Ultimately, we aim at a better understanding of what these countries' climate and development strategies encompass in terms of emissions reductions as well as electrification goals, as per reflected in their INDCs. Given the bottom-up process inherent in the INDCs and the climate agreement mechanism, the paper gives insights on how these countries have used the INDCs to prioritize sustainable electricity access. The electrification goals are achieved by increasing generation in these countries for domestic use and enabling access to generated electricity. The INDCs are an ideal platform to achieve this if generation capacity is increased by catalyzing climate finance if the expansion falls under the category of climate-appropriate technologies. The BAU case electricity generation has been computed using a simple regression model. It has been compared with targets given by the countries or multilateral organizations. The regression model's independent variable is the GDP/capita for each individual country. These GDP/capita forecasts are also an underpinning assumption of their submitted INDCs, and thus it is reasonable to use them in the regression model to forecast electricity generation. The diversity of the power mix is calculated using the Shannon-Weiner Index. The percentage of renewable energy sources are calculated along with their share in the total potential available in each country. The results show that the three countries have different storylines as to their sustainable electricity access targets and their INDCs. Ethiopia aims at nearly 100% renewables for power in 2030, while Kenya's renewables only generate 54% of the total electricity provided in 2030. In the case of DRC, the

renewables are very high, but the per capita electricity use is very low and it will become a power exporter. Although the climate mitigation goals for the energy sector as defined in the INDCs of the three countries are ambitious, they still have a long way to go in translating the electricity access ambitions into feasible domestic electricity use.

Keywords: electricity access, INDCs, GHG emissions, sub-Saharan Africa, renewables