



## **Regional assessment of the hydropower potential of rivers in West Africa**

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The 15 countries of the Economic Community of West African States (ECOWAS) face a constant shortage of energy supply, which limits sustained economic growth. Currently there are about 50 operational hydropower plants and about 40 more are under construction or refurbishment. The potential for future hydropower development – especially for small-scale plants in rural areas – is assumed to be large, but exact data are missing. This study supports the energy initiatives of the “ECOWAS Centre for Renewable Energy and Energy Efficiency” (ECREEE) by assessing the hydropower potential of all rivers in West Africa. For more than 500,000 river reaches the hydropower potential was computed from channel slope and mean annual discharge. In large areas there is a lack of discharge observations. Therefore, an annual water balance model was used to simulate discharge. The model domain covers 5 Mio km<sup>2</sup>, including e.g. the Niger, Volta, and Senegal River basins. The model was calibrated with observed data of 410 gauges, using precipitation and potential evapotranspiration data as inputs. Historic variations of observed annual discharge between 1950 and 2010 are simulated well by the model. As hydropower plants are investments with a lifetime of several decades we also assessed possible changes in future discharge due to climate change. To this end the water balance model was driven with bias-corrected climate projections of 15 Regional Climate Models for two emission scenarios of the CORDEX-Africa ensemble. The simulation results for the river network were up-scaled to sub-areas and national summaries. This information gives a regional quantification of the hydropower potential, expected climate change impacts, as well as a regional classification for general suitability (or non-suitability) of hydropower plant size – from small-scale to large projects.