Report Examines Sustainable Minigrids for Rwandan Refugee Camps

April 9, 2020 By Yasmin Ali Leave a Comment

Investment in clean energy solutions — in particular minigrids — offers the potential to reduce the costs and environmental impact of humanitarian operations, according to a briefing note on Rwanda published by Imperial College London, UK.

Fossil fueled systems often power humanitarian assistance work. Philip Sandwell and Javier Baranda Alonso, humanitarian energy researchers at Imperial College London, assessed the viability of using combinations of renewable and fossil fueled energy generation systems in refugee camp settings, with a focus on Rwanda.

Renewable minigrid installed by Meshpower in partnership with Imperial College London, in Mahama refugee camp, Rwanda. Meshpower is a developer of minigrids for rural off-grid and displaced people. Courtesy of Arthur Santos.

Rwanda has experienced a rapid rise in electrification. Household access to electricity increased from 6% to 49% between 2008 and 2019. Minigrids are seen as a cost-effective option to provide electricity access in rural areas, where refugee camps are often located.

Nyabiheke refugee camp

As of 2019, Rwanda was home to 149,000 refugees according to the United Nations Refugee Agency UNHCR. 13,000 are hosted by Nyabiheke refugee camp. Lacking access to the grid, the camp requires around 13 kW of diesel generation. Humanitarian organizations spend an estimated $30,000 per year on diesel, with associated annual emissions of 101 tons of carbon dioxide equivalent.

Sandwell and Baranda Alonso's techno-economic study results show that introducing hybrid solar PV, battery and diesel or fully renewable solar PV and battery minigrids can reduce lifetime electricity costs and emissions. A fully renewable system could result in a lifetime cost reduction of 32% and greenhouse gas emissions reduction of 83% for Nyabiheke.

As well as reducing costs and emissions for humanitarian organizations, these minigrids could promote resilience and productivity for displaced populations.

Improving energy access for displaced populations

Minigrids tend to power water pumping, schools, and institutional facilities.

"Depending on the context, they might also power refugee households, marketplaces, or businesses founded by refugees," Baranda Alonso explained.

Spurred on by political agreements like the Comprehensive Refugee Response Framework between UNHCR and Member States of the United Nations, commitment towards sustainable energy in displacement settings is on the rise. The agreement includes Rwanda, and aims to integrate refugees into society through measures like the right to work and access to local schools.

"That gives a new lease of life to minigrid companies who can say 'these people in these camps need access to electricity…we can help you to achieve the political goals by providing access to energy for their businesses,'" Sandwell said.

The lack of energy demand data in refugee camps is a challenge. As such, the Imperial College London team is now working to create generic demand profiles to inform modeling of sustainable grid systems. This could aid decision making for minigrid developer with such issues as selecting suitable tariffs to ensure profitability while providing accessible and affordable energy for refugee populations.

The full briefing, "Sustainable Minigrid Systems in Refugee Camps: A Case Study of Rwanda," is available here.

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