
 AFRICA

A hybrid-microgrid box of tricks for the ICRC

The largest logistics hub in Africa for the International Committee of the Red Cross (ICRC) is located in the Kenyan capital Nairobi, a city exposed to frequent power outages and power quality issues. ABB will be supplying the ICRC with a containerized microgrid to provide an uninterruptable power supply (UPS) derived from traditional and renewable energy sources. The microgrid will be supplied with all of the elements included in a single container, making this innovative solution of great use for other ICRC projects.



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The ICRC, founded in 1863, is headquartered in Geneva, Switzerland. The logistics hub in Kenya is the ICRC's largest in the field →1. Employing 170, the Kenyan logistics hub is the ICRC's largest storage facility and is responsible for the delivery of food and other essential items such as medicines and relief supplies across the African

ABB is building a containerized hybrid microgrid to maximize the use of renewable energy and ensure a reliable power supply for the ICRC.

continent. ABB is building for the ICRC a containerized hybrid microgrid, with a battery energy storage system that runs on photovoltaic (PV) energy and a diesel generator to maximize the use of renewable energy and ensure a reliable power supply. The microgrid will work in parallel with the on-site solar/diesel generation, seamlessly disconnecting and connecting to the main grid as required. It is scheduled for completion by the middle of 2017.

Microgrids are used to integrate distributed energy resources and loads that can be operated in a controlled, coordinated way. They can be either connected to the main power grid or can provide power independently, ensuring utility-grade power quality and grid stability.

These small-scale grids are exceptionally flexible and can be transported, bringing power to remote communities and facilities that might otherwise have to wait years or even decades for a grid connection. They are also ideal as back-up power sources for grid-connected installations in places prone to power outages.

Microgrids integrate multiple distributed generation sources including conventional diesel and gas, and/or renewables such as solar, PV, wind, hydroelectric, tidal and even thermal schemes like combined heat and power (CHP), together with energy storage. The microgrid provides the overall control to coordinate these resources to meet the requirements of industrial, residential or consumer loads [1].



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01 ICRC logistics hub
in Nairobi (©ICRC).

Microgrids have enormous potential in Africa, where more than 900 million people lack access to electricity. In sub-Saharan Africa, where two-thirds of the population – 620 million people – live without power, microgrids could dramatically speed up economic development [2].

ABB, a pioneer in microgrid technology, has installed over 30 microgrids around the world in remote communities, islanded electrical grids, research and industrial campuses and utility grid support applications.

Solutions with a purpose

The project has two main purposes. Firstly, to ensure the ICRC facilities are fed with uninterrupted and reliable power in order to avoid losses of critical items like drugs and medicines due to power outages. Power outages are not uncommon in Kenya so a UPS backup is essential for storage of critical supplies →2.

Secondly, to serve as a pilot project for the ICRC, so that they may, in a controlled environment, test and learn the technology before deploying it to refugee camps, where the issues with power are more severe than in Nairobi.

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Plug and... save

The containerized hybrid microgrid solution for the logistics hub in Nairobi will include:

- a control system – the Microgrid Plus system
- a stabilization system – the PowerStore system
- an energy storage system – based on Li-ion batteries.

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02 Duration of power outages in selected African Countries [3]
Notes: CAR=Central African Republic. Data is from the latest available business survey for a given country.
Sources: World Bank (2014b); IEA analysis.

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References

[1] M. Ghavi. (2016, Dec. 16) Microgrids Have a Key Role to Play in a Low-Carbon Future [Online]. Available: <https://microgridknowledge.com/microgrids-key-role-low-carbon-future/>

[2] A. Al-Saffar, M. Baroni, C. Besson et al., "Africa Energy Outlook," Int. Energy Agency, World Energy Outlook Special Rep. Paris, 2014. pp. 3.

[3] A. Al-Saffar, M. Baroni, C. Besson et al., "Africa Energy Outlook," Int. Energy Agency, World Energy Outlook Special Rep. Paris, 2014. pp. 26.

In addition to the containerized items, ABB will also supply engineering services, transportation, erection supervision and commissioning.

The project will allow the integration of renewable solar energy into the existing grid, which is nowadays fed by the electricity company Kenya

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“Reliable power is essential for our staff to continue their life-saving work uninterrupted in the field” – ICRC President Peter Maurer.

Power (KPLC) and diesel generators. So in addition to protecting essential ICRC resources, the hybrid microgrid will assist in reducing carbon emissions.

“Reliable power is essential for our staff to continue their life-saving work uninterrupted in the field” said ICRC President Peter Maurer.

“In addition, the ABB microgrid solution is in line with the ICRC’s goal to use environmentally friendly technologies. Solutions like this are proof that cooperation between the corporate and humanitarian sectors is not only possible but imperative. We are happy and proud to count ABB as a member of our corporate support group.”

The agreement reflects an ICRC initiative launched in 2014 for greater technology collaboration with the private sector. ABB has been a member of the ICRC corporate support group for the past decade, contributing to water and habitat programs for victims of conflict in the Democratic Republic of Congo and Iraq. ABB also helps train ICRC engineers. ●

