

INSIGHTS

West Africa "“ a role for off-grid renewable energy?

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West Africa is a land of opportunity, home to some of the richest oil and mineral resources in the world. The rush for the region's oil, gold, iron and other commodities has driven economic growth at a faster rate than anywhere else in Africa. Yet West Africa's bountiful wealth may also be limiting its development potential. The increasing demand from industry is placing enormous strain on an aging and inadequate infrastructure, with installation of new capacity hampered by inefficiency and poor governance. With population growth now outstripping the rate of new supply, it seems unlikely that West Africa's energy demands can be met solely by development of national or international grids. In this article, we consider the energy challenges facing the region, the role of the West African Power Pool and the potential of off-grid development to provide renewable, reliable energy supply beyond the grid. **Challenges** A number of countries in West Africa rank amongst the least electrified in the world with many (Mali, Liberia and Sierra Leone among them) having no effective national grid. The lack of access to electricity is a significant obstacle to economic growth. Businesses which operate in remote areas are often reliant on diesel generators to power their operations. Diesel is expensive, it pollutes the environment and it can be dangerous to human health. It needs to be transported to sites in tankers. This has been a particular issue for the mining industry in West Africa, as exploration companies move away from grid connections in search of new deposits. There is a broader human impact as well. Without electricity, people must fetch and carry fuel, food storage is limited and the activities of a community are limited to daylight hours. The ability of the population to work and contribute to economic growth is limited as the daylight hours are taken up with the task of day-to-day living. **WAPP** In an effort to address the energy challenges in West Africa, 14 of the 15 member states of the Economic Community of West African States (ECOWAS) established the West African Power Pool (WAPP) in 1999. WAPP aims to integrate the national power systems of its members into a unified regional electricity market to provide citizens of ECOWAS with stable, reliable electricity at affordable costs. There is no doubt that WAPP will be beneficial for the development of renewable energy in the region. However, West Africa covers a surface area of almost 20% of the African Continent and is home to a rural population of over 50%, many of whom will live in communities which lie beyond the reach of the new infrastructure. In addition, there is no guarantee that electricity from the grid will always be affordable for local communities. For these reasons, West Africa will need to look beyond centralised grid power to fill the power gap. **Beyond the grid?** It is

against this backdrop that ECOWAS has sought to promote innovative off-grid or mini-grid solutions, powered by renewable energy, in its push for energy access. Mini-grids "the localised generation, transmission and distribution of power" are relatively quick and easy to set up and can generate anything from a few kilowatts to a few megawatts of power. They can be upgraded to meet increased demand and connected to the grid if and when it reaches the area. And as the cost of renewable technologies has fallen globally, a well-maintained renewable energy system is likely to be less expensive over its lifetime than one powered by diesel. Investors remain nervous about the challenges of renewables which include investments in measurement campaigns and due diligence to identify the best technologies for the local conditions. In addition, renewable technology must be supported by storage systems which provide back-up when the wind drops or the sun fails to shine. These systems can add up to 50% to the cost of setting up an off-grid network and historically have been capable of covering only short term blackouts. That said, there are promising signs. Last year, for example, the Abu Dhabi Fund for Development and the International Renewable Energy Agency awarded a \$ 5 million low-cost loan to the government of Mauritania. The purpose of the loan was to finance a new mini-grid consisting of 18 wind turbines, providing 15 kW of power to households, schools, health facilities, civic buildings, a desalination plant and an ice-making plant. There are encouraging stories from elsewhere in Africa as well. In October last year, Danish wind turbine manufacturer Vestas and Swiss power technology firm ABB agreed to collaborate on the Wind for Prosperity (WfP) initiative to bring affordable electricity to energy-poor, wind-rich rural communities. The technology behind their first project in Kenya is a hybrid wind-diesel power generation system able to provide stable, reliable electricity to isolated mini-grids. If successful, WfP plans to roll out the initiative across the world, including a number of countries in West Africa.

Conclusion As a consequence of decades of underinvestment, West Africa's existing electrical infrastructure is not fit for purpose and over half of the region's population does not have access to electricity. The development of WAPP is welcome but, on its own, it will not be able to bridge the gap between supply and demand in the region. There is growing evidence of investment in off-grid renewable development. Reliable statistics are not available but it is clear that the ECOWAS member states have taken a proactive role to address the current energy challenges. If West Africa is to achieve its economic potential, it will need to exploit its plentiful natural resources. In addition to oil and minerals, the reducing cost of renewable energy technologies means that the region can now take advantage of its plentiful hydro, solar and wind resources.

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