



POWER AND COAL PROSPECTS IN DEVELOPING AFRICA

Africa faces more developmental challenges than almost any other region. It has about one-fifth of the world's population at roughly 1.37 billion (2020), yet generates just 3% of global gross domestic product (GDP) which has grown at a slower rate than the global average in recent decades. Energy poverty is a major problem with per capita energy demand being a third of the global average at just 0.7 tonnes of oil equivalent (toe) per person. Traditional biomass in the form of wood fuel accounts for half of all the energy consumed by end-users in Africa and will remain significant in the coming decades.

Access to electricity is uneven. Almost 100% of the population in North Africa is connected to power supplies. However, in sub-Saharan Africa, home to 80% of the population, only half the people have access to electricity. For those with access, supplies can be unreliable and a major cause of disruption to economic activity. The pressure to provide more reliable and affordable electricity supplies is mounting in Africa as the population is expected to increase significantly to roughly two billion by 2050. Urbanisation is also increasing, so the demand for energy will be focused in centres that require grid-supplied power due to a higher population density, more modern housing, commerce, industry, and infrastructure.

Conventional power generation from gas (39%), coal (30%), and hydroelectricity (17%) are the main sources of power in Africa and could continue to dominate for some years even as renewables increase. Coal may remain important as it can provide both baseload power and flexible output to balance variations in renewable power generation. However, non-hydro renewable energy, such as wind and solar, is making only modest inroads into Africa accounting for just 3% of the power generated in 2019.

Coal-fired power accounted for 260 terawatt-hours (TWh) of the total 850 TWh (all fuels) generated in 2019. Three-quarters of the coal power was generated in South Africa. However, South Africa seeks to reduce its dependence on coal, while other African countries are exploring ways to expand their coal mining and power generation sectors. But pressure from international climate change agreements and meetings such as the UN Climate Change Conference in 2021 (COP26) means there is a risk that investment in modern coal technologies will lose momentum in Africa.

For countries where coal power dominates, it is difficult to determine the potential for alternative sources to replace it such as solar, wind and gas power. In South Africa, coal supports a large mining industry that employs many people, creates wealth in local communities, and is a valuable export commodity. These are important considerations in an economy where unemployment is high. The situation is similar in Botswana and Zimbabwe. Elsewhere, Mozambique, Nigeria and Tanzania have yet to develop coal-fired power despite possessing large coal reserves. These countries share common themes which underpin the development of their economies, which involve using domestic coal reserves to produce affordable electricity while encouraging better energy security and self-sufficiency.

Chronic shortages of electricity suppress economic activity which impairs business and industry in Africa. Even for households that are connected to power, their needs are often not fully met due to supply disruptions. Electricity is therefore an important precursor to meeting many Sustainable Development Goals (SDGs), and coal-fired power can support an economy's development. However, finance is a key

issue and debt-laden utilities, which are typically state-controlled, find it difficult to raise funds to build power projects, especially the more capital-intensive state-of-the-art coal plants with the cleanest pollution control measures. A growing number of financial institutions are unwilling to fund coal power projects and even some African banks have announced policies to reduce their asset exposure to coal-related investments. As such, funding for coal plants in Africa has an uncertain future.

Currently, Africa has just over 50 GW of coal-fired capacity operating, most of which is in South Africa (44 GW). Modern high efficiency and low emissions (HELE) coal power has made some progress in transforming the African coal fleet as there are 7 gigawatts (GW) of supercritical (SC) technology in development in South Africa and 1 GW ultrasupercritical (USC) technology in Morocco. As of 2021, 12 GW of new coal plants were in the planning stages across 15 countries, but the likelihood of these plants reaching the construction stage remains uncertain as countries adapt their energy strategies around new COP26 pledges and in the wake of the energy crisis of 2021-22.

Upgrading existing plants could avoid the cost of large capital projects, and provide a more cost-effective way to improve plant efficiency and reduce emissions. However, as financial institutions withdraw support for coal projects, there is a risk that the benefits provided by modern coal power plants are overlooked, such as generating reliable baseload power all year, while simultaneously providing fast ramping speeds to cope with changes in demand or when renewable power drops. Coal-fired power can act as a potential buffer to ease grid balancing in times of need, but more importantly, it can provide affordable bulk power supplies to empower African countries to become more self-sufficient and achieve SDGs as rapidly as possible.

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Each executive summary is based on a detailed study which is available separately from: www.sustainable-carbon.org. This is a summary of the report: Power and coal prospects in developing Africa by Paul Baruya, ICSC/319, ISBN 978-92-9029-642-3, 115 pp, May 2022.