

Electricity in Africa

The dark continent

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Power shortages have become one of the biggest brakes on development

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SEEN from space, Africa at night is unlit—as dark as all-but empty Siberia. With nearly 1 billion people, Africa accounts for over a sixth of the world's population, but generates only 4% of global electricity. Three-quarters of that is used by South Africa, Egypt and the other countries along the north African littoral.

The need for more power stations in the rest of the continent has long been recognised, but most of the attempts at electrification in the 1970s and the 1980s failed. In some countries, dictators pillaged power stations for parts and fuel. In others, power stations were built but not maintained. Turbines were run at full capacity until they broke, then were abandoned. By some counts, only 17 of Nigeria's 79 power stations, many dating from this period, are still working; the country's demand for power is an estimated 7,600 megawatts, against an actual operating capacity of 3,500MW. The World Bank reckons that 500m sub-Saharan Africans are without what it calls "modern energy".

The situation is bound to get worse as the demand for power continues to grow. Africa's relatively healthy economic growth of recent years begets factories and shopping centres—and power cuts galore.

Whenever demand outstrips supply, the lights go out—several times during the writing of this story. The ubiquitous exodus from huts to houses only adds to the strains. Even the poorest rural migrants, once in the city, prize electric lighting and television sets, and millions are leaving their villages. Kenya's power utility estimates that it adds 12,000 households a month to the national grid.

For now, the continent remains largely dependent on hydropower: 13 countries use it for 60% or more of their energy. But Africa's rain falls more variably than, say, Norway's, and its dams often operate below capacity. Still, many new dams are being planned. Ethiopia has staked its development on damming the Blue Nile and other rivers. In west Africa dams are due to be built on the Niger, the Volta and Bandama. Some of these projects will be held up by financial and environmental disputes, just as Uganda's 250MW Bujagali dam on the White Nile has been. But most will get built.

The river with the biggest hydro potential is the Congo. The potential demand, too, is huge. Only 6% of Congolese have access to electricity and more power will be needed to get at the country's trove of minerals. A grand project to build a series of dams along the Congo's fast-flowing stretches could theoretically supply 39,000MW, enough to power the entire continent. But that will probably remain a dream. Congo has a terrible reputation among investors, and distributing the electricity across thousands of kilometres, much of it jungle, would pose formidable problems.

Aggreko, a company based in Scotland, is the world's biggest supplier of temporary electricity in the shape of



back-up generators. It meets up to 50% of Uganda's power needs, and 10% of those of Kenya and Tanzania. It believes that the global power shortfall in the next decade will be much greater than predicted, perhaps over 500,000MW. The ensuing competition for energy, it argues, will see the world split between those countries whose economies grow faster than their power consumption and those, including most of Africa, whose power consumption grows faster than their economies.

Many African governments are looking at alternative sources of energy to make up their projected shortfalls. Hydropower is clean, from the point of view of greenhouse-gas emissions, but most of the easy alternatives, notably coal, are dirty. Donors committed to cutting global carbon emissions are unlikely to favour more dirty coal-fired power stations of the sort that predominate in South Africa, although the government there claims that it wants to clean them up. Some fossil fuels, however, are less damaging than coal. A pipeline planned for west Africa, which will carry gas that is now flared off in oilfields, could stabilise electricity supply in coastal cities.

Few Africans in rural areas have access to electricity. Connecting them to national grids will be slow and expensive. Yet Lilliputian windmills, water mills, solar panels and biomass furnaces could have a big collective impact. The cost of lighting a shack takes 10% of income in the poorest households and the kerosene lamps are highly polluting. In response, the World Bank has rolled out "Lighting Africa", an ambitious effort to get 250m of the poorest Africans on clean-energy lighting by 2030.

Talk of the mass production of biofuels in Africa is premature, but advances have been made. Some investors are backing jatropha, a plant whose seeds produce an oil for burning in generators. There is also an effort to tap geothermal energy. The Great Rift Valley, from Eritrea to Mozambique, could produce 7,000MW. Kenya hopes to get 20% of its energy from geothermal sources by 2017.

Engineers think they can also use the steady winds in Africa's mountain ranges for power production. And if the costs of using the sun's warmth can be reduced to 30% below its present cost, vast solar farms could offer cheap, clean energy for African cities and in doing so boost incomes in rural areas. Egypt, which relies mostly on natural gas, is looking hard at solar power.

Other remedies for Africa's power shortages are more familiar but just as urgent: more efficient appliances, such as LED lighting, more deregulation, better use of existing resources by, for instance, improving the quality of power lines, and pooling power into regional grids. Otherwise Africa will remain in the dark.