The sustainability equation for Africa's data centres

By David Erwee, Head of Architecture, Managed Services at Datacentrix

Data centres have become an increasingly visible part of the infrastructure underpinning today's digital economy. As organisations adopt cloud services, artificial intelligence (AI), digital financial services and other data-intensive technologies, demand for data centre capacity continues to grow across Africa.

At the same time, data centres are attracting greater scrutiny than ever before because of the resources they require. Electricity consumption, water use and environmental impact have all become significant deliberations, particularly in markets where energy and water resources are already under pressure, drawing attention towards more efficient and responsible operations.

Africa needs digital infrastructure to enable growth, and data centres are an important piece of that equation. The challenge is therefore to find the right balance between expanding capacity and managing the resources required for operation.

Efficiency must become central to design

Sustainability in the data centre environment is not one-dimensional. It encompasses energy efficiency, power resilience, water consumption, cooling, equipment utilisation and the source of the energy being used.

Power resilience, for example, should mean more than having generators available when the grid fails. Operators also need to consider the environmental impact of how the facility is powered and identify opportunities to incorporate renewable generation and energy storage.

Cooling is another area where practical changes can make a difference. Data centres can handle rising heat loads without using proportionally more electricity and water. For instance, closed-loop cooling systems can reduce dependence on water, while hot- and cold-aisle containment can improve airflow management and reduce the amount of energy required to cool the wider facility. In appropriate climates, facilities can also make use of cooler external air during certain periods rather than relying entirely on mechanical cooling.

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These measures are relatively straightforward and show that sustainability does not always require a dramatic technological overhaul. Improving the efficiency of the systems already operating within a facility can make a meaningful contribution to its overall resource consumption.

A diverse energy mix, not a single fix

Another area of rising interest is alternative energy sources for data centres. Solar and wind can play a role where conditions make them viable, while battery energy storage can help address the intermittency of renewable generation, carrying facilities through periods when generation is lower.

For South Africa in particular, reducing reliance on diesel for backup power is an important consideration. Gas can offer a lower-emission alternative to diesel and, in some circumstances, existing generator equipment can be converted to operate on it. But this should not be viewed as the end point of the sustainability journey. Gas remains a fossil fuel, yet where it can reduce emissions while providing reliable backup capacity, it may be one step in a transition towards a more diversified energy mix.

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The broader objective should therefore be to combine resilience, efficiency and lower-emission energy sources rather than treating any single technology as the answer.

The most sustainable data centre is not necessarily the newest one

As the data centre market develops, there is also an important question around what happens to existing facilities.

It can be tempting to assume that building new facilities around the latest technology is the only route to improving efficiency. However, replacing an existing data centre is a significant undertaking, and rebuilding is not automatically the most sustainable or economically sensible option.

There are circumstances where a purpose-built facility will offer substantially better efficiency, particularly when older infrastructure is approaching the end of its useful life, but targeted upgrades can also deliver value.

Retrofitting solar generation to an existing data centre, replacing ageing chillers with more efficient equipment, upgrading uninterruptible power supply systems or improving cooling and airflow management can all contribute to better performance without requiring a complete rebuild.

The right approach will depend on the age and condition of the operation, the remaining useful life of its infrastructure, the cost of the upgrade and the expected payback period. In other words, sustainability needs to be considered alongside the practical economics of the investment.

Location matters too

There is another dimension to sustainable data centre development that is sometimes overlooked: location.

A data centre's environmental efficiency is important, but so are its connectivity, proximity to customers, disaster recovery considerations and ability to maintain the workloads it was built to serve.

A highly efficient facility that is poorly connected or located in an unsuitable environment may not be a sustainable long-term proposition. This is particularly relevant as cloud and data centre capacity expand across Africa; a sustainable cloud region needs to bring together efficient power and cooling with the connectivity, resilience and equipment required to make the facility commercially viable.

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Doing more with less

The growth of AI adds another layer to this discussion. AI workloads require significantly greater computing density, which in turn places additional demands on power and cooling infrastructure, again sharpening the focus on efficiency. As workloads grow, data centre operators cannot simply keep adding resources at the same rate. They need to look at how to deliver greater computing capacity while controlling the required energy, water and other resources.

This is where the sustainability conversation becomes more constructive. Rather than treating digital growth and environmental responsibility as opposing objectives, the industry should focus on improving the efficiency of the infrastructure that enables the development.

For data centre operators, this means considering the full lifecycle of the system, from the energy source and cooling technology through to equipment replacement.

For customers, it means asking where their workloads are hosted as well as how efficiently that infrastructure operates.

And for the industry as a whole, it means recognising that the data centres required to strengthen Africa's digital economy will need to become increasingly resource efficient as they scale. This goes beyond adding data centre capacity in Africa. It is about developing it in a way that advances digital and economic growth while making better use of available energy, water and infrastructure resources.

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