

# A sustainable future: Green buildings key to reducing energy consumption

By [Thabang Byl](#)

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Construction is a key sector to address South Africa's housing shortage and infrastructure needs, and thus is unlikely to slow down. The sector is also at the forefront of economic recovery plans as it has the double advantage of being labour-intensive with a knock-on effect on many industry sectors in its supply chain.



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As a consequence, the construction industry worldwide is facing growing challenges in conserving material and energy resources, as well as reducing its CO<sub>2</sub> emissions. Buildings presently account for approximately 40% of the world's energy consumption and that figure is on the rise. Beyond energy use, buildings also are responsible for nearly half of all greenhouse gases, specifically carbon dioxide.

With Africa facing rising urbanisation and population growth, construction is a sector which cannot be overlooked when considering green initiatives.

South Africa has committed to the UN's Sustainable Development Goals which means taking tangible action work towards achieving these goals. Three goals in particular come to mind when considering the construction industry: sustainable cities and communities, responsible consumption and production, and climate action. Further, South Africa has its own National Framework for Sustainable Development which provides the basis for a long-term process of integrating sustainability as a key component of the development discourse and shows South Africa's commitment to the principles developed at international summits and conferences.

With 31 October being named World Cities Day by the United Nations, it is pertinent to consider what South Africa can do to improve efforts towards sustainable – and smart – cities. The country's real estate industry needs to improve its focus on the energy performance of their buildings through energy benchmarking of their properties, identifying best practices and developing strategies to increase efficiency of the built environment.



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There are two separate but complementary approaches to reducing building energy consumption:

- Implementing energy efficiency measures.
- Integrating renewable energy sources.

To achieve optimal results and optimise investment, building energy efficiency measures should be considered first. This is especially true for existing buildings where investments are usually made progressively over time.

For new buildings, the net-zero energy consumption requirement is specified in the early stages of the project. With such a goal clearly in mind, a building can be designed from the beginning to be net zero, ensuring that the building can incorporate renewable energy sources and will support active energy management systems and effective building operation.

## Boosting energy efficiency

Energy efficiency measures also fall into two categories, passive and active. Passive energy efficiency measures simply avoid the unnecessary use of energy. One example of a passive energy-efficient measure is switching from conventional light bulbs to energy-saving lighting, such as halogen incandescent, compact fluorescents (CFL), and LED lightbulbs, which produce the same amount of light but use less energy.

Active energy efficiency is about taking the control of the energy use. This type of energy efficiency measure typically requires continuous monitoring — using power measurement devices and cloud-based or on-premises power monitoring software — and active management, including an action plan and following up on results.



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## Incorporating renewable energy

To become neutral or positive with regard to energy, it is essential to integrate clean, local energy sources. Several renewable technologies that are commercially available today can completely cover the consumption needs of buildings.

Consisting primarily of photovoltaic (PV) and wind turbine systems, these renewable technologies are, however, variable, intermittent energy producers. To achieve the overall objective of mastering and optimising energy use while also becoming more independent of the electrical grid, these energy resources can be coupled with storage or other more stable electricity generation technologies, such as combined heat and power generation (CHP).

Another important element of designing, constructing and managing green buildings is using control and optimisation solutions that play an important role in improving the way energy is produced, consumed and stored.

A first layer of control, called the energy management system (EMS), is key. Usually cloud based, these systems are able to forecast and optimise energy usage, leveraging on-site distributed energy resources to reduce energy bills and better integrate renewables. In addition to an EMS, a power management system can be used to operate the system on-site.

The aforementioned solutions are part of a larger green building ecosystem that provides some of the most effective means to achieving a range of South Africa's development goals, such as addressing climate change, creating sustainable and thriving communities, and driving economic growth.

## ABOUT THE AUTHOR

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