

# CONSTRUCTION & ENGINEERING ALERT

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In this series, CDH's Construction & Engineering law experts address key issues facing the South African construction industry and provide insights into its future. Part 2 reviews the innovative digital solution of Building Information Modelling (BIM) and looks at the expected changes to construction processes following the release of the United Nations (UN) Climate Change Charter.



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## Climate change, keeping construction evergreen in the race to net zero

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In [Part 1](#), we explored how BIM can be used to make construction projects more time and cost efficient, and its role in maximising limited resources and creating an attractive option for future investors. The construction industry is increasingly leveraging technology to improve its efficiency and sustainability and both BIM and construction robotics are seen as some of the most impactful tools to achieve this.

Whereas BIM creates a central database that facilitates a collaborative process between all role players in the construction process by enabling work on a single shared model, further advancements in the use of technology have the potential to increase the speed of project completion and enhance efficiencies. The use of drones on project sites for the recording of construction progress, topographical mapping to more accurately survey land,

tracking of construction equipment to prevent equipment misplacement, and security surveillance to monitor equipment loss that is often vulnerable to theft are some of the areas where technology can play a role. Essentially, where BIM enables a collaborative process, drones can upgrade the efficiency of progress reports and improve personnel safety and building inspections.

### **AUTOMATION POTENTIAL**

Construction continues to be one of the most labour-intensive industries. Many of the tasks are repetitive and time-consuming, such as bricklaying, welding, rebar tying and painting. These tasks can be fast-tracked using robotics and automation. Construction robots also significantly reduce human-induced error and losses due to fatigue. For example, a semi-automated bricklayer has been able to lay 250,000 bricks for the Poff Federal Building in Roanoke, Virginia, at 380 bricks an hour, which is approximately six times faster than a human bricklayer.

Safety is another concern that can be addressed by automating heavy equipment and fleets for excavation, transportation, load lifting, concrete works and demolition. In line with BIM, construction automation increases productivity and reduces the work's labour-intensive nature while being a safer alternative to dangerous and hazardous tasks. Researchers at the University of Illinois Urbana-Champaign and the Midwest Economic Policy Institute estimate that nearly half of construction jobs could be replaced by robots by 2057.

Although the use of construction robots and technology may offer construction projects a significantly reduced environmental impact, the adoption of such technologies may not be suited to South Africa's socio-economic reality – in 2021, South Africa's unemployment rate surged to the highest on a global list of 82 countries monitored by Bloomberg.

# Climate change, keeping construction evergreen in the race to net zero

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## GLOBAL CONVENTIONS

Globally, the recent UN Climate Change Conference has revisited the need for the construction industry to comply with the Paris Agreement and the UN Framework Convention on Climate Change. These conventions aim to stabilise greenhouse gas concentrations to a level that would limit further human interference with the climate system by keeping a global temperature rise this century well below 2°C and to pursue efforts to further limit the temperature increase in future.

Buildings account for nearly 40% of global greenhouse gas emissions, 50% of the world's energy consumption and 40% of raw material usage. Sustainability is the main focus of many emerging construction industry trends. As early as 2007, a [Chartered Institute of Building survey](#) found that carbon reduction was seen as the greatest issue that required innovation in the construction industry, with 48,25% of all respondents wanting to invest in "green" innovation.

The recent UN Climate Change Convention, titled Conference of the Parties (COP26), highlighted the pressing nature of this issue. As early as 2015, participating countries agreed, in terms of the Paris Agreement, to a common long-term temperature goal to limit the rise in the mean global temperature to well below 2°C and, further, to limit the rise to 1,5°C. At the current rate it is projected that:

- by 2050, 1,6 billion urban dwellers will be regularly exposed to extremely high temperatures and over 800 million people living in more than 570 cities will be vulnerable to sea-level rise and coastal flooding; and
- by 2060, that the world's building stock will double and almost 70% of the global population is projected to live in urban areas.

The issue remains that less than 3% spent on new buildings goes to energy efficient buildings. It is estimated that by 2030, energy

efficient buildings will be an investment opportunity worth \$24,7 trillion. Of the 186 COP26 countries, most fail to consider total decarbonisation targets and the sustainability of building materials.

While the use of BIM has the potential to assist in managing the efficiency of the construction project lifecycle, the ever-present threat of climate change requires steps to be taken in the design, construction and maintenance of buildings to radically improve their sustainability.

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Green buildings have minimal impact on the environment. Their design is climate-responsive, and the utmost care is taken during constructing to minimise negative effects on the environment. The potential reductions in the negative environmental impact are:

- Up to 50% reduction in energy consumption
- Up to 40% reduction in freshwater demand
- 40 to 65% reduction in building water consumption
- 30 to 40% reduction in operational costs of building

Locally, the Green Building Council South Africa (GBCSA) has developed the Green Star SA rating tools, based on the Australian Green Star tool but developed specifically for the South African construction industry, to provide an objective measurement system for green buildings' overall

environmental impact in South Africa. The rating is based on nine categories created for each building, each with a range of credits that address environmental and sustainability aspects of designing, constructing and operating a building. The categories are:

1. Management
2. Indoor environment
3. Energy
4. Transport
5. Water
6. Materials
7. Land use and ecology
8. Emissions
9. Innovation

Further points have also been awarded for socio-economic impact. The purpose is to move from a linear economy to a circular economy by maximising energy efficiency,

reducing resource consumption and disposal of recycling materials and eliminating avoidable waste. Green Star SA is a voluntary environmental rating system that evaluates the environmental design and construction of buildings and was developed to provide the property industry with an objective measurement for green buildings and as a way to recognise and reward environmental leadership in the property industry.

However, in light of COP26, more needs to be done to incentivise the South African construction industry to embrace technology to improve efficiency and sustainability and ensure it does not fall behind the curve of the global trend in the race for net zero.

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**BBBEE STATUS: LEVEL ONE CONTRIBUTOR**

Our BBBEE verification is one of several components of our transformation strategy and we continue to seek ways of improving it in a meaningful manner.

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