

+ IMPACT

Official publication of the Green Building Council of South Africa



19



zero

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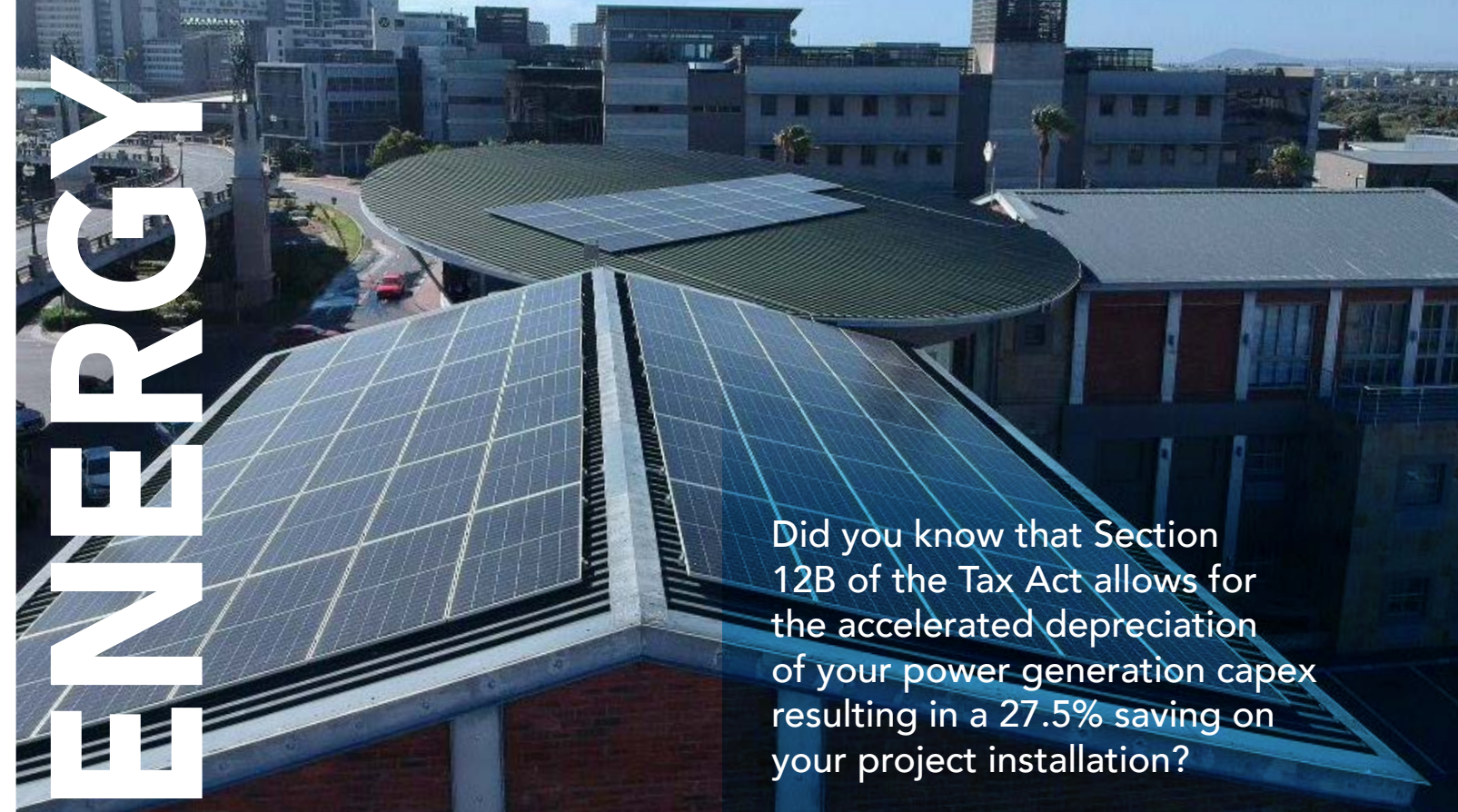
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2-4 Nov 2022

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Join the thought-leaders, influencers and innovators behind the green building movement at #GBCSA2022

The draft programme for the 15th Green Building Convention is LIVE and, driven by our #regeneration theme, is taking the conversation on the transformation of the built environment to the next level.

[View the programme](#)



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Highlights on the plenary stage.

+IMPACT

The official publication of GBCSA



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CALLING ALL THOUGHT LEADERS

+Impact Magazine, the official publication of the GBCSA, presents thought leadership from local and international green building commentators and practitioners, and showcases the excellent work of GBCSA members.

Are you a thought leader in your relevant field? GBCSA members are invited to submit stories about projects, design concepts, materials, research and anything else that promotes a healthy sustainable built environment. Submit a 100-word description of your content idea to: alexis@greeneconomy.media

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With buildings and their construction together accounting for 36% of global energy use and 39% of energy-related carbon dioxide emissions, the built environment has a responsibility, and the opportunity, to shift to building holistic, data-driven and renewal-focused spaces.

So many different pockets of the South African built industry have been doing just this. In our news section on page 12, 84 Harrington Street, Cape Town, is the world's tallest building constructed with hempcrete and is setting the benchmark for how to build a safe, carbon-neutral, multi-storey building using hemp.

The hempcrete block is a non-load bearing, insulating masonry product that consists mainly of hemp, which is one of the fastest-growing plants on earth, reaching maturity in four months. Hempcrete absorbs so much carbon during its rapid growth that more CO₂ is locked up in a hempcrete wall than is used to build it.

Kedibone Tsiloane, founder of Ramtsilo Manufacturing and Construction, began prototyping the use of plastic in brickmaking in 2016 and formally went into market in 2019 (page 12). And on page 64, we have a closer look at the ecobrick, an empty PET bottled filled with single-use plastic that is used in sustainable construction.

Legaro Medical Centre, Melrose North, aims to be the most sustainable building in Africa with the highest 6-Star Green Star rating possible. The rating will include net-zero carbon and net-zero water certification (page 16).

A highly energy-efficient building that uses its remaining energy from a renewable energy source, so that there are zero-net carbon emissions on an annual basis is termed net-zero carbon. Do not miss our showcase of GBCSA net-zero carbon certified projects on page 46.

The GBCSA defines a net-zero water building as one "designed, constructed and operated to greatly reduce total water consumption and then use harvested, recycled and reused water such that the amount of water consumed is the same as the amount of water produced".

Vleihuis Residential Development in Linden, Johannesburg, is set in a landscape traditionally dominated by wetland. Restoring the indigenous wetland ecology of the site was the starting point for "reversing local extinction through sustainable architecture." The wetlands provide evaporative cooling of around 2°C to surrounding air temperature – the change projected due to climate change – so this created landscape will provide resilience of the design for the future.

The Existing Building Performance (EBP) tool focuses on the operational phase of a building lifecycle, realising that energy efficiency and sustainability is about the journey to better performance. The tool rewards energy and water monitoring initiatives in office buildings as well as the adoption of sustainability focused management policies.

A major component (40%) of the EBP certification is energy and water benchmarking. Project teams seeking certification for their office buildings must make use of the Energy Water Performance (EWP) tool. Other ways to measure energy and water compliance paths are available within the EBP tool for other building types. The EWP water score informs the future-proofing strategy for a building recognising that water security will face significant pressure in the imminent years. *+Impact* uncovers the EBP tool on page 36.

The investment to create high-performance buildings is significant. Often, particularly skilled facilities managers are challenged with working as waste-free as possible and are required to meet ESG targets that are being set at group level. Today a successful facilities manager is key to ensuring a fuss-free green operating environment that retains tenants for longer while ensuring the building becomes increasingly valuable (page 26).

The theme for the 15th Green Building Convention – The RE-Generation – is aimed at "shifting years" and is focused on the regeneration needed in the built environment in this decade of accelerated climate action. It is about building a RE-Generation of people that move beyond sustainability to building regeneratively towards transforming the built environment for people and planet to thrive. Make a positive impact and be there.

Let's thrive, let's net that zero!
Alexis Knipe
Editor





EDITORIAL ADVISORY BOARD

BOB VAN BEBBER

Bob van Bebber, a senior director at Boogertman + Partners spearheads the conceptualisation and delivery of many of the practices' large complex projects. From Soccer City, the main stadium for the 2010 FIFA World Cup, to large mixed-use precincts as well as the largest single tenanted corporate head office in the southern hemisphere for Discovery Health. He was recently recognised by the South African Professional Awards as the winner of the Professional of the Year: Architecture Class Award as well as the Overall Professional of the Year for 2019. Van Bebber's passion extends into urban design, interior design and education.

www.boogertmanandpartners.com



GRAHAME CRUICKSHANKS

Grahame Cruickshanks has worked as a professional architect, sustainability consultant and management consultant with 20 years of experience in the design, construction and property industry. Focusing much of his career on green buildings and an expert in his field, he has worked on a variety of Green Star and BREEAM certified projects and other building projects in South Africa, Singapore and the UK. Prior to joining Growthpoint Properties as the head of sustainability and utilities, Cruickshank's previous roles included managing executive for market engagement at the GBCSA and manager at EY's Climate Change and Sustainability Services.

www.growthpoint.co.za

JUTTA BERNS

Jutta Berns is an industry leader and one of South Africa's first internationally accredited green building professionals, establishing her company Ecocentric in 2007. She has degrees from the Universities of Bonn (Germany) and Cambridge (UK), and a diverse blue-chip client base. Berns specialises in sustainable and net-zero solutions for large property portfolios. She has several LEED Platinum and 6-Star Green Star projects in her portfolio, is a GBCSA faculty member, a Green Star Assessor and GBCSA TAG member, and winner of the Gauteng Entrepreneur of the Year 2019 Award by the Women's Property Network and 2019 winner of the Established Green Star Awards by the GBCSA.

www.ecocentric.co.za



MANFRED BRAUNE

Braune currently holds the position of Director: Environmental Sustainability at the University of Cape Town (UCT), where he leads the strategy and implementation of environmental sustainability across all spheres of the university since early 2019. He has also served as a non-executive director of GBCSA in a voluntary role since August 2020. Braune's background is as a professional engineer, having worked at WSP Group for over 10 years as a consulting engineer, where he then started and led WSP's green building business for three years and then worked for the GBCSA for 10 years.

<https://www.uct.ac.za/main/explore-uct/sustainability>

MARLOES REININK

Marloes Reinink is owner of Solid Green Consulting. With an academic background in innovation and architecture, she has been working as a sustainable building consultant for more than 15 years in South Africa and Africa. She founded Solid Green in 2010, which is one of the leading sustainability consultancies in Africa and achieved its 100th green building certification in October 2020. Reinink's passion is advocating for a greener built environment and she recently started GreenED, an online education platform for sustainability in the sector. Reinink is an ambassador for the International Living Future Institute; a Living Future accredited professional; and a facilitator of the SA Collaborative Network for a Living Future.

www.solidgreen.co.za



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During

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MAKING AN IMPACT

THE RE-GENERATION MOVEMENT

There is a growing consensus among experts in the built environment that there is a “regeneration gap” in building and that we urgently need to expand our thinking on sustainability to thinking regeneratively when we look to the future of green building.

With buildings and their construction together accounting for 36% of global energy use and 39% of energy-related carbon dioxide emissions (UNEP), the built environment has a responsibility and the opportunity to shift to building holistic, data-driven, and renewal-focused spaces and places.

That is why the theme for the 15th Green Building Convention – The RE-Generation – is aimed at “shifting years” and focused on the regeneration needed in the built environment in this decade of accelerated climate action. It is about building a RE-Generation of people that move beyond sustainability to building regeneratively towards transforming the built environment for people and planet to thrive.

THE RE-GENERATION 2-4 November 2022 | Century City Conference Centre, Cape Town
www.gbcsaconvention.org.za

GBCSA WORKSHOPS

By December 2022, non-residential buildings will be required by law to track and display an Energy Performance Certificate (EPC). To obtain an EPC, a building owner will need to gather building information and contract a South African National Accreditation System inspection body to audit the information.

GBCSA TRAINING WORKSHOPS FOR EPCs

- **Green Building Insights EPC 1: Understanding the Application of EPC Standards for Buildings**
Public and private sector building owners, and facilities managers responsible for data collection required for EPC auditing purposes should attend. Delegates explore South Africa’s energy landscape and legislation as it refers to EPC requirements.
- **Green Building Insights EPC 2: Understanding EPC Inspection Body Accreditation Process**
The collection of energy data in preparation for the EPC and the auditing of the energy data.

Visit www.gbcsa.org.za for more information.

84 HARRINGTON STREET

The world’s tallest building constructed with hempcrete

A partnership between two Cape Town-based companies, **Hemporium and Afrimat Hemp**, 84 Harrington Street is setting the benchmark for how to build a safe, carbon-neutral, multi-story building using hemp.

“From a sustainability and eco-construction perspective, we wanted to take hemp construction in South Africa to the next level, while also contributing to the inspiring hemp construction projects being undertaken globally,” says Duncan Parker, founding partner and CEO, Hemporium.

There is a massive increase in the global demand for bio-based construction which is driven by the need for the reduction of CO₂ emissions. Hemp construction is considered the gold standard for CO₂ reduction in buildings. Afrimat Hemp is leading the way for a new era of carbon-neutral building materials and investing in a sustainable future in construction. They supplied the hempcrete blocks and building systems for 84 Harrington Street (as seen below).



The lower density of the hemp blocks reduces the load of the walls on the foundations and therefore the cost of concrete.



A global first, 84 Harrington Street is officially the world’s tallest building constructed using hempcrete blocks and hemp building materials.

ONE BRICK AT A TIME

Generation Equality is a campaign that links South Africa to global efforts to achieve gender diversity by 2030. Several women have stood up to be counted.

One such outstanding woman is 32-year-old Kedibone Tsiloane, founder of Ramtsilo Manufacturing and Construction – a 100% black female-owned sustainable company. Ramtsilo provides waste management and recycling services for plastic pollution, which is used in the manufacturing of strong, durable and fire-retardant bricks.

“We are from the township and upon discussion with one of the waste collectors, we learnt that plastic waste collection in conjunction with the recycling of plastic has created a source of revenue for the unemployed. We began prototyping the use of plastic in brickmaking in 2016 and in 2017, and once we had a product that we were comfortable with, we took [it] for testing. The results were much better than we expected, and we formally went into market in 2019,” says Tsiloane.



BEST INFRASTRUCTURE PROJECT

The New Ashton Arch, South Africa’s first transversely launched concrete tied-arch bridge, clinched an award for Best Infrastructure Project greater than R100-million at the 2022 Fulton Awards, held every two years by the Cement & Concrete South Africa (CCSA). The project also received a commendation for Innovation and Invention in Concrete. The judges praised the New Ashton Arch for its “unique bridge engineering technique”.

AECOM, which entered the project on behalf of its client, the Western Cape Government’s Department of Transport and Public Works, was responsible for all engineering aspects, from road and bridge design to project and construction management. The main contractor was Haw & Inglis Civil Engineering.

Careful attention was paid to the materials selection and structural performance to ensure constructability of the larger concrete elements, while favouring important ESG goals like recycling. In this regard, the old bridge became part of the foundation of the new bridge. In terms of sustainability, the cementitious system adopted comprised 30% fly ash, which has a much lower embodied carbon content.

“A project like this reveals that our South African engineers can compete with the best in the world, which is very encouraging,” says AECOM Cape Town bridges team lead Abé Newmark.



A night view of the New Ashton Arch.



Stay cable installation at the New Ashton Arch.

IKUSASA ACHIEVES SIX STARS

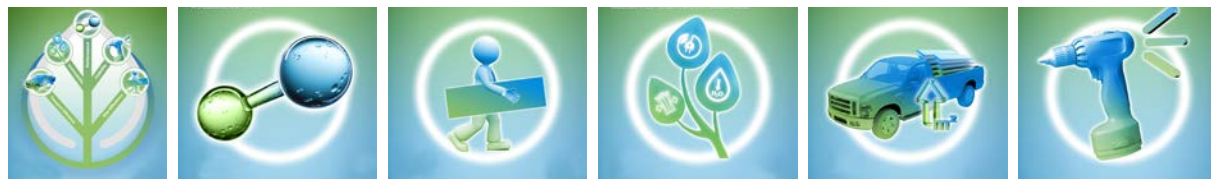
The Ikusasa building in the Oxford Parks precinct in Rosebank has been awarded six stars by the GBCSA. The 6-Star Green Star SA Office V1.1 Design Certification from the GBCSA is considered as World Leadership status. In both its construction and operation, Ikusasa reduces water use, energy consumption, process waste and pollution.

To achieve a Green Star Net-Zero Carbon Level 1 score, Ikusasa generates all the energy required by the base building. This is achieved by harnessing renewable energy, with a solar photovoltaic system on the roof. Energy efficiency is enhanced through sub-metering, which tracks the main areas of consumption.



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‘EcoTech™ is their enhanced engineering technology that provides an exceptional performance-to-weight ratio, achieving a higher calibre of performance and sustainability, while elevating the standard for plasterboard in the market,’ explains Anton Marais, Head of Product (Gyproc).

In recent years, dry construction has come to the fore as a promising alternative to regular brick and mortar construction. “Dry construction consumes 95% less water than masonry construction and is made from environmentally-friendly recyclable materials. With a three to four times faster installation speed, and an eight to ten times lighter weight to masonry construction, dry construction is gaining momentum as a favored alternative,” says Marais. “Not to mention its aesthetic appeal, with a seamless, crack-free surface.”

The standard range of RhinoBoard® plasterboards, now with EcoTech™, are produced with a 10%* reduction in carbon emissions and an 8%* reduction in water use. The boards are produced efficiently using 8%* less virgin raw materials and yet deliver the same trusted breaking strength of the original RhinoBoard® plasterboard. The

new technology has also allowed for efficient usability, as the board is now easier to cut, snap and fix, and allows one to transport more square meters per load, with improved handling and installation onsite.

Saint-Gobain cares about building better for people and the planet, by offering solutions that deliver sustainability and performance to drive the transformation of construction markets. These initiatives are just the beginning of Saint-Gobain’s journey towards Net-Zero, with ongoing and deliberate efforts to ensure sustainability targets are achieved.

For more information, please visit www.saint-gobain-africa.com | www.saint-gobain.com | www.gyproc.co.za 

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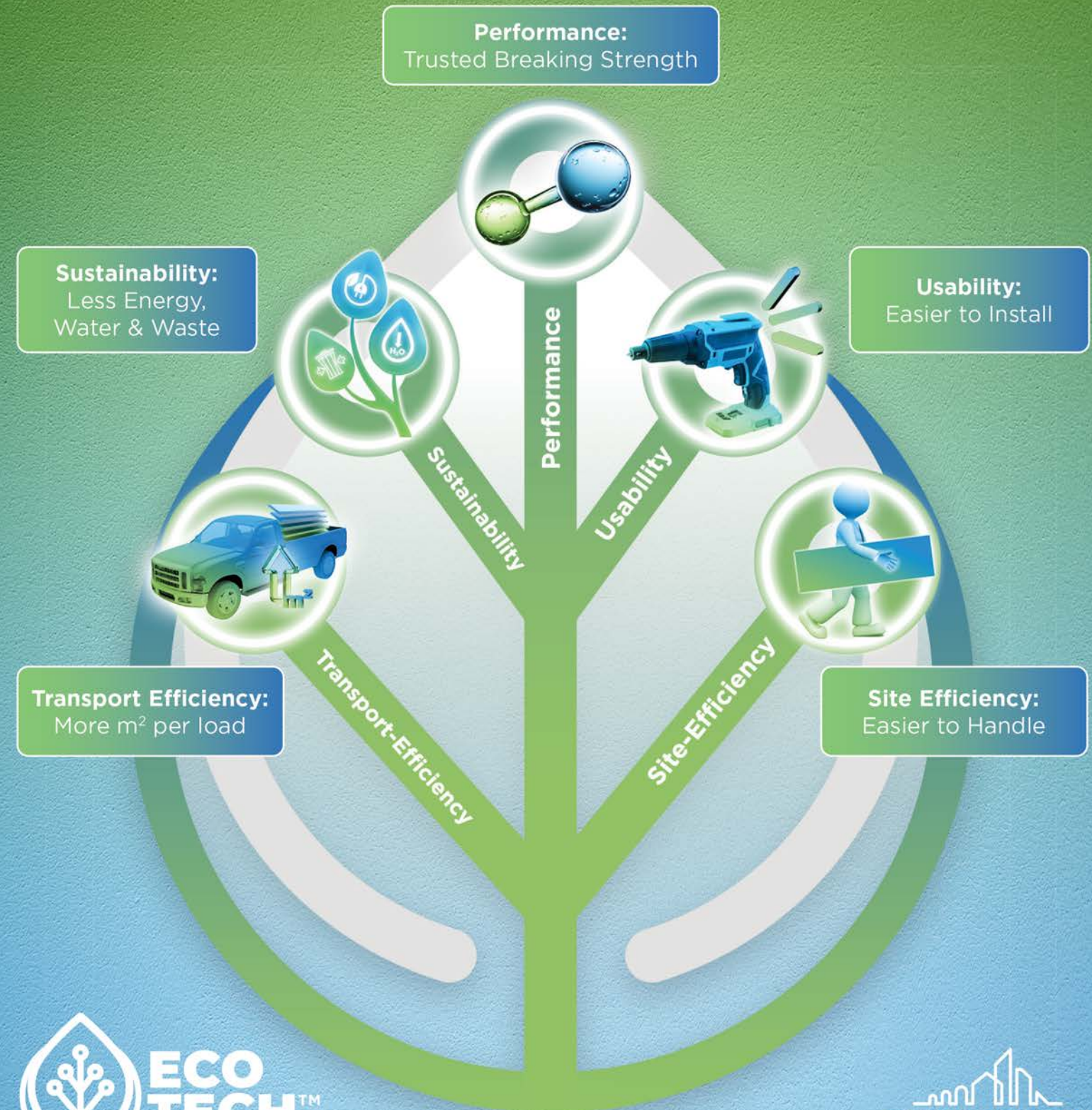
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In water-scarce South Africa, the importance of designing buildings with net-zero water certification should be a no-brainer: to achieve a sustainable balance between water availability and demand. Yet, in practice it's less common than you would think.

WORDS Kim Maxwell



NET-ZERO WATER

Designing for

Marc Sherratt

Vleihuis Residential Development

The GBCSA defines a net-zero/net-positive water building as one “designed, constructed and operated to greatly reduce total water consumption and then use harvested, recycled and reused water such that the amount of water consumed is the same as the amount of water produced (net zero). Or if the water recycled or produced is greater than the water consumed (net positive).”

Georgina Smit, head of technical at GBCSA, points out that building design options should not be limited. “Net-zero water can be achieved via several technical solutions, but key ingredients include an integrated design approach and focusing on optimising efficiency first. Then secondly, considering alternative supply solutions. Site conditions and design response for each building should be unique and considered in terms of optimising the building’s efficiency,” she says.

“Net-zero carbon, which deals with operational energy, is easier to justify than net-zero water,” explains Marc Sherratt of Marc Sherratt Sustainability Architects in Johannesburg. Local water is good quality and relatively cheap, compared to soaring electricity costs, so the financial incentive just isn’t there. “Net-zero carbon has a payback period, in some

cases only three to five years. That’s why we’re seeing the net-zero carbon rating being the most popular at present.”

RESIDENTIAL DEVELOPMENT

Sherratt is the founder and sustainability architect on Vleihuis Residential Development in Linden, Johannesburg. It was GBCSA-rated Net-Zero Carbon – (pilot) Level 2, Net-Zero Water – (pilot) Level 2 and Net Positive Ecology – (pilot) Level 1 ratings in September 2018, for the design. “We took a development approach by buying the land and rezoning and developing the design ourselves,” he explains. “Covid significantly delayed our progress. However, we’re hoping to break ground in six months with our show unit.”

Five units in the development have a 1 350m² floor area, set in a landscape traditionally dominated by grassland, wetland and koppies. Restoring the indigenous wetland ecology of the site was the starting point for “reversing local extinction through sustainable architecture. The new residential units are designed to sit sensitively in the wetland landscape like a bird’s nest”.

It’s the water aspects that are relevant. “The wetlands provide evaporative cooling of around 2°C to surrounding air temperature – the change projected due to climate change – so this created landscape will provide resilience of the design for the future. The wetland won’t just be for aesthetic pleasure, but to store and filter drinking water for residents, to provide aquaculture services and a wildlife sanctuary for indigenous wetland species. The architecture sits raised above the wetland with its water flowing underneath each unit.”

Sufficient storage is a challenge with net-zero water, according to Sherratt. “With Vleihuis, instead of unsightly tanks, we used a created wetland. How you deal with stormwater is then crucial, as generally, this is your cleanest renewable water source.”

NET-ZERO WATER FOCUS

- Reducing demand by employing innovative and efficient technologies that consume less water.
- Generating alternative water supply sources to offset purchased potable water.
- Treating wastewater on-site and reusing it appropriate to the use.
- Implementing green infrastructure that allows stormwater to infiltrate to the original water supply.



“Sustainable Urban Drainage (SUD) systems are an alternative way of dealing with stormwater to the conventional approach: putting it in a pipe and getting it out as fast as possible. SUDs try and slow water, keeping it near the surface using natural means and absorbing water back into soils and plants onsite,” he explains. “Water should be seen as a resource, not a waste product.”

“Of course, residential is the hard one to crack,” he adds. “To get people to spend on sustainable technology that has a long-term horizon, which also usually involves a change in consumption behaviour.”

COMMERCIAL OFFICE

“The goal of the net-zero tool is reduced environmental impact. With net-zero water certification specifically, the focus is to reduce water consumption to self-sustaining or even regenerative levels,” says André Harms, founder of Ecolution Consulting. He was the sustainability engineer on The District, a commercial office building

in Woodstock, Cape Town, that was GBCSA-certified in 2018 (until 2021) and achieved its Net-Zero Water (pilot) Level 2 Occupant Consumption (modelled) rating.

As an existing, operational building when the alternative water solutions were implemented and Net-Zero Water certification was pursued, it presented some design challenges. “These include first ensuring the building’s infrastructure (flush and flow fittings) are as efficient as possible, before quantifying the water consumption and suitably sizing the water treatment plant,” Harms clarifies.

“Identifying and allocating space to plant, equipment and storage tanks was another challenge, as space in commercial buildings is typically constrained, so conflicting demands are often placed on open areas.”

Suitably sizing a system to cater for an unknown future can be tricky. Both in terms of the alternative water supply (in this case, basement dewatering/drainage water, which can fluctuate with changing rainfall and groundwater) and demand within the building.

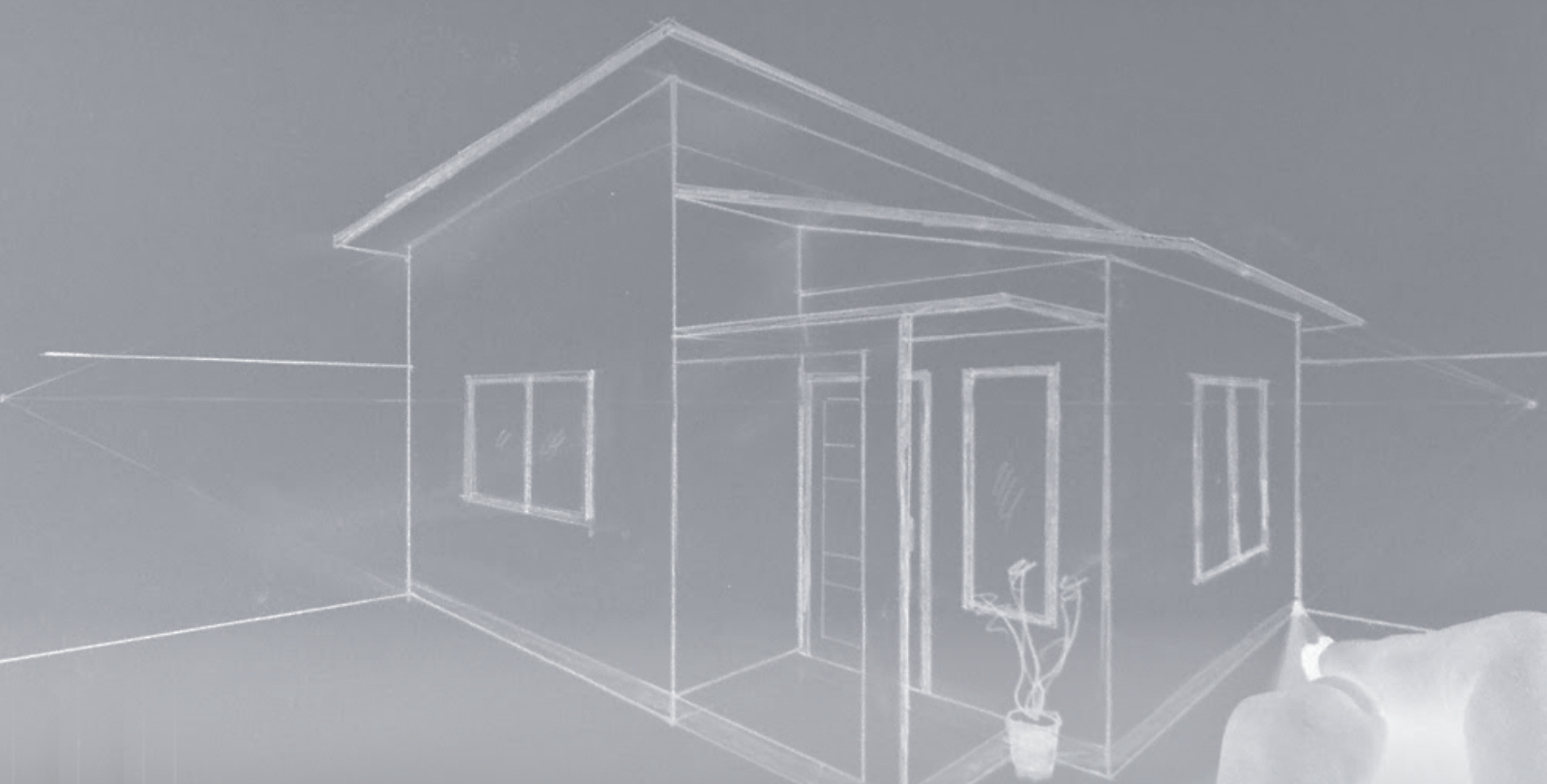


Part of the challenge relates to the building location and local weather patterns, and how that supports water harvesting.





South African Council
for the Architectural Profession



BUILDING A SAFE HOUSE

No person can erect a building/house without approved building plans prepared by a registered architectural professional.

Any member of the public who erects a building/house without approved building plan prepared by registered architectural professional is considered guilty of an offence.

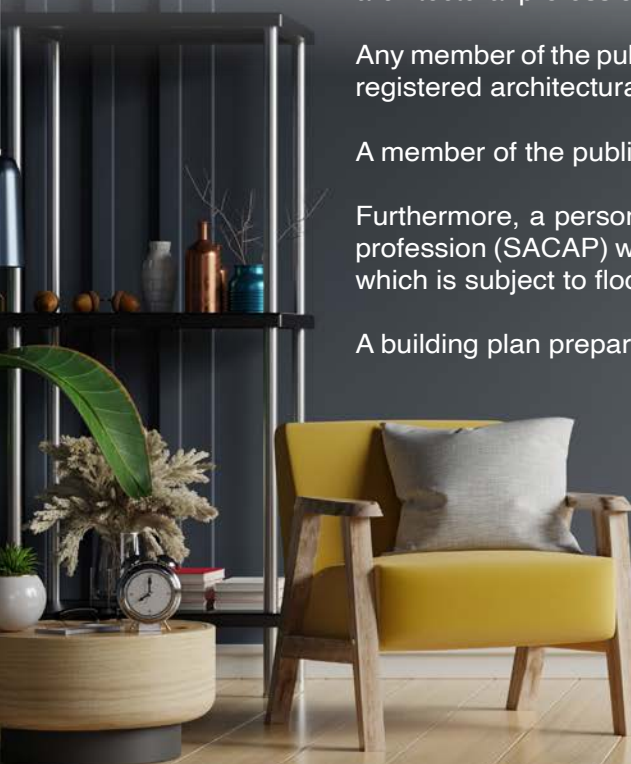
A member of the public will also suffer losses because the building will be demolished.

Furthermore, a person who is not registered with the South African Council for the architectural profession (SACAP) will not be able to advise a member of the public not to build a house on a site which is subject to flooding or does not drain properly.

A building plan prepared by a person who is not registered will be dangerous too.

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Evolution Consulting

The District building in Woodstock, Cape Town.

DESIGN INNOVATION

The District's net-zero water design innovation was that its water filtration plant has the capacity to generate 140kL of potable water daily from four sumps in the basements. This water is "cleaned to WHO standards and injected into the current reticulation", rendering the building independent of municipal water. Harms says The District's plant was intentionally oversized compared to the building's demand, to be able to provide treated water for other buildings or needs.

Owner Growthpoint Properties was approached for insights as to why the 2018 design certification (until 2021) for The District has not been renewed. "The Net-Zero Water certification for The District was primarily motivated by two factors, the first being the record-breaking drought facing the City of Cape Town, due to three years of inadequate rainfall. As a result, dam levels were at 25% capacity by January 2018," says Grahame Cruickshanks, Growthpoint Properties' head of sustainability and utilities. "The second, equally significant factor, was that The District seven-story building is built on top of a naturally occurring spring that flows into the basement. These conditions were unique to both that time and location and may not be repeated at other properties."

Cruickshanks says the primary benefit for The District 2018 tenants was a reliable water supply, to ensure they could maintain business continuity during Cape Town's water restrictions. "During the drought, relaxations to regulatory compliance cleared the path for the water project, based on technical and financial feasibility studies at that time. Subsequently, the City reinstated these regulations, making the project significantly less viable."

"The cost of meeting regulatory requirements, primarily due to the time it takes to obtain licenses and the associated consultant fees, has made the water processing plant financially unfeasible," he concludes. "In addition, excess water from the on-site water installation is currently discharged as wastewater and not used in the building. We have, as a result, placed the re-certification of The District as Net-Zero Water on hold until we can come up with a viable solution."

Smit acknowledged that there are still technical challenges to easily achieving Net-Zero/Net Positive Water buildings. "Part of the challenge relates to the building location and local weather patterns, and how that supports water harvesting," she says. "But furthermore, and in some cases, the lack of ideal payback periods and incentives also play a role."



**"A mind shift
is required by
seeing buildings
not exclusively
as dependent on
external services
and resources."
- André Harms,
Evolution Consulting**



The District building in Woodstock, Cape Town.

“A mind shift is required by seeing buildings not exclusively as dependent on external services and resources, but as an opportunity to identify avenues where the building and its systems can become independent from the grid and add to resilient cities’ provision of services and utilities,” suggests Harms.

LOOKING AHEAD

Annelidé Sherratt (Marc’s wife) is head of department of green building certifications at Solid Green Design Consulting. The company is involved with a project that pushes sustainable boundaries. Legaro Medical Centre is at 76 Corlett Drive, Melrose North. The building is targeting the first international Living Building Challenge (LBC) rating system water accreditation for a medical facility, the first LBC Petal Certification for a local commercial office and a GBCSA 6-Star Green Star Medical suites v1.1 Design certification. Certifications were originally scheduled for completion in 2020.

Legaro Medical Centre is aiming to be the “most sustainable building in Africa”. Mrs Sherratt says at between 90-100 points, they are aiming for the highest 6-Star Green Star rating possible. The rating will include Net-Zero Carbon – Level 2 (Base Building and Occupancy) and Net-Zero Water – Level 2 (Base Building and Occupancy).

From a water perspective, the Net-Zero Water – Level 2 (Base Building and Occupancy) means the building is designed so “all water to be used on site will come from a non-municipal supply – rainwater and grey water”. It will be done via rainwater harvesting from a roof area of 790m², a reclaimed water system, stormwater management system and wastewater treatment.

“We are targeting Net-Zero Water. This means 100% of the project’s water needs must be supplied by captured precipitation or other natural closed loop water systems, and/or by recycling used project water. And be purified as needed, without the use of chemicals,” she adds.

Stringent requirements also mean “105% of the project’s energy needs must be supplied by on-site renewables on a net annual basis, without the use of on-site combustion”. In addition, they have to sub-meter major energy end users (heating, cooling, lighting, fans/pumps, plug loads, vertical transportation and domestic hot water).

A tall order indeed but encouraging for net-zero goals and water specifically. +



Water should be seen as a resource, not a waste product.

Legaro Medical Centre render for 76 Corlette Drive, Melrose North.



Legaro Medical Centre

SBS TANKS: PART OF THE JOURNEY TO NET-ZERO WATER

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Businesses and consumers need to implement responsible water management practices, not merely as a tick the box exercise to meet targets and benchmarks, but as a means of ensuring the future sustainability of life, the environment, and future economic development. Moving towards net zero water consumption with the implementation of an effective water demand management and processing solution needs to be a part of every business plan and commercial development strategy.

SBS tanks recently devised a solution for KwaZulu-Natal based company, CHEP, that supplies and maintains high quality pallet and container supplies which require high pressure washing prior to despatch. The solution includes the harvesting, filtration, and storage of rainwater and run-off water from the premises, providing an effective back-up storage solution to enable operational continuity during water supply interruptions.

SBS installed a 500-kilolitre water tank at CHEP alongside a concrete sump fitted with submersible pumps for water feed, maximising the use of vertical space usage on the limited footprint available. Based at the lower end of the site, the sump collects and stores all surface and rainwater run-off from the site and the roof of the building and serves as a stormwater retention pond, minimising the impact of peak flow on the external municipal stormwater network.

The water collected in the sump is treated prior to being pumped back into the pipe reticulation network on the premises with a tailmade filtration system providing clean and potable (drinkable) water, effectively reducing the requirement for “new” water to the site as part of the company’s journey to net zero.

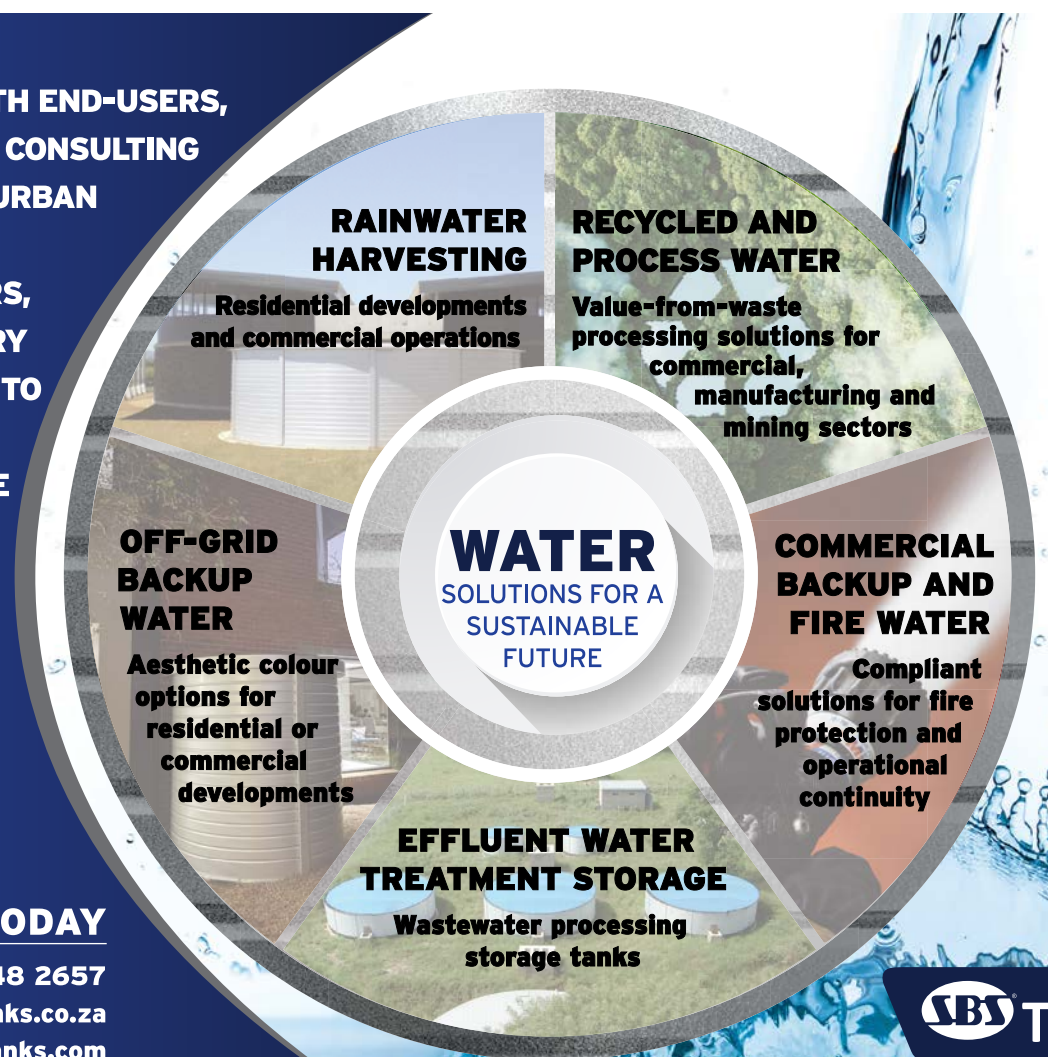
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SUSTAINABLE SANITATION: HOW GREEN TECH AND A PARADIGM SHIFT CAN BRING THE CHANGE WE NEED

Dr Valerie Naidoo is the Executive Manager of the Water Research Commission (WRC), which works together with global experts to have highly informed water decision-making through science and technology at all levels, in all stakeholder groups, and innovative water solutions through research and development for South Africa, Africa and the world. She spoke to Positive Impact magazine about the green technologies and programmes that are helping to shape a sustainable future.

“It is now well-recognised that South Africa and its neighbouring countries are high climate-risk areas, with drier, hotter conditions predicted to continue an upward trajectory in line with global warming statistics,” says Dr Naidoo. “Water stress is a priority problem across the country, and so the issue that really needs to be addressed relates to the fact that across South Africa, water that is perfectly safe for human consumption is used for flushing.” In urban homes, full flush toilets use at least nine litres of potable water, contributing to around 30% of household water use. “While the flush

toilet connected to a sewer system is a global strategy that has resulted in a significant reduction of waterborne illnesses, the approach is not viable over the long term, given water scarcity and the fact that high urbanisation trends and population growth will require even more people to be connected to a system which is costly to operate, maintain and implement.” There is also the reality that the condition of South Africa’s municipal waste water treatment works is declining, with many ranging from a poor to a critical state.

On the opposite side of the technical spectrum are on-site sanitation systems. By far the most common system used in rural and per-urban informal settlements is that of pit latrines, commonly known as “long drops”, with faecal waste dropping into a hole in the ground. While the advantage of these latrines is that they do not require water or sewer pipes to function, chemical toilets were an emergency measure. They are difficult to manage, filling quickly and requiring costly disposal of the faecal sludge.

FILLING THE GAP

Clearly, there is a need for a product that is able to perform its function without the disadvantages of aspirational flush toilets and rudimentary pit latrine toilets. This is the gap that the WRC has been seeking to solve through its South African Sanitation Technology Enterprise Programme (SASTEP), involving national and international partners. Over the past ten years, SASTEP has supported and accelerated the uptake of the latest, cutting-edge toilets through policy adjustments, demonstrations, testing and science-based improvements towards localisation and industrialisation. Systems manufactured by SASTEP’s commercial partners, such as Enviro-Options and WEC Projects, can provide off-grid waterborne sanitation that is non-sewered with net-zero water. Filled with water on start-up, the system allows for the recovery of water used for flushing and requires only periodic top-ups to compensate for losses. The water used to fill the system does not have to be potable, as treated stormwater run-off can be used for flushing.



The G2RT was installed in a South African home in June 2022.



The first G2RT product was shipped to South Africa in May 2022.

Many nonsewered sanitation systems are prefabricated and modular, and can be deployed faster and more easily than civil-work-intensive waste water treatment works. In order to fast-track adoption, support from the Department of Water and Sanitation (DWS) and other government stakeholders is needed. The WRC has been working with several sanitation industry stakeholders to develop a mark scheme that would allow for local ISO 30500 accreditation and certification. This voluntary, international product standard, published in October 2018 and adopted as is by the South African Bureau of Standards (SABS) in 2019, provides general safety and performance requirements for the product design and performance testing of nonsewered sanitation systems.

G2RT: TIME FOR A PARADIGM SHIFT

Given the necessity for a transformative technology to address the challenges of the globally accepted “gold standard” of sanitation (the flush toilet), in 2011 the Bill and Melinda Gates Foundation launched the “Reinvent the Toilet Challenge”, to co-create sustainable solutions for people worldwide who don’t have access to safe, affordable sanitation. In 2018, at the Beijing Toilet Expo, grant recipients demonstrated the breadth of different technologies. In 2019, Phase 1 was embarked on for the Generation 2 Reinvented Toilet (G2RT), a design and planning phase, with the down-selection of technologies and development of the engineering design packet. Between 2020 and 2021, development of individual modules and core concepts, integration of the processes and the realization of SURT (single user reinvented toilet) systems took place, with 2022 marking the deployment of the systems into the field, and the optimisation, simplification and development of systems through phase 3, a testing and evaluation phase. Field testing took place in South Africa and India, with South Africa having become a testbed for developing and demonstrating technology solutions.

An important part of getting these solutions in circulation is

having appropriate process performance standards to ensure that the new toilets are able to meet a specific public health and environmental standard. Globally, process standards for these technologies have been adopted by the International Standards Organisation (ISO), with many countries adopting the new standard. The current prototype was shipped to South Africa in May this year and the first installation in a home in South Africa took place on 10 June 2022.

The revolutionary toilet systems have water-saving or water-recycling features, are aspirational in design, and, most importantly, eliminate pathogens and sludge production at point-of-source, without the need for sewers. For informal settlement areas, or areas with constrained water supply, these solutions could revolutionise the world’s sanitation services, at a time when it needs it most. G2RT is also being designed to be powered by renewable energy or with a very low energy consumption.

GLOBAL COLLABORATION

“The whole process is about a global collaboration of turning what was previously an infrastructure, into an appliance,” says Dr Naidoo. “It requires a shift in thinking and for people to embrace G2RT as ‘normal’; in the same way as communication infrastructure transformed from telephone towers and lines into distributed communications, with forecasters estimating that sub-Saharan Africa will have nearly 1 billion mobile phones in 2023.”

Dr Naidoo is excited by the opportunities that this “sanitation revolution” will present for local entrepreneurs and small and medium-size (SME) businesses. “If there is a complete conversion to G2RT toilets, the product volumes will be enormous; and there will be economic opportunities throughout every stage of the process, from the manufacturing of units and components, through to the distribution, transportation and installation of each and every toilet. At a time when economic growth is sorely needed, this green technology can lead to service-related industry development. +





The fundamentals of FACILITIES MANAGERS

The transformation in South Africa's construction sector from 15 short years ago when local green building pioneers started to establish the case for Green Star rating systems is visible to more than sector professionals. Likewise, today tenants and owners accept that facilities management has moved forward and far beyond the simple installation of LED lighting.

WORDS Alan Cameron

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The investment to create high performance buildings is significant. Often particularly skilled professionals are needed to fully utilise the site as well as the complimentary design and use of the building.

“Facilities managers (FMs) today are challenged with working as efficiently and as waste-free as possible,” says GCX CEO and founder Kevin James. GCX provides a reporting and analytics platform for managing ESG risk to give companies reporting functionality to map carbon footprint activities across multiple buildings or sites. “FMs are often required to meet ESG targets that are being set at group level. This is a dramatic change from a decade ago when FMs performed a maintenance function and simply hoped nothing expensive broke.”

“Every day, FMs need to make the facility run and are dealing with building systems, tenant representatives and occupants. Their role varies from equipment maintenance to managing how people behave to making sure the

indoor environment is a good place for people to be,” says sustainability consultant and owner of Common Space, Zendre Compion. “This role covers procurement, coordination between stakeholders, site management, through to aspects affecting indoor environmental quality and health like thermal comfort and cleaning.”

MEASURE AND MANAGE

Instead of jumping into efficient lighting projects, first establish a baseline of power use and make sure your FM actions are informed, encourages James. “Once there is a recorded understanding of good and poor performing assets, you then look at what projects can be started to reduce energy, water or minimise waste. FMs achieve the support required by showing how green behaviour contributes to overall ESG targets set by the landlord and often the tenant as well,” advises James.

The FM team runs the building according to a regulatory





Waterwise planting enables significant irrigation savings.



standard. The GBCSA Energy Water Performance (EWP) tool enables organisations to benchmark the energy and water performance of a building over time. Only once requirements increase for FM teams to also document the sustainability of the building is the extra data collected. This can be used when looking at existing building performance certification.

Compion, who uses a human-centred approach to building sustainability, points out that areas where green building ratings are designed to have an impact are often not recorded. “Today’s FM is required to understand the intended performance of the building, measure it and manage it,” she says. This points to tracking, reporting and ensuring the operational systems FMs use are robust enough to prove building performance. “Buildings can only be smart in as far as the management team are driven to turn data into insight that improves their ability to manage their building well.”

FMs are required to have a deep technical background to understand the functioning of air conditioning, glass and materials used inside and outside the building; an ability to understand nuanced building processes and ensure their implementation; while also having the emotional aptitude to handle service providers and tenants.

The FM should be motivated to improve the building as part of their role. And this attitude is largely influenced by the work culture the FM operates within, notes Compion. Firstly, FMs need to understand they have the support to make and act on their own decisions. When there is mutual professional respect between colleagues Compion noticed that FMs do not simply manage waste, they look at the lifecycle of objects they are buying for the building. At this level of attention, FMs are often able to contribute significantly to group-wide sustainability targets. Secondly, incentives can be effectively used to ensure green management is not viewed as unnecessary additional work.

GREENING FM’S FOUR PILLARS

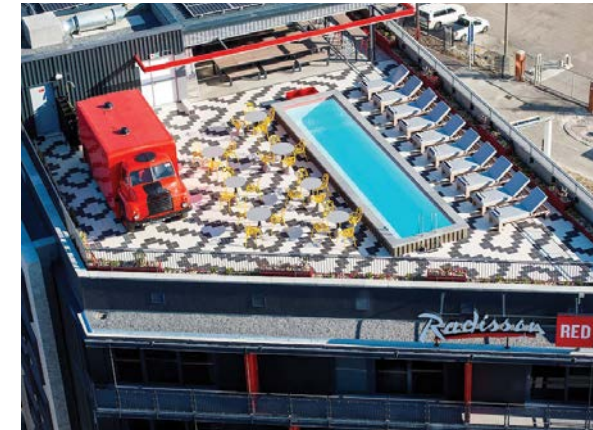
Smart metering systems track and monitor building performance and provide data that helps us optimise the building as well as attract and retain tenants, says Mareli Cloete, V&A Waterfront senior manager for Safety, Health and Environment.

People, processes, building and technology remain key to fulfilling the FM role. It is accepted that green construction is completed by following rigorous specifications applied

Building information modeling (BIM) is a process supported by various technologies that generate digital representations of a building. Data is extracted and used for decision-making purposes for the property. BIMs are a great backing for FMs wishing to support their drive towards sustainability.



To create and maintain an enjoyable living environment, FMs must decide on how best to utilise what is often limited space in the facility, including general grounds and garden areas. An example shown here is the food garden at V&A Waterfront.



V&A Waterfront’s Radisson Red Hotel has a 5-Star Green Star Custom Hotel Design and a 5-Star Green Star As-Built rating. The Ridge (above) won the highest-rated building at the 2021 GBCSA Leadership Awards.



Today’s facilities manager is required to understand the intended performance of the building, measure it and manage it.

to the structural material and technologies incorporated that reduce the carbon footprint associated with the build and operation. Gradings often support ethical and green standards present in the value chain surrounding the creation of these products.

Efficiencies are not only inherent to the design and selected materials but also in its use, and FMs manage how people use the building to achieve its designed performance. Installing green hardware such as water-wise aerator spray taps or grey water toilet flushing systems that use recycled water are only part of why a building may be viewed as high performance.

The use of monitors and sensors enable further efficiency of various elements of the building function according to their design, but the high point of optimisation – often only seen through ongoing educational efforts by the FM – is achieved when all building occupants support this goal through their individual actions.

Companies are expected to publicly report against a scorecard of ESG measures. ESG reports touch on all aspects of a company, including the carbon impact of their operations, offices and supply chains. An able facilities manager can reduce the sustainability impact of the building, to the benefit of owner and tenants obliged to include it as part of reporting on their working

environment. A green building owner who outsources FM responsibilities, especially to multiple service providers, may find it more difficult to secure a level of feedback that reveals an understanding of all the moving parts, and which can be used to contribute towards and enhance ESG reporting, Compion notes. When FMs are part of the core team putting their equipment upgrade and modification recommendations through, a cost analysis exercise is often worthwhile.

Compion agrees that the professional value of an FM is increasingly being recognised, but points out what often is missed is their potential contribution during the design and development phase. She makes the case that should the FM of a new building be known, then they should be invited to give comment during design and construction to fine-tune operations of the new buildings in the very initial stages.

ENCOURAGING TENANTS

“The most important thing to approach the tenant with is tangible facts. You need to back up your statements,” Cloete says. “The Waterfront believes in building a business case for green and environmental sustainability, so when speaking to tenants we present case studies, perhaps around efficient lighting or low-flow taps. We present the facts and figures around these installations to the tenants.” She explains that the Waterfront signs a green lease with tenants that stipulates consumption per m² and appropriate resource efficient initiatives.

When working within the FM remit there are several opportunities to create demand for improved products with a lighter carbon footprint, notes Compion. From the



motivation to the procurement manager or CFO explaining why a high-value item should be green, to requiring smaller providers to explain why and how their products are sustainable. Similar action is possible with contractors and tenants by ensuring they take responsibility for the volume and disposal of their waste. Recycling practices are of-course key and to be encouraged, however a waste assessment will reveal how all parties can decrease the levels of waste entering the building, not just on how better to dispose of it.

Compion stresses that at each stage of implementing a green building practice, education should accompany it. As tenants understand the reason why, they will look to see what they can do to initiate and support green practices, such as requesting to use their own lunchboxes and refillable bottles at a local fast-food takeaway. A quarterly green forum for building occupants where ideas can be discussed is also a useful way to spread enthusiasm.

Compion notes that in green buildings with multiple teams or tenants it is useful to measure the energy usage of each through smart metering. A project she was exposed to saw a screen installed in the building foyer showing the energy performance of each tenant. This quickly turned into a friendly competition between tenants, to everyone's benefit. Besides for the



Facilities managers are often able to contribute significantly to group-wide sustainability targets.

convenience of sub-metering in usage patterns, users enjoy being exposed to the data and it encourages further interest and more engaged stakeholders.

CHANGE MOTIVATION

There are and will be instances when FMs are unable to act, only advise. Wanting to drive change but unable to practically assist it can be discouraging. In these instances, FMs are advised to make a case based on research and benchmarks. Joining the dots between tenant absenteeism and a reluctance to invest in good indoor air quality and biophilic design can show the owner the price of a trying to tenant a sick building.

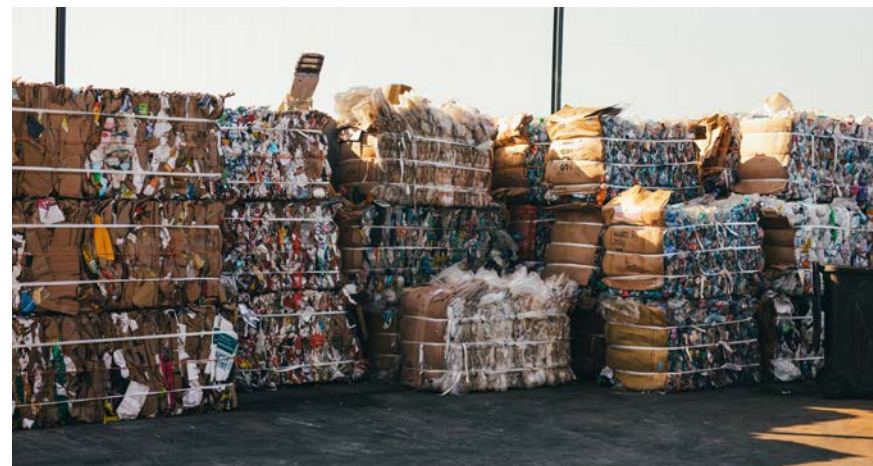
“Post-Covid, FMs are also facing potential changes in how their buildings will operate with flexible work hours and flexi-desk space and a range of other logistical issues becoming part of their responsibility. It is a good time to promote changes to how the building operates, or introducing new operational practices,” says Compion.

James says FMs should not be concerned. Sustainability roles within companies are now being elevated to executive level, no longer is the annual report sufficient, but stakeholders expect detailed reports on the company's level of sustainable behaviour.

The role of the facilities manager reflects this, says James. FMs are acknowledged to contribute to property owners' and tenants' desire to steward natural resources in a socially just and environmentally sustainable manner. Today a successful facilities manager is key to ensuring a fuss-free green operating environment that retains tenants for longer while ensuring the building becomes an increasingly valuable asset. +



The waste sorting facility at the V&A Waterfront.



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Edward Hector
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(Pretoria)
Managing Director

Literature reviews by agencies such as the World Health Organisation (WHO) and others have shown that long-term exposure to ambient air pollution increases mortality and morbidity from cardiovascular, respiratory disease and lung cancer, all of which shortens life expectancy.

As a result, the challenges for future reductions in the burden of disease attributable to air pollution are substantial. International experience has shown that exposure to ambient air pollution and its associated burden of disease can be lowered for entire populations via policy action at the national and subnational levels via aggressive air quality management programmes, focused on major sources of air pollution.

Particulate Matter (PM) is the collective name for fine solid or liquid particles added to the atmosphere by processes at the earth's surface, and includes dust, smoke, soot, pollen and soil particles.

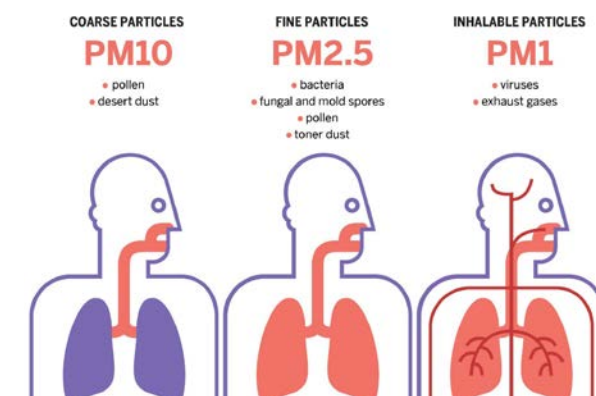
Air pollution is a complex mixture of gases and particles whose sources and composition vary spatially and temporarily. Population-weighted annual mean concentrations of particle mass with aerodynamic diameter less than 2.5 µm (PM2.5) is one indicator used to quantify exposure to air pollution. PM2.5 is the most consistent and robust predictor of mortality in studies of long-term exposure.

It is widely accepted that PM2.5 is hazardous to our health, as it can penetrate the lung barrier and enter the blood system.

Ambient outdoor air quality contributes directly to Indoor Air Quality (IAQ) because the introduction of fresh air (ventilation) into an air-conditioned building largely

PENETRATION OF PARTICLES INTO THE BODY

The smaller the particles, the more dangerous they are



determines the quality of the IAQ. Higher ventilation rates are deemed to improve IAQ, and CO₂ is often a proxy for IAQ.

Consider the fact that your building may be pulling in a poor quality of fresh air, combined with other factors internally, such as off gassing of VOCs, photocopier dust as well as airborne pathogens from human occupants. You may not be aware of it, but the sealed building in which you may spend 90% of your time, may adversely affect your life – or improve it considerably.

DATA-BASED INSIGHTS HOLD THE ANSWER

With the advancement in sensor technology using Internet of Things (IoT) it is now possible to have a web-based dashboard providing real time IAQ measurements indicating a range of data from temperature to VOCs, PM levels as well as CO₂. Once you have the data, you can also consider various measures to improve IAQ beyond ventilation rates and filtration, that include various forms of air purification products. Much of the product development pre-dates COVID-19, where countries have already put in place guidelines and regulations around improving indoor air quality after early outbreaks of the SARS virus.

While some of the most advanced free-standing units focus on what is called the breathing zone, other technologies such as UVCGI and Photo Catalytic Oxidation (PCO) can be installed within the ducted systems of the air-conditioning plant operating as one integrated system. Schools, offices, hospitals and call centres have all gained significant benefit by installing monitoring systems as well as IAQ technologies.

Until now, the green building movement has largely targeted energy and water use because it was easy to measure with a few sensors and analysis of energy bills, with the return on the investment easily quantified. The shift to IAQ is more complex, however, and the investment provides a return based on the improved health of the occupants, which is hard to quantify on a balance sheet. +



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REDEFINING THE GROWTHPOINT TO ZERO

The Existing Building Performance tool

The GBCSA's Green Star Existing Building Performance tool rewards building owners that optimise their buildings performance demonstrating good operational performance over a measured period and contributing towards better quality spaces for tenants.

WORDS Melinda Hardisty



The V&A Waterfront is one of the greenest precincts on the continent by means of intensity and percentage area.

- A total of 35% global energy consumption and 38% global carbon dioxide emissions are related to building and construction. (United Nations Environment Programme, 2020)
- South Africa needs to meet its net-zero emission target by 2050 and set more ambitious nearer-term emissions targets to play an equitable role in limiting global temperature increases to well below 2°C, and preferably to below 1.5°C – as per the Paris Agreement’s targets.
- Accounting for ~15% of the country’s GHG inventory, buildings are a key part of South Africa’s decarbonisation strategy; building emissions will need to decrease by 34% in relation to the International Energy Agency’s Reference Technology Scenario by 2050 (or by 82% below current emissions) if South Africa is to align itself to a 2°C scenario – i.e. most buildings will need to be at or near to net-zero carbon.
- In most instances, improved energy efficiency (EE) reduces building operational expenditure and thus comes with strong economic arguments. However, the need to improve EE is increasingly being led by the net-zero imperative, this is especially relevant in South Africa where grid electricity is highly carbon intensive.
- The Post-2015 National Energy Efficiency Strategy (NEES), also requires that state-owned buildings reduce specific energy consumption by 50%, and commercial buildings by 37%, by 2030, off 2015 benchmarks.

The Existing Building Performance (EBP) tool focuses on the operational phase of a building lifecycle, realising that energy efficiency and sustainability is about the journey to better performance. The tool rewards energy and water monitoring initiatives as well as the adoption of sustainability focused management policies. The GBCSA released the green lease toolkit in partnership with the South African Property Association. It provides methodologies for negotiating the shared benefit and responsibility of green buildings between tenants and landlords.

MEASURE TO MANAGE

A major component (40%) of the EBP certification is energy and water benchmarking. Project teams seeking certification must make use of the Energy Water Performance (EWP) tool. Developed by the GBCSA in 2011 and sponsored by Growthpoint Property, this free tool can only be used for office buildings. Other ways to measure energy and water compliance paths are available within the EBP tool for other building types. The tool is normalised for factors such as occupancy rate, equipment and climate and allows property or portfolio owners to compare their office building performance in relation to a benchmark, giving each building a score on a sliding scale of 1 to 10. A building owner can peruse certification with EWP, potentially as a precursor to an EBP certification; this solicits a cost from the GBCSA.

In many cases, the EWP score provides the necessary benchmarking to motivate for retrofitting a building or change building management practices. The data compiled for the EWP benchmarking process will point to opportunities to improve the water performance of a building through rainwater harvesting and installing recycling measures. The EWP water score informs the future-proofing strategy for a building recognising that water security will face significant pressure in the imminent years.

“When the original EBP tool was developed, it endeavoured to take as many building typologies as possible into account, but there were nonetheless limitations and,

In response to the need to drive energy efficiency in existing buildings the GBCSA developed its Existing Building Performance (EBP) tool. This performance rating encourages:

- Optimised performance in areas under the landlord’s influence – the rating expires after three years and building owners need to recertify.
- Setting up a win/win situation between tenants and property owners that drives further efficiencies within tenancies.

in reality, it has largely been applied to the commercial office segment of the market,” explains GBCSA head of technical, Georgina Smit.

A customisation process was adopted so that GBCSA can offer the market standardised guidelines for energy and water benchmarking of industrial buildings, as this currently does not exist in the South African property market. Furthermore, nuances around industrial building ownership needed to be slightly reconsidered within the tool to better serve the market.

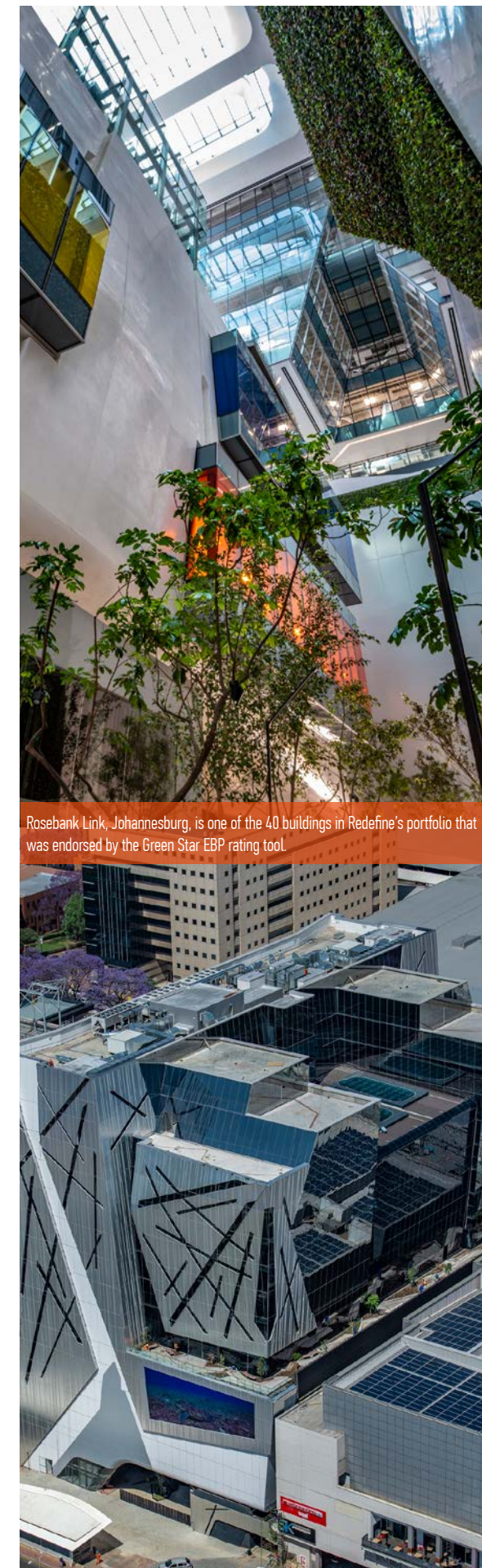
For example, many single tenancies operate on triple net leases which places a lot of the operational decision-making with the tenant and not the landlord. “A custom tool is not a new one, but instead focuses on customising the existing tool for a new typology, to better suit the functionality and user profile of that typology,” explains Smit.

EWP TO EBP TO ESG

With a portfolio of assets in South Africa spanning all three traditional property sectors (office, industrial and retail), Growthpoint notes that the EWP that is integrated into the EBP tool facilitates bottom-up learnings on efficiency and costs as well as top-down learnings for sustainability and accessing financial products.

Grahame Cruickshanks, head of sustainability and utilities at Growthpoint Properties, explains that improving the efficiency of buildings, especially their energy consumption, is one of the easiest and most cost-effective ways to reduce carbon emissions, adding that

“Property owners, such as Redefine, stimulate market transformation by pioneering and leading when they ‘walk the talk’ and commit significantly to certification.”



Rosebank Link, Johannesburg, is one of the 40 buildings in Redefine’s portfolio that was endorsed by the Green Star EBP rating tool.

“green-rating tools such as the Green Star EBP are proven to have a direct impact on increasing the number of green buildings and delivering positive environmental impacts for the country.”

Growthpoint currently has 132 EBP-certified buildings in its portfolio (including some of which are recertifications and apart from its certifications for new buildings) and is targeting more.

Mareli Cloete, senior manager for SHE (safety, health and environment) and sustainability at Cape Town’s V&A Waterfront, highlights that the Waterfront has publicly committed to becoming a carbon-neutral precinct by 2035. She says, “The only way that you can do this with existing buildings is to measure their operational efficiency, plan accordingly and set targets and objectives.” The EBP tool facilitates this process.

The V&A precinct has six EBP-rated buildings and another five pending. That is in addition to 11 new building Green Star certifications.

In a progressive contribution to transformation of the commercial green building space in September 2021, JSE-listed South African real estate investment trust (REIT), Redefine Properties, certified/recertified another 40 buildings in their property portfolio under the EBP rating tool. These accolades included 16 office EBP recertifications and 24 new EBP certifications across Gauteng, Cape Town, KwaZulu-Natal and Polokwane. This is the largest bulk Green Star EBP certification from any one commercial property owner to date and represents a major milestone for green property in South Africa.

Redefine’s diversified property portfolio (amounting to R75.3-billion) includes a mix of retail, office and industrial space throughout South Africa, and retail and logistics property investments in Poland. It currently has 131 Green Star EBP ratings in its portfolio (some of which are recertifications). Of these, 18 achieved 5-Star Green Star certifications and seven achieved a 6-Star Green Star accolade. The 6-Star Green Star certificates include Collingwood (initial certification/recertification), Gatehouse (initial certification/recertification), Old Warehouse (initial certification/recertification) and Central Building.

“Property owners, such as Redefine, stimulate market transformation by pioneering and leading when they ‘walk the talk’ and commit significantly to certification,” says Smit. “EBP certifications extend far beyond just energy and water performance management to encompass a much broader and holistic approach to sustainability management at an operational level. As such, they represent a commitment to a wide range of sustainability issues by a property owner and manager.”

Head of ESG at Redefine, Anelisa Keke, elaborates: “The benefits of green buildings run deeper and wider than what’s obvious at first glance. Besides the water and energy efficiencies, reduction of emissions and waste that come through sustainable design, construction and operations at Redefine the certification is a testament to our drive to create, manage and invest in spaces in a manner that changes lives.” She says that Redefine is focusing on being net zero by 2030.

Investec Property Fund (IPF) has 25 EBP certifications, two of which are recertifications. Jutta Berns, director and principal at Ecocentric, is responsible for IPF’s certification processes. She is excited that, apart from office buildings being done, IPF also has five industrial EBPs in progress as part of the Green Star EBP Custom Industrial Tool, currently in pilot phase.



The Watershed is a historic warehouse, reimagined by Wolff Architects as a space to house traders, offices and exhibition/eventing as well as a co-working.

V&A WATERFRONT

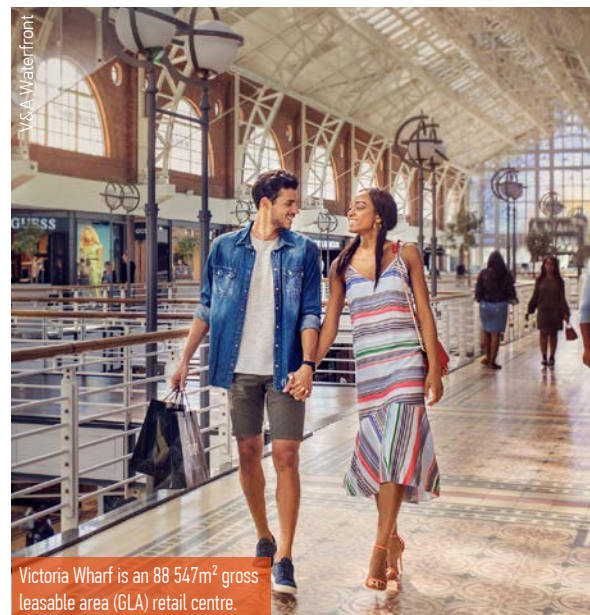
The Watershed is a mixed-use building that achieved a 6-Star Green Star EBP rating in 2019. It opened in its current form in 2015. Much of its existing structure and finishes were retained as fewer new materials mean less embodied energy. This included keeping the original timber warehouse floor, refurbishing extant windows and suspending the new first floor from the original gantry structure. The space maximises natural daylight, reducing dependency on artificial light while also minimising heat

gain. It is mostly naturally ventilated, minimising the requirements for mechanical circulation while maintaining excellent indoor air quality. A solar energy roof installation reduces power usage to below 50% when compared to similar building typologies.

All stores housed in the building are SMMEs that supply local products. Easy access to public transport (MyCiti buses) and cycling lanes means that almost all building staff use transport methods other than single occupancy cars.

Victoria Wharf shopping centre achieved a 4-Star Green Star EBP rating in 2015 and upgraded to a 5-Star rating in 2019. Areas of improvement that aided the extra star included on-site waste management and recycling initiatives, extensive use of skylights and LED technology, the inclusion of water-efficiency measures, curtailing motor transportation, preference for materials with low-environmental impact and without toxic emissions as well as actively driving the elimination of single-use plastics.

Cloete highlights that tenant participation is vital in the EBP process because the focus is mostly on operational targets. "With an average tenant vacancy rate of only 1%, it became imperative to introduce a green vision that would be inclusive of tenants. Our Green Lease Toolkit offers incentives to tenants who commit to recycling." By 2019, almost a quarter of its 450 retail tenants and 80 eateries had signed up to the programme.



Victoria Wharf is an 88 547m² gross leasable area (GLA) retail centre.

INVESTEC PROPERTY FUND

2929 on Nicol was IPF's first property to receive an EBP certification in 2018. It was re-rated in 2021 with a 5-Star



Investec Property Fund's 2929 on Nicol is a 16 048m² office park, comprising three buildings in Bryanston, Johannesburg.



Investec Property Fund's 345 Rivonia Road is a 10 494m² office building in Johannesburg.

345 Rivonia Road achieved a 5-Star Green Star EBP rating in May 2022. Berns explains that the building design allows for ample natural lighting while still minimising glare and thermal gains, making it a very comfortable internal space. She adds, "Energy and water performance played the most significant role in achieving the coveted 5-Star Green Star rating, where the building scored 60% of the possible energy performance points and 71% of the possible water performance points."

REDEFINE PROPERTIES

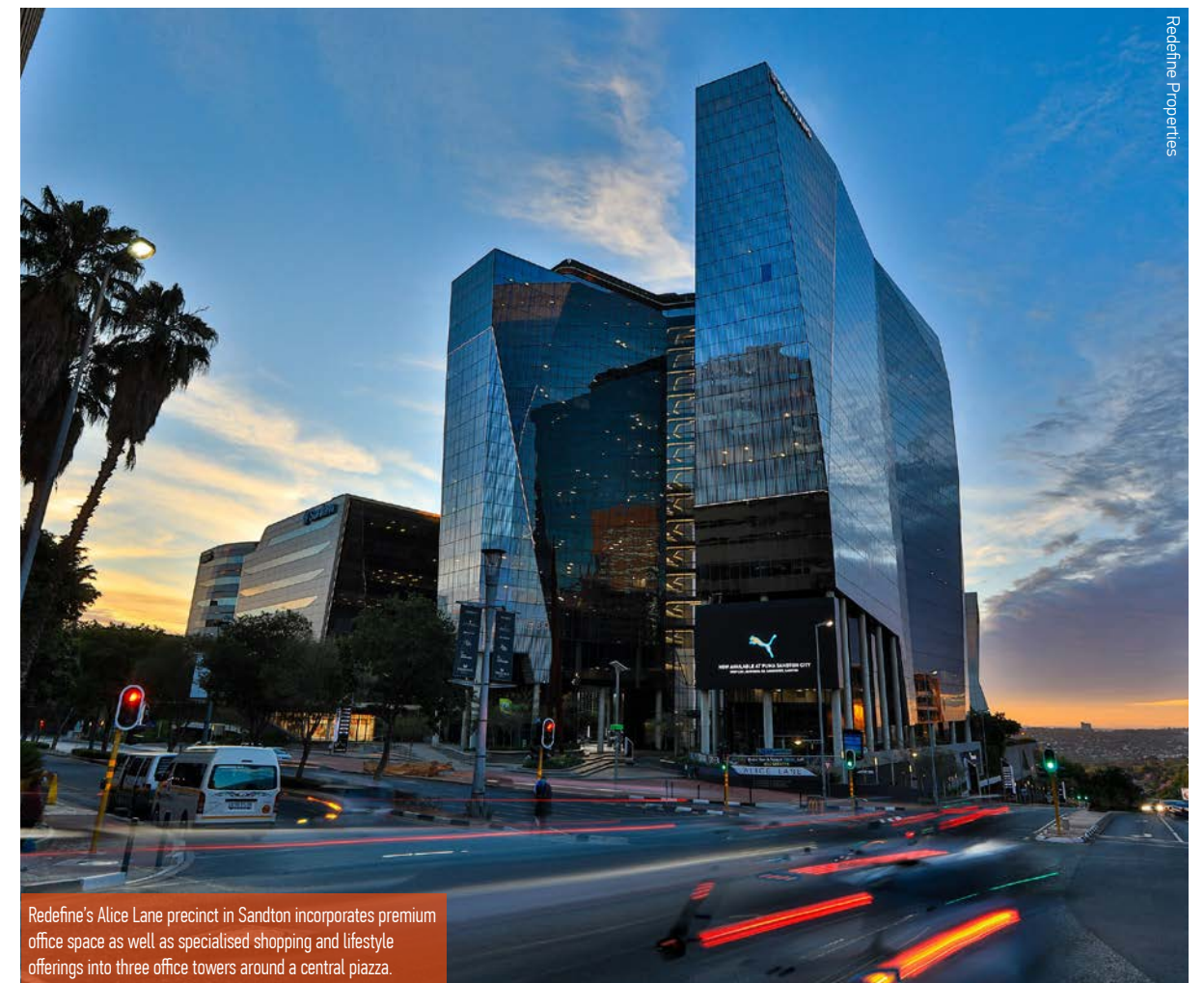
The Alice Lane development was the first Green Star rated precinct in the area, achieving a 4-Star Green Star As-Built and its first office design certification in 2003 (4-Star Green Star) and all three buildings have subsequently received 4-Star Green Star Office Design or As-Built ratings.

The EBP rating is a 4-Star Green Star rating. It performs particularly well when it comes to on-site facilities and services, public transport access and pedestrian friendliness, reducing the carbon footprint of transportation of its users.

Green Star certification. "Achieving a 5-Star Green Star rating as part of the recertification speaks to the maturity of the implementation of the tool at the property, which made recertification fairly straightforward, with particular effort on behalf of the property team to improve the energy and water performance," says Berns.



These efficiencies typically also offer attractive returns on investment.



Redefine's Alice Lane precinct in Sandton incorporates premium office space as well as specialised shopping and lifestyle offerings into three office towers around a central piazza.



Redefine's Black River Park office precinct has one of the largest roof-mounted solar installations in southern Africa – one of the 30th largest in the world.

Black River Office Park in Observatory, Cape Town, is a district of 13 buildings. All eight office buildings are Green Star rated, making this one of the greenest office precincts in South Africa. Three of the buildings have 6-Star Green Star EBP ratings, one a 5-Star Green Star EBP rating and one a 3-Star Green Star EBP rating.

GROWTHPOINT

River Park achieved a 5-Star Green Star rating in March 2022. To achieve this rating, the energy and water consumption was reduced, indoor air quality was monitored and mixed-mode ventilation (natural and mechanical)



Growthpoint's River Park is a commercial office development in Mowbray, Cape Town. It has over 13 322m² of multi-tenanted, B-grade offices.

“
By mostly targeting improved water and energy efficiency, EBP ratings become relatively simple to achieve.

was implemented. LED lighting was installed and glare control devices were introduced in occupied spaces. Apart from the physical interventions, green lease criteria and operational guidelines were introduced.

As EBP measures operational statistics, it is important to spell out the requirements for building use. In this case, these included a building users' guide, cleaning policy, travel plan, green procurement and purchasing policies, as well as management plans for landscaping and operational waste.

ECONOMIC EQ

Cruikshanks is clear that, apart from the environmental imperatives, there are economic advantages to building owners, particularly those with large portfolios. The main benefits for property investors include improved total return on investment on Green Star rated properties, improved let ability (some tenants now regard a Green Star rating as a prerequisite), investor attractiveness (institutional investors require ESG criteria in place and certifying Green Buildings confirms their performance in terms of ESG), and access to green finance opportunities (like green and sustainability-linked bonds).

He further explains that by mostly targeting improved water and energy efficiency, EBP ratings become relatively simple to achieve but also that these efficiencies typically also offer attractive returns on investment. So, upgrading existing buildings' performance just makes environmental and economic sense. +

SIKA GETS SEAL OF APPROVAL AT KLEIN CONSTANTIA WINERY

As a world-class winery, it is important that Klein Constantia Winery maintains its optimum conditions throughout the year, to live up to its global standards. The winery floor required a rehabilitation and for this task Sika's durable, leading products were specified.

The project required the identification and rehabilitation of old and damaged flooring at the winery. The bad substrates were removed and reprofiled with SikaCem®-810, a one component modified SBR polymer additive, that is mixed in with the floor screed, to correctly shape the floor falls. Once complete, it was left to cure for 21 days, to acquire the strength needed to apply Sikafloor®-20 PurCem®. Sikafloor®-20 Purcem® is a hybrid flooring screed that is ideal for the winery environment. It can withstand high impact, is slip resistant and allows for steam cleaning. Firstly, the floors were prepared with a light grind and then termination slots were cut into them. These slots facilitate the holding and gripping of the new floor, thus increasing its lifespan. Thereafter, the specialist applicator used a hand trowel to apply the Sikafloor®-20 PurCem® at a 6mm thickness, which was then left to cure for five to seven days. This latter product is a hybrid flooring screed and is an ideal solution for the winery environment, with its high impact resistance, non-slip, and steam-cleanable surface.



Desmond Van Vuuren from CCRS was the main contractor on site and Ian Wilkinson from Apex Construction Consultants was the onsite Project Manager in this successful revamp.

SIKA CORPORATE PROFILE

Sika is a specialty chemicals company with subsidiaries in 101 countries around the world, manufacturing in over 300 factories. Its 27,000 employees generated annual sales of CHF 9.32 billion in 2021. +



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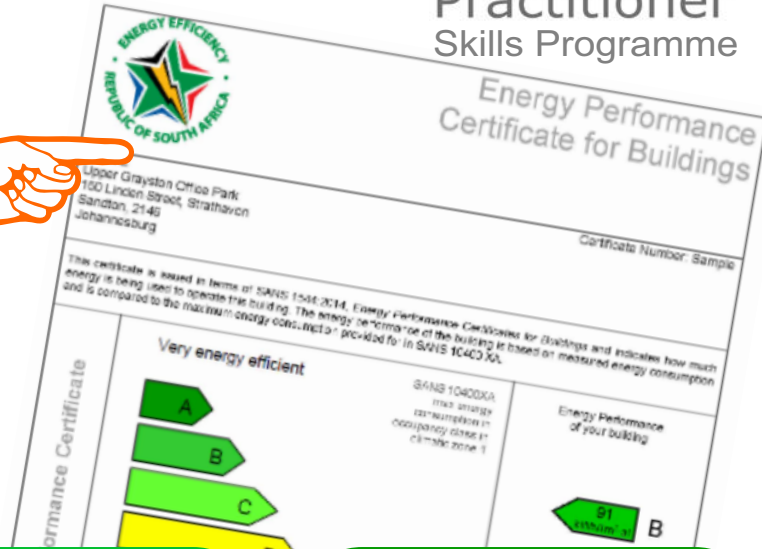
DID YOU KNOW:



It is now law that certain buildings need to display this guy



Let's help you by helping your client to comply!



WHAT IS AN EPC?

An Energy Performance Certificate (EPC) is a certificate that indicates the energy performance of a building.

It also shows:

- what potential the building has of becoming more energy efficient
- how energy efficiently the building is used

Building categories that must comply:

- offices,
- entertainment facilities,
- educational institution buildings, and
- places of public assembly such as sporting facilities and community centres.

WHAT HAPPENS IF I DON'T COMPLY

It is law now - as published in the regulation for the mandatory display and submission of EPCs for buildings - as per Government Gazette, Notice 700 of 2020.

According to the National Energy Act (No. 34 2008) penalties for contravening the Act - in which the EPC regulations are derived from - may incur a penalty of up to R5 million and/or imprisonment for a period not exceeding 5 years, if convicted.

EPC deadline is 7 December 2022

NEED HELP? WE GOT A SOLUTION

We have EPC Practitioners who completed a QCTO Skills Programme that can assist you.

How can they help you?

- Check if your building needs an EPC
- Collect your building data

What happens thereafter?

You get a SANAS accredited Inspection Body in to:

- Verify the information collected by the EPC Practitioner
- Issue your building EPC

CERTIFICATION SCHEME TO ENCOURAGE CONTINUOUS PROFESSIONAL DEVELOPMENT OF EPC PRACTITIONERS

The Certified Energy Performance Certificate Practitioner (CEPCP) is an individual who performs an assessment of a building facility to compile and collect data and information required for verification towards an Energy Performance Certificate (EPC) for buildings. This is in terms of the EPC Regulation signed into effect in December 2020, and effective for compliance in December 2022, by the Minister of the Department of Minerals Resources and Energy (DMRE) in terms of Act number 34 of 1998.



TM Lesetla, Certified Energy Manager (CEM®), Certified Measurement and Verification Professional (CMVP®), Certified Energy Auditor (CEA®) and Certified EPC Practitioner (CEPCP)

South African building owners are required by law to submit their building data for the National Building Energy Performance Register (NBEPR) and display an EPC in the foyer of the building.

In the case of public buildings owned, operated, or occupied by Government, the accounting officer carries this responsibility. This must be done through a South African National Accreditation System (SANAS) EPC Inspection Body in accordance with the EPC Regulation requirements, and the relevant standards.

The South African National Energy Development Institute (SANEDI) – the body responsible for the NBEPR, in partnership with the Institute of Energy Professionals Africa NPC (IEPA), undertook a Skills Programme in the Quality Council for Trades and Occupations (QCTO) registered EPC Practitioner qualification code SP220323 at the beginning of 2022, to develop skills to meet the requirements of the EPC Regulation. IEPA is a QCTO Skills Development Provider (SDP) and was the Development Quality Partner (DQP) for the EPC Skills Programme together with a Steering Committee. With the necessary skills available, the DMRE can strive to meet the goals set with the implementation of EPCs. There are currently eight SANAS-accredited EPC Inspection Bodies, with a total of xx Technical Signatories and over 40 EPC Practitioners who are ready to serve building owners and assist with getting buildings ready for inspection, or to inspect buildings and issue EPCs for you. In addition, a lot of training is available, a qualification is registered, and many building owners are already using these platforms to upskill their own building managers, facilities managers, electricians, and other staff members to get their own buildings ready for EPC Inspection Bodies to issue their EPCs for them. There are many ways to approach this as a building owner yourself or using the skills already available to you on a part-time basis, through the various programs developed.

More recently, to give assurance to skills available, a Certification scheme has been developed to firstly verify that a person is able to perform the work of assessing or auditing a building for an EPC through the correct data and

information collection in a logical systematic manner, and secondly to ensure such persons remain knowledgeable on the topic by requiring continuous professional development towards remaining Certified as an EPC Practitioner.

There are many training options available, the Certification scheme looks wider than that into the existing qualifications of a person, their experience relating to EPCs, and whether they have had formal training in the EPC Regulation and related standards as well as safety requirements for energy auditing, and whether they understand the South African National Accreditation System (SANAS) requirements for Inspection Bodies. They also need to be able to logically produce an EPC report and certificate, and be able to solve problems when they encounter them whilst performing an EPC building assessment or audit. These are all qualities a Certified EPC Practitioner must demonstrate and maintain throughout their career.

The Certification scheme for EPC Practitioners has been tested, and the first five candidates have achieved their Certification as EPC Practitioners. This includes TM Lesetla, from Tshebo Facilities,

an Energy Services Company (ESCO) providing services to clients to get their buildings ready for SANAS-accredited EPC Inspection Bodies. "The training received through the Institute of Energy Professionals Africa, an affiliate of the Association of Energy Engineers (AEE), together with the written examination with high pass requirements, and the assignment given towards certification, is arguably the most comprehensive in the country by far, in getting one to be a Certified EPC Practitioner. I would recommend it for anyone who would like to be involved in EPC, and have a full understanding of all applicable standards, including but not limited to SANS1544, SANS10400-XA, SANS/IEC/ISO17020," commented TM Lesetla, CEPCP, Tsebo Energy Solutions. The other four candidates include Robert Clarke, also from Tshebo Energy Solutions, Jannie van Bosch and Ian Nel from Tolplan, and Dumisane Ndlovu from Improvair. The list of Certified EPC Practitioners is available on the www.iepa.org.za website. +

DOES YOUR CLIENT'S BUILDING HAVE AN ENERGY PERFORMANCE CERTIFICATE (EPC) YET?

www.sanedi.org.za | 011 038 4320

The pilot of the scheme is completed, and the Certification scheme is now available for public comment by persons in the EPC industry that can contribute constructively to its success; we invite such persons to apply to comment on the scheme by completing this online application – use the QR code to access the form. Deadline: 9 September 2022 for comments.





ADVANCING NET ZERO

GBCSA NET-ZERO CARBON CERTIFICATES

Progressing net-zero emissions is an essential systemic shift towards a more sustainable built environment. The GBCSA was the second Green Building Council in the world to release a net-zero scheme, and to date has certified 25 net-zero projects, of which 19 are net-zero carbon.

The Green Building Council's strategy is to follow a reduction first, outcomes-based approach. Through gathering data to inform low-carbon choices, benchmarks are set, best-practice methods incorporated, associated costs reduced and greater uptake eased – stepping up market transformation to sector emissions reductions.

To moderate embodied emissions, increase resource efficiency and stimulate the development and market supply of low-carbon products, the sector must (1) reduce its environmental impact through design and construction, and (2) generate a strong demand signal to finance to decarbonise materials and processes.



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FROM GROUND ZERO

NET-ZERO CARBON

A building that is highly energy-efficient and the remaining energy use is from renewable energy, preferably on-site but also off-site where necessary, so that there are zero-net carbon emissions on an annual basis (Net Zero) or if the energy from renewable energy results in more energy being produced than what is on site (Net Positive).

GREENFIELD INDUSTRIAL PARK

Building Emissions (modelled) (pilot) – Level 1

Validity: October 2017 – October 2020

Greenfield Industrial Park was developed as an upmarket space in Cape Town's growing airport industrial node. The building has been designed to generate as much renewable energy in a year as is consumed by the base-building operations (lighting, air conditioning and site services).



TWO DAM SUSTAINABLE

Occupant Emissions (measured) (pilot) – Level 2

Including 13.6% offset purchased

Validity: October 2017 – October 2020

Two Dam Sustainable is an off-grid responsibly operated trout farm that runs almost entirely on renewable energy. The farm is home to a hyper-efficient recirculating aquaculture system, which is the first of its kind in Africa.



VODAFONE SITE SOLUTION INNOVATION CENTRE

Occupant Emissions (modelled) (pilot) – Level 2

Validity: October 2017 – October 2020

The Vodafone Site Solution Innovation Centre in Midrand, Johannesburg, was completed in 2011. Located within its exclusive vegetated space, the building presents itself as a transparent box with large overhangs and a naturally ventilated double-façade to avoid undue problems of solar heat gains.



78 CORLETT DRIVE

Building Emissions (modelled) (pilot) – Level 1

Validity: December 2017 – December 2020
Developed by Legaro Properties, the three-storey project is situated on a brownfields site. The design incorporates strong minimalist geometries, with shading louvers acting as a dynamic façade element and passive shading device.



VLEIHIJS DEVELOPMENT

Occupant Emissions (modelled) (pilot) – Level 2

Validity: September 2018 – September 2021

The project's design brief stated that it should "seek to lead in every way in the architectural innovation of sustainability and biomimetic principals". The architecture and landscape form a symbiotic relationship where one cannot thrive without the other.

MDA PROPERTY HOLDINGS

Building Emissions (modelled) (pilot) – Level 1

Validity: March 2019 – March 2022

The MDA Property Holdings building is designed to reduce the natural depletion on the environment. The two-storey office building is characterised by optimised solar control, daylight and HVAC system design. PV solar panels ensure that the building produces more energy than it consumes.



Solid Green Consulting



LORDS VIEW INDUSTRIAL PARK

Base Building (modelled) (pilot) – Level 1 As-Built Rating v1

Validity: January 2020 – January 2023
The building is an industrial structure with most of the space being a warehouse. The circulation system is a mixture of natural and mechanically ventilated spaces. A shared PV system reduces the main power usage and an integrated building management system has been installed.

ZERO IN ON ACTION

1. **Focus on emissions reduction.** Minimise offsets via best practice sustainable construction and operation, by reducing energy demand, shifting away from fossil fuels and using 100% renewable energy.
2. **Reward residual emissions.** Invest in carbon reduction projects that are credible and permanent as determined via independent third-party verification.
3. **Advance quantifiable benefits.** Direct funds into offsets that store carbon and provide tangible environmental and/or social improvements, particularly those with nature-based co-benefits.



HOTEL NIEU

Occupant Emissions (modelled) – Level 2

Validity: April 2020 – April 2023

The intention of the Hotel Nieu development is to provide upmarket hospitality services to people who care deeply about appropriate stewarding of resources. The Nieu philosophy is concerned primarily with the most appropriate use of land and resources.

ARABIAN PROPERTY AWARDS
AWARD WINNER
2022-2023

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- Sustainable Residential Development SA



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DE ZICHT LIFESTYLE CENTRE
Base Building (modelled) – Level 1
Validity: January 2021 – January 2024
De Zicht Lifestyle forms part of the Balwin De Zicht Residential Complex in Cape Town. The building achieved net-zero energy through its lighting and HVAC installations, which are supplemented by a 14.58kWp PV system that generates 25 960kWh annually.



BALLITO HILLS LIFESTYLE CENTRE
Building Emissions (modelled) – Level 1
Validity: March 2021 – March 2024
The Balwin Properties building situated within the Ballito Hills Lifestyle Centre achieves net-zero energy through reducing its energy loads by using energy efficient lighting and HVAC installations, which are supplemented with a 14.58kWp solar PV system that generates 25 960kWh annually.

NET ZERO NET POSITIVE
Net Zero/Net Positive is applied to new construction projects, fit out and existing buildings in operation. Net Zero/Net Positive certification awards projects which go beyond the partial reductions recognised in the GBCSA tools and have reached the endpoint of completely neutralising or positively redressing their impacts.

GREENPARK LIFESTYLE CENTRE
Building Emissions (modelled) – Level 1
Validity: April 2021 – April 2024
Situated within the Greenpark Lifestyle Estate, this community centre project is developed by Balwin Properties. A direct visual connection to the external environment is provided for 80% of the community centre occupied area. A high level of thermal comfort is ensured for at least 98% of occupied hours.





GREENLEE GREENBARN

Building Emissions (modelled) – Level 1

Validity: April 2021 – April 2024
Greenlee Greenbarn, located at Linbro Park, Johannesburg, serves the Greenlee Residential development. There is a restaurant, laundromat, art gallery, concierge services as well as a manager’s office and meeting rooms. Solar photovoltaics and LED lights were installed to achieve Level 1 Net Zero Carbon.



IN2FOOD – BONAERO

Building Emissions (modelled) – Level 1

Validity: November 2021 – November 2024
In2Food – Bonaero manufactures food for Woolworths and various airlines. The industrial facility consists of food preparation, storage and office areas. The factory floor has a CO₂ refrigeration system which has zero ozone depletion potential and low global warming potential gas. All hot water is heated by the system.



Solid Green



CITY INDUSTRIAL PROPERTY

Building Emissions (modelled) – Level 1

Validity: September 2021 – September 2024
The City Industrial Property in Bellville, Cape Town is the flagship facility for City Logistics. The building is an industrial typology building with mixed-mode ventilation, low VOC internal finishes, rainwater harvesting and efficient lighting control system.

GREENCREEK GREENBARN

Building Emissions (modelled) – Level 1

Validity: TBC
Situated within the Greencreek Riverwalk estate, the leisure project developed by Balwin Properties, has a plethora of amenities including a food garden and art gallery. The design of a traditional rustic farmhouse rooted in nature consists of architectural initiatives which contribute to the sustainability of the entire estate and are recognised as world leadership.



FYNBOS LIFESTYLE CENTRE

Building Emissions (modelled) – Level 1

Validity: October 2021 – October 2024
Balwin Properties has exceeded targets by implementing several innovation measures in this single-storey community centre situated in The Fynbos Lifestyle Estate, which allow for a world leadership building. This is done through GBCSA online courses.



THE HUNTSMAN LIFESTYLE CENTRE

Building Emissions (modelled) – Level 1

Validity: October 2021 – October 2024
Developed by Balwin Properties, the single-storey community centre project has a 57.2kWp PV system installed, which yields 102.1MWh annually. The building design shows an improvement of 100% over a SANS10400 notional building.



BALWIN HEAD OFFICE

Building Emissions (modelled) – Level 1

Validity: March 2022 – March 2025
The new Balwin HQ, located on Corlett Drive, Johannesburg, in an urbanised context adjacent to the Melrose Arch development. The building is made up of four basement levels and five office floors. The redevelopment will see the removal of three cones and the creation of two new floors under an elevated concrete box.



NEXUS AT WATERFALL

Building Emissions (modelled) – Level 1

Validity: April 2022 – April 2025
Nexus at Waterfall is in Waterfall City, Johannesburg. Energy sub meters are present to accurately monitor energy consumption. The building has a 200kW solar PV system. Ventilation meets fresh air standards set by SANS required for buildings in South Africa.

SANBS HEAD OFFICE

Information not available at time of publication. +

A better life through accreditation

The South African National Accreditation System (SANAS) is the only national body responsible for carrying out accreditations in respect of conformity assessment, as mandated through the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act (Act 19 of 2006).

Our mandate is to provide an internationally recognised and effective accreditation system in support of public policy objectives including trade facilitation for the betterment of our people.

SANAS Accreditation is an essential tool for decision-making, risk management and supplier selection. It can also provide a competitive advantage in domestic markets through access to public sector contracts, and also overseas with greater acceptance in export markets.

It is a preferred mechanism for identifying competent bodies to implement government policies and regulations aimed at safeguarding the public and building public confidence in activities that impact on such fields such as health, welfare, security, the environment, education, and financial services.

SANAS accreditation supports socio-economic growth and environmental sustainability as indicated hereunder:

WHAT WE DO

- Accreditation of conformity assessment bodies.
- Expand the acceptance of conformity assessment results nationally, regionally and globally.
- Provide effective direction and leadership in developing accreditation programmes in new fields
- Offer training on matters related to accreditation.

BENEFIT TO SOCIETY

- Accredited conformity assessment bodies provide accurate calibration, test, inspection and certification results that are essential for the protection of society's health and safety, as well as the environment.
- Poor-quality products are kept out of our market.
- Improved living conditions and a safer environment.
- Calibration, testing, inspection and certification results can be trusted.

BENEFIT TO INDUSTRY AND EXPORTERS

- Facilitate the acceptance of South African-produced goods and services globally.
- Tested, inspected, or certified once, accepted everywhere. Reduce cost and mitigate the risk of rejection of exported goods and services.
- Level the playing field between big and small conformity assessment bodies.
- Reduce the need for retesting, re-certification, or re-inspection.
- Provide world-class quality infrastructure.
- Improve the understanding of accreditation and the implementation of a management system.

BENEFIT TO SOUTH AFRICA

- Increase local business' export opportunities.
- Improve South Africa's product competitiveness.
- Support regulators in the protection of society's health and safety, and the environment.
- Lock in exports and improve economic growth.
- Minimise waste of scarce financial resources and create jobs.
- Improve South Africa's knowledge base and encourage continued compliance with international requirements.

SANAS VALUE PROPOSITION

Our value proposition expresses the services we offer, as well outlines the benefits of services to our customers.



SANAS has accredited over one-thousand eight-hundred and seventy Conformity Assessment Bodies across South Africa as well outside our borders. Conformity assessment and accreditation are important parts of the South African quality infrastructure, along with metrology and standardisation.



PROJECT NUTSHELL

Location:	Sandton, Johannesburg
Type of building:	Public and Education
Green Star rating:	4-Star Green Star Public and Education Building Design
Project dates:	October 2019 to July 2021
Project size:	3 726m ²

Identifying the need to improve the quality of its employees' work-life balance, financial group FirstRand achieved this by providing wellness and lifestyle facilities within the existing Merchant Place campus in Sandton, Johannesburg.

WORDS NGAGE Media and Robbie Stammers

Merchants of

MAGNIFICENCE



A 4-Star Green Star rating represents the best practice in the South African context for designing and constructing buildings. And while this rating is important for the project as the sustainability credentials are confirmed by an independent certifier, the wider impact is even more important, and that is the collective effort of all stakeholders – the building owner, the professional team, the contractors and the occupiers to be part of the movement transforming the South African real estate sector towards a sector that is more sustainable and resilient.

“As part of our ongoing commitment to the Green Building Council of South Africa, and since we became gold-founding members in 2008, we have continued to press forward with sustainable developments. It pleases us that we have been able to add a new layer to the 30-year-old Merchant Place complex given our ongoing relationship with RMB and Eris Property Group. This adds to our vast record of more than 30 rated buildings,” explains Bob van Bebber, director at Boogertman + Partners Architects.

“Known as 8 Merchant Place (8MP), the building, in many aspects, is most definitely a new addition to the Merchant Place complex in that it adds a mixed-use service building to a corporate campus and has become the heart of the campus with ongoing day-to-day activities and events. It also makes a big impact visually for what is a very small building. In the way that it contrasts the very rectilinear existing built fabric of Merchant Place and the adjacent Investec head office, with a curvaceous and sinuous outer form that seems to have been poured into the left-over space between the two corporate giants of Sandton, while borrowing from the existing detail of the bird’s beak cornice line of Merchant Place,” adds Van Bebber.

Leading consulting engineering and infrastructure advisory firm Zutari also played a crucial role in bringing this three-storey building to fruition by providing civil,

structural and wet services in addition to environmentally sustainable design (ESD) consulting.

“This is in line with the purpose the building serves, namely a wellness centre fitted with medical rooms, gym, educare centre, complementary retail and a rooftop entertainment area with a perimeter running track,” explains Yovka Raycheva-Schaap, associate, ESD consulting and project management at Zutari.

The project is a showcase of the one-stop-shop solutions that Zutari prides itself on co-creating with its clients. “Having the civil, structural and wet services all provided internally by us allowed for efficient co-ordination between the disciplines and resolution of any clashes and issues before the construction information was issued,” highlights Zutari technical director, Mark Axelrod.

Zutari’s structural scope of work encompassed the design and supervision of the new building, including strengthening the existing columns and underpinning the foundations, while the civil scope comprised the stormwater design. “From a structural perspective, the project was complicated by the geometry of the new floor slabs, strengthening the existing structure and interfacing with the existing services,” he points out.

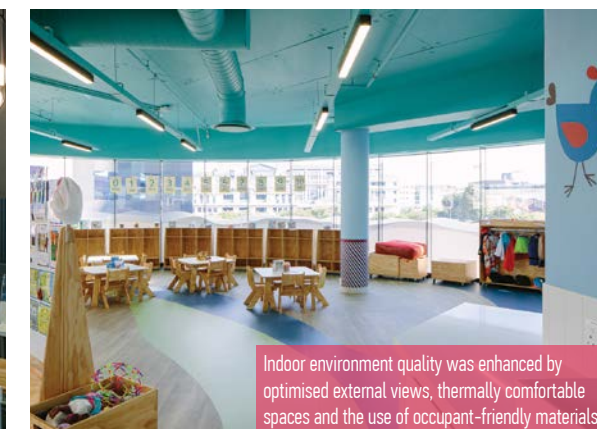
Calculations revealed that the load-carrying capacity of the existing columns and foundations in the basement was insufficient to support the additional load from the new building. Zutari therefore developed strengthening details for the existing columns using reinforcement



The project is a showcase of the one-stop-shop solutions that Zutari prides itself on co-creating with its clients.



The benefits of 3D modelling were transferred to the contractor, as initially it was challenging to visualise the complex slab geometry.



Indoor environment quality was enhanced by optimised external views, thermally comfortable spaces and the use of occupant-friendly materials.

concrete collars. This had to be carried out with minimal interference to the functioning of the building and vehicle movement along Bute Lane and in the basements.

Existing services in the basements such as water tanks could not be moved, which posed additional challenges. For the foundations, the underpinning piles were installed unconventionally to avoid existing services. As a result, strap beams were introduced to resolve the eccentric loads. The existing ground slab had a pond and landscaping that had to be removed to construct the new elevated ground level. This consisted of sleeper walls with a BONDEK® slab, which is a profile steel sheeting widely accepted by the building and construction industry for high efficiency and speed of construction. To ensure that the new load was less than that of the existing ground slab capacity, the existing no-fines concrete under the new building footprint was removed.

In terms of wet services, Zutari was appointed as a consultant for the internal hot and cold-water reticulation, internal soil and waste drainage reticulation and central hot water generating plant installation, explains Vincent Gieselbach, the wet services engineer.

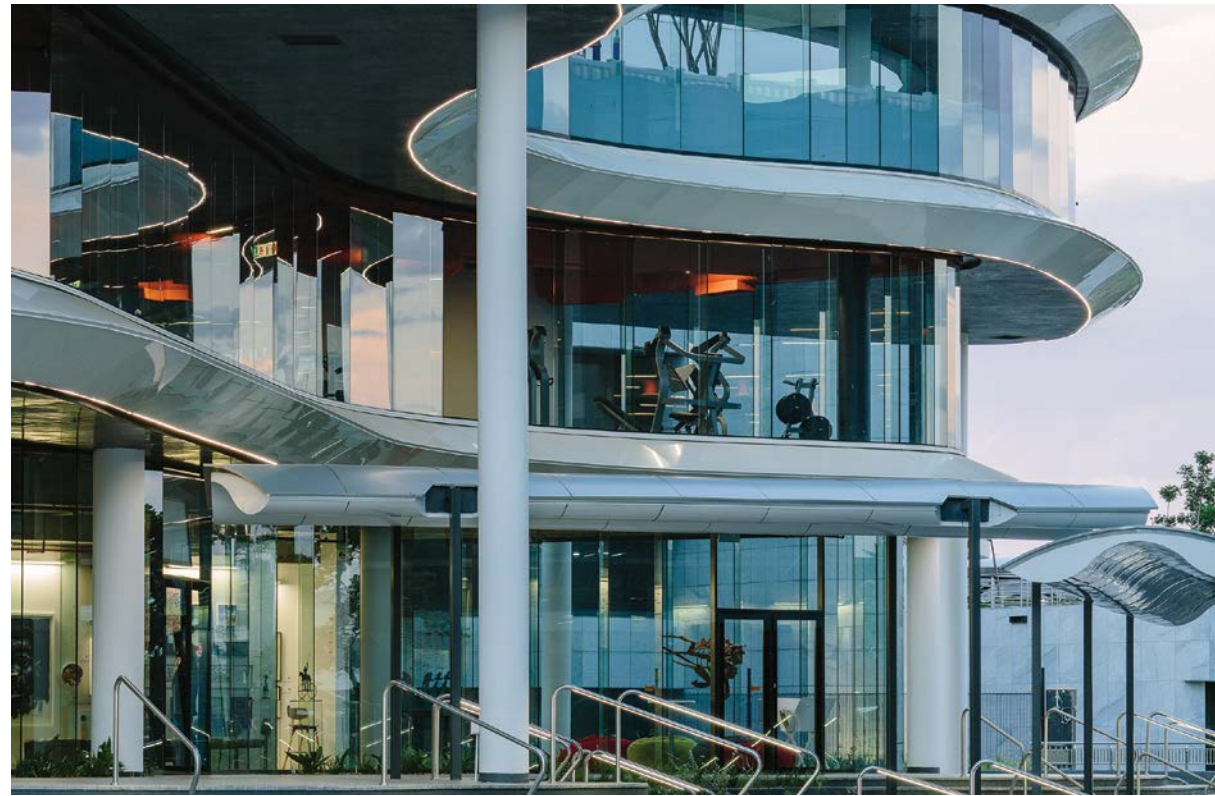
The design was carried out to meet both Green Star and

SANS10400XA requirements. Efficient sanitary fittings were installed throughout the building. Hot water is provided by means of a central hot water system with a heat pump. Comprehensive water metering is installed and connected to the Building Management System (BMS) for optimal water-use management.

Enhanced indoor environment quality was achieved by means of increased ventilation rates, glare-control elements, optimised external views and connection to nature, thermally comfortable spaces and the use of occupant-friendly materials and finishes. Dedicated exhaust risers within the tenancies ensure that air pollutants from printing machines, for example, are exhausted outwards.

The building’s optimal energy performance results from the selection of energy-efficient HVAC systems and lighting, as well as the rigorous commissioning and fine-tuning of all services. Where individually enclosed spaces are unoccupied for a period, the BMS automatically switches off electricity-consuming services.

Given the location of the building in the wider Merchant Place campus, 8MP makes use of centralised existing services and facilities such as a standby generator farm, backup chiller capacity and the wider-campus BMS and



parking spaces, which would have had to be sourced independently for a conventional building.

“This arrangement makes the project unique from a future reuse of equipment and facilities perspective, which certainly contributes to the improved overall environmental performance of the building,” highlights Raytcheva-Schaap.

Waste management was handled in a responsible way during the construction of the building. An Operational Waste Management Plan was implemented by the project owner to ensure that, once the building was operational, waste generation is reduced and diverted from landfill by means of recycling and/or reuse.

The building also incorporates safety features aimed at limiting the spread of Covid-19 infections and similar viruses. For example, the main entrance of the building, as well as all entrances to the different tenancies, feature touchless doorways.

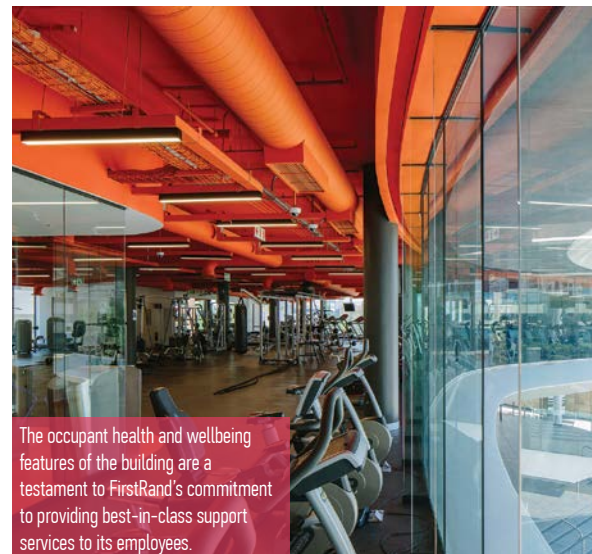


The location of the 8MP building in the wider Merchant Place campus.

The drawings for the existing building were all completed on CAD. However, due to the geometric complexities of the new building, 3D modelling was vital for the success of the project. Together with Boogertman + Partners, Zutari drove the Building Information Modelling (BIM) collaboration on the project, ensuring all services were coordinated on one federated model.



8MP has a curvaceous and sinuous outer form that seems to have been poured into the left-over space between the two corporate giants of Sandton.



The occupant health and wellbeing features of the building are a testament to FirstRand's commitment to providing best-in-class support services to its employees.



“The benefits of 3D modelling were transferred to the contractor, as initially it was challenging to visualise the complex slab geometry,” adds Axelrod. Zutari assisted Trencon to install Naviswork Freedom, as well as demonstrating how to operate the model.

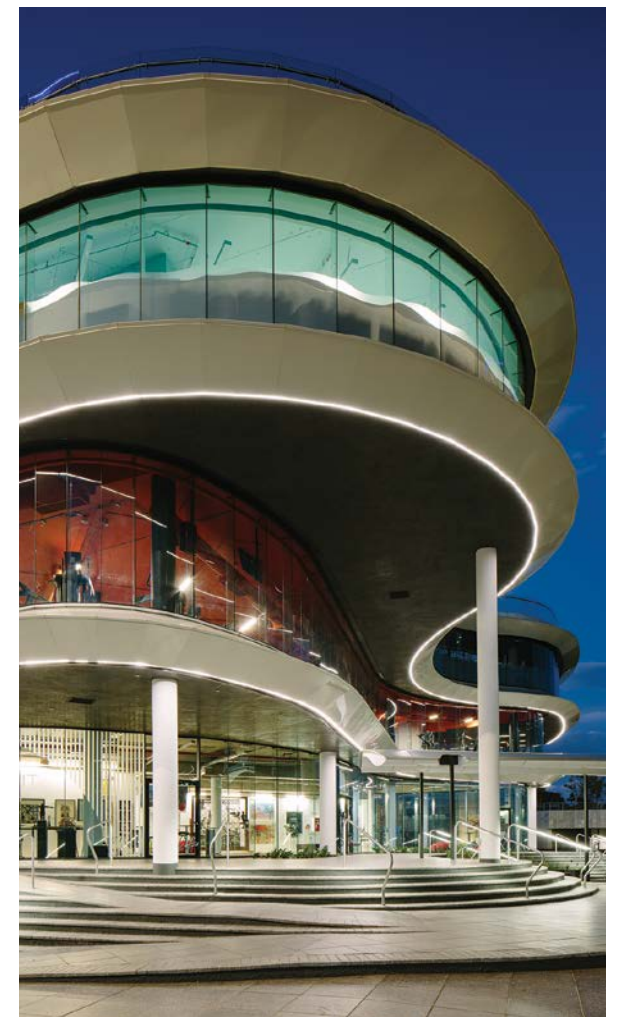
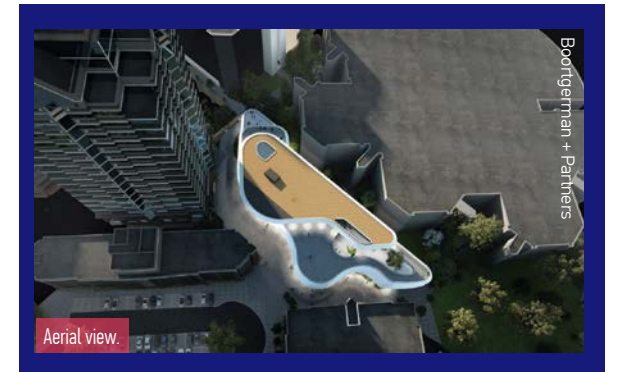
Project completion was originally planned for 20 January 2021. However, due to Covid-19 restrictions, the site stopped all work for ten weeks from March 2020, and the project was finally completed on 16 July 2021.

“The ESD credentials of the building, as well as the implemented occupant health and wellbeing features, are a testament to FirstRand's commitment to environmental sustainability and providing best-in-class support services to its employees,” concludes Raytcheva-Schaap.

The chief operations officer for the Merchant Place Campus Real Estate Management Services, Vinod Naidoo, says that 8MP has added significant value to the campus experience and met FirstRand's ambitions to develop environmentally sustainable workplaces for its employees. +



The building also incorporates safety features aimed at limiting the spread of Covid-19 infections and similar viruses.





Another ECOBRICK in the wall

Its value may be debated in environmental circles, but the ecobrick exists. Two innovative Cape Town builds show how a beverage bottle stuffed with rubbish can help reduce a project's carbon footprint.

WORDS Kim Maxwell

What is an ecobrick and why use it in construction? Put simply, this empty polyethylene terephthalate (PET) bottle is hand-stuffed with tightly compacted, single-use rubbish: from sweet wrappers, clingwrap and foil to assorted soft plastic. Ecobricks can stop rubbish with no or low recycling value from reaching over-capacity landfills.

The International Union for Conservation of Nature's National Guidance for Plastic Pollution Hotspotting and Shaping Action report on South Africa (December

2020) estimates that the country generates about 2 370-million tons of plastic waste annually. Of that, 70% of plastic waste is collected, but only 14% is recycled. South Africa's per capita plastic waste generation is about 41kg per year, above the 29kg global average.

Now consider that the built environment generates nearly 50% of annual global carbon emissions. Of those, building operations are responsible for 27%, and building materials and construction (embodied carbon) an additional 20% annually, according to the Global Status Report for Buildings and Construction 2021.

ECOBRICK FLOORS AT THE RIDGE

So, in that context, it's unsurprising that a V&A Waterfront goal was to create a Cape Town commercial property that pushed the boundaries of sustainability in design. As a new, low-energy building, The Ridge was designed to achieve a reduction in operational carbon emissions of up to 82%. It achieved a GBCSA 6-Star Green Star for both design and as-built ratings for Office Design v1.1 rating and won "highest-rated building". Its use of ecobricks was an innovative aspect.

Tessa Brunette, sustainability leader for Africa, India and Middle East at Arup, was the engineering lead on The Ridge. The company offers consulting engineering within the built environment and worked on the project from 2018 to 2021. "The ecobrick idea came about in one of our early 'blue-sky thinking' workshops with the team including the client, V&A Waterfront, and architects, studioMAS," explains Brunette. "We were throwing all sorts of ideas around and the question was asked: aren't there better ways to fill voids than by using either virgin polystyrene or a lightweight concrete?"

A novel solution was suggested to make up the floor level difference in the building. "The office areas in the Ridge building have a raised access floor. It's a 'false' tiled floor surface that is installed on pedestals on top of a concrete floor slab, creating an air void used for services," says Brunette. In the toilet areas, where raised access floors weren't required, instead of making up that depth difference by using standard solutions – virgin polystyrene filler or lightweight concrete – ecobricks were the material of choice.

CONSISTENCY CHALLENGES

Using an untested material in the floors brought challenges. Brunette says the biggest issue was the reliability of the ecobrick's structural strength in relation to its density. "To solve this, we designed it so that the inconsistency was not a problem. We didn't rely on the ecobricks to carry any load. All they had to do was fill the floor void," she explains.

"There was a thinner concrete layer and a steel mesh

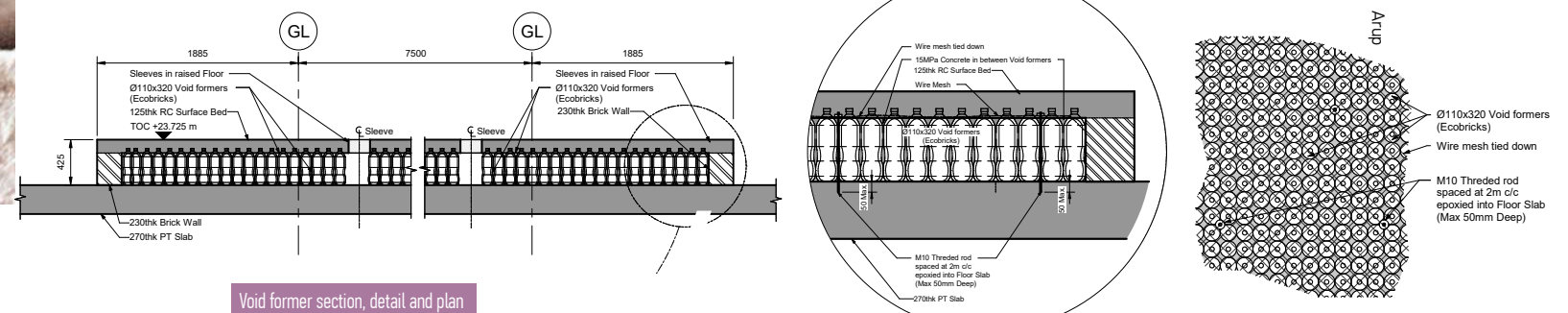


The Ridge at the V&A Waterfront.

inside the concrete: the combination of the steel mesh and the thinner concrete layer spreads the load so that it isn't carried by the ecobricks." Effectively solving the unreliability issue and reducing the project's carbon footprint by avoiding virgin material.

The outcome? "Everyone was happy. It took a lot for us to get to the right solution when designing. So, there were a few iterations during the design phase, but once that was all resolved and there was a trial/prototype pour, it all happened very quickly."

Could ecobricks in floors become a thing in new builds? Brunette believes it's a delicate balance. "It's about recognising that single-use plastic is around now, so we should reuse it in buildings, to keep it out of landfills and oceans. But to be careful not to rely on single-use plastic as a building material going forward," she says. "It's about understanding that both the building and plastic industries should be designing differently, towards a future not reliant on single-use plastic because it is unsustainable."



Void former section, detail and plan



Excavations starts on The Ridge.



THE RIDGE AND ECOBRICKS

- Concrete has a high environmental footprint, so void formers are used to “fill space” and reduce the concrete required. Polystyrene void formers are not recyclable as they’re made of virgin hydrocarbons.
- Using ecobricks in The Ridge was a first for the building sector globally.
- Ecobricks were placed vertically to fill the 450mm-deep void adjacent to access floors.
- The total void volume in the building is 41m³, equating to 14 000 ecobricks. Each bottle weighed 418g.
- Ecobricks were also used to create flowerbeds in the adjacent food garden.
- The Ridge ecobrick system used about 5.5 tons of single-use plastic pollution. Working off the 41kg per capita average plastic waste generation in South Africa, these void formers are the equivalent of 134 people’s annual single-use plastic waste.



Steel reinforcement mesh was placed on top of the bricks to keep them in place during concreting and to control cracking in the concrete.

EDUCARE CENTRE FROM MUD AND WASTE

In August 2022, Ulwazi Educare Centre in Delft, Cape Town, was nearly complete. Built as an education space for 200 pre-school children, its construction used a host of upcycled and natural materials. These include 1 700 large car tyres, 6 000 ecobricks, 60 cubes of “cob” (sand, clay and straw), various “bricks” made from crushed, upcycled polystyrene used in film sets, 240 cubes of crushed builders’ rubble (for filling the tyres) and numerous glass bottles, lime internal plasters, gum poles, recycled doors and windows.

The project has taken five years. Sustainable builder Peter McIntosh of Natural Building Collective provided the hands-on design expertise. He has no formal building qualifications, but leverages skills learnt during two decades of living and building off-grid homes in a South

African permaculture community. Much of his ecobrick experience was acquired while running a green building academy in Guatemala.

“We use ecobricks in our building projects because they exist, and it shows that the community wants to contribute. But there are positives and negatives,” says McIntosh. “If you’re in Guatemala, people take the trash and just throw it into the waterways and elsewhere. There’s no official waste collection. So, picking up a plastic bottle and ecobricking is doing somebody a favour because you’re picking up trash.”

In South African metros, where two-litre bottles are more likely to go into recycling streams, McIntosh isn’t convinced about the usefulness of ecobricks. “Context is important,” he says.



Ulwazi Educare was completed in July 2022.



Building walls using tyres with ecobricks to fill spaces at Ulwazi Educare.



Ulwazi Educare in Delft.



Ecobricks in walls inside classrooms.



Upcycled materials include recycled tyres, ecobricks and glass bottles.



Our creativity has to go towards looking at genuine solutions to the amount of waste we’re producing.

“There are ways of using ecobricks responsibly. If you put trash in them in rural Transkei, that trash won’t make it into the waste stream, so it makes sense.” It’s also about the practicality of ecobrick forms. “When building, it’s impossible to design anything around a round plastic shape. From a fire point of view, plastic is dangerous, so it needs to be built in a responsible manner,” he continues

THE POSITIVES

“But on the positive side, ecobricks take up space, so that spares the need for other virgin materials.” At Ulwazi, McIntosh used an innovative system to capture carbon by using rows of recycled tyres to build thick walls, each filled with crushed building rubble and earth. “When we packed out recycled tyres with cob to create walls, we put ecobricks into spaces between the tyres, so there’s a saving of materials there,” McIntosh explains.

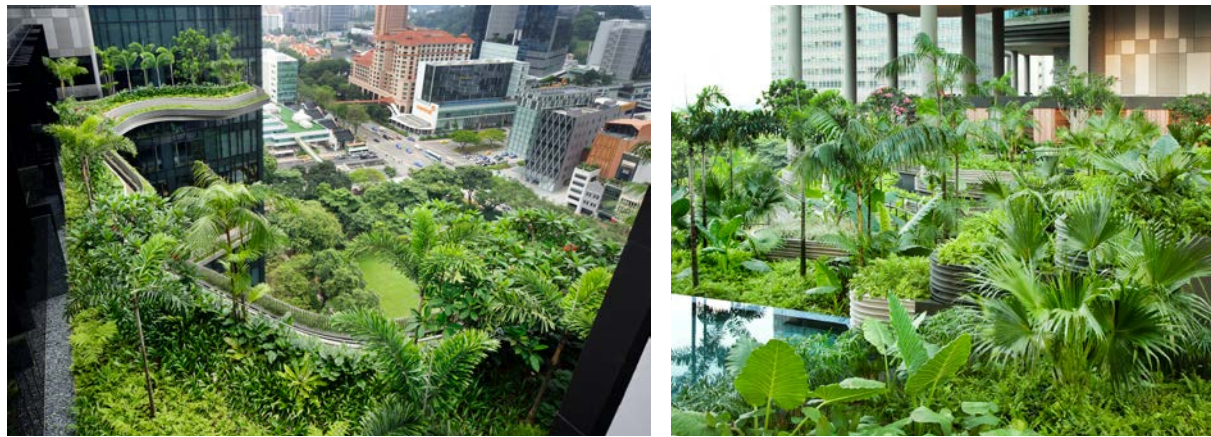
“And if I build properly so they’re not a fire hazard, ecobricks can provide the most beautiful walls and art. You can leave some ecobrick backs or caps exposed in a wall. In Ulwazi, we built the internal walls from ecobricks and created amazing wall patterns.”

Uthando South Africa, a Fair Trade certified non-profit organisation, assisted in crowdfunding the construction. “We’ve provided funding for six township schools, from

CLIMATE CHANGE CRISIS

Fernie says changing to more innovative building practices is vital. “We’re in the midst of the most significant climate change crisis in human history – look at the catastrophic KZN floods, yet Gqeberha is running out of water,” he explains. “Our creativity has to go towards looking at genuine solutions to the amount of waste we’re producing. And to sustainable living, which includes sustainable building practices.”

Plans were in place for the original Ulwazi space to be renovated once the children moved into the new section. “My building philosophy is not constrained by the materials I use,” says McIntosh. “It’s got to be durable, kind to the planet and to have a social impact – we employ a lot of local community labour. So, these buildings aren’t more expensive in terms of materials because so much is upcycled. But do have higher labour costs because they are more labour-intensive.” +



THE HOTEL THAT IS A GARDEN

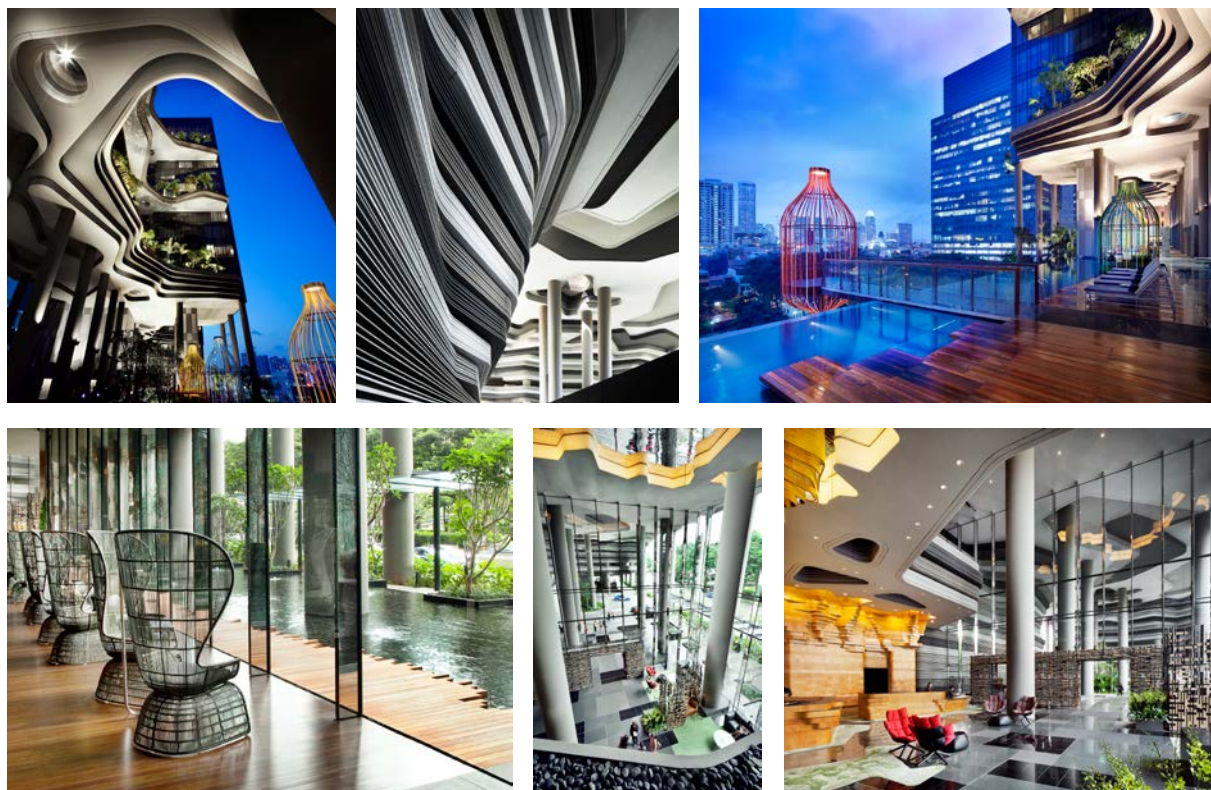
The Parkroyal on Pickering, Singapore, designed by Singapore-based WOHA Architects, was conceptualised as a garden. Waterfalls flow from swimming pools and garden terraces on the podium roof into gaps from which plants can grow.

Greenery thrives throughout the site, with its voluptuous sky garden, tropical plants and frangipani layered between blocks of guest rooms and the hotel garden which seems to form a part of the bordering park.

Suspended above the pool deck of a five-storey platform, a 12-storey tower forms an E, so that the guest rooms either look out into the sky garden or north to the park. The hotel is shaded by the sky garden and shielded from morning and afternoon sun by the adjoining buildings. The building is divided horizontally by the open verandah on the fifth floor and by the protruding layers of the sky gardens above.

The platform or podium is referred to by WOHA as “topographical architecture”. The laminated, rolling layers of pre-cast concrete wrap around the hotel’s public areas. The winding bands of concrete weave through the podium without interruption and without forming boundaries between the interior and outside areas.

“We wanted to recreate an urban street scale, so that people walking and driving could pick up interesting details. And we wanted to work with the building’s mass and appearance, so we could avoid the usual city scale of building-as-silhouette, and so we could implement a garden-themed aesthetic,” says WOHA. +



Patrick Bingham Hill



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