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THE LINE: Turning science fiction into reality to pull off the ultimate real estate challenge

South African Giles Pendleton leads a project that will realise the vision of a mammoth and futuristic vertical eco-city in the desert



By Glenda Williams

Giles Pendleton is no stranger to challenges. Nor does he shy away from them. But the development he is now leading must be one of the greatest real estate challenges of all time. It's a challenge of staggering proportions.

"It is almost mission impossible. What we are doing has never been done before. And I like a good challenge," says the South African who is heading up this colossal groundbreaking development, Executive Director of Development of THE LINE, Giles Pendleton.

Pendleton is referring to realising the vision of a mammoth, futuristic eco-city set within the NEOM region in northwest Saudi Arabia on the Red Sea.

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Aptly named ‘THE LINE’, the vertical mega-city will be 170km long, reach 500m into the sky and have a width of just 200m. Framed in mirrored glass to blend into the environment, the vast unbroken skyscraper will stretch across coastal desert, mountains and upper valley.

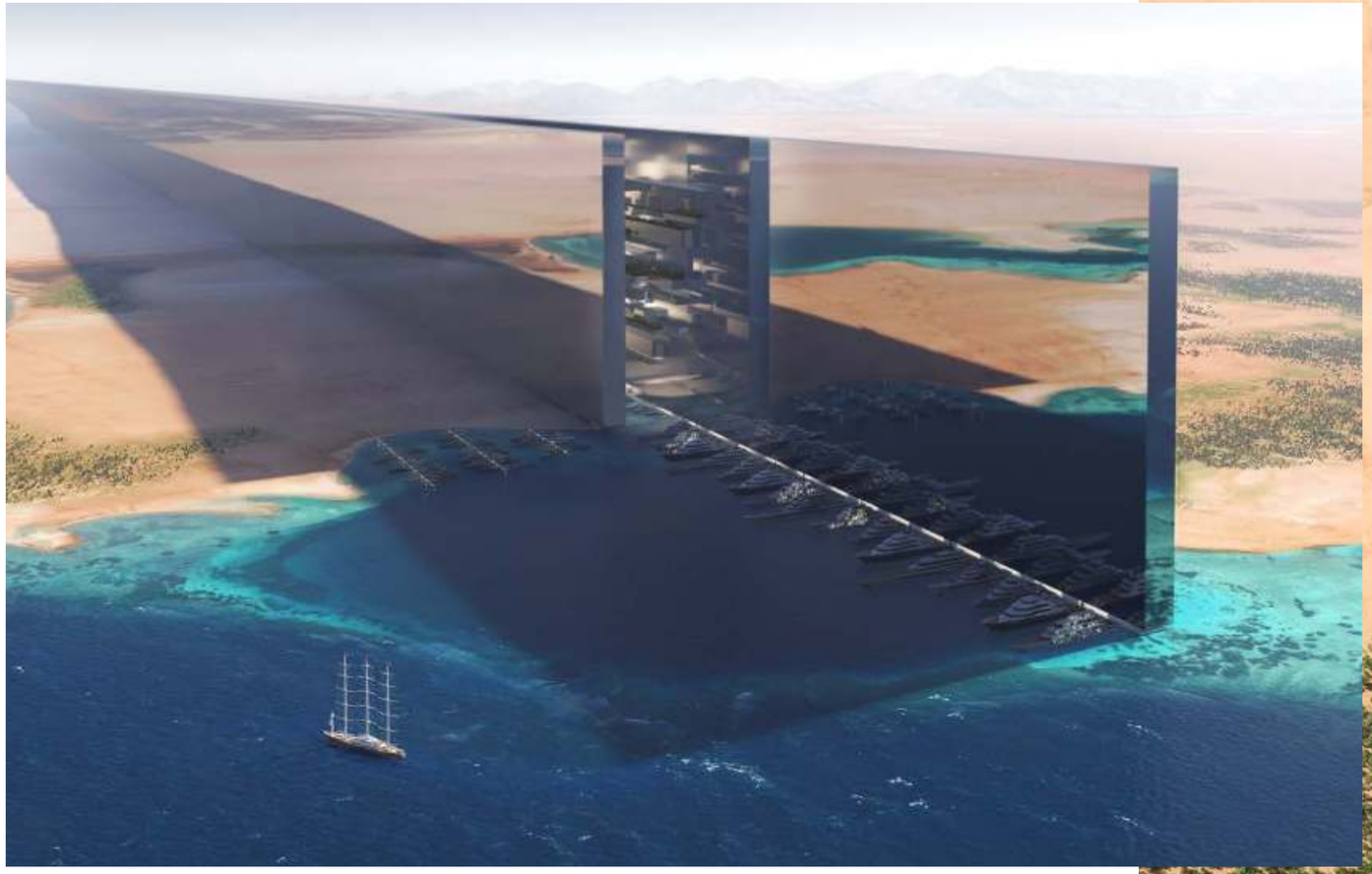
THE LINE will accommodate nine million people and be entirely powered by renewable energy.

Built as one continuous structure, it will be the world’s largest and longest green building. Yet, a mere 34sq.km will touch the ground. “That’s the only footprint we have. Everything else will be rehabilitated and taken back to its natural state and the environment will be rewilded,” says Pendleton. It’s a stark contrast to a city like London, which has a footprint of 1,600sq.km for its nine million inhabitants.

Constructed in phases, THE LINE will take 23 years to realise, with Phase One set for completion in 2030 at a cost of 1.2 trillion ZAR.

Pendleton has led numerous large-scale developments; none though have been quite on the scale of THE LINE.

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As former Chief Development Officer of South African REIT, Attacq, he was responsible for the development of the 2,500-hectare Waterfall precinct in Gauteng. Passionate about sustainability and smart cities, Pendleton is also former Chairman of the Green Building Council of South Africa. He has worked on projects in Eastern Europe, in Australia on the Olympics, and in Dubai.

“I spent 14-odd years in the Middle East, and all of this I think came together quite nicely in what they were looking for on THE LINE,” he tells **Asset**.

The urban environment of the future

The vision is of a clean, green, utopian city that provides an unmatched urban living experience while preserving the environment. It’s a vision of a city that solves many of the world’s city problems.

The area chosen for this futuristic city is the 26,500sq.km geographical region of NEOM, with THE LINE as NEOM’s centre piece.

“The goal is to have 95% of NEOM as nature reserve, with humans only touching 5% of the land. It’s a tall ask and the

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only way you can solve all those fundamental city problems of pollution, congestion, and sprawl, is to build a brand-new city from scratch, a city that is contributing to the environment rather than taking away from it. That's what we are doing," explains Pendleton.

"NEOM is probably the most unpopulated area of Saudi Arabia. It's a part of the world chosen for several reasons. It allows us to give a lot of land back to nature. It has an incredible landscape, from sea and coral islands to mountains and ski resorts. And it's part of the old gateway from east to west. 13% of the world's trade runs right past the front door in the form of shipping through the Suez Canal. Geopolitically it's a good location to be in; it has the ability to put Saudi Arabia almost on the edge of Europe."

THE LINE will be built in a continuous line of 800m-long modules, each module designed to house up to 80,000 people with work, leisure, education, health services and other amenities within a five-minute walk for the city's vertically layered communities. These spaces are all built in the height of the building, not on the ground.

There will be lots of little high streets for convenience shopping, a soccer stadium will sit 300m in the sky, and the city will be a massive vertical farm.

Still, there's a certain irony that comes with building a city here that will not feature cars. Saudi Arabia is, after all, an oil-producing country. But in the pursuit of zero-carbon emissions and a walkable city, other means of commuting will play their part.

“We’ll have travellators, elevators, and two train systems – a highspeed rail moving from one side of THE LINE to the other in 20 minutes, where at the end an international airport will be located, and a local metro with stops every 2.4km. Both trains will be underground in tunnels running alongside the building.”

Sideways-moving elevators may surface. “We are trying to solve tomorrow’s problems with tomorrow’s technology, today.”

Everything in the vertical city will run on renewable energy, predominantly from large wind and solar farms. “And we are creating the world’s largest green hydrogen plant in NEOM. Hydrogen is, without doubt, the fuel cell of the future. The ability to create almost endless renewable energy is a huge opportunity for us to tap,” he says.

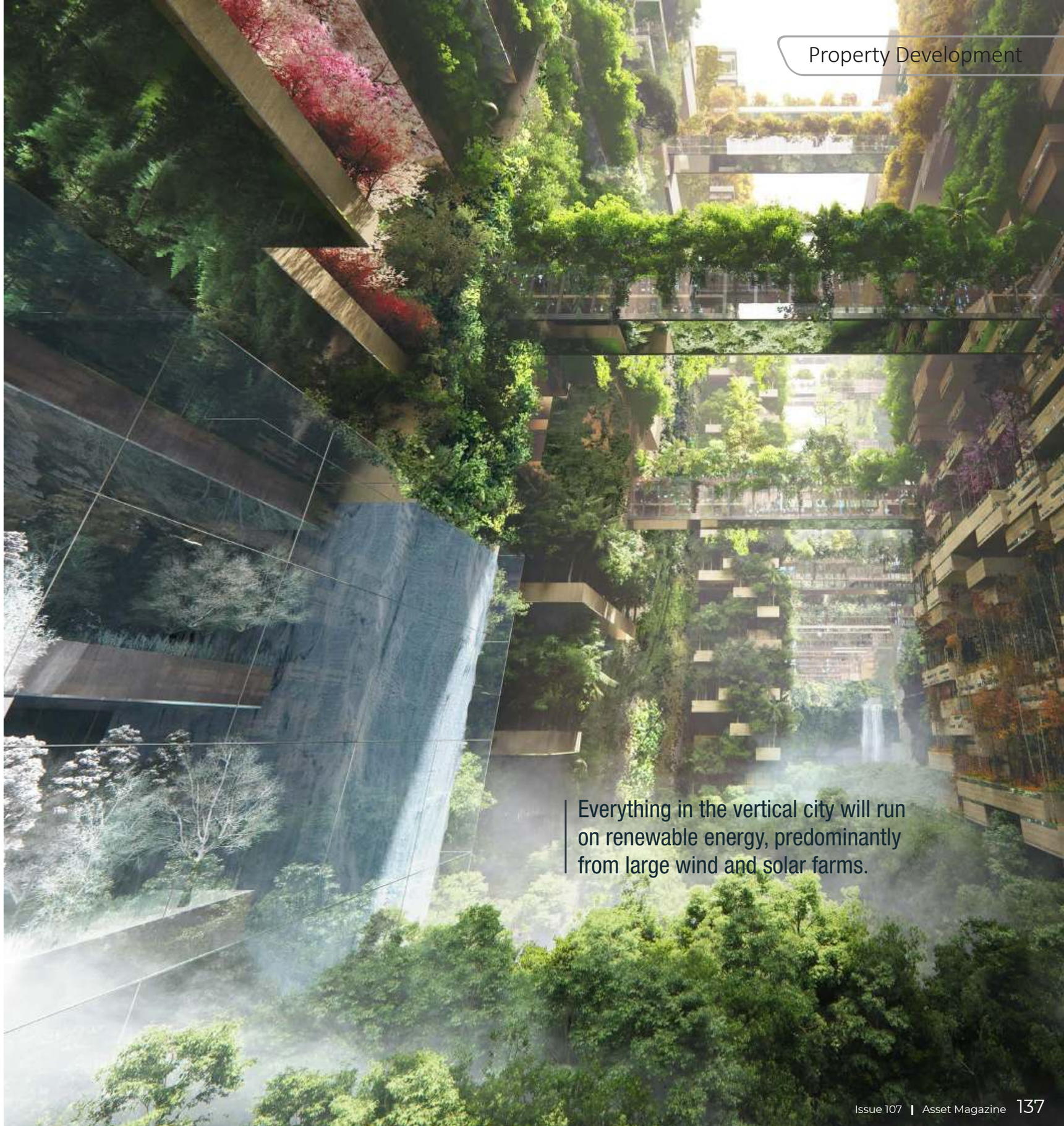
Water, even more precious in a desert environment, will come from desalinated water and ground water. And there’s unlikely to be water loss due to leaks. “Going vertical means a leak will be picked up instantaneously.”

Aiming to be the world’s most liveable environment

“We are not just designing a building; we are designing a lifestyle. We’re designing the world’s largest living experiment aimed at improving people’s lives and experiences so that THE LINE has a very high liveability index.”

The structure is designed to encourage hypermobility at height. “In our world, everything is a five-minute walk, up, down, left, or right from wherever you are. Our aim is to have people walking between 15,000 and 20,000 steps daily because an active community means fewer medical incidents,” explains Pendleton.

Artificial intelligence and algorithms will run much of what happens in the background. “Essentially we will be building the world’s largest digital platforms. We want machines to help us have a better experience rather than us being beholden to machines. You can’t escape AI, you can’t escape cognitive cities and big data, and that’s something we’ve embraced.”



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The Kingdom of Saudi Arabia aims to triple its inhabitants by 2050, and THE LINE will be one of its lures. The aim is to do what Dubai has done by attracting people from around the world to the city because of its lifestyle, amenities, and ease of doing business.

"Dubai has gone from a city of 25,000 to nearly four million in the space of 25 years. NEOM intends to do that by looking at what Dubai, Singapore, and Hong Kong have done, what the financial and tech sectors and Silicon Valley have done," Pendleton says.

"Part of the objective is to create a large amount of incubation hubs and start-ups, especially in tech, digital, media, fashion, education, bio and medical. Clean, green industries are primarily the focus.

"Our objective is to make ourselves competitive relative to the traditional migrant hubs of the world, like Dubai, Singapore, and Hong Kong. If we have the facilities, the environment and the eco system that supports that, many people will want to be part of that."

Building THE LINE

Several large base camps have been built near the site. It's here that Pendleton is based together with "plenty of other South Africans" and an extremely diverse workforce that boasts over 70 nationalities. "If you want to build a city you have to be in the heart of it. There is nothing out here, no towns or cities. There's sand, the roads and the sea."



Despite the remoteness, the intention is not to import everything to build THE LINE.

“Industrialising the supply chain is a stated objective. That is what OXAGON, a port and massive industrial hub in the NEOM region, is designed for,” states Pendleton.

“We think we have enough scale and a long enough supply chain to warrant the setting up of every single piece of the supply chain in the construction process. But we may have a combination of imported and locally made modules, just to get the ball rolling,” he acknowledges.

The automotive and aviation industries have been big inspirations for how things will be done on the structure.

“We are literally going to assemble planes and cars, but in the form of a building. Aviation and car guys are deeply involved because they figured out how to assemble things quickly and accurately. Robots assembling a whole series of factory-manufactured pieces on the building, is what we’re working towards.”

Undoubtedly one of the world’s most ambitious projects, THE LINE is starting to take shape. “Bulk earthworks and piling are all underway. It’s probably one of the biggest earthworks sites in the world,” says Pendleton.

THE LINE is part of a much bigger 2030 vision to accelerate the Kingdom and diversify away from its dependence on oil. Tourism is a big part of that vision. A new Saudi airline is being introduced, airport terminals expanded, and thousands of hotels are being built in Saudi Arabia.

“Saudi Arabia is literally changing before our eyes. Things are rushing along to drive a very different economy to the economy of yesterday,” concludes Pendleton.

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