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ESSAY



SUSTAINABLE CITIES
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Sustainable Cities: Bridging the Gap Between Vision and Reality



| Wind turbines at Serra da Lousã, Portugal.
Image: Nuno Marques / Unsplash

Cities recognise that prioritising sustainability is the way forward to overcome challenges such as climate change and socio-economic inequalities, but do not always achieve results on the ground. Envision Group's International President Sylvie Ouziel outlines the challenges that cities must address to translate their vision of a smart and sustainable future into reality.

Protecting the future of the planet is not only a moral obligation but a matter of survival.

I expect to find the reader in violent agreement if I plead for more sustainable cities: powered by renewable energy, fostering recycling and a circular economy, embracing diversity of all kinds, promoting social blending, and seamlessly including vulnerable groups.

Yet reality has not caught up with this vision. The United Nations estimates that by 2030, 16.5% of the global population will be over the age of 60 and 59% of us will be living in cities. Ahead of that milestone, cities already contribute two-thirds of global emissions and consume over 70% of global energy production. Fossil fuels, long regarded as a cheap option, make up a large part of our energy needs, but burning these non-renewable fuels contributes to 87% of carbon dioxide emissions. This is a far cry from the ideal of net zero emissions and a circular lifestyle that many

envision as key to protecting the future of the planet, which is not only a moral obligation but a matter of survival.

COVID-19 has also threatened the livelihoods of many and exacerbated existing socio-economic fault lines against a backdrop of rising tension and polarisation. It is imperative that cities act quickly to bridge the gap between their vision of the "ideal city" and current reality. I outline four challenges that cities can address to do so.

Financing Sustainability for the Long Haul

While public money will be needed to ensure part of the financing for sustainable solutions, the pandemic has severely impacted nations' debt levels. Tenable private business models are also needed

Embracing digital technology can enhance long-term project bankability.

to ensure scalability. But the latest technological advancements provide assurance that such solutions will be all the more compelling and sustainable in the long run.

For example, the cost of renewable electricity generation—notably, solar and wind—and battery storage is falling year-on-year by double-digit percentages. Unlike fossil fuel prices, which are subject to the availability of natural resources and market fluctuations, renewable electricity and storage prices centre around the technology required to produce them from green sources such as wind and sunlight, and follow a “Moore’s law” of steady decrease with rapid advancement in technology. In the long run, project costs can be expected to decline further with technological advancements such

as pre-fabrication technology or the emergence of new materials from the application of circular economy principles in the built environment sector.

Embracing digital technology can also enhance long-term project bankability. For instance, solar micro-grid projects underpinning green campuses, districts, or cities can be modelled into a “design digital twin” that stacks up various monetisation levers—such as self-consumption, grid injection, spot market trading, and ancillary grid services—to recoup capital expenditure of the photovoltaic panels and electricity storage. Once the project is funded and built, the same digital twin technology can be used to monitor actual outcomes and optimise, in real time, the overall economic efficiency and carbon footprint of the infrastructure.



Digital technology like blockchain allows the Brooklyn Microgrid to create a local energy marketplace. This provides more reliable energy and benefits both consumers and infrastructure owners financially.
Image: Sasha Santiago, Storylabs I/O, Future Relics



British local authorities like Oxford City Council are partnering the private sector to achieve its Net Zero targets by 2040.
Image: greir / iStock

Aligning Siloed Responsibilities

On their own, public or private institutions struggle to deliver high-impact sustainable solutions. Collaboration between the public and private sectors is therefore fundamental to align investment, regulation and innovation.

Some British local authorities are doing this by moving from tactical to strategic procurement, to reach a net zero carbon emissions target by 2050 or sooner, at the lowest possible cost to their citizens and businesses. They use open tender processes to identify consortia partners that can deliver integrated local net zero and smart city solutions. In partnering with these local authorities, leading clean energy and smart infrastructure companies utilise innovative, low-cost and clean energy

technologies underpinned by a common Artificial Intelligence of Things (AIoT) digital backbone.

By operating under these collaborative frameworks, local authorities remain in the driver's seat of their decarbonisation and smart city programmes, while attracting low-cost capital from institutional investors keen to build on their sustainable investment portfolios. The pioneering local authorities behind these net zero transformations also make their frameworks accessible to other public sector organisations around the country, ensuring that everyone can benefit from these models at the lowest cost to the consumer, in an aligned way, without any top-down imposition or "obligation".



The ComerciosLocal.es website allows users to discover local shops in La Rambla by linking data of local businesses from Open Data BCN with Google Maps.
 Image: Jorge Fernández Salas / Unsplash

64

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 When executed well, electric micro-mobility and other public transportation technology can bring citizens closer together.
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Democratising Data and Technology to Lower Barriers

Even as many people support wind energy, social diversity and waste recycling, there are still numerous others who would object to installing wind turbines, social housing or a waste treatment plant in their neighbourhood. To overcome this, it is crucial that differing viewpoints be heard and addressed as part of decision-making processes.

Traditionally, public data such as city budgets, investments, new tenders, regulations and new laws are available to only a part of society. But initiatives that democratise data access and

transparency can help lower social barriers and involve the community in building a city that works better for everyone.

Barcelona has deployed digital tools such as the Open Data BCN service to democratise its governance since 2015, with open data and open standards as key enablers. For example, citizens can access contractual KPIs for each public supplier, request improvements and report any contractual non-compliance. The city makes privacy, data sovereignty, and data security core elements of its governance approach through participatory



Emerging micro-mobility solutions founded on digital technology, such as e-scooters, make the city more accessible to all citizens.

Image: Max Claus

processes, to ensure that citizens choose how the smart city should serve them, rather than the other way around.

Technology can also help narrow geographical divides. As a complement to efficient public transport and smart-traffic solutions, emerging micro-mobility—often in the form of free-floating solutions such as bicycles, mopeds, scooters and ride-sharing—shortens commute times and enhances accessibility. In Rio de Janeiro, dockless e-scooter app Lime has been part of the daily commute of people from all backgrounds.

Tourists and locals use this electric micro-transportation option to avoid traffic congestion and move around the city, to and from beaches, the city centre, high-end residential neighbourhoods and underprivileged communities. Technology is a fundamental part of Lime's operations, giving users real-time information on the location of scooters via its mobile app, and detecting user patterns to minimise scooter damage. When executed well, electric micro-mobility and other public transportation technology can bring citizens closer together.

Real-time information transparency can help mitigate some of the geographical challenges that large urban areas face. The Dutch approach to flood risk management relies not only on massive engineering feats to raise physical flood defences, but also on AIoT technology to operationalise flood resilience. This technology includes high-resolution weather forecasts, real-time sensors and early warning systems, and integrates data from different provinces, municipalities and private parties, to keep citizens informed and prepared to respond in emergencies.



Completed in 1931, the Empire State Building has been completely retrofitted with smart technology, which has helped it reduce energy consumption by 38%, with more than \$4.4 million in energy savings each year.
Image: Jonas Brief / Unsplash



Adopting less intrusive technologies can help cities embrace their rich urban legacy sustainably.



Embracing the Weight of History

Finally, few cities have the luxury of starting with a clean slate. Virtually all cities must transform themselves from a state of urban legacy. Retrofitting for energy efficiency, accessibility and inclusivity is more challenging than designing from scratch. For instance, adding renewable electricity supply or expanding grid capacity into a district, deploying high-speed internet to historical buildings, and making services more accessible for the elderly and vulnerable populations, can quickly become monumental headaches. Once again, adopting less intrusive technologies such as 5G and 5G LANs versus WIFI, smart sensors and systems to optimise energy

usage, and even drones to improve safety and accessibility, can help cities embrace their rich urban legacy sustainably.

Inasmuch as the world is charging towards a climate catastrophe, not all is lost just yet. Cities already recognise the urgency for sustainability, whether by way of short-term or long-term solutions, to overcome existing challenges and to avoid certain scenarios in the future. With technological progress, coupled with proper financing, governance, alignment and transparency mechanisms, unleashing the potential of cities to achieve a smart and sustainable future is fully possible. 🌱