

Building truly sustainable cities

How connected systems can help cities build sustainability and wellbeing into their indoor and outdoor spaces

In association with



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SmartCitiesWorld White Papers examine an emerging or growing trend in smart cities, highlighting progress so far and future development, as well as spotlighting case studies from cities around the world. In this report, we explore how cities are building sustainability into their indoor and outdoor environments.

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Sustainability: from nice-to-have to mission critical for cities

In 1987, the United Nations (UN) defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. No-one could argue with the sentiment, but we also know that rapid urbanisation and the demands of fast-paced modern life over recent decades has made this a big ask for today's generations.

Sustainability touches all areas of human life – from land and sea to health and wellbeing, from the buildings we live and work in to how we get from A to B, and from what we eat and consume to how we produce goods and procure them. It is also inextricably linked to the battle against climate change and reducing carbon emissions. For cities in particular, sustainability is fast becoming the watchword guiding a range of strategies and initiatives across all municipal departments.

Sustainability itself has been on a journey, shifting from a nice-to-have to an imperative, driven not just by climate action but environmental, social and governance policies in public and private sector organisations, the green energy transition as well as a desire by individuals to look after the planet and behave more ethically. Meanwhile, geopolitical events have increased the cost of energy and threatened energy security, which in turn has also moved sustainability right up the agenda.

Landmark agreements like the 2015 Paris Accord and the launch of the UN Sustainable Development Goals (SDGs) in 2016 – specifically SDG 11 Sustainable Cities and Communities and SDG 13 Climate Action – have provided a framework and targets to galvanise us into action. To keep global warming to no more than 1.5°C, as called for in the Paris Agreement, global emissions need to be reduced by 45 per cent by 2030 and reach net zero by 2050. By net zero, the UN means cutting greenhouse gas emissions to “as close to zero as possible”, with, for example, any remaining emissions re-absorbed from the atmosphere, by oceans and forests.

Alongside this overarching guidance, industry bodies, action groups and non-governmental organisations (NGOs) are helping us to drill down to assess the task in specific sectors like energy, the built environment and transportation.

In short, we know what we must do but concerns about shortfalls in meeting these targets are well documented and constantly reported on. What needs to happen now is targeted and specific action to help us get there. And while agreements and treaties are made nationally and federally, the action must be taken at city level. Indeed, cities know they sit at the frontline of this action – it’s a given – and from the mayors at the top to the departments that sit below them, there is a desire to ensure each city plays its part. Great work has already been done and we are moving in the right direction but, if there is a criticism, it is that action needs to happen even faster.

As it stands, we are currently off-track to meet the targets and Toby Morgan, senior manager, built environment at the non-profit Climate Group, says one of the issues is that the 2050 net zero target still feels like a long way off to some: “A better and shorter term way of looking at it is that we need to halve emissions by the end of this decade, which will be here in the blink of an eye.”

His concerns are writ large in the UN’s 2023 Global Sustainable Development Report (GSDR), which says “at this critical juncture, midway to 2030, incremental and fragmented change is insufficient” to achieve the Sustainable Development Goals in the remaining seven years. It adds: “Implementation of the 2030 Agenda requires the active mobilisation of political leadership and ambition for science-based transformations.”

To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43 per cent by 2030. So cities have to make specific, measurable and attainable goals both for the short term and the long term.

The good news is that we have many tools to help us and there is a window of real opportunity for cities to engage and work together with their ecosystems of technology providers, system integrators, consultants and other stakeholders to build more sustainable urban environments.

A city’s typical portfolio of buildings and assets, which spans streets, parks, municipal buildings, healthcare facilities, sports campuses and more, provides huge scope for decarbonisation. For instance, the collective potential of commitments made by 9,000 cities and local governments through the Global Covenant of Mayors for Climate & Energy – if fully implemented – could achieve annual reductions of 1.4 gigatonnes of equivalent carbon dioxide (Gt CO₂e) in 2030 and 2.8 Gt CO₂e in 2050 from business-as-usual (BAU) emissions.

This SmartCitiesWorld whitepaper, produced in association with global lighting leader Signify, aims to provide targeted and actionable advice to help cities accelerate their low-carbon plans and become more sustainable.

We will explore how cities can take a carbon reduction-first approach to the clean energy transition, with energy efficiency playing a central role, seek out what can be considered “easy wins” when it comes to low carbon projects, highlight the technologies that can play a crucial role and share best practices from around the world.

Our aim is to help cities and their stakeholders work together to create truly sustainable indoor and outdoor spaces that improve quality of life today and ensure future generations inherit a cleaner, greener world.

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Energy efficiency – the “forgotten child” of decarbonisation

When discussing sustainability and the path to net zero, the conversation often centres around how we can lower greenhouse gas (GHG) emissions using more renewable energy, electrifying transportation and heating systems, creating smarter urban spaces and even building new, shiny cities from scratch. These are all elements that are crucial to any net zero action plan but can also be lengthy, resource-intensive and expensive projects.

By comparison, energy efficiency programmes deliver a return on investment in terms of sustainability benefits and cost-savings in far quicker timeframes. Toby Morgan of Climate Group describes energy efficiency as “the forgotten child” of the green transition. Indeed, if electric cars and expensive renewable energy infrastructure projects are the stars of the race to net zero, energy efficiency tends to be cast in a much less glamorous supporting role. With such pressing targets, however, it needs to move up the agenda and share centre stage.

In practical terms, what do we mean by energy efficiency and how does it differ from other sustainability practices? Put simply, it is using less energy to perform the same task and there are a host of ways to achieve this such as retrofitting buildings, modernising lighting and using connected technologies to gain more control over infrastructure and assets. As Harry Verhaar, head of global public and government affairs at Signify, emphasises: “Energy efficiency is not an invisible form of energy, it is the people who put in double glazing, that change the lights in the ceilings and the streets, that put in building management systems and heatpumps.”

According to the International Energy Agency (IEA), energy efficiency has the potential to deliver more than 40 per cent of the reduction in energy-related greenhouse gas emissions over the next 20 years, according to its Sustainable Development Scenario. The agency is calling now until 2030 “the crucial decade for energy efficiency” and since its 8th Annual Global Conference on Energy Efficiency in Versailles, France in June 2023, 47 governments from around the world signed up to the goal of doubling the average global rate of energy efficiency improvements by the end of the decade.

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In its breakdown of public budgets on energy research, development and demonstration submitted to the IEA by its member and association countries, it reveals that energy efficiency receives the highest segment (24 per cent) of public money, both supporting and recognising the view that adopting a reduction-first approach is key to reaching carbon-neutrality. In a ministerial statement, the IEA said energy efficiency has a critical role to play in improving living standards and energy security as well as reaching net zero emissions by 2050: “This means ramping up annual energy efficiency progress from 2.2 per cent today to over 4 per cent annually by 2030 in a move that would create jobs, expand energy access, reduce energy bills, decrease air pollution, and diminish countries’ reliance on fossil fuel imports – among other social and economic benefits.”

Digitalisation, demand-driven solutions and investments in modernising electricity grids were identified as priorities for what will lay the foundations for energy efficiency to feature “in all areas” of the clean energy transition. Further underlining its importance, Dr Fatih Birol, IEA executive director, said it is hard to “overstate the importance of energy efficiency” for strengthening energy security and keeping the goal of limiting global warming to 1.5°C “within sight”. Dr Birol also describes energy efficiency as a “jobs machine”, stressing its vast economic benefits.

Cities must play their part in this crucial decade of decarbonisation and, as a starting point, need look no further than their immediate built environment.

Why cities must decarbonise their buildings

In the World Green Building Council (WorldGBC) 2019 Embodied Carbon Upfront report, it highlights how buildings are responsible for almost 40 per cent of global energy-related carbon emissions with 28 per cent from the energy needed to run them and 11 per cent from construction and the materials they use. In 2018, it launched the Net Zero Buildings Commitment made up of 172 leaders from private and public sectors. World GBC has set two goals for the built environment:

- By 2030, all new buildings, infrastructure and renovations will have at least 40 per cent less embodied carbon with significant upfront carbon reduction, and all new buildings will be net zero operational carbon
- By 2050, all new buildings, infrastructure and renovations will have net zero embodied carbon and all buildings, including existing buildings, must be net zero operational carbon.

WorldGBC says “a bold approach” is necessary given the sector is globally responsible for 35 per cent of energy consumption, 38 per cent of energy related carbon emissions, 50 per cent of resource consumption, and is expected to double in total footprint by 2060. In the US, residential and commercial buildings are responsible for 40 per cent of energy for lighting, heating, cooling and appliances while in Europe the buildings sector consumes more than a third of the energy demand.

Those handing out the funding are clearly aware of the key role cities play in reducing emissions in the built environment. In Europe, special attention is given to good city planning in the Horizon Europe Mission on Climate-Neutral and Smart Cities programme, while in the US, the Inflation Reduction Act extended the tax deduction for energy efficiency upgrades.

Given the scale of the emissions, any progress made in decarbonising the built environment is going to represent considerable progress towards net zero. And this is where energy efficiency programmes come in because they can be used to bring about rapid carbon reductions that also have a positive impact on a city's bottom line. Moreover, retrofit energy efficiency programmes also help cities double down on their decarbonisation efforts as they play into the central

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theme of the circular economy, which is to make existing infrastructure and assets low-carbon without going back to the drawing board.

This has added resonance in the built environment. It's often overlooked that a building isn't only responsible for carbon emissions after it has been built but also during its construction and, indeed, even before that during the manufacturing and transportation of the materials used to build it. These “embodied” or “upfront” carbon emissions contribute around 11 per cent of all global carbon emissions.

But by implementing energy efficiency programmes in existing buildings, significant embodied carbon as well as operational savings are made. Hence, with half the buildings that will exist in 2050 already built, WorldGBC sees retrofitting as key to achieving decarbonisation targets – “the greenest building is the one that is already built”, says WorldGBC.

Energy efficiency programmes come in many forms but among the most effective for the built environment is the implementation of advanced building and energy management systems. This involves equipping the building with a connected, interoperable infrastructure that draws on data, sensors, LED lighting and the Internet of Things (IoT) to ensure the building is able to run at optimum efficiency. For example, occupancy data collected by the sensors could be used to automatically adjust LED lighting and HVAC levels and security and safety requirements. This also helps to create more comfortable and customised environments for occupants and we discuss the benefits of why this needs to be factored into the discussion later.

As well as helping to make real-time adjustments, this data could be used by city building managers to inform wider policies over building and energy usage. Given the broad range of municipal-owned and managed buildings across a city, this data is extremely valuable. The performance of buildings could be compared, best practices shared and evidence-based decision-making used to ensure investment in energy efficiency programmes is money well spent.

Using connected systems in the built environment for a range of applications can bring about considerable carbon-savings but cities can realise further wins by zeroing in on what can be seen as one of their greatest allies in their drive to become more sustainable: connected LED lighting.

The central role played by connected lighting

Connected LED lighting may only be one vertical within both a building- and city-wide intelligent infrastructure but it is a vital one. Its ability to reduce lighting-related energy consumption by 80 per cent makes it one of the highest performing replacement technologies available to cities and organisations. The millions of tonnes in carbon savings this equates to in turn makes it critical for achieving net zero and therefore crucial to boosting sustainability in cities and tackling climate change.

Indoor and outdoor lighting conversion projects also provide cities with one of the juiciest pieces of low-hanging fruit available when it comes to making rapid energy- and cost-savings through energy efficiency programmes. Cities own and manage a broad portfolio of infrastructures, spanning municipal buildings, streets, parks, recreational and sports facilities, hospitals and healthcare buildings, schools, colleges and prisons. All of these operate their own lighting systems so based on the 80 per cent energy consumption reduction figure, it isn't difficult to see how the carbon and cost-savings quickly ramp up by switching to connected LED lighting.

Signify has performed a detailed modelling exercise (see panel) which shows the cost- and time-savings that can be made when cities convert indoor and outdoor lighting to LED. The data clearly demonstrates not just how much carbon reduction and cost-savings are possible but how funds saved could be used to make a significant contribution to other sustainability initiatives that go beyond energy efficiency.

Connected LED lighting is also the backbone and underpinning network for other applications that can bring further benefits in areas like sustainability, improving citizen quality of life and climate action. Air quality and weather sensors, traffic cameras, surveillance technologies and other devices can all be added to an interoperable network to gather building- and city-wide intelligence. Data from each of these can be analysed, cross-referenced and used for more informed decision-making. The very fact that such a network cuts across different municipal departments also means it can help to break down data and workplace silos that sometimes impede progress.

Smart street lighting is viewed as the starting point when it comes to building a smart and sustainable city. In 2018, Mesa, the third largest city in Arizona, began upgrading its street lighting infrastructure to energy-efficient LED technology as part of its smart city initiative. It sought to realise energy- and cost-saving benefits but quickly identified broader applications and benefits, which included using the infrastructure to deliver free wifi to citizens, support community safety, enhance quality of life as well as complement its Dark Sky efforts.

How LED lighting can free-up electricity for use elsewhere

It is sometimes overlooked that LED lighting can also “free up” electricity that can be used to speed electrification of heating and transport.

For a 40,000 m² logistics centre, LED lighting could save:

- €0.3m in energy costs
- 1 GWh in energy consumption
- 250 tons of CO₂.

With the freed-up electricity, you could:

- Charge 433 electric vans
- Power 114 electric forklifts.

For a 15-floor office tower with an area of 50,000 m²:

- €0.6m in energy costs
- 1.7 GWh in energy consumption
- 450 tons of CO₂.

With the freed-up electricity, you could:

- Power 50 per cent of the tower's HVAC system
- Run 536 refrigerated vending machines.

In a mid-sized city of 200,000 inhabitants, LED lighting could save:

- Outdoor: 13.1 GWh, €4.4m
- Buildings: 22.7 GWh, €7.5m
- Total CO₂ reduction: 8.300 tCO₂

With the freed-up electricity you could annually recharge:

- 37 e-buses
- 1,050 electric vehicles.


In a large city of 1,500,000 inhabitants, LED lighting could save:

- Outdoor: 79.9 GWh, €26.8m
- Buildings: 140.1 GWh, €47m
- Total CO₂ reduction: 51.200 tCO₂

With the freed-up electricity you could annually recharge:

- 230 e-buses
- 6,470 e-cars.

The data presented here is an illustrative forecast representing a possible future outcome based on a proprietary model that Signify has developed to help customers and the public understand the impact that lighting can have on the environment. Signify's Green Switch calculation model applies logic to input from numerous sources, references, and data points (available upon request) to generate a simulated view of a given market's energy consumption, the accuracy of which cannot be verified. For detailed information on Signify's conversion model, including the underlying assumptions and proposed conversions, see [here](#). Thousand separator is a comma (,) – Decimal separator is a period (.)

A nighttime photograph of a city street. In the foreground, the rear of a dark car is visible, with a license plate that reads '0719'. The street is illuminated by several streetlights, creating a warm glow. The background shows more streetlights and the silhouettes of buildings and trees against a dark sky. The image is partially framed by a green diagonal shape on the left side.

Signify's Interact connected lighting platform offered the flexibility Mesa required and the simplicity to build upon the city's existing street lighting infrastructure. Nodes were installed on each luminaire, allowing Mesa's street lighting team to remotely control the lighting.

By strategically dimming the city's streetlights, it reduced energy usage and light trespass in neighbourhoods as well as sky glow and was able to better meet citizens' needs. Mesa streetlight supervisor Nathan Curtis and his team ran a street light dimming pilot and conducted extensive research, ultimately dividing Mesa into four street lighting zones as outlined in its Master Plan.

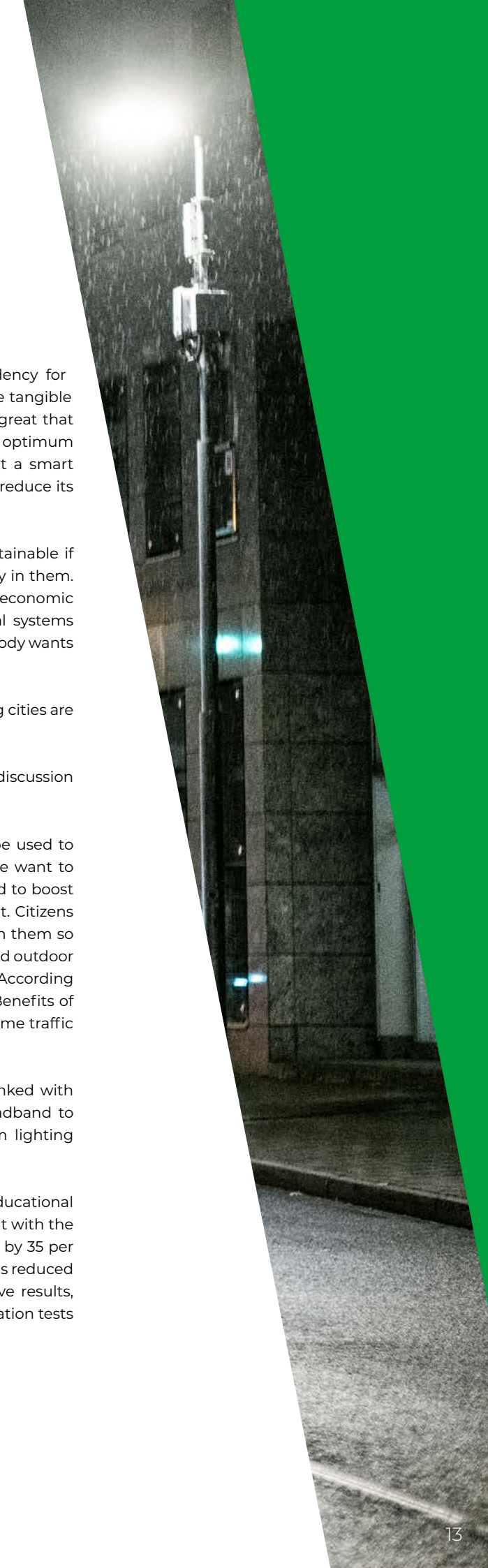
Streetlights would be dimmed or brightened remotely based on each zone's unique requirements, and lights wouldn't reflect upwards to preserve the night sky. Preventing unnecessary light from casting upwards supported Mesa's Dark Sky initiative and became a staple component of the Street Light Master Plan. The Dark Sky initiative ensures the preservation of Mesa's starry night sky from light pollution and is one reason tourists visit its desert lands.

Signify's Interact connected lighting system also allowed the city to have access to diagnostic and energy data. The city can optimise energy use and rapidly detect any faults in the system. Curtis and his team know instantly when a light goes out, so they can efficiently deploy a maintenance team to fix it. By extending its street lighting infrastructure with connected technology, Mesa laid the foundation to unlock even more value for its city and citizens beyond the smart dimming.

It then used Signify's BrightSites solution to help it install broadband communication nodes into existing street lights, creating a wireless mesh network and enabling wireless fibre connectivity. The nodes installed into the luminaires provided a simple solution to achieve broadband connectivity. "It is also an aesthetic choice, meeting guidelines for our downtown area. It puts the node into the luminaire instead of attaching the device to the street light pole with wires hanging at various points," said Harry Meier, City of Mesa deputy chief information officer for innovation and smart cities.

The city's wireless broadband connection powers public wifi cameras and sensors to provide real-time crime support for law enforcement and access to better education, economic and entertainment opportunities in the community.

Sustainability: the human factor

A nighttime photograph of a street scene. A tall streetlight pole is the central focus, with a bright light fixture at the top. The pole has some equipment attached to it. The background shows a dark building with some windows and a sidewalk. The image is partially framed by a green diagonal shape on the right side.

In seeking to boost sustainability in cities, there has been a tendency for initiatives to look no further than the technological solutions and the tangible and direct impact they have in areas like carbon reduction. Yes, it's great that a connected lighting infrastructure allows the building to run at optimum efficiency and provides valuable data for decision-making and that a smart street lighting network can massively reduce a city's energy bill and reduce its carbon footprint but what happens next?

Cities, and their buildings and infrastructures, will only be truly sustainable if they fulfil their purpose to the human beings that live, work and play in them. "We also need to think about how we can sustain livable places, economic vitality and human health and wellbeing," says Peter Duine, global systems expert at Signify. "What good is a net zero building, for instance, if nobody wants to spend time in it?"

And ultimately, the discussion must go beyond human life to ensuring cities are also sustainable for nature and that they promote biodiversity.

Technology has a key part to play in all of this but only if the vision and discussion around sustainability are broad enough to encompass these themes.

When it comes to outdoors, connected lighting, for example, can be used to beautify public spaces, parks and cultural centres that make people want to visit them and, in turn, support economic activity. It can also be used to boost the nighttime economy in cities which, post-Covid, still need support. Citizens also need to feel safe and secure in cities if they are to spend time in them so city managers need the ability to control lighting remotely in parks and outdoor spaces. Such technology can also increase safety on the roads at night. According to an assessment by the World Council on City Data (The Citywide Benefits of Smart & Connected Public Lighting), LED lighting can reduce nighttime traffic accidents by up to 30 per cent and street crime by up to 21 per cent.

Moreover, there are the indirect technology benefits that can be linked with a connected lighting infrastructure such as expanding public broadband to tackle digital inequity, helping channel energy savings made from lighting usage into the grid or for EV charging or heating systems.

There is also evidence to support the benefit of LED conversions in educational settings. A year-long study in a primary school in Hamburg found that with the Philips SchoolVision lighting system, pupil reading speeds increased by 35 per cent, frequency of errors fell by almost 45 per cent and restlessness was reduced by 75 per cent. A similar study in Amsterdam shows equally positive results, reporting that pupils score on average 18 per cent higher in concentration tests with the Philips SchoolVision lighting system.

The City of Mesa has shown that with the vision and will, what starts as an energy efficiency project can broaden out to provide benefits such as these. It identified seven priorities in its Building a Smarter Mesa: Smart City Strategic Plan. Ranking equally with protecting the environment, creating sustainable options and modernising essential infrastructure to provide city services are creating a vibrant, attractive downtown that is “thriving with live, work and play activities” and building “an engaged, inclusive and equitable community” that can provide a high quality of life to all Mesa citizens.

“With Signify’s technology, our street lighting network has evolved into a multi-purpose smart city platform,” said Harry Meier. “It supports our sustainability efforts, has allowed us to expand broadband access into key neighbourhoods and gives us parking analytics and so much more.

“More collaboration between the Street Lighting Department and IT will leverage the lighting network for sensors that monitor traffic, air quality and noise, for example, to further drive quality of life improvements in the city.”

As human beings, we also spend a high proportion of our lives indoors and whether it’s an office building, educational campus, hospital or sports and recreational facility, it is incumbent on building owners and managers to ensure the experience inside these buildings is a comfortable and pleasant one.

Indoor air quality (IEQ) for instance, has moved right up the agenda, especially since the Covid-19 pandemic and connected systems can help to monitor and improve this. Workplaces also need to be more sustainable and human-centric, especially if they are to attract people back to the office. The tech-savvy Gen Z and so-called Generation Alpha cohorts in particular will have higher expectations of their workplaces than previous generations.

Connected systems and advanced technologies can support municipal leaders to make their buildings healthier by, for example, adjusting light and temperature levels when conditions change or aligning lighting with circadian rhythms.

There are also building certifications programmes focused on wellbeing and health that cities should explore. The Well Building Institute’s WELL Building Standard, measures how buildings impact occupant health while the Fitwel Certification from the Centre for Active Design focuses on areas such as wellbeing and occupant safety. Achieving these demonstrates to employees, citizens/customers that cities are taking health, wellbeing and their duty of care seriously and are also a public display of their commitment to creating healthier, more sustainable buildings.

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“It supports our sustainability efforts, has allowed us to expand broadband access into key neighbourhoods.”

No one-size fits all cities


Of course, no two cities are the same, they have unique needs and priorities. While there will be commonalities, no two sets of sustainability activities or approaches to implementing solutions will be identical. Political cycles also play a part as well as the scope and willingness to engage in private public partnerships. Whatever the backdrop or approach though, cities need to ensure they are aware of the full range of options open to them when it comes to technologies, funding and operating models.

When exploring connected solutions, cities should look for trusted partners who can help them navigate the road ahead. One of the areas which can stymie the expansion of a connected infrastructure is a lack of interoperability because of proprietary products and services. Cities need to make sure that products and services are compatible and adhere to the emerging standards in the smart city space. Signify’s Interact offering has been designed as a secure, scalable connected system that enables cities to expand their infrastructure and respond to different priorities.

Interact is the underpinning infrastructure for the City of Mesa, which also enabled it to incorporate the Signity BrightSites smart pole solution to create a wireless mesh network to deliver fibre broadband. Another Signify brand, Telensa, has implemented connected street lighting in cities around the world, including the Mexican municipality of Solidaridad. Its threefold aim is to provide operational efficiencies, create savings for the city and improve environmental wellbeing. Control nodes, known as ‘Telecells’ installed on each streetlight luminaire will communicate wirelessly back to the PLANet software to provide deeper understanding of the way the municipality’s lights are performing. In return each luminaire can be controlled and programmed via the central software individually.

As a response to the need for urgent climate action, as well as recognition of support needed in the post-Covid era, unprecedented levels of funding has been flowing in to support governments and countries to achieve their carbon reduction aims. The European Green Deal makes €1.8 trillion investment available to EU member states to take immediate and aggressive climate action and the US Inflation Act (IRA) includes tax breaks for the installation of energy efficient equipment such as LED lighting, heat pumps and building insulation.

These and other landmark initiatives are continuing to help accelerate both global and local climate action as well as mobilise public and private sector organisations.



“The circular lighting approach reduces maintenance costs by 60 per cent with zero waste to landfill.”

Signify stands ready to support cities around the world and by building sustainability into its own offerings and operating models can pass this low carbon benefit on to customers. Its own growth areas are aligned with the UN Sustainable Development Goals and one of these focuses on the circular economy. The circular lighting approach reduces maintenance costs by 60 per cent with zero waste to landfill. Meanwhile, its circular lighting portfolio includes 3D printed, serviceable and recyclable luminaires while circular components are and have recyclable parts. A 3D printed luminaire has an up to 47 per cent lower carbon footprint for its materials, production and logistics than its equivalent counterpart.

Signify is also advancing the solar-powered lighting sector with a range of solar luminaires which can deliver energy savings of up to 75 per cent and can also help to provide cost-effective lighting solutions in off-grid areas.

Services, as well as products, are also circular and include the light-as-a-service (LaaS) model, which combines lighting design, installation and maintenance in a single contract and involves no major upfront investment but is rather based on a monthly fee. Combining light-as-a-service with circular procurement can also support better decision-making and accelerate progress and achieve positive outcomes.

Making this the decade of action

If we return to the UN's definition of sustainability set out more than three decades ago of meeting the needs of the present without compromising the ability of future generations to meet their needs, we must acknowledge there is much work to be done. Although we are right to be critical of the lack of progress made in some areas, we owe it to the future generations to not allow this to paralyse or impede our actions.

Organisations such as the Climate Group, the World Green Building Council and the International Energy Agency are all emphasising the importance of making this decade count and we must heed this clarion call.

The good news is we do have a window of opportunity to act. Moreover, progress doesn't have to be linear: it is within our power to accelerate it and make it exponential. If cities and their partners work together in a reduction-first approach to the clean energy transition, with energy efficiency playing a central role, we can make great strides to build a sustainable future.

About Signify

Signify is the world leader in lighting for professionals and consumers and lighting for the Internet of Things. Its Philips products, Interact connected lighting systems, and data-enabled services deliver business value and transform life in homes, buildings, and public spaces. With 2021 sales of EUR 6.9 billion, approximately 37,000 employees, and a presence in over 70 countries, Signify aims to unlock the extraordinary potential of light for brighter lives and a better world. The company achieved carbon neutrality in 2020, has been in the Dow Jones Sustainability World Index since its IPO for four consecutive years, and was named Industry Leader in 2017, 2018 and 2019.

