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### **Foreword**

Is "smart" a loaded term in 2025? Across the world, city residents routinely see the phrases smart urban planning, smart mobility, and, of course, smart cities appearing in news articles, alongside hundreds of ideas and applications that use the "smart" label. However, when it comes to directly understanding what these terms mean for the future of their living environments and daily routines, things become a bit less clear, and a bit less "smart."

What is needed in the smart cities and mobility conversation is greater clarity on exactly what it means to deliver on the promise of more efficient, liveable, and low-carbon urban environments. What are the goals? What are the costs? Where are the gains? Where are the hurdles? How can we bring it all together in a manner that gives the people who live in cities the outcomes they want? Every city is different, and its vision of a smart future must accommodate its unique context, but in all cases, there is a need for fewer grand declarations and more clear-cut analysis that identifies specific needs, appropriate solutions, and viable timelines.

Fortunately, 2025 has already given smart city planners and developers plenty of positives to explore. From AI-assisted planning to advances in electric vehicles on the ground and in the air, the ingredients for smarter and more sustainable cities are rapidly maturing. However, acceptance is what drives adoption; if cities are going to realize their smart potential to the fullest, the proposed methods must secure public buy-in, which means that solution providers (and their backers) need to clearly demonstrate how their planned changes will improve lives and livelihoods.

With such a complex challenge laid out before them, how are city planners, technologists, policymakers, and developers navigating the current landscape of smart cities and mobility? Each of these groups has a vital role to play – by sharing their priorities, pain points, and next planned moves, they can find avenues for mutual understanding and possible cooperation. Abu Dhabi Sustainability Week (ADSW) – hosted by Masdar – aims to foster this sense of collaboration and shared experience, in the hope that it will help accelerate the realization of a genuinely smarter future.

Each year, Masdar convenes a series of ADSW Advisory Committees on key sustainability topics. These sessions gather leaders from across business, academia, and public service for open, transparent dialogue about what is happening on the ground, what innovations or trends they are witnessing, and what they believe should happen next. In 2025, the ADSW Advisory Committee on Smart Cities and Mobility brought together experts from around the world to exchange insights on building the cities of the future.

This insights report condenses the committee's key discussions – analyzing the impact of AI on urban design, human-centric and nature-integrated development, the evolution of mobility, how to balance sustainability with affordability, the role of policy and regulatory frameworks, and the future of urban infrastructure. Its goal is to provide a candid assessment of where we stand and what needs to happen next, if we are to build smarter, greener cities.



# Al and Data-Driven City Design

One of the first topics the committee tackled was the surge of interest in artificial intelligence (AI) and data-driven approaches to city design. As soon as we talk about smart cities, participants noted, the conversation invariably turns to AI. From self-driving lorries in Dallas (US), to social care chatbots in Buenos Aires,<sup>1</sup> the past year, advances in AI have been dramatic, and cities are beginning to feel the effects.

Committee members emphasized that AI should be seen as an enabler to achieve sustainability and efficiency goals, rather than viewing its adoption as the end goal itself. There was a general criticism that, much like the overuse of the term "smart," there is a temptation among urban developers to "blindly grab for an AI-based solution first," when more impactful and appropriate solutions are available.

There was broad agreement that AI and data analytics can help cities optimise everything from traffic flows to energy use – but only if the operators in those key systems figure out how to harness the right data and draw meaningful insights, enabling further efficiencies across the city's vital infrastructure and networks. Technological showcases, while important for sparking further innovation and interest, are not the long-term drivers of smart city development progress.

We are creating huge volumes of data that no one quite seems to know how to leverage. Without the right direction, the right vision for the city, it's easy to get pulled towards a tech adoption that looks good on paper but doesn't deliver in terms of improving liveability. We need to agree on what a smart city looks like before racing into AI implementations for their own sake.

The committee agreed that an integral part of this shared vision for smart cities is that they are flexible enough to integrate future technological advancements and changing behaviors of residents. One example discussed was the potential impact that fully autonomous vehicles may eventually have on city design. When the day arrives where people can reliably hail a self-driving taxi, and then enjoy a quick, affordable, and convenient journey, this may substantially reduce the need for car ownership. With fewer owned cars and fewer human taxi drivers, this should theoretically reduce the need for cities to maintain sizeable car parks and multi-lane roads.

With driverless taxi trials gaining speed in forward-leaning cities like Dubai<sup>2</sup>, urban planners must anticipate this changing dynamic now. New parking facilities built to cater to current demand could be engineered so that they can later be converted to other uses if personal car demand drops. Al has an essential role to play in this regard; by creating reliable city-wide digital twins, Al-based solutions can optimize plans for individual buildings, neighborhoods, even whole zones, while always ensuring that such plans are flexible enough to cater to a broad range of future scenarios.

Al in smart city development is not just about individual areas of city living more efficient and sustainable; it has the potential to fundamentally alter the urban fabric by designing infrastructure and operational measures that quickly respond to the changing needs of the people who use them.

# **Human-Centric, Nature-Integrated Urban Development**



Technology fires the imagination. Big projects with bold claims featuring futuristic tech are useful for drawing the eye of investors and projecting success. However, committee members strongly underscored that people and nature must lie at the heart of smart city initiatives. Too often, plans for city development focus too heavily on an impressive infrastructural centerpiece, without addressing the associated human experience or environmental context.

"Does the project improve people's lives?" "Does it provide reliable return on investment (ROI) across its lifecycle?" "Does this thing really need to be built?" – These are some of the crucial questions that smart city planners must ask themselves before commencing with such big-ticket projects, according to the Advisory Committee.

Members called for a recalibration of priorities: successful future cities will be those designed around human wellbeing and sensitively integrated with the natural environment, not those sporting the most advanced technology for its own sake. Human-centric design should be the mantra, meaning that urban planners and developers should take the daily experience of residents, commuters, and visitors as their start point, end point, and constant guide.

When we think about any innovation, it should always come back to the human experience. People need to buy into the idea BEFORE we build it, so we must show them that it will change their lives for the better. Most people living in cities don't care about technical brilliance – they care about having a shorter commute and cleaner air.

Equally "missing from the conversation," as another expert observed, is the nature side of smart cities and mobility. Modern urban development cannot ignore the large-scale environmental impacts of building and operating cities – or the opportunity to work with nature to improve sustainability and resilience. Participants pointed out that constructing new infrastructure (roads, rails, buildings, telecom networks) at the scale required for expanding cities often strains ecosystems through habitat loss, resource extraction, and harmful emissions.

Yet, nature itself can be a powerful ally in sustainable urban design if integrated thoughtfully. The committee discussed a vision of nature-integrated urban development: cities with abundant green spaces, water features, and biodiversity woven into the urban fabric. Such nature-based design provides not only aesthetic and health benefits, but also tangible services – vegetation can help manage stormwater and heat, urban forests sequester carbon, while parks and green spaces improve public health (physical and mental) along with biodiversity.

Members discussed the need for urban developers to respect the "nature-mobility nexus" at play. For example, expanding public transit infrastructure can reduce pollution and boost mobility, but large projects could also disrupt local ecology if not carefully managed.

Conversely, preserving wetlands or planting trees along transit corridors can enhance the

performance of those systems by buffering floods or providing shade. In practical terms, the committee highlighted that large-scale infrastructure projects should undergo rigorous environmental impact assessment paired with protective measures. For instance, if a city plans a new highway or rail line, it should simultaneously plan corridors for wildlife while looking for ways to "pay for itself" in terms of any ecological impacts, even if this means resorting to offset-based solutions. Ideally though, the project should work with nature as much as possible, while limiting its impact at every stage of its development and subsequent operation.

This principle highlights the broader objective espoused by the committee – can we imagine a city that is not just technologically smart, but "carbon negative, water positive, and zero waste?" Achieving truly sustainability urban design and development means creating environments where each element is supported by the others; major infrastructure projects need to play an integrated role in the city's overall sustainability journey, going beyond merely "paying for themselves."

Across all these interconnected priorities, the committee urged developers to keep the end users uppermost in their minds. Human-centric, nature-integrated smart cities are more than just top-down deployments of tech; they should be co-created with input from residents to address what people truly care about. People and nature are not afterthoughts; they are the very purpose of making a city smart. Technology and data are merely tools to serve these higher aims.



# **Mobility Evolution**



Few areas of urban life are changing as rapidly as mobility. From innovative modes of travel to new models of ownership and access (including ridesharing, mobility-as-a-service, and integrated transport apps), the Advisory Committee agreed that the coming decade could fundamentally transform how we get around cities.

They also emphasized that the shift toward smarter, more sustainable urban transport must be inclusive—ensuring affordability and equitable access remain central to the approach. If significant proportions of an urban population are left out of the picture e.g., if prices remain too high or coverage fails to reach their area, this will only serve to widen the wealth gap, undermine public buy-in and ultimately compromise the concept of truly integrated smart city transportation.

Discussion on the current smart mobility landscape focused on a specific innovation of particular interest to the Middle East region - Electric Vertical Take-off and Landing aircraft (EVTOLs), or air taxis. The UAE is now one of the world's leading hubs for EVTOL innovation and testing, and the committee explained the potentially revolutionary nature of the technology. The vision is a fully integrated, end-to-end sustainable transport system—where passengers travel to a vertiport in a ground-based EV, board an air taxi, and complete the final leg of their journey in another electric vehicle—seamlessly booked, paid for, and managed through a single digital platform. While this game-changing setup may seem futuristic, commercially available air taxi flights will be available (albeit in a limited manner) in Abu Dhabi and Dubai as early as 2026.3

Once scaled up, air taxis will start moving people efficiently and sustainably through the air in a way that private helicopters cannot hope to match. However, the committee explained that the impact of EVTOLs may be even greater when it comes to moving cargo. From bulk freight to individual package deliveries, current road-based transportation of cargo through cities is a massive disruption for its residents. A range of drones suitable for small personal deliveries all the way up to cargo shipments (from ports or airports to specialized vertiport logistical centers) could avoid thousands of unnecessary road journeys made by trucks, lorries, and bikes in every city, every day.

Air taxis and cargo drones, whether they're piloted or automated, have the power to take vehicles off the road at unprecedented levels. But we're inventing as we go; no one's done this anywhere in the world yet.

While excitement remains high around this exceptional set of advanced mobility technologies, the committee also outlined the need to address the basic mobility needs of urban areas through refinements of conventional transit methods. The committee raised the point that India's roads claimed over 172,000 lives in 2023, averaging roughly one road death every three minutes.4 This harrowing statistic underscores that the mobility evolution must be inclusive and based on appropriate methodologies. High-tech solutions for wealthy urban centers are only part of the bigger picture; what matters most is lifting the baseline of mobility for everyone.

In the near term, one of the most effective ways to improve urban transport sustainability is simply to increase shared mobility and public transit usage. The committee discussed how ridesharing services, carpool initiatives, and high-quality public transport can alleviate congestion and reduce emissions right now, paving the way to longer-term goals. A personal example from the committee is that despite living in a modern city, their daily commute takes over 90 minutes, largely due to traffic. Their overarching point was that having a model green city means little if you have to sit in gridlock and pollution for hours to get there.

The participant then argued that to meet climate goals like net-zero pledges for 2030 or 2050, cities must invest in smarter mobility solutions rather than relying on simply adding capacity. It is not enough to keep adding capacity (e.g.: by building bigger and wider roads) to an existing transport setup that is easily overwhelmed.

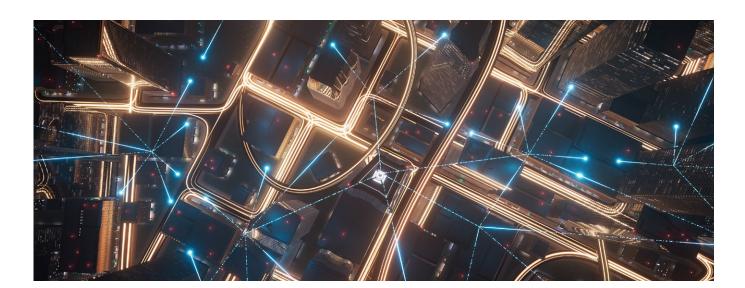
Instead, urban residents must be presented with more attractive options that encourage them to leave their personal vehicle at home. Depending on the city, country and region involved, investing heavily in improving existing mass transit solutions (bus routes, metro systems, etc.) might be more cost-effective than developing an entirely new and unproven model.

It's clear that mobility in the smart city context is multi-faceted. The visionary end-state might be autonomous EVs and flying taxis zipping around zero-carbon cities. But the transition phase requires greater focus on making current transport more sustainable and effective. The committee's consensus was to pursue a dual track: support innovation in advanced mobility (with pilot projects, regulatory sandboxes, etc.) while simultaneously investing in improving existing transport setups (through shared mobility programs, better cycling/pedestrian infrastructure, and general public transport upgrades).

As the committee summarized:



We must get into shared mobility and also improve what we already have otherwise we'll never reach those net-zero targets, and we won't even reach our destination on time.



# Sustainability and Affordability

"In construction, sustainability often comes at a premium – remaining competitive against other more cost-focused developers is very challenging." This candid observation from the committee summed up a central tension in building smart, green cities: the most environmentally friendly materials, technologies, and designs can cost more upfront than conventional options. In the real world of budgets and balance sheets, this can be a major hurdle. The committee devoted part of its discussion to exploring how to make sustainable urban development financially viable and widely adoptable – in short, how to ensure the green city revolution is affordable at the point of construction, not just in the long term through cost savings.

Developers and practitioners on the committee shared their direct experience trying to infuse ambitious sustainability measures into projects while keeping costs competitive. In one case, a developer is creating new large-scale "sustainable communities" and has been pushing the envelope on building physics (maximizing insulation and energy efficiency in their building design approach). They have managed to implement many advanced features, but "the challenge is when client attitudes harden on the matter of sustainability versus cost," the committee member admitted.

While there is no shortage of well-funded flagship building projects in prosperous cities around the world that lean heavily into sustainable practices, materials and features, most construction markets are highly competitive, forcing companies to operate on tight margins. This makes the sustainable approach harder to justify when it might hamper a company's ability to reliably and consistently secure business with clients who are looking carefully at upfront costs.

To "thread the needle" of costs vs. sustainability, committee members emphasized the importance of holistic cost-benefit analysis and creative thinking. First, committee members recommended evaluating and promoting lifecycle costs as part of their marketing and negotiation approach, rather than just upfront costs. A green building might cost more to build, but if it's far more efficient, it will save money on energy and water every year. Over the life of the infrastructure asset, those operational savings can outweigh the initial investment – not to mention the social and environmental value of lower carbon emissions.



Another tactic discussed was leveraging AI and automation to optimize designs to meet sustainability targets at minimum cost, effectively finding the "sweet spot" where green features yield maximum impact. This might mean, for example, identifying the most cost-efficient combination of solar panels and insulation thickness for a given building, or using the most cost-effective advanced construction techniques available in a given market (like 3D printing or modular construction) to lower costs.

The committee also highlighted how governments have a vital role to play in tipping the scales in favor of sustainable buildings. Tax breaks, faster permitting, preferential reception in public construction contract bids – governments can incentivize sustainability, allowing developers to achieve affordability parity. This goes hand in hand with the regulatory piece; building codes that mandate solar readiness or water recycling, for example, can push the industry to shift more rapidly towards green building approaches. This dual approach sends a strong market signal that sustainability is the way forward and shows firms that can't or won't embrace greener methods that their overall competitiveness may be short-lived.

Tough as it might seem to compete, you also have to consider the cost of not building sustainably. Construction and architecture firms must look towards a future where the regulatory landscape is mandating increasingly greener materials, methods, and features. If you're exclusively throwing up cheap buildings, you're not going to keep pace with the regulatory environment or the market sentiment. That's an opportunity cost for you, and a built-in environmental cost for everyone else."

The committee also discussed the importance of inclusivity, much like transport, when it comes to housing and broader access to green buildings. High-tech smart districts, or green housing developments, are useful in demonstrating the viability of sustainable construction and maintenance, but truly sustainable cities need to be accessible to the wider population. In some innovative projects, developers are incorporating mixed-income housing and striving to keep utility costs down for residents through energy and water efficiency measures. The overall sentiment from the committee was that smart designs and green buildings should not be limited to a luxury niche product, but a new normal that improves economic and environmental outcomes for everyone.

The intersection of sustainability and affordability is about innovation in both technology and mindset. It requires looking at long-term value, harnessing new tools to cut costs, and aligning incentives so that what's good for the planet is also good for the purse strings. The committee was optimistic that as sustainable solutions scale up, costs will come down, as we've seen with renewable energy. With clever planning, a sustainable city can become cheaper to operate and live in than a wasteful, unsustainable one.



### The Future of Urban Infrastructure

Looking ahead, the Advisory Committee reflected on what the future holds for urban infrastructure in an era of rapid change. How will the physical backbone of our cities - the roads, bridges, utilities, buildings, and public spaces - adapt to meet the needs of tomorrow? If there was one overarching sentiment, it was that urban infrastructure must become more flexible, resilient, and inclusive than ever before. Future cities will likely blend the old and the new: historic structures standing alongside 3D-printed buildings; decades-old water pipes retrofitted with smart leak detectors; highways repurposed into green corridors. The challenge (and opportunity) is to retrofit existing cities to be smarter and greener, while building new infrastructure that is future-proof.

Aging water systems, congested roads, and overburdened public transport can be found in many places. This highlights a priority for the future - infrastructure upgrades. It's not just about new cities or new developments; a huge part of sustainability is improving what's already built. For instance, upgrading an old grid to handle renewable energy, or renovating old buildings to be energy efficient can yield enormous benefits. The committee noted that these "less glamorous" projects are critical to a global transition, since the majority of the urban environment that will exist in 2050 is already in place today.<sup>5</sup> Cities need to plan massive retrofitting initiatives, possibly incentivized by government initiatives or targeted regulations.

Resilience to climate change must be a central consideration for future infrastructure. The committee frequently tied this to the nature-integration theme. Green infrastructure, like wetlands for flood control, green roofs for cooling, or urban forests for air quality, will be as important as grey infrastructure. Many cities face more extreme weather ahead (heatwaves, heavy rain, sea level rise), so any future designs must take this into account. Higher seawalls, bigger stormwater drains, decentralized energy systems - the committee strongly advocated for building climate resilience into our cities and urban environments.



Not every part of the world is ready for decarbonization of its cities and infrastructure, that's plain to see. But wherever they are on that journey, they all need practical stepping stones, they need roadmaps, and they need success stories to follow. By sharing experiences and highlighting successful approaches, we can foster greater ambition and move faster towards urban sustainability.

The human dimension of infrastructure remains integral to its future design and development. The committee stressed that infrastructure is ultimately about serving people's needs and aspirations. Future infrastructure should be designed with community input and ideally create local jobs during its construction, while strengthening local supply chains and training local talent. When a city invests in new infrastructure, it's also an opportunity to invest in its people by enhancing their quality of life and providing new economic opportunities.

Ultimately, the future of urban infrastructure will be defined by adaptability and foresight. Cities that plan for flexibility - where a piece of infrastructure can have a second life or serve multiple purposes - will fare better in the face of uncertainty. Those that invest in resilience will protect their citizens and economies from shocks. And those that embrace both cutting-edge innovation and the maintenance of existing assets will provide a higher quality of life, at a lower environmental cost.

# **Key Takeaways**

Al is a powerful enabler, but purpose is key: Advanced data analytics and Al are transforming city planning and mobility – from generative design of buildings to autonomous vehicles. Yet the committee stressed that technology should serve clear sustainability and liveability goals. Defining what "smart" means is crucial before deploying Al solutions.

Put people and nature at the center: A recurring theme was the need for human-centric and nature-integrated design. Smart cities should enhance the human experience – making daily life more convenient, healthy, and enjoyable for residents. Equally, they must work with the environment, protecting ecosystems, using green infrastructure, and reducing resource footprints.

Mobility is evolving fast – don't leave anyone behind: The future of urban mobility is emerging, driven by novel innovations and iterative improvements of existing setups. In the transition, improving public transit and shared mobility is essential to quickly reduce emissions and congestion levels. Inclusivity matters too – the mobility revolution must benefit everyday commuters, not just early adopters of new tech.

Sustainability must be balanced with affordability: Greener materials, buildings, and systems often carry higher upfront costs, posing a challenge for adoption. Sustainable developers must put the lower lifecycle costs and environmental benefits front and centre in their messaging to prove their business case and encourage clients to think long term. They must be taught to view sustainability as a necessary investment, not an added expense. Government policies and incentives are a crucial piece of the puzzle to push urban planners and construction firms towards greener building methodologies and away from ostensibly cheaper options than carry a high environmental burden.

Success breeds success: The future of infrastructure will be built on the success stories of the next few years. As cities create bold new transportation systems, adopt greener building codes and regulations, retrofit old infrastructure for new purposes, and sculpt urban environments that better accommodate nature, they are drawing up blueprints for the truly smart, sustainable cities of the future.

# **About the ADSW Advisory Committees**

Abu Dhabi Sustainability Week (ADSW) Advisory Committees serve as a platform for high-level dialogue and knowledge exchange on pressing sustainability topics. Convened by Masdar as part of the ADSW initiative, these committees bring together a diverse group of leaders and experts from business, government, academia, and civil society. Each committee focuses on a specific theme – such as smart cities and mobility, water, or, in this case energy – reflecting the complexity and interdependence of sustainable development challenges.

The committees are designed to foster candid discussions that break down silos between sectors and regions. Participants include CEOs and senior executives of international companies, government policymakers, leading researchers, and technology innovators. This diversity ensures a wide range of perspectives. In closed-door sessions, members share insights, highlight key challenges, and propose actionable solutions and areas for collaboration. Discussions are held under the Chatham House Rule, allowing participants to speak openly about successes and setbacks, learn from one another, and identify common ground. The dialogue is intentionally forward-looking and focused on practical outcomes.

Insights from the committees help shape ADSW's content, direction, and related initiatives. Recommendations are distilled into official reports such as this one and shared with a broader audience to inspire continued dialogue and action. These findings often inform the agendas of ADSW summits, panels, and workshops, and may guide Masdar and its partners in developing new initiatives or advancing policy advocacy aligned with the committee's conclusions. In past years, the committees have contributed to meaningful outcomes, from catalyzing cross-border partnerships to introducing new topics into global forums such as the World Future Energy Summit.

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#### About Abu Dhabi Sustainability Week

Abu Dhabi Sustainability Week (ADSW) is a global platform supported by the UAE and its clean energy leader, Masdar, to address the world's most pressing sustainability challenges through crucial conversations accelerating responsible development and fostering inclusive economic, social and environmental progress.

For more than 15 years, ADSW has convened decision-makers from governments, the private sector and civil society to advance the global sustainability agenda through dialogue, cross-sector collaboration and impactful solutions. Throughout the year, ADSW conversations and initiatives facilitate knowledge sharing and collective action that will ensure a sustainable world for future generations.

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### **About the World Future Energy Summit**

The World Future Energy Summit is the leading global event for clean energy and sustainability, bringing together innovators, business leaders, policymakers, and investors to turn ambition into action.

Over three days, the international exhibition and conference addresses the most pressing challenges of our time—clean energy, climate change, sustainable cities, water security, waste management, green finance, and the transformative power of artificial intelligence.

By uniting almost 42,000 attendees from public, private, and non-profit sectors, it serves as a critical bridge between bold policy and real-world solutions.

worldfutureenergysummit.com











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