2025

APA FORESIGHT

Trend Report for Planners

Use the future when preparing for uncertainty and helping communities navigate change. Stay a step ahead of the issues impacting the future of planning and our communities. Brought to you by the American Planning Association and the Lincoln Institute of Land Policy.

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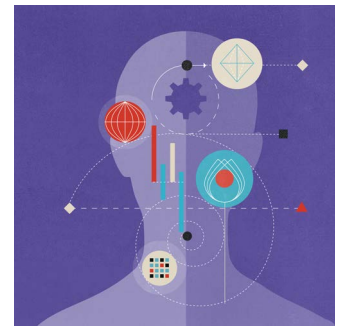

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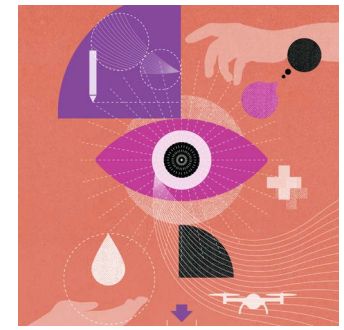

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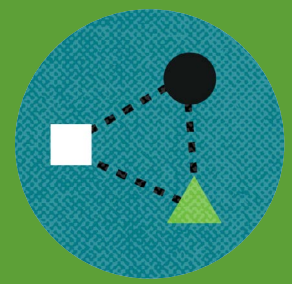

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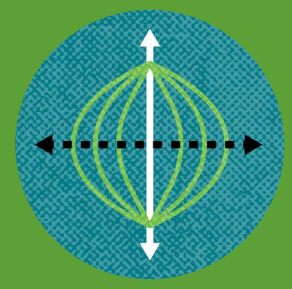

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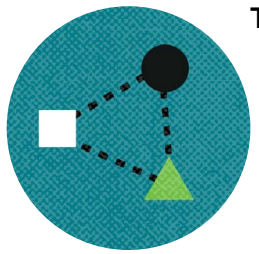

This is the fourth *Trend Report for Planners* developed by the American Planning Association (APA) in partnership with the Lincoln Institute of Land Policy.

As in previous years, the core of this *Trend Report* is a list of the most impactful existing, emerging, and potential future trends that the APA Foresight team, together with our Trend Scouting Foresight Community, identified as relevant to planning. The trends are structured within three timeframes (Act Now, Prepare, Learn and Watch), indicating the urgency of planners' action. Within each timeframe, trends are grouped into themed clusters. For each trend, the report gives insights and explains why it is important for planners to know about and consider the trend in their work. All trends and signals are based on facts and are described neutrally and without judgment. The purpose of the report is to share potential drivers of change and shifts that will possibly impact the work of planners and the communities we serve as planners.

While most of the trends and signals from previous *Trend Reports* are still relevant, we didn't repeat them in this *Trend Report* unless there were major updates that were important to highlight. All trends and signals from this report and previous reports are also available online in APA's Trend Universe where they will be regularly updated, reflecting the accelerating pace of change today and in the future.

Furthermore, the report addresses the future of planning, explaining how the planning profession will have to evolve to keep up with a continuously changing world, what new skills planners will have to develop, and what new tools are worth trying.

Additional features throughout this report include deep dives, future scenarios, and trend talks. This year's **deep dives** focus on three innovative concepts, their opportunities, and their risks. We dive deeper into artificial intelligence and its promise to resolve climate issues while at the same time exacerbating those issues due to its energy and water consumption. We highlight the progress in the development of robots, their myriad potential applications, and how planners can prepare for them. And we explain why fungi might have the power to resolve a wide range of challenges, from climate change to health and others.

Like last year, based on different trends and signals, we also did some time travel and created a variety of **future scenarios**. These scenarios are examples of how planners can use the trends from this report to create multiple plausible futures with their communities and how they might affect the path forward. We traveled to the year 2035 to better understand what living with heat might look like. We looked at the year 2045 to imagine how the increasing pandemic risk might play out in the light of emerging robotics. And we explored plausible scenarios for the year 2055 on the intersection of current longevity and health innovations with the uncertainties of the housing market. For more information on scenario planning, you can visit APA's Scenario Planning KnowledgeBase Collection and the Lincoln Institute's Consortium for Scenario Planning.

Finally, this year we conducted **trend talks** with three experts about the futures of the public sector, transportation planning, and planning in outer space. These conversations are available on the APA podcast, and short versions are featured in this report.

How to use this report

This *Trend Report* is intended to be used as a tool or reference when planning for the future of our communities. Planners can use the trends listed in this report to augment their long-range and current planning processes, to use futures in community visioning processes, to create scenario planning exercises, to organize futures literacy labs, or simply to inform decision-making about the future.

To determine and prioritize the most important trends to consider, planners can evaluate and rate the trends based upon (1) the expected extent and severity of the potential impact, and (2) how certain or uncertain it is that a trend will occur in a community. The Trend Prioritization for Planners graph demonstrates how these two factors interact in trend evaluation. Trends in the upper right quadrant of the graph—high impact and high certainty—represent top priorities for planners to pay special attention to. Trends in the lower right—high impact and low certainty—are specifically well suited for exploratory scenario planning exercises.

In addition to APA's *PAS QuickNotes* 94, "Planning With Foresight," which briefly describes how you can use the multiple trends of this report in a foresighted approach, we developed an interactive online course on how you can make sense of the future, train your futures-literacy muscles, and use foresight in your work: Using the Future to Create Dynamic Plans. The course offers approaches on how you can identify trends and signals in your community together with your community members, how you can prioritize and focus on the most important trends, how you can imagine what the future might look like, and how the practice of foresight can help you create dynamic plans that allow you to pivot along the way while the future is approaching.

Trend Prioritization for Planners

APA FORESIGHT:

Using the Future to Create Dynamic Plans

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This upskilling course, Using the Future to Create Dynamic Plans, gives planners the ability to imagine multiple plausible futures, use the future in our work, and plan with the future. This interactive self-paced training includes how to use strategic foresight in planning with applicable tools and methodologies to equip planners with the essential skills needed to navigate change and understand how future uncertainties may impact communities.

An Inclusive Approach to Futures

"A society grows great when old men plant trees in whose shade they shall never sit." —Greek proverb

USING FUTURES can result in more resilient and equitable plans, but if our future imaginings aren't developed through an inclusive approach, they won't lead to a truly equitable future. APA's *PAS QuickNotes 110*, "Decolonizing the Future: An Inclusive Approach to Futures," explains how and why we must rethink our approach to imagining and discussing futures.

This approach challenges past and present systems, envisioning multiple, diverse futures, and ensuring the outcomes are translated into actions. It is about creating safe spaces for historically marginalized worldviews and cultural identities, moving away from one dominant perspective, and encouraging the imagination and co-creation of many possible futures. It promotes continuous learning, unlearning, and action.

Planners can start by asking the following three questions.

Whose future are we talking about?

"We see the world the way we are, not as the world is." *—Tamira Snell, Copenhagen Institute for Futures Studies*

IMAGINING THE FUTURE IS ABOUT GAINING THE POWER TO SHAPE IT. Limiting our view to the dominant perspective risks replicating the mistakes of the past. Futures thinking is about the people who will be living in the future. Planners must understand the diverse cultural views of those whose futures we are imagining and integrate different worldviews and their interconnections.

Who will be living in that future?

"When we talk about the future, we have to have the future at the table." *—Angela Wilkinson, World Energy Council*

THE FUTURE BELONGS TO THOSE WHO WILL INHABIT IT. This includes children—and those who aren't yet born. Including far-out futures in today's planning is challenging when the present is overwhelming. While local planning does not yet often address future generations, some communities have started to involve children and youth in their planning processes. We need to continue fostering these approaches and integrating them into planning.

What's the role of planners?

"Using futures for collaboration of people in the present." *—Adam Kahane, Reos Partners*

PLANNERS CAN USE THE FUTURE TO BRING PEOPLE TOGETHER IN THE PRESENT. They can empower community members to imagine their futures and engage them in creating change. They can create spaces for meaningful conversations and synthesize collective visions into actionable plans. Decolonization is a strategic action for the present, not just an idealized future.

About the American Planning Association

The American Planning Association is an independent, not-for-profit educational organization that provides vital leadership in creating great communities for all. APA and its professional institute, the American Institute of Certified Planners, are dedicated to advancing the profession of planning, offering better choices for where and how people work and live. The nearly 40,000 APA members work in concert with community residents, civic leaders, and business interests to create communities that enrich people's lives.

Through its philanthropic work, the APA Foundation helps to reduce economic and social barriers to good planning. APA is based in Chicago.

APA Foresight—learning with the future

APA Foresight helps planners navigate change and prepare for an uncertain future. With foresight in mind, planners can guide change, create more sustainable and equitable outcomes, and establish themselves as critical to thriving communities. Foresight is not about predicting the future—it is about understanding drivers of change that are outside of our control, how we can prepare for them, and when it is time to act. APA Foresight identifies emerging trends and explores how scenarios stemming from each may impact the world, our communities, and the planning profession in the years to come. The path forward requires adjusting, adapting, and even reinventing planning processes, tools, and skills to meet the needs of a changing world. Through APA's foresight practice, planners will find support, training, and new research for making sense of ever-changing futures.

American Planning Association
Creating Great Communities for All

CONSORTIUM FOR
SCENARIO PLANNING

LINCOLN INSTITUTE
OF LAND POLICY

About the Lincoln Institute of Land Policy

With locations in Cambridge, Massachusetts; Washington, D.C.; Phoenix; and Beijing, China, the Lincoln Institute of Land Policy organizes its work around three impact areas: land and water, land and fiscal systems, and land and communities. The Lincoln Institute envisions a world where stewardship of land and water resources ensures a livable future; where prosperous cities and regions provide essential public goods and services through coordinated land use planning and public finance; and where equitable allocation of limited land resources supports thriving communities.

Consortium for Scenario Planning

The Consortium for Scenario Planning at the Lincoln Institute of Land Policy offers a community of practice for practitioners, including access to technical assistance, educational resources, and a network of fellow innovators. Its mission is to improve the practice of scenario planning and broaden its use in communities of all sizes across disciplines. Through research, peer-to-peer learning, networking, training, and technical assistance, the Consortium helps communities develop better plans to guide a range of actions, from climate change adaptation to transportation investment.

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APA's Trend Scouting Foresight Community

For a successful foresight practice, diversity is key to capture different perspectives, ensure that we identify a variety of trends directly or indirectly connected to planning, and avoid missing trends or signals within or outside the planning world. The members of APA's Trend Scouting Foresight Community meet quarterly to share observations, discuss present-day shifts they have observed, and hint at signals that could evolve into future trends. The community includes thought leaders from multiple disciplines, industries, backgrounds, career stages, and countries. With our Trend Scouting Foresight Community, we want to imagine futures beyond the views and perspectives within the planning profession, challenging the continuation of our past and present.

Thank you to our trend scouts for their valuable inputs!

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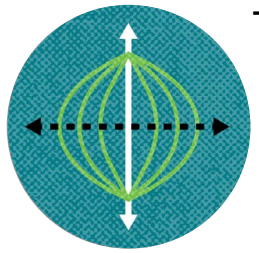
APA's Trend Universe



The Trend Universe is the place to find all of the trends and signals that APA has identified as part of our foresight practice. The trends here are dynamically updated, reflecting the accelerating pace of change of today and tomorrow. Here, you can find existing trends (act on them now), emerging trends (start preparing for them), and potential future trends (keep watching and learn more about them) organized around eight general categories.

Transportation and Infrastructure

Emerging trends and shifts within the transportation and infrastructure sectors are changing how we get around, how we access critical services, and where we live and work.

Economic Development

Global and local shifts in economic development are not only changing the type of work that people do but are impacting the built environment and our communities as well.

Technology

Emerging and evolving technological trends are manifesting in how and where people live, work, and play, and are leading to changes in how we structure and build our cities and communities.

Social Change

Social change is often reflected in not just how we plan and structure our communities, but also in the practice of planning itself.

Climate, Energy, and the Environment

From the impacts of climate change to innovations in energy production and grid modernization, existing and emerging environment trends shape both the built and natural environments.

Future of Work and the Workplace

Broad economic restructuring, including income inequality, job growth and creation, and workforce participation, is reshaping the future of work and workplaces while simultaneously creating or exacerbating existing disparities and segregation.

Politics and Geopolitical Dynamics

Political and geopolitical trends shape and are shaped by changes across the societal landscape and are intensified by the acceleration of political polarization and emerging global challenges.

Housing

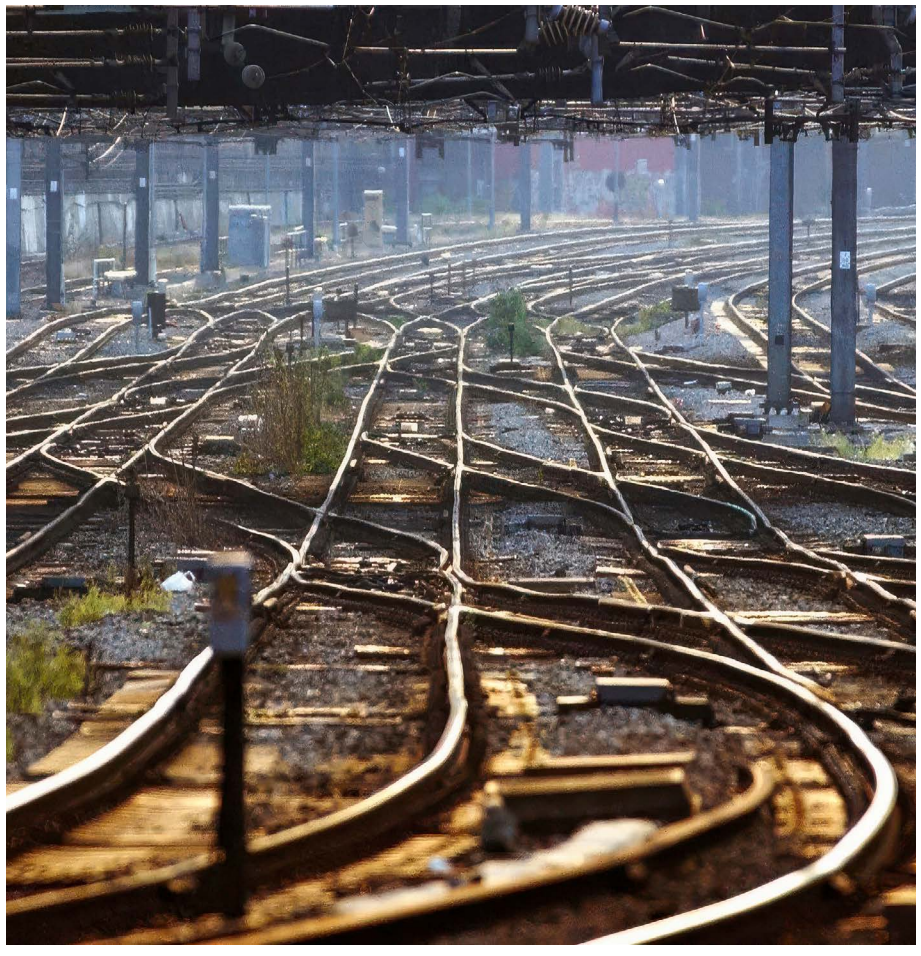
Emerging trends in the housing sector point to the critical role that planners will likely play in future decades.

The trends we need to act on now

The list of trends on which planners need to act now is growing. While many trends from previous Trend Reports remain relevant, some are evolving. **Climate mitigation strategies** are shifting, **digital fatigue** is driving people away from tech tools, and **demographic changes** are redefining **housing** and **public space needs. Heat, wildfire, and air pollution** will profoundly impact future living, while **water** is running out.

Check out APA's Trend Universe for more trends planners need to act on now.

Shifting Climate Mitigation Strategies



Secondary climate change impacts, such as the buckling of railway tracks due to extreme heat, are a source of increasing concern. Photo by Bruno Vincent/Getty Images.

As the impacts of climate change continue to worsen, long-standing approaches to climate mitigation are coming under fire. Carbon offset strategies are increasingly scrutinized, and corporate climate commitments are becoming overshadowed by AI ambitions. These strategies are starting to be seen as neither viable in today's markets nor adequate for the scale of the problem. The consequences of these failures are most significant at the local level, where planners must work

to cultivate community resilience in the face of ever-increasing climate impacts. Yet as these impacts continue and existing mitigation strategies fall out of favor, new legal and regulatory strategies are emerging to meet the threat.

Climate threats accelerate cascading impacts

2024 saw the largest-ever recorded increase of carbon dioxide in the Earth's atmosphere, pushing the planet past the 1.5C-degree threshold established as the global warming limit goal in the 2015 Paris Agreement. As greenhouse gas emissions continue to rise, cascading impacts are a source of increasing concern. Long-acknowledged risks like extreme precipitation, drought, and sea level rise are giving rise to major secondary issues like threats to the transportation network, the energy grid, and wastewater systems. Significant concern is also growing over larger-scale issues such as crop loss, as disruptions to weather patterns wreak havoc on everything from orange to wheat harvests across the globe. Hazard mitigation and climate adaptation, formerly professional specialties, are quickly becoming integral to all planners' everyday work in communities across the country.

Something's off with offsets

Carbon offsets have long been seen as a way for governments and corporations to offset or negate their greenhouse gas emissions by investing in projects that remove or avoid emissions, such as protecting forests. This strategy has recently come under fire, though, as studies are showing that many of these offset purchases aren't reliably tracked, preserved, or protected. Indigenous groups in particular have taken aim at carbon markets, with many arguing that they are an exercise in creative accounting rather than genuine climate action. In some cases,

purchased land may be lost entirely to wildfire or development. Given the popularity of carbon offsets as the carbon strategy of choice for many corporations over the last two decades, this will likely remain a major concern in the coming years and will continue to sow doubt regarding market-based mitigation approaches.

Big tech companies, small climate goals

Major tech companies such as Google and Microsoft are finding it difficult to meet their climate goals as their attention turns to competing in the massively growing AI field. While these companies haven't fully abandoned climate action, many have seen their emissions grow significantly over the last two years due to large-scale expansions of the energy- and water-intensive data centers needed to power AI operations (see also Water at Risk: Global Change, Local Consequences). Google has promoted the potential of AI to fight climate change (see also Deep Dive: AI's Double-Edged Sword), but some portray these actions as an attempt to "greenwash" away concerns over emissions. As the power needs of AI continue to fuel the rapid growth of data center construction, planners should ensure that their communities are prepared to deal with the impacts of these facilities.

Good climate data for all remains out of reach

While the integrity and accessibility of climate data has long been a cornerstone of climate action, the unequal distribution of critical climate data is receiving renewed attention. A recent federal report found that climate data collection is significantly lacking in U.S. territories as compared to U.S. states, even when risks are higher in those territories. Similar inequalities are seen globally; for example, while Mozambique has recently pioneered and deployed an advanced cyclone warning system, many other African nations lack similar access to the forecasting and monitoring available in the West. Without more equitable access to climate data, action by planners to both mitigate and adapt to climate change in many of the most vulnerable places will be far more challenging.

EXPERT INSIGHT

"Something to watch is how the growth that our communities need will be shaped as climate change drives the expansion of risky and increasingly undevelopable, and uninsurable, areas while disrupting and pushing communities into states of disaster recovery."

—Brendan Irsfeld, AICP, Lane County Office of Emergency Management.

Climate litigation is the new mitigation

Recent years have seen the large-scale emergence of a new strategy to fight climate change: litigation. Hundreds of climate-related lawsuits have been filed across the world, many of which have led to specific regulatory actions by national, state, and local governments to mitigate emissions and protect land and natural resources. Indigenous communities have led the way on this strategy. Island nations in the Caribbean, Pacific, and West Indies won major international rulings pressuring larger nations to more aggressively curb emissions, and in Hawaii, youth and Indigenous activists won a landmark victory requiring the state's transportation system to decarbonize rapidly. In April 2024, a major European court issued a landmark ruling against the Swiss government for not doing enough to fight climate change; similarly, in August 2024, a South Korean court ruled that the government's climate policies are failing to protect citizens' rights, calling for stronger carbon-reduction targets. In Latin America, the Brazilian city of Linhares granted legal rights to the waves at the mouth of the Doce River in June 2024, recognizing nature as a legal entity, and in the U.S., voters in Everett, Washington, granted legal rights to part of the Snohomish River watershed in November 2024. This movement toward recognizing the rights of ecosystems represents a growing legal shift toward holding governments and corporations accountable for environmental damage.

Legal decisions, however, can go the other way; in November 2024, an appeals court in The Hague dismissed a 2021 ruling that required Shell to cut carbon emissions by 45 percent by 2030. But given these recent successes, litigation will likely become an increasingly potent tool for fighting climate change, and many expect this trend to accelerate in the coming years.

The New Average: Demographics and Housing Needs

With the number of single-parent families rising along with other demographic shifts, less than one-fifth of U.S. households now fit the traditional “nuclear family” model of a married couple with children. Photo by Anchiy/E+/Getty Images.

The evolving composition of U.S. society reflects demographic trends common in highly industrialized countries, such as declining birth rates and increasingly diverse household structures. These shifting demographics are exacerbating mismatches between housing supply and demand, and high housing prices are limiting opportunities for younger generations to establish independent lives.

Additionally, with the ongoing trend of an aging population, the U.S. remains unprepared to meet the housing needs of older adults and caretakers. The affordable housing crisis continues to push more people, increasingly including full-time workers, into homelessness. Planners are well positioned to take charge of addressing these housing challenges. By incorporating the needs of different generations and various household types into planning processes, planners can help create inclusive, affordable, and adaptable housing solutions for all.

The nuclear family is blowing up

Less than one-fifth of U.S. families now fit the traditional “nuclear family” model of a married couple with children. Single-person households and married couples without children now make up more than half of all U.S. households. More women are choosing to have children outside of marriage, and the number of children living in single-parent households is rising. The number of multigenerational households is also growing, and diverse household arrangements such as living with

nonrelatives have increased. Federal legislation defining family has not kept pace with these shifts, however, often failing to include nontraditional or "chosen" families. This evolving landscape of family life calls for more inclusive policies and broader societal recognition of diverse households. For planners who often rely on traditional household structures as a basis for policymaking, it may be essential to rethink existing approaches to accommodate the growing variety of family arrangements.

Falling birth rates garner rising political attention

Between 2022 and 2100, the U.S. Census Bureau projects U.S. population growth to be just 9.7 percent. While 2012 population projections estimated over 420 million people by 2060, data from the 2020 Census lowered this estimate by 13 percent. This slowdown is largely driven by an aging population and a national birth rate that reached a record low of 1.62 births per woman in 2023.

Nearly all racial and ethnic groups have experienced declining birth rates, though the Hispanic population continues to have the highest among all. Politicians across the spectrum are proposing various solutions to increase fertility rates. These range from conservative pronatalism movements to more widely supported ideas such as per-child tax credits or direct payments and limits on childcare costs. Many factors driving declining birth rates reflect positive societal advancements over recent decades, however, such as fewer teen pregnancies, access to reproductive health services and college education, and increased pay equity between women and men. Additionally, research shows that one of the most effective personal methods for reducing greenhouse gas emissions is having one fewer child. For planners, this suggests the need to support families with children as well as expanding infrastructure for eldercare and housing to ensure that communities are equipped to support both younger and older generations.

EXPERT INSIGHT

"Declines in natural increases in population and immigration are going to change what it means when we think of planning for growth."

—Ryan Lanyon, Metrolinx

It's not easy being a parent

Though politicians may be calling for higher birth rates, raising children poses both financial and emotional challenges. Research highlights that climate change exacerbates these difficulties. Exposure to extreme heat has been linked to various reproductive health issues, such as complications with menstruation, conception, and childbirth. Meanwhile, access to maternal care is becoming increasingly difficult. A growing number of U.S. hospitals are closing their obstetric units, forcing many patients, especially those from rural communities or communities of color, to travel greater distances for prenatal and postpartum care. Furthermore, childcare has become one of the most significant fixed expenses for many households, especially as pandemic-era federal support dwindles. For planners, these trends call for helping communities support families by improving access to health care, childcare, schools, and family-friendly services.

Everyone needs affordable housing

According to research by Zillow, in 2024 households needed to earn $47,000 more than in 2020 to afford a single-family home, with 2023 being the least affordable home-buying year in over a decade. Factors such as inflation, high interest rates, and the shortage of affordable housing—outlined in the *2024 Trend Report*—have put the "American Dream" of owning a home out of reach for many people. With homeownership now almost 50 percent more expensive than renting, planners should support policies to build rental options that cater to diverse needs. Increasing the supply of homes remains the main recommendation for policymakers at all levels of government. Almost a third of Gen Z lives with their parents—the highest percentage in the past century—due to declining housing affordability, higher unemployment rates, and delays in marrying and starting families. Creating and preserving "starter homes" currently in short supply can help the younger generation gain independence and start a new household earlier.

But it's not just the younger generations that need affordable housing options. Research indicates that the U.S. is largely unprepared to meet the housing needs of more than 58 million people aged 65 and over, especially the fastest-growing group of those over 80, who are more likely to require accessible housing, services, and in-home support. Nearly 11.2 million older adults were cost-burdened in 2021,

reaching an all-time high. Many baby boomers continue to hold onto large homes due to the lack of suitable housing options, further limiting availability for younger generations. Many older residents wish to age in place, making community-based housing solutions even more critical. Planners must be ready to address these future challenges through policy changes that may include creating programs for low-income older adults, encouraging the transition from large homes to apartments with elevators, and promoting the development of smaller or stacked accessible homes in single-family areas.

Generations apart in wealth

In 2023, baby boomers, Gen X, millennials, and Gen Z each made up approximately 20 percent of the total U.S. population. The Silent Generation accounted for just under five percent, while Gen Alpha represented slightly more than 12 percent. However, wealth distribution among these groups is far from equal. Millennials and Gen Z combined hold just over nine percent of total wealth, while baby boomers control 52 percent. Despite being criticized for lagging in wealth accumulation, millennials have recently made significant gains, thanks in large part to rising home prices doubling or quadrupling this generation's median household net worth. Over the past decade, however, generational wealth gaps have widened. In 2001, older families had $254,000 more in wealth than younger families; by 2022, this disparity had grown to $347,000. One of the main challenges for planners is to provide younger generations with affordable housing options that won't become a financial burden and will encourage them to remain in their communities.

Six generations in the workforce

U.S. workplaces now employ six generations—from the youngest members of the Silent Generation, often still holding key leadership roles, to the teenagers of Gen Alpha beginning their first summer jobs. Gen Z, millennials, Gen X, and baby boomers make up most of the American workforce, each with distinct values and needs. Recent research on white-collar workers highlights the importance of corporate culture and equity, diversity, and inclusion (EDI) efforts, as well as workplace flexibility across these groups. Notably, flexibility is equally valued by baby boomers and Gen Z, underscoring how a post-pandemic hybrid work environment can benefit employees of all ages. But the "silver tsunami"—the mass retirement of baby boomers, a group currently comprising 76 million workers—is approaching, which could lead to a significant workforce shortage for decades to come. This generational shift will also impact the planning profession. The retirement of baby boomers combined with younger generations' workplace expectations could create tensions and challenges in planning practice, particularly in public-sector planning (see also Trend Talk: The Challenges of Public-Sector Planning).

The new demographics of homelessness

Within the sharp rise in homelessness, several troubling trends have emerged. In 2023, the number of families with children in shelters surged by 17 percent, totaling around 25,000 people. One in six homeless individuals in the U.S. is nearing retirement age (55–64). And while no federal data exists on unhoused workers, shelter administrators and local groups report a notable increase in first-time homeless individuals who are employed. These numbers are expected to rise further, driven by the overwhelming number of cost-burdened renters and the lack of affordable housing for minimum-wage workers. Data collection on homelessness presents limitations and challenges, leading to an underestimation of the true scale of the problem.

Tensions between cities and homeless populations have grown as officials attempt to maintain public safety without sufficient shelters to meet demand. The 2024 U.S. Supreme Court *Grants Pass* ruling granted cities the authority to clear encampments and remove homeless individuals from public spaces, further fueling this conflict (see also The Evolving Needs of Public Spaces). In California, San Jose's experiment with AI-powered surveillance to monitor homelessness has garnered national attention, raising concerns among housing advocates about the ethical implications of such technology. While homelessness is a systemic issue in American society, planners seeking solutions may prioritize forming partnerships with specialized nonprofits and other local organizations to deliver housing and essential support services.

Co-Living With Extreme Heat

Urban communities face extreme heat challenges and more.

2035 Scenarios

Abundance of renewable energy and electrification of everything.

Fossil fuels are the primary energy source, but we are running out.

Planners designed communities for heat.

SCENARIO D
COOLING CONUNDRUM

Unreliable and expensive energy supply makes it hard to cool homes.

Public spaces stay cool with nature-based solutions but increased carbon emissions from widespread A/C usage create a vicious cycle.

SCENARIO A
IT'S HOT, BUT THAT'S COOL

Heat-resilient cities offer appropriate cooling systems, including green and blue infrastructure elements.

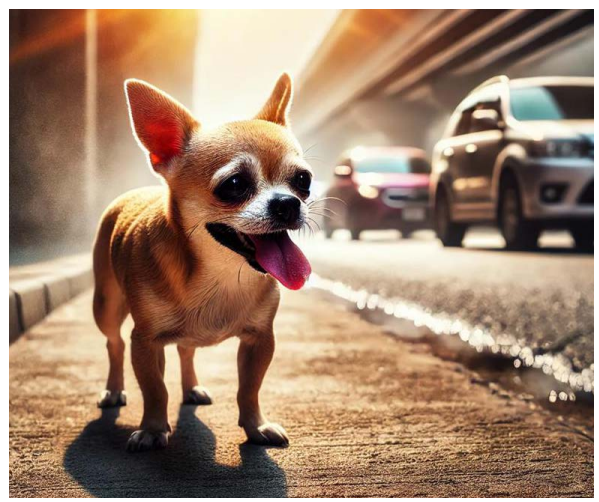
A mix of sustainable energy sources and a stable grid allow for decarbonization, electrification, and a decentralized, more equitable distribution of energy.

SCENARIO C
HEAT HATH ITS FURY

Cities are boiling while air quality is worsening due to carbon emissions.

Energy is scarce and expensive. Power outages are frequent.

Cities experience drought and significant vegetation loss.



SCENARIO B
A DOG DAY'S NIGHT

People stay indoors with A/C running. Social life shifts to evening hours.

The energy grid collapses more frequently during heat waves. Batteries pose fire hazards.

Cities experience drought and significant vegetation loss.

Planners failed to prepare their communities for heat.

Photo illustrations created in ChatGPT.

Digital Fatigue

A growing movement for screen-free public spaces, like restaurants offering tabletop boxes for diners' smartphones, is encouraging people to disconnect from their devices to foster better communication and personal connections. Photo by Jeenah Moon/*The New York Times*.

The ongoing distrust of online news, increasing concerns over AI-generated content, and a growing desire to reconnect in real life characterize the emerging reality of digital fatigue. To address the negative health effects of social media on Gen Z, often called the "anxious generation," schools are banning cell phones in classrooms and states are restricting kids' and teens' access to social platforms. Disconnecting from high-end digital tech or taking a "digital detox" has become an increasingly common practice.

AI-spamalot

The increasing prevalence of AI-generated content is contributing to the growing distress people experience when online. A 2024 Reuters report found that 72 percent of Americans are worried about distinguishing between real and fake information in online news. Platforms such as Facebook have been flooded with AI-generated spam and scams despite Meta's efforts to identify and label AI-generated material, creating risks such as identity theft, fraud, and other illegal activities. Content moderation has always been a challenge for social media due to the vast user base and varying regulations across countries. However, the rise of generative AI has made AI spam an unavoidable aspect of online feeds. This issue becomes even more problematic when politicians exploit such misleading content to manipulate public sentiment. Meta's January 2025 decision to replace third-party fact-checkers with user-generated "community notes" on its platforms

could further encourage the spread of disinformation.

Protecting youth from their smartphones

U.S. social scientists indicate that Gen Z faces higher levels of depression and anxiety, self-reporting their frustration with the amount of time they spend online. However, another U.S. survey reported that 90 percent of Gen Z respondents said that they felt somewhat happy the previous day, though many also struggled with stress and anxiety. Some argue that Gen Z's proficiency with new technologies makes them better prepared for the future of work, and they are far from doomed. Regardless of these differing viewpoints, most researchers agree that technology is a defining characteristic of this generation, with more time spent online correlating with poorer outcomes.

In response to concerns about youth mental health, the U.S. is taking steps to regulate smartphone usage and social media access to mitigate potential negative effects on children and teens. The U.S. surgeon general has suggested that social media platforms should carry warning labels similar to those on cigarettes. In July 2024, the Senate passed the first major internet safety bill for children in two decades, aiming to protect minors online. States are also taking action: Florida has barred children under 14 from using platforms such as TikTok and Instagram, and 13 states are suing TikTok for allegedly targeting minors with addictive designs, contributing to worsening youth mental health. In schools, there's a growing trend to ban cellphone usage during school hours; several states have adopted such policies to reduce distractions and promote healthier social interactions. In November 2024, Australia became the first country in the world to implement a complete ban on social media access for individuals under 16. The ban is set to take effect in 2025, and tech companies that fail to comply will face substantial fines.

EXPERT INSIGHT

"People are desperate to reconnect in rural areas and are actively looking for in-person communication."

—Kayla Barbour, APA Design Thinking Interest Group

These measures reflect a broader effort to balance the benefits of technology with the need to be more conscious about younger generations' well-being. Planners will also have to find the right balance between digital tools and real-world interactions as youth engagement in planning processes gains more attention, a trend noted in the *2024 Trend Report*.

Returning to life in real life

It appears that people might be increasingly ready to turn off their smartphones and return to more in-person experiences. Globally, 39 percent of Reuters survey respondents said they were avoiding online news in 2024 (up from 29 percent in 2017), often due to feelings of disappointment and distress. In the U.S., nearly half of Gen Z says they wish major social platforms were never created, and almost all of them try to reduce screen time. Additionally, almost half of Americans say dating is harder today than it was a decade ago, which has led many young singles to turn away from online dating platforms. Instead, attendance is surging at in-person dating events, from speed dating to chess nights. Some ad campaigns are promoting the use of "dumbphones" at parties to help people stay more present in social settings. In the Netherlands, there's a growing movement for screen-free public spaces and "digital detox hangouts," encouraging people to disconnect from their devices to foster better communication and personal connections.

Even high-tech executives, many of whom have made their fortunes in the digital world, are opting for retro technology as a subtle power move. This offline trend is also showing up in various professions: some doctors continue to use pagers, businesspeople still send faxes, and some authors are snail-mailing newsletters to their subscribers. Print media is also experiencing a resurgence, with annual book sales growing since 2020. Whether this shift is driven by digital overload, nostalgia, or a desire for other meaningful experiences, it highlights the importance of both online and in-person experiences. Planners will likewise need to balance digital public engagement with face-to-face interactions, fostering meaningful communication and empathy within communities. This includes creating in-person opportunities to engage youth in planning processes, which can help connect younger generations to their communities and each other.

Changing Lifestyles from Heat, Wildfire, Air Pollution

Extreme heat poses a major health and safety threat to those who work outdoors or lack access to adequate cooling, such as this Houston tree removal crew. Photo by Adrees Latif/Reuters.

Year after year, temperatures continue to break records. Extreme heat from our warming planet is already changing how we work, go to school, and spend time with our family and friends. But heat is also a major driver and accelerant of impacts from wildfires and poor air quality. Extreme wildfires have doubled over the last 20 years due to higher temperatures, persistent drought conditions, and a legacy of federal wildfire suppression policy. And extreme heat makes air quality even worse. Understanding these three interrelated factors will be vital to designing and adapting our communities in the future.

Extreme heat as a natural disaster

Extreme heat's rising death toll is leading to calls from environmental, labor, and health-care groups to reclassify heat as a federal disaster and for government agencies at all levels to address this growing threat. As a start, the interagency National Integrated Heat Health Information System released the first-ever U.S. national heat strategy in August 2024. Reclassifying extreme heat as a natural disaster could reshape how planners can respond to heat disasters, especially if federal post-disaster funding for heat impacts becomes available.

Daily life is heating up on multiple fronts

Getting to work is becoming more difficult amid extended periods of

extreme heat. Much road and rail infrastructure isn't designed to handle extremely high temperatures. Road surfaces are buckling, leading to more costly maintenance and daily commute disruptions. The deformation of railway tracks due to extreme heat in 2024 caused service delays for Amtrak, the DC Metro, and New Jersey Transit, among others, and air conditioning on trains and buses is struggling to keep up with high temperatures.

Even homes aren't safe from extreme heat, especially for renters. Air conditioning is increasingly seen as a necessity, not a luxury. While laws nationwide require landlords to heat rental units in cold weather, no such legislation exists for summer cooling. Activists are calling for stronger protections for renters who lack protection from extreme heat. In New York City, a proposed bill would require air conditioning for renters, and the federal government has released guidance to help public housing agencies protect tenants from extreme heat. Planners can take steps to embed heat resilience into the fabric of our communities.

Communities still lukewarm on cooling centers

Cooling centers can play an important role in providing shelter from extreme heat. These facilities—often housed in schools, libraries, and other community buildings—are being set up more often and for longer than in past years. But getting residents to use them can be a challenge. As extreme heat becomes more common, planners can play a major role in building public awareness of cooling centers and working to integrate other supportive services to reach those most in need.

Heat-related labor issues reaching a boiling point

Heat poses a major health and safety threat to those who work outdoors or lack access to adequate cooling—especially construction, food service, and agricultural workers—and it can also decrease productivity of knowledge and office workers. In response, the Occupational Safety and Health Administration (OSHA) is considering a rule that would establish the first-ever federal safety standard addressing excessive heat in the workplace. At the local level, Phoenix and Tucson both passed outdoor worker heat safety ordinances in 2024. Some states, however, are preventing or preempting local governments from adopting such protections.

Meanwhile, as wildfires grow in size, intensity, and regularity, local, state, and federal agencies are struggling to hire firefighters. Adding to the firefighting challenge are "zombie fires" that smolder through the winter and can reignite in early spring, lengthening the wildfire season. In the wildland-urban interface, where wildfire risks are acute and growing, planners are already playing an active role in risk reduction and should continue to help communities increase wildfire resilience.

Smoke and heat days are the new snow days

The lengthening wildfire season is now stretching into the school year. Declining air quality due to wildfire smoke is having a measurable impact on students' cognitive and mental health, attendance, and outdoor recess time (and at the other end of the generational spectrum, it can increase dementia risk). Schools are adapting by using HEPA filters, masking, and other interventions to ensure student safety.

Heat has acute and long-term effects on both mental and physical health, and it is emerging as a significant burden for students. Studies show that high temperatures decrease student performance on tests and could affect high school graduation rates. And when temperatures surpass cooling capabilities, some schools are using "heat days" to shorten or cancel classes. Planners can partner with health and school officials to create policies addressing extreme heat and air quality issues in schools.

Some like it hot on vacation—but others don't

Vacation, travel, and leisure are being affected by longer periods of higher temperatures, with both positive and negative effects. Summer travelers are flocking to Florida to escape even higher temperatures at home, while the city of Scottsdale, Arizona, is marketing its intense heat as a tourism draw. But extreme heat is making national park visits riskier, and outdoor concerts and festivals are seeing higher rates of hospitalizations for heat stroke and exhaustion. In Canada, wildfires and smoke are jeopardizing the county's tourism economy, and higher winter temperatures are threatening ski resorts and winter-based tourism around the world. Planners in tourism-dependent economies will need to help their communities prepare for the coming changes.

AI's Double-Edged Sword: Environmental Solutions, Sustainability Challenges

While the evolution of artificial intelligence (AI) seems unstoppable, AI presents a stark contradiction regarding the environment. On one hand, AI is hailed for its ability to drive sustainability solutions and tackle pressing environmental issues. On the other hand, it is criticized for the massive energy and water consumption of the data centers that power its operations.

Data centers are responsible for approximately three percent of global electricity consumption and almost five percent of all the energy used in the U.S. Photo by Jovelle Tamayo/*The New York Times.*

This deep dive explores AI's paradoxical role in environmental sustainability: its potential to transform environmental solutions while introducing new sustainability challenges.

AI: A MASSIVE ENERGY HOG.
While AI offers vast potential, its environmental cost is undeniable. Training and running large AI models requires enormous computational resources with massive energy and water consumption—a single ChatGPT query uses nearly 10 times more electricity than a regular Google search. As the popularity of AI grows, its energy footprint could soon rival that of entire nations. Central to AI's energy consumption are the data centers housing the servers that power these models.

Data centers are responsible for approximately three percent of global electricity consumption and almost five percent of all the energy used in the U.S. The International Energy Agency predicts AI's electricity demand will double

Deep Dive

by 2026. This has delayed the decommissioning of coal plants previously slated for closure. The microchips used in AI servers depend on rare earth elements often mined in environmentally destructive ways (see also Emerging Conflict Amid the Green Transition). In the U.S., data centers accounted for more than two percent of carbon dioxide emissions in the past year, nearly matching the amount produced by all domestic commercial airlines. Data centers generate large amounts of electronic waste, and the mercury and lead in servers add to the environmental damage. Potential indirect environmental consequences of AI include diverting attention and investment away from critical areas such as climate technology. As more companies integrate AI into their operations, the demand for data centers is only expected to rise, posing a challenge for communities and regions committed to reducing their carbon footprints.

AI-powered programs such as Google's FireSat are being used to detect smoke plumes from small fires and provide early warnings to firefighters. Illustration courtesy of Google.

HARNESSING AI FOR SUSTAINABILITY AND RESILIENCE SOLUTIONS. Despite these challenges, AI holds immense potential to drive sustainability efforts. As planners work to create more sustainable communities, AI can play a pivotal role in optimizing resource use, reducing emissions, and improving environmental monitoring.

One promising use of AI is for wildfire management. AI-powered satellites and drones are being used to detect smoke plumes from small fires and provide early warnings to firefighters. AI algorithms can predict the spread of wildfires by analyzing weather patterns, terrain, and fuel conditions. These technologies improve response times and resource allocation, potentially saving lives and minimizing ecosystem damage.

Other environmental monitoring applications include using AI to analyze satellite data and detect methane leaks, a major greenhouse gas emissions challenge. In agriculture, AI is optimizing water use, helping farmers manage resources more efficiently and reduce pollution from runoff. AI-powered drones are monitoring farmland for illegal activities, such as manure spreading in winter, which can contaminate water supplies and harm marine wildlife.

Google is using AI to model urban heat islands in 14 U.S. cities, enabling planners to mitigate these effects through better design, increased green spaces, and improved infrastructure. AI's many potential applications in different environmental sectors highlight its capacity to contribute to a more sustainable future.

INNOVATIONS AND SOLUTIONS FOR AI'S ENVIRONMENTAL IMPACT. In response to AI's growing environmental costs, companies and researchers are exploring ways to mitigate its impact. In Europe,

Deep Dive

net-zero efforts seek to reduce data center emissions through renewable energy use and heat capture. Along those lines, Google has signed a significant offshore wind agreement to power its data centers in the Netherlands, Meta is collaborating with Georgia Tech in developing direct air capture (DAC) technology to reduce carbon emissions, and Norway's Green Mountain has agreed to send waste data center heat to warm the world's largest land-based trout farm.

Another approach is reducing AI's energy needs. Neuromorphic computing systems modeled on the human brain can increase operational efficiencies, reducing the resource-intensive processes typically associated with AI development. Such innovations could play a key role in curbing AI's environmental impacts.

These technological advancements could help communities balance the benefits of AI with its resource consumption. Planners can implement regulations to determine data center locations and establish development requirements. As building net-zero data centers could support both economic growth and environmental sustainability, planners could work to create incentives for companies that prioritize green AI initiatives and help establish guidelines for responsible AI deployment within their jurisdictions.

BALANCING INNOVATION AND ACCOUNTABILITY. While technological innovation is vital, effective regulation is also necessary to manage AI's environmental impact. Governments worldwide are exploring measures to curb AI emissions and promote transparency in reporting. The U.S. Securities and Exchange Commission (SEC) has implemented climate disclosure rules requiring companies to report their environmental risks, including those related to AI technologies, while the United Nations Environment Programme (UNEP) has called for standardized procedures to measure AI's environmental footprint. For AI to become a true driver of sustainability, regulatory frameworks must be adopted globally to hold companies accountable for their environmental claims.

A Georgia Tech researcher examines a component of a direct air capture system that employs carbon fiber strands. Photo courtesy of Georgia Tech.

THE ROAD AHEAD. The future of AI in sustainability will require a multifaceted approach. Lawmakers must establish standardized procedures for measuring AI's environmental impact and implement regulations that mandate transparency in emissions reporting. Moreover, innovation must continue to push the boundaries of energy-efficient AI algorithms and greener data centers, with a shift toward renewable energy as a critical component of this transition.

Planners can help shape how AI technologies are integrated into communities to promote sustainability and community well-being. Rather than using AI simply for its own sake, planners must align its use with environmental and community objectives to deliver real, measurable value. Beyond regulating data centers, planners can integrate AI tools into broader planning efforts, such as optimizing traffic management, reducing emissions, and enhancing environmental monitoring. Planners can also work with communities to weigh the benefits and trade-offs of AI applications, ensuring these technologies serve both environmental objectives and local needs. By guiding the responsible and purposeful adoption of AI, planners can ensure that technological innovation goes hand in hand with sustainable urban development.

Deep Dive

The Evolving Needs of Public Spaces

The pet industry is booming, with the global market expected to reach nearly $500 billion by 2030; the U.S. now has more households with pets than with children. Photo by fotografixx/E+/Getty Images.

Even before the COVID-19 pandemic caused the temporary closure of communal spaces across the country, the number of "third places"—the places between home and work where people encounter others in social spaces—had been in decline. But some cities are reimagining how public spaces can adapt. From the repurposing of traditional locales to the creation of new ones in a digital landscape, the ways in

which people are interacting (or not) with their environment and each other continue to change.

Planning for pets

The pet industry is booming. Globally, the market is expected to reach nearly $500 billion by 2030. The U.S. now has more households with pets than with children, and in 2024 China was on track to have more pets than toddlers by the end of that year. Cities can obtain a "pet-friendly" certification to attract tourists, and the number of U.S. dog parks is exploding. Across the country, developers are adding dog-specific areas in and near housing complexes to attract buyers, and despite laws prohibiting owners from bringing their pets aboard public transit, many do so anyway. The rise in pets and pet liberties may be a result of changing generational norms, so planners will increasingly need to consider how public spaces can accommodate pets in appropriate ways.

More (accessible) public bathrooms in cities

Though bathrooms are a human need, they aren't always publicly available or accessible. Some places, however, are seeing a growing movement to change that (even by way of bathroom influencers). In addition to releasing a map of the city's public restrooms, New York City recently announced plans to build or renovate nearly 100 public bathrooms. Chicago, Maine, and Saskatoon in Saskatchewan, Canada, are considering or have passed legislation to create more public bathrooms. Amsterdam recently agreed to expand the number of women's and accessible bathrooms across the city, which only had three public restrooms for women compared to 35 public urinals for men. As this might suggest, bathroom accessibility is also a concern. A bill recently introduced in New York would expand the number of adult

changing tables in public spaces for those with disabilities, with similar efforts underway in parts of Minnesota, Ohio, and Florida. Planners can help to incorporate more of these basic amenities into the landscapes of their communities.

Going solo

According to the 2023 American Time Use Survey, the time Americans spend alone is increasing. Likewise, data shows that over the past two years, dining reservations for one have increased in the U.S., Germany, and United Kingdom by 29 percent, 18 percent, and 14 percent, respectively. In Britain, the number of solo travelers rose from six percent in 2011 to 16 percent in 2023, and another study found that 54 percent of travelers were considering traveling alone in 2024. This trend may have implications for how planners design public spaces and how local economies accommodate people recreating on their own instead of in groups.

Cover your ear, bud

Though not completely new, a growing interference to the public arena is an increasing number of people forgoing headphones in public spaces. Both in the U.S. and abroad, people are putting their phones on speaker, playing music, phone calls, games, and entertainment for all to hear. Whether this is caused by self-absorption or iPhone design, planners should consider how to incorporate this changing behavior into designs for public spaces. Open-plan office designs may offer ideas for reducing noise pollution and facilitating interactions.

Libraries step up to fill social service gaps

The role of libraries as public spaces continues to evolve as they increasingly expand the number and types of services available. Today's libraries may lend out clothing along with books and provide language practice, health screenings, and job application assistance. Some have constructed play areas, while others offer sports equipment rental and free hearing aid batteries. In rural communities, libraries can be a source of food and clean drinking water, and some are serving as climate resilience hubs. Planners should be aware of the many ways in which libraries can support the local community, which can also serve as a signal of municipal shortcomings.

EXPERT INSIGHT

"Even five years after the COVID pandemic, a stigma around health and public spaces still lingers. However, people are craving public spaces and craving to be around each other."

—Anna Stanley, Walt Disney Imagineering

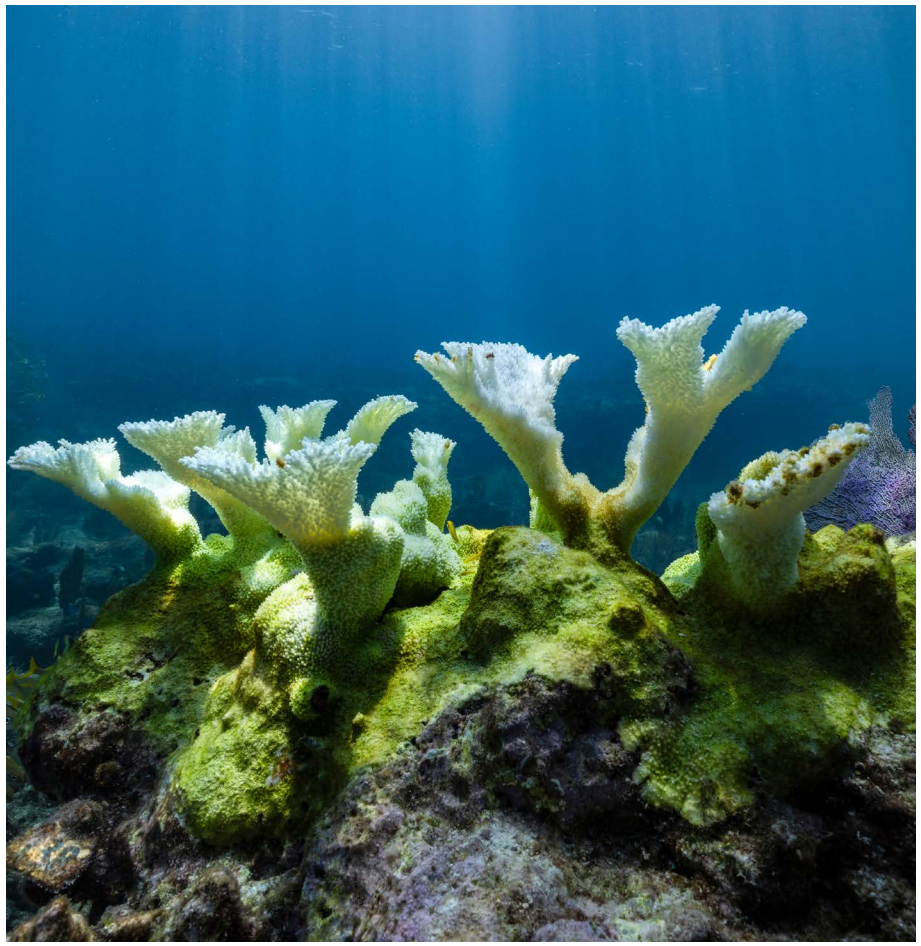
Sleeping criminalized in public spaces

Homelessness is at an all-time high, making the 2024 U.S. Supreme Court ruling *Grants Pass v. Johnson*, which allows localities to clear homeless camps regardless of shelter availability, even more impactful. Though the city at the center of the lawsuit—Grants Pass, Oregon—has yet to determine how to regulate homelessness, over a dozen California cities quickly passed laws that either ban or severely punish public camping. Bans and proposed bans have also been issued by cities in Iowa, Illinois, Arizona, Oregon, New Hampshire, and statewide in Florida. Planners' strategies to offset the impacts of these policies may include leveraging funding to combat homelessness, amending zoning and permitting requirements, promoting economic mobility through programs such as universal basic income, and adapting disaster preparation and recovery efforts.

Public space goes digital

The trend of "quiet metaversing" identified in the *2024 Trend Report* seems to be experiencing a reversal. Myriad spaces and activities are now available in the metaverse, including university campuses, baseball games, places of worship, and even civil rights marches. Ikea announced it would be hiring new staff to work in its metaverse store. Looking forward, companies are touting VR tourism as a sustainable alternative to the real thing, and the metaverse has potential to drastically change retail shopping. Other online applications are also being used to replace in-person experiences; Zoom had to raise the number of simultaneous viewers it allows to one million to accommodate 2024 election campaign rallies. Planners should consider the implications for physical spaces if virtual activities become broadly adopted and begin planning for a hybrid world.

Water at Risk: Global Change, Local Consequences



Historic marine heat waves occurred across the globe in 2024, causing mass bleaching of elkhorn and other corals in the Florida Keys and threatening complex ocean ecosystems. Photo by Jennifer Adler for Vox and the Pulitzer Center.

Water is integral to the life, health, and well-being of our communities, yet at all scales it is under threat. From the global challenges of a warming ocean to the risks posed by regional water scarcity and threats to local water quality, water will determine the future of our communities. In the coming years, planners will increasingly be called to play pivotal roles as coordinators, facilitators, and experts in community form and function to help chart a path toward the holistic integration of water-related issues into planning practice.

Our oceans are overheating

Ocean warming is driving significant impacts on society, communities, and global biodiversity. The Gulf of Mexico is the hottest it has been in the modern era, causing the rapid formation of Hurricanes Helene and Milton. In 2024, temperatures in the Great Barrier Reef were the highest in four centuries, leading to continued mass coral bleaching and looming threats to complex ocean ecosystems. Heat-driven ocean expansion has caused one-third of global sea level rise, posing direct threats to coastal communities on a global scale.

The causes of oceanic warming are complex, but rising greenhouse gas emissions in both air and water are primary drivers. Highlighting this complexity, recent regulations intended to curb atmospheric pollution from large cargo ships may have contributed to warmer ocean temperatures by reducing particles in the atmosphere that reflect sunlight. Even beyond the oceanic warming impacts of more frequent and severe storms, long-term sea level rise, and local ecosystem collapse, the effects of other, more major shifts could be cataclysmic.

Slowing currents could reshape global weather

Due to rapid warming, currents in the Arctic and the Atlantic appear to be slowing down. One recent study points to the potential rapid collapse of the Atlantic current, though other studies say that a long-term slowdown is more likely. These changes could drastically impact Earth's climate and lead to major changes in global weather patterns, like shifting monsoon seasons in the tropics and Southeast Asia and more extreme winters in parts of Europe and the U.S. Food-producing regions are especially at risk, as

predictable weather patterns are crucial to the stability of the global food supply, and downstream impacts at the regional and community scales could be similarly significant. This may require planners in these communities to proactively plan for agricultural, economic, and infrastructure resiliency.

Beverage companies and AI are coming for your water

In addition to these large-scale global threats to water, regional water supplies are facing new challenges. Large-scale commercial water bottling operations driven by private equity are an increasing risk to the stability of local water sources. But even more significant are the massive water demands of artificial intelligence (AI), which is a rapidly growing threat to local and regional reservoirs, aquifers, and freshwater sources (see also Deep Dive: AI's Double-Edged Sword). As these commercial operations continue to scale up, water scarcity is likely to worsen.

AI data centers such as Google's The Dalles, Oregon, facility demand massive amounts of water for cooling data servers. Photo courtesy of Google.

Planners can act to integrate concerns about water usage into local data center regulations.

What's in your glass: pollution, plastics, and PFAS

In addition to water supply, water quality is increasingly under threat. In 2024, American Water Works Association members rated source water protection as their primary concern. Along with industrial and agricultural pollution, researchers increasingly point to poor health outcomes due to microplastics, PFAS, and other "forever chemicals" contamination of water supplies. New federal drinking water standards to limit PFAS and microplastics exposure are a critical first step to dealing with this issue. At the local level, specialized treatment plants can reduce concentrations of PFAS and other microplastics. Improving long-term health outcomes is a core planning concern, especially given the historical roots of planning in addressing water and air quality. As new issues around water quality become widespread, planners should be prepared to act to protect water supplies and the health and well-being of their communities.

Thirsty cities and regions on the brink

As water needs rise due to population growth, commercial uses, and industry demands, extreme water scarcity is emerging as a major threat. Cape Town's Day Zero, highlighted in the *2022 Trend Report*, was a harbinger for coming water crises in cities across the globe. Mexico City is increasingly tapping groundwater reserves due to persistently low reservoirs, leading to fears that the city may be sinking. Water rationing in Bogotà, Colombia, is just one recent attempt to deal with increasingly scarce local water supplies. In Port Lincoln, South Australia, overextraction is making groundwater too salty, requiring extensive processing to make the water drinkable for residents, and in coastal Bangladesh 20 million people, especially women, face health threats from salinity in drinking water. Major droughts in the Catalonia region of Spain have pitted residents against tourists in competing for limited water supplies. And globally, one-quarter of all food crops are currently threatened by unreliable or highly stressed water supplies. The challenges for planners and communities are significant, especially given planners' roles as key regulatory agents and coordinators across the residential, commercial, and agricultural sectors.

Tricks to keep the water running

Recent attempts to stave off catastrophic water scarcity have seen some success as communities seek to draw from a wider variety of water sources or limit use of existing water sources. Some of these recent strategies include pipeline construction to link up with faraway rivers, proactively refilling major aquifers during times of sufficient rainfall to hedge against drought, and creating and enforcing stringent new restrictions on groundwater usage to allow natural aquifer and reservoir recovery. Unfortunately, these strategies are far from foolproof, especially those that only address supply-side issues. As competition for water grows and finding new water sources becomes more difficult, planners and communities may be forced to fully reckon with the challenges of meeting current and future water needs.

The Challenges of Public-Sector Planning

Sue Schwartz, FAICP
Illustration by Rebecca Clarke

To listen to the full interview hosted by Joe DeAngelis, AICP, scan the QR code above or visit planning.org/podcast.

From the personal to the professional, planners are taking on the futures of their communities.

Sue Schwartz has worked for more than 40 years in local government and is an accomplished planner and leader in the planning profession. As the current APA president, she is one of only six people to serve as president of both APA and the American Institute of Certified Planners. She also serves as the planning director of Greensboro, North Carolina.

In 2024 Sue participated in the "Local Government 2030—Action for the Future" initiative, which convened 50 young leaders from cities, counties, and regional councils across the U.S. to envision and shape the future of local governance.

JOE DEANGELIS: Public-sector planning seems to be in a challenging place right now. Our members report that hiring is difficult and they're still working through upheavals brought about by the COVID pandemic. What are you seeing in the field today?

SUE SCHWARTZ: Planning is a profession that is always evolving. You have to foresee the changes that are happening in society. Let's talk about the hiring challenges. When I got my first job here in Greensboro I was one of 300 applicants. My last opening had 11 applicants. It's absolutely astonishing to see that difference.

Then there's the perception of work in the public sector and the competition between pay grades in different cities. There's also the perception of how hard it is in the public sector given the political environment. And then there's keeping up with emerging technologies.

So yes, there are a lot of challenges that we're seeing. But planning is a profession that takes on challenges pretty well, I think.

Planners are witnessing firsthand political polarization and declining civility in our country. What are the skills, characteristics, and attitudes planners will need to be successful and thrive in this environment?

Locally, we've had to do some security trainings and develop protocols for setting up public meetings. Looking into the future, a skill planners will need to grow in this profession is developing a sense of personal resiliency. What can you do to deal with these stressors that you don't have control over? It's part of our job. And for us to be impactful and helpful to our communities, we've got to take care of ourselves.

Sometimes it's knowing when to remove yourself from a situation. Sometimes it's just knowing how not

to respond. If you're a manager or director, you need to be able to make sure your staff has the training and skills to handle things because you're not always going to be there to step in. You have to be strong in this job, and that takes work and effort. But as long as we create an environment for our staff to learn, we'll survive and help our communities navigate these tough times.

The *2024 Trend Report* featured a deep dive on living and working in a hybrid world of digital and in-person experiences. How do you see that shift impacting public-sector planners in the coming years?

Here in Greensboro, staff can work from home two days a week if their job allows it. I think it leads to a healthier workplace. People have a little more flexibility to handle family life, whether it's caring for an elder, a special-needs child, or themselves. But planners must still have enough face-to-face time with both their colleagues and the public to be effective, so it's up to us to set the right guidelines for hybrid and remote work.

These new approaches have impacted the hiring competition within the public sector. A former employee of mine went to work for another city about an hour's drive from here, and he only goes into the office once every two weeks. He can't afford to move to that city, but they have very flexible working programs so he can work there. All of these trends are intersecting with each other and will continue to evolve within the public sector.

The public-sector workforce is aging, with longtime staff retiring. As emerging professionals enter the planning workforce, how are their needs different, and what does that mean for the future?

First is the flexibility to work from home. If Greensboro didn't have that, I don't think we would have the type of interest we're seeing in open positions. Next is the ability to use technology. Then there's access to training. When I first started in planning, training was seen as a privilege, but the last several planners I've hired expect continuous training. They want to know that they are going to be able to keep up and continue to be a part of something bigger.

Our youngest employees were part of the COVID generation, so they require a little more socialization. You don't realize those things you pick up when you're attending classes in person with other students. It's not a huge challenge to overcome, but we have to be intentional about integrating planning students from this generation into the workplace.

Why do you find working in the public sector especially important and rewarding? Will anything change in the coming years as these trends continue to evolve?

I think the public sector needs planners more than ever. We are uniquely trained to look at the interconnectedness of things and see the big picture. Look at Hurricane Helene in North Carolina. We had this catastrophic, unprecedented event in the western part of the state. I don't know that any amount of planning could have predicted or prevented this catastrophe. But understanding the infrastructure network, the water and sewer lines, the transportation network—and real human trauma, people's fears and concerns? That's where planning comes in.

As we look at all these things happening around us, we must ask the question: what does this mean to my community? Planners are an important cog in the democratic process. Our job is to bring people together, talk about the future and different choices about those futures, and make sure that everyone has an equitable chance in that future. It's a very noble thing. We must lean into the nobility of what we do, because it's hard to be noble when everybody's yelling at you because you didn't get their zoning case approved. The nobility is in working very hard for outcomes that our children and our grandchildren will be proud of.

Trend Ta

The trends we need to prepare for

Planners must prepare for a future where **AI** is poised to take on greater control in decision-making processes, local repercussions of escalating **geopolitical turbulence** may deepen, and the **green transition** could spark additional conflicts. Meanwhile, **paradoxical national migration trends** and accelerating global climate migration will intersect with the emergence of both new and persistent **health risks**, and societies are shifting toward a **post-work era**.

Check out APA's Trend Universe for more emerging trends planners need to prepare for.

AI Power Struggle

Victor Miller, a 2024 mayoral candidate in Cheyenne, Wyoming, promised to let "VIC" (Virtual Integrated Citizen), an AI chatbot modeled on OpenAI's GPT-4, make decisions for him if elected. Photo courtesy of Victor Miller.

Artificial intelligence (AI)-powered technologies—particularly generative AI—appear to have reached "peak hype," sparking new questions and concerns as the initial excitement wanes. In parallel with the reliability of models and environmental concerns (see also Deep Dive: AI's Double-Edged Sword), the central issue for the midterm future is whether we should allow AI-powered systems

to have greater decision-making authority (and a lot of our data) in the pursuit of optimal, efficient solutions for the public good, or if humans should always retain ultimate control.

As local and state governments explore AI's potential by deploying chatbots and digital twins in the U.S. and globally, the rise of politicians and executives driven by large language models (LLMs) is no longer far-fetched. Despite the absence of comprehensive U.S. AI regulation, the expanding range of AI applications points to a growing dependence on these technologies to influence law enforcement strategies and bolster surveillance.

AI-enabled political candidates

The growing influence of AI-powered systems on decision-making can significantly affect how society functions, especially as these technologies start taking on roles traditionally reserved for elected officials. In the summer of 2024, Victor Miller, a mayoral candidate in Cheyenne, Wyoming, made waves with an unconventional campaign promise: if elected, he would let an AI bot make decisions for him. Similarly, U.K. businessman Steven Endacott ran for British Parliament in 2024 with his AI-powered avatar, "AI Steve," representing him as an Independent candidate. Though both Miller and Endacott lost their races decisively, their candidacies set precedents for the use of AI in political campaigns, raising questions about who can run for office and how AI tools like GPT models might be employed in such roles. For planners, this trend may present additional challenges, particularly in navigating relationships with politicians who increasingly rely on AI models and generated content, if not fully automated decision-making algorithms.

AI executives in the corporate world

In the private sector, there's an even greater willingness to embrace AI for decision-making. Companies are integrating AI to optimize operations and boost profits, with some suggesting that AI could soon play a role at the highest levels of management. A recent survey found that nearly half of CEOs believe AI could automate much of their roles, and according to Jack Ma, CEO of Alibaba, "a robot will likely be on the cover of Time magazine [in the future] as the best CEO." However, AI is still not advanced enough to fully develop strategies on its own. Though it excels in tasks such as competitive analysis and performance evaluation, which can significantly enhance strategic outcomes, the "soft skills" required for effective leadership remain a challenge. Beyond that, AI may soon be used to evaluate whether executives are experiencing cognitive decline and offer ways to help them avoid scrutiny. These developments suggest that AI's influence in leadership roles—whether in politics or business—will only grow, with profound implications for how we approach elections and government.

AI-powered law enforcement

A new wave of AI tools promises to enhance public safety by using data to predict crimes before they happen and identify suspects. Police departments in the U.S. and worldwide are already adopting AI-powered software for crime prediction and suspect identification, and some are experimenting with AI tools to draft incident reports. However, these advancements raise concerns about bias in the data used to train AI systems, potentially reinforcing inequalities and leading to unfair outcomes. Additionally, relying heavily on algorithms can have fatal consequences, as seen in Spain, where an algorithm failed to predict repeated domestic violence, resulting in inadequate protection for the victim and a murder that could have been prevented. With the growing reliance on AI in law enforcement, a new challenge arises: how to prepare communities for the reality of constant surveillance and data collection.

EXPERT INSIGHT

"An issue I've observed is that planners try to highlight the humanistic element of decision-making, but they don't have the language or theoretical grounding to really justify their work."

—Moozhan Shakeri, Creative Minds in Urban Planning

AI-driven drones for surveillance

While the use of drones for law enforcement is already an established practice, an advancement in this area is the deployment of drones powered by machine learning to detect suspicious activities after disasters. While drones provide the advantage of being faster first responders than traditional police units and have the potential to prevent crimes, concerns have arisen regarding overpolicing of disadvantaged communities and identity protection. Planners can serve as representatives of their communities to advocate for equity in the use of this technology and collaborate with law enforcement to develop better guidance and regulations.

Human authentication and data protection regulation

With advancements in AI technologies, we may soon encounter the risk of being unable to distinguish human text, images, and voice from machines. One proposed solution from OpenAI founder Sam Altman is World ID, a human authentication tool that scans individuals' irises for unique identification and verification. However, since the project was launched globally in 2023, it has faced bans in several countries and sparked significant controversy regarding its concept and the tools employed.

Additionally, a new concern is arising over how to protect neural data, which originates from an individual's brain and nerves. It can readily be collected through a growing number of consumer products. In April 2024, Colorado became the first state to enact legislation regarding the protection of neural data, and California followed in October of that year.

No matter how powerful AI becomes, planners must maintain a critical stance towards these technologies, advocating for careful protection of personal data, supporting historically disenfranchised communities, and promoting more equitable development of AI.

Growing Geopolitical Turbulence

Sustainable Development, an Eduardo Kobra mural installed at New York's United Nations headquarters in 2022, symbolizes the importance of considering the needs of future generations when addressing global challenges in a time of growing geopolitical turbulence. ©UN Photo/Rick Bajornas.

Accelerating geopolitical shifts are impacting the American economy and local development. Globally, competition is intensifying for AI leadership, access to critical materials, and a skilled workforce. The younger populations in industrializing countries continue to grow, while most Western nations face challenges related to aging demographics. These global tensions have direct consequences for local communities

and planners, who are tasked with ensuring sustainable development in an increasingly turbulent environment. Furthermore, international dialogues on the needs of future generations are affecting long-term planning at the local scale, emphasizing the importance of considering the interests of those yet to come.

The international AI race is on

While international organizations are collaborating on global AI regulations, many countries are competing in this new AI race by investing in local tech companies and resources. France, India, the UAE, Saudi Arabia, and others are betting on AI by boosting domestic development to keep pace with the U.S., which currently leads in this field. At the same time, the U.S. government is expanding the domestic production of microchips and urging its allies to take actions restricting China's access to this essential technology. As AI-related technologies intensify energy and water demands (see also Deep Dive: AI's Double-Edged Sword), planners

will become increasingly involved in ensuring equitable resource distribution and advocating for community interests. Additionally, planners play a crucial role in establishing partnerships with the private sector to support community development in the AI era.

Deglobalization or multi-alignment?

The *2024 Trend Report* covered the emerging trend toward deglobalization—but while Western countries are deglobalizing, it seems that the rest of the world is starting to go the opposite direction. With growing competition on the global stage, the use of tariffs and sanctions has increased political influence over this dynamic. According to a recent *Foresight Magazine* interview with Parag Khanna, a leading global strategy advisor, these policies may be isolating Western countries—which comprise only 12 percent of the world's population—from the rest of the world. For the other 88 percent, a trend toward reviving traditional values and rejecting Western influence seems to be on the rise. The consequence is a trend toward multi-alignment among some countries (e.g., India) who are choosing to partner with multiple countries and players on both sides. The uncertainties caused by this geopolitical situation might impact future local business operations. Global companies with subsidiaries around the world will have to rethink their local presence, setting up local businesses with local production and local identities to avoid tariffs and sanctions.

Critical material access is reshaping geopolitics

Geographic concentrations of critical material mining and processing operations are leading to political and economic tensions. These materials are essential for producing technologies such as wind turbines, solar panels, electric vehicle (EV) batteries, and microchips. However, significant dependencies on China—one of the largest suppliers of refined critical materials in the world—have prompted efforts to source such materials locally or from political allies. For example, despite protests from residents and environmentalists, in July 2024 the European Union signed a cooperation pact securing access to Serbia's lithium reserves (Europe's largest source), thereby ensuring access to EV battery material for EU automakers. The geopolitical back-and-forth appears to be escalating—in December 2024, China banned exports of certain critical minerals to the U.S. in response to a U.S. ban on exporting microchips to China. The search is on across the globe for new deposits of critical materials, especially as asteroid mining remains hypothetical.

The future workforce is in Africa and South Asia

National disparities in birth rates are also driving changes in global dynamics. Half of the world's population lives in countries with fertility rates below the "replacement rate" of 2.1 births per woman. A new study predicts that by 2050, 76 percent of countries will have fertility rates below the replacement rate; by 2100, this percentage will increase to 97 percent, with more than half of all births occurring in sub-Saharan Africa. Global demographic centers are already shifting rapidly, with younger and working-age populations increasingly concentrated in Africa and South Asia. Thus far, policies in Japan and other countries to boost fertility have not seen much success. This shift is poised to impact the global power dynamic, as these regions become home to a significant portion of the world's most productive labor force. Appropriate immigration policies will be crucial to secure a stable labor market.

Looking to future generations

Our ability to address global challenges such as climate change is hindered by a lack of foresight and long-term thinking. The definition of sustainability as stated in the 1987 Brundtland Report emphasized the need to meet the needs of future generations. However, no government has included deeper considerations of future generations in their policies or actions.

In 2024, the UN released its Declaration on Future Generations and held the first Summit of the Future in New York City, putting this issue front and center. While this might be a small first step in considering the needs of those yet to come, it is an important signal that might enable long-term thinking and a more inclusive approach to the future. As planners plan for the future of their communities, they also must consider those who will be living in that future by bringing youth to the table and considering the needs of future generations in their plans.

Optimus Primetime: Navigating a Future With Robots

Robots have been a cornerstone of science fiction for decades, but they are now closer to science than fiction—even though a survey of G7 countries found that the majority of respondents were uncomfortable with the idea of humanoid robots. Research has found that the presence of a robot decreases workers' feelings of meaningfulness and autonomy in their jobs. Incidents with robots outside the workplace have also incited frustration, and numerous reports of people damaging delivery robots suggest the tone of human sentiment towards them.

Despite these concerns, the robotics industry is still garnering significant investment. Apple and other large companies have launched robotics programs, and some projections expect the market to nearly double over the next five years. The field seems to be at a turning point, largely because of the artificial intelligence (AI) boom. Consequently, it's worth examining what recent developments have been made in robotics, and how those developments may work their way into a variety of sectors.

NEW DEVELOPMENTS IN ROBOTICS. Recent years have seen the rapid acceleration of AI interest in the tech industry. Now, some companies have started to look at how AI can be combined with robotics to enhance features of both. The vast amounts of data that AI scrapes across the internet can help more quickly teach robots a larger variety of skills, though robots still require visual data that isn't as plentiful (which some research teams are trying to innovate around).

Social robots that stimulate cognition and offer companionship to older adults are being deployed to address a shortage of care workers in private homes and assisted-living facilities. Photo courtesy of Blue Frog Robotics.

Deep Dive

Liquid neural networks (LNN) are another recent advancement at the intersection of AI and robotics; these structures are designed to handle continuous data streams using significantly less storage capacity and computing power than traditional neural networks. Integrating LNNs into robots allows them to adjust their behavior dynamically and adapt to changing environments.

While AI-powered robotics generally focus on simple household or factory tasks, one of the more controversial applications has been weapons for war. AI-powered drones (see also AI Power Struggle) can track and fire at targets without human intervention, and robots that operate on land are in development. Given the ethical implications of creating machines that could make potentially fatal decisions, the UN recently passed a resolution encouraging countries to regulate the use of these weapons.

While most specialty-purpose robots look very much like machines, people have long dreamed of a future where robots look like them. This future may not be far off. The first factory to mass-produce humanoid robots was recently built in Oregon, and Tesla is advertising jobs to train their humanoid robots. One humanoid robot just broke the running speed record for its kind, and others are able to watch and learn how to perform a variety of tasks. New advances in electronic skin, which imbues robots with touch sensitivity, could also contribute to more humanlike robots.

Advances in humanoid robot technology include the Chinese company Unitree's H1 robot, which in March 2024 broke the humanoid robot running speed record by reaching 7.4 miles per hour. Photo from Unitree video.

Despite this progress, there are still a variety of hurdles that humanoid robots must navigate (literally and figuratively) to reach the level of integration imagined by their creators. It's still difficult for robots to adapt to the vast array of spatial and variable elements in their environments. Bipedal robots are also more structurally unstable, leading some to question their further development. Future advancements may remedy some of these concerns, though it's unknown how quickly this may occur.

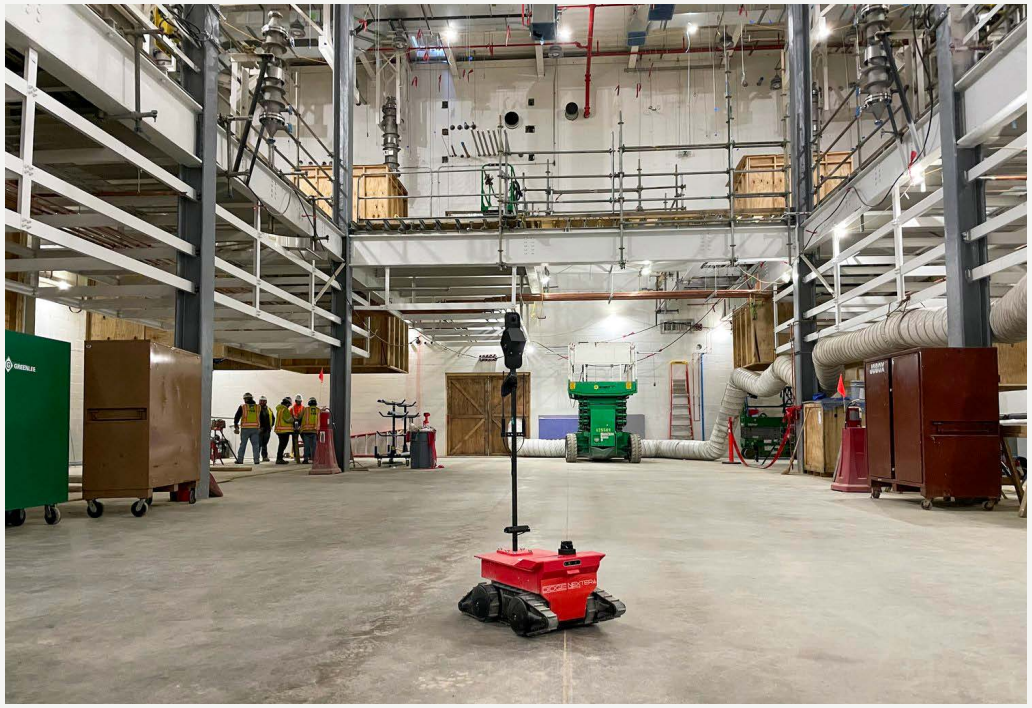
ROBO-COWORKERS. As technology advances, so too do fears of its potential to replace humans in their jobs. While robots and AI are changing how some jobs are performed, the number of workers that will be displaced due to these technologies isn't clear. And, as noted above, robotics is creating new jobs. Planners should be aware of how robotics advancements may affect not just their field, but others as well.

Robots are already being integrated into communities, including

Deep Dive

public spaces. Thousands of delivery robots are in operation across cities globally, and services are expanding as companies partner with existing delivery services such as Uber. Autonomous robots are also being piloted to pick up trash and food waste, and prototypes are being considered for robotic crossing guards. Challenges include non-robot-friendly street and sidewalk environments, though the presence of robots may encourage the design of more accessible public spaces. But planners must consider policy concerns that arise from designing public spaces for robots, including privacy, equity, safety, and sustainability issues.

Some robots are finding a home in private spaces. A shortage of care workers and the loneliness epidemic have left many feeling isolated and without the resources to take care of themselves (see also Emerging and Intensifying Health Risks). Social robots, which aim to stimulate cognition and offer companionship, have become more common in assisted-living facilities; officials have distributed them to elderly people in at least four states. But surveys have found that older adults aren't always comfortable with artificial companions, and concerns include data privacy and the potential of these robots to perpetuate the isolation they are trying to remedy. How widespread social robots ultimately become may have broader implications for people's relationships to robots and how they are prioritized in public and private spaces.



Robots are increasingly being used by the construction sector, which is also facing worker shortages, to automate more menial tasks. Photo from Nexterarobotics video.

The construction sector is also plagued by worker shortages. To compensate, some developers have brought on robots to take over more menial tasks. Relatedly, labor shortages have prompted energy companies to use robots in solar panel installation. Industry-wide attitudes towards robots appear to be changing, and their presence seems poised to expand.

CONCLUSION. Takeout delivery and social companionship are far from the only roles that robots are playing in our societies. From preventing wildfires to farming, or making guacamole to assisting security guards, robots are assuming a presence in an ever-growing number of workplaces, and the integration of AI and robotics points towards rapid acceleration of their development. This doesn't mean, though, that the robots will take over. Co-collaboration with robots is possible and exists today. The extent to which this may change in the future won't be determined by robots, but by people.

Deep Dive

Emerging Conflict Amid the Green Transition

Fort McDermitt Paiute and Shoshone tribe member Daranda Hinkey and her neighbors are fighting to halt construction of a lithium mine near a sacred site in Nevada, one of many such emerging threats to Indigenous lands and the greater environment. Photo by Rick Bowmer/AP Photo.

Wind and solar power are flooding the market far faster than predicted just a few years ago. Those renewables, however, need new materials and components that often require intensive and disruptive mining operations. The rush to compete in this space and meet climate mitigation goals could mean major impacts on protected and Indigenous land, the cultural importance of that land, and the wider natural environment. Resistance is beginning to coalesce in the U.S.

and across the world as Indigenous groups seek to retain control over and prevent exploitation of their lands. Renewed interest in nuclear power also presents new questions and concerns. Given the potential growing conflict within the environmental and climate movements, planners should be prepared for challenges at the local level, especially where climate mitigation goals come face to face with environmental protection.

Renewables outpace predictions

Wind and solar energy are the fastest-growing electricity sources in history, and renewables broadly accounted for 30 percent of global electricity generation in 2023. Still, much more is needed to reach climate targets, and distribution of renewables is uneven. Some places across the U.S. and Europe with highly concentrated renewables are seeing energy prices go negative, which could disincentivize further production. This is already being seen in California, whose public utilities commission voted to reduce the number of credits that residents with solar receive from utility companies. Planners should be aware of the tensions that can sometimes be posed by conflicting local and federal policies, especially in areas experiencing rapid renewables development.

Energy demands fuel a nuclear revival

Despite perceived risks, energy demands are fueling a revival in nuclear energy. In May 2024, the first new nuclear plant in decades opened in Georgia, reversing a decades-long national trend of plant closures. Earlier in 2024, the Biden administration signaled support for the development of new U.S. nuclear power plants, noting that they will be a necessary source of carbon-free energy to meet future

energy demands. Big tech companies agree; Microsoft, Google, and Amazon have all signed deals with nuclear providers to power future data centers. Technological advancements within the field of nuclear power may enable smaller, cheaper modular reactors, potentially allowing for wider-scale development across the U.S. But questions remain about the impacts of untested modular reactor designs and whether aging nuclear plants can withstand the stresses of climate change. Given the renewed growth of this sector, planners may be called upon to play a significant regulatory role in balancing energy needs with the health and safety of nearby communities.

The new raw-materials rush

With the spike in renewable energy has come increased mining for the raw minerals and metals required by these technologies. The demand for these materials may quadruple by 2040, creating even more geopolitical tension worldwide (see also Growing Geopolitical Turbulence). These include lithium, cobalt, and silicon, as well as over a dozen rare earth elements. Mining, however, comes with myriad human and environmental costs, and often occurs in disadvantaged areas. Some of these materials also present supply challenges, though in 2024 scientists discovered new U.S. reserves of lithium and helium. Some countries are actively pursuing material discovery; Norway now permits exploratory deep-sea mineral extraction, and the U.S. has funded projects that mine seaweed for rare earth elements. If not performed sustainably, increased mining efforts may introduce issues to areas previously unaffected by the industry and exacerbate them in existing mining regions. Planners should be aware of ways that their communities may be affected by the burgeoning needs of the clean energy transition.

EXPERT INSIGHT

"We're seeing resistance to new energy production, both from an economic perspective as well as individuals not wanting to be in close proximity to wind and or solar projects."

—Jeff Ray, JEO Consulting Group, Inc.

Indigenous sovereignty and the green transition

The rush to discover and mine new metals and materials is pitting government and private interests against Indigenous peoples, primarily through the extraction and exploitation of resources on tribal lands. More than half of projects to extract energy transition materials are on or near Indigenous land, and Indigenous peoples are directly impacted by over a third of global environmental conflicts, either through landscape, land, or livelihood loss. Some efforts are underway to boost Indigenous sovereignty, though as evidenced, existing sovereign nations still must often contend with external entities. Given that planning is largely taught from a Western standpoint, planners should work to approach core issues of the field, such as land use and ownership, from disparate perspectives. This should include working with tribes to protect the rights of Indigenous people and control of their land.

Traditional knowledge informs climate mitigation frameworks

Not only could protecting the sovereign rights of Indigenous peoples reduce the negative impact of environmental conflicts over the green energy transition, it could provide solutions to these conflicts. Indigenous knowledge is increasingly being integrated within existing approaches to climate change mitigation and adaptation. The Māori in New Zealand are embarking on a variety of conservation and restoration efforts, several Native American nations are reintroducing bison to the U.S. plains to enhance environmental and socioeconomic outcomes, and Indigenous knowledge is informing nature-based solutions and the documentation of ecological shifts in the rapidly warming Arctic. Planners should recognize the heritage of the communities that they work in and incorporate traditional knowledge into planning for sustainability, which should also be informed by the Seventh Generation principle of the the Haudenosaunee Confederacy: considering how decisions today will impact seven generations into the future.

New and Intensifying Health Risks

Increasing global temperatures are expanding tropical disease transmission zones, leading to the first local transmissions of malaria, dengue fever, and other mosquito-borne illnesses in the U.S. and other countries. Photo by Engineer studio/Shutterstock.

The state of public health is under siege, with cascading impacts on nearly every corner of society. Climate change is quickly emerging as the source of numerous health threats not only directly from increasing temperatures, but also indirectly through the expansion of tropical disease zones to historically temperate climates. Extreme weather events are also contributing to the spread of disease, as are changing social norms and degrading infrastructure. Other societal health risks are converging, including those related to gun violence, mental health, and the care economy.

Climate change goes viral

Many sectors of society are impacted by accelerating climate change, and public health is no exception. Increasing global temperatures are expanding tropical disease transmission zones. Malaria is now being locally transmitted in the U.S., and in August 2024 a Massachusetts town closed its parks overnight to prevent the spread of eastern equine encephalitis. Outbreaks of dengue fever, another mosquito-borne disease, were seen in Bangladesh, Puerto Rico, and many Central and South American countries. A number of countries, including the U.S., have recently reported their first local transmissions of dengue.

Climate change is leading to the spread of diseases in another way: through more frequent and intense extreme weather events. Droughts and flooding have been largely

responsible for the spread of cholera across southern Africa, increasing rain is preventing people in Madagascar from seeking treatment for malaria, and oscillation between extreme flooding from atmospheric rivers and drought is causing a spike in Valley fever in California. Brain health is also being impacted by climate change, with increasing temperatures linked to neurological deterioration.

Planners can prepare for these quickly altering conditions in several ways. Property maintenance codes, improved wastewater management, and other strategies can help reduce the number of mosquito breeding sites and minimize human contact with mosquitoes. Strategies to reduce urban heat island effects, such as increasing green spaces, should be balanced with consideration for how those methods can contribute to mosquito-borne illness transmission. All of these efforts should be conducted in tandem with extensive public outreach and education.

Pandemic and chronic disease risks are on the rise

Since the COVID-19 epidemic, experts have warned of an increased risk of future pandemics and the need to better prepare for them. In August 2024, the World Health Organization declared mpox a global public health emergency after an outbreak in the Democratic Republic of the Congo spread to neighboring countries. In the U.S., concerns grew throughout 2024 over the spread of bird flu to cattle, pigs, and people, with the first human bird-flu death reported in Louisiana in January 2025. Virus mutation and transmission between animal species signals the potential for a human outbreak and intensive livestock farming practices could be increasing this risk.

Accompanying the increase in communicable diseases is a rise in noncommunicable diseases. According to the most recent data, chronic diseases such as cancer and diabetes are causing 75 percent of global deaths. The COVID-19 pandemic has given rise to long COVID, a chronic condition that has taken an estimated one million Americans out of the labor force. A parallel concern is the increased rate of cancer among younger generations, particularly colorectal, cervical, and breast cancers.

In many places, systemic and structural issues heighten susceptibility to disease. Strategies of improving sewage and water systems, reducing biodiversity loss, and increasing housing quality and density can help create healthier and more resilient cities. Planners can also look to successful COVID-19 responses, such as mobile health clinics and equitable vaccine rollouts. Cities can lower the risk of noncommunicable diseases by reducing noise and air pollution, allocating more resources to aid homeless populations, increasing access to healthy food, and making it easier to walk or bike.

Lonely and alone

It isn't only the health of individuals that is at risk, however; society-wide concerns are also growing in magnitude. The persistence of the "epidemic of loneliness" has impacted some cities' approaches to planning. In February 2024, San Mateo County, California, became the first local government in the U.S. to classify loneliness as a public health emergency, and policymakers in the Belgium municipality of Woluwe-Saint-Pierre must now consider how their legislation impacts single people. The ongoing issue of U.S. gun violence—which the U.S. surgeon general declared a public health crisis in June 2024—is garnering new attention as gun-related suicide numbers are rising, particularly in rural areas.

The care economy for both children and the elderly is another facet of society experiencing challenges. Care worker median pay is only $16 per hour, despite the intensity and qualifications required of the job. This perpetuates the gender pay gap, given that 85 percent of home care workers are women, and is also contributing to decreasing retention rates of these workers. Childcare workers face similar circumstances. Despite high costs to families, those employed in the industry often earn low wages with no benefits.

Planners can help to play a role in remediating some of these concerns. A National League of Cities initiative targeting early childhood workforce development offers ideas, and cities can employ strategies such as financial literacy training and zoning updates to grow their childcare economies. For parents, states are beginning to pass legislation to fill the funding gap for childcare businesses now that federal COVID-related financing has expired. For eldercare and public health broadly, cities can also look to technology, inclusive design, and increased collaboration among stakeholders to improve outcomes.

Can't Live With or Without Robots

How robots could change our outlook on pandemics. Illustrations by Jackie Besteman

Scenarios 2045

Robots are common and in use throughout service sectors and in homes.

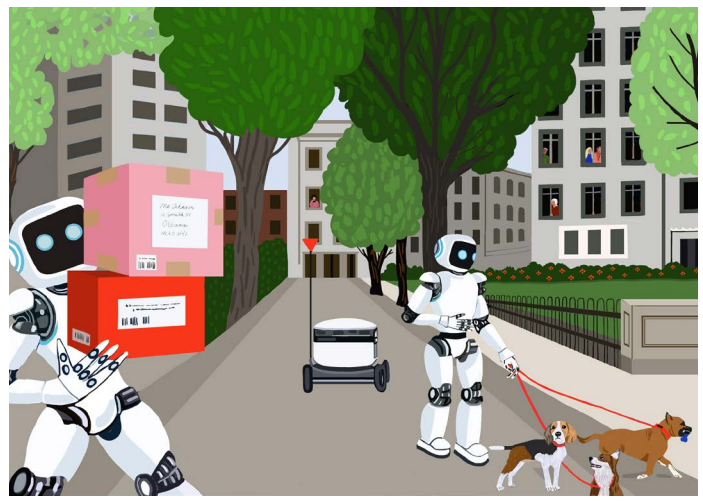
Robots exist with limited use.

Pandemics are the new normal.

SCENARIO D
ROBOTS, ROBOTS EVERYWHERE

Robots do essential work, from shopping to delivery to walking the dogs.

When another lockdown is announced, people stay inside and robots keep working.



SCENARIO A
IT'S 2020 ALL OVER AGAIN, AND AGAIN, AND AGAIN

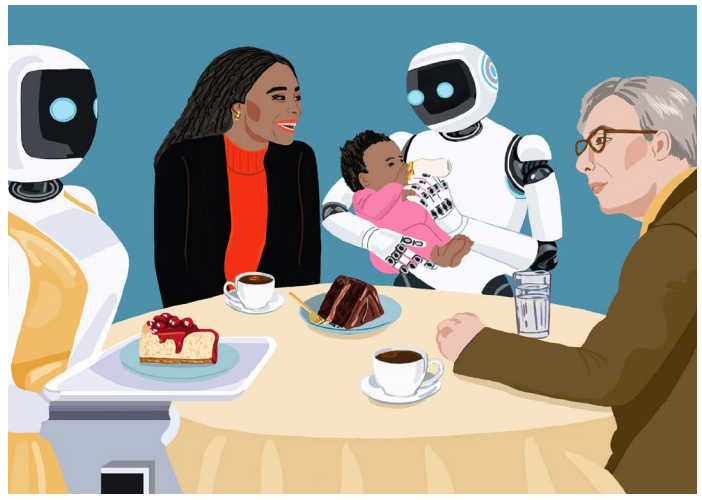
Lockdowns as we know them from 2020 are the new way of living.

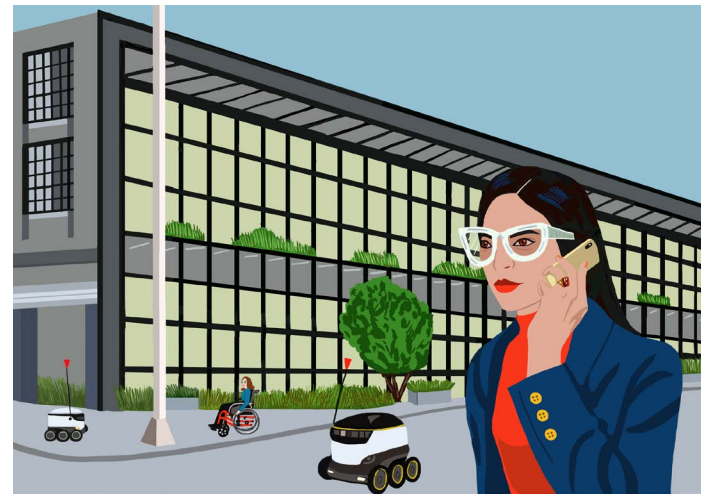
Loneliness and isolation add to mental health concerns.

SCENARIO C
CHORES AREN'T US

We have time to exercise and socialize while robots do our work.

Robots take care of the elderly and the very young.





SCENARIO B
JUST LIKE ANY OTHER DAY

Pandemics are under control.

Life and work continue as usual, with an occasional robot sighting.

Pandemic risk is low due to successful prevention measures.

The Paradoxes of Migration

Insurance providers have become less willing to insure homes in hazardous areas, leaving homeowners in Florida and other areas hit hard by climate impacts without coverage. Photo by Caitlin Ochs/*The New York Times*.

The movement of people is always in flux, as their living conditions may not always match their desires. But migration patterns do not always match expectations. Climate change is creating harsher conditions in more regions across the country, yet it is those regions to which people are moving. Simultaneously, climate change is driving up the costs of home insurance nationwide, with major implications for the parts of the country most susceptible to hazardous events.

Climate migration can be unpredictable

The drastic impacts of climate change are threatening the well-being of millions of people. In the U.S., 34 percent of people live in areas at risk of natural disasters and flooding, with 41 percent of rental units vulnerable to climate change. But people aren't necessarily moving out of these high-risk places. Though the number of climate abandonment areas—places where climate change pushes people out—is growing, those displaced may stay in the area or leave and move back later, and areas that are currently experiencing some of the worst effects of climate change are the ones seeing the greatest influx of new residents. Affordability and homeownership aspirations appear to be factors in these decisions; in 2023, nearly 20 percent of houses sold in New York City were likely to flood within 30 years. Other economic considerations may also come into play, such as rising insurance and energy costs.

Globally, megacities have begun preparing for climate migrants through the provision of health, financial, and educational resources, or by channeling migrants to nearby communities to help better distribute aid. The U.S. can also look to nature-based solutions, zoning laws that prioritize density in safe areas and restrict construction in vulnerable ones, renter protections, and improved research to better prepare for climate migration and track climate displacement.

Don't say "climate haven" just yet

In the wake of increasing disasters, interest in climate havens is growing. For the U.S., these are the areas largely in the Midwest and Northeast that are predicted to avoid the harshest effects of climate change. But they aren't wholly safe from climate change—every state in the country has experienced at least one billion-dollar disaster in the past

five years—and some worry that the term is a misnomer. Nevertheless, cities marketing themselves as climate havens are making changes to bolster their resilience, such as Cincinnati's investments in stormwater infrastructure and neighborhood resilience plans in underserved areas. Other cities can pursue similar strategies, though they should be realistic about their vulnerability to unpredictable weather events.

Unsure about insurance markets

As the effects of climate change become more pronounced and frequent, insurance providers have become less willing to insure homes in hazardous areas. In Florida, Progressive alone has dropped coverage for nearly 100,000 homes—most of which were in high-risk areas—and nearly one-third of Florida residents who lost their provider had intentions to move or already had. In July 2024, the Louisiana state legislature repealed a law preventing insurance companies from canceling policies that had been in effect for at least three years. Insurers are seeing reduced profits or even losses in most states; the resulting rising costs have led some people to forgo home insurance altogether. Even the Midwest, one of the "climate havens" discussed above, is seeing higher premiums as the number of severe storms in the region increases. Homeowners that never considered having flood insurance are being hit hard, as was the case for North Carolinians in September 2024 with Hurricane Helene. Both owners and developers of affordable multifamily properties that receive tax credits are also experiencing surging insurance premiums, which is disincentivizing new development.

To mitigate industry impacts to homeowners, some regulators employ strategies such as mandating insurance industry transparency and forbidding "bluelining"—the increase in premiums or withdrawal of services in high-risk areas—by providers. The National Association of Insurance Commissioners recently adopted a National Climate Resilience Strategy for Insurance to guide regulators and providers alike, and Florida has passed several laws aiming to reduce insurance premiums and provide mitigation grants to homeowners and multifamily properties. Growth in "non-admitted" residential insurance policies is skyrocketing, though this lightly regulated sector lacks guaranty funds and major disasters could leave those policyholders without protection. Planners should be aware of the potential long-term impacts of these changes on their communities, and work to mitigate their effects by restricting development in high-risk areas.

Into the eye of the storm

One of the greatest paradoxes in U.S. migration patterns is the movement of people to the most at-risk areas. Cities in the Northeast and Midwest are seeing population losses, while states in the South and West continue to gain residents even as climate change impacts are striking these areas the hardest. Relative tax burdens and lower costs of living are likely key factors, though the persistent movement of people to southern states has spurred backlash over a perceived strain on resources. While planners in receiving cities can prioritize strategies such as affordable, dense housing and upgraded infrastructure, and those in areas seeing population declines can look to established "shrinking city" approaches, economic incentives that encourage people to move to less climate-risky areas could be a strategy worth exploring.

EXPERT INSIGHT

"Suddenly, insurance is becoming a shaper of climate reaction."

—Nico Larco, AIA, University of Oregon

Politics and policies are influencing where people go

As partisan divides become more ingrained in the U.S., policies and ideology are increasingly influencing people's movements. Medical students are now less likely to seek residencies in states that severely restrict or ban abortion. Florida made news in August 2024 when the state's tourism marketing agency removed resources for LGBTQ travelers from its website (which prompted the Illinois Office of Tourism to include additional resources on its website). Eleven states have passed bills prohibiting Chinese citizens from buying property over alleged national security concerns, with dozens of others considering similar legislation. And several states have passed or proposed legislation that would make it a crime for immigrants to enter those states illegally, separate from federal immigration enforcement. One such law in Iowa was overturned after a judge deemed it unconstitutional. Planners should be aware of policies and other measures targeting specific demographic groups and the potential ramifications for their communities.

Redefining Balance: Life in the Post-Work Era

As the experiences of Tampa-based social media company Brick Media and other workplaces around the world have shown, switching to a four-day workweek can lead to higher productivity and greater life satisfaction. Photo courtesy of Brick Media.

Technological innovations and a rethinking of work-life balance following the COVID-19 pandemic have sparked increased discussions about the amount of time we spend at work. Four-day workweek pilots introduced globally and in the U.S. show that reduced hours can lead to higher productivity and greater life satisfaction. Despite this, weekly work hours have remained relatively stable over the

past few decades, even as advancements in technology and processes have promised greater efficiency. This raises a key question: Is now the time to start working less? And if so, how will we use the extra time gained from shorter workweeks?

Embracing the life of leisure

Research shows that Americans who feel they don't have enough free time experience lower well-being compared to those who feel they have enough. However, having an abundance of free time only makes make people happier when that time is spent meaningfully. Data from Europe indicates that longer work hours negatively impact both happiness and health, suggesting that a shorter workweek could enhance overall life satisfaction. The same is true in the U.S., where 79 percent of workers said they would feel happier if they worked a four-day workweek and 81 percent believed they would be just as productive. Furthermore, the OECD's 2023 report *The Future of Work* projects that 27 percent of current jobs are prime candidates for automation. This will likely reduce

the demand for time-consuming, labor-intensive work, potentially leading to fewer work hours in the future.

Your job is not who you are

Traditional American work culture emphasizes long hours and minimal vacation or paid leave, with many people identifying more with the work they do than other pleasures in life. People in the industrialized world tend to (or have to) organize their lives around work. However, in 2023, a Pew Research Center study found a new trend: only four in ten U.S. workers see their job as central to their overall identity, and for more than a quarter, their job doesn't define who they are. While work may remain important for personal well-being, the relationship people have with their jobs is shifting.

Alongside this trend could come a shift in people's attitudes towards leisure. If individuals use their free time to pursue personal projects or passions, leisure could replace work as a primary focus in life. This shift

EXPERT INSIGHT

"What's interesting in AI conversation is what to do with the time that we're saving."

—Adam Beck, TEMPO Institute

is reinforced by the idea of viewing a job as a verb rather than a noun, or reframing the common question "What do you do for a living?" as "What do you like to do?" (CIFS *Farsight* #7). Furthermore, the percentage of Americans older than 65 is expected to rise to 23 percent by 2025. These current and future retirees increasingly seek to make the most of their "new chapter in life" with new hobbies, travel opportunities, and meaningful leisure activities to enrich their lives. This could offer new opportunities for planners to engage people in planning processes and projects, as more individuals may seek fulfillment outside of work through active participation in their communities.

Blurring lines between work and play

Adoption of AI and other technological shifts could further blur the lines between remote work and leisure, a trend that began during the COVID-19 pandemic. The growing popularity of "workcations" and "bleisure" suggest that work and personal life may increasingly overlap as individuals find themselves working while traveling. Some countries are pushing back against this trend; among others, Australia enacted a "right to disconnect" law for workers in August 2024. The boundaries between work and play could continue to dissolve, reshaping how we think about both.

Mass pushback on mass tourism

The growing importance of leisure in our lives is triggering a rise in travel activity. In 2025, the number of foreign tourists visiting the U.S. is projected to exceed pre-pandemic levels. Climate change impacts are giving rise to "last chance tourism," in which travelers seek to visit vanishing glaciers and ice caves before they disappear. However, climate change is also making these sites increasingly unstable.

The post-COVID surge of mass tourism has sparked significant pushback in major tourist destinations such as Barcelona, Amsterdam, Venice, Kyoto, and others.

Post-COVID surges in mass tourism have sparked significant pushback from residents in Barcelona and other major tourist destinations. Photo by Q/Shutterstock.

Residents are expressing their frustration with the influx of international tourists and, in some cases, the negative consequences of short-term rentals. For instance, in Hawaii, a law passed in 2024 allows local governments to regulate—and potentially ban—short-term rentals within their jurisdictions. Moreover, some traditional cruise destinations are reconsidering their tourist strategies and becoming increasingly resistant to visitors arriving on cruise ships. Juneau, Alaska, plans to become the first city in the state—and one of the few in the U.S.—to limit the number of daily cruise ship tourists.

For planners, the visible backlash from locals worldwide may raise questions about the conventional agenda of branding and "selling" a city to tourists. Prioritizing the needs of local communities, supplying affordable housing options, and creating more spaces for meaningful leisure activities may be good opportunities for planners to better prepare for this emerging trend.

Prioritizing Youth and Children in Transportation

Beneetta Mary Jose, LEED Green Associate

Illustration by Rebecca Clarke

To listen to the full interview hosted by Joe DeAngelis, AICP, scan the QR code above or visit planning.org/podcast.

Seeing a future that's about fostering community, equity, and resilience in every journey we take.

Beneetta Mary Jose is a transportation planner at Fehr & Peers. She holds a master's degree in urban and regional planning from the University of South Florida and a bachelor's degree in architecture from the University of Kerala, India. Her main areas of interest are transportation, youth in planning, and resilience. She serves on the APA Student Representative Council and in 2023 was named Student Planner of the Year by the APA Florida chapter.

JOE DEANGELIS: Can you tell us what you see as major emerging trends in transportation today and what they might mean for the future?

BENEETA MARY JOSE: One of the most exciting trends in the field right now is micromobility. E-scooters, bike sharing, cargo bikes—you name it, they are making waves, especially in urban areas. Cities are putting real effort into integrating these options into traditional transit networks, making it easier and also seamless to switch from a bus to a bike or scooter to get that first mile–last mile connectivity. On the other hand, without safe and accessible infrastructure, these options are inequitable. Rising traffic deaths and a lack of protective infrastructure highlight how essential it is for planners to focus on designing safer streets and bridging that gap between underserved populations and infrastructure.

I'm also fascinated by electrification in transportation. Electric vehicles are taking center stage across all modes of transportation, from cars to buses to delivery trucks, and even planes. We're seeing policies shift to accommodate the infrastructure change and a potential rethinking of gas taxation as mileage taxation.

I believe this movement is bigger than just transportation. It's about public health, clean air, and creating cities where people can thrive. These trends reflect a future where transportation is not just about moving people—it's about fostering community, equity, and resilience in every journey we take.

Can you share your thoughts about the interests and priorities of young professionals in transportation planning today amidst all the disruptions within this sector?

As young professionals, we're focused on creating cities that are connected and accessible for everyone. For us, transportation is not just about getting from point A to point B—it's about building the

Trend Talk

communities and creating systems that serve people better and more equitably. What excites me most is how collaborative and innovative this field is right now. Young planners have a real commitment to listen, engage, and make things happen in partnership with the communities we serve. We are not afraid to think big and make bold decisions. Even though we get pushback at times about certain proposals or improvements that we're making, we're still not afraid to take on that challenge and convince people that this is an important step. There's a lot of work ahead, but we can do it.

Today's young people will be living in a future world we're planning for them. Is there any attention being paid to incorporating the perspectives of children and youth into transportation planning?

This is a topic I can talk about for hours and hours and never get bored. Traditionally, planning transportation systems are designed with adults in mind, right? How can we get them from point A to point B as quickly as possible? But as planners, we recognize the importance of having a safer, more accessible, and more inclusive environment for all age groups, from small kids to working professionals to older adults. So yes, there's a growing emphasis on ensuring these transportation systems serve the needs of younger populations.

Youth today are also very digitally active. So as planners, we are finding ways to integrate tech solutions within transportation so that children have the tools to get from one place to another and their parents feel safe sending them out alone. Another hot topic right now is reducing vehicle size. We've seen so many cases where drivers are hitting small children because they simply can't see them, and we're starting to see policy changes to address this.

In short, transportation planning today is increasingly incorporating the voices and needs of young people. Planners are recognizing that the systems we build now will shape their futures. By prioritizing safety, accessibility, and inclusion, we are creating a future transportation network that meets the needs of all users.

As an emerging professional within the transportation planning field, what is your vision for transportation 20 years into the future?

I see a future transportation system that's much more seamlessly integrated, highly affordable, more sustainable, and highly reliable. I love streets that are taken over by people. It's a community experience. Everything is accessible by foot or by biking or other transportation modes. Everything is within 15 minutes of your house. I see that our future is bright, and I'm eager to help shape it.

2024 U.S. Election Outcomes: What to Expect in 2025

Photo by Emily Elconin/*The New York Times*.

What the new administration means for tax and fiscal policy, housing, transportation, and the environment.

In the 2024 general election, Donald Trump was elected to a nonconsecutive second term as president of the United States. Republicans now control the legislative and executive branches of government and will bring a new agenda, though thin congressional majorities will complicate governing.

The roadmap for policy action is clear. Unified control will lead to action on a major tax bill. Pending deadlines for Congress will put infrastructure, transportation, and farm policy on the agenda, and housing remains an area of bipartisan interest. The new administration will chart a more deregulatory course, particularly on issues of permitting, energy, and the environment.

This election highlighted some broader issues that affect both governance and planning. Polarization seems likely to continue as rhetoric and action on social issues fuel further division. The potential for a more combative public realm will demand new skills and approaches from planners and may pit local ideological perspectives against the tide of national policy.

Frustration at government inefficiency and economic issues were key electoral considerations, raising important questions for planners. Winning politicians from both parties showed a willingness to challenge existing processes and push reforms to government systems and legacy programs. For planners, this suggests the need to focus on outcomes and show how planning can be a valuable tool for addressing economic challenges, such as housing opportunity. Planners may find it difficult to argue for more

APA Insights

investment when the benefits of previous policies are too unclear or uncertain for too many people.

While these underlying drivers of the election have deep roots and longer-term implications, the election also points to a desire for near-term change that will drive policymaking.

APA INSIGHTS

"With action on taxes all but certain in 2025, many tax-related programs vital to planning will be debated. Some key issues include expansion of the low-income housing tax credit (LIHTC), renewal of opportunity zones, the solvency of the highway trust fund, and potential tax tools for housing."

TAX AND FISCAL POLICY. A confluence of factors in 2025 makes federal tax policy a critical topic. Congress faces a deadline to renew a wide array of tax provisions from the 2017 Tax Cuts and Jobs Act. Without action, most tax rates would automatically rise, which is an unappealing prospect on Capitol Hill. Republicans in control of Congress will be able to use a process known as reconciliation to advance a tax bill without Democratic votes. Reconciliation has been essential for moving major legislation in recent years, including the Inflation Reduction Act and the original Tax Cuts and Jobs Act.

With action on taxes all but certain in 2025, many tax-related programs vital to planning will be debated. Some key issues include expansion of the low-income housing tax credit (LIHTC), renewal of opportunity zones, the solvency of the highway trust fund, and potential tax tools for housing. Expect discussions of tax provisions for commercial to residential conversions, home rehabilitation, workforce housing, and economic development tools.

While tax changes can ride on reconciliation, spending on regular federal programs and agencies will still require compromise and negotiation. There will be tremendous pressure to cut domestic funding to accommodate the costs of tax cuts and fulfill campaign promises about the size of government. However, mustering majorities in Congress will still be difficult, testing the ability of Republicans to stick together and find enough Democratic support to pass bills in the Senate. The politics of fiscal austerity will likely return, balanced against the realities of congressional dealmaking.

HOUSING. Housing policy stands out as both a national priority and an area of potential bipartisanship. 2024 saw candidates of both parties and at all levels talking about the importance of addressing housing. That rhetoric came as nearly two dozen states enacted laws aimed at housing supply and several bipartisan federal proposals continued to gain traction. As the new administration and 119th Congress take office, there is a strong existing foundation for action on housing.

Last year, HUD's new PRO Housing grant program received funding to support local plans and policies for zoning and land use reforms. Legislative proposals to make HUD a strong partner for local reforms through models, frameworks, and research saw bipartisan support. Republicans who will lead housing-related committees under the new administration brought forward proposals aimed at tackling issues such as modular and manufactured housing. Other proposals would make housing reforms a factor in infrastructure grants, identify regulatory barriers, and boost rural housing.

While it is easy to find bipartisan agreement on the fact of a housing crisis, it is undeniably harder to find a similar consensus on how to address it, especially using federal levers. Despite the challenge, the new order in Washington has an opening for action. Tax policy,

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incentives, linkage to infrastructure, assistance for rural and manufactured housing, and support for local action may be the areas with bipartisan appeal.

TRANSPORTATION AND INFRASTRUCTURE. One of the signature achievements of the Biden administration was the enactment of the Bipartisan Infrastructure Law (BIL). The surface transportation programs in BIL are due for reauthorization in 2026, with work beginning in 2025. Though a major overhaul is not likely, planners can expect immediate shifts in funding for existing grant programs, along with changes in formal guidance for competitive grants and factors driving grant decisions. Republican leaders will likely scale back discretionary programs for climate, equity, and active transportation and reemphasize formula funds to states, and the new administration is expected to eliminate a proposed rule requiring climate change goals and measurements in transportation planning.

For transportation programs not subject to annual appropriations, core program funding will likely be stable through the end of 2026. There will be pressure to cut back programs with funding approved annually by Congress, such as transit Capital Investment Grants, multimodal RAISE grants, and Safe Streets grants. However, draconian cuts could be difficult to pass on Capitol Hill given slim majorities.

Another likely shift in emphasis will be in the areas of automation and electrification. The Trump administration seems poised to reduce support for EV charging infrastructure and tax credits for electric vehicles while accelerating work on standards for autonomous vehicles.

ENERGY AND ENVIRONMENT. One area where bipartisan collaboration may be possible is reforms for permitting and environmental review. A bipartisan framework for changes would speed energy projects, and a U.S. Supreme Court decision due in mid-2025 that could curtail the scope of National Environmental Policy Act (NEPA) reviews may further spur deregulatory momentum.

The fate of the Inflation Reduction Act (IRA) is uncertain. Many Republicans have taken aim at the law's combination of tax credits and new federal spending to address climate change. But cutting it back may prove challenging, with most of the resources already allocated and appropriations bills harder to pass.

Even if IRA programs withstand challenges, however, support for new federal climate action will be unlikely given unified Republican control in Washington. At the same time, states and localities may find opportunities to leverage federal programs and investments in ways that support local climate plans. Despite this environment, expect an emphasis on resiliency and technological innovation to continue.

The post-election landscape raises important issues about how to maintain local momentum in key policy areas unlikely to see new federal support while taking advantage of fresh political attention and popular demand for action in areas such as housing. There will be opportunities to provide critical insights into how systems from local land use to federal environmental reviews can be improved and reformed in ways to meet today's demands while balancing and protecting long-term needs. Planners will face new demands but are also positioned as a critically valuable profession uniquely capable of helping navigate change.

APA INSIGHTS

"The post-election landscape raises important issues about how to maintain local momentum in key policy areas unlikely to see new federal support while taking advantage of fresh political attention and popular demand for action in areas such as housing."

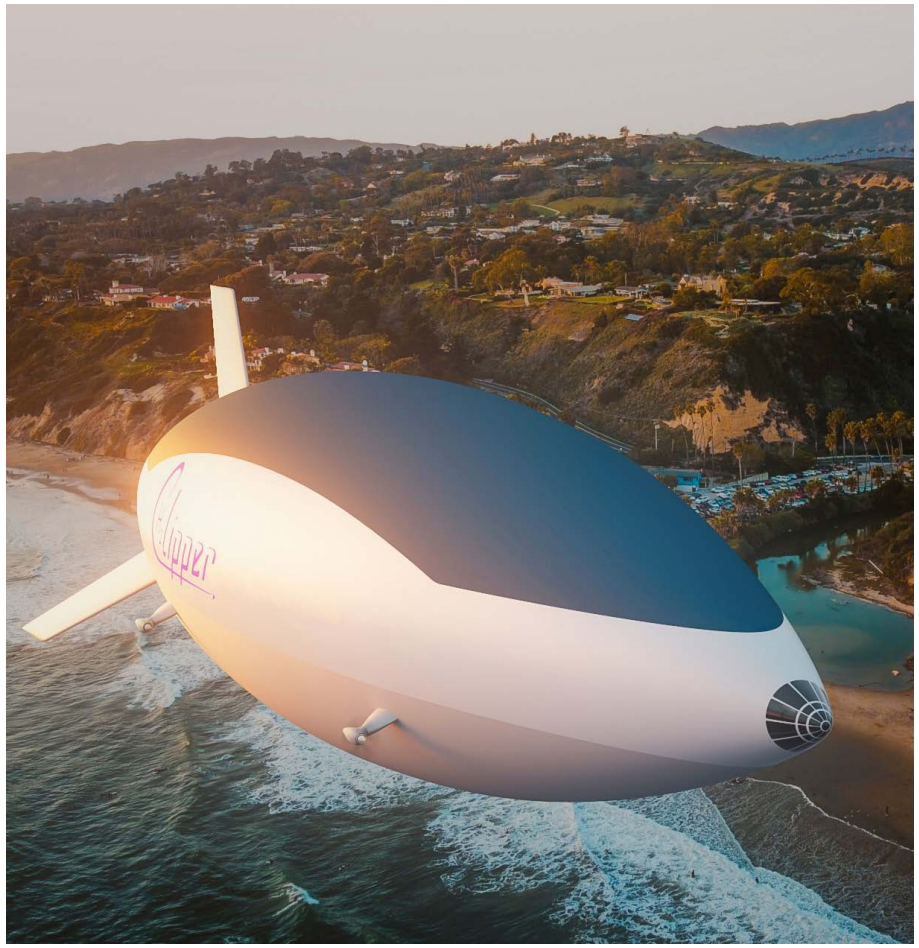
APA Insights

The signals we need to learn about and watch

“Learning with the future” defines APA’s foresight practice. And looking at the growing number of signals on the horizon, the importance of learning more about the future becomes obvious, as many of them have the potential to reshape planning in the future. Signals for 2025 range from **air mobility** and **personalized health care** to **climate innovation** and the surprising potential of **fungi**.

Check out APA’s Trend Universe for more trends planners need to learn about and watch.

A Sky Full of Stuff: The Future of Aviation



The aviation industry is seeing an upsurge in development, from novel prototypes to updated versions of earlier aircraft such as the Clipper, a hydrogen-powered cargo blimp. Photo courtesy of H2Clipper, Inc.

It's a bird! It's a plane! It's a…drone? A flying taxi? A blimp? In the future, it might be all of them at once. The aviation sector is seeing an upsurge in aircraft development—some novel, and some a revised return to the past. Some just sound absurd. Related attempts to make air travel greener may or may not be realistic. Indeed, it's not certain that the signals here will ever be viable choices for flight, but they're still worth watching given the implications for planning—and the world—if they do.

Droning on and on

Since drones first took to the skies, regulations have tightly controlled their flight. The Federal Aviation Administration's (FAA) visual line of sight (VLOS) rule means that drone operators must be able to see their aircraft at all times unless they have gone through a lengthy waiver process. To remove barriers to industry growth, the federal government has directed the FAA to develop new rules regulating drone flights beyond visual line of sight (BVLOS), though the September 2024 deadline has come and gone and it has yet to do so. This could mean big growth in drone delivery services—which a growing number of cities are permitting—and more drone use by police departments. As the likelihood for more drones in the sky increases, planners should be aware of local and federal regulations, understand the implications of drone expansion on communities, and consider adding drones to their planning toolkit.

Advanced air mobility slow to take off

While past *Trend Reports* have discussed advanced air mobility (AAM), an emerging transportation sector using vertical take-off and landing (VTOL) vehicles, its promises have been slow to arrive. Houston, the Bay Area, Dubai, and France among others have signed service agreements with AAM companies, though operation dates have been continuously delayed. The first autonomous intercity electric VTOL flight was completed in China in early 2024, however, and in October 2024 the FAA announced regulations allowing "powered-lift" aircraft to operate within the National Airspace System. Planners should monitor the developments within the AAM space, as these vehicles will require new infrastructure and their use may affect traditional ground transportation methods.

Going via gondola

In the absence of AAM progress, gondolas may become a more feasible form of air travel. With the success of this mode in many Latin American cities (Caracas, Bogotá, Medellín, Mexico City, and others), interest in gondolas as public transit is growing both in the U.S. and internationally. Despite their ability to surpass congestion on the ground and their lack of noise and exhaust, gondolas do have limitations, and localities will need to weigh their benefits relative to more traditional public transportation methods.

The elusive pursuit of sustainable aviation fuel

Aviation is one of the most carbon-intensive sectors. One potential solution to this challenge is sustainable aviation fuel (SAF), which adds nonpetroleum components such as cooking oils to a fossil-fuel base to maintain compatibility with existing infrastructure (contributing to concerns over greenwashing). Demand, however, is far outpacing supply; in 2024, estimated SAF production equaled only 0.53 percent of aviation fuel needs. As a result, some airlines that had set ambitious climate targets are now reconsidering them.

SAF companies continue to attract investments, and some airports are being touted as SAF hubs. The anticipated growth of the industry will likely have downstream effects. Some states, including Kansas and Illinois, are looking to construct SAF factories, as are other countries. With these comes marginal job growth. Planning may be required to accommodate the expansion of this industry, particularly for agricultural states that may be tapped for fuel production.

Planes can be EVs, too

The promise of electric cars to help reduce carbon emissions has sparked interest in the electrification of other types of transportation—even airplanes (including seaplanes). The commercial electric aircraft market is growing, with some predicting nearly a quarter of airplanes sold being electric by 2045. The battery requirements of large electric aircraft pose major challenges, though one prototype transported 90 people nearly 500 miles. Another option could be hybrid technology, currently in development by GE Aerospace. In preparation, the City of Reedley and Fresno County, California, have created the first FAA-certified electric aircraft training program. If electric air travel ever becomes possible on a large scale, planners will need to consider how the potential noise reduction could positively impact areas around airports, airport design, and larger changes in transportation planning.

Powered by the sun, and maybe flying too close to it

Though the laws of physics and a variety of other factors prevent commercial airplanes from being fully powered by the sun, advancements are being made in smaller, lighter solar-powered aircraft that can stay aloft for months at a time. These devices could serve as more sustainable and adaptable satellites, helping to reduce the amount of space debris—an issue discussed in the *2024 Trend Report*. This may have trickle-down effects on climate change mitigation efforts, disaster response and recovery efforts, and environmental monitoring, among other sectors.

A new generation of supersonic air travel

Ever since the Concorde made its final flight 20 years ago, there's been interest in resuming supersonic air travel. Current prototypes aim to overcome challenges of cost, noise, and sustainability. NASA and Lockheed Martin are testing a model that distributes its sonic boom more evenly, reducing sound pollution. The private sector is also developing new models, and one company has already completed construction of a factory to produce supersonic jets in North Carolina. But there's debate over how environmentally friendly these jets can ever be, given their rate of fuel consumption. Though it remains to be seen how viable and pervasive supersonic jets will be, their usage could affect travel behavior, airport design, and climate change mitigation efforts.

Blimps are back, baby

There's another type of aircraft that's seeing a possible resurgence: the blimp. A number of prototypes and concepts are under development, including seven-pound mini blimps to be used as helicopter alternatives. Several companies have completed test flights or promise to soon. The broad applicability of blimps is not yet known, though this more sustainable form of aviation may have implications for tourism and long-haul freight transport.

Climate Innovation

Technological advancements are driving new climate change mitigation approaches, such as geoengineering proposals to slow down the melting of Antarctic glaciers. Photo by Felton Davis/Flickr.

As climate change accelerates, new approaches are emerging to address its impacts and offer sustainable solutions. Recent technological advancements and legal shifts are pushing the boundaries of what is possible in climate action. These innovations could have significant implications for planning and community design, development, and management.

Planners should closely monitor these developments to understand their potential impacts and opportunities.

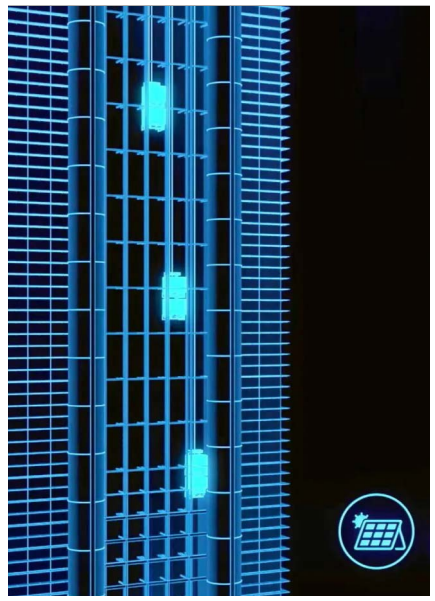
Carbon capture and removal breakthroughs

Carbon capture technology is a growing frontier in climate innovation. In 2024 the EU agreed to establish a certification process to better regulate these technologies, and in the U.S. the industry is advocating for more regulation to bolster confidence in the sector. Approaches being tested include capturing carbon emissions directly from industrial processes and using seawater to remove carbon from the atmosphere. One company is launching a large-scale initiative to "mineralize" carbon dioxide, transforming it into the industrial product calcium carbonate at a steel plant in Gary, Indiana. Carbon capture technology is not without concerns, however; the first underground commercial carbon sequestration plant built in the U.S. is leaking, worrying nearby residents. As these approaches are further developed and refined, planners should explore how and if carbon capture

can be integrated into their local economies.

Powering up energy storage with battery innovation

The need for clean, renewable energy is driving innovation in both energy production and storage. Companies around the globe are investing in lithium-sulfur (Li-S) batteries as a more sustainable alternative to traditional lithium-ion batteries, offering higher energy capacity with fewer environmental costs. Despite challenges such as lifespan and lack of commercialization, research and development in Li-S battery technology continue, with the global market expected to grow 26 percent by 2030. Innovations in energy storage include carbon dioxide–based battery systems that provide electricity when solar power isn't available. Along with the battery innovations highlighted in the *2024 Trend Report*, other ambitious projects include the development of carbon-cement supercapacitors at MIT that could store renewable energy within roads and buildings, as well as using heavy blocks and gravity to store green energy in skyscrapers, allowing them to power themselves. Additionally, vehicle-to-home charging systems being piloted by Volkswagen and others can turn electric vehicles into backup home power sources, further decentralizing energy systems and offering greater resilience. Such innovations could help planners reshape how communities manage energy needs.



Gravity energy storage systems lift heavy blocks to the tops of skyscrapers, creating potential energy that is converted to electricity when the blocks are lowered to the ground. Photo ©Energy Vault Holdings, Inc.

Gearing up for geoengineering

Interest continues to grow in geoengineering, the controversial approach discussed in the *2024 Trend Report* of directly manipulating the environment to combat climate change. Scientists have proposed projects to slow Antarctic ice melting using underwater plastic or air-bubble curtains to block warm water from reaching glaciers. Some environmental groups are getting on board; the Environmental Defense Fund has moved to fund research on the effects of reflecting sunlight into space as global warming intensifies. But local governments are showing caution; in June 2024, the Alameda, California, city council voted to stop scientists from spraying salt into the atmosphere as initial research into this solar radiation management strategy.

EXPERT INSIGHT

"Cities are increasingly pursuing circularity as a model, recognizing its potential to align climate action with economic innovation."

—Deepa Vedavyas, NOPEC

These technologies represent a significant shift in how humanity might intervene in natural processes to manage the climate, raising complex questions about environmental impacts, governance, and long-term sustainability. Planners should monitor geoengineering as it evolves and learn more about its potential to be incorporated (or not) into their climate strategies.

Legal and policy shifts in climate accountability

While lawsuits and major international court cases point to a new front in advocating for major climate action (see also Shifting Climate Mitigation Strategies), a wave of reactions in the form of legal challenges to longstanding environmental law and sudden policy shifts in the U.S. could blunt future climate innovation. Courts around the world are setting new precedents for climate action. The June 2024 U.S. Supreme Court decision overturning Chevron deference is expected to open the door for more legal challenges to environmental regulations. Moreover, the incoming administration is expected to dismantle federal climate initiatives and environmental protections, which are critical to safeguarding the planet, with promises to eliminate environmental regulations as part of the economic agenda. Planners should monitor these developments as legal changes could directly impact land use regulations, environmental justice, and development, influencing how communities can improve sustainability and resilience in the face of growing environmental challenges.

Longevity, But Where?

What happens if we can't solve the housing supply crisis? Illustrations by Jim Tsinganos

Scenarios 2055

Health innovations increase life span to more than 150 years.

Life expectancy remains stable or decreases.

Housing supply remains limited; slow to no progress in availability.

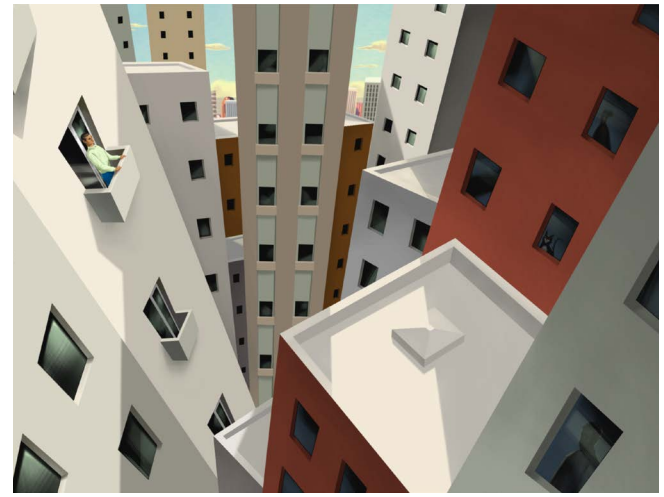
An ongoing housing boom results in abundant housing.

SCENARIO D
SEVERE HOUSING CRISIS FOR ALL AGES

The increasing population has nowhere to live.

The homeless population spikes.

Urban areas lose population due to cost of living.



SCENARIO A
CITIES GROW TO MEET DEMANDS

Extensive population growth pushes housing boom.

Urban boundaries expand with increased density across large areas.

Truly rural areas become less common.

SCENARIO C
HOUSING STILL A CHALLENGE

Most people can't afford a home.

Multigenerational households have become the norm as young people can't afford to buy and the elderly find care within the family.

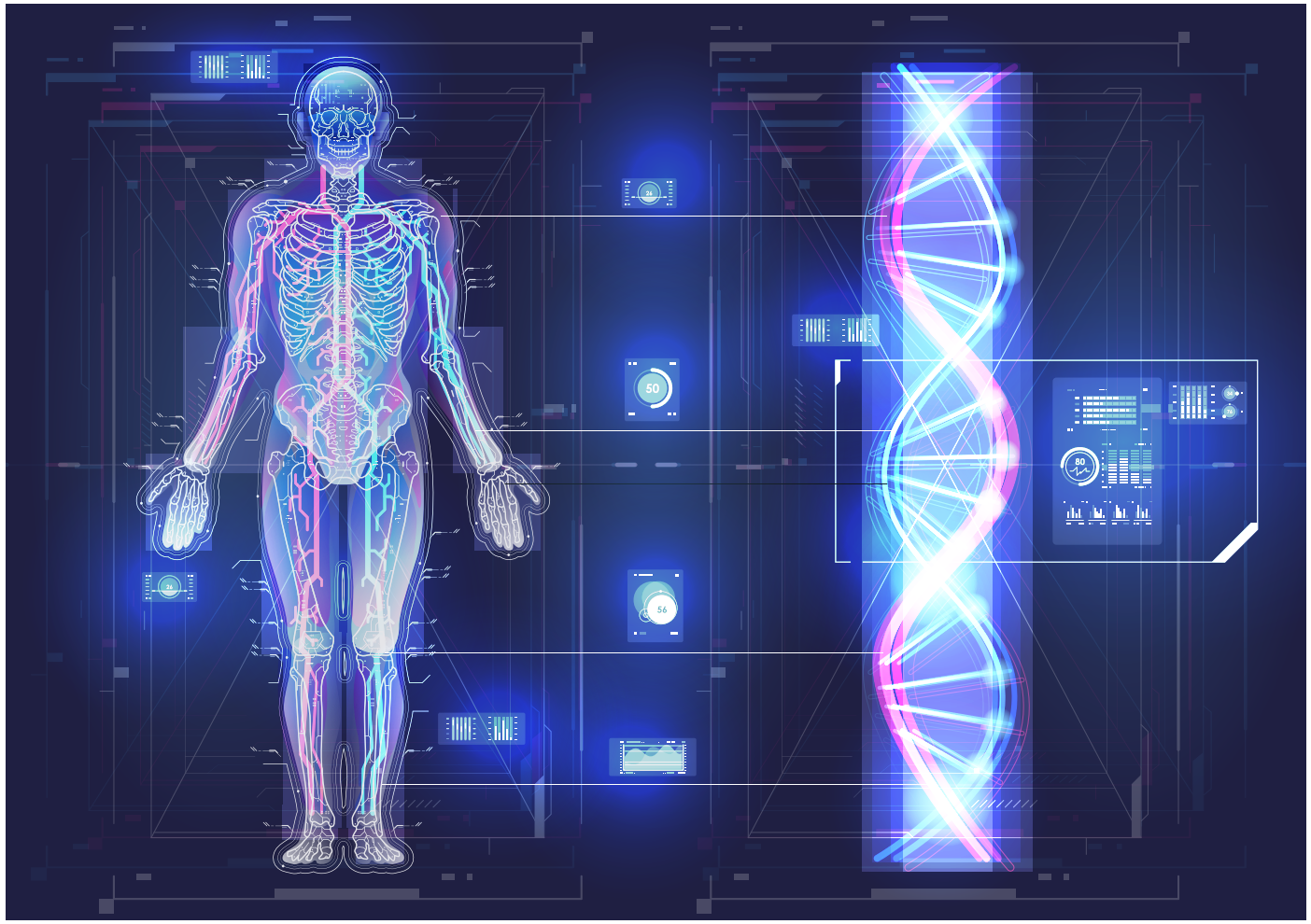
SCENARIO B
AFFORDABLE CHOICES AVAILABLE FOR ALL AGES

Less competition for housing.

Decrease in homelessness.

Improved mental health and upward mobility.

The Personalized Health-Care Revolution



Technological advancements are reshaping patient care, diagnostic processes, and treatment strategies, pointing to a future of customizable health care. Photo by hiro-hideki/iStock/Getty Images Plus.

Emerging technological advancements are reshaping patient care, diagnostic processes, and treatment strategies, pointing towards a future where health care is potentially more precise, accessible, and customizable based on individuals' needs. However, there are significant concerns and drawbacks to this potential revolution, such as data privacy and quality, as well as the sidelining of experts in favor of DIY approaches.

While the impacts of this personalized health-care revolution on people's lives may be significant, the impacts on communities are highly uncertain.

Tech-powered personalized medical care

The rise of personalized medicine is transforming the traditional one-size-fits-all approach to health care. Advances in artifical intelligence (AI) are enabling treatments specifically tailored to an individual's genetic profile. For example, CRISPR-Cas9 technology allows for precise gene editing, which has shown great promise in treating genetic diseases such as Alzheimer's. Additionally, doctors are using digital twin technology to predict how patients will respond to specific treatments and adjust care accordingly. Combined, these technologies hold significant promise in the identification and treatment of major genetic diseases. And using big data to create human digital twins could enhance city digital twins, enabling planners to explore the relationships between the built

environment and health outcomes to make more informed decisions.

While digital twin and gene-editing technologies might enable the flagging and treatment of genetic diseases, there are major ethical issues regarding the use of these tools for needs that might not be considered medically necessary. This may point toward a future that will see major progress in dealing with longstanding medical issues, but this progress may not be evenly distributed or equitable.

Decentralized approaches to rural health care include a pilot program in Tennessee offering medical care from vans in Dollar General store parking lots. Photo by Sarah Jane Tribble/KFF Health News.

DIY medicine and health-care accessibility

With health care becoming increasingly decentralized, the trend of DIY medicine is gaining momentum. In the U.K., where general practitioner shortages have left many patients without access to timely care, individuals are turning to DIY treatments. Homemade remedies for skin cancer and at-home abortions have become more common, though these unregulated treatments present significant health risks. In the U.S., self-managed abortions have increased significantly since the U.S. Supreme Court's *Dobbs* ruling, raising concerns about access to safe and regulated medical care.

The growth of a more decentralized approach to medicine signals major disruption to an established industry that currently plays a central role in many communities. Planners should be aware of potential longer-term disruptions and associated impacts at the local level. Strategies may include planning for decentralized health-care systems, such as telemedicine hubs or mobile health clinics, to ensure patients in underserved areas have access to professional medical care.

Growing concerns over health data privacy

As personal health data is becoming increasingly central to innovation within the field, privacy and ethical concerns grow. In April 2024, Colorado became the first U.S. state to pass neural data privacy legislation, followed by California in September (see also AI Power Struggle). As AI technologies are increasingly used to analyze biometric data, the resulting commercialization of health data raises concerns about patient privacy. If not governed properly, the widespread use of AI in health care could lead to bias in decision-making and misuse of personal data, amplifying inequalities in care delivery. Similarly, the data needs of personalized digital twins are enormous. While the promises of such innovation are significant, the downstream impacts of their widespread use are extremely uncertain.

While these developments seem to have little relationship with the work of planning, they may signal significant shifts in both individual behaviors and the future of communities. For example, if AI is successful in improving outcomes for IVF and related fertility treatments, greater choice in how and when to have children could impact anything from population growth (or decline) to the need for local schools. Additionally, the increasing use of AI in health care could influence how medical facilities are designed, possibly affecting the future of local hospitals and other longstanding centers of medical care.

Harnessing Fungi for a Sustainable Future

In daily life, we might find mushrooms in the forest or buy them at grocery stores, but fungi are far more than just mushrooms. An entire kingdom with at least six million different species, they range from microscopic cells to some of the largest organisms on Earth—like Oregon's *Armillaria ostoyae* (honey fungus), which spans 965 hectares and is estimated to be 8,000 years old. Fungi have a significant impact across various fields, including human health, agriculture, biodiversity, ecology, and manufacturing.

Under the pressures of climate change and the transformations it brings, fungi may serve as an ancient yet powerful tool for humanity and urban settlements. They hold the potential to support the shift away from fossil fuels, tackle plastic pollution, and facilitate a transition to more sustainable food systems. In recent years, innovators across industries have begun to see fungi in an entirely new light. With such remarkable potential and versatility, it raises the question: are we entering the age of fungi?

FUNGI FOR HUMANITY. While certain fungi pose risks to humans and crops, others offer innovative solutions to pressing global challenges such as hunger, climate change mitigation, and advancements in health care.

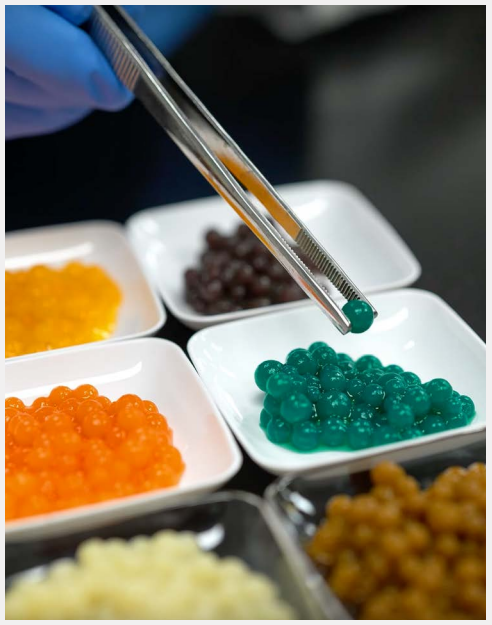
Mushroom farms are emerging as a sustainable agricultural alternative to the global livestock industry, which produces more than a third of methane emissions and contributes significantly to global warming. The trend of converting livestock farms to mushroom farms is expanding both in the U.S. and internationally, with some farmers shifting from poultry and cattle to

Mushroom farms are emerging as a sustainable alternative to the global livestock industry, offering a valuable protein source to support a shift to greener plant-based diets. Photo by The Little Mushroom Company.

Deep Dive

mushroom cultivation. In 2023, the global mushroom market reached 17.25 million tonnes, with the domestic mushroom market projected to grow almost three times in the next 10 years. As plant-based food sales continue to rise, "mushroom-preneurs" across the country are encouraging Americans to eat more mushrooms. Shifting to a plant-based diet is a simple way for individuals to reduce their carbon footprint, and mushrooms serve as a valuable protein source to support this transition.

This includes lab-grown fungi foods. The fungus *Fusarium venenatum* was first discovered in the soil of a garden in the U.K. during the 1960s. It has since undergone extensive research and development, leading to the mass production of mycoprotein and the emergence of an entire industry of meat alternatives. Recently, researchers at the University of California, Davis, have been using the fungus *Aspergillus awamori* to create lab-grown, edible balls that can be processed into products like boba and "caviar" with various textures, colors, and flavors. These mycofoods can be cultivated anywhere using nutrients from agricultural byproducts, offering a valuable new protein source to help meet global food demands.



Lab-grown fungi foods include boba and "caviar" created by researchers at the University of California, Davis. Photo courtesy UC Davis.

Fungi are still revolutionizing modern medicine. The famous antibiotic penicillin, discovered in 1929 as a blue-green mold, remains a staple in many antibacterial treatments. Similarly, lovastatin—a cholesterol-lowering drug used to combat heart disease—was first isolated from a soil-dwelling fungus, *Aspergillus terreus.* A lesser-known, yet important, fungal-based medicine is cyclosporin, an immunosuppressant that enhances the success of organ transplants. This versatile drug was discovered in *Tolypocladium inflatum*, a mold commonly found in soil and leaf litter.

Fungi are also at the forefront of scientific research for their potential in treating depression and post-traumatic stress disorder (PTSD). Psilocybin, the psychoactive compound in psychedelic mushrooms, is being studied for use in psilocybin-assisted psychotherapy to improve mental health conditions. Additionally, psilocybin "microdosing"—taking a small fraction of a regular recreational dose, well below the level needed to experience psychedelic effects—has become a growing trend in the U.S.

FUNGI BENEFITS FOR CITIES AND COMMUNITIES. With the potential to accelerate plastic decomposition, reduce microplastics and other pollutants from wastewater, and support sustainable construction, fungi present a new area of exploration for planners and communities alike.

One of the key roles fungi play in our ecosystem is breaking down organic matter and keeping it circulating through the carbon cycle. Very few organisms can break down plastics, and even fewer can feed on them. In recent years, however, researchers have identified several fungi capable of breaking down certain types of plastic. International research teams are now experimenting with different fungi to find optimal methods for accelerating the breakdown of more resistant plastics such as polyethylene terephthalate (PET), commonly used in food packaging and drink bottles. While fungi hold promise in addressing plastic pollution, they are likely only part of the solution, as this decomposition process also releases carbon dioxide back into the atmosphere.

Deep Dive

Fungi hold additional environmental cleaning potential. Mycoremediation is a technique that uses fungi to treat contaminated soil sites. Fungi have already demonstrated their ability to absorb diesel and oil from soil and water. As wildfires increasingly impact certain states, concerns are growing about post-fire toxic ash and the runoff that contaminates surrounding waterways. Some organizations are now exploring post-fire remediation using various types of fungi to address these environmental challenges.

Before wastewater can be reused or discharged into nature, it must undergo treatment to ensure it meets required cleanliness standards and to remove solids potentially harmful to human health and the environment. However, conventional methods do not fully eliminate micropollutants such as microplastics, pharmaceuticals, industrial chemicals, cosmetics, and pesticides from water. While bacteria, fungi, and algae have long been used in purification processes, recent research in Europe has found that residual waste from white button mushroom cultivation can aid in removing certain micropollutants. This substrate has proven effective at reducing concentrations of pesticides and pharmaceuticals in contaminated water, suggesting an alternative to current wastewater treatment practices. Furthermore, researchers at Texas A&M University have developed an innovative method to break down PFAS, commonly known as "forever chemicals," using fungi.

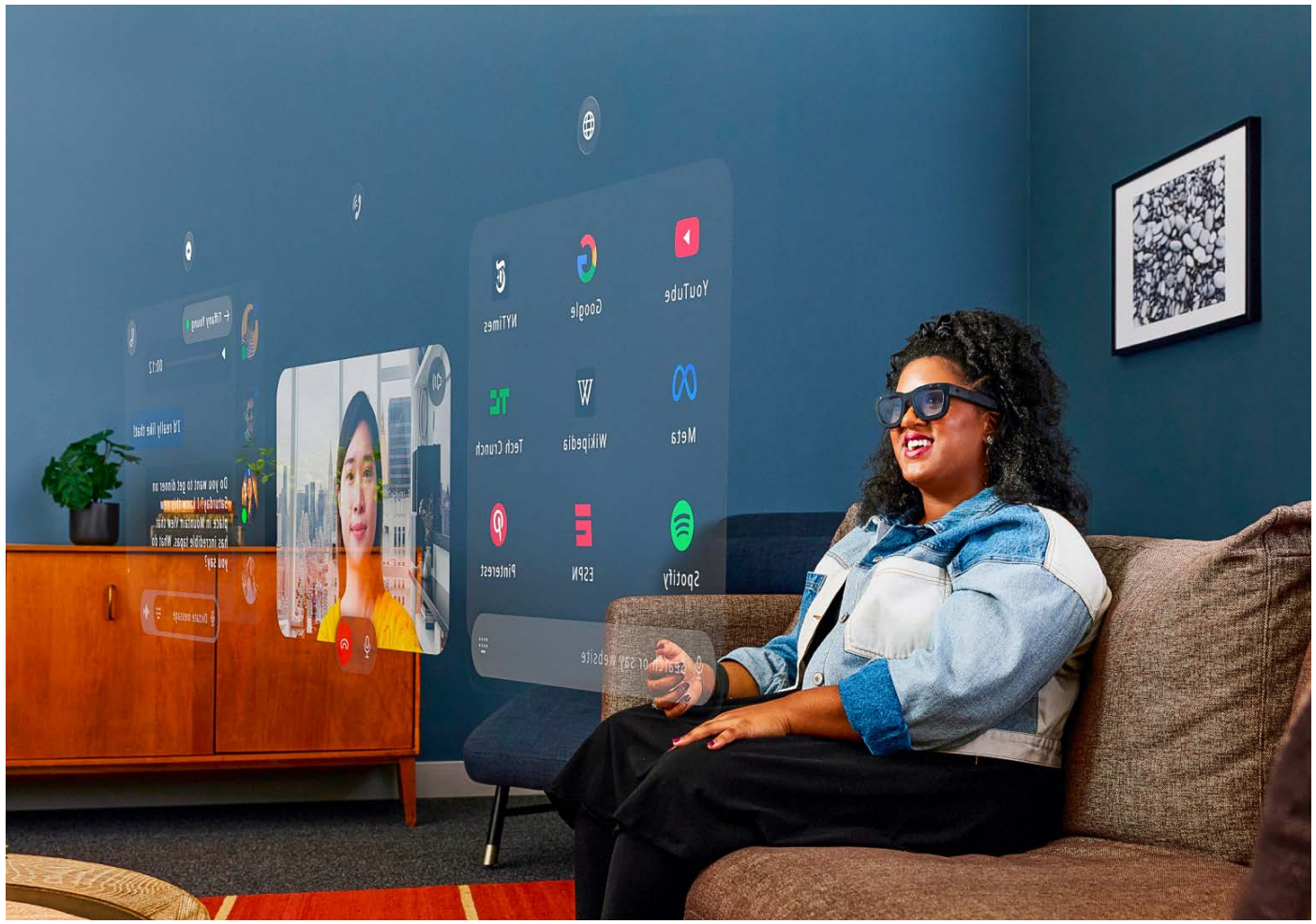
And while fungi can break things down, they can also be used to produce almost anything. The fashion industry is already benefiting from leather made from mycelium, while architects are exploring ways to use fungi to recycle toxic rubble. Cities face challenges with abandoned houses contaminated with lead and other pollutants. When these structures are demolished, the waste can be processed by fungi and transformed into clean bricks suitable for new construction. Construction blocks made from oyster mushrooms are also being used in Namibia to help expand affordable housing options. Additionally, fungi can be used to produce biodegradable, plastic-like materials that easily break down in the environment. Recent research has presented an optimistic prospect: a single type of mushroom could soon replace many traditional plastic products.

"Mycoblocks," bricks made from local mushrooms, are a potential construction material for affordable housing in Namibia and other countries. Photo courtesy of MycoHAB.

A FUNGAL FUTURE. Fungi existed on Earth long before humans and may outlast our civilization. As fungi adapt to break down the plastics humans have left behind, they also reveal plastic-like properties that could revolutionize production lines. These organisms also offer alternative protein sources and sustainable farming solutions, making them increasingly relevant in climate adaptation discussions. Furthermore, fungi may hold the key to sustainable construction, pollution management, and a healthier planet overall. Some applications, such as mushroom farming and fungal-based construction materials, are immediately applicable for planners, while others may seem more distant. However, as we turn our focus to nature-based solutions for urban environments, fungi could become a valuable, age-old partner in creating better living spaces for all.

Deep Dive

Innovations That Could Reshape Everyday Life



Improvements in hands-free AI wearables, like the Orion augmented-reality glasses under development at Meta, could change how people interact with social and built environments. Photo courtesy of Meta.

The world is moving in a number of directions at once, and it's unclear which paths it will take in the future. For now, it's worth examining initiatives at various stages of development. Some may be more certain than others, but all have the potential to generate significant, widespread impacts should they come to fruition. Though the future cannot be predicted, now is the time to watch closely what's on the horizon and learn more about it.

AI wearables show future promise

In an effort to seamlessly integrate technology into everyday life while also curbing reliance upon it, start-up companies and tech giants alike are releasing screenless artificial intelligence (AI)-enabled wearables. Though they've thus far been met with mixed to poor reviews, the AI wearables market is expected to balloon over the next decade, and as AI continues to advance, so too will the products that use it. Should screenless devices become mainstream—a possibility given current desires to reduce screen time (see also Digital Fatigue)—this would signal a change in how people use technology and could impact how they interact with social and built environments.

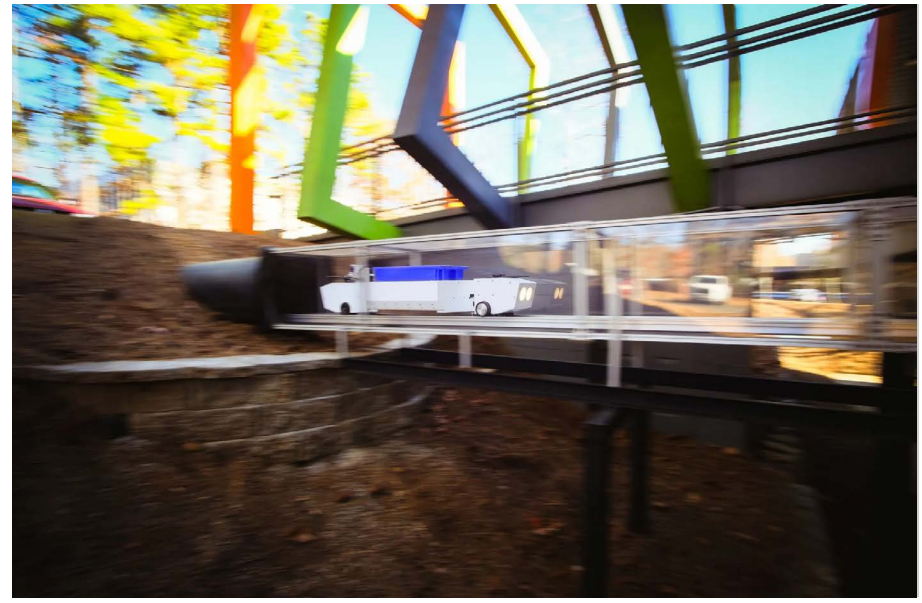
Material gains in material sciences

The scientists at MIT's Self-Assembly Lab who popularized the concept of 4D printing, as described in the *2024 Trend Report*, are looking

to advance materials science even further. They have proposed liquid metal printing and programmable materials that can change their behavior as future mass-production and design methods. Researchers at the University of Chicago's Pritzker School of Molecular Engineering have created shape-shifting plastic that can transform its form and properties with heat and cooling. This technology has various applications, including space travel, where it minimizes the need for multiple tools, as well as in robotics and recycling. Innovations in transparent wood could transform construction, architecture, and even electronics, and one start-up has developed a hydrogel to replace nonstructural concrete in construction. Another company is using bacteria to dye fabrics and build limestone lamps using "biodesign" techniques, and an international team of researchers is working to develop bacteria-enhanced plastics that can break down naturally in a landfill. All of these strategies have the potential to drastically affect how structures and the objects inside of them are built, while also reducing environmental impacts and waste.

Marginal leaps in quantum computing

Quantum computing can quickly solve exceedingly complex problems that cannot be handled by traditional computers. While still in its infancy, the technology is hitting early milestones and has the potential to greatly expand its market size. Interest in this field, however, isn't limited to the private sector. The U.S. Department of Energy recently granted over three dozen awards totaling $65 million to quantum computing research projects, and the state of Illinois is partnering with the private sector to build the largest quantum computing facility in the country. Numerous industries stand to be impacted should quantum computing be fully realized. Drug research in health care, modeling in finance, and traffic optimization in planning are a few of many proposed applications.



Austin-based startup Pipedream Labs' demonstration autonomous underground delivery program in Peachtree Corners, Georgia. Photo courtesy Pipedream Labs.

Food delivery and dining are cooking up changes

The last decade has seen a shift in how people approach the restaurant industry, from the rise of delivery app services to changes in dining behavior. Similar trends seem poised to continue, especially by way of technological innovations. One company has already begun piloting an autonomous underground delivery service beneath a planned community in Georgia, which it hopes will make food and package delivery cheaper and more reliable. Other projects are trying to introduce augmented and virtual reality to dining, and food itself is starting to change; for example, the gene-editing tool CRISPR is being used to improve the flavor of mustard greens. Widespread applications of these technologies could affect how people interact with dining and food—and with each other—though it's yet unclear how readily adopted they'll be.

Hardwiring people for space

Space travel can be risky long after a rocket is launched. Those who go to space are subject to higher levels of radiation than experienced on Earth, which can increase their chances of getting cancer and other diseases. Changes in gravity can also have extended impacts on a person's genes. Consequently, some have proposed using CRISPR to edit the genes of astronauts before they go into space to protect their bodies from long-term impacts. Though such a treatment is not yet possible, the potential for a future with a subset of people designed to live in space—*Homo spatialis*—remains (see also Trend Talk: The Role of Planners in Space Exploration).

The Role of Planners in Space Exploration

Justin Hollander, PhD, FAICP
Illustration by Rebecca Clarke

To listen to the full interview hosted by Joe DeAngelis, AICP, by scan the QR code above or visit planning.org/podcast.

Planners can bring specialized knowledge to help shape cities and settlements in space and on other planets.

Justin B. Hollander is a professor of urban and environmental policy and planning at Tufts University. His research and teaching are in the areas of urban planning, design, and real estate development. He co-edited the book Urban Experience and Design: Contemporary Perspectives on Improving the Public Realm *(with Ann Sussman) and is the author of 10 other books, including* The First City on Mars: An Urban Planner's Guide to Settling the Red Planet. *He is an editor-in-chief of the* Journal of Planning Education & Research *and hosts the Apple podcast* "Cognitive Urbanism".

JOE DEANGELIS: What does the space industry look like today, and what do you see happening over the next couple of decades?

JUSTIN HOLLANDER: First of all, you have the government agencies that we're all familiar with: NASA and the European Space Agency. Countries in Asia are also building their own space programs and actively developing technology to go into space. In addition, there's been a real explosion of interest in the private sector. Many people are probably familiar with the work that private companies like SpaceX and Virgin Galactic have done with space tourism. So this is a big area of growth and investment. And as the cost of these kinds of launches has gone down pretty quickly, I think we can expect further investment.

In many ways humans have already colonized Low Earth orbit, having had a presence in the International Space Station for over two decades. There will be new space stations. The Chinese are about to launch one, and NASA, with other partners, is building another one.

In the coming decades, I think we will see a permanent or semi-permanent presence of humans on the moon. Not only is NASA interested, but there is also interest from the European Space Agency and from China. Before we know it, I think parts of the moon will resemble Antarctica—that is, remote and very uninviting for human occupation and settlement, yet still settled through different missions and scientific enterprises.

Following on from there, both NASA and SpaceX have been very explicit about their hope through the Project Artemis initiative to build a launch facility on the moon that would then bring humans to potentially settle Mars.

It's rare for a planner to think about planning a city from scratch, and even rarer for that city to be somewhere other than on Earth. What do you see as the planner's role in helping to design and plan a city on another planet generally, or Mars specifically?

Today, plans for space colonization are being led by engineers and scientists. Architects are consulted on occasion, but planners are not part of this conversation. Leaders aren't considering what planning brings to the table. In my book, I've tried to take the most salient pieces of our knowledge base related to outer-space planning and put them in one place to show that planners and planning can play a role in helping to shape these cities and settlements in space and on other planets.

For example, science fiction has taught us that cities on Mars will be under futuristic-looking domes. But it's important to understand how important building underground is when you're thinking about a place like Mars. Radiation is a serious problem for sustaining human populations, and being underground can offer protection from that. In addition, it's really cold on Mars, especially in the winter, especially on the poles. So I think we can expect early settlements of Mars to be below grade. From the perspective of planners interested in the history of human settlement here on Earth, humans have been building and living in underground sunken courtyards and cliff dwellings for thousands of years. If planners are part of this work, they can help to bring some of that knowledge to the table.

Planners today on Earth often deal with challenging ethical questions, and going to Mars will likely raise a host of interesting ethical issues. What ethical considerations might planners of the future need to account for when designing or planning a new settlement in an alien environment?

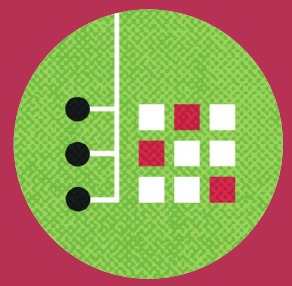
Life in space or on Mars is just so dangerous to humans. Even if it's possible to colonize Mars and to have people live there for long periods, it is certainly not going to be a healthy place. So I think we need to be aware of those risks and those hazards. I told a student of mine about just how dangerous it will be, and he said, "I don't care if I die there. I don't care. I just want to be there." I think that's another dimension to consider regarding the ethics of the situation.

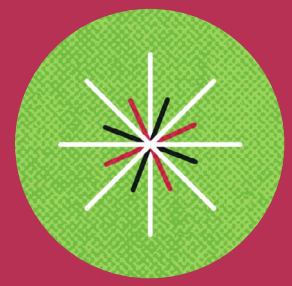
There's a famous trilogy of books on Mars by the author Kim Stanley Robinson, where he does such a great job of grappling with this question of what he calls "planetary preservation." As planners we're used to concepts like historic preservation or environmental preservation. To have a long-term presence on Mars, humans would have to manipulate the climate and the atmosphere. And there's a real destructive component to doing such a thing. The ethical question is: should we just leave Mars alone? Or do we have some sort of manifest destiny to conquer it and make it suitable for human life?

Are there any lessons you think can be drawn from studying the settlement of space and other planets that are useful for planners today on Earth?

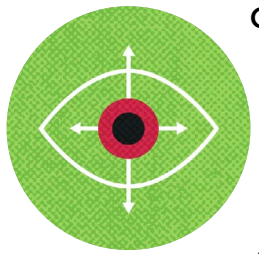
I cannot tell you how terrified I am of the idea of living on Mars. I mean, it's such an awful place—there's no water to drink or air to breathe, and there's no food to eat. We are so lucky that we have Earth. We have something really good right here under our feet. It shouldn't get in the way of us continuing to explore what outer-space planning might look like and prepare for what might happen. But let's be grateful for what we have and continue to love and cherish this planet.

The future of planning





Inclusive Futures and the Role of Technology



Over the past five years, APA has championed foresight and futures literacy in planning, emphasizing the planner's role in crafting resilient plans that lead to equitable outcomes. Like previous trend reports, the *2025 Trend Report* lists around 100 trends and signals that are relevant to planning. This section reflects on how we should evolve our approach to using foresight in planning.

Using the future to bring people together in the present

Foresight is a process of learning with the future, creating multiple plausible imaginings of what the future might look like, and preparing for them. While traditionally rooted in military strategy and corporate profit-making, foresight in urban planning must focus on serving the common good. This requires decolonizing the future—a concept outlined in APA's *PAS Quick-Notes 110* (see also An Inclusive Approach to Futures)—to prioritize diverse perspectives, cultural wisdom, and historically unrecognized voices.

Decolonizing the future is an ongoing process of learning and unlearning. It involves creating spaces where all voices, including those of future generations, can influence decision-making. It challenges traditional power structures and redefines expertise, fostering resilient and inclusive communities that respect everyone. By embedding equity and cultural diversity into planning, foresight becomes a tool for empowerment and sustainable progress. Planners can use futures thinking to unite people in the present.

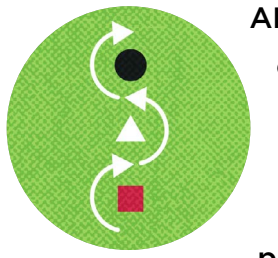
Applying technology with a purpose

The potential and opportunities to leverage technological and social innovations in our work have never been as promising as they are today. Innovative solutions that support co-creation and more inclusive participation can help us to listen more and better understand the most vulnerable and their needs.

Trends such as artificial intelligence (AI) and automation may evoke fears of job displacement, but they also offer opportunities. Ethical and equitable applications of AI can improve planning processes, freeing planners to focus on community engagement. For example, automation can replace tasks like permitting processes, allowing more time for human-centered work.

However, some technological innovations have introduced new stresses, such as social media toxicity and mistrust of Big Tech. Planners must guide technology toward meaningful applications, using it to enhance lives, foster equity, and create sustainable outcomes. This challenge presents an opportunity for planners to lead meaningful change in an increasingly complex world.

Upskilling



APA uses foresight to identify current and future skills gaps related to emerging trends and addresses them through the Upskilling Planners program. This year, key areas for planners to focus on include building relationships, navigating complex challenges, and leveraging digital tools.

Strengthening relationships across communities and stakeholders

In today's diverse and polarized communities, the human skills of active listening, cultural humility, and self-awareness are essential. Fostering trust and collaboration requires planners to communicate effectively about sensitive topics, such as climate change and equity. The APA webinar Navigating the 'E-Word' Across Conservative Landscapes provides strategies for addressing equity using alternative terminology to encourage dialogue.

Conflict resolution is another critical skill for planners. APA's online training Mastering Conflict for Effective Planning teaches strategies to diffuse tensions and uncover community concerns, while Empathy, Equity, and You emphasizes using compassion to co-create equitable solutions.

Cultural humility is increasingly important as shifting demographics and climate migration reshape communities. Planners must respect diverse values, recognize their own biases, and approach planning with equity and objectivity.

Navigating complex challenges through collaboration and communication

As planning issues grow more complex, cross-disciplinary collaboration is vital. For example, integrating artificial intelligence (AI) into urban systems requires partnerships with tech experts and government agencies. Planners must also communicate effectively with varied audiences—elected officials, community members, and professionals from other sectors—using clear, jargon-free language.

Strategic communication is key in aligning stakeholders toward shared goals. By bridging diverse perspectives, planners can turn visionary ideas into actionable projects. To support this, APA is developing new communication-focused training programs launching this year.

Innovating with purpose in the digital planning era

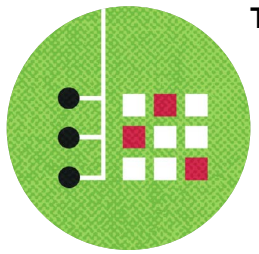
The rise of digital planning has transformed public engagement and urban management. Tools such as extended reality allow planners to present projects immersively, while online engagement methods expand community participation.

Digital twin technology, offering real-time urban simulations, is becoming indispensable for data-driven decision-making. To equip planners with these skills, APA is creating training programs on digital twins, available soon.

Adaptability and critical thinking remain crucial for adopting innovative tools while balancing ethical considerations. Planners must leverage these skills to create inclusive, forward-thinking solutions for the future.

By focusing on these areas, planners can address emerging challenges and lead communities toward resilient and equitable futures.

PlanTech: Updating the Planner's Toolkit



The accelerated pace of technological development challenges planners' abilities to stay ahead of innovations and leverage new tools that can improve outcomes for organizations and communities. This section highlights recent technological frameworks and tools for planners to consider in their day-to-day work. A comprehensive list of technologies covered in previous *Trend Reports* is available on the APA website.

Resilience of digital systems

Digital system resilience refers to a system's ability to maintain its core functions while preventing, detecting, and recovering from an event. As early mainframe computers have evolved into today's interconnected cloud infrastructure, this resilience has become increasingly critical. It requires an architecture that is complex, distributed, and interconnected, enabled through advancements in telecommunications infrastructure, computational capacity, and storage. While this new landscape can yield benefits, such as more efficient or automated workflows, faster processing of data, better insights into complex datasets, and enhanced communications across previously siloed arms of an organization, it also introduces numerous vulnerabilities.

There is a dire need for organizations to continuously assess and implement security measures and resilient system architectures. To that end, the National Institute of Standards and Technology (NIST) and other authoritative organizations offer guidelines for ensuring the resilience of digital systems. Planning practice and digital system resilience are intrinsically linked; however, planners may struggle to relate this information to their daily practice. Reaching out to IT colleagues to implement best practices for staying on top of cyber risks is a good first step while waiting to see what the profession's role will be in the protection and maintenance of these systems.

Cloud data usage

As the movement towards smart cities continues, the need for cloud computing, data storage, and teleconferencing has introduced cybersecurity and data protection challenges into the planning process. Not only do planners have obligations to support organizational defense against cyberattacks, they must also manage permissions and ensure equitable access to platforms. To support digital resilience as it relates to the cloud, planners can embark on a variety of actions, including educating themselves on sharing permissions and common cybersecurity threats such as phishing attacks; collaborating with IT departments to implement dual authentication and encryption; and understanding data protection requirements, such as data residency and sovereignty. Agencies can also develop strategic plans for integrating cloud software that make the transition more thoughtful and controlled.

Computer vision

Computer vision (CV) is a technology that uses artificial intelligence (AI) to enable a computer to identify objects from visual inputs such as photos and videos. CV can be used throughout the planning process, though it tends to be used most heavily in the early stages of problem identification and data collection. Specifically, CV can help to digitize infrastructure, enable observation of built environment interactions through programs such as Ecocounter, and digitally recreate a space in 3D using

reality capture. CV also comes with its share of risks, however, including privacy and biasing concerns, which planners should be aware of before using the technology.

AI integration and uptake

The AI boom has persisted and the market continues to expand, though some are beginning to question the efficacy of recent models amid lackluster adoption and limited public awareness. Governments are proposing legislative efforts to regulate AI, both in the U.S. and abroad, even as they adopt the technology themselves. Still, planners have opportunities to engage with AI in their work. AI can be used to generate images that help visualize the potential outcomes of a project or automate development and building code processes, and one large language model (LLM), called PlanGPT, has been developed exclusively for planning use. AI is also being used to augment smart cities—especially in the realm of traffic management and rule enforcement—though this form of technology can be costly to maintain, and some initiatives don't account for all modality types.

Another emerging use of AI is its convergence with geographic information systems (GIS). GeoAI is helping make GIS accessible to a larger audience while offering expanded methods of analyzing data. Through the use of AI assistants, planners can use prompts to ask questions of geographic and tabular data to quickly gain insights into issues such as permitted uses, future land use, development restrictions, and more. Still, planners should be aware of AI's limitations and exercise caution when engaging with it.

Generative AI ethics

With the increased attention toward AI, planners must be mindful of the ethical implications and limitations of its use. AI offers both potential benefits, such as workflow improvements and data processing, and potential drawbacks, including privacy concerns and environmental damage (see also Deep Dive: AI's Double-Edged Sword). Some frameworks attempt to help planners to navigate this dichotomy, and stringent guidelines are recommended to mitigate the associated harms. Planners should also be aware of disclosure policies relevant to their work, which often vary across institutions and governments. New laws, such as the California AI Transparency Act, require disclosure of AI use in content. Planners should also be mindful of the risks of inputting sensitive data into a large language model (LLM), as well as the reputational effects of using AI, particularly when it's inaccurate.

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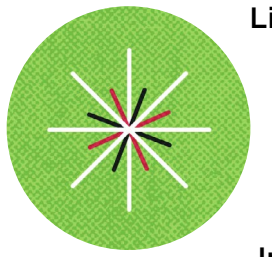
Conclusion



Like previous trend reports, this fourth *Trend Report for Planners* by the American Planning Association, in partnership with the Lincoln Institute of Land Policy, highlights the unprecedented complexity and rapid change shaping our era. Understanding and preparing for the future has never been more critical for planners. The trends and signals identified in this report—and their potential impacts on communities and the planning profession—underscore the importance of proactive planning and preparing communities for future uncertainties.

This report is designed to help planners navigate a dynamic and interconnected landscape. While not all trends will directly affect every community, their ripple effects often transcend boundaries, making it essential to consider multiple future scenarios and prioritize resilient and equitable solutions.

Building on past reports, this edition emphasizes new and emerging topics that planners should address in the coming year. It represents a process of "learning with the future," enabling planners to adapt to evolving challenges and uncertainties. Core themes such as climate change, artificial intelligence, housing, health, and transportation persist, yet within each lie shifting dynamics that profoundly influence planning efforts. Global economic disruptions, technological advancements, and demographic shifts are just a few of the external drivers reshaping local contexts.

While the future may seem daunting, it is also filled with potential. Global and local challenges require innovative solutions, and the possibilities offered by social and technological advancements are limitless. Now is the time to embrace and apply these solutions in equitable and sustainable ways, turning complexity into opportunity.

APA and the Lincoln Institute remain committed to providing planners with the knowledge, tools, and strategies necessary to address today's challenges while preparing for an uncertain future. By incorporating emerging trends and foresight into planning practices, communities can thrive amidst change, building resilience and inclusivity for the years ahead.