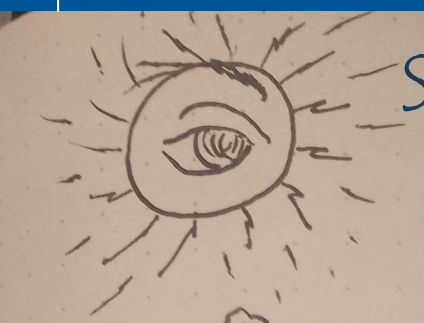
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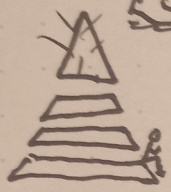
A Publicati on of the International Division
of the Ame rican Planning Association



Seeing like a Sun 1
EMMA RAGNHOF – MICROCLIMATES



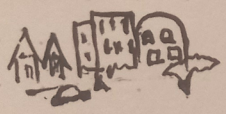
Right to Walk: Promoting the Streetscape as a Third Space 4
MAITREYI C , NIYAFA NAUFAL – COMPLETE STREETS

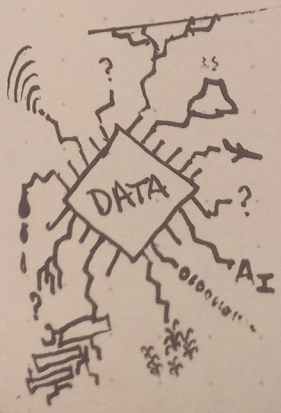


Awareness Before Intervention 6
IRINA BUSURINA – COMMUNITY OUTREACH



Investment-Ready Cities: Strengthening US-Vietnam urban development cooperation 9
MAI NGUYEN – VIETNAM





Rediscovering scale in cultivation of urban charm 11
NAAMA BLONDER AND MISHA BERENZYAK – URBAN THEORY

Data Centers as a New Land Use: Six Questions 14
TIFFANY LUO – SITING DATA CENTERS

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City of Fences



Faceoff between fence and facade

Sometimes changes start sprouting up in cities like weeds in a garden, little noticed at first, but which can eventually take over. Defensive architecture is one of those weeds which we would like to live without. It reminds us of a time, not so long ago that older buildings still remember, in which neighbor trusted neighbor and outsiders were few. Now our buildings tell the story of a culture gone mad, in which people seek the comfort of iron bars separating them from the world, of which we are all one.

What had to have happened for consensus to preside that the yards with which our houses were designed now need to be wrapped in fences to adapt to the times, one neighbor at a time, until the fence has become a line without end? The enclosed yards remind us of a time, we can't quite remember just when it came to an end.

Certainly the world is no more dangerous now than in times past, and we've been building fences and walls since the time before time. What makes it today such a crime? These days, you just never know when a fentanyl-crazed man might let himself in, hungry for blood. Now we all have to defend our property like never before against the dangerous classes, the hoards and the masses. Next thing you know and we'll all need to carry guns, too!

It isn't only older neighborhoods, built to be streets lined with yards, that have adapted to the times to ring their grass with fences, but new neighborhoods, too, designed from the start to hide a yard behind bars so that passers by might stop to look in on the lifestyle of people who choose to live in houses designed as though they were zoos.

Ancient old buildings in some of our oldest neighborhoods still seem to work in this modern world so committed to fences, because not getting broken into is nothing new. Back then, the wall did the work of separating inside from out, it was the dividing line between public and private, then we planners, came up with a solution to the lack of urban trees and began to require a buffer of private space between sidewalk and facade. And in this space the idea also sprouted that this little strip of private space must also be defended. Lawns and gardens came to serve the role of moats, to draw in spectator's eyes on what cannot be tread. Is it any surprise that people would eventually decide they would be better off with a gate? And if the message of the street lined with lawns is 'enjoy my beauty, but keep moving and do not touch,' what message does the street lined with fences send to those to pass by?

Gates and walls come at different scales. Think of the Great Wall of China, the Limes wall between Rome and the Germanic tribes or the US border wall – this separation between

insiders and outsiders is at a grand, civilizational scale – and then we can find innumerable examples of walled cities, built to keep out marauding armies and to allow guards to decide who could and could not enter, but which encircled a whole community, from farm hands to city dwellers. Modern walls define us more narrowly, the dwellers of an exclusive enclave who gate their communities to keep it composed of people like themselves, and, of course, to admit those who they hire to clean, if only they promise not to stay. We've scaled the urban wall down to the fences around apartment buildings, or even around single-family homes. We've even fenced in our back yards to keep our neighbors in their places. Such a narrow sense of identity, of who is in and who must be kept out. Solidarity and community distilled down to the bare building blocks – not society, just individuals.







Perhaps if we go back to the old way of letting the walls do the work of protecting what's precious and charge the public with beautifying streets with landscape and trees, we can solve the problem of that liminous private space that tempts us with with something to defend. Perhaps we could reinvent an aspect of that world for which our nostalgia yearns where the walls defend only once, without a secondary line of defense, if only we were to drop the requirement for setbacks and yards.

Can we keep ourselves safe and still have a yard? How have people solved this riddle in the past? Courtyards, back yards, parks, and other kinds of commons have served city dwellers for centuries. Zaguans, entry hallways that create a flagpole lot often open up to a mid-block courtyard, can be used to create a sort of front-yard residential experience, while also creating an opportunity for commercial street frontage, keeping the street active, creating a sort of mixed use where the interior of blocks is residential and the exterior commercial.

As the mayor of Oakland in the early 2000s, Jerry Brown ran an anti-blight campaign to remove tall fences and barbed and razor wire and chain-link barriers, which, he argued, depressed property values. This was accompanied by an effort to attract new residents by adding what was called "elegant density." Rules against fences may be one way to get rid of fences, but imagining architectural alternatives to address the deep-rooted desire for a sense of safety force us to stretch our imagination to imagine new possibilities for

placemaking and urban design. Imagine for a moment an urban landscape that incorporates greenspace and shade from trees without relying on private yards. Imagine this in a dense downtown, a sleepy suburb, and somewhere in between. What would be different about the layout of parcels and blocks? And what would have to change in your zoning code to implement whatever it is you are imagining?

Certainly it wasn't LeCorbusier's vision for the gardens of the city to be put into cages, but that is what happens when his vision of towers in parks is put into zoning codes that require landscaped setbacks proportional to tower height. The city of fences represents a disconnect between the values we intended to write into our zoning, which was to correct for the short-sightedness of our antecedents, who designed our downtowns with too few trees and too little green. We may opt to look at the iron bars protecting the city's private gardens as a temporary solution to the insecurity of the moment, and tell ourselves that the way we have designed our setback and greenspace rules is good, and that it is merely temporary and local circumstances that have produced fence-lined streets. We can tell ourselves that some day, whe the world is less mean and we have eliminated poverty and created universal health care, the bars can come down, and until then, as a gift to future generations, we will suffer the hostile architecture that represents a mismatch between the vision that guided our plans and the values we live by. This would require that we recognize the fence-lined streets that are popping up like weeds in city after city, neighborhood by neighborhood, as the result of a flaw in our theory. Or we can modify our theory to design the kinds of places we want to live in that include sufficient trees and greenspace and provide a sense of security that allows us to live in communities that don't need to reinforce their divisions along property lines with wrought iron fences.

Sky Tallman, AICP, *is the editor for InterPlan and an independent urban planning consultant and author of Metrocoalescence, Zoning for Incremental Growth in the Self-Organized City.*





Microclimates

Seeing like a Sun

An alternative approach to urban microclimate

Emma Ragnhof

Imagine seeing like the winter sun. From your low hanging vantage point, you see only the parts of town that reach upwards, or which lie unobstructed, as expanses of streets and plazas provide clear paths of travel for the unrelentingly straight path of your photons[1]. Yet even where plazas and streets allow your gaze to travel freely, what ends up filling most of your field of vision is not these upwards facing expanses, but the south facing surfaces that flank them – walls, plinths, doorways, stairways and hills alike.

When you hit these surfaces, you warm them up. And because the winter air is dry, it takes only a moment before the surfaces are practically buzzing with your charge.

The black surfaces are particularly receptive, as they absorb all your wavelengths, unlike white, which reflects them.

Here, heat-loving creatures like lizards, critters and humans alike take notice of you, and ones that come by tend to postpone for a while whatever endeavor they were up to, take pause, and press themselves against these surfaces, not wanting to be anywhere more than here.

Though your weakened winter power may not be enough to outright heat them up, their heat loss to their surroundings is nonetheless drastically reduced. Not to mention that your touch affects their brain chemistry and their skin, releasing Vitamin D and endorphins that start flowing through them.

Now, here, on this short winter day, you're a scarce and treasured resource, and there is nowhere these creatures would rather be than with you.

A seemingly unsolvable conflict

With this story I wish to show that in winter, also known in micro-climatology as the marginal season, the sun is an attractive feature, if not the unrivaled most attractive feature, in urban spaces[2].

And yet this perspective profoundly conflicts with the state of the art of micro-climatology, where the warming effect of sun is overwhelmingly understood as harmful. This understanding permeates throughout:

- Academic literature
- Research fund strategies
- Municipal visions
- Consultancy reports

[1] Or the unrelentingly wavy path of them, but I digress.

[2] In rural spaces sun is sought out as well, but here the sun is a more abundant resource, whereas the dense fabric of the city tends to render the sun more scarce – unless the south facing surfaces are utilized.



In this anti-warming context, a terminology, methodology and solution-complex seems to have converged into a paradigm consisting of:

1) A terminology which describes the warming effect of sun as "Urban Heat Island Effects" (UHI).

2) A methodology which tends to employ microclimate modelling and microclimate measurements, to locate and measure instances of overheating.

3) A solution complex which tends to recommend large area cooling interventions, such as tree canopies, water features, blue-green infrastructure (BGI) and nature-based solutions (NBS), aiming to eliminate instances of overheating, wherever or whenever they occur.

Within this paradigm, the story of the precious resource of winter sun fits awkwardly – nay, it has no place at all.

But can the state of the art of microclimatology be altered to encompass it, and how does this synergize with other - and within this context overlooked - contributions?

The historic tradition of thermal-temporal devices

Perhaps the simplest way to resolve the conflict of sun as either good or bad is through a temporally sensitive approach, recognizing sun as attractive in winter, and shade as attractive in summer.

And indeed, several academics have called for temporally sensitive approaches, recommending the tailoring of time-specific solutions – thermal-temporal devices, if you will – across various scenarios - all seasons, all weather cases, and all times of day - thereby circumventing the value judgement of sun as neither good nor bad.

In fact, many pre-modern design practices, such as loggias, courtyards and chahar baghs indicate that this temporally specific approach, and the employment of a diverse range of thermal-temporal devices, has been the historic norm, rather than the exception.

By comparison, the contemporary approach appears unusually generalized in its aim, favoring solutions that work as much time as possible, over as large an area as possible. This large-scale-large-timeframe perspective appears to coincide with the emergence of microclimate modelling software[1], which – apparently by design - nudges the user towards large area impact, across prolonged timeframes.

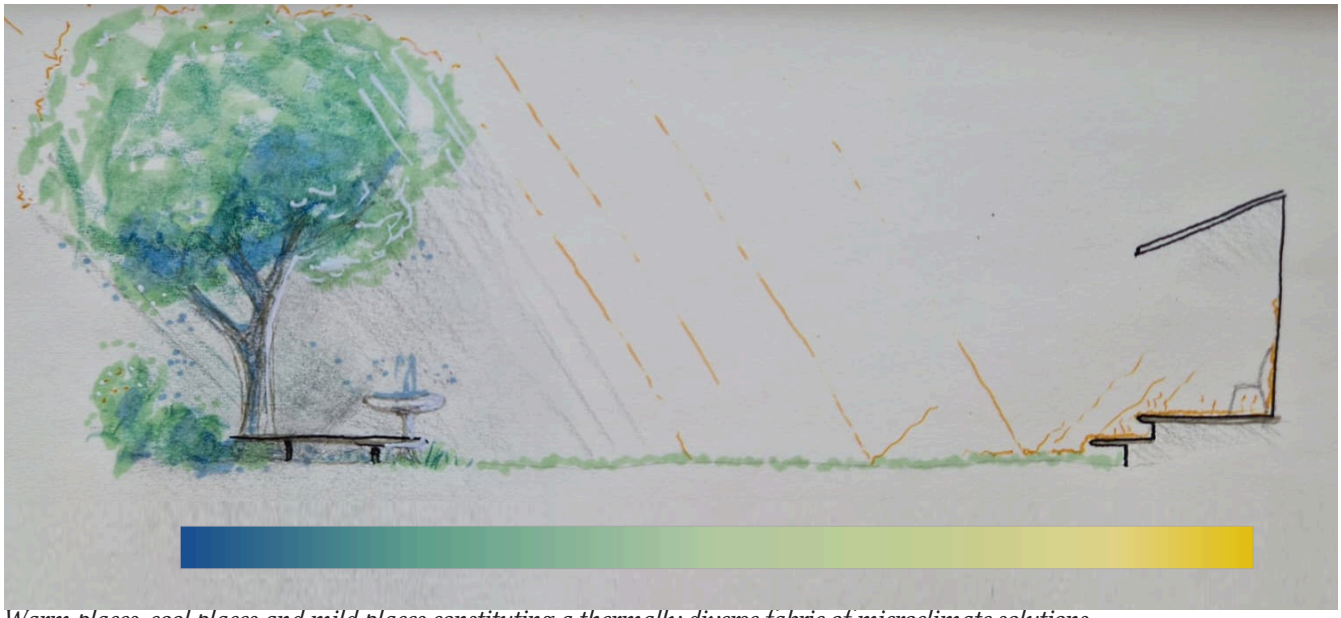
In doing so, solutions converge a relatively homogenous 'optimum', compared to the older practices, which tend to converge on a rich variety of thermally contrasting solutions, none of which are intended to stand alone, but which instead achieve a high 'level of service' when existing in proximity to each other.

Thus we have two approaches which seem to be fundamentally at odds – so much so that the one approach has entirely decoupled from the other, with one falling into obscurity, and the other dominating to the extent that it is the only one receiving funding, thereby constituting a self-reinforcing feedback loop, echoing across academia, academic funding strategies, governance, and consultancy.

In the following, I will attempt to make a case for an alternative approach, which circumvents value judgements of sun as either good or bad through consistent temporal specificity, thereby hopefully bridging the gap between the two approaches.

Against microclimate optimization, in favor of microclimate rhythmanalysis

[1] *In the solutions generated through microclimate modelling software, there appears to be a phenomenon not unlike convergent evolution, as recommendations appear to converge on the generally elegant, albeit primitive (compared to pre-modern microclimate design) thermal device of trees.*



Warm places, cool places and mild places constituting a thermally diverse fabric of microclimate solutions.

Insofar as microclimate optimization aims that every unit of surface is comfortable as much of the time as possible, it replicates a relatively monotonous fabric of microclimate solutions, effectively narrowing the operating envelope of the city.

A wider operating envelope can be achieved through a diverse fabric of varied microclimate solutions. The varied microclimate solutions can be pursued as follows:

First, adopt the perspective of the low hanging winter midday sun. In the places that are visible from here, aim to make warm places.

Second, adopt the perspective of the high summer midday sun. In the places which are out of view from here, aim to make places of cool respite.

Third, seek to connect these places with a fabric of "milder" or more moderate microclimates, thereby enabling a rhythmic flow throughout the days and the seasons, as users occupy which ever place they find comfortable.

The earliest point in the year, at which the warm microclimates are comfortable for prolonged sedentary occupation, may be called the "cool edge case".

The warmest point of the year, at which the coolest microclimates are comfortable for prolonged sedentary occupation, may be called the "warm edge case".

This approach may be called a rhythmanalysis , or a seasonal edge case analysis.

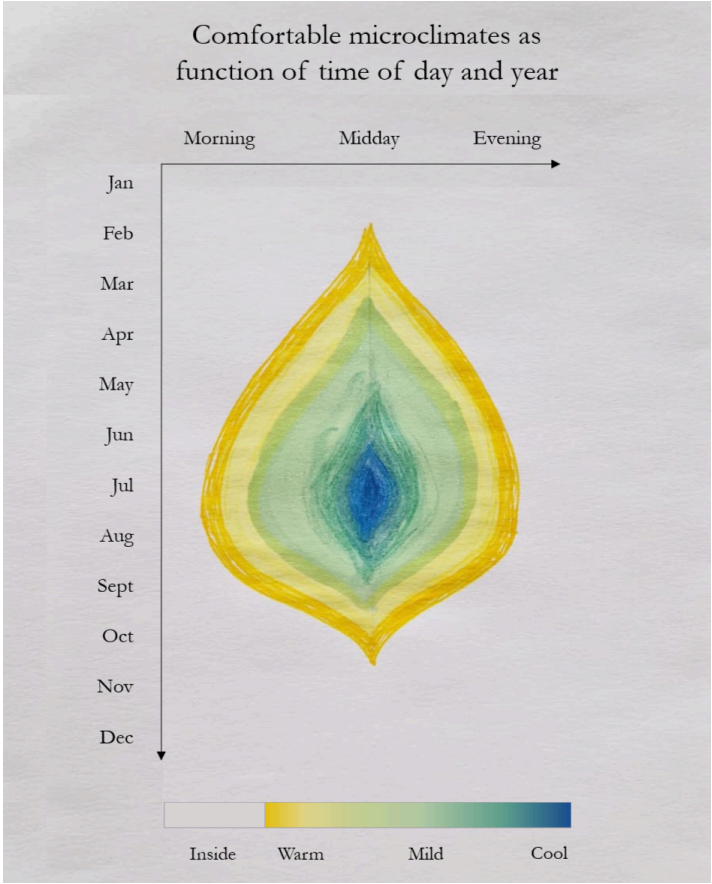
In this approach, no thermal phenomenon is either good nor bad: Heat Island Effects are positive when it is cold. Wind chill and wind tunnel effects can be positive when it is hot.

In other words, heatwave heat island effects are understood in this framework to be a non-problem as long as there are comfortable places nearby, and comfortable paths to get to them. Thereby this approach embraces that, come nighttime, any spaces that were overheated during the day can be appreciated as they radiate residual warmth, enabling long, pleasantly warm summer nights.

This approach aims to resolve the apparent case of Goodhart's Law[1] in the contemporary, optimization-oriented microclimatology paradigm:

Our microclimate objective function of comfort as much of the time as possible, in as many spaces as possible, inadvertently narrows the operating envelope of our cities, thereby yielding rapidly diminishing returns toward the goal of

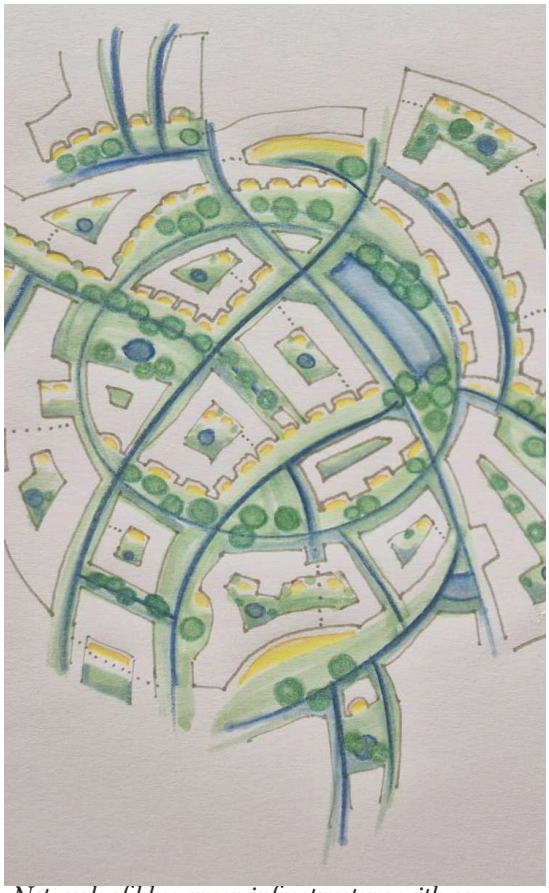
[1] "When a measure becomes a target, it ceases to be a good measure"



the city that is experienced as comfortable as much of the time as possible. And but when a tree falls, and there is no-one there to hear it...

For now, it appears that the global optimum is likely found in the direction of a wider range of microclimates – from cool, to mild, to warm. Not microclimates guided by optimization. Microclimate guided by rhythmanalysis. Microclimate guided by seeing like a sun.

Emma Ragnhof is an arctic civil engineer and urban planner from Denmark with five years behind her in Greenland. She authored the book "Cities for Seasons – In favor of microclimate diversity in the world's most livable cities," inspired by her master's thesis of the same name. Her work focuses on welfare cities, as approximated by life between buildings, soft edges, third spaces and the third sector, with emphasis on everyday movement patterns. Emma holds a BEng in Arctic Civil Engineering from The Technical University of Denmark and a MSc in Nordic Urban Planning Studies from Roskilde University.
https://www.linkedin.com/in/emma-ragnhof-932217132/
Access the full thesis here: https://doi.org/10.31235/osf.io/hj7qd_v1
Access the book here: https://citiesforseasons.com



Network of blue-green infrastructure with an archipelago of heat islands and cool oases

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Complete Streets

Right to Walk as a Way of Promoting the Streetscape as a Third Space

Maitreyi C (President, NOSPlan), Niyafa Naufal (Secretary General, NOSPlan)

Every day, millions of people in India step off the curb and step into traffic because, in most cases, the footpath is absent, broken, obstructed by parked vehicles, or discontinued along the street. The road becomes the only available space for walking and other street activities.

For decades, Indian transport engineers ignored the footpath or considered it as an optional checkbox while drafting road plans. Whatever was left from the carriageway was considered the "footpath." Often, when these carriageways were expanded using up the so-called footpaths.

In June 2026, the Supreme Court of India changed this order of priority. The case arose from a tragedy in which a 5-year-old boy was killed by a tanker while walking to school with his father on a road that did not have a footpath. The Court held that walking is a fundamental right and affirmed that every person is entitled to the right to a safe and clearly demarcated footpath.



The same pedestrians who were once viewed under the Motor Vehicles Act as liabilities to be insured against are now legally elevated above motorized traffic, holding an enforceable constitutional right to walk that takes precedence over vehicles.

A footpath is not just for transportation, but the space where hawkers and customers engage in the daily informal economy's conversation, where children walk to school, where the elderly stroll, where a political rally coalesces before it goes to the street. When a footpath is lost to encroachment, lack of maintenance, or just by not being there, it is not only the safety of the pedestrian that is reduced; the public realm itself is diminished.

Of the estimated 1.19 million road traffic fatalities globally, India contributes to approximately 11-13% annually. This amounts to over 168,000 deaths, despite accounting for less than 2% of the world's motor vehicles (World Bank & WHO Global status report). Out of these total fatalities in India, nearly 67%-70% are vulnerable road users (pedestrians, cyclists and two-wheeler riders). Pedestrians alone account for over 20% of national road deaths (MoRTH).

High pedestrian casualties are a system problem, not a personal one. Rather than rash driving or recklessness, the danger comes from poor urban planning and roadway design. India's massive informal sector operates on street margins out of economic necessity.A paucity of parks and plazas means that the streets serve as the country's main urban third space. Without dedicated footpaths or organized vending zones, this public life is forced to mix with active traffic lanes, turning essential community spaces into lethal hazards. The street is not just meant for moving vehicles, it is a dynamic and multi-purposed public space which is now recognized in the law.

To see what a street could be, it helps to understand what third spaces are. The sociologist Ray Oldenburg described the "third

place" as a space outside home and work where people meet without obligation, such as a tea stall, a market area, or a neighborhood square. These "third spaces" are open to all, safe, welcoming, easy to reach, and free to use. Every city needs them, yet they are disappearing as public life moves into malls, cafes and other paid private places. This shifting of public spaces to those that charge for entry has severely limited access to public spaces for children, teenagers and the elderly who often cannot afford such spaces.

This judgment offers a way to see the streetscape as one of these third spaces. The judgment essentially treats walking not only as a means of transport but also links it to freedoms of expression, assembly and association, and recalled walking traditions such as the Dandi March (2026 INSC 647 | 2026 SCO.LR 6). A footpath is also a place where people talk, gather, and take part in public life.

Implementing this ruling will change how streets are planned. Firstly, it changes the order of design. If walking must take precedence over vehicles, then the footpath space must be allocated first and the carriageway fitted accordingly.

Secondly, it turns the footpath into an obligation. The ruling has placed the duty to provide and maintain footpaths on municipal bodies, development authorities and rural local bodies (In the US, it is often the responsibility of the adjacent property owner to maintain sidewalks). Hence, this must be reflected in the various plans, projects, road design standards and budgets as a mandatory requirement.

A footpath that is built only for the movement of pedestrians is just a corridor. A footpath that invites people has to have shade to get reprieve from the heat, benches, lighting, and vendors. If the right to walk is understood to be a right to public life as much as it is about a right to safety, then these elements must be provided, too.

Two Indian examples illustrate the concept of the streetscape as a third space well. In Chennai, the Pondy Bazaar pedestrian plaza was opened in November, 2019 on a busy shopping street in T Nagar. It significantly reduced the carriageway area, converting it to expandedfootpaths. The footpaths on both sides have seating, sheltered bus stops, toilets, and spaces for vendors. This was Chennai's attempt to treat a street as a place for people, and its amenities show what a footpath can offer beyond just movement. The road now attracts people who come for the purpose of shopping as well as leisure. It has also become a performance space with local music bands and street plays taking place.

In Bengaluru, the traditional katte system has existed for decades but is unfortunately being cleared away for development lately. The Katte is a raised platform around a peepul tree, where people socialise, vendors gather and children play. It became a natural third space because it offers shade, a place to sit and a reason to stop.

The Supreme Court ruling on right to walk is a legal win, but its value depends on what planners and cities build. A footpath designed for movement follows the law, but it is only a footpath that lets people stop, sit and gather that fulfills the potential of this newly recognized right of Indian citizens. Chennai shows what deliberate design can achieve and the Katte shows what people create themselves when given a space. Cities should strive to design and provide both. The challenge is now on to planners to make the footpath a place worth staying in.

Maitreyi C and Niyafa Naufal represent NOSPlan, an organization of planning students that aims to connect students with planning professionals across India.

Community Engagement

Awareness Before Intervention

Developmental Alignment as a Framework for Urban Planning and Placemaking

Irina Busurina

A project can have vision, resources, and professional expertise, yet community participation remains limited. Stakeholder alignment can take longer than expected, and carefully designed interventions struggle to become part of the social fabric of a place.

After years working in architecture, participatory public art, community facilitation, and cultural placemaking, I have observed a consistent pattern: successful interventions begin with awareness of where the community is in its development.

I call this *Developmental Alignment*: a framework for connecting the developmental capacity of a community's social infrastructure with the type of intervention being introduced. Before designing solutions, practitioners first examine existing relationships, values, trust, and capacity.

The answer to the question, "What project should we bring?" comes from the answer to the question, "What does this community need at this stage of its development, and how can this project serve those needs?"

The same developmental logic that shapes individual growth can also be considered across three interconnected scales: individual, community, and place. Maslow's hierarchy of needs describes a progression from foundational needs and safety toward belonging, esteem, and self-actualization.[1] Developmental Alignment explores how related developmental conditions can be considered in community and place.

Three developmental phases

1. Foundation: Stability and Trust

The Foundation Phase focuses on stability. Communities develop relationships, trust, shared values, and structures for participation. This social infrastructure creates the conditions for future growth.

This emphasis is consistent with research on social capital, which examines how networks, trust, community cohesion, and collective capacity support communities. Forrest and Kearns describe social capital as including networks and norms that influence community cohesion and collective action, while Lochner, Kawachi, and Kennedy distinguish related community-level concepts such as collective efficacy, neighborhood cohesion, and community competence.[2]

The questions are: What do we need? What creates safety and reliability? How do we build

	Foundation →	Activation →	Contribution
Individual ↓	Stability Safety, belonging, building personal capacity	Identity Personal values, strengths, what makes me matter	Contribution What can I offer? What legacy do I build?
Community ↓	Trust Shared values, reliable structures, collective capacity	Belonging Shared stories, local identity, cultural meaning, collective ownership	Civic Leadership Regional influence, knowledge exchange, co-creation at scale
Place	Infrastructure Basic systems, accessibility, safety, gathering spaces	Cultural Identity Place narrative, distinctive character, experiential quality	Regional Impact Radiating influence, innovation, legacy model-building,

trust? What can we sustain together?

At this stage, practitioners can prioritize consistent presence, listening, acknowledgment of local history, and small opportunities for participation. A gathering, a series of conversations, or a simple shared activity can establish relationships that subsequent interventions will depend upon.

Research on community efficacy similarly suggests that collective capacity develops through social capital, civic infrastructure, and local conditions that enable people to act together.[3]

2. Activation: Identity and Belonging

Once a foundation exists, communities begin defining what makes their place meaningful. Local identity strengthens, participation deepens, and people move from involvement toward co-creation.

This transition connects with research on place attachment and community participation. Manzo and Perkins describe place attachment as an important connection between environmental and community psychology and planning practice, noting that attachment to place can support community participation and collective action.[4] Research by Kao and Sapp further found that bonding and bridging social capital, together with trust, are associated with stronger community attachment.[5]

The questions become: What do we value together? What creates belonging? What stories, traditions, and experiences represent this place?

Cultural programming, public space experiments, and collaborative design can become effective at this stage because people have developed enough trust to shape meaning together.

Research on place attachment and community development also suggests that emotional bonds to place can interact with community capacity, reinforcing the relationship between social development and the experience of place.[6]

3. Contribution: Civic Impact

When a community achieves stability and trust and develops identity and belonging, it is ready to start developing capacity. The next stage is when communities begin looking beyond their immediate boundaries, initiating projects, sharing knowledge, influencing broader systems, and contributing to the wider city.

This connects with research on community capacity and collective capabilities. Recent community-engaged planning research in South Vancouver argues that planning for complete communities needs to consider not only physical and social infrastructure but also residents' agency and capacity to shape their communities.[7]

The questions evolve: What can we contribute to the wider city? What knowledge can we share? What legacy can the people in this place create? How can we access city-wide resources to build the infrastructure/project that is needed locally?

Regional partnerships, civic innovation, leadership, and knowledge-sharing can emerge from this stage because the community has developed the foundation and identity required to contribute.

Three phases in the development of a community follows the same developmental logic, and can be considered simultaneously across the individual, community, and place.

An individual building personal stability asks different questions from someone seeking to contribute. A new community developing trust requires different strategies from a community with established civic networks. A neighborhood strengthening basic infrastructure requires different interventions from a place developing cultural identity and regional influence.

The scales influence one another. Individual capacity influences community participation. Community relationships influence the quality of a place. Place creates conditions for further human development.

Research examining sense of community similarly identifies relationships between social capital, citizen participation, collective efficacy, place attachment, and satisfaction with community and place.[8]

Why alignment matters

Many placemaking efforts begin with ambitious visions, cultural programming, or large-scale engagement strategies. These approaches become more effective when they are matched with community readiness.

A Foundation Phase community may require relationship building, listening, trust development, and shared priorities before a larger visioning process. An Activation Phase community may benefit from cultural programming, public-space experiments, and collaborative design. A Contribution Phase community may be ready for regional partnerships, innovation, and civic leadership.

When an intervention is mismatched with developmental capacity, limited participation can appear to be resistance. Developmental Alignment offers another possibility: the intervention may be asking a community to operate at a stage it has not yet reached.

This perspective also connects with planning research on participation. Manzo and Perkins argue that planning practice can benefit from recognizing emotional relationships to place alongside participation and empowerment.[4] Developmental Alignment extends that conversation by asking whether the capacity for participation itself should be considered when practitioners select an intervention.

Awareness before intervention

Communities are dynamic. Economic shifts, leadership transitions, displacement, social disruption, and environmental events can change their developmental conditions. A community with established capacity may return to Foundation work after a natural disaster or a crisis.

For planners, this suggests a practical question before selecting an intervention:

Did this intervention derive from a process that was aligned with the developmental stage of the community?

For architects, this means considering the social conditions that shape the planning and design processes to create a physical environment that enhances social capital, identity and meaning. For planners, this means aligning engagement and implementation processes with community capacity. For developers, this means recognizing social infrastructure as part of the conditions that support long-term stewardship and value. Placemaking is ultimately a process of creating conditions where people, communities, and places can evolve together.

Before we design the future of a place, we need to understand the ground: the quality of its social infrastructure, the relationships already present, and the developmental stage from which its future can grow. Developmental Alignment offers one practical lens for making that assessment: awareness before intervention.

Existing research has examined these dimensions individually: social capital, place attachment, collective efficacy, community capacity, and participation. Developmental Alignment brings these concepts into a developmental sequence, proposing that the appropriate planning intervention depends partly on the community's existing relational and civic capacity.

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Vietnam

Investment-Ready Cities

Strengthening US-Vietnam urban development cooperation

As the Vietnamese economy continues to develop, US planning firms are making an impact on the country's development.

Mai Nguyen

How U.S.–Vietnam Urban Development Cooperation Strengthens Bilateral Economic Ties

Vietnam's success in attracting foreign direct investment is entering a new phase. As the country seeks to expand investment in semiconductors, advanced manufacturing, logistics, renewable energy, and digital industries, the conversation is shifting from attracting capital to sustaining it. Increasingly, investors evaluate not only industrial parks and transport infrastructure, but also the quality of planning, governance, and urban services that support long-term business growth.

This is where U.S.–Vietnam cooperation has quietly made an important contribution.

The broader economic relationship illustrates why urban development matters. Since the United States and Vietnam established a Comprehensive Partnership in 2013, later elevated to a Comprehensive Strategic Partnership in 2023, bilateral trade has grown from approximately US $30 billion to more than US $209 billion in 2025 - a nearly sevenfold increase. Vietnam is now the United States' eighth-largest trading partner, while the United States remains Vietnam's largest export market. Vietnam is also among the top ten export markets for U.S. agricultural products and is increasingly importing American services and technologies.

As bilateral trade expands into higher-value industries, the quality of urban systems, from transport and energy infrastructure to digital services and governance, will play an increasingly important role in sustaining investment and economic competitiveness.

While the United States has not been a major financier of Vietnam's urban infrastructure, it has helped strengthen something equally important: the planning ecosystem that enables investment. Through technical assistance, professional exchange, and private-sector collaboration, U.S.–Vietnam cooperation has contributed to stronger institutions, better planning practices, and wider adoption of technologies that help Vietnamese cities become more competitive investment destinations.

Planning before construction

Every successful investment begins long before construction starts. Decisions about land use, infrastructure, digital systems, and governance determine how efficiently cities grow and how confidently investors commit capital. For investors, planning quality is ultimately a question of risk. Cities with transparent planning systems, coordinated infrastructure, and predictable governance reduce uncertainty, shorten project timelines, and improve the long-term performance of private investment.

A clear example is Ho Chi Minh City's Intelligent Operations Center. In 2020, the U.S. Trade and Development Agency (USTDA) supported the development of a roadmap, implemented by Virginia-based Winbourne Consulting, to integrate transportation, public safety, utilities, and other municipal data into a unified platform for data-driven urban management. Rather than financing physical infrastructure, the project strengthened the city's capacity to plan, coordinate, and manage future investments more effectively.

USTDA later supported a smart city roadmap for Ecopark Township, while the U.S.-ASEAN Smart Cities Partnership expanded knowledge exchange between Vietnamese cities and American urban technology experts. Similarly, USAID's five-year Vietnam Urban Energy Security project helped Ho Chi Minh City develop its Net Zero Emissions Strategy while mobilizing US $4.2 million in clean-energy investment by 2024.

Collectively, these initiatives demonstrate how technical cooperation can strengthen planning systems, improve project preparation, and create a more enabling environment for future investment.

Building institutions through professional exchange

Planning systems are only as strong as the professionals behind them.

Over the past decade, universities, fellowships, research partnerships, and professional organizations have strengthened connections between Vietnamese and American planners, architects, engineers, and public officials. These exchanges allow ideas, technical expertise, and practical experience to move in both directions while helping Vietnamese institutions build long-term planning capacity.

An important milestone came in November 2023, when the Vietnam Urban Planning and Development Association (VUPDA) and the American Planning Association's International Division (APA-ID) signed a Memorandum of Understanding to expand cooperation between planning professionals in both countries. Announced shortly after the elevation of bilateral relations to a Comprehensive Strategic Partnership, the agreement reflected a shared commitment to innovation-driven and inclusive economic growth.

Since then, the partnership has supported technical workshops, professional exchanges, and participation by Vietnamese planning leaders in the American Planning Association's National Planning Conference. These activities strengthen professional networks while exposing practitioners in both countries to new approaches for addressing increasingly complex urban challenges.

From planning ideas to investment opportunities

Government cooperation creates the foundation, but the private sector transforms planning into investment.

A growing number of American consultancies, engineering firms, and technology providers are now active participants in Vietnam's urban development - not as occasional advisors, but as long-term partners. Their work gives Vietnamese cities access to international expertise while helping investors develop projects that meet global standards for planning, sustainability, and governance.

Boston-based Sasaki, for example, has contributed to urban planning and design projects in Vietnam for more than two decades, illustrating the long-term role American firms can play in shaping urban growth.

More broadly, American expertise has become part of everyday planning practice through digital planning tools, smart-city technologies, and internationally recognized sustainability standards. These tools improve project preparation, enhance transparency, reduce development risk, and strengthen long-term asset value, qualities increasingly valued by institutional investors and multinational companies.

This growing collaboration also creates opportunities for both economies. As Vietnam's demand for smarter and more sustainable urban development increases, American firms are able to export knowledge-intensive services, including planning, engineering, digital technologies, and technical advisory expertise, while supporting Vietnam's continued economic transformation.

Looking ahead

Vietnam has firmly established itself as one of the world's most attractive investment destinations. Sustaining that momentum will depend not only on expanding infrastructure, but also on strengthening the planning systems, institutions, and professional capacity that support increasingly sophisticated industries.

U.S.–Vietnam cooperation has helped advance these foundations through planning expertise, professional exchange, and technology collaboration, while creating new opportunities for American firms to export high-value services. As the Comprehensive Strategic Partnership evolves, urban development represents an area of mutual benefit - enhancing Vietnam's investment competitiveness while expanding commercial opportunities for the United States. In the next phase of bilateral economic cooperation, stronger cities will be as important as stronger factories.

Mai Nguyen, Vietnam Country Representative, American Planning Association International Division, and CEO of SmartF.

Urban Theory

Rediscovering scale in cultivation of urban charm

Naama Blonder and Misha Bereznyak



The following is an adaptation from Chapter 1 of Building Charm: A Hyper-Practical Guide to Developing Outstanding New Neighborhoods by Naama Blonder and Misha Bereznyak, founders of Smart Density. Drawing on international experience and years of hands-on work, Building Charm presents a proven, practical system for creating genuinely appealing neighborhoods, one developed within real-world development and municipal constraints and applicable across a wide range of densities, from low-rise settings to complex high-density environments.

Why do even our most thoughtful new neighborhoods lack the charm found in older places?

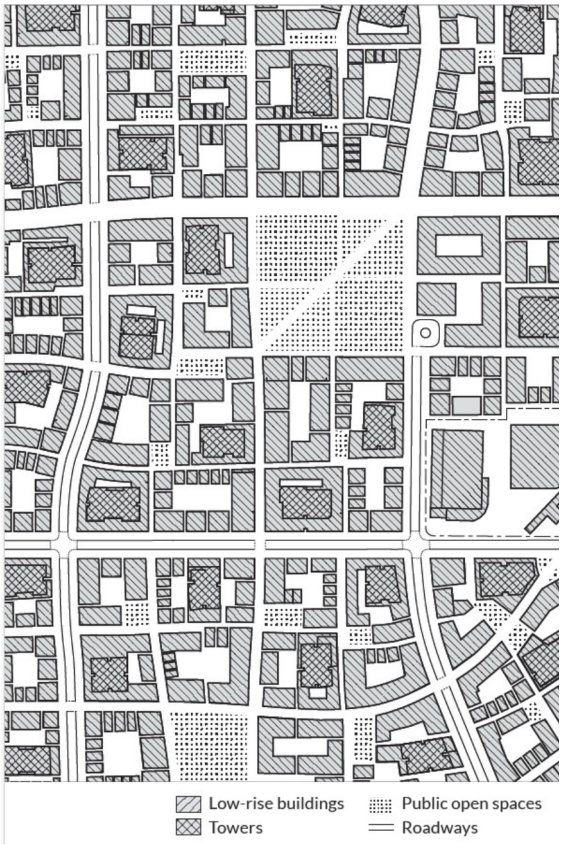
The departure of Modernist planning from traditional patterns of city building, and the problems it created, have been widely discussed and are now well understood. And while Modernist planning ideas still dominate in many places, a different set of ideas and practices has emerged among urban planners and designers, aiming to recreate the walkability, variety, and quality of public spaces found in older neighborhoods. These approaches have influenced the design of many new neighborhoods.

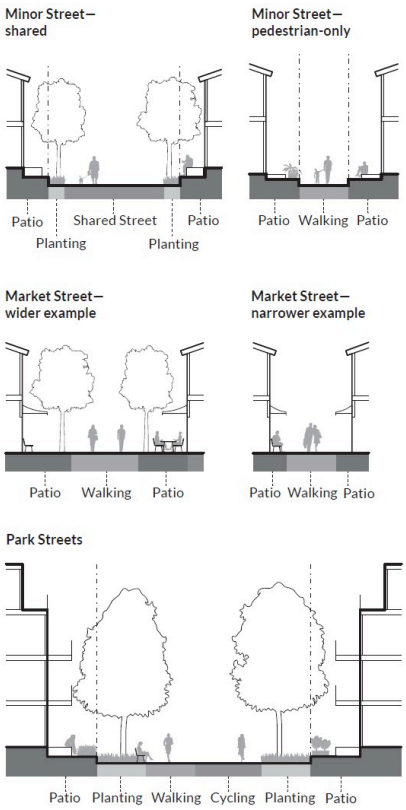
These ideas and practices generally follow what we named in the book the prevailing urbanist model—a widely shared contemporary framework for urban development that prioritizes reduced reliance on cars, walkability and cycling infrastructure, access to public transit, well-defined streets and parks, and often medium to high densities with mixed uses. This model represents what is widely considered best practice among urban planners and designers, and it has shaped many of the more successful new neighborhoods built in recent decades.

But while some new neighborhoods offer valuable lessons in innovation and the implementation of best practices, there remains a significant gap between what contemporary planning principles promise and what they deliver. Despite these advances, few new neighborhoods achieve the same richness of experience and sense of place that many older neighborhoods provide so successfully.

It took us time to recognize that the prevailing urbanist model itself had fundamental limitations. Both of us had grown up and practiced in places shaped by Modernist planning, where any improvement felt significant.

When we began our careers in urban planning and design, 15 years ago, relatively few neighborhoods had been built according to the principles of the prevailing urbanist model, making it easy to attribute any shortcomings to implementation issues or local conditions rather than to flaws in the model itself.





However, the shortcomings of the neighborhoods and the principles that produced them became apparent over time. As the novelty of such neighborhoods wore off, we became urban planners and attempted to implement the principles of the prevailing urbanist model ourselves, but met with little success in achieving the qualities of traditional cities.

We had a few opportunities to work on projects that appeared to have great potential, but with the design tools we were using, those projects yielded only mundane results.

In a project in the Greater Toronto Area, we were retained to create a vision to transform a 100-hectare area of low-intensity commercial and logistic uses near a train station into a dense, mixed-use community. We worked within a new street network that had already been planned, but we otherwise had a significant level of freedom in the design. We applied the leading principles of the prevailing urbanist model, and also identified a unique opportunity to create a continuous secondary network of mid-block connections that enriched the experience and the opportunities in the neighborhood. However, even at the level of a vision plan, it became clear that the constraints imposed by the pre-established street network would not allow us to achieve our aim.

Another project in Southeast Asia initially appeared promising. This project had a spectacular setting with an existing network of irrigation and flood control canals. Other development projects in the area failed to take advantage of the context and filled most of the canals. We decided early to take a different approach and integrate the canals in the design, which created an attractive quality. Despite this strong start, as the design developed, it became increasingly clear that its overall character would end up being typical of new development in the area, especially in the street experience, which is a critical factor in shaping the feel of a neighborhood. This was disappointing—not because the design wasn't unique, but because, even with the integration of the canals, we still couldn't mimic the character and qualities found in older neighborhoods in the region, not even those alsoshaped by canals. While in the previous project we'd been limited by a pre-existing street network, here we were limited mainly by our own ideas.

The failures that we experienced directly and, more importantly, the disappointment we felt when visiting neighborhoods designed by the brightest designers in the field convinced us that we were all still doing something wrong.

What we eventually came to understand was that following the accepted principles of good urban planning was not enough. The problem wasn't necessarily the principles themselves, but the scale at which we applied them.

This realization led us to develop Scaling Down, a system that approaches neighbourhood design at a much finer grain, paying attention not only to the overall structure of a community but also to the smaller elements and relationships that shape how people experience it. Scaling Down examines how the physical elements of a neighborhood work together to create the complexity, variety and human scale we discussed here.

This became the foundation of Building Charm: a practical approach to creating new neighborhoods that can accommodate contemporary development requirements while achieving the qualities that make older places so appealing.



Naama Blonder and Misha Bereznyak are founders of Smart Density. Building Charm was published in September, 2026 by Rethink Press.

Learn more at smartdensity.com.

Data Centers as a New Land Use

Six questions in planning for they physical footprint of computing.

Tiffany Luo, AICP, LEED AP

Data centers are more than buildings that house computers. They are an emerging land use shaped by proximity, networks, land, energy, heat, water and local impacts, and climate impacts. Starting from a landmark decision in Lower Manhattan, this article sets out six questions that planners can use to review data centers, drawing on examples from the United States, China, the United Kingdom, Ireland, Germany and Singapore.

A Siting Decision from 1928

At 60 Hudson Street in Lower Manhattan stands the former Western Union Building, built between 1928 and 1930 and designated a New York City landmark in 1991. When it opened, it was described as the largest telegraph building in the world, bringing together Western Union's headquarters and operations in one place.[1]

The city's landmark designation report records why Western Union chose this site. It was close to the company's major clients in Lower Manhattan, including the Stock Exchange, the commodity exchanges and the Wall Street ticker service. It was close to the company's existing operations facility on Walker Street, which made it easier to move the many telegraph lines that connected that facility to branch offices. And the area north of Washington Market, now known as Tribeca, was relatively inexpensive.[2] Western Union was weighing proximity to users,

[1] New York City Landmarks Preservation Commission, Western Union Building, Designation Report LP-1749 (New York: LPC, October 1, 1991), https://s-media.nyc.gov/agencies/lpc/lp/1749.pdf. Accessed September 30, 2026.

[2] Landmarks Preservation Commission, Western Union Building.

Question	What planners ask	Examples in this article
Proximity	How close does the facility need to be to its users?	60 Hudson Street; China's eastern and western computing hubs
Network	Which networks does the site need to connect to?	The internet exchange origins of Loudoun County, Virginia
Land	How much land, in which zones, and through what review process?	Loudoun County's special exception process; England's national planning framework
Energy	Who supplies the electricity, and who pays for grid upgrades?	New Jersey's data center rate class; Ireland's connection policy; Singapore's capacity allocation
Heat, water and local impacts	How are cooling water, wastewater, waste heat, noise and generator emissions handled?	Germany's Energy Efficiency Act; Virginia's statewide review of data centers
Climate risk	Will the site remain safe and operational over the facility's life?	The UK's critical national infrastructure designation

Table 1. Six questions for planning data centers

connection to existing networks and the cost of land.

The building kept its role as a meeting point for networks. By 1991, the designation report noted that several telecommunications firms had space in the building, taking advantage of its fiber-optic connection point and the ability to interconnect with each other's equipment.[1] The factors that guided Western Union in 1928 still guide the siting of data centers today. What has changed is the scale of the facilities and the number of other systems they depend on.

From Building Type to Land Use

Conventional zoning tends to ask what category a building belongs to: office, commercial or industrial. Loudoun County, Virginia, for example, decided in 2000 that data centers would be regulated like office buildings.[2] That category no longer describes the types of impacts produced by the facilities being built today. The International Energy Agency (IEA) estimates that data centers used about 415 terawatt-hours (TWh) of electricity in 2024, around 1.5 percent of global electricity use, and expects this to more than double to around 945 TWh by 2030.[3] In the United States, Lawrence Berkeley National Laboratory (LBNL) found that data centers used 176 TWh in 2023, or 4.4 percent of the country's electricity, and its projections for 2028 range from 6.7 to 12 percent (Figure 1).[4] The University of North Carolina's Data-Driven EnviroLab maps 1,586 data center campuses in the continental United States, including 60 Hudson Street.[5]

At this scale, whether a site can host a data center depends on much more than its zoning category. It depends on how close the site is to users, which networks it can reach, how much land is available, where the electricity comes from and who pays for the grid connection, how cooling water and waste heat are handled, the impact of noise and emissions from generators and equipment, and whether the site will remain safe over the life of the facility. These are six questions: proximity; network; land; energy; heat, water and local impacts, treated here as a single question; and climate risk. Together they involve land use, infrastructure, environmental, fiscal and hazard mitigation planning at the same time.

A further question runs through all six: what does the host community receive in return? The sections below take the six questions in turn,

[1] *Landmarks Preservation Commission, Western Union Building.*

[2] *Loudoun County, Virginia, "Data Centers: The Loudoun Story," https://www.loudoun.gov/6408/Data-Centers-The-Loudoun-Story. Accessed September 30, 2026.*

[3] *International Energy Agency, Energy and AI (Paris: IEA, 2025), Executive Summary, https://www.iea.org/reports/energy-and-ai/executive-summary. Accessed September 30, 2026.*

[4] *Arman Shehabi et al., 2024 United States Data Center Energy Usage Report, LBNL-2001637 (Berkeley, CA: Lawrence Berkeley National Laboratory, December 2024), https://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report_1.pdf. Accessed September 30, 2026.*

[5] *Data-Driven EnviroLab, U.S. Data Center Policy Explorer, University of North Carolina at Chapel Hill, campus snapshot September 2, 2026, policy records 2010–2026, https://data-center.apps.cloudapps.unc.edu/?view=overview. Accessed October 10, 2026.*

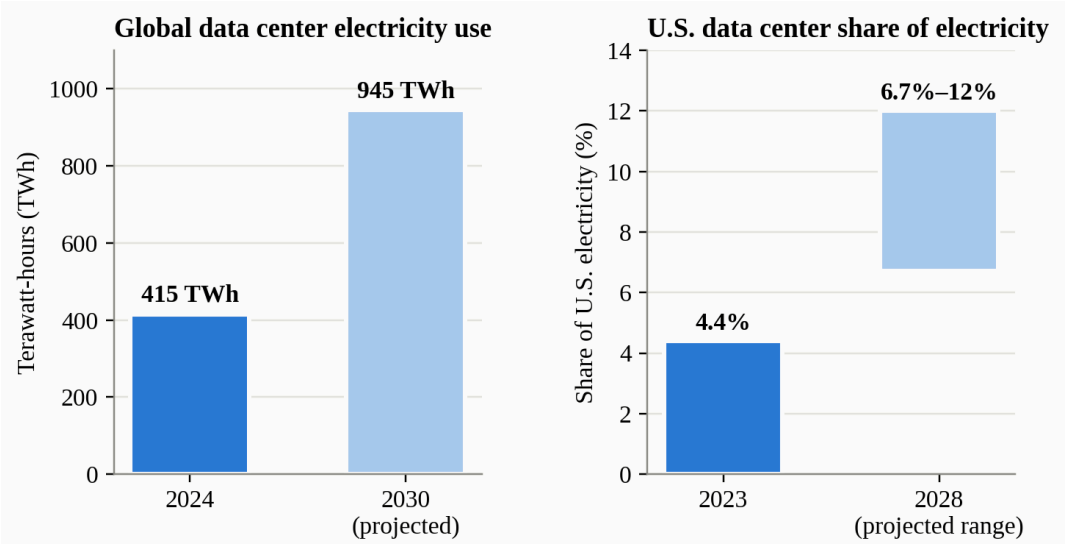


Figure 1. Data center electricity use, globally and in the United States. The two panels use different units. Sources: International Energy Agency, Energy and AI (2025); Shehabi et al., 2024 United States Data Center Energy Usage Report (LBNL, 2024). Chart by the author.

using examples from six countries to show the planning tools each one involves (Table 1).

1. Proximity: How Close to Users?

Some computing tasks need to respond almost instantly, while others can wait. Distance adds only a small delay, but it matters for real-time services and for networks that exchange traffic at hubs such as 60 Hudson Street. China has used this difference as the basis for national planning. In February 2022, the national government approved a project to build eight national computing hubs, together with 10 national data center clusters. Most of China's data centers had been in eastern regions, where land and energy are limited, while western regions have abundant resources, especially renewable energy.[1]

The National Development and Reform Commission (NDRC) divides the eight hubs into two groups (Figure 2). Four hubs are in the Beijing-Tianjin-Hebei region, the Yangtze River Delta, the Guangdong-Hong Kong-Macao Greater Bay Area and the Chengdu-Chongqing region. These areas have large numbers of users and strong demand. The other four hubs are in Guizhou, Inner Mongolia, Gansu and Ningxia. These areas have abundant renewable energy and a suitable climate, and they serve the whole country as bases for computing that does not need to happen in real time, such as background processing, offline analysis and data backup.[2]

In 2025, China's National Data Administration reported that intelligent computing, the kind used to train and run artificial intelligence models, made up 80.8 percent of computing capacity at the hub nodes. The agency also noted that some places have more computing capacity than they use while others have less than they need. In response, it is building a national platform to monitor and schedule computing resources across regions, so that demand in one region can be met by capacity in another.[3]

2. Network: What Must the Site Connect To?

Data centers tend to grow where networks already meet. Loudoun County traces its data center industry to 1992, when engineers created the first commercial internet exchange point, a

[1] *National Development and Reform Commission of the People's Republic of China, "China Approves Mega Project for Greater Computing Power, Digital Future," February 18, 2022, https://en.ndrc.gov.cn/news/mediarusources/202202/t20220218_1315947.html. Accessed September 30, 2026.*

[2] *National Development and Reform Commission, High-Tech Industry Department, interview with China Strategic Emerging Industries magazine, "'东数西算'全面启动 八枢纽激发数据新活力" ["'East Data, West Computing' Fully Launched: Eight Hubs Bring New Vitality to Data"], March 21, 2022, https://www.ndrc.gov.cn/fzggw/jgsj/gjss/sjdt/202203/t20220321_1319862.html. Translation by the author. Accessed September 30, 2026.*

[3] *National Data Administration of China, reported in "'东数西算'枢纽节点智算规模占比超八成" ["Intelligent Computing Exceeds 80 Percent of Capacity at 'East Data, West Computing' Hub Nodes"], Beijing Municipal People's Government portal, May 3, 2025 (originally published by People's Daily), https://www.beijing.gov.cn/ywdt/zybwdt/202505/t20250503_4080278.html. Translation by the author. Accessed September 30, 2026.*

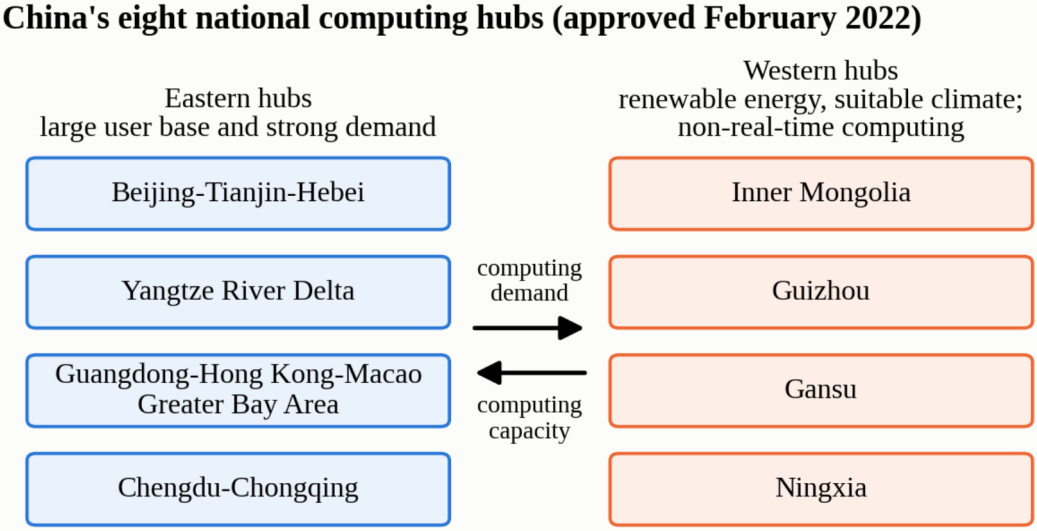


Figure 2. China's eight national computing hubs and their roles as described by the National Development and Reform Commission. Diagram by the author; not a map and not to scale. Source:

place where networks connect to each other, in a parking garage in nearby Vienna, Virginia. The largest wave of data center development in the county followed between 2007 and 2016.[1] As at 60 Hudson Street, existing network connections attracted more facilities over time. For planners, this means that the location of fiber routes, exchange points and existing data centers is part of the land use picture, even though these networks are rarely shown on a zoning map. Clustering can allow facilities to share fiber, substations and transmission lines, but it also concentrates their effects on nearby neighborhoods. A 2024 review by Virginia's Joint Legislative Audit and Review Commission (JLARC) found that about one-third of the state's data centers were near residential areas.[2]

3. Land: How Much, Where and Through What Review?

The land question has grown with the size of the buildings. Loudoun County, VA, reports 233 existing data center buildings with about 56.5 million square feet of floor area as of March 2026. The average existing building is about 234,000 square feet, and recently permitted buildings average about 339,000 square feet. Another 35.7 million square feet is in projects that are approved or in site plan review but not yet built, and the county does not expect all of them to be built. A further 20.7 million square feet is in applications still seeking legislative approval; the county does not say whether the two figures overlap (Figure 3).[3]

The county has adjusted its review process accordingly. Data centers are limited to areas zoned for office and industrial uses and are not permitted in the county's rural policy areas, which cover about two-thirds of the county. On March 18, 2025, the Board of Supervisors adopted zoning amendments that changed data centers from a by-right use to a use that requires a special exception approved by the Board. The county has also begun a second phase of work to prepare zoning standards written specifically for data centers and utility substations, addressing land use, compatibility, aesthetics, infrastructure and natural and environmental resources.[4] These are the local impacts of data centers: how they fit with neighboring uses, how they look, and what they require of infrastructure and natural resources. At the state level, JLARC recommended that Virginia localities be expressly authorized to require sound modeling studies and water use estimates for proposed data centers.[5]

[1] *Loudoun County, "Data Centers: The Loudoun Story."*

[2] *Joint Legislative Audit and Review Commission, Data Centers in Virginia, Report 598 (Richmond, VA: JLARC, 2024), https://jlarc.virginia.gov/pdfs/reports/Rpt598.pdf; summary at https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp. Accessed October 10, 2026.*

[3] *Loudoun County, "Data Centers: The Loudoun Story."*

[4] *Loudoun County, Virginia, "Data Centers: Land Use Considerations," https://www.loudoun.gov/6410/Land-Use-Considerations. Accessed September 30, 2026.*

[5] *JLARC, Data Centers in Virginia.*

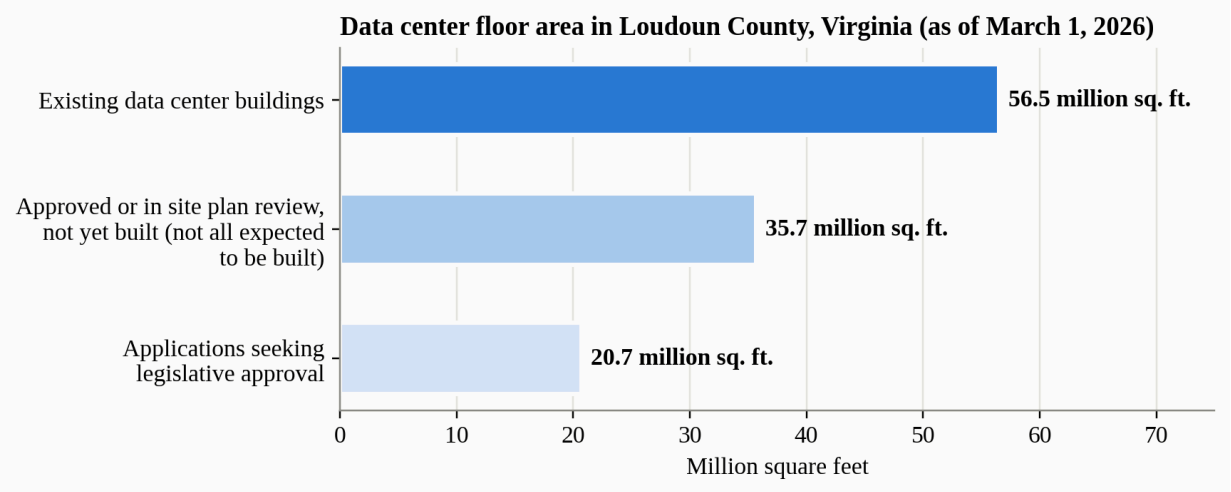


Figure 3. Data center floor area in Loudoun County, Virginia, as of March 1, 2026. The second bar includes approved legislative applications, approved site plans and site plans in review; the county does not expect all of these projects to be built. Source: Loudoun County, "Data Centers: The Loudoun Story." Chart by the author.

National governments can also shape the land question. In September 2024, the UK government designated data centers as part of the country's critical national infrastructure.[1] In England, the National Planning Policy Framework published in August 2026 asks plans to make provision, where a need exists, for high-technology sites including data centers and associated generating capacity.[2] Data center projects may also opt into the Nationally Significant Infrastructure Projects regime, under which a national government minister makes the final decision instead of the local planning authority.[3] Under this route, applicants are no longer legally required to consult before applying, though they are encouraged to engage, and the public can still register as interested parties, submit written representations and ask to speak at hearings.[4] The host local authority can also submit a local impact report that the examining authority must consider.[5] In Virginia, Loudoun County added a more detailed local review, while England added a national route for the largest projects. Both are ways of matching the review process to the scale of the use. States are also active: the Data-Driven EnviroLab identifies 615 state bills from 2010 to 2026 that directly regulate data centers, 100 of them enacted, including 2026 bills in Pennsylvania and Michigan that address comprehensive plans and zoning overlay districts.[6]

4. Energy: Who Supplies the Power and Who Pays?

Energy is the fourth factor. Data centers need large and reliable power connections, and they often locate near one another; the IEA reports that nearly half of U.S. data center capacity is in five regional clusters, and that data centers already account for a large share of electricity use in some local markets.[7] The grid infrastructure that serves them is often decided outside local planning. In Virginia, the State Corporation Commission, rather than the county, approves the routes of high-voltage transmission lines.[8]

[1] *Chris Bryant, Minister of State for Data Protection and Telecoms, UK Parliament Written Statement HCWS89, September 12, 2024, https://questions-statements.parliament.uk/written-statements/detail/2024-09-12/hcws89. Accessed September 30, 2026.*

[2] *Ministry of Housing, Communities and Local Government, National Planning Policy Framework, published August 17, 2026, Chapter 7, policies E1 and E2, https://www.gov.uk/guidance/national-planning-policy-framework-chapter-7-building-a-strong-effective-economy-e1-4. Accessed October 10, 2026.*

[3] *Adam Clark, Nuala Burnett, Iona Stewart and John Woodhouse, Data Centres: Planning Policy, Sustainability, and Resilience, House of Commons Library Research Briefing CBP-10315, May 27, 2026, https://commonslibrary.parliament.uk/research-briefings/cbp-10315/. Accessed September 30, 2026.*

[4] *Planning Inspectorate, "Nationally Significant Infrastructure Projects: The Stages of the NSIP Process and How You Can Have Your Say," GOV.UK, last updated July 30, 2026, https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-the-stages-of-the-nsip-process-and-how-you-can-have-your-say. Accessed October 10, 2026.*

[5] *UK Government, "Nationally Significant Infrastructure Projects: Advice for Local Authorities," GOV.UK, last updated September 28, 2026, https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-for-local-authorities. Accessed October 10, 2026.*

[6] *Data-Driven EnviroLab, U.S. Data Center Policy Explorer.*

[7] *IEA, Energy and AI.*

[8] *Loudoun County, "Data Centers: Land Use Considerations."*

Some states are addressing the question of who pays. New Jersey is part of the regional electricity market operated by PJM Interconnection. In PJM's capacity auction for the 2027–2028 delivery year, held in December 2025, the clearing price was $333.44 per megawatt-day, and PJM's auction report attributes an increase of about 5,250 megawatts in forecast load largely to additional large-load users.[1] In July 2026, Governor Mikie Sherrill signed legislation (S731/A796) to create a new ratepayer class and rate structure for data centers, so that they pay for their own energy use and the grid infrastructure associated with them. The legislation also requires data centers to cut back before residential customers when the grid is strained.[2] New Jersey legislators have also introduced bills, now in committee, that would set a statewide framework for data center siting, land use approval, energy sourcing, water use and environmental impacts.[3]

Ireland addresses energy through grid connection rules. In December 2025, the Commission for Regulation of Utilities (CRU) adopted a connection policy that applies to new connection applications received after the decision; applications already in process continue under the earlier policy. New data centers with a demand of 10 megavolt-amperes (MVA) or more must provide dispatchable generation or storage, on site or nearby, that matches their requested capacity and takes part in the wholesale electricity market. Data centers of 1 MVA or more must meet at least 80 percent of their annual demand with additional renewable electricity generated in Ireland, with six years from energization to reach this level.[4]

Singapore, a dense city-state with limited land and energy, has managed data center growth by controlling when new capacity is added. The government paused data center growth in 2019 and launched a pilot call for applications in 2022 that selected new data centers based on sustainability and their contribution to connectivity and economic goals.[5] In May 2024, the Infocomm Media Development Authority announced a Green Data Centre Roadmap that aims to provide at least 300 megawatts of additional capacity in the near term.[6]

5. Heat, Water and Local Impacts

Data centers produce heat as they operate, and many facilities use water for cooling. In Virginia, JLARC found that most data centers use no more water than a large office building, but that oversight of how water is shared among local uses is limited.[7] In Idaho, a 2026 law provides that data centers beginning construction on or after July 1, 2026, may not use water for cooling as a consumptive use unless it is supplied by a municipal, water district, or water and sewer district system.[8] Even air-cooled facilities may increase water use indirectly, because generating their electricity often requires water; how much depends on the source of that electricity,[9] and its local significance depends on whether the power plants are in water-stressed regions. Wastewater is a further question. Cooling system discharge, known as blowdown, can contain treatment chemicals, salts and metals and may require permits or treatment. Some non-water coolants may contain PFAS, persistent synthetic chemicals that are hard to remove, and PFAS may be present in some

[1] *PJM Interconnection, 2027/2028 Base Residual Auction Report, December 17, 2025, https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2027-2028/2027-2028-bra-report.pdf. Accessed September 30, 2026.*

[2] *State of New Jersey, Office of the Governor, "Governor Sherrill Announces Ratepayer Relief, Signs Major Legislation on Energy, Saving New Jerseyans $1B Annually," press release, July 7, 2026, https://www.nj.gov/governor/news/2026/20260707a.shtml. Accessed September 30, 2026.*

[3] *Data-Driven EnviroLab, U.S. Data Center Policy Explorer.*

[4] *Commission for Regulation of Utilities (Ireland), Large Energy Users Connection Policy: Decision Paper, CRU2025236, December 12, 2025, https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU2025236_Large_Energy_User_connection_policy_decision_paper.pdf. Accessed September 30, 2026.*

[5] *Infocomm Media Development Authority (Singapore), "Launch of Pilot Data Centre – Call for Application ('DC-CFA') to Support Sustainable Growth of DCs," press release, 2022, https://www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/press-releases/2022/launch-of-pilot-data-centre---call-for-application-to-support-sustainable-growth-of-dcs. Accessed September 30, 2026.*

[6] *Infocomm Media Development Authority (Singapore), "Singapore Announces Green Data Centre Roadmap," press release, May 29, 2024, https://www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/press-releases/2024/sg-announces-green-data-centre-roadmap. Accessed September 30, 2026.*

[7] *JLARC, Data Centers in Virginia.*

[8] *Idaho Legislature, House Bill 895 (2026), Session Law Chapter 291, effective July 1, 2026, https://legislature.idaho.gov/sessioninfo/2026/legislation/H0895/. Accessed October 10, 2026.*

[9] *Shehabi et al., 2024 United States Data Center Energy Usage Report, 46.*

cooling system discharges, so this needs to be assessed facility by facility.[1] Water supply and wastewater are therefore questions planners can ask about any proposed site, at both the local and the regional scale.

Germany has made waste heat a planning matter through its Energy Efficiency Act (Energieeffizienzgesetz, or EnEfG), adopted in November 2023. The law applies to data centers with a non-redundant connected load of 300 kilowatts or more. Data centers that begin operating on or after July 1, 2026, must reach a power usage effectiveness (PUE) of 1.2 or lower and a share of reused energy of at least 10 percent. PUE is total facility energy divided by the energy used by computing equipment; a value near 1.0 means little energy goes to cooling and other support systems. The planned share rises to 15 and 20 percent for data centers that begin operating from July 1, 2027, and July 1, 2028, respectively, to be reached within two years of operation. Separately, all data center operators must cover their electricity use with renewable electricity, on an annual accounting (balance) basis, from January 1, 2027.[2]

The law connects these requirements to local heat planning. The heat reuse requirement does not apply if, among other conditions, the operator has an agreement with a nearby municipality or heat network operator stating a concrete intention to build a heat network that would meet the requirement within ten years. A heat network, or district heating system, pipes hot water from a central source to many buildings.[3] Under this approach, a data center site is evaluated together with existing or planned heat networks and the neighborhoods they serve.

Noise and air quality are also local impacts. Data centers keep diesel generators for power outages. In Virginia, JLARC found that these generators were run mostly for maintenance and produced less than 4 percent of regional nitrogen oxide emissions in Northern Virginia.[4] Their role is changing. In 2025, the U.S. Environmental Protection Agency clarified that certain emergency engines, under specific regulatory conditions, may run up to 50 hours a year to supply power to the grid as part of a financial arrangement with another entity.[5] In 2026, the U.S. Department of Energy issued specific temporary emergency orders allowing PJM to direct backup generation at large loads, including data centers, to run as a last resort.[6] Texas Senate Bill 6 of 2025 applies to large loads above a 75-megawatt threshold. During an energy emergency, once available market services have been used, the grid operator may have such customers whose backup generation can serve at least half of their on-site demand run that generation or reduce load.[7] In Virginia, the Department of Environmental Quality's April 2026 permitting guidance sets Tier 4-level emission controls as presumptive best available control technology for data center generators in applications submitted from July 1, 2026.[8]

Cooling equipment and generators produce low-frequency sound and vibration and may produce infrasound, below the range of normal hearing, although infrasound exposure at operating data centers has not been well measured. JLARC

[1] *Uttam K. Saha, Understanding How Data Centers Impact Surface and Ground Waters, Temporary Publication 121 (Athens, GA: University of Georgia Extension, June 10, 2026), https://fieldreport.caes.uga.edu/publications/TP121/how-data-centers-impact-surface-and-ground-waters/. Accessed October 10, 2026.*

[2] *Gesetz zur Steigerung der Energieeffizienz in Deutschland (Energieeffizienzgesetz – EnEfG) of November 13, 2023 (BGBl. 2023 I Nr. 309), sections 3 and 11, https://www.gesetze-im-internet.de/enefg/__11.html. Translation by the author. Accessed September 30, 2026.*

[3] *EnEfG, section 11.*

[4] *JLARC, Data Centers in Virginia.*

[5] *U.S. Environmental Protection Agency, "EPA Issues Clarification to Help Power Data Centers, Ensure U.S. Is the AI Capital of the World," news release, May 1, 2025, https://www.epa.gov/newsreleases/epa-issues-clarification-help-power-data-centers-ensure-us-ai-capital-world. Accessed October 10, 2026.*

[6] *U.S. Department of Energy, Order No. 202-26-23 (May 2026) and Order No. 202-26-33 (June 30, 2026) under Section 202(c) of the Federal Power Act (PJM Interconnection), https://www.energy.gov/documents/doe-order-no-202-26-33; U.S. Environmental Protection Agency, "Clean Air Act Resources for Data Centers," https://www.epa.gov/stationary-sources-air-pollution/clean-air-act-resources-data-centers. Accessed October 10, 2026.*

[7] *Texas Senate Bill 6, 89th Legislature, Regular Session (2025), enrolled version, https://capitol.texas.gov/tlodocs/89R/billtext/html/B00006F.htm; Electric Reliability Council of Texas, "89th Legislative Session – ERCOT Status," May 2026, https://www.ercot.com/files/docs/2025/09/15/89th-Legislative-Session-PPTX-ERCOT-Status-May-2026-Final.pdf. Accessed October 10, 2026.*

[8] *Virginia Department of Environmental Quality, Diesel Engine-Generator Set Procedure for Writing New and Modified Permits, Air Permitting Guidance APG-576, revised version effective April 9, 2026, https://townhall.virginia.gov/L/ViewGDoc.cfm?gdid=5121. Accessed October 10, 2026.*

found that data center noise was not loud enough to damage hearing but that some residents reported effects on their well-being, and it suggested zoning ordinances with maximum sound levels.[1] A 2026 peer-reviewed review notes that standard A-weighted decibel measurements give little weight to low-frequency sound. It found no published study that had measured the low-frequency and infrasound spectrum of an operating data center or examined health outcomes in relation to that exposure, so there is not yet evidence of health effects specific to data centers.[2] The sources reviewed for this article also do not establish specific effects on wildlife or ecosystems. Planners setting standards may therefore need to specify how sound is measured, not only how loud it may be.

6. Climate Risk: Will the Site Keep Working Over Its Lifetime?

Planning review of data centers usually considers how a facility affects its surroundings. It can also consider how the surroundings may affect the facility. The first direction covers the facility's demand for electricity and water, its waste heat and the substations and transmission lines it may require, as discussed above. The second direction concerns the hazards a site faces. When the UK government designated data centers as critical national infrastructure, it noted that they are exposed to the effects of climate change, which is increasing the risk of flooding, heatwaves and other extreme weather.[3]

The second direction matters because data centers operate for many years and support services that residents, businesses and governments use every day. Computing equipment is replaced more often than the building, so planners may also ask how electronic waste will be handled, for example through an equipment disposal plan, use of certified electronics recyclers, which EPA encourages,[4] and reporting on equipment reused or recycled. During review, planners can ask whether the site, or the roads and utility lines that serve it, lies within a current or projected flood zone. They can ask how more frequent extreme heat may affect cooling needs and the reliability of the local grid, whether the water supply for cooling is reliable during drought, and whether the facility can keep operating, or shut down safely, if nearby electricity or telecommunications networks are disrupted. Because nearly half of U.S. data center capacity is in five regional clusters,[5] a single severe weather event in one region could affect many facilities at once.

Planners already have tools for these questions, including flood maps, heat vulnerability assessments, hazard mitigation plans and long-range climate projections. These tools are most useful early, during comprehensive planning and site selection, rather than only during building design. A jurisdiction could, for example, map areas that combine available land, grid capacity and lower long-term hazard exposure, and use that map to guide where data centers are encouraged.

What Does the Host Community Receive?

The question of what the host community receives cuts across all six. In Loudoun County, data centers generated about $1.2 billion in property tax revenue in fiscal year 2026, equal to 39 percent of the county budget.[6] Local governments could consider four steps. First, depending on state enabling law and their own approval authority, they can negotiate community benefit agreements, or include commitments on electricity costs, water use, noise, local hiring and training in development

[1] *JLARC, Data Centers in Virginia.*

[2] *Megan Rand Wheeler, Brandi Everett, Steven M. Williamson and Victor Prybutok, "Infrasound and Low-Frequency Noise in Data Center Environments: A Narrative Review Toward Health-Protective Acoustic Design Standards," Clean Technologies 8, no. 4 (2026): 126, https://doi.org/10.3390/cleantechnol8040126. Accessed October 10, 2026.*

[3] *Bryant, Written Statement HCWS89.*

[4] *U.S. Environmental Protection Agency, "Certified Electronics Recyclers," last updated July 31, 2026, https://www.epa.gov/smm-electronics/certified-electronics-recyclers. Accessed October 10, 2026.*

[5] *IEA, Energy and AI.*

[6] *Loudoun County, "Data Centers: The Loudoun Story."*

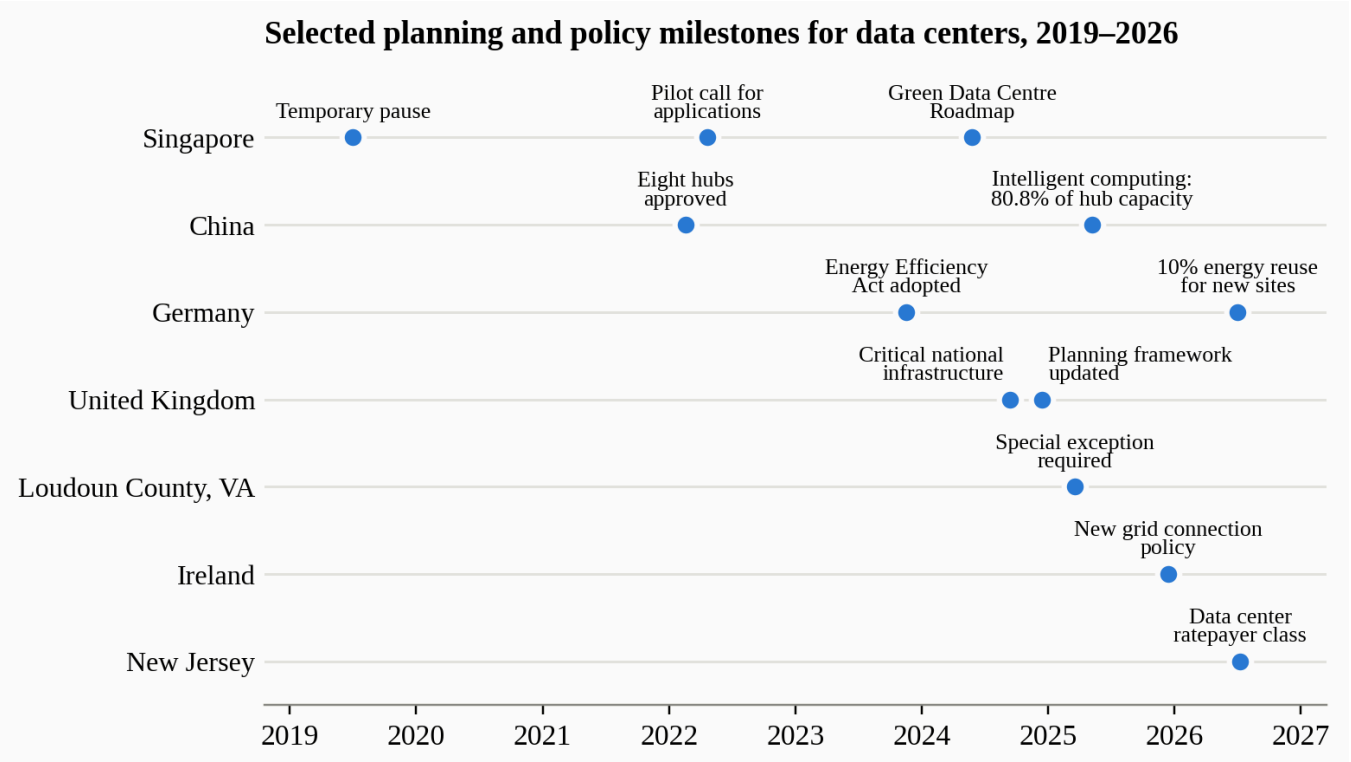


Figure 4. Selected planning and policy milestones for data centers, 2019–2026. Positions within each year are approximate. Sources: see notes in the text. Chart by the author.

agreements or conditions of approval, so that the commitments become part of the formal approval record. Second, where they have the authority, they can require regular reporting on electricity use, water use, local employment and community investment; New Jersey's August 2026 law (S3379/A4096), which requires data center operators to report energy use, water use and backup power to the Board of Public Utilities twice a year for three years, is a state-level example.[1][2] Third, they can coordinate early with the utility regulator, grid operator, air quality agency and water utility, which make many of these decisions. Fourth, they can direct community investment toward priorities already identified in the comprehensive plan or capital improvement program. Where district heating exists or is planned, heat supply agreements similar to those in Germany's law can be another form of community benefit.

Reviewing the Whole System

In 1928, Western Union chose a site in Lower Manhattan because it was close to its clients, connected to its existing lines and affordable.[3] Data center siting still depends on proximity, network connection and land, and it now also depends on energy, on heat, water and local impacts, and on climate risk. The examples in this article show that each of these questions is being answered somewhere, often by a different agency or level of government (Figure 4).

For planners, the practical lesson is that a data center application cannot be reviewed as a building alone. A complete review looks at the parcel and its zoning, the grid connection and who pays for it, the water supply and wastewater, the use of waste heat, noise and air quality, the site's exposure to climate hazards over its expected life, the agreement with the host community, and the regional infrastructure the facility depends on. Many of these decisions sit outside the planning department, so the planner's role is often to bring the relevant agencies together early.

[1] *State of New Jersey, Office of the Governor, "Governor Sherrill Delivers All Four Pillars of Data Center Plan, Puts Power Back in the Hands of Communities," press release, August 27, 2026, https://www.nj.gov/governor/news/2026/approved/20260827a.shtml. Accessed October 10, 2026.*

[2] *New Jersey Legislature, Statement to Senate No. 3379 with Senate Floor Amendments, adopted February 24, 2026, https://www.njleg.state.nj.us/bill-search/2026/S3379/bill-text?f=S3500&n=3379_S2. Accessed October 10, 2026.*

[3] *Landmarks Preservation Commission, Western Union Building.*