



China Mainland
中国大陆

ULI GREATER BAY AREA NET ZERO IMPERATIVE



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ON THE COVER: Shenzhen, China



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About the Urban Land Institute

The Urban Land Institute is a global, member-driven organization comprising more than 45,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide. ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific region, with members in 81 countries. ULI's extraordinary impact on land use decision-making is based on its members' sharing expertise on a variety of factors affecting the built environment, including urbanization, demographic and population changes, new economic drivers, technology advancements, and environmental concerns. Peer-to-peer learning is achieved through the knowledge shared by members at thousands of convenings each year that reinforce ULI's position as a global authority on land use and real estate. Drawing on its members' work, the Institute recognizes and shares best practices in urban design and development for the benefit of communities around the globe.

More information is available at uli.org. Follow ULI on [Twitter](#), [Facebook](#), [LinkedIn](#), and [Instagram](#).

About ULI China Mainland

The ULI China Mainland National Council brings together real estate professionals, civic leaders, and the business community for educational programs, initiatives impacting the region, and networking events, all in the pursuit of advancing responsible and equitable land use throughout the region. As a nonpartisan organisation, ULI is recognised as one of China's most respected and widely quoted sources of objective information on urban planning, growth, and development. ULI China Mainland is active in Beijing, Shanghai and Greater Bay Area, and delivers regular content-rich events, product councils, and study tours and delivers the widely-attended ULI China Mainland Winter and Summer Meetings.

July 2021, the ULI Greater Bay Area (GBA) Organizing Committee was established to drive the strategy and growth of ULI's work in the region. James Wong, Executive Director of Hon Kwok Land, is the ULI GBA founding Chair. Founding member companies include China Overseas, Pear River Group, Innospace, Hon Kwok Land Investment and is supported by Kailong, Zenif, Magasta, Palatin, and more.

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ULI Advisory Services: National and Global Programs

Since 1947, the ULI Advisory Services program has assembled well over 700 ULI-member teams to help sponsors find creative, practical solutions for complex land use challenges. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services. National and international panelists are specifically recruited to form a panel of independent and objective volunteer ULI member experts with the skills needed to address the identified land use challenge. The program is designed to help break through obstacles, jump-start conversations, and solve tough challenges that need an outside, independent perspective. Three- and five-day engagements are offered to ensure thorough consideration of relevant topics.

Learn more at americas.uli.org/programs/advisory-services.

The Net Zero Imperative

Thanks to a generous gift from Owen Thomas, ULI has launched the Net Zero Imperative – a multi-year initiative to accelerate decarbonization in the built environment. Additional gifts from Lynn Thurber, Joe Azrack, Franz Colloredo-Mansfeld, and Dan Cashdan further support and bolster the NZI program's scale and impact. Work to advance the initiative includes technical assistance panels in five global cities each year, designed to help developers, building owners, cities, and other relevant constituents reduce carbon emissions associated with buildings, communities, and cities. The fundamental goal of the effort is to provide concrete ideas and strategies to real estate owners, public sector leaders, and the general public to eliminate carbon emissions from the built environment to reach net zero. Through its work, the initiative will create global resources (research, toolkits, and other tools) to help all ULI members accelerate decarbonization in their real estate operations and in their cities.

ULI Advisory Services identify creative, practical solutions for complex land use and development challenges.

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BACKGROUND

In July 2021, ULI launched the global Net Zero Imperative to help accelerate market transformation toward a net zero built environment, defined as a building portfolio that is highly efficient and fully powered by on-site and off-site renewable energy sources. ULI's Net Zero Imperative (NZI), funded with generous support from ULI member Owen Thomas, supports the work of local communities seeking concrete ideas and strategies for real estate owners, public sector leaders, and the general public to eliminate carbon emissions from the built environment and reach a state of zero net carbon emissions.

Why is it important?

Over the past five years, nearly every country and more than 300 US cities made a commitment to achieve the Paris Climate targets. As of 2020, only a handful of cities have made meaningful progress in developing climate action plans that will accelerate decarbonization of the built environment. Yet cities, countries, investors, and tenants are still looking to the buildings sector to meet comparable greenhouse gas reduction goals.

Leading investors are including environmental, social, and governance goals in their real estate debt and equity considerations, leading tenants are including it in their leasing decisions, and regulators are incorporating a path to net zero into building codes and regulations for new and existing buildings.

NZI Goals

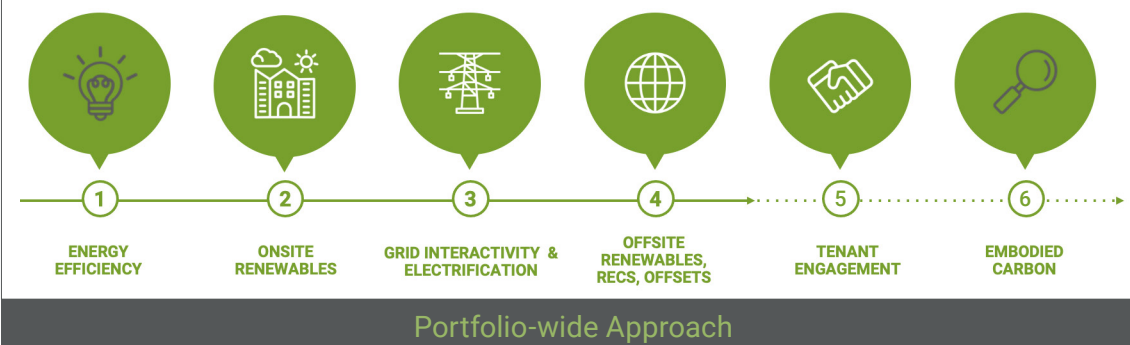
Using ULI's trusted Technical Assistance Panel (TAP) process, eight cities across the globe are working to achieve the following NZI goals for their community:

- Accelerate the decarbonization of the built environment;
- Chart a cost-effective path to net zero for the real estate industry;
- Leverage the power of ULI's global network to drive development and investment that supports this path to decarbonization;
- Get the private sector working hand-in-hand with cities on policy and incentives that can help accelerate investment in decarbonization; and

Net Zero Community Impact

A net zero building portfolio is highly efficient and fully powered by on-site and off-site renewable energy sources and offsets

The journey to portfolio-wide net zero includes several core aspects.



- Develop case studies and tools based on global best practices highlighting cost-effective strategies across geographies, asset classes, and building types.

ULI's Role in Driving toward Net Zero

As a global organization focused on transformative impact in communities worldwide, ULI has an important role to play in action toward a net zero built environment.

Deep Network. ULI has a deep network in cities across the globe and can bring leading experts on net zero together with the architects, builders, owners, investors, and policymakers who can make meaningful progress on decarbonization. Additionally, the ULI Greenprint Center for Building Performance is a worldwide alliance of leading real estate owners, investors, and strategic partners committed to improving the environmental performance of the global real estate industry and reducing greenhouse gas emissions by 50 percent by 2030 and to achieve net zero carbon operations by 2050.

Private Sector Leadership. ULI is a steadfast leader in these cities throughout changes in government leadership or sentiment on climate. ULI is building capacity, interest, and investment in the private sector, building momentum towards decarbonization that will be sustainable. Additionally, through ULI's local district council network, it can provide connections, convening power, and local awareness in ways other organizations cannot.

Cohort Engagement. As a global organization, ULI builds cohorts that help local leaders get the resources they need to succeed in their decarbonization efforts. ULI's goal is to connect local leaders with technical experts to work through the mechanics of decarbonization and connect local leaders with a global network of architects, developers, investors, and land use planners who can help move the industry forward on their goals.

Shenzhen was selected as one of eight global cities to advance the energy performance of buildings through the

NZI. The other cities include Kansas City, Missouri; Los Angeles, California; Minneapolis, Minnesota; San Jose, California; Austin, Texas; Beijing, China; and Toronto, Canada. The multi-year cohort model will allow these cities the opportunity to collaborate and share best practices and collective resources. For Shenzhen, the NZI also supports the funding of this study, bringing international and local expertise to advise on the creation of net zero initiatives for the region.

Buildings are responsible for 40% of global greenhouse gas emissions, and up to 70% of emissions in urban cities.

To better understand the challenges and opportunities of incorporating net zero initiatives into the real estate sector in Shenzhen, ULI assembled a team of local and international experts (the Panel) with expertise in the areas of development, design, energy innovation, and consulting. Through meetings

over the course of two weeks and following roundtable discussions with local experts, the Panel together identified and outlined an initial path for the Shenzhen development community to take to further embrace net-zero practices across real estate portfolios.

Shenzhen Context

In a September 2020 speech to the UN General Assembly, President Xi Jinping announced that China would aim to reach peak emissions before 2030 and achieve carbon neutrality by 2060. These ambitious goals are now driving a new round of regulatory and policy initiatives at local and national levels in China.

More recently, other local governments in China have initiated proactive measures to incentivize and compel carbon efficiency in buildings. The municipal government in Shenzhen introduced new rules (the Regulations on Green Buildings) effective 1 July 2022, initiating a stricter regulatory environment covering the entire building lifecycle and applying to both developers and building owners. In particular:

- New buildings in Shenzhen (over a specified size) must now meet a minimum 1-star rating under China's Green Building Evaluation standard – a

Guiding Questions

How should Shenzhen incentivize real estate owners to integrate technology into new and existing buildings, to decarbonize while sustaining profitability?

Policy: What does China's national decarbonization policy mean at a local city level?

Technology: What innovative technologies are most impactful now and in future?

Real Estate Owners: What is the business case for real estate owners to act now? What are the challenges for implementation?

level equivalent to LEED (Leadership in Energy and Environmental Design) Silver and stricter than otherwise required in Guangdong province or elsewhere in China. For new public buildings, an even higher 2-star standard has been set. Retrofits, meanwhile, are encouraged (but not required) to meet the 1-star standard.

- For planning and construction purposes, architects must submit design specifications to authorities in advance to demonstrate 1-star standard achievement, and an inspection is required before completion to ensure buildings are in compliance.
- Operations and maintenance are also subject to monitoring. Residential units will be sold under contracts specifying the building's green rating, providing owners with legal recourse should the building fail to perform as indicated. Green buildings are also subject to random post-occupancy inspections by officials to ensure they continue to

meet operational performance standards. Building management companies will therefore have to learn how to operate and manage their assets in accordance with the designated standards.

- Buildings will be subject to a baseline energy consumption standard (which has yet to be set). The rule will apply first to public buildings, and energy performance data will be submitted on a digital government platform with building performance checked automatically. Buildings failing to meet the baseline standard over a two-year period will be subject to punitive fines. Indoor air quality standards will also be set, measured, and tracked on a similar basis.
- Developers who meet high environmental standards will enjoy incentives in the form of GFA concessions, such as those found in Hong Kong. These concessions will be available for buildings adopting high standards of insulation and shading and using



prefabricated façade components. In addition, buyers of residential units with 2- and 3-star ratings will qualify for mortgages for a higher-than-normal percentage of their purchase prices.

With this information in hand, the Panel set forth to answer the guiding questions posed through the NZI initiative and designed to encourage adoption of NZI processes and technologies in Shenzhen's built environment.

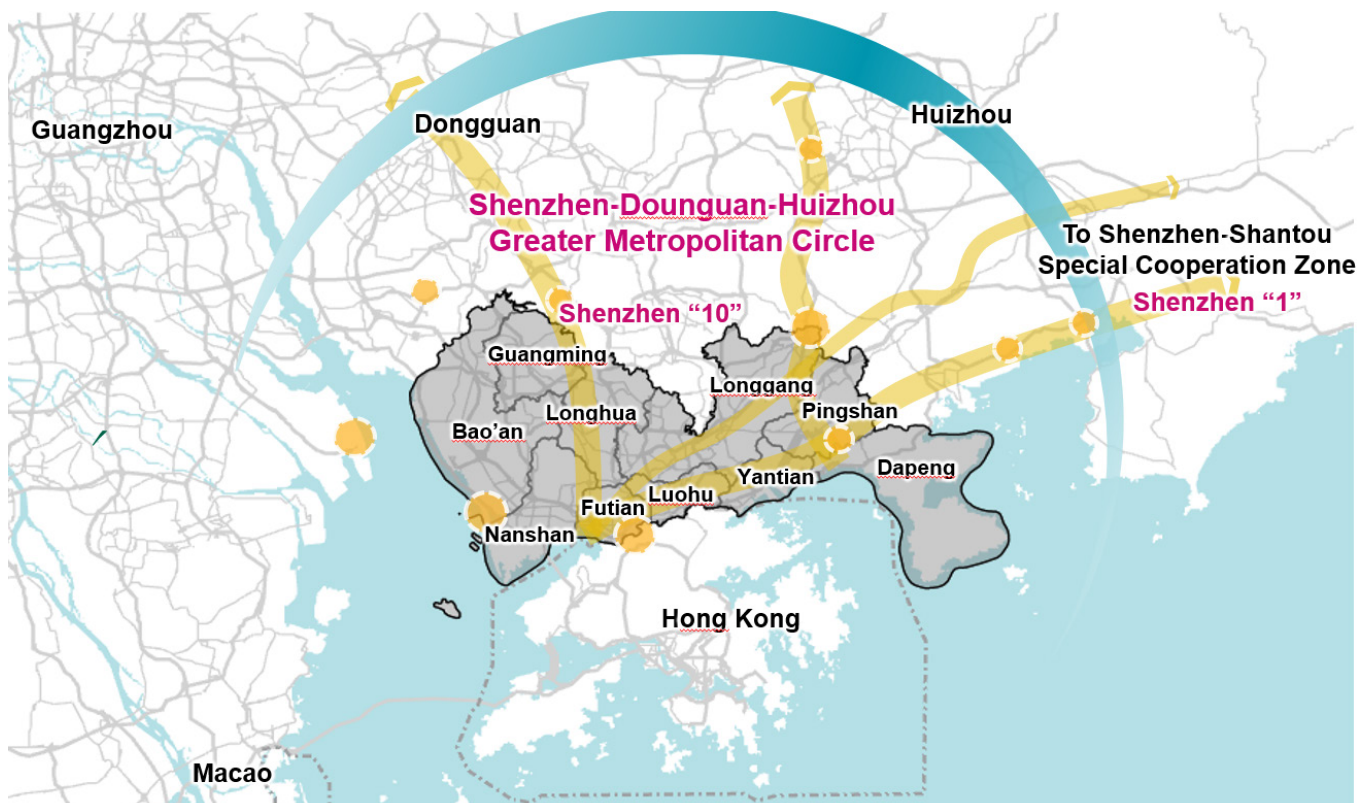
About Shenzhen

Shenzhen, located in southeastern China on the northern border of Hong Kong, is home to over 17 million people. The Shenzhen mega-city cluster sits in the Greater Bay Area (GBA) along on the eastern bank of the Pearl River and is within the Guangdong province. The city's proximity to Hong Kong and the benefits of becoming China's first special economic zone have provided Shenzhen with a certain degree of autonomy from the central government and has attracted domestic and foreign investment, leading Shenzhen to become a global technology hub.

Shenzhen is home to nine regional cities or subdistricts, including, Louhu, Futian, Nanshan, Bao'an, Longgang, Yantian, Longhua, Guangmin, and Pingshan. The City's 2021 GDP topped US\$474 billion, compared to Hong Kong's 2021 GDP of US\$368 billion.

Ongoing urbanization continues to generate high demand for new buildings, which leads to both a problem and an opportunity. With total building floorspace likely to rise by 40 percent between now and 2060, according to International Energy Agency estimates, the total volume of carbon emissions from new buildings in China will continue to rise. On the other hand, given potentially long building lifespans, there is a window of opportunity for wholesale adoption of energy-efficient technologies at the development stage, when carbon remediation measures are both easier and cheaper to implement.

While there is little current statistical data relating to sustainability and net zero carbon practices in Shenzhen, the city ranked 61st for environmental sustainability out of 100 cities in the Arcadis 2022 sustainable Cities Index.



THE POLICY LANDSCAPE

China's national decarbonization policies are in place and must be followed, yet there is a very compelling case to be made for intentional collaboration between the public and private sectors, working together to advance decarbonization in the built environment. It is also worth noting that there is a case to be made for China's business sectors to each understand their respective roles in the larger supply chain – the decarbonization strategies adopted by businesses responsible for each step in that supply chain will impact the ultimate carbon impact of the products manufactured.

Central Government Policy Landscape

China has been working to create a framework to reduce carbon intensity in buildings for at least two decades. Still, carbon intensity of Chinese buildings remains high by global standards. China's operational energy consumption stands at approximately 51 percent of total countrywide emissions, compared with an equivalent 35-40 percent throughout the rest of the world, according to figures published by the Lawrence Berkeley National Laboratory China Research Program.

Urbanization continues to generate high demand for new buildings to house workers, which creates both a challenge and an opportunity. Total building floorspace likely to rise by 40 percent to nearly 90 billion square meters between now and 2060, according to International Energy Agency (IEA) estimates, and the total volume of carbon emissions from new buildings in China will continue to rise. At the same time, there is a window of opportunity for wholesale adoption of energy-efficient technologies at the time of construction of these new buildings, when carbon remediation measures are easier and cheaper to implement.

In recent years, the government has introduced increasingly strict regulations concerning carbon efficiency in buildings, with the first two standards in the following list providing a foundation for formulating more specific carbon emission standards across buildings' lifecycles through 2060.

- The National Standard for Building Carbon Emission Calculation ("National Standard") [GB/T51366-2019]

- The Technical Standard for Nearly-zero Energy Buildings ("Technical Standard") [GB/T51350-2019]
- The Design Standard for Energy Efficiency of Public Buildings [GB/50189-2015]
- The General Code for Efficiency and Renewable Energy Application in Buildings [GB/55015-2021]
- The General Code in Building Environment [GB55016-2021]
- The General Code for Design of Building Water Supply and Drainage and Water Saving [GB55020-2021]

In addition, China's 14th Five-Year Plan (2021-2025) requires that:

- Building emissions should peak immediately and decline by 90% by 2050 relative to 2015.
- Approximately 75% of building energy use should be supplied by electricity by 2050.
- Most district heating systems in northern urban China should be decarbonized by 2050.
- Embodied energy in buildings should be reduced by extending building lifetimes through retrofits and/or use of higher-quality building materials.

In line with national and local regulations introduced over that time, Shenzhen has worked to reduce carbon intensity on both a district-wide and a single-building basis. Planning guidelines for the central business districts (CBD) require

each block to meet specified green building standards, and the district offers incentives for building owners to achieve green building certifications.

As a result, since 2008, all new CBD projects have applied for either domestic or international green building certification, and more than 85 percent of buildings in the CBD are

currently LEED certified. In December 2016, the Beijing CBD was awarded LEED for Neighborhood Development Gold Level certification. In addition, green transport modes provide over 75 percent of the district's transportation, and the CBD serves as a green transportation pilot zone for the city.

Policy Examples from *Decarbonizing the Built Environment, 10 Principles for Climate Mitigation Policies*

Setting goals over time

Minneapolis,
Minnesota, U.S.A.

In 2012, Minneapolis set a citywide greenhouse gas emission reduction target of 15 percent by 2015 and 30 percent by 2025. Large commercial buildings in the city represent nearly 50 percent of community energy use. The city passed a benchmarking ordinance in 2013 requiring commercial buildings more than 50,000 square feet, and municipal buildings more than 25,000 square feet, to measure and disclose energy and water use to the city. And by 2014, a new goal was added to reduce emissions 80 percent by 2030. In early 2019, the City Council voted unanimously to expand on the success of the first ordinance and include multifamily buildings over 50,000 square feet. In addition, as planned in the city's 2013 Climate Action Plan, the expanded ordinance was paired with time-of-sale and time-of-lease energy use disclosure ordinances, which notify potential buyers and renters of energy efficiency levels, to further incentivize energy upgrades. Building on the momentum created by earlier, less stringent initiatives is a strong way to advance climate goals without surprising stakeholders with new and difficult requirements.

Using benchmarking data to model energy reductions

Washington, D.C., U.S.A.

Clean Energy DC, the city's energy and climate action plan, outlines the necessary actions to achieve the District's goal of reducing annual greenhouse gas emissions 50 percent by 2032. This plan leans on eight years of citywide benchmarking data to understand the market's building stock and to set building sector energy use intensity (EUI) projections. According to the District, this plan is the first energy plan in the country to use city benchmarking data to inform its modeling and recommendations. These recommendations include the necessary energy and EUI reductions for individual property types.

Ensuring accurate baselines

St. Louis, Missouri,
U.S.A.

In 2017, St. Louis passed a benchmarking ordinance for all municipal, institutional, commercial, and multifamily residential buildings more than 50,000 square feet. After two rounds of reporting deadlines passed in 2018 and 2019, the city determined that more than half of covered buildings had missed the deadline. To help ensure that the city can set accurate baselines, in late 2019 it began assessing small fines (less than \$1,000 per year) and will withhold occupancy permits until all covered buildings participate in reporting. Ensuring that the right data is available by gently nudging those who may have "missed the memo" on compliance is a thoughtful means of meeting the necessary initial goals.

SETTING A FOUNDATION FOR REAL ESTATE

Buildings contribute nearly 40 percent of global emissions; therefore, to keep global warming below 1.5 degrees Celsius, buildings will need to reduce emissions by 50 percent by 2030 and essentially be carbon neutral by 2050. To reach carbon neutrality will require substantial investment in energy efficiency, electrification, and renewable energy.

For Shenzhen to reach carbon neutrality by its stated goal of 2060, real estate will need to be an active partner. For the purposes of this briefing, the real estate sector is defined as building developers, owners, and managers, and the use of “cities” refers to the public-sector departments within a municipality that are responsible for passing and implementing climate mitigation policies for a jurisdiction. Although other building stakeholders and service providers also play an important role in policy development and implementation, the business case and opportunities for involvement and influence differ for each group. Real estate developers, owners, and managers are the ones financing any required data collection, audits, or energy and emissions performance improvements, and therefore, they are the target “real estate” audience and Shenzhen is the target “public sector” audience for this briefing.

Within Shenzhen, the Pingshan District (the district) is of particular interest in the conversation around decarbonization. The district is known for its large industrial base featuring structures generally built in the 1990’s. While some building owners in the district have kept pace with advances in building technology, many buildings have been left unimproved for the past 20 years. Some of these buildings are reverting to the government, which is tearing them down and creating blank building sites with the hope of attracting green businesses and green buildings in their place. As business owners in Pingshan seek to renew land leases for the land upon which they operate their current businesses and the government contemplates how to attract additional high-tech manufacturing to sites left empty by exiting businesses, there is an exciting opportunity to incorporate net zero building technologies and practices

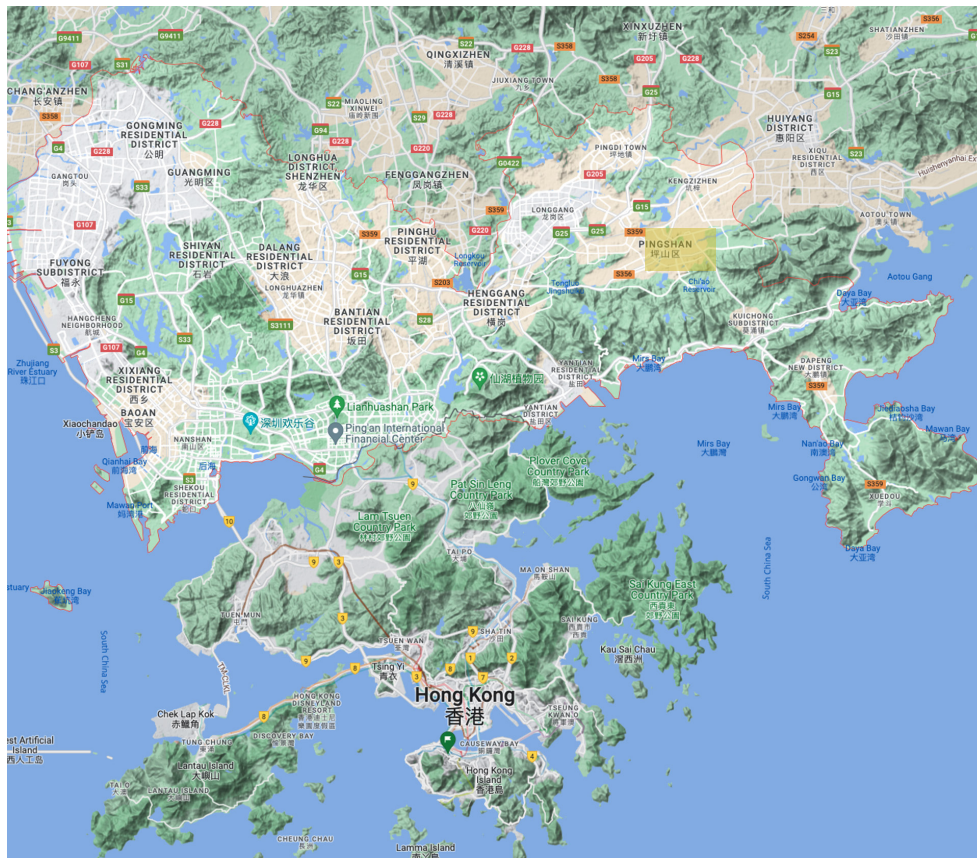
into building renovations and new construction.

Given the state of the buildings today in Pingshan, most of the real estate projects in the district will likely involve a redevelopment of the entire facility. Adaptive reuse of some industrial buildings may occur, but, in most cases, complete facility redevelopment will allow developers and business owners to better meet the demands of new industrial technology and attract manufacturers to the district. It is also highly likely that these newer technologies and industrial users will require fewer employees to operate machinery, which means that fewer factory-associated residential units will be required to house workers in an increasingly automated operation.

The real estate industry and the public sector are encouraged to work together in the pursuit of net zero initiatives and policies for the Pingshan District specifically. The following foundational steps will help set a collaborative path that can be both actionable and achievable.

Understand the Baseline

It is commonly said that “you cannot manage what you do not measure.” Benchmarking ordinances and practices are often the first step as governments and building owners pursue energy and emissions reductions. Benchmarking provides a baseline of performance and can be used to identify underperforming buildings. Measuring and tracking building stock performance through greenhouse gas (GHG) inventories can also support effective policy formation and help building owners track progress over time. This baseline data, analyzed to assess ongoing performance, is frequently made public – through an annual city report, company website, or at the point of sale or lease of a building – to



increase transparency and to provide tenants and/or future owners more information on a potential space.

Set Targets

After establishing a baseline, realistic targets and timelines for reducing building emissions, from short-term interim goals to long-term aspirational ones, can be set. Creating positive momentum is key to long-term success. When it comes to setting goals at the building or district level, the government can lead by example, setting and achieving ambitious public-sector goals first and testing new strategies and technologies.

Define Metrics

Metrics used in policy formation should be carefully selected and defined. For example, a policy seeking to reduce carbon emissions should measure carbon emissions, not energy efficiency metrics. Additionally, there are variables that can influence the calculations, including total energy reductions, timing of energy consumption

as power plant emissions are not static, and the use of on- or off-site renewables. Policy language dictating metrics should be precise. For example, “net zero” is a term commonly used, yet there is a difference between a “net-zero-energy” building, which requires any energy used at a building to be offset by on-site renewables, and a “net-zero-carbon” building, which requires the building to be fully powered by on- or off-site renewable energy. Pingshan leadership may also choose to embrace a net-zero policy that requires “net-zero embodied carbon” in addition to the more typical focus on emissions from operations. Clarity of terminology is key to helping the real estate industry understand the investments needed to achieve new goals.

Streamline Policies

Many real estate owners and developers operate in multiple markets, so complying with new policies is easier if the requirements are similar to those in similar cities. In the U.S., some cities require data for energy benchmarking be submitted through the U.S. Environmental Protection

Agency's Energy Star Portfolio Manager, a free online tool that allows buildings to track their energy, water, and waste data. Simple approaches already in use help drive compliance, such as benchmarking in Portfolio Manager, which the average contractor or building owner can understand. Aligning the details of a policy and the operational strategy for implementation helps real estate stakeholders understand what will be required of them and reduces friction. Examples of this include: ensuring that current building codes provide an easy pathway for new construction to meet climate action plan goals and milestones; and ensuring that all policies within a city use similar metrics and timelines.

Opportunities for Synergy

Building-sector decarbonization goals that complement the government's goals for resilience, public health, workforce development, and transportation will provide a broader range of positive impacts for cities. By working to find areas of collaboration between these goals, the community receives more benefits from the decarbonization of real estate. Some cities have sought to address all of these topics within climate action plans or resilience strategies, developing the plans with interdepartmental working groups that will have a range of responsibilities for implementation.

All Buildings Should Participate

Policies that require and make it possible for all buildings to comply with new decarbonization policies maximize their impact toward Pingshan's goals. Different owners and property types have different needs when it comes to technology, education, and financing to make sustainability improvements, but the more demand there is for supplies and a workforce, the easier and less costly it becomes to comply. It also increases the potential for best practice sharing across industries as well as building emissions trading programs, which can increase the economic efficiency of building decarbonization.

Additional Support for Building Owners

As some industry sectors may be more financially constrained, alternative pathways should be considered to help support their compliance. Also, there may be new financing options available under these policies, putting fines collected from noncompliant commercial buildings toward improvements in sectors with financial challenges. Using these strategies, emissions reductions can be accomplished in a more cost-effective manner.

NET ZERO AND TECHNOLOGY

Pingshan is home to a variety of industrial users with varying energy consumption needs. As these business owners seek means by which they can lessen their utility costs, reduce fossil fuel consumption, and embrace newer net zero practices, the following decarbonization initiatives should be of particular interest to current and future building owners and developers in Pingshan.

Renewable Energy and Net Metering

With the wide expanse of rooftops in the district, the addition of solar installations to those building rooftops should be of keen interest. In the U.S., for buildings with solar installations, net metering and renewable energy credits provide good incentives for building owners and business owners. In both scenarios, business or building owners can commoditize green power and earn a profit from the sale of energy back to the grid. In other instances of excess energy generation, building owners can share the excess across a micro grid or store the excess energy onsite for days for use when the weather is not optimal for renewable energy generation.

In addition to the benefits for building and business owners, the government may also realize a direct benefit from renewable energy installations. The government could seek arrangements with building owners to lease rooftop space on privately-owned building surfaces and install renewable energy systems that feed back into and support the energy production in the grid.

Electric Battery Storage and Infrastructure

There are a number of factories in Pingshan that are in the business of producing batteries, which makes the concept of leveraging battery technology to promote renewable energy storage an interesting pursuit for the district. Battery energy storage could add value in Pingshan by providing utility grid load management, enabling renewable energy storage, and helping to decarbonize the grid. Battery storage could also scale to provide district-wide energy storage and grid management, balancing the energy usage across the district and providing power during off-peak times.

“These are opportunities that shouldn’t be missed – to cut carbon, monitor usage, and collect and share data.”

Next Generation Heat Pumps

In environments with heavy manufacturing relying on gas infrastructure, the use of next generation heat pumps is worth considering. The clean technology of these heat pumps works well when stacked for mid-rise buildings, particularly if hooked into a geothermal loop with a gas pump back-up mechanism. Next gen heat pumps could also allow buildings to run on partial loads, recognizing partial building occupancy, which will be much more energy efficient for the building owner and business operations.

Similarly, the focus on rainwater collection systems in China over the past 20 years could provide a viable platform for the installation of water-cooling systems and water-sourced heat pumps that can help lessen the energy consumption by district buildings.

Create a Pingshan Net Zero Center of Excellence

To help demonstrate the available net zero technologies and building innovation systems, Shenzhen could establish a Pingshan Net Zero Center of Excellence. This building or small campus would be built with and feature the latest in net zero innovations, including, for example, a technology showcase of data systems and energy systems, low-carbon

materials such as new age, more breathable cement, and natural cooling systems. The innovation center could feature the use of open-source data for measuring and tracking energy consumption across the campus and provide a platform by which district businesses could partner with related industries and educational systems to provide connections to training and development for the surrounding workforce. Ideally, this innovation center would also demonstrate how multiple owners can benefit from district-wide initiatives embracing district-scale innovations and showcasing the related impact of the net zero technologies.

Data Collection is Key

Progress toward net zero will be incremental over time. Understanding baseline energy consumption for buildings and measuring and monitoring future use will assist all parties in recognizing improvements and identifying gaps in energy capture. This baseline information and ensuing measurements should be housed on a transparent platform, accessible by building owners, and used by all parties to evaluate and measure success.

Building owners should be required to automate the collection of energy consumption data. Personal data would not be shared but collective data is critical to assist with benchmarking. (The U.S. Environmental Protection Agency and Greenprint both provide energy consumption data to assist with these types of benchmarking activities.) As power, gas, and water usage are already tracked in Pingshan, this information could be shared among building owners to see how their buildings perform relative to past performance and relative to the current performance of other buildings in the district. This data could also be benchmarked against a regional Shenzhen standard to spur additional efficiencies or celebrate measurable success in Pingshan.

PropTech Tools

Measurement tools for energy usage abound. Below is a small sample of platforms and products worth exploring further in a net zero pursuit.

- [Heliotherm](#) (heat pumps for commercial buildings)
- [Avvir](#) (BIM-focused reality analysis)
- [Mapped](#) (data infrastructure for IoT)
- [Nostromo](#) (building cooling solutions)
- [Low-carbon Cement product information](#)
- [Example of a platform for benchmarking data](#)

Financing Net Zero Technologies and Change

Pingshan's financial capacity may be somewhat limited at the start of its net zero initiative pursuits, but it could finance early renewable energy installations through a bond program used to establish an initial revenue stream. Specifically, Shenzhen could leverage China's recently formalized green bond market and criteria for this purpose. See [China's Burgeoning Green Bond Market: Developments, Characteristics, and Outlook](#) for additional insights.

There may also be access to sustainable funding on the debt/financing side for net zero initiatives. Financing could be retrofitted through a local green bond or an institutional investor willing to invest in driving the greening of the properties as the market is not quite ready to take the lead on investments of this nature.

Private developers might likewise leverage green bonds for their investments in Pingshan. A private developer could joint venture with a factory owner to assist with green infrastructure improvements, taking a financial interest in the factory owner's lease extension. The result would be a sustainable financing source for the factory owner and another path toward promoting and embracing net zero targets set for the Pingshan District.

As the technology is constantly evolving, there are more opportunities for net zero building innovations than can be detailed in this briefing. The Technology and Innovation Product Council of ULI Asia Pacific could be an additional resource for those seeking the latest innovations impacting the real estate industry.

- [Delve](#) (a platform for master planning)

THE BUSINESS CASE FOR REAL ESTATE

A majority of the buildings in the Pingshan district date back to the 1990's and many are nearing the end of their effective lifecycle and lease terms. As building owners and developers contemplate the future of these sites and identify the needs of the business owners they wish to attract to the district, there is a pressing need to renew the land leases across Pingshan. With the government's strong interest in developing green buildings in the district and the real estate industry's strong interest in developing/redeveloping in this area, marrying the two agendas, tying land leases (extensions and early renewals) to the incorporation of net zero building practices and technology makes sense for all parties.

The timing of the building redevelopment and the land lease renewal paired with the likelihood of new construction (rather than adaptive reuse) also provides ample opportunity to incorporate property technologies that will measure, monitor, and deliver critical energy usage data back to the district. Incorporating these technologies during construction will be a much more cost-effective solution than retrofitting buildings at a future date.

No matter the stage of progress, from policy proposal to implementation and compliance, real estate plays an important role in the decarbonization of the built environment. ULI's *10 Principles for Decarbonizing the Built Environment* has been used as a primer for this briefing and outlines how the real estate sector can get involved specifically, through providing policy input, preparing capital budgets for sustainability investments, educating internal staff on energy efficient technologies, and more. The greater the engagement, the greater the overall value to the building owner and the broader community.

The Role of Real Estate

The role of the real estate sector, as noted in the *10 Principles for Decarbonizing the Built Environment*:

Collect data: Benchmark building performance as a best practice and work with the government to help identify the challenges to data collection (especially when tenants/residents pay their own utility bills directly).

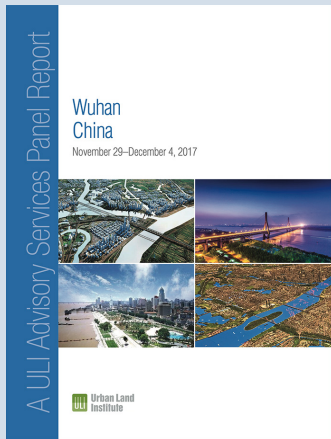
Prepare internal goals: For national or global real estate portfolios, although internal goals will likely not match the disparate city goals spanning the portfolio geography, they will prepare buildings for improved performance and reduced carbon emissions across the board. Align portfolio-wide sustainability goals with leading city policies on climate mitigation and efficiency. This step will help “future proof” buildings for emerging climate targets and regulations. After tracking progress internally, consider setting public goals for emissions reductions.

Make connections: There are multiple different city departments that regulate buildings, often working within their own silo. Reminding policymakers focused on climate mitigation to connect with other building regulators, such as building codes, zoning, utilities, transportation planning, and even historic preservation, ensures that policies are aligned and that they are working toward the same goals.

Incorporate sustainability in design: Considering energy performance during building design and construction ensures maximum energy and cost-savings benefits for building owners. Thinking ahead can also save building owners on future energy performance standards compliance costs, a real concern as more cities move to pass policies.

Measure the benefits of climate action efforts beyond reduced greenhouse gas emissions: Analyze, understand, and communicate the triple-bottom line benefits of

ULI Case Studies Relating to Large-scale Implementations

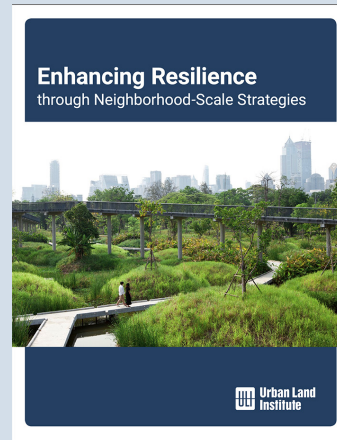


At the request of Shui On Land and the City of Wuhan, this panel provided strategic advice about the development of Changjiang New Town, a 500 square kilometer area located northeast of the Central Business District. The panel's recommendations included physical, social, and organizational underpinnings that will

allow the New Town to develop as the City of the Future. Special attention was given to new technologies, transport systems and a focus on achieving "net-zero" for energy, water, and waste.

The smart city of the future must meet the following goals:

- Put people first;
- Design and create a multimodal, green, and renewable transportation system;
- Conceive, design, build, and operate around the concept of "net zero" for energy, water, and waste;
- Achieve and maintain a community that enjoys one of the highest happiness rankings among the major cities in the world;
- Design and implement a land use plan that considers an ecological framework, rather than just an infrastructure framework;
- Design and implement a community-centric land use pattern rather than a transport-centric land use pattern
- Design and implement districts that support diversity of uses in scale and identity;
- Create a flexible and responsive city fabric;
- Create a location that can successfully attract and retain talent;
- Develop communities that act as an economic engine;
- Support lifelong learning as a core component of each of the individual and the combined districts; and
- Provide the civic leadership and intentionality that will achieve the highest level of return for the New Town.



Enhancing Resilience through Neighborhood-Scale Strategies introduces real estate actors, designers, policymakers, and finance professionals to the opportunities and challenges of preparing neighborhoods and communities for accelerating physical climate risks, including extreme temperatures, floods, storms and high winds,

seismic risks, water stress and drought, and wildfires.

The report includes the following:

- The business case for neighborhood-scale resilience projects;
- A summary of several neighborhood-scale strategies for each physical climate risk;
- An overview of public-sector policies influencing the resilience strategy context; and
- A selection of financing solutions and funding mechanisms applicable to neighborhood-scale solutions.

As climate risks accelerate, many communities are facing new or intensifying risks. For every climate risk, however, hazard mitigation strategies exist that, if done at the neighborhood scale, can provide more collective protection than when they are done individually or ad hoc.

As resilience design knowledge, supportive policy, and financing tools come into greater alignment, neighborhood-scale solutions can become mainstream practice and provide co-benefits for health and sustainability for current and future generations.

projects to explain investment decisions. Think outside the box to incorporate non-energy benefits into the financial calculation and seek complementary funding sources if available.

Understand the impacts: Better understand the secondary economic impacts of developments that enhance public health and social equity, including better community relations, increased retail traffic and sales, lower worker/resident turnover and reduced absenteeism, and enhanced brand equity for creating community benefits.

Collaborate: Recognize real estate's potential to help create a thriving and equitable community. Be attuned to issues that could impact the long-term prosperity of the communities because the properties' financial performance depends on the surrounding communities thriving. In markets that include carbon credits, consider investing in carbon reduction in other buildings—find the lowest cost, highest return on investment (ROI) opportunities to reduce carbon emissions.

Learn from public buildings: In some markets, public buildings will lead with new technology, greater procurement power, and the ability to invest in technologies

and strategies that have a much longer ROI. Owners should look to leverage the technology experience and procurement power of their cities and help public buildings pursue private-sector strategies for enhanced energy and carbon performance.

Share lessons learned: Many building owners lack the finances and knowledge to implement energy efficiency projects. Share successful projects through case studies that include financial details (investment, kilowatt-hour savings, and cost savings) to help educate the broader market on the strong business case for energy efficiency.

Energy cost uncertainty is risky: The cost of grid-supplied electricity and natural gas is increasing due to rising crude oil prices and aging infrastructure. Buildings that have lower energy costs can immediately reduce operating expenses and provide security against energy supply chain issues and rising energy costs.

Corporate goals and branding: Reducing carbon emissions feeds directly into an organization's corporate social responsibility strategy, which can support brand reputation and help attract and retain new customers and staff and potentially attract new investors.



THE ROLE OF GOVERNMENT INCENTIVES

Working together, the government, private developers, and business owners can make meaningful progress in the pursuit of a net zero future. Decarbonizing the built environment is of increasing interest to tenants and investors, yet the investments in the building technologies and data monitoring practices are not insignificant and are impacting project proformas in ways that limit widespread adoption at present. The public sector can help incentivize net zero pursuits.

The government has at its disposal means by which it can incentivize the green building practices it would like to see in Pingshan. From providing building concessions to approving early lease renewals, the government has the incentives that developers seek.

Building Concessions

The district could adopt a policy to incentivize the adoption of net zero building practices at the time of construction. For example, if a developer builds to a standard that is above the code requirements, the district can provide certain concessions to ease the development process. In another example, if the embodied carbon for a new building is a certain percentage below the minimum requirement, the developer/building owner may gain access to certain other incentives or financial benefits. (The State of California has a system like this in place that ties building permits to a requirement to meet specific targets by certain dates.)

“If the government gives developers what they want, they will bend over backward to achieve green goals.”

– Shenzhen Real Estate Developer

Master Plan and Lease Extension/Land Use Expansion

Tying net zero building practices to extensions on land leases and/or an extension of land uses beyond the current zoned use would be incredibly strong incentives for building owners and business owners.

China’s land use plans are updated annually and include indications for lease extensions. There is an opportunity to leverage lease extensions to include net zero requirements. Pingshan should adopt a more comprehensive master plan and more consistent criteria for “guaranteed” lease extensions. Then if a developer or business owner wants to redevelop in a green zone, there would be clear criteria for how the development is built, including net zero initiatives, and how and when data related to energy consumption is provided. Tying potential land lease extensions and/or early lease renewals to net zero practices such as these would be a strong incentive for developers and business owners to adopt green building practices.

Additionally, revised comprehensive master plans should include net zero districts, driven by property technology such as energy storage, EV infrastructure, and potentially heat pumps. The districts would collect relevant data, benchmark the data, and make it transparent and public.

The Carrot and the Stick

There may be an interesting approach the government could take as it relates to the land lease payments building owners pay. Using a carrot approach, the government could provide lease payment reductions for building owners who over-achieve on the targeted carbon reduction goals.

Alternatively, measuring the same output and using a stick approach, the government could increase lease rates or building rents in instances where building owners are not meeting established carbon reduction targets.

Factory Housing

Factories in the Pingshan industrial area are often built with associated dormitory-style housing for factory workers. The accommodations are often sparse, but the proximity to the place of employment means that residents do not have to travel far in their commute and are therefore impacting the environment far less than more typical commuters.

By way of example, a developer acquired a factory that had 600 associated dorms. Of those 600 units, roughly 400 were vacated when residents moved at the factory's closure; and the other 200 units remained occupied by residents who did not want to move. Neither the exiting/closed company nor the developer/new building owner is responsible for rehousing these residents, yet their continued presence is problematic to future uses at the site. At site purchase, the government asked the developer to create separate long-term housing for the 200 remaining residents and the developer received lease extensions on the subject property in return.

This lingering residential conundrum is not uncommon in the district. Factory owners and the government are faced with the challenge of repurposing sites that have become home to residents who do not want to move. In one approach, the developer or factory owner could be allowed to carve out the residential portion of the site, mark it as residential, and then redevelop the carved off industrial section more intentionally focused on the industrial use and in a manner that embraces the government's desired net zero practices. Another solution to this housing challenge could be achieved through the cooperation of the government, developers, and business owners to assemble

disparate residential properties across the district into one larger residential zone, complete with amenities and green space. This places residents in proximity to other residents, separates them slightly from the industrial uses, and frees some of the land on the purely industrial sites for further business expansion or redevelopment. This may also help solve the questions around the long-term viability of the current arrangement where in the government provides services – schools, emergency services, etc. – to a wide geography of housing units interspersed among the factories. Housing grouped together would create a more efficient service area. Provided that the properties under consideration are large enough for this type of segmentation and separation, and the owner recognizes the benefit of privately developing their land, this approach could incentivize a public-private interaction that leverages net zero recommendations and addresses housing needs in the district.

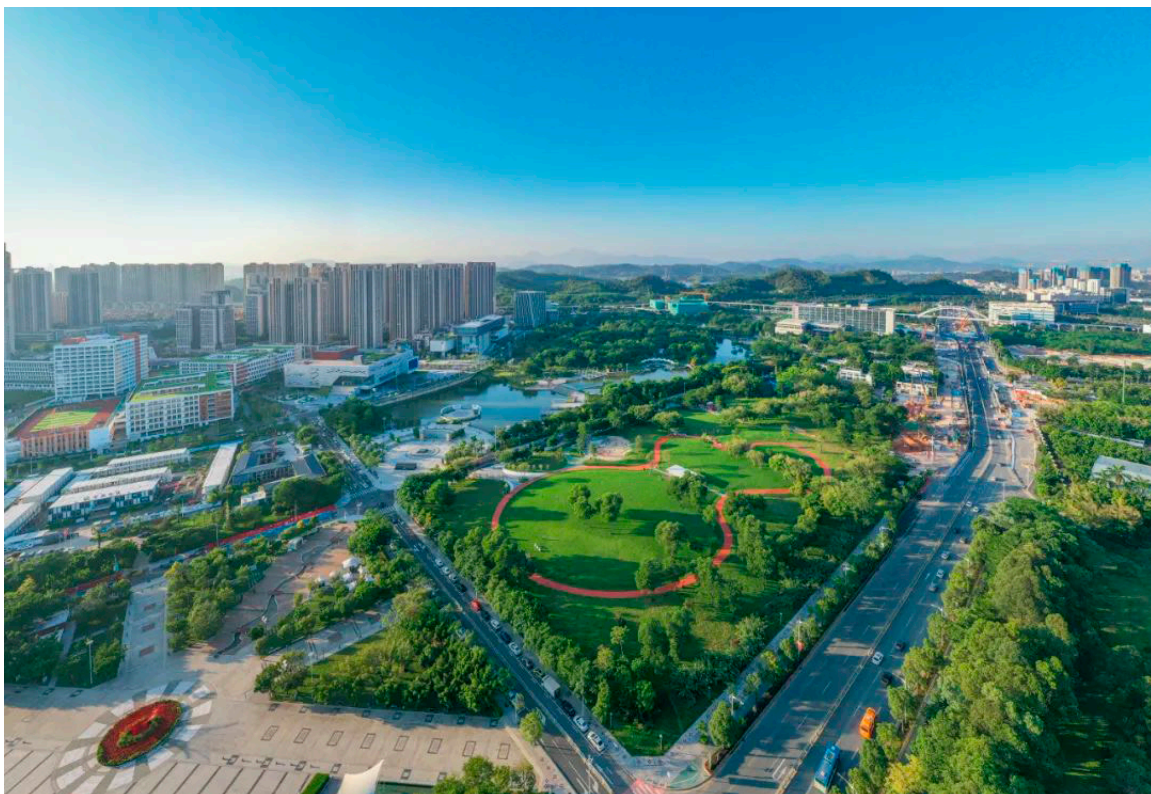
In nearly all of these incentive scenarios, the panel encourages the use of pilot projects to demonstrate the initiative and test the results. In a quest to test the viability of an initiative, participants should be provided financial incentives to (a) take the initial risk on a new program, helping identify gaps or revisions needed, and (b) allow the government access to the ensuing data produced by the pilot. This data can form the foundation of a program going forward and reinforce the WHY of the initiative. The government could establish a smart hub for Pingshan in order to process the data or turn to the newly established Center of Excellence to manage the process. The Center of Excellence could showcase information about the pilot projects, providing access to relevant data for everyone's knowledge and benefit and celebrating the achievements via a civic award or other additional recognition.

NEXT STEPS

As the government and the Pingshan District specifically consider how to best incentivize and support green building initiatives and the pursuit of net zero emissions in the region, it is worthwhile to consider the role that policies, incentives, and technology can play in advancing decarbonization. The private market is still grappling with the financial benefits associated with net zero initiatives, but developers, building owners, and business owners are all beginning to understand the critical role they play in decarbonizing the built environment and driving reductions in fossil fuel consumption.

The recommendations contained in this brief report should provide the foundation for a productive conversation between members of the development community and representatives of Shenzhen's government. With the former designing the future buildings dotting the landscape and the latter controlling the land use, cooperation is paramount. Common ground may be found, and the region may soon begin to realize the benefits of net zero practices more fully.

Further conversations on this topic are warranted and ULI stands ready to support the dialog, providing additional insights, industry expertise, and best practices gleaned from the real estate industry experts from around the globe. ULI welcomes the opportunity to continue this conversation and support Shenzhen's net zero and decarbonization goals.



SHENZHEN SPECIAL ZONE NEWS

10 Principles for Decarbonizing the Built Environment

1. Calculate A Baseline, Then Set Interim and Aspirational Goals

Setting ambitious and meaningful data-backed targets with clear definitions and metrics ensures clarity and puts everyone on the same page.

2. Involve Stakeholders Early and Continuously

Engaging stakeholders (such as : developers, tenants, business owners, and policy makers) early and often can provide meaningful input to ensure compliance is achievable, while building awareness and potential support for future policies. Role for real estate: Participate in working groups and work with industry colleagues to provide feedback on the impact of potential policies.

3. Understand The Business of Real Estate

Calculating the impact that policies can have on day-to-day operations and capital decisions helps real estate integrate policy requirements into its business plan. Role for real estate: Determine and share the economic impacts of potential draft city policies, but also understand the potential benefits, including benefits to building owners and tenants.

4. Align With the Larger Policy Ecosystem

Directing all policies toward the same goal ensures consistency, resulting in city policies that build off of state policies. Role for real estate: Think ahead by incorporating sustainability in building design and operations to lower the future costs of compliance and educate building-level stakeholders as new policies pass.

5. Connect To a City's Other Social and Economic Goals

Leveraging the opportunities to address public health, workforce development, social equity, and transportation in achieving energy efficiency and climate mitigation creates policies that achieve more benefits for the community. Role for real estate: Measure the benefits of climate action efforts and communicate the triple-bottom line benefits of projects to explain investment decisions.

6. Be Comprehensive

Subjecting all buildings—public and private—in a city to a new ordinance supports collaboration and impact and can potentially cross-subsidize capital improvements across building types such as energy efficiency in affordable housing. Role for real estate: Learn from energy efficiency and electrification strategies used in public buildings and collaborate to share lessons learned with all building owners in the city.

7. Prioritize Existing Buildings

Recognizing that every market is different, include more than policies for new construction; tailoring incentives and regulations to existing buildings has a greater overall impact. Role for real estate: Work energy efficiency into the entire portfolio, by taking lessons learned from one retrofit into other buildings.

8. Be Flexible in Achieving Goals

Simplifying requirements enough for everyone in the industry to understand and providing multiple pathways to compliance improves participation. Role for real estate: Work the cost of compliance into the building's capital plan and participate in pilots or incentive programs wherever possible to lower costs.

9. Foster a Marketplace of Support

Convening resources in one location supports education, technical assistance, financing, and training to identify opportunities for improvement and innovation. Role for real estate: Take advantage of all city-provided support, share best practices with the market, and take projects beyond basic compliance if possible.

10. Ensure Compliance, Reward Success, and Accelerate Transformation

Implementing meaningful but scaled penalties for noncompliance while also recognizing and rewarding achievements can help drive desired performance. Role for real estate: Understand the costs of noncompliance but work to comply with new climate regulations to demonstrate commitment, avoid penalties, and achieve recognition.

ABOUT THE PANEL



Hei Ming Chen
Panel Co-Chair
Founder and Chairman
KaiLong Group

With over 30 years of real estate experience, Mr. Cheng's work experience has covered a comprehensive range of activities, including ground up real estate development, real estate investment, fund management, business consulting, commercial banking operations, liquidity, and interest rate risk management. As one of the key founding members of KaiLong in 2004, Mr. Cheng has built and led the team to become a leading player in Asian Pacific, Greater China and London's vibrant investment and asset management market. To date, KaiLong has invested a total of over US\$4.0 billion in 56 real estate projects. Of these, 32 have already been exited with excellent risk adjusted returns. Before joining KaiLong, Mr. Cheng was the General Manager of Shui On Land. He oversaw the development and operations of Rainbow City, City Apartment, and Hangzhou Xi Hu Tiandi, as well as participating in the construction and operations management of Shanghai Xintiandi. Prior to that, Mr. Cheng held various senior positions with Standard Chartered Bank, including Greater China Head of Finance and Risk and Senior Manager of Marketing and Operations. In 2011 Mr Cheng founded KFoundation together with generous support from KaiLong employees and friends, uniting the KaiLong community under our shared mission to give back to society. Since its inception, KFoundation has raised over RMB 16 million. KFoundation has sponsored a total of over 3,278 students varying from secondary school to university.



Scott Dunn
Panel Co-Chair
Chief Strategy Officer, Asia
AECOM

Scott Dunn is the Chief Strategy Officer for Asia in AECOM, the world's trusted infrastructure consulting firm delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. Scott is an urban planner and city integrator who leads cross-functional interdisciplinary teams in providing integrated services and sustainable solutions for large, complex and multidisciplinary projects across Asia, among them high-density masterplans for new towns and regeneration of existing urban landscapes that have drawn on sustainable and smart themes. Scott also drives the River Restoration and Integrated Coastal Management Practice Initiative delivering integrated watershed solutions across our water infrastructure business. Scott is a ULI Global Governing Trustee, Advisory Board member for the ULI Center for Sustainability and Economic Performance and sits on the Asia Pacific Executive Committee, Chair of the Nominations Committee and the Singapore Country Council (founding Chairperson). He is an advocate of sustainable land development and high density urban environmental design and believes that in order to create great places, one should be both sensitive to the environment and be responsible for the society. His books and papers on urban mobility, sustainability and livability issues are frequently published with local and international media. For ULI, he has co-authored four publications with the Singapore Center of Liveable Cities – *10 Principles for Liveable High-Density Cities Lessons from Singapore* (2012), *Creating Healthy Places through Active Mobility* (2014), *Creating Liveable Cities Through Car-Lite Urban Mobility* (2016), and *Urban Mobility: 10 Cities Leading the Way in Asia-Pacific* (2017).



Heidi Creighton, FAIA
Vice President – Sustainability
Skanska

Heidi Creighton is a registered architect, a LEED Fellow, WELL Faculty, and a Fitwel Ambassador. Her work focuses

on sustainability and wellness strategies and certifications for academic, healthcare, commercial, and residential projects. She provides sustainability consulting services at the building and masterplan scales, as well as 3rd party certification management (LEED, Living Building Challenge, and WELL), post occupancy evaluation, and health and wellbeing-focused design. Heidi is a passionate advocate for a restorative built environment, delivering socially, economically and environmentally sustainable developments. Heidi has been active in the green building industry for more than 15 years and has served on the USGBC-LA Board of Directors since early 2013. She is an Officer of USGBC-LA in the position of Secretary. Recent speaking experience includes: Not Why, But How: Diversity, Equity and Sustainability at MGBCE Keynote (2017); Healthy and Happy: The Importance and Value of Human Capital at Greenbuild (2016); Alphabet Soup: Deciphering Sustainability Rating Systems and Lessons Learned at the Neighborhood Scale at APA California (2016); Healthy and Happy: The Importance and Value of Human Capital at AIA National (2016); Integrated Health and Wellness: WUSTL's Hillman Hall at MGBCE (2016); USC Comprehensive Post-Occupancy Evaluation Study: and The Impact of Indoor Environmental Quality on the Building Occupants' Behaviors at MGBCE (2016).



Brad Dockser
Chief Executive Officer and
Co-Founder
Green Generation

Brad Dockser is GreenGen's CEO/Co-Founder, transforming the world's built environment

through its visionary end-to-end approach integrating energy, real estate, technology, and capital markets to Operate in the Green. Throughout two decades of real

estate investing, Brad was a Principal with MacFarlane Partners and Founding Partner and Managing Director of Starwood Capital Europe and Starwood Capital Asia overseeing operations in each region. Brad received an A.B. cum laude in Economics and an MBA, both from Harvard University. Brad serves as a Global Governing Trustee of the Urban Land Institute's (ULI) and is on the Global Advisory Board for ULI's Center for Sustainability and Economic Performance. He was previously Chair of ULI's Redevelopment and Reuse Product Council and founded ULI Washington's Sustainability Initiative. He is a Non-executive Director of London-based Conduit Capital and member of The Economic Club of Washington DC, US Green Building Council, and International Society of Sustainability Professionals.



Zander Geronimos
Head of Strategic Partnerships
and Business Development
MetaProp

As the Head of Strategic Partnerships and Business Development for MetaProp,

Zander leads relationships and communications with key players across the real estate value chain and acts as a conduit between strategic real estate firms and the emerging PropTech community. Additionally, he is an active angel investor and holds several board advisor positions. Prior to joining MetaProp, Zander was a Senior Solutions Engineer covering the North American region for VTS, where he spent four years working across business development, strategic data analysis, marketing, and solutions engineering. His efforts supported the growth of VTS from a startup to a market leader, as the company became the #1 technology platform in leasing and asset management with over 12 billion square feet of commercial real estate space on the platform. His breadth of experience allowed him to work with sales, marketing, data, product engineering, and design. Before that, Zander started his career as a Real Estate Research Analyst for a Hedge Fund in Stamford Connecticut. He adds immense value to the MetaProp platform given his experience as a PropTech operator and his work with the strategic real estate com-

munity. Zander holds a B.S. from the McIntire School of Commerce at the University of Virginia with focuses on Real Estate and Marketing. He is the founder of the University of Virginia Alumni in Real Estate and is a regular guest lecturer at the University on real estate technology topics. He also has guest lectured at many prominent universities including Yale, UCLA, and Cornell. Outside of work, Zander is an avid cook and traveler.



Billy Grayson
**Senior Vice President, Centers
 and Initiatives**
ULI

Billy Grayson is the Executive Director for the Center for Sustainability and Economic

Performance at the Urban Land Institute, a nonprofit education and research organization that focuses on land use, real estate and urban development. As Executive Director for the Center for Sustainability, Mr. Grayson manages a team leading programs on climate risk and resilience, health and wellness, and building energy and environmental performance. ULI works with members, community leaders, coalition partners, and other key stakeholders to build awareness around sustainability issues in the built environment, and to provide our members with the tools and resources they need to cost-effectively drive sustainability into their projects and operations. Mr. Grayson has over a decade of experience leading energy and sustainability initiatives in real estate, distribution, and supply chain operations. As Sustainability Director at Liberty Property Trust, Mr. Grayson led a 500+ building initiative that included green building construction, energy efficiency retrofits, and sustainability-focused property management strategies and tenant engagement. As Vice President, Social and Environmental Sustainability for the Electronics Industry Citizenship Coalition (EICC), Mr. Grayson led a global compliance program working with the electronics supply chain to identify and mitigate environmental and human rights risks in their shared supply chain, as well as programs addressing climate change mitigation. As Sustainability Director at WESCO, Mr. Grayson developed an operational sustainability program that reduced

energy, water, and waste, and launched a global marketing initiative for WESCO's sustainability-focused energy technology products and services.



James Wong
Executive Director
Hon Kwok Investment Co., Ltd

James Wong is the Executive Director of the Chinney Group. The Group's four publicly listed Hong Kong subsidiaries: Hon

Kwok Land (0160.hk), Chinney Investments (0216.hk), Chinney Alliance (0385.hk), and Chinney Kin Wing (1556.hk) are focused on high-tech Engineering, Construction, Trading, Investments, and Real Estate. The businesses range from building their own 80-storey Hon Kwok Tower in Shenzhen to building and operating Hong Kong's largest data center to installing the air traffic control radar at the Hong Kong Airport. This family business was founded by his great grandfather in Nanjing in the 1920's to build China's railway system. He split his childhood between the US, Canada, and Hong Kong. After graduating from the University of Washington with his BA (with Honors), he went on to earn a Master's Degree from the Florida Institute of Technology in Information Systems Engineering as well as a Juris Doctor from the University of California, Hastings College of Law. He is a Phi Kappa Phi member and an advocate for Lifelong Learning. He is a member of the California Bar as well as a licensed California Real Estate Broker. He is also a LEED Green Associate and Well AP. Before joining his family business in 2010, James held positions variously as a lawyer on Toyota's eDiscovery team in Torrance, California, and as a tax lawyer at Baker and McKenzie (Los Angeles/Hong Kong) and Price Waterhouse Coopers (San Francisco). He is married to Lisa and has two kids Cameron and Samantha. He served as a delegate to the Chinese People's Political Consultative Conference for Jiangsu Province until 2018. In addition, he serves on the Board of Trustees of the Florida Institute of Technology (otherwise called NASA U) where he is an adjunct professor teaching Business and Healthcare Law and was the 2018 Outstanding Alumni Award winner. Currently he serves as a Global Trustee

for ULI. He is also the Vice President of the Hong Kong Huskies. He was formerly the Treasurer of the Association of Corporate Counsel's Southern California Chapter, as well as a Governor on the Board of the American Club of Hong Kong. He is one of the founders of the Seattle I-District Asian Street Fair (now in its 35th Season) and created Seattle's first-ever Computer Dating Dance in 1983.



Edison Zhang

Founder

GB Tech Consulting Limited

Dr. Edison Zhang obtained his PhD degree from the University of Hong Kong in 2014, majoring in sustainable building design,

eco-city planning, carbon auditing, and healthy building. He is an entrepreneur, a designer, a researcher, and a teacher. Dr. Zhang is the first mover in green building development and research in both Hong Kong and Mainland China. He was involved in the 1st LEED CS building project in Hong Kong - 50 Connaught Road,

Central, Hong Kong, and the 1st batch of the WELL AP training in Mainland China. He is also in charge of the 1st WELL registered public kindergarten project in China – the Shenzhen 6th Kindergarten. With more than 13 years of experience in green and healthy building, Dr. Zhang has been involved in more than 40 green/healthy building projects and 10 national/regional/local research projects. He has published nearly 20 conference and journal papers, participated in the establishment of six green building and eco-city standards, and received more than 10 international/local green building awards. Recently, Dr. Zhang founded business focused on the development of performance-based healthy building monitoring systems and benchmarking with WELL and other healthy building standards, supporting healthy indoor environments. He also appointed as a committee member for the establishment of the Chinese national standard – The Evaluation Standard for Green and Ecological District, GB/T51255-2017. Dr. Zhang has been recruited by the Shenzhen Building and Construction Bureau to research and write green building standards and related policies.



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