

# PROVIDING HOMES FOR ALL

INSIGHTS FROM  
SINGAPORE &  
SHANGHAI

*Providing Homes for All: Insights from Singapore and Shanghai* represents the inaugural collaboration between Singapore's Centre for Liveable Cities (CLC) and the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management (MCHURDM). This publication is produced under a Memorandum of Understanding (MoU) signed between CLC and Shanghai MCHURDM where both parties have committed to create, share and disseminate knowledge on urban governance through joint research collaborations. This MoU is under the ambit of the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC) that was established in April 2019 to deepen engagement and cooperation between Singapore and Shanghai.

Following reciprocal visits, workshops and extensive discussions between officers from both cities, along with engagements with housing practitioners from the private sector and experts from academia, five key aspects of Singapore and Shanghai's affordable housing provision were mutually identified as being of greatest salience and learning interest to both cities. The five areas form the basis of this publication, and they are: neighbourhood planning, affordability, housing construction and design, estate rejuvenation and management, as well as community building and resident engagement.

The willingness to break down traditional knowledge silos and collaborate across different urban systems is critical for a successful housing system, while learning and sharing knowledge across different cities has been key to producing this publication. As society, technology and challenges continue to evolve, this spirit of partnership stands both Singapore and Shanghai in good stead in providing quality and liveable homes for all, well into the future.

CENTRE for  
**LiveableCities**  
SINGAPORE

Shanghai Municipal  
Commission of Housing,  
Urban-Rural Development  
and Management



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Set up in 2008 by the Ministry of National Development and the Ministry of the Environment and Water Resources, the Centre for Liveable Cities (CLC) has as its mission “to distil, create and share knowledge on liveable and sustainable cities”. The CLC’s work spans four main areas— Research, Capability Development, Knowledge Platforms, and Advisory. Through these activities, the CLC hopes to provide urban leaders and practitioners with the knowledge and support needed to make our cities better. For more information, please visit [www.clc.gov.sg](http://www.clc.gov.sg).

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SINGAPORE

## FOREWORD

**Singapore** and Shanghai have enjoyed strong economic and bilateral relations since China's opening up of its economy in the 1980s. Today, Shanghai is the second largest direct investment destination for Singapore-based companies venturing into Mainland China. In 2019, total trade between Singapore and Shanghai exceeded US\$14 billion (S\$ 19 billion). Our companies are active in a wide range of sectors, from finance, retail, food and beverage to healthcare, education and real estate.

Beyond trade and investment, Singapore and Shanghai seek to further enhance our connectivity and create more opportunities for collaboration. With the establishment of the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC) in April 2019, six key areas have been chosen as focal points for increased cooperation between the two parties—the “Belt and Road Initiative”, Financial Services Cooperation, Technology and Innovation, Urban Governance, Ease of Doing Business, and People-to-People Exchanges. The cooperation in these areas will produce far-reaching benefits for the people of both cities. As co-chair of the SSCCC, I look forward to activities that the Council will catalyse, and to strengthening our partnership in the years to come.

Singapore and Shanghai share the same aspiration to create liveable and sustainable environments for our people. We both face the same urban challenge of making the best use of limited land, while ensuring that our rich culture and heritage are preserved. Our people are energetic, innovative and open to diverse ideas. At the same time, there is enthusiasm from the administration in both locations to implement policies which will provide a high quality of life.

This shared aspiration and spirit of collaboration is reflected in this joint publication titled *Providing Homes for All: Insights from Singapore and Shanghai*. This is the first of many collaborative research efforts between Singapore's Centre for Liveable Cities and the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management, and is produced as part of the Memorandum of Understanding under the ambit of the SSCCC.

Through the combined efforts of researchers, housing authorities, partner agencies, academia and leading representatives from the private sector, this publication provides a clear picture of each city's contexts, challenges and approaches in providing quality, affordable public housing for its people. We hope that these candid accounts will enrich the reader's understanding and provide insights on how cities can co-create solutions in urban governance through engaging various stakeholders and communities, and inspire our readers to share ideas in tackling current and future urban challenges. By leveraging the knowledge and efforts of such a wide range of stakeholders, I am confident that both Singapore and Shanghai will continue to build more liveable cities for our respective residents.



**Mr Lawrence Wong**

Minister for Education and  
Second Minister for Finance, Singapore

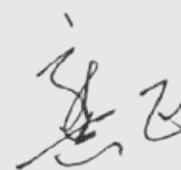
SHANGHAI

## FOREWORD

The publishing of *Providing Homes for All: Insights from Singapore and Shanghai* is a remarkable achievement that showcases the fruit of the cooperative efforts in sharing domain knowledge under the Shanghai-Singapore collaboration framework. I would hereby like to acknowledge the hard work that the teams from both cities put in and offer them my sincere congratulations!

Shanghai and Singapore have a long history of mutual exchange and collaboration that is being further nurtured with the establishment of the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC). At the inaugural meeting of the SSCCC, several important domains were selected for expedited collaboration, while the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management (MCHURDM) and the Singapore Centre for Liveable Cities (CLC) honed in on “Housing”—an issue closely related to the livelihoods of citizens—as a topic for special research. Reflecting on their respective journeys in public housing development to draw insights from past experiences in resolving housing challenges, both parties have distilled useful lessons documented in this publication that will help in providing better quality homes for all.

Whilst extending my fervent support, I also hope that Shanghai and Singapore will continue to strengthen collaborative ties in areas of mutual interest such as the “Belt and Road Initiative”, Financial Collaboration, Technological Innovation, Business Environment, Urban Governance and Cultural Exchanges. Such endeavours will no doubt contribute to augmenting Singapore and China’s cooperative partnership, enabling both parties to progress with the times.



**Mr Gong Zheng**

Mayor of Shanghai

## MESSAGE | SINGAPORE

# TAKING A SYSTEMS APPROACH IN PROVIDING HOMES FOR ALL IN SINGAPORE

## By Mr Khoo Teng Chye

Executive Director,  
Centre for Liveable Cities

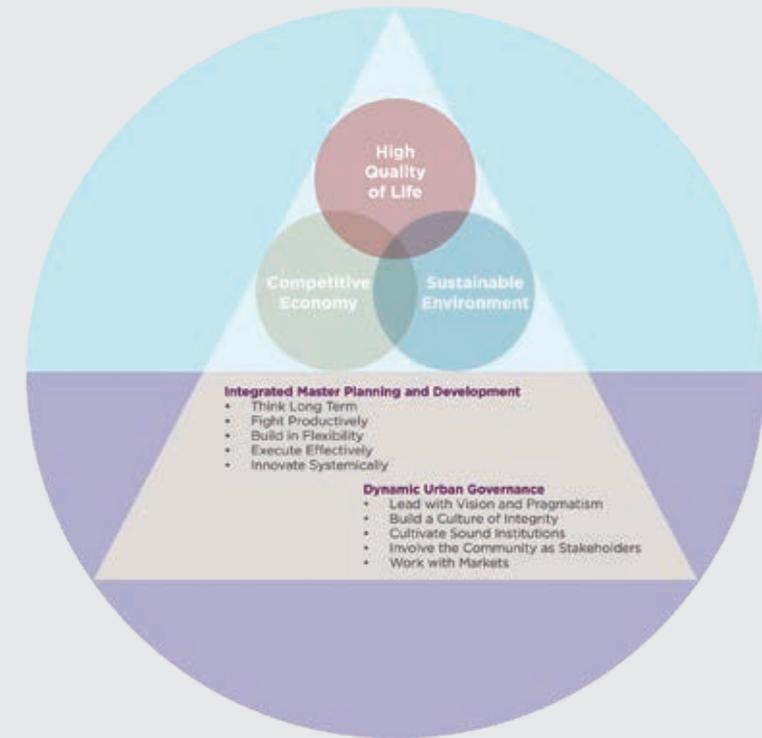
In the area of public housing provision, Singapore and Shanghai's contexts differ in certain fundamental ways due to their dissimilar population size, land area, and housing market systems among others. Yet there are also commonalities in the challenges each city has faced in the past and continues to grapple with. This is where both cities can learn from each other's experiences and efforts at applying a "systems approach" towards providing quality public housing for their residents, which this publication seeks to distil.

This approach of working across different urban systems is encapsulated in the Singapore Liveability Framework<sup>1</sup> which the Centre for Liveable Cities (CLC) has derived from Singapore's urban development experience and serves as a guide for developing a sustainable, liveable city that is able to provide a high quality of life to its residents.

In the case of Singapore, its public housing has undergone significant transformation over a relatively short period of time, much like its urban

*Singapore's systems approach to urban development as distilled in the Singapore Liveability Framework.*

Infographic courtesy of the Centre for Liveable Cities.



landscape. From having the majority of its rapidly-growing population living in overcrowded, unsanitary squatter settlements and a housing situation labelled as "a disgrace to a civilised community" in the 1940s and 1950s, Singapore has emerged as one that presently houses about 80% of its residents in more than a million flats spread across 24 towns and several estates.

The Housing and Development Board's (HDB) key mission in the early years following its formation six decades ago was to expediently build as many new HDB flats as possible to address the acute housing shortage; an objective aided by it being the central housing authority and the adoption of a total approach to the planning, design and construction whereby the HDB oversaw all aspects of public housing development in Singapore.

Over subsequent decades, as Singapore continued on its upward trajectory in urban and economic development, the housing needs of residents also continued to evolve and grow increasingly diverse. In tandem, supporting industries and related professional capabilities in the field of housing provision also became more advanced.

The combination of these factors presented the HDB with the opportunity to adopt a more dynamic and integrated approach to planning and developing its housing estates, or what we at CLC refer to as taking an "urban systems approach". Affordable housing in Singapore strives to achieve multiple outcomes, most of which require working across different urban systems. They provide residents with a safe and comfortable living environment, which



includes well-maintained buildings and self-contained vibrant estates catering to their daily needs from food to healthcare, to education and recreation. Estates are also serviced by a well-connected transport network to encourage community building and social integration.

Housing communities now have a resident mix that cuts across different socio-economic and ethno-cultural groups. More recently, they have also begun to cater to an increasing ageing population and are built to be environmentally sustainable and resilient in the face of climate change. Adding to these objectives is the need for public housing to remain affordable and within the financial reach of the majority of the population.

Given its complexity and numerous potential challenges, implementing a good affordable housing system requires dynamic urban governance; the ability to take a total systems approach to housing by working across the interfaces of different agencies and systems such as urban planning, engineering, design, transportation, public utilities, sanitation and healthcare. Furthermore, greater flexibility can be built into the system by having its operators extend beyond the public sector and include the private sector where greater expertise and access to more advanced technology and innovation may reside. Residents, the important third “P” in the Public-Private-People Partnership, should also be engaged as an important stakeholder, and be part of the decision-making process in order to empower them to take greater ownership of their living environment.

These are areas where the Singapore Government and the HDB in particular, as it celebrates the 60th anniversary of its

**TOP LEFT:** *Toa Payoh New Town, one of Singapore's earliest satellite towns.*

Image courtesy of the National Heritage Board.

**BOTTOM RIGHT:** *The next generation of eco-friendly public housing at Punggol Northshore.*

Image courtesy of the Housing and Development Board.

formation, have done well in; tirelessly working across and integrating the different urban systems whether in the area of housing affordability, construction, rejuvenation, estate management, or community building.

As with all systems, none are perfect and there will always be more that can be done and further improved upon. Singapore can certainly take a leaf from Shanghai's book. For instance, what conditions would encourage Singapore's private sector to be more proactive and to sustain their participation in the public housing market? From CLC's study visit to Shanghai as part of the research for this publication, the private sector in Shanghai is seen to play a very proactive role in developing new technologies and methods such as prefabrication for building construction, which is done in collaboration with research institutions and supported by the municipal government. Is there a role for our private sector to be involved in providing affordable housing for the lower income strata of society, which is currently driven by the public sector, such as the case of private enterprises in Shanghai taking the lead in developing public rental housing within industrial parks to cater to imported talent? In place of demolishing and rebuilding, can some older buildings be conserved and refurbished as public housing to complement urban rejuvenation efforts, as seen in Shanghai's Chun Yang Li?

In the face of natural disasters and global health pandemics such as the unprecedented COVID-19 outbreak, this said event forced billions of people around the world to remain in their homes while putting strain on existing healthcare infrastructure and available accommodation for those placed on quarantine. How could a city's public housing system and its

many stakeholders and partners mobilise their skills, capabilities, resources and interdependencies built up over the years, and channel these towards the expedient construction of adequate temporary housing in a matter of days for those affected? How can residents come together to galvanise strength and support from one another to navigate these uncertain times as a cohesive community? With residents needing to work and learn remotely from home during workplace and school closures in the midst of a pandemic, how can neighbourhoods be made even more self-contained to reduce the need for residents to travel beyond the immediate vicinity of their homes for their daily necessities in order to enhance community safety?

These are challenging questions to ponder not only under present-day circumstances, but also well into the future. However, with the spirit of rising to the challenge, accountability, working in tandem with partners across the different urban systems, and continually leveraging on innovative ideas and tools in providing quality affordable housing for its people that has helped Singapore overcome equally daunting obstacles in the past, these challenges are far from insurmountable.



# PROVIDING HOMES FOR ALL THROUGH RENTAL AND PURCHASE IN SHANGHAI

## By Mr Huang Yongping

Director General, Shanghai Municipal Commission of Housing, Urban-Rural Development and Management

**Housing** is a perpetual issue and challenge in urban development. Shanghai and Singapore are very different in terms of the size of their respective population, physical size, and developmental experience. Despite these differences, both cities have been able to build a public housing system adapted to their local situation and are successful in providing affordable housing for citizens. This is a remarkable achievement and useful experiences have been accumulated in the course of this process.

To facilitate and bring to fruition key collaborative initiatives identified by the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC) in areas such as housing development and public housing, the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management (MCHURDM) and Centre for Liveable Cities (CLC) agreed to jointly publish a book documenting and comparing the development process of public housing systems in Shanghai and Singapore. Building upon this foundation, both research teams collaborated closely to produce this publication, which details Shanghai and Singapore's achievements in housing development, by sharing our respective experience in providing public housing, and explores ideas on the future of housing development.

Looking back, Shanghai's housing development has been both a remarkable and painstaking journey. Prior to 1949, most citizens in Shanghai faced difficulty getting accommodation. Since the founding of the People's Republic of China in 1949, and especially after the economic reforms that began in 1979, housing has been an issue close to the hearts of Shanghai's leaders. The municipality has embarked on an exploratory journey to innovate and learn from good domestic and international experiences, including those of Singapore. Shanghai has made remarkable progress through decades of unremitting efforts, to establish the basic framework for the public housing system today.

Shanghai's current housing framework rests on the principle that housing is for accommodation and not speculation, and that there has to be a balance between housing efficiency and allocation fairness. Within this framework, there are two systems—one catering to the private housing market and the other for public housing. Shanghai is focusing its efforts on developing the commercial market, encouraging citizens to purchase only for the purpose of accommodation. At the same time, Shanghai is committed to improving the four types of public housing, namely, the subsidised low-rent housing, the public low-rent housing, shared property housing and resettlement housing. The framework will also facilitate residents to either rent or purchase their home, without preference for either method<sup>2</sup>, by developing the rental market.

Shanghai's efforts allowed living conditions to improve significantly while the city's urban landscape underwent dramatic changes. By end of 2019, the

per capita living space of Shanghai urban residents had already increased to 37 m<sup>2</sup>. Nonetheless, Shanghai's housing development will face new challenges in the future with increased constraints on land and space resources, an ageing and increasingly international population creating diversified demand, as well as citizens with higher mobility and higher expectations of their living environment and quality of life.

To meet these challenges effectively, Shanghai can learn from Singapore's experiences. For example, Singapore had adopted a dynamic and integrated approach to plan and develop its public housing estate, facilitating the coordinated development of transport, cultural, education and medical amenities, resulting in integrated community development. At the same time, in order to preserve the attractiveness and value of old estates, the HDB identified the upgrading of Housing and Development Board (HDB) estates as an important strategy since the 1980s. Various upgrade and renewal programmes, such as the Neighbourhood Renewal Programme, are introduced at various points of the estates' lifespan to rejuvenate the landscape of these older estates and revitalise the community.

Housing is an economic and social issue relating to welfare of numerous households, their livelihood, socio-economic development, and social stability. It is an issue that both Shanghai and Singapore pay a lot of attention to. Hopefully, this publication will serve as a platform and opportunity for further exchanges and collaboration on their respective housing issues. May we persevere in our effort to realise our common goal of "Housing for all".

# INTRODUCTION

## CONTINUING A TRADITION OF COOPERATION AND KNOWLEDGE SHARING

**Providing Homes for All: Insights from Singapore and Shanghai** represents an inaugural collaboration between Singapore's Centre for Liveable Cities (CLC) and the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management (MCHURDM). This publication is produced under the Memorandum of Understanding (MoU) signed between CLC and Shanghai MCHURDM where both parties have committed to create, share and disseminate knowledge on urban governance through joint research collaboration. This MoU is under the ambit of the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC) that was established in April 2019 to deepen engagement and cooperation between Singapore and Shanghai.

This publication is the culmination of months of research, dialogue, and knowledge exchange between officers from both cities. This continues a longstanding tradition of cooperation and sharing of knowledge, skills, and technology between Singapore and cities across China that extends beyond the area of housing into numerous sectors that have contributed to both countries' economic development.

To develop a richer understanding of each city's contexts, challenges and approaches to providing affordable housing for their citizens while strengthening ties between officials from both agencies, CLC and Shanghai MCHURDM organised

**BOTTOM LEFT:** MoU signing between CLC and Shanghai MCHURDM, and official launch of the joint publication outline at the 2019 Global Cities Forum in Shanghai.

Images courtesy of the Centre for Liveable Cities.

**TOP RIGHT:** Understanding Transit Oriented Development and Singapore's integrated planning approach to public housing during a visit to Toa Payoh Town by the Centre for Liveable Cities and Shanghai MCHURDM delegation.

Image courtesy of the Centre for Liveable Cities.

**BOTTOM RIGHT:** The delegation gaining a deeper appreciation of township management and housing upgrading works during a visit to the Pinnacle @Duxton.

Image courtesy of the Centre for Liveable Cities.



two study visits to Singapore and Shanghai. The knowledge gleaned and key takeaways for each city from these reciprocal visits have been distilled in this publication to allow these lessons to be shared with other cities, beyond Singapore and Shanghai, and trigger further discourse among city leaders, urban planners and other key stakeholders on the pertinent topic of affordable housing provision.

During the visit to Singapore in September 2019, officials from Shanghai MCHURDM were able to learn first-hand about critical aspects of Singapore's public housing policies, development and administration through a series of learning journeys and briefings at various groundbreaking and internationally-acclaimed housing estates and developments. These included visits to Toa Payoh Town Centre to experience Singapore's integrated town planning and rejuvenation efforts, Kampung Admiralty, an award-winning project which represents Singapore's first integrated retirement community development, and the Pinnacle@Duxton, a towering 50-storey structure that is home to the tallest public housing development and longest sky garden in the world, where representatives from the Tanjong Pagar Town Council

shared on issues pertaining to township and estate management as well as upgrading efforts.

A learning journey was also organised to Singapore's first eco-town at Punggol where the delegates got to experience a location that has benefited from the Active, Beautiful, and Clean (ABC) Waters Programme—the Punggol Waterway—where a variety of eco-friendly features have been introduced into the various public housing developments. Delegates got to see first hand how these features have been seamlessly integrated with the surrounding amenities and waterways.

During each of these visits, the delegates were able to hear directly from the developers and administrators their experiences in bringing these groundbreaking projects to fruition while exchanging views on Shanghai's own experiences in these areas. The study visit to Singapore culminated in a full-day workshop where key players from the private sector and academics specialising in the field of housing and real estate were invited to share with the Shanghai delegation the vital role that public-private partnership plays in public housing development in Singapore and to engage in in-depth



discussions with representatives from the Housing and Development Board (HDB), the Urban Redevelopment Authority (URA) and CLC's housing research team on what learning points resonated with the visiting delegation and could be beneficial and applicable to Shanghai's context.

Subsequently, the CLC-led Singapore delegation paid a return visit to Shanghai to learn more about their experiences and insights. Various local agencies including the Shanghai Chengtou Group Corporation (a state-owned enterprise) shared on Shanghai's past, present and future challenges in providing affordable housing. Learning journeys were organised to understand the importance of conservation in Shanghai. This included a visit to Chun Yang Li that showcases Shanghai's increased efforts in rejuvenating older estates instead of simply demolishing them in the midst of rapid urbanisation, and to Jian Ye Li which has been given a new lease of life after being transformed from an ageing housing estate into a vibrant mixed-use development consisting of a hotel, restaurants and a social activity centre.



The Singapore delegation also visited Jing'an District's Operation and Management Centre where they could see first-hand how technology and data gathered through the deployment of closed-circuit televisions has been widely applied to the management of municipal issues in the district. A trip to the Bund area helped illustrate how urban design can enhance the liveability of surrounding areas and promote active mobility, as evident by its vehicle-free 46-km-long walkway that residents and visitors alike are now able to enjoy.

## DISTILLING THE KEY LESSONS IN AFFORDABLE HOUSING PROVISION

Following the reciprocal visits, workshops and extensive discussions between both sets of officers, five key aspects of Singapore and Shanghai's affordable housing provision were mutually identified as being of greatest salience and learning interest to both cities. These topics form the focus of the chapters for this publication.

The first chapter examines how each city's affordable housing approach has evolved over the decades to reach its current state, and the various challenges that had to be overcome along the way, highlighting the key principles that have been built upon and continue to hold firm till the present day.

The second chapter highlights the lengths that both cities have gone in maintaining the affordability of public housing and keeping these within the reach of their citizens, through policies, subsidies and a range of other interventions.

The third chapter delves into the physical construction of affordable housing and the key ingredients



that contribute to its success such as the use of materials, technology, standards and regulations. The chapter also outlines the importance of continuous improvement and working in tandem with the industry and private sector.

The fourth chapter discusses the topic of upgrading, rejuvenation and estate management. All of which are critical in continually providing residents with good quality homes and a liveable environment across the lifespan of these buildings and infrastructure.

The penultimate chapter casts the spotlight on the communities who call these estates their homes and how intangible bonds of trust and understanding can be further strengthened within these physical spaces. The increased efforts by the governments to engage and empower residents to take greater ownership over their living environment will also be showcased.

The concluding chapter gives a glimpse of what lies ahead for affordable housing in both Singapore and Shanghai, the emerging challenges on the horizon, as well as the opportunities that can be grasped to further build on the work that has already been done and propel the affordable housing system of both cities to the next level of success. The chapter will also convey the areas of each city's approach that most resonated with the researchers from both cities during the course of this engagement and production of the joint research publication, which will lay a strong foundation for future collaborative projects between the CLC and Shanghai MCHURDM.

**BOTTOM LEFT:** *The Singapore housing delegation visiting Chun Yang Li to better understand Shanghai's rejuvenation efforts for older estates.*

Image courtesy of the Centre for Liveable Cities.

**TOP RIGHT:** *Learning Journey to Huangpu River.*  
Image courtesy of the Centre for Liveable Cities.

## CHAPTER 1

*HDB's towering  
Pinnacle@Duxton  
juxtaposed against  
Singapore's housing  
of yesteryear.*

*Image courtesy of  
Justin Adam Lee  
(Shutterstock)*

# THE EVOLUTION OF HOUSING FOR ALL





## THE DAUNTING ROAD FROM MUDFLATS TO A METROPOLIS

**Since** its emergence as a newly independent island-state in 1965, Singapore's rapid growth and development in a matter of decades has been globally recognised as an important role model of forward-looking planning and effective governance. One of the key reasons for its success has been its approach to providing public housing for its residents. At present, more than four-fifths of all Singaporeans live in public housing in the form of flats constructed by the Housing and Development Board (HDB), 90% of whom own their homes. In total, the HDB houses around 3.2 million residents in over 1 million flats, spread across 24 towns and several estates. Considering the dire situation and numerous challenges that it had to face just over six decades ago, Singapore's present-day achievements would have been almost unthinkable back then.

Inadequate town planning and insufficient funding and manpower for housing development under the British colonial government, coupled with poor drainage and sanitation

*Singapore's dire living conditions—with unsanitary slums, poor infrastructure and pollution in the early years of nation building.*

Images courtesy of the National Archives of Singapore.

infrastructure, and the rapidly growing population through arriving migrant workforce exacerbated the already overcrowded, unsanitary living conditions plaguing pre-independence Singapore. With the majority of the population residing in and around the city centre in slums and illegal squatter settlements, a Housing Commission set up by the colonial government in 1918 to review the state of housing in Singapore's central area found that the root of the problem lay in the poorer classes not being able to afford to rent a room, leading to the sub-division of rooms and proliferation of slums, adding to the overcrowding conundrum. The Commission called for the establishment of an Improvement Trust to oversee the urgent improvements needed to address the dire housing conditions.

In 1927, the Singapore Improvement Trust (SIT), Singapore's first planning authority, was established.

In its first six years, the Trust focused on the planning of new roads and open spaces, and the widening of existing roads under a General Improvement Plan. However, given its broad mandate to “provide improvement of the town and island of Singapore”<sup>3</sup>, the SIT had to take on the additional responsibilities of acquiring land, providing housing to those displaced by the improvement schemes, enhancing existing houses, and providing communications and traffic facilities as well as sanitation.

These varied roles left the SIT severely short of manpower and resources and hence, unable to meet its mandate. The situation was worsened by the Japanese Occupation in World War 2, which destroyed already limited building stocks, and the post-war baby boom which followed.

With living conditions deteriorating to the point whereby a 1947 Report of the Housing Committee labelled Singapore “a disgrace to a civilised community”<sup>4</sup> and home to one of the world's worst slums, the SIT was tasked in 1951 with carrying out a comprehensive diagnostic survey of Singapore to help guide future development plans and ensure that sufficient land be set aside for residential, industrial, commercial and leisure purposes. A 3-year study, led by British town planning consultant George Pepler, resulted in the 1955 Preliminary Island Plan and was further refined after gathering public feedback into the 1958 Master Plan, Singapore's first statutory land use blueprint.

While detailed and forward looking, the resource-strapped SIT was unable to implement this Master Plan, which called for urgent housing, road and land development as well as the demolition of ramshackle and unsafe buildings, all in the face of perennial land scarcity.

## PROVIDING AN INTEGRATED IMPLEMENTATION APPROACH BY FORMING A CENTRAL AUTHORITY

After Singapore attained internal self-governance in 1959, the Ministry of National Development (MND) was established to guide national land use, optimise scarce land resources and deliver affordable, quality public housing to the people. To streamline the decision-making process for public housing development, the HDB was formed on 1 February 1960 to replace

the SIT. The HDB's top priority was clear—ramp up a large-scale public housing programme that would be able to house the majority of the population. In the first Development Plan formulated in 1961, housing was identified as a national priority, making up 43% of social development allocation, with S\$153 million set aside for housing development from 1961 to 1964.

The government acknowledged the importance of putting in place a central housing agency and authority—the HDB—from the start, one that would be responsible for ensuring housing planning and projects were carried out in a coordinated and timely manner, given the urgency in building new homes. As the sole government agency accorded the authority to oversee the entire life cycle of public housing, reinforced by legislative powers under



the Housing and Development Act and the Land Acquisition Act, processes such as acquisition, financing, planning, design, allocation, resettlement and management in the provision of public housing would be seamlessly coordinated. The effectiveness of this centralisation would soon be tested barely a year after the HDB's establishment with a massive fire at Bukit Ho Swee, a low-income squatter settlement made up of attap and wooden houses, which occurred on 25 May 1961.<sup>5</sup> Over 2,800 homes were destroyed and an estimated 16,000 residents were left homeless overnight. In line with the government's pledge to rehouse all affected families in new homes within a year and with relief efforts that "tested the whole machinery of the government in action" as described by HDB planner and architect Alan Choe, the HDB was able to successfully rehouse the residents in available and newly-constructed flats in areas such as Queenstown, Tiong Bahru and Kallang by February 1962. These emergency flats constructed to house the fire victims represented the HDB's first large-scale building project.

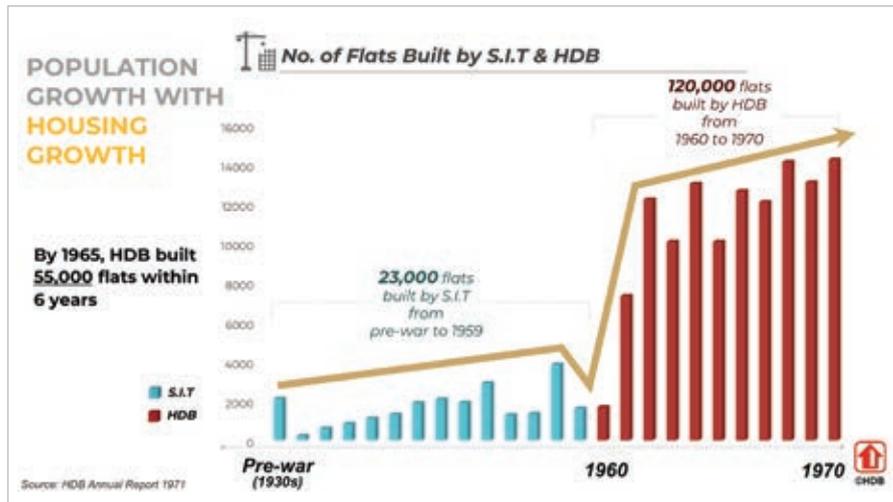
With a clear and pressing mission such as resettling residents living in similarly unsafe squatter settlements, streamlined decision-making processes, and an action-oriented leadership team, the HDB was able to build 31,317 units within its first three years of operation, in stark contrast to the 22,115 dwelling units built by the SIT in a span of 32 years. In doing so, the HDB successfully "broke the back" of the acute housing shortage.

**BOTTOM LEFT:** Conserved art deco-style SIT housing in Tiong Bahru.

Image courtesy of Wikimedia Commons.

**TOP RIGHT:** The aftermath of the 1961 Bukit Ho Swee fire and the new resettlement flats in Queenstown that were completed less than a year later.

Images courtesy of the National Archives of Singapore.



## ADOPTING A LONG-TERM STRATEGIC OVERVIEW THROUGH THE 1971 CONCEPT PLAN

While centralisation of authority allowed the HDB to plan for housing estates in a more comprehensive manner, this legislative power needed to be supported by an equally holistic and long-term land use strategy that could set out not only Singapore’s future housing development plans but also its transport, industrial and infrastructure development needs for the next few decades. The 1958 Master Plan could not offer this. By the 1960s, the Master Plan, which served as a statutory medium-term land use plan for Singapore’s development over the next 10 to 15 years, could no longer keep pace with the rapid demographic, economic and political changes that were underway in Singapore.

In 1967, Singapore embarked on a 4-year State and City Planning (SCP) Project as part of an Urban Renewal and Development Project under the United Nations Development Programme (UNDP). The SCP’s key recommendation was that an integrated approach needed to be taken in planning and transport, which culminated in what would become Singapore’s first long-term land use and transport planning blueprint—the 1971 Concept Plan. It comprised a ring structure of satellite new towns situated around the Central Water Catchment Area, and an East-West corridor along the island’s southern coast to connect major employment hubs such as Changi Airport, the Central Business District (CBD) and the

**TOP LEFT:** The housing construction trajectory under the SIT and the first decade after the HDB’s formation.

Infographic courtesy of the Housing and Development Board.

**BOTTOM RIGHT:** The 1971 Concept Plan.

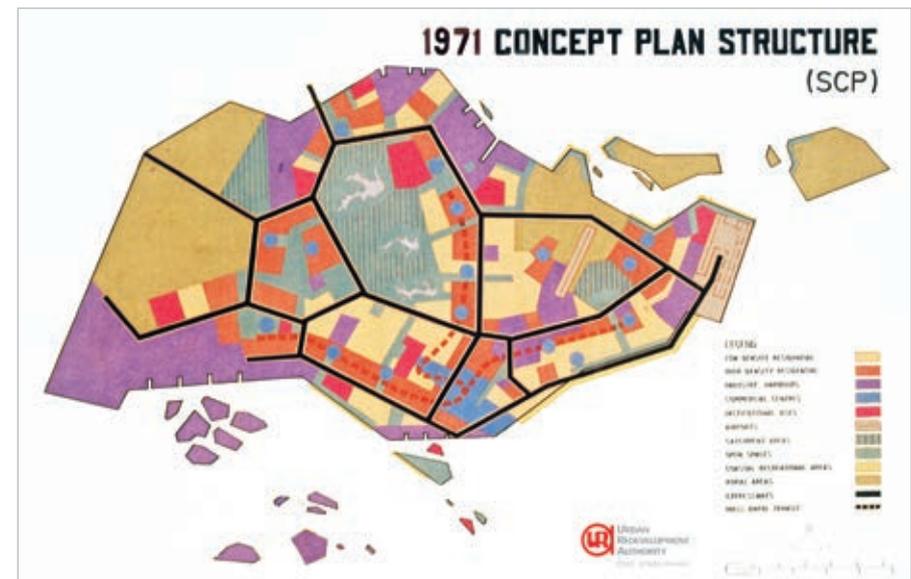
Image courtesy of the Urban Redevelopment Authority.

Jurong Industrial Estate. The ring design safeguarded land for the construction of transportation networks such as expressways and a rail-based Mass Rapid Transit (MRT) system as well as land-intensive mega complexes such as Changi Airport and Pasir Panjang Terminal. The plan would also anchor the CBD, the heart of Singapore’s economic activity, with well-connected transport links to the housing estates.

The 1971 Concept Plan proved to be the breakthrough in the planning and development of decentralised, self-contained HDB new towns that has remained a defining feature of Singapore’s public housing over the decades. By striking a balance between housing, schools, business and industry, retail, transportation, community amenities, green and recreational spaces, this approach to town planning continues to provide residents with the proximity to their daily “live-work-play-learn” needs.

## INTEGRATED PLANNING FOR GREATER SELF-SUFFICIENCY, CONNECTIVITY AND LIVEABILITY

A clear illustration of how the Singapore government and the HDB have adopted a systems approach to housing while at the same time having a clear guiding concept and principles to instil structure and order is the way in which HDB towns have been planned. Firstly, the HDB has applied the concept of a hierarchy to its town planning where at the residential level it is tiered according to flats, precincts, neighbourhoods and towns. Subsequently, plans for the infusion of amenities are made correspondingly such as the introduction of commercial facilities with precinct shops, neighbourhood and commercial centres, and town centres that cater to the different residential tiers. Similarly for residents’ recreational needs and



well-being, parks can be found across each HDB town, from precinct greens, to neighbourhood parks and common green spaces, to town parks.

An integral part of the HDB's town planning strategy has been that the towns must be planned for self-sufficiency, as self-contained towns that can meet residents' work, play, learning and living needs. In addition, there must also be connectivity through comprehensive road and rail networks, with the town centre serving as the town's transport hub equipped with a bus interchange, MRT station, expressways and major arterial roads fringing the towns, and smaller roads plying through the town. Yet these approaches and concepts are never static and instead evolve over time. Since the mid-1990s, the HDB has adopted what is dubbed as the "Punggol 21" blueprint, a new housing concept for town planning in the 21st century, whereby MRT stations at the town centres are connected to a wider network of Light Rail Transit (LRT) feeder stations serving the surrounding precincts. This shifts the concentration away from commercial centres, allowing for more retail options at the town centre, supported by clusters of shops at the LRT stations, and greater interconnectedness through the implementation of cycling networks, parks and waterways.

In translating these ambitious plans into action, the HDB has worked closely with multiple agencies such as the URA, National Parks Board (NParks), Land Transport Authority (LTA), Public Utilities Board (PUB)—Singapore's National Water Agency, National Environment Agency (NEA),

Building and Construction Authority (BCA), Ministry of Education (MOE), Ministry of Health (MOH), Ministry of Social and Family Development (MSF), People's Association (PA), Jurong Town Corporation (JTC) and a host of others from the public and private sectors, with each serving as an important cog in the smooth functioning and delivery of a total housing system.

### BEING FLEXIBLE AND RESPONSIVE TO CHANGING TIMES

Two critical building blocks of the HDB's successful public housing implementation—centralising authority and integrated long-term master planning—aid the foundation for other key tenets of Singapore's approach to housing its people that still hold true to this day. From the rental model of the early 1960s to the "Home Ownership for the People" scheme to encourage Singaporeans to own their homes and in doing so, develop a stake and greater sense of belonging to the country and community they live in. At the same time, ensuring that public housing is kept affordable through offering different housing typologies to suit different means, aided by housing grants and subsidies, and Acts such as the Central Provident Fund (CPF) Amendment Act that allows citizens to use their CPF savings to pay for their HDB flats through down payments and monthly instalments.

*"This was a scheme that would give every citizen, every family, a stake in the wealth of the country, as it developed. As you develop the country, with greater infrastructure, more roads,*



*underground railways, facilities and increasing incomes from industry and commerce, property prices must go up. And we knew that when we gave them this flat, we are giving them a solid chunk of Singapore's assets."*

Prime Minister Lee Kuan Yew on the importance of home ownership.

Moving away from cookie-cutter flats designed for functionality to more aesthetically pleasing, quality homes, the HDB sought to harness the skills and strengths of the private sector in areas such as design, architecture, and construction. This includes designers and architectural expertise from firms like WOHA,<sup>6</sup> designers of the innovative SkyVille@Dawson and award-winning Kampung Admiralty, SCDA Architects who designed SkyTerrace@Dawson, and ARC Studio who played a significant role in realising the monumental Pinnacle@Duxton, which earned the 2010 Best Tall Building award by the Council on Tall Buildings and Urban Habitat (CTBUH), as well as the 2011 Urban Land Institute's Global Awards for Excellence.<sup>7</sup> In 2019, Pinnacle@Duxton was further conferred the 10-Year Award by CTBUH. The award recognises projects which have proven their value and performance over the last decade.

*The Home Ownership for the People Scheme was launched by the HDB on 12 February 1964.*

Image courtesy of the Housing and Development Board.

Adapting to changing times is not limited simply to the initial development phase. It is important to ensure that these buildings and the surrounding estates continue to be well maintained long after construction, and not fall into a state of neglect and disrepair. Meanwhile, older estates are rejuvenated with the addition of fresh amenities and creative ideas that leverage on the latest technology and innovation, both from the market and developed in-house, to improve the efficiency and quality of housing provision. An example is Tampines Town which was developed in the 1980s. The town has been carefully maintained and improved over the years and was recognised in 1992 as an innovative and successful human settlement project with the World Habitat Award at the United Nations headquarters in New York. Today, the town is one of the most developed regional centres, serving the eastern part of Singapore.

Looking beyond hardware and physical infrastructure, Singapore's housing policies place residents at the heart of the planning process, and are geared towards strengthening communal bonds between residents of diverse ages, ethnicities, religions and socio-economic background living together in high-rise, high-density housing. Imbuing estates and towns with distinctive characteristics and features help in developing a shared identity and sense of ownership among the community. The town centres of Toa Payoh, Bedok and Clementi are easily recognisable due to unique built structures, while other locations rely on the injection of blue and green features coupled with recreational amenities to create a unique identity such as the Punggol Waterway, Alkaff Lake at Bidadari, and the Tampines North Boulevard Park.



*The redeveloped Bishan-Ang Mo Kio Park. Through the Active, Beautiful and Clean Waters programme, the canal running through the park was naturalised into a meandering river, integrating green and blue into the community.*

Image courtesy of the National Parks Board.

**Housing** is a necessity for human survival and development, and an important element in determining a person's quality of life. The Party and government leaders of Shanghai had always considered housing-related issues to be an eternal theme and a perpetual challenge for metropolises. As such, the city implemented different housing policies targeting specific challenges that were prominent during various stages of Shanghai's development, with the aim of granting citizens easier access to housing and better living conditions.

## DEVELOPMENT OF THE NATIONAL ECONOMY CONTRIBUTES TO IMPROVEMENT OF HOUSING CONDITIONS

According to the Shanghai Municipal Bureau of Statistics, Shanghai's gross domestic product (GDP) in 1978 was RMB 27.281 billion. By 2019, it increased to RMB 3.815 trillion, and the disposable income per capita rose from RMB 413 to RMB 69,442 during the same period. In the meantime, the construction sector and real estate sector—which are secondary and tertiary industries respectively—grew rapidly. The development of these industries changed the housing situation from being worrisome, to being sufficient and later becoming an area of excellence. With improvements in housing provision and the living environment, Shanghai has been able to better meet its residents' demands for a higher quality of life. At the same time, the development of the construction and real estate sectors have propelled the growth of the national economy and continues to contribute to the harmonious development of the society.

## DIFFERENT EMPHASIS AT DIFFERENT STAGES OF HOUSING DEVELOPMENT

Between the founding of the People's Republic of China in 1949 and 1979, 20.09 million m<sup>2</sup> of accommodation was built in Shanghai, providing basic living conditions for its vast number of citizens. The first stage of Shanghai's housing system reform—from 1979 to 1990—focused on the experimenting with housing privatisation. Between 1991 to 1995, changes were driven by the reform of the provident fund and sale of old public housing. The focus then turned to the modification and renewal of old estates and its associated resettlement, and the coupling of secondary and tertiary markets from 1996 to 2000. (The secondary market refers to transactions

involving new houses, while the tertiary market refers to transactions involving second-hand houses.) Between 2001 and 2005, Shanghai put forward the principle of the “Three Focuses” to improve the real estate market. The “Four-in-One” housing security system came into being during the 2006 to 2010 period with the aim of addressing Shanghai residents' housing difficulties through the construction of large-scale

public housing communities. The “Two Systems”—namely housing market and housing security—was further refined from 2011 to 2015. In 2016, President Xi Jinping reiterated that “houses are for accommodation, not speculation.” Since then, Shanghai has been even more mindful to adhere to the “One Positioning” principle, prioritising accommodation as it develops a housing system to best serves its residents.

### CONSTRUCTION OF LARGE-SCALE RESIDENTIAL COMMUNITIES

Shanghai's initiative to construct large-scale, public housing communities adheres strictly to the principle that all planning should be government-led, adapted to local conditions, be scientific, and reasonable. These communities are built around the city centre where there are established commercial, education, healthcare and civic facilities, along with rail-based public transport to provide maximum convenience for the residents. Such housing is constructed in accordance to stringent standards to ensure their quality. Where such development occurs, the government concurrently expedites the provision of public transport, expands education and healthcare facilities, and ensures adequate provision of other amenities such as banking, post offices, cultural and sports facilities, and retail shops and services within the public housing communities to meet the residents' needs.



Songjiang District  
Sijing Town Large-Scale  
Residential Community  
Base.

Image courtesy of Shanghai  
Municipal Housing  
Administration Bureau.

## HOUSING AVAILABILITY GROWTH SIGNIFICANTLY OUTPACES POPULATION GROWTH

After decades of development, the total urban gross residential area in Shanghai increased by 6.7 times from 89.01 million m<sup>2</sup> in 1990 to 686 million m<sup>2</sup> in 2018. Over the same period, the permanent resident population in Shanghai increased by 0.82 times, from 13.34 million to 24.24 million. The growth of the total urban gross residential area has significantly outpaced the growth of permanent resident population.

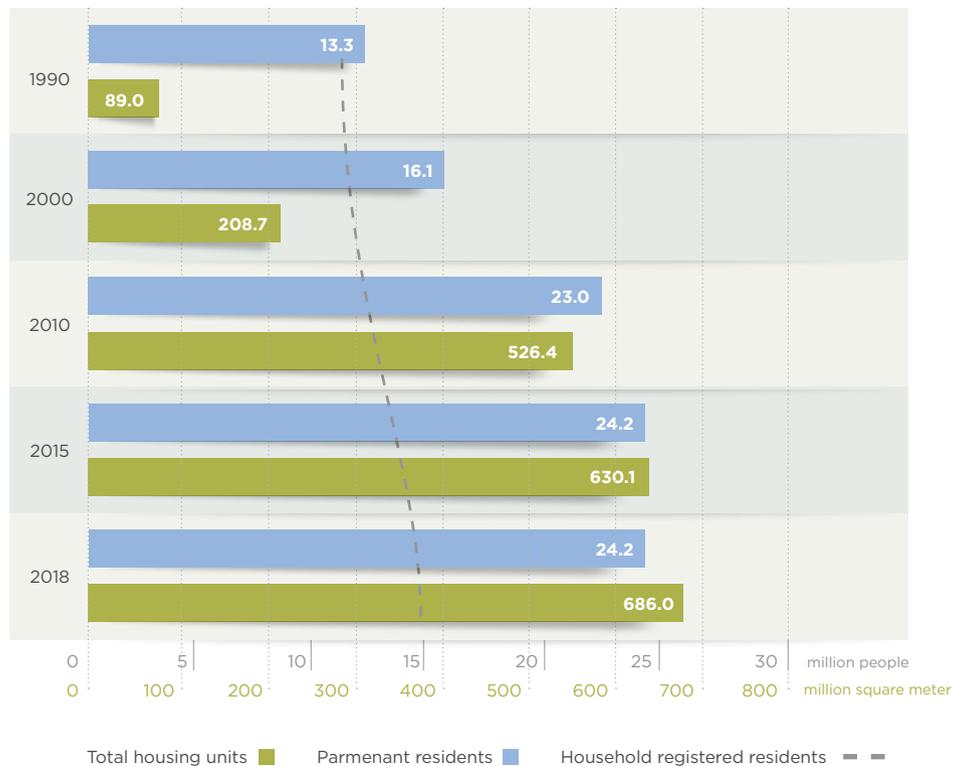
This is a marked improvement in the living conditions. While Shanghai's public housing policy continues to expand and provide relief to citizens with housing difficulties, the focus of public housing has transitioned from addressing basic needs to a new phase that addresses residents' quality of life.

**BOTTOM LEFT:** *The floor area per person in Shanghai (m<sup>2</sup>).*

Infographic courtesy of Shanghai Municipal Bureau of Statistics, Shanghai Municipal Housing Administration Bureau.

**TOP RIGHT:** *Minxing District Pujiang Town Residential Base*

Image courtesy of Shanghai Residential Construction and Development Centre.



## CONSTANT PROGRESSION OF SHANGHAI'S HOUSING SYSTEM

As previously mentioned, Shanghai's current housing framework is neatly summed up as "One Positioning, Two Systems, Three Focuses and Four-in-One". This framework covers housing for both rental and purchase, and was developed as a result of accumulating years of experience. "One Positioning" describes the principle that houses are for accommodation and not speculation. "Two Systems" refers to the commercial housing market system and the housing security system. "Three Focuses"

highlights the principles adhered to in developing Shanghai's commercial housing market—to provide primary residences, to develop for the consumption of the city's residents, and to focus on non-luxury residential units. "Four-in-One" refers to Shanghai's efforts in upgrading the four types of public housing, namely subsidised low-rent housing, public low-rent housing, shared property housing and resettlement housing. In order to draw parallels and explore the differences with Singapore's experience, the subsequent chapters of this publication will mainly focus on Shanghai's public housing.

## A NEW PHASE FOR HOUSING DEVELOPMENT

As the Shanghai government shoulders its new mission to further improve people's livelihood, new challenges are emerging.

Firstly, there are new constraints in terms of housing development. When pushing for housing development in a megacity, one must abide by multiple principles such as being user-centric, planning before acting, safety first, coordinated spatial planning, using scales, and promoting integrated developments in residential, office, commercial and cultural districts. Secondly, new trends are emerging in housing demand. Housing development needs to react to shifting demographics and lifestyles in order to satisfy residents' housing needs. Thirdly, new requirements are needed when constructing residential projects. New residential projects must place greater attention to spatial planning, resource conservation, developing medium and small commercial apartments and environmentally-friendly accommodation. Fourthly, new concepts are needed in housing improvement works. While raising the quality of new houses, the city must also improve the quality of living conditions and the environment for the masses through the concept of organic renewal, so as to bring about a greater sense of satisfaction to the people living in older districts, while sharing the fruits of urban development with them.



*Songjiang District Xinkaijiayuan Residential Estate.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.

# DISTILLING INSIGHTS

**Having** a central authority in the form of the HDB, that was tasked with the responsibility of overseeing the entire public housing life cycle, and was reinforced with legislative powers, is critical for a more integrated approach to housing implementation. This has enabled better coordination across the various processes from acquisition to financing, from planning to design, and construction and allocation, which is essential when faced with an urgent need for housing development, as Singapore did in its early years after attaining self-governance.

**Enabling** residents to be able to own their home through affordable pricing and generous subsidies has given them a tangible stake in the country and society at large. In addition, the HDB public housing has been designed and planned in ways that generate a shared identity and community bonds, while also enhancing the sense of ownership over one's living environment.

## SINGAPORE

**A** long-term, comprehensive land use strategy that encompasses housing, transportation, industrial, commercial and recreational considerations is needed to provide the framework for housing development. This has enabled HDB towns to be planned as self-sufficient, self-contained towns that can provide for residents' live, work and play needs, through bringing together numerous partner agencies and experts from inter-related urban systems as part of the planning process.

Examples include Toa Payoh, Bedok and Clementi town centres as well as the injection of water, greenery and recreational amenities to create a unique town identity such as the Punggol Waterway.

**Keeping** track of and embracing changes in society's needs and aspirations, and advances in technology and innovation has allowed the HDB to experiment and build upon past successes. This has contributed towards its ability to break new boundaries in housing development, as seen in its numerous award-winning housing projects done in partnership with the industry.

**The** housing authorities of Shanghai implemented different housing policies targeting specific challenges that were prominent during various stages of Shanghai's development—alleviating residents' housing difficulties. The housing situation transformed from being worrisome to being sufficient and subsequently attaining excellence. With improvements in housing provision and the living environment, Shanghai has been able to better meet its residents' demands for a higher quality of life. At the same time, the development of the construction and real estate sectors have propelled the growth of national economy and continue to contribute to the harmonious development of the society.

**Through** long-term exploration and constant adjustments from lessons learnt, Shanghai developed a housing system framework based on "One Positioning, Two Systems, Three Focuses and a Four-in-One" concept. This framework provides broad policy directions for promoting housing purchase and rental. The development journey of the housing system has been a process of responding to the changing needs of the people, leading to the continuous improvement of their living conditions.

## SHANGHAI

**The** expanding coverage of Shanghai's housing security system provides effective alleviation for residents' housing difficulties. The focus of housing security has moved from providing basic accommodation to a new phase where improving residents' quality of life is the main concern. The assistance provided is now more targeted at the two specific groups who need it the most. The first group are residents from low- and middle-income families who may face challenges in securing a home despite holding household registration certificates. The second group are permanent residents—particularly young professionals—who contribute significantly to Shanghai's development but do not hold registration certificates.

**While** the Shanghai government shoulders its new mission to further improve people's livelihood, new challenges are emerging—including new constraints in terms of housing development, new trends in housing demand, new requirements when constructing residential projects and new concepts in housing improvement works. To face these challenges, there must be more exploration and experimentation to meet citizens' aspiration for quality of life.



## CHAPTER 2

*One of the many residential areas in Shanghai.*

Image courtesy of Nomads.team (Shutterstock)



MAINTAINING AN  
AFFORDABLE,  
INCLUSIVE  
HOUSING SYSTEM

## ENSURING AFFORDABILITY IS THE KEY

The 16th Annual Demographia International Housing Affordability Survey released in January 2020 ranked Singapore as the joint-third most affordable nation alongside the United Kingdom, and after the United States (first) and Canada (second). This was based on the major housing markets surveyed in each country. Singapore's median multiple score of 4.6, calculated by comparing the median housing price against median household income, translates to the number of years it would take for a resident to fully own his home, assuming no other expenses. Closer to home, a 2019 analysis by Professor Sing Tien Foo, Director of the National University of Singapore's (NUS) Institute of Real Estate and Urban Studies, also found a healthy level of affordability particularly for the Housing and Development Board (HDB) flats in both the new and resale housing markets. His findings, also based on price-to-income calculations, show that an average household would have to save less than four years' worth of income in order to purchase

**BOTTOM LEFT:** 2019 Price-to-Income ratios for various housing types in Singapore.

Infographic courtesy of the Housing and Development Board.

**TOP RIGHT:** Flat buyers can gather fresh renovation and interior design ideas for flats of different sizes from the HDB's My Nice Home Gallery.

Image courtesy of the Housing and Development Board.

Flat Type	2-Room Flexi	3-Room	4-Room	5-Room
Estimated Floor Area (Sq m)	36/45	65	90	110
Average Indicative Selling Prices*	\$136,000	\$219,000	\$329,000	\$441,000
Median Monthly Income	\$1,800	\$2,600	\$5,000	\$6,900
Enhanced CPF Housing Grant, if eligible	\$75,000	\$65,000	\$45,000	\$25,000
Nett Selling Price (Less Grants)	\$61,000	\$154,000	\$284,000	\$416,000
Monthly Instalment**	\$216	\$600	\$1,140	\$1,688
Debt Service Ratio	12%	23%	23%	24%

\*Average selling prices for new HDB flats under various stages of completion offered in 2019 in non-mature estates.

\*\*Computed based on concessionary interest rate of 2.6% over 25 years.

Notes:

- i. Median monthly income refers to income of first-timer applicants buying a flat direct from the HDB in 2019 in non-mature estates.
- ii. The Enhanced CPF Housing Grants (EHG) is assumed to offset the maximum 90% loan where applicable, assuming that buyers have sufficient savings for the 10% down payment.
- iii. Assumed applicants are aged 35 & below and household consists of two adults with no other financial commitment. The stamp, conveyancing and other fees payable to buy a flat are not included in the table.
- iv. The currency is in Singapore Dollars (S\$).



a new or resale HDB 3-room to 5-room flat.<sup>8</sup> As shared by former Minister for National Development, Lawrence Wong, the average monthly instalment-to-income ratio for first-timer families buying new flats in non-mature estates is less than a quarter of the applicants' monthly income.<sup>9</sup>

Underpinning these figures is Singapore's approach to keeping its public housing affordable and ownership within reach of Singaporeans regardless of their socio-economic situation that can be seen as being directed at two fronts—the supply and the demand.

## KEEPING DEVELOPMENT COSTS LOW

### (i) A Transparent and Fair Process for Acquiring Land

In supplying flats for the housing market, one of the HDB's strengths has been its ability to keep the costs of

development low. A major development cost component for any housing project around the world is the cost of acquiring land. One of the most significant legislation that enabled the HDB to achieve its public housing goals was the Land Acquisition Act (LAA). The replacement of the Land Acquisition Ordinance with the LAA in 1967 provided the government with a much-needed mechanism to expeditiously acquire privately owned land in Singapore for rapid urban development.<sup>10</sup> This, in turn, meant faster public housing development. Efforts to construct housing estates before the passing of this Act tended to encounter delays and obstructions owing to the fact that the government at the time had no legal powers to easily facilitate repossession of land in Singapore.

In implementing such potentially contentious and far-reaching legislation, it was necessary to maintain the



transparency and fairness of the process, as well as the legal and administrative framework involved. In Singapore's case, this involved putting in place safeguards and channels for appeals to prevent the abuse of the legislation and to ensure that land was indeed acquired for the public good. The Act was amended in 1974 to peg land compensation to current market value or the market value at a predetermined date—whichever was lower—and again in 2007, when it was based solely on current market pricing. Still, the central tenet of not allowing land owners to profit from land zoning

changes at the expense of the state held firm. From 1959 to 1984, around 43,713 acres of land (a third of Singapore's land area) was acquired, with half of this being allocated to the HDB for public housing.

**(ii) Lowering Building and Construction Costs through Good Governance, Trust and Scalability**

In addition to the land supply, building and construction comprise another sizeable portion of development costs. The HDB has striven to keep these costs low with various measures geared towards raising integrity, efficiency, quality and productivity.

In the early days of the HDB, these included the introduction of competitive tendering to reduce the formation of cartels in the construction industry, weeding out corruption and profiteering, reducing building material costs through leveraging on government-run producers such as steel mills, granite and sand quarries, and even an HDB-run brickworks factory at one stage. The HDB also proactively and strategically sourced from various suppliers and stockpiles materials to ensure constant supply at reasonable prices for construction continuity. For such measures to achieve their objectives, a spirit of trust and mutual cooperation between the government and construction firms was critical and was achieved through efforts such as providing assurances to firms that they would be paid on time for their work, which in turn helped to reduce building delays and cut costs.

**(iii) Achieving Cost Savings through Innovation and Benchmarking**

Another way in which the HDB tries to control construction and building costs while improving efficiency is through continuous innovation and leveraging on the latest methods and technology in the market. One example is its use of prefabrication construction, a more efficient approach to construction where components of a building are first constructed off-site, under controlled plant conditions. This method allows for the materials and design to be equivalent to the same codes and standards found in conventionally built facilities, yet they are constructed in about half the time. Measures such as these help to create new efficiencies and work flows that control and ultimately lower construction costs.

As for raising productivity, one approach taken was benchmarking the productivity of HDB's contractors against global industry leaders at the time, such as top Japanese construction firms like Shimizu in the 1980s.<sup>11</sup> The HDB eventually engaged Shimizu to conduct a detailed study of the construction work done by their contractors, with a view to improving efficiency. The findings and recommendations proved to be helpful in identifying a number of ways that local contractors could reduce waste and improve efficiency.

This role of the private sector in the building and construction of public housing flats in Singapore and how the HDB supported and partnered the industry will be delved into in subsequent chapters.

*An HDB engineer (in blue shirt) on-site, at a construction project at Bidadari.*

Image courtesy of the Housing and Development Board.

## BALANCING DEMAND AND INCLUSIVENESS THROUGH ROBUST POLICIES

### (i) Market Separation to Ring-Fence Demand

With development costs already being kept low, and new flats priced by the HDB at significant discounts compared to the market,<sup>12</sup> this would inevitably translate to tremendous demand in an open housing market, which the supply line may then struggle to keep pace with. As such, conditions and restrictions would be needed to ring-fence housing demand so as to ensure that it is able to meet the needs of its target population and is still attainable to them. In Singapore's public housing, its primary objective is to cater to the needs of its citizens first and foremost.

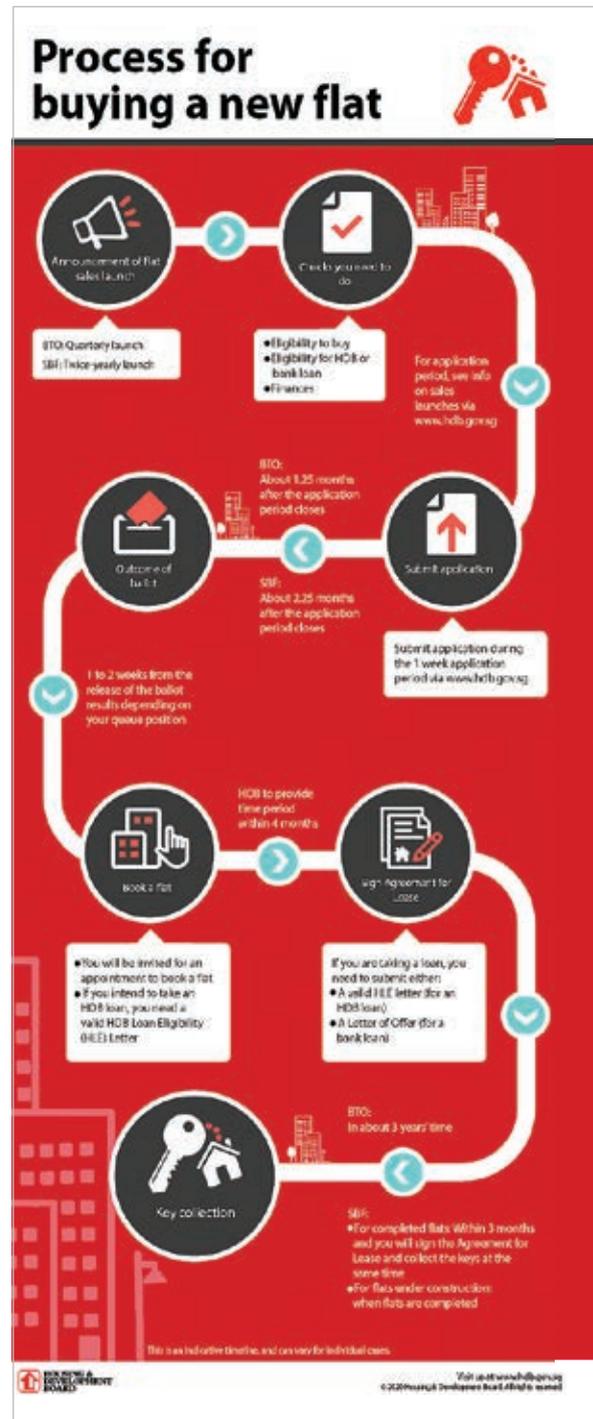
As explained by Mah Bow Tan, former Minister for National Development, in managing housing demand, it is important to put in place a market system that is fair, cost-effective and efficient.<sup>13</sup> Singapore has separated its primary market (new flats bought directly from the HDB) from the secondary market (resale flats). Having both markets provides more options and better serves the needs of Singapore's diverse population.

### (ii) Ensuring a Transparent and Fair Allocation System

The allocation of new HDB flats is premised on two broad practices: queuing (first-come, first-served) and balloting (based on the drawing of lots).

*Timeline for the BTO application process.*

Infographic courtesy of the Housing and Development Board.



The Registration for Flats (RFS) queue system operates on a “first-come, first-served” basis. However, this system has become more complex over the years with the changing dynamics between demand and supply, stemming from broader market forces such as the Asian Financial Crisis in 1997. When the crisis broke, persons queuing for new flats vanished in a flash, which led to 31,000 unsold flats that took five years to be sold off.<sup>14</sup> In such instances, the HDB allocates the unsold units mainly using the Walk-In Selection System under which applicants can walk in and book a flat on the spot on a first-come, first-served basis.

The balloting system, in many ways, represents a natural evolution to the lessons learnt from the deployment of a queuing system. This is best exemplified in the Build-To-Order (BTO) system that replaced the RFS in December 2002. Under the original BTO mode, the HDB would proceed to construct the new flats in the BTO projects offered only when at least 70% of the flats have been booked. Hence, buyers would have to wait until the end of the selection exercise to know if the HDB would proceed with the construction. Since May 2011, the HDB has proceeded to call tenders for construction as soon as the architectural drawings and tender documents are ready, and as such there is no longer a need to wait for the 70% take-up rate.

However, when supply exceeds demand, a ballot is performed to determine the queue position for selection of flats for booking. In this system, the vast majority of these flats are allocated to first-time buyers who are in more urgent need of a flat and each buyer has to provide a

down payment to ensure their booking, which raises their level of commitment. Although not a perfect system, this approach is viewed as the best strategy to minimise unexpected changes in buyer behaviour due to changes to the economy or global geo-political events. This BTO system is a flexible and responsive system that allows the HDB to adjust the BTO supply depending on the market situation. For instance, the HDB ramped up the BTO supply and launched close to 100,000 BTO flats in the period from 2011 to 2014 to address strong housing demand. Upon clearance of the first-timer demand backlog, the BTO supply was tapered to a more sustainable level to avoid a supply glut and accumulation of unsold flats. In situations where there are balance flats after each selection, these flats will be rolled over for offer under the Sale of Balance Flats exercise.

In addition to these balloting procedures, there are various eligibility conditions when buying subsidised housing. These conditions calibrate housing access for different population segments, in support of the wider national objectives guided by the government's pro-family social framework which encourages marriages, procreation and care for the seniors. These objectives include privileging citizenship, supporting marriage and parenthood, and encouraging mutual care and support. For example, to support marriage and parenthood, a higher proportion of the flat supply is set aside for young first-timer couples and families with children. With the limited resources and housing subsidies available, the HDB imposes strict eligibility conditions on its home buyers such as citizenship, family nucleus, income ceiling and non-ownership of private property.

Priority schemes for first-timer applicants and those with more urgent housing needs also help improve their chances of being balloted for a new flat.<sup>15</sup> These include the Parenthood Priority Scheme and Married Child Priority Scheme that enhance the chances of married couples with children, or married children who wish to live with or near their parents (or vice versa).

**(iii) Placing a Ceiling on Demand and Non-Ownership of Private Property**

Another important strategy in managing the demand for affordable housing is through the implementation of an income ceiling for potential buyers and non-ownership of private property.<sup>16</sup> This is to prevent those with greater means from entering and competing with those who need public housing more. In addition, a 5-Year Minimum Occupation Period is imposed on flat buyers, within which they are not allowed to sell or rent out their flat, or buy a private property. This helps to curb speculative demand and reinforce the owner-occupation principle of public housing. Those who exceed the ceiling or own a private property but still wish to own an HDB flat can buy a resale flat on the open market. Available housing grants for both new and resale flats are also differentiated according to household income or the type of flat they buy.<sup>17</sup> As household income rises in tandem with economic growth, the income ceiling for eligibility is also progressively updated to keep pace and ensure that home buyers continue to have access to affordable housing and related subsidies.

*Rates for rental flats under the HDB Public Rental Scheme.*

Image courtesy of the Centre for Liveable Cities.

**HDB PUBLIC RENTAL SCHEME**

Monthly Household Income	Applicant Type	Monthly Rent	
		1-Room	2-Room
S\$800 or less	First-timer	S\$26 - \$33	S\$44 - \$75
	Second-timer	S\$90 - \$123	S\$123 - \$165
Between S\$801 and S\$1,500	First-timer	S\$90 - \$123	S\$123 - \$165
	Second-timer	S\$150 - \$205	S\$205 - \$275

**(iv) Providing Rental Housing for Lower Income Families**

In spite of the affordability of the HDB flats, the reality of the situation is that some Singaporeans may still not be able to afford their own homes due to low household income or other life challenges. The HDB’s Public Rental Scheme<sup>18</sup> enables the lower income earners who have no other available housing options, to live in rental flats at highly subsidised rates starting from S\$26 a month for a 1-room flat and at S\$44 for a 2-room flat.

There are approximately 50,000 households<sup>19</sup> living in public rental flats. There have been continuing efforts to support families to own their homes. One example is the HDB’s “Fresh Start Housing Scheme” introduced in December 2016. The scheme enables eligible families living in public rental flats to purchase a 2-room Flexi flat on a shorter, more affordable lease while also qualifying for a housing grant and an HDB concessionary loan. In addition, the HDB’s “Step-Up CPF Housing Grant” was enhanced in May 2019 to provide eligible second-timer families living in public rental flats with assistance to buy 2-room or 3-room, new or resale flats in the non-mature estates. The HDB has also established the Home-ownership Support Team (HST) in December 2019 to better guide and support rental flat families who are ready for home ownership and demonstrate a desire to take responsibility for the process. The HST works with each family to understand their needs and circumstances including their family, financial, health and employment, and guides them to work out their housing budget and plan their finances to repay their home loans.<sup>20</sup>

**FINANCING TO KEEP HOUSING AFFORDABLE**

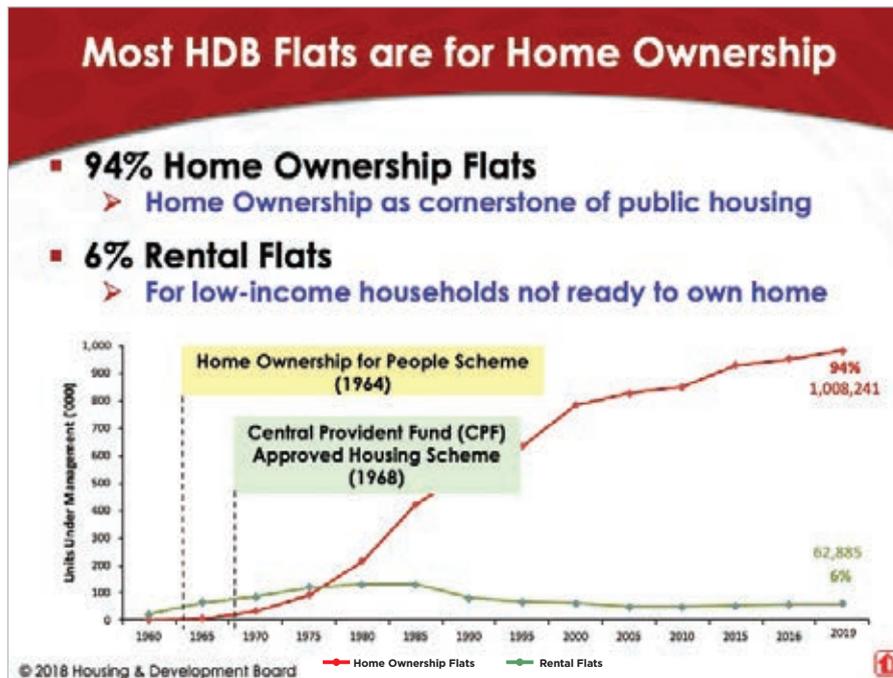
There are three main financing avenues through which the HDB has striven to help Singaporeans afford their flats—by allowing the use of their Central Provident Fund (CPF) savings, providing a housing loan at a concessionary interest rate, and providing housing grants and subsidies.

**(i) Allowing the Use of CPF Savings to Finance Home Purchases**

The push towards home ownership began in 1964, when the government introduced the Home Ownership for People Scheme to help Singaporeans own their HDB homes so that they could have a stake in the country. However, the rate of home ownership remained low at 5% in the two years following its introduction as the majority of Singaporeans still lacked the income and purchasing power.

With the government viewing home ownership among Singaporeans as a critical priority, new legislative changes were made through amendments to the CPF<sup>21</sup> Act of 1968, giving each citizen the option to withdraw a portion of their CPF monies to finance the purchase of their flats.<sup>22</sup> This included placing down payments and servicing monthly instalments. Following the Amendment, the demand for rental units dropped while that for purchase units rose, with the HDB receiving a record 8,455 applications for purchase that same year, with 70% of these coming after the Amendment was announced.

Through the current CPF Public Housing Scheme, Singaporeans are able to use their CPF Ordinary Accounts to finance all or part of the purchase price of their



new or resale flat, to service monthly housing loan instalments, and to pay the stamp duty, legal fees and other related costs such as flat and lift upgrading.<sup>23</sup> This enables them to own homes with minimal impact on their take-home pay.

#### (ii) Providing a Housing Loan at a Concessionary Rate

Along with the implementation of the Home Ownership for the People Scheme in 1964, the HDB also took on the role of a mortgage financier. This was essential as financing was needed for flat purchase, which was a big-ticket item. To assist the target group, the HDB provided them with subsidised housing loans. The mortgage loans were given on a 15-year term at a fixed concessionary interest rate of 6.25%, subject to a down payment of 20% of the purchase price. Subsequently in 1986, the HDB concessionary mortgage rate was changed from a fixed rate to a floating rate pegged at 0.1 percentage point above the prevailing CPF Ordinary Account savings rate. The current concessionary interest rate stands at 2.6%.<sup>24</sup>

At this moment, to ensure that the government’s resources are given to those who need them most, eligible buyers are limited to a maximum of two concessionary interest rate housing loans. The HDB also conducts credit assessment to ensure that buyers make a prudent flat purchase, and do not overstretch

**TOP LEFT:** A rise in home ownership following the introduction of the CPF Public Housing Scheme. Infographic courtesy of the Housing and Development Board.

**BOTTOM RIGHT:** Subsidies and grants tiered to different income groups and to those who need it more.

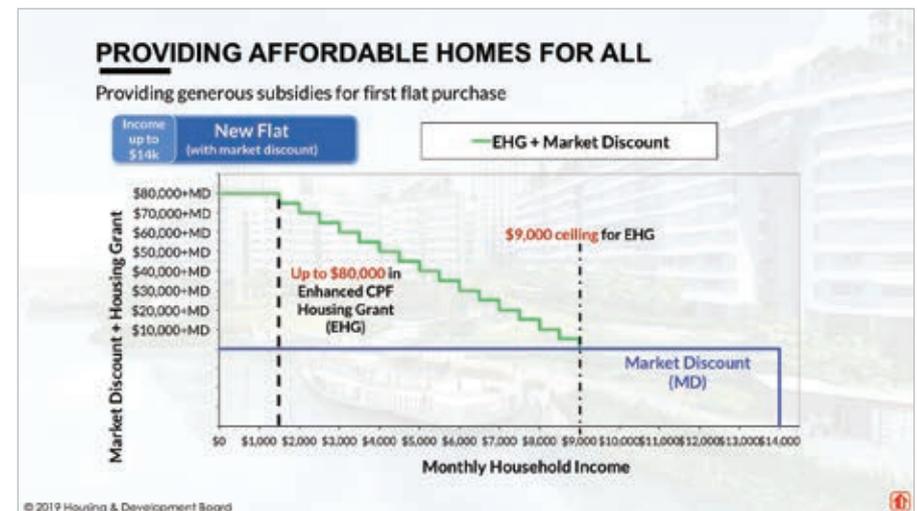
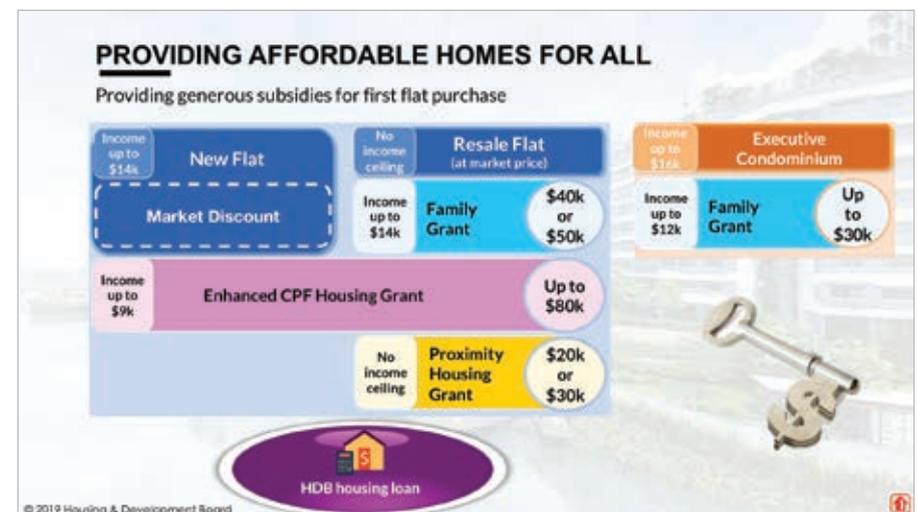
Infographic courtesy of the Housing and Development Board.

themselves. From 2003, flat buyers also have the option of taking up a housing loan from the financial institutions regulated by the Monetary Authority of Singapore, with various packages that can meet the diverse needs of buyers.

#### (iii) Providing Subsidies while Maintaining Sustainability

The CPF Housing Grant was introduced in 1994 to provide options for citizens to

buy flats from both the primary and the secondary markets. Over the decades, various housing grants and schemes have been put in place by the HDB, and these continue to be enhanced. As a result, this has enabled public housing to be kept within the reach of a wide stratum of residents—singles, families, the elderly, low-income earners, first-timers or second-timers.



Housing grants such as the Additional CPF Housing Grant (AHG) and Special CPF Housing Grant (SHG) are geared towards reducing the financial burden of first-timer home buyers. Since 2019, the AHG and SHG have been replaced by the “Enhanced CPF Housing Grant” (EHG). The EHG further helps lower and upper-middle income households afford their first home by providing the same grant amount to both first-timer new and resale flat buyers, regardless of their choice of flat type and location.<sup>25</sup> To encourage mutual care and support, children looking to buy a resale flat to live with or near their parents, or vice versa, are also eligible for subsidies under the Proximity Housing Grant. With these, eligible home buyers can potentially receive up to S\$160,000 in housing grants when they buy a resale flat, or up to S\$80,000 in housing grants when they buy a new flat, on top of the generous discount on the flat price.

In addition, the Multi-Generation Priority Scheme gives priority allocation of flats to parents and married children who jointly apply for two flats in a BTO project where 2-room Flexi or 3-room flats are integrated in the flat mix and 3-Generation (3Gen) flats enable married children to live under the same roof with their parents.

The HDB plays a social role in providing affordable public housing and the HDB’s overall net deficit is covered by government grant. Complemented by the HDB’s constant innovation and management of development costs as well as tie-ups with the CPF scheme and prudent financing management, all these have helped to ensure the financial sustainability of the HDB’s public housing programme.

## FROM RENTAL FLATS TO EXECUTIVE CONDOMINIUMS: MEETING DIVERSE HOUSING NEEDS

In addition to efforts at enabling greater accessibility for Singaporeans to own their own homes, a unique and related feature of the HDB approach has been in providing a mixed range of housing typologies to cater to the varying resident types (from singles to multi-generational families), budgets and aspirations. While the first generation HDB flats were simple and utilitarian in their design, and ranged from 1- to 3-room flats, today’s flats range from 2-room Flexi, 3- to 5-room and 3Gen flats. These are built in a mixed typology approach, where a combination of different flat types can be found within the same block and neighbourhood to allow for greater social mixing across the different socio-economic classes. The Executive Condominium<sup>26</sup> (EC) Scheme, where homes are designed and built by private developers who tender for the land, accords Singaporeans access to high quality housing offerings by the private sector but at a lower cost, also sees high take-up rates.

For the EC Scheme in particular, its dual objectives are providing affordable housing of a good standard comparable to that of a private condominium<sup>27</sup> for home buyers within the target income group, and at the same time fulfilling their growing aspirations of owning private property. After a minimum occupancy period of five years from when the development is completed for units purchased directly from the developer when it cannot be sold or rented out, owners are able to sell their

unit to Singaporeans and permanent residents. After a further five years, the EC becomes fully privatised and units can then be sold to foreign buyers.

One example of a recent EC is The Terrace Executive Condominium at Punggol, which has a leasehold of 99 years. It consists of 12 tower blocks, with a total of 747 residential units representing a range of housing typologies. Developed by Kheng Liong Co (Pte) Ltd, its unique “terraced” landscape offers tiers of lifestyle amenities to the residents.<sup>28</sup> The development also has direct access to the adjacent 4.2-km stretch of My Waterway@Punggol, a joint agency project between the HDB and the National Parks Board (NParks). The waterway serves to increase park and water frontage for the housing estates while providing a green respite for residents.<sup>29</sup>

*The Terrace EC is strategically located along the Punggol waterway.*

*Image courtesy of Ang Hak Liang.*





**TOP LEFT:** Current HDB housing typologies and the resident profiles that they serve.

Infographic courtesy of the Centre for Liveable Cities.

**LEFT:** HDB homes are priced to fit different budgets.

Infographic courtesy of the Housing and Development Board.

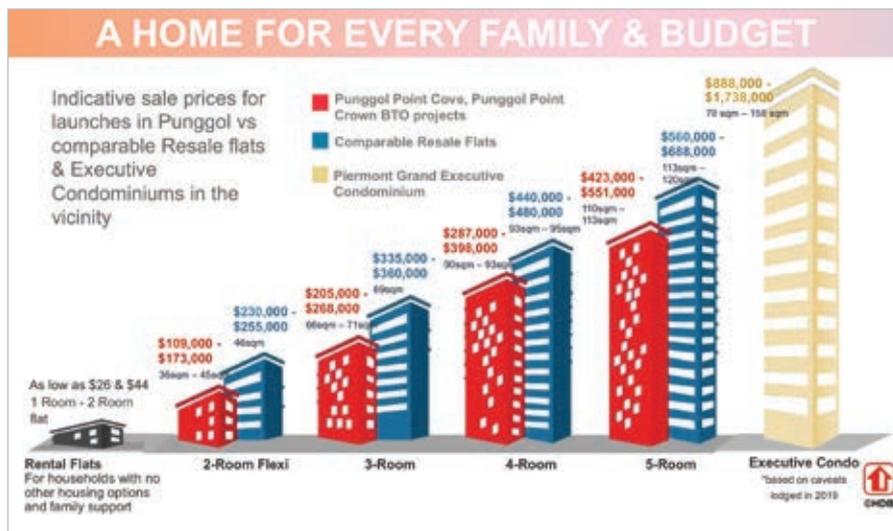
**BOTTOM RIGHT:** Monetisation options available to seniors.

Infographic courtesy of the Centre for Liveable Cities.

CPF Retirement Account with their proceeds from the move. Under SHB, seniors will also receive up to S\$30,000. They have the option of renting out their entire flat or a room to receive rental income, while still living in their home.

In 1998, the HDB unveiled the Studio Apartments (SA) Scheme to provide an additional housing option for senior flat owners aged 55 and above to unlock the value of their existing flats by selling their larger flats and moving into smaller SAs, thus enabling them to continue living independently. The SAs were conveniently located close to amenities and transport networks, with community facilities nearby to provide elderly support services. These units, which were designed and fitted with elder-friendly features, came in two sizes of about 35- and 45-m<sup>2</sup> flats. They were sold on 30-year leases, with the option to extend for another 10 years. SAs cannot be rented out or sold on the open market. Should the senior flat owner want to move out or happen to pass away before the 30-year lease runs out, the SA would be returned to the HDB and compensation given for the unused portion of the lease.

Since 2015, the SA Scheme has been replaced by the 2-room Flexi Scheme whereby the HDB offers flats with shorter leases of 15 to 45 years, in addition to the standard 99-year lease, for seniors aged 55 and above. Additional priority is also given if the new 2-room Flexi flats are near to the seniors' current homes or the homes of their married child under the "Senior Priority Scheme". There is also the Lease Buyback Scheme where one can sell the tail-end of one's flat's lease to the HDB to receive a monetary bonus, on top of a lifelong monthly income through CPF LIFE.



The currency is in Singapore Dollars (S\$).

## UNLOCKING THE VALUE OF HDB FLATS FOR THE ELDERLY

With 1 in 4 Singaporeans projected to be aged 65 or older by 2030,<sup>30</sup> the HDB has introduced initiatives geared towards helping citizens unlock and monetise the value of their HDB flats

during their retirement years,<sup>31</sup> allowing citizens to supplement their retirement income. This includes the Silver Housing Bonus (SHB) where seniors can "right-size" their homes and receive a lifelong monthly income through CPF LIFE<sup>32</sup> (Lifelong Income For the Elderly), a lifetime annuity scheme, and keep any balance amounts after topping up their

## MONETISATION OPTIONS FOR SENIORS





## SHANGHAI'S PUBLIC HOUSING SYSTEM

**Providing** public housing is an important function of the government. Shanghai established its public housing system in the 1980s and has continued to improve upon it since. Over the years, a public housing system adapted to Shanghai's characteristics has been developed and supported by relevant policies to provide effective relief to the residents' housing challenges.

*Low-rent housing in Jiangqiao Town.*

Image courtesy of Shanghai Real Estate Science Research Institute.

## ESTABLISHMENT OF HOUSING SECURITY WITH SHANGHAI CHARACTERISTICS

In 1987, Shanghai listed housing issues as a government priority<sup>33</sup> and set about addressing it by focusing on alleviating shortages within the city. Over a 12-year period—from 1987 to 1999—Shanghai provided assistance to 120,000 households:<sup>34</sup> first to families with per capita living space of 2 m<sup>2</sup>, then those with 2.5 m<sup>2</sup> and finally those with 4 m<sup>2</sup>. This was done through the construction of public housing estates. The project was commended by the United Nations.

While the public housing project was successful in addressing the housing shortage, the system was implemented within the context of a planned economy, and accommodation was allocated directly by the government as a form of welfare. As China developed into a socialist market economy, and as the housing system reforms continued, this welfare approach could no longer keep up with market demand. As such, Shanghai sought to establish a sustainable public housing system based on market principles. In 2000, Shanghai's public housing focus changed to that of low-rent housing, pioneering a low-rent housing system in China for low-income families. From 2000 to 2005, improving the living

conditions for families receiving only basic income<sup>35</sup> and had difficulties in accessing housing became the main focus. Shanghai's low-rent housing schemes were commended by China's Ministry of Construction and awarded the "Exemplary Chinese Habitat Award" in 2003.

In 2005, efforts were made to hasten the development of both the property market and public housing system while Shanghai continued to develop its housing market system. This was driven by the desire to provide residents with housing options that were within their financial means and to facilitate housing for all. Since then, Shanghai's development has been based on the principles of streaming, multiple channels, being systemic and providing full coverage.<sup>36</sup> This "Four-in-One" system, as it is referred to, encompasses four major categories, namely: subsidised low-rent housing, public low-rent housing, shared property housing and resettlement housing. It covers both purchased and low-rent housing.

Subsidised low-rent housing primarily targets low-income families in Shanghai with local household registration certificates, and have difficulty gaining access to housing. Citizens can either apply to the government for rent subsidy or allocation of a subsidised rental house.



Public low-rent housing caters to young workers, “imported” talent, migrant workers and other permanent residents in Shanghai, who face difficulty accessing housing. This programme is run by the private sector with government support. The size and condition of these dwellings meet basic living requirements and are rented at discounted rates.

Shared property housing targets eligible low- and middle-income families who face difficulty accessing housing. The government rolls out preferential policies, builds housing according to relevant standards, specifies house types and prices, defines the range of uses and disposition rights, and shares ownership with such buyers.

Resettlement housing is provided to support residents affected by major projects, old town reconstruction, urban renewal and rural resettlement projects. Run by the government, resettlement housing programmes adhere to preferential policies, are built according to government-specified construction standards and subject to price control.

**LEFT:** *Xinning Apartment*  
(public low-rent housing).

Image courtesy of  
Shanghai Real Estate  
Science Research Institute.

**RIGHT:** *Xinyi Apartment*  
(public low-rent housing)  
living room.

Image courtesy of  
Shanghai Real Estate  
Housing Security Co.



## POLICIES SUPPORTING THE ESTABLISHMENT AND OPERATION OF THE HOUSING SECURITY SYSTEM

### (i) Fiscal Investment

Shanghai has clarified the sources of special funds for housing security. For example, the sources of special funding to provide subsidies for resettlement and rental for public housing are mainly local fiscal budgets and revenue from land sales. Public housing projects are exempt from various government taxes, administrative fees and need not contribute to any government funds. A dedicated public housing project fund has been set up to finance the construction of selected public housing within the city. Spending on public housing has been budgeted for on both

municipal and district levels, and this expenditure has been increasing over the years. In addition, Shanghai is also devising new financial support schemes such as subsidised interest rates, government fund investment and tax incentives to attract social participation in the construction and operational management of public housing.

### (ii) Tax Incentives

Shanghai has implemented preferential tax policies for the construction, operation, management and transaction of public housing, so as to encourage a range of different stakeholders to get more involved in improving housing security for residents, which would then achieve better balance between social and economic development. For example, subsidised rental houses, public rental houses and shared



property houses are exempt from land tax. Operators of subsidised and public rental houses are exempt from paying operations and property taxes as long as they adhere to government-recommended rental rates. Any institution or social organisation which has transferred their old property for the purpose of constructing public housing is exempted from value-added land tax if the value added is less than 20%. Transactions on such properties are also exempted from stamp duty fees.

### (iii) Guaranteed Land Availability

Despite facing constraints on land resources, Shanghai has ensured that there is sufficient land supply for public housing by allocating specialised land for the projects. The government administers land allocation for the purpose of building shared property projects. For shared property housing within commercial projects, the government refunds the developer a percentage of the land price based on the type of land, or issues a directive

assigning rights of usage to the developer for the purpose of developing public housing. The two main types of land transfer in China are through direct assignment or sale. By assigning the land for public housing purpose, the developer only needs to pay a small fee and resettlement costs, and is exempt from paying land profit tax. There is also no limit on the years of usage.

### (iv) Financial Support

To support the development of public housing, Shanghai offers Housing Provident Fund loans, policies to support financial institutions in offering preferential loan rates for developers. For example, China Development Bank not only offered loans for large-scale public housing projects in 2009, it also joined other commercial banks in offering joint-loans for public housing communities. Apart from incentivising developers, support is also given to residents in the form of affordable home loans from entities such as the Housing Provident Fund and commercial banks, and so on.



**LEFT:** *Co-ownership affordable housing in Sijing Town.*

Image courtesy of Shanghai Real Estate Science Research Institute.

**RIGHT:** *Resettlement housing in Jiangqiao Town.*

Image courtesy of Shanghai Real Estate Science Research Institute.

## MULTIPLE SOURCES FOR HOUSES

Shanghai provides public housing through methods such as new construction, extension of commercial projects, reconstruction, purchase, and conversion of existing projects. The supply of public low-rent housing (including subsidised housing) comes from a myriad of sources. These include: construction of new public housing, conversion of non-residential buildings that are not in use, building of public housing as part of private housing projects, purchase of leftover housing stock, conversion of other types of public housing, and subletting of houses provided by individual lessors. For shared property housing, Shanghai's primary method of supply is through building new large residential communities. As supplementary measures, the government may also construct public housing as an auxiliary part of an existing private housing estate, release units from existing stockpiles, or purchase ready-built houses from the market. Shanghai requires that all construction projects (excluding the ones for low-rent housing) on land parcels newly leased for private housing to reserve at least 5% of the total housing construction area for public housing and its car park area.

### SHANGHAI LAND (GROUP) CO., LTD PARTICIPATES IN CONSTRUCTION OF PUBLIC HOUSING

Shanghai Land (Group) Co., Ltd was founded in 2002 and has since prided itself as a socially-responsible corporation that contributes to society by improving people's living environments and enhancing developments. It is committed to the construction and management of public housing and is the earliest state-owned real estate enterprise to participate in large-scale public housing construction, offering the largest selection of public housing. As of 2018, the corporation has developed more than 40 affordable public housing projects, totalling 12 million m<sup>2</sup> of floor area and provided more than 100,000 resettlement houses.

### A "FAIR, OPEN AND JUST" ALLOCATION SYSTEM

#### (i) Dynamic Criteria

In recent years, Shanghai has established a mechanism to adjust the eligibility criteria for public housing application, in order to adapt to the current state of social and economic development. The mechanism takes into consideration factors such as housing market prices, residents' income levels and government financial resources. At the same time, Shanghai continues to revise relevant policies to expand the provision of public housing in ways that enhance citizens' sense of gain, happiness and belonging.

The criteria for accessing subsidised low-rent housing—the most basic public housing—have been revised eight times since 2006 to increase their accessibility. This was implemented after housing eligibility was decoupled from another welfare scheme governing the minimum living allowance. The criteria for subsidised low-rent housing are: (1) the applicant has obtained the urban household registration certificate of Shanghai for three consecutive years

and lived in the place of application for at least one year; (2) the living space is smaller than 7 m<sup>2</sup> per family member; (3) the disposable income per person per month and the per capita property for families with at least three members are below RMB 3,300 and RMB 120,000 (S\$ 660 and S\$ 24,000) respectively. Families with two or fewer members will have their income and property ceiling raised by 10%.<sup>37</sup>

Public low-rent housing caters to permanent residents with stable employment in Shanghai, and who have difficulties in accessing housing. There are no limitations on the household registration certificate, income, or property type. The existing criteria for access to public low-rent housing are: (1) the applicant has a registration of permanent residence or the Shanghai Residence Permit, pays social insurance premiums for a stipulated number of years, and signs a labour contract for a certain number of years with a local employer; (2) the per capita living space is smaller than 15 m<sup>2</sup>; and (3) the applicant is not benefiting from any other public housing policies of Shanghai.<sup>38</sup>

The criteria for access to shared property housing have undergone revisions on five occasions since the programme was piloted in 2009. The current criteria are: (1) the applicant has obtained the urban household registration certificate of Shanghai for three consecutive years and lived in the place of application for at least two years; (2) the per capita living space is smaller than 15 m<sup>2</sup>; (3) the disposable income per person per month and the per capita property for families with at least three members are below RMB 6,000 and RMB 180,000 (S\$ 1,200 and S\$ 36,000) respectively. Families with two or less members will have their income and property ceiling raised by 20%.<sup>39</sup> In September 2018, Shanghai expanded the coverage of the shared property housing programme by offering it to citizens without the household registration certificates of Shanghai, but have had the Shanghai Residence Permit for a substantial number of years, have higher education background, meet future industrial development needs, and contribute to the economic and social development of Shanghai.

*Changing District 6th Batch Shared Property Affordable Housing Consultation Office.*

Image courtesy of Shanghai Real Estate Science Research Institute.

## 长宁区第六批次共有产权保障住房 江苏路街道咨询受理活动点





**(ii) Improving Allocation Policy**

Shanghai values the importance of fairness in the allocation of public housing programmes. Providing basic accommodation to families with needs is to be done in accordance with the principles of “fairness, openness and justice” at all stages, from access criteria, application review, and allocation to exit. To ensure that the applicants are eligible, Shanghai utilises information technology to verify the applicant details such as income, property, housing and other information. Audits at both sub-district and district levels are conducted stringently, the results are publicly announced twice, and a system to conduct random checks is administered at the municipal level. The ballot number, process of selection and allocation of units are made public so that members of the public, notary organisations, deputies to the Shanghai People’s Congress, members of Chinese People’s Political Consultative Conference (CPPCC) Shanghai, and media can provide checks and balances. At the same time, strong measures for post-sale management of the houses are also put in place to actively monitor usage and promptly remove those who do not meet the requirements from the system.

**TOP LEFT:** *Changning District 6th Batch Shared Property Affordable Housing Consultation Office.*

Image courtesy of Shanghai Real Estate Science Research Institute.

**TOP RIGHT:** *Jinshan District 6th Batch Shared Property affordable housing balloting exercise.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.

**BOTTOM RIGHT:** *Putuo District 7th Batch Shared Property affordable housing balloting exercise.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.





## STRICT POST-SALE MANAGEMENT

Shanghai maintains strict regulations on its public housing system to prevent abuse. Families living in subsidised low-rent housing and public low-rent housing are not allowed to lend, lease or sublet their houses. Neither are they allowed to leave the houses unoccupied, or occupied by others in any form. Before obtaining full property rights, the buyer or roommate of a shared property housing shall not transfer, gift, lease or lend the house without authorisation. The beneficiary of the resettlement housing shall not transfer or mortgage the housing within three years after obtaining the property ownership certificate without special reason. The public housing agency branch overseeing the area where the house is located may order violators to rectify these breaches and hold them accountable for breach of contract.

To ensure fairness and to enhance the effective allocation of public housing, Shanghai has also established an exit mechanism. For subsidised low-rent housing, the city reviews the family's eligibility once every three years and withdraws the rental house if the family no longer meets the requirements. In terms of public low-rent housing, Shanghai introduced a policy to withdraw the public low-rent housing after a 6-year lease period and introduced a set of provisions to rent the accommodation at market rate. For shared

**TOP LEFT:** *Public low-rent housing project—Yaohuabinjiang apartment bedroom.*

Image courtesy of Shanghai Real Estate Housing Security Co.

**BOTTOM RIGHT:** *Shared property affordable housing estate Jingcaifang neighbourhood festival.*

Image courtesy of Jingchengyiju Residential Committee Zhang Jing.

property housing, the city stipulates that the owner can only list and transfer the housing or purchase the government's share of property rights five years after obtaining the real estate certificate.

## RESOLUTION OF RESIDENTS' HOUSING ISSUES

As a result of the enhanced public housing programme, issues relating to housing have been resolved for a large number of Shanghai residents. For example, all eligible low-income families with household registration in Shanghai have been offered subsidised low-rent housing. Public low-rent housing has solved the housing problems of young workers, introduced talent, non-native employees and other permanent residents in Shanghai. Shared property housing has helped the sandwiched class to buy houses with property rights and improved the living conditions of

a large number of families. The policy also allowed families without household registration in Shanghai to have a stable life in the city with more opportunities. Resettlement housing is an effective solution for residents affected by major development projects, old city reconstruction and other projects.

By the end of 2019, the subsidised low-rent housing had benefited 129,300 households, of which 44,200 households are currently in the programme. A total of 177,000 units of public low-rent housing (including housing rented by employers) had been procured and 211,000 households have moved in, and 600,000 households had benefitted from the programme. In total, about 110,000 households have signed up to purchase shared property housing. In addition, these public housing programmes have eased population pressure in the city centre and promoted infrastructure development in their surrounding areas.



# DISTILLING INSIGHTS

## SINGAPORE

**Establishing** strong governance practices and fair processes in land acquisition and construction tendering have helped prevent abuse of the system, cartel formation and profiteering in the housing system. Proactive and strategic sourcing of materials by the HDB, legislation that encourages productivity and quality, and latest innovations such as prefabrication construction, have also contributed to housing development costs being kept low.

**With** prices for new flats that are significantly discounted compared to private housing, measures such as market separation, balloting and putting in place income ceilings and other eligibility criteria are necessary to ring-fence the high demand for the HDB flats and ensure that affordable housing remains accessible to those who need it the most. At the same time, systems such as the HDB's BTO system are put in place to ensure flat allocation is transparent and fair while remaining flexible and responsive to changes in demand so that housing supply is kept sustainable.

**Eligibility** requirements for new flat ownership and financial grants, such as raising of income ceilings, have to constantly be reviewed to keep pace with citizens' changing financial means. This is to ensure that affordable housing remains within reach to all.

**Offering** a range of housing subsidies such as the CPF Housing Grant has helped reduce the financial burden of first-time home buyers. With enhancements made over the years in grant amounts, and with the same grant amount being provided to both first-time buyers of new and resale flats through the Enhanced CPF Housing Grant, additional assistance is provided to lower and upper-middle income households in affording their first home.

To present potential homeowners with more financing options, the HDB also took on the role of mortgage financier, offering subsidised housing loans on a 15-year term at a concessionary interest rate which currently stands at 2.6%. However, caps are put in place whereby home buyers are limited to two concessionary interest rate housing loans and credit assessments are also carried out to ensure that buyers are making prudent flat type choices and are not overstressing themselves.

**To** lower the development cost of its public housing, Shanghai has applied a combination of policies ranging from financial investments, such as having a dedicated housing security fund; tax incentives for affordable housing construction, operations, management and transactions; ensuring sufficient land for shared-property affordable housing through government land transfer. When public housing projects are integrated within commercial projects, the developer may also apply for a percentage of the land price to be refunded, or the assignment of land usage rights should the development meet certain criteria.

**Shanghai** has established a dynamic mechanism that takes into consideration housing market pricing, residents' income and the level of government financial resources. In order to increase housing accessibility, the eligibility criteria have been revised and relaxed numerous times over the past few years. Residents now also have access to better financing options when purchasing shared-property affordable housing with more home loans available from the Housing Provident Fund as well as commercial banks.

## SHANGHAI

**Shanghai** leverages on information technology to verify the eligibility conditions—such as income level, property ownership and so on—to ensure fairness in the assessment of housing applicants. At the same time, queuing, balloting and other measures ensure equitable allocation for public housing.

**Shanghai** is enhancing the exit mechanisms of its public housing to ensure the efficient allocation of housing security resources. This includes a systematic review of the qualifying conditions of families living in low-rent housing every three years; placing a 6-year lease on public low-rent housing and provisions for adjustment to prevailing market rates thereafter; and placing a 5-year minimum occupancy period for jointly-owned affordable housing before the owner is allowed to list and transfer housing ownership or purchase the government's share of the property rights.



## CHAPTER 3

*Construction projects underway in Shanghai.*

Image courtesy of Shutterstock

# BUILDING A CONSTRUCTIVE PARTNERSHIP WITH THE INDUSTRY





*Training in mobile crane inspection being carried out by the BCA Academy.*

Image courtesy of the Building and Construction Authority.

## THE NEED FOR CAPABILITY BUILDING

### (i) A Weak Industry Amidst a Housing Shortage

With the Housing and Development Board (HDB) given the daunting task of alleviating the acute housing shortage through the rapid construction of large numbers of flats, it was met with a weak local construction industry with limited major corporations based in Singapore. There were few firms that were capable of spearheading large-scale projects, let alone doing so under tremendous time pressure; the overall productivity of the industry was low. Faced with this challenging operating environment, the HDB shouldered the responsibility of providing the full spectrum of expertise and capacity in planning and building public housing in Singapore—from resource planning and contract management, to sourcing and quality assurance of construction materials, to coordinating across different agencies. Hence, it was critical for the HDB to explore ways to strengthen the industry such that the private sector could play a more active role in the overall public housing system.

### (ii) Building Up Skills and Trust

Given this urgency, the HDB adopted a pragmatic approach of “getting them in first, upgrading their skills later” when it came to collaborating with the private sector. From that starting point, various schemes were subsequently implemented to increase capability and efficiency in the private sector. To raise skill levels, the Construction Industry Development Board (CIDB), the precursor to the Building and Construction Authority (BCA), which presently regulates Singapore’s building and construction industry, conducted training programmes for construction workers. While putting standards, testing and certification protocols in place, the programmes also helped with training young workers who sought to enter the construction industry, and upgrading the skills of the more experienced workers.<sup>40</sup>

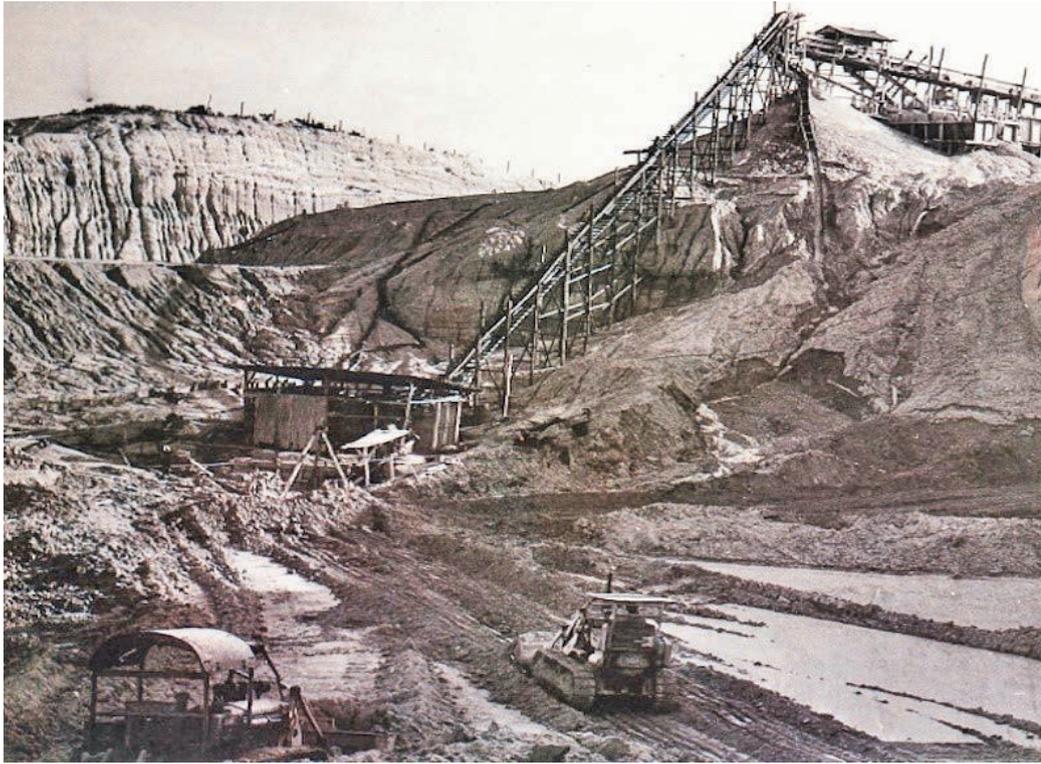
Schemes aimed at incentivising contractors to increase their productivity were introduced, such as the “Merit Star Scheme” in 1973, under which contractors were evaluated based on efficiency, workmanship, site management, safety measures, and levels of mechanisation. Merit stars were awarded to contractors who performed consistently well, and each star was worth a 0.5% bidding preference when tenders were evaluated.

Beyond encouraging greater productivity, these schemes provided a formal platform for the HDB to build long term relationships with a pool of skilled, reliable and trusted contractors.

Another scheme was the “Core Contractor Scheme” that was introduced in 1982, under which contractors with a minimum paid-up capital of S\$500,000 and a minimum of 5 stars attained from the “Merit Star Scheme” would be offered a guaranteed annual workload for a fixed number of years. Contractors benefitted from the scheme as it allowed them to plan ahead for their projects in terms of time allocation, manpower and other types of resource investment, such as machinery and equipment. This scheme, however, came to an end in 1988 as it was no longer practical to allocate a predetermined volume of work given the glut of unsold flats and subsequent slowing down of the HDB building programme.

## ENSURING SUFFICIENCY AND QUALITY OF CONSTRUCTION MATERIALS

Beyond bridging the skills gap, another challenge was in safeguarding an adequate supply of building materials, given Singapore’s lack of natural resources. The consistently high demand for materials such as concrete and granite saw the establishment of two government-owned granite quarries in Pulau Ubin and Mandai; a mechanised sand quarry in Tampines; and a concrete plant in Marina Centre run by the government-owned company Resources Development Corporation (RDC).<sup>41</sup> Laboratories were also set up within production plants to carry out rigorous



checks on the quality and consistency of building materials.<sup>42</sup> In order to ensure sufficient supply, the HDB planned for the bulk purchase and stockpiling of key materials such as cement, tiles and steel, as a buffer, to meet any shortages due to unforeseen circumstances.<sup>43</sup>

## REINFORCING BUILDING SAFETY IN THE CONSTRUCTION SECTOR

The initial lack of expertise in Singapore's construction sector saw many buildings built with quality shortcomings in the design and construction processes. This situation was made all the more challenging in the context of an accelerated building programme implemented to meet the housing needs of Singapore's rapidly growing population. As the number of construction projects rose, so did the level of attention paid to building quality and safety. Following the disastrous Hotel New World collapse<sup>44</sup> in 1986, the need to regulate building safety grew all the more pressing, and was a clear signal of the importance of more stringent checks.

*A Tampines sand quarry in the 1970s, where the sand was used for the construction of Toa Payoh Town, the East Coast reclamation and Changi Airport's development.*

Image courtesy of Tampines Constituency Sports Association (TCSA).

The Construction Quality Assurance System (CONQUAS) administered by BCA represented a major step forward in this direction. Implemented in 1989, it is a quality assessment tool for construction workmanship that provides a common standard across the industry. It was to allow a more objective and systematic assessment process that would meet time and cost targets. The assessment covers three components: structural, architectural, as well as mechanical and engineering (M&E) works, with points being awarded for works that meet the standard.<sup>45</sup>

To date, the CONQUAS has been consistently updated to make it more comprehensive and robust, with the latest ninth edition being released in 2019.<sup>46</sup> In the latest edition, major defects detected during the internal finish assessments such as water seepage through walls and windows, functionally deficient doors and windows, and inter-floor leakages will now be taken into consideration during scoring. The severity of major defects and end-user feedback will also be included in the scoring.

Incentives are offered to the private sector to encourage adoption of CONQUAS, as well as to motivate companies to score well against the metrics set. Consistently high CONQUAS scores would translate to increased client confidence and competitive advantage. The Bonus Scheme for Construction Quality based on CONQUAS scores, sees bonuses given upon completion for scores above the industry average. While poor quality would be penalised with a deduction in payment. Contractors who

consistently perform well on CONQUAS are given tendering advantages when bidding for future government projects. This had the desired effect in raising overall workmanship quality in the construction sector. Although CONQUAS is not mandated for private-sector projects, developers and builders have nevertheless submitted around 95% of private residential and commercial projects in Singapore for assessment.<sup>47</sup>

Reflecting the HDB's continued efforts to innovate and improve the built quality of public housing, the CONQUAS scores for the HDB's Built-To-Order (BTO) projects have risen steadily over the years. From an average CONQUAS score of 81.8 in 2009, it rose to a high of 93.7 in 2019, surpassing that of private housing.

## TAKING BOLD STEPS IN CONSTRUCTION INNOVATION

### (i) Benefits of Precasting and Prefabrication

With construction costs rising in tandem with the ramping up of housing supply, it became increasingly necessary for the HDB to explore more efficient and cost-effective methods of construction. To address Singapore's labour shortfall, the deployment of new technologies, such as prefabrication, was needed to increase productivity while keeping costs low. Since the 1980s, the HDB had already begun exploring precast and prefabrication technologies by Korean, Australian, Japanese and French contractors in a bid to increase the quality and efficiency of flat construction.<sup>48</sup>

Precasting refers to the casting of concrete components in a controlled environment away from the construction site, while prefabrication is the practice of assembling components of a structure in another manufacturing site before transferring the completed components to the site. These methods help shorten overall construction time as site preparation can be done simultaneously with component-building. At the same time, this offers more reliable quality control, a safer work environment, and lower dependency on manual and unskilled labour.

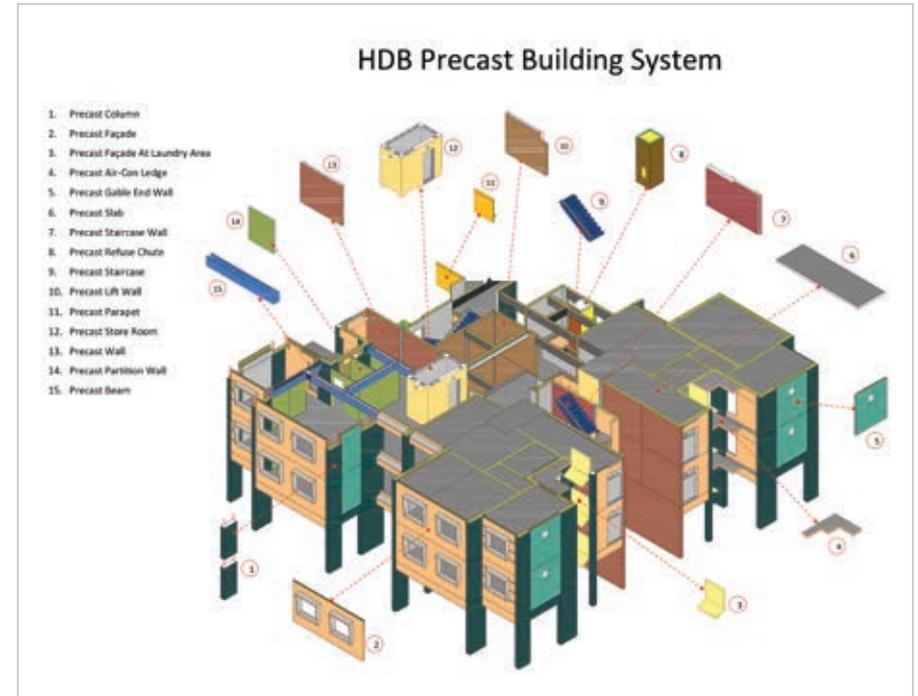
A bold move at the time, the first projects to apply this prefabrication method were the construction of 3- and 4-room flats in over 15 towns spread throughout Singapore, such as Bukit Batok, Bukit Panjang, Hougang, Jurong West, Tampines, Woodlands, Choa Chu Kang and Yishun.<sup>49</sup> Besides enhancing the quality and safety of public housing, precasting has also helped the HDB reduce construction waste, noise and dust levels, while minimising the inconvenience to nearby residences.<sup>50</sup>

**BOTTOM LEFT:** On-site installation of prefabricated HDB block components.

Image courtesy of the Housing and Development Board.

**TOP RIGHT:** Visualisation of the various precast components that contribute to housing construction.

Infographic courtesy of the Housing and Development Board.



**(ii) Staying Ahead of the Prefabrication Curve**

As a pioneer in the use of prefabrication in Southeast Asia, the HDB endeavours to remain at the forefront of such technologies, through devoting resources to research. This commitment has been aided by new initiatives rolled out over the years to support the use of prefabrication. In 1995, the Prefabrication Technology Centre (PTC) was set up to spearhead the development and use of prefabrication technologies.<sup>51</sup> The PTC carries out prototyping and test-bedding for the development of new building technologies for larger scale application, and is responsible for many of the engineering breakthroughs that made the iconic Pinnacle@Duxton possible. Through the work of the PTC, project

productivity had risen by 12.3% from 2010 to 2016.

At present, the HDB is working on the application of more advanced methods such as concrete Prefabricated Prefinished Volumetric Construction (PPVC), which involves fabricating 3-dimensional modules of whole rooms to reduce work on site. These modular units can be combined in different configurations to create different flat layouts. This method has been piloted at Valley Spring@Yishun in March 2017, after initial testing at West Terra@Bukit Batok.<sup>52</sup> In 2011, the HDB introduced concrete Prefabricated Bathroom Units (PBU), where whole toilets complete with fittings and finishes are assembled off-site. Today, all toilets are constructed in this way.

In addition, five Integrated Construction and Prefabrication Hubs (ICPH) are being built with the intent of bringing all existing technologies under one roof in a high-tech hub. Each hub will have annual production capacities of at least 100,000 m<sup>3</sup>.<sup>53</sup> Contractors who have carried out prefabrication work for the HDB are also able to generate more business by exporting their services to developing countries, through support given by BCA.

To support the wider use of prefabrication, the HDB has developed systems for design and quality control. The Structural Engineering Computer-Aided Design (SE CAD) aids in structural analysis and designing of high-rise buildings, and is able to eliminate discrepancies between drawings.<sup>54</sup> The Automated Precast Production System (APPS) automates

the production process to produce custom-made room-sized floor and wall panels, allowing more complex designs to be fabricated and installed quickly.<sup>55</sup> To maximise efficiency, the HDB strives to standardise components built across projects as far as possible, or minimally within projects. For example, components such as staircases, water tanks, and refuse chutes are standardised across projects, while façades are standardised within projects. In addition, identical façades for adjacent units are designed with single components wherever possible, to facilitate faster assembly.

Today, prefabricated components constitute about 70% of the structural concrete utilised for new HDB projects.<sup>56</sup> These efforts are reflective of the HDB's forward thinking, in spurring the adoption of new enabling technologies across the construction sector.



## EXPANDING THE ROLE OF THE PRIVATE SECTOR THROUGH DECENTRALISATION

### (i) Raising the Quality Bar for Public Housing

In the 1970s and 1980s, Government-Linked Companies (GLCs) such as RDC, were important players in Singapore's construction scene and overall economy. However, a turning point came during the 1985–86 recession, which resulted in the bursting of the construction bubble. This saw the government moving to divest its stake in GLCs to allow for a broader role for the private sector in the economy, and subsequently privatising several public sector departments.<sup>57</sup> Decentralisation in the housing sector led to HDB's Building and Development Division, which had previously been responsible for planning and designing HDB flats, being corporatised on 1 July 2003<sup>58</sup> as HDB Corporation Pte Ltd, and subsequently renamed Surbana. Surbana subsequently merged with Jurong International Holdings to form Surbana Jurong on June 2015.<sup>59</sup> Surbana Jurong continues to participate in the design and development of HDB flats, including Treelodge@Punggol, the first HDB precinct to be

**BOTTOM LEFT:** PPVC modular units at Valley Spring@Yishun.

Images courtesy of the Housing and Development Board.

**TOP RIGHT:** Using SE CAD software allows for more accurate structural analysis and design.

Image courtesy of the Housing and Development Board.

presented with the BCA Green Mark Platinum Award, under a scheme launched in 2005 to shape a more environmentally friendly and sustainable built environment. It has since expanded its operations to more than 120 offices in over 40 countries so as to export its expertise in housing development built up over the decades together with the HDB globally.<sup>60</sup>

Even before corporatisation, the HDB had started engaging private sector consultants through a Design and Build programme, which led to the design and construction of homes that stood out as outstanding, unique projects at the international level, setting new benchmarks for quality public housing. Such projects include 18 10-storey housing blocks in Tampines New Town by P&T Architects and Shimizu

**LEFT:** *Surbana Jurong's Treelodge@Punggol.*

Image courtesy of Surbana Jurong.

**RIGHT:** *HDB housing projects at Tampines New Town showcasing the unique designs and creativity of the private sector.*

Image courtesy of P&T Architects.

Corporation; and Blocks 631 to 637 at Choa Chu Kang North Avenue 6 by Akitek Tenggara II and built by Neo Corporation Pte Ltd. Both are groundbreaking public housing projects in Singapore in terms of the standards of design and construction that went into their development. Their involvement in public housing projects has enabled companies in the sector to build up the necessary experience and gain international recognition such that they are better equipped to export their expertise beyond Singapore.

This partnership continued after corporatisation and today, about 85% of the HDB's projects are designed together with private consultants. As part of efforts to grow its internal technical expertise, the HDB formed the Centre of Design Excellence (CoDE) under its Building and Research Institute to pilot more innovative designs as well as test-bed advanced building technologies and construction methods, so as to achieve higher productivity and quality standards in public housing developments.





### A Shift Towards Overseeing Other Aspects of the Public Housing Life Cycle

While private sector involvement has traditionally been limited to construction tenders, it has, in recent years, expanded to other parts of the public housing life cycle. Following the corporatisation of HDB's Building and Development Division in 2003, the design of many HDB flats and estates, including project management, has been actively undertaken by the private sector, leveraging on the know-how and creativity that they possess. For instance, the private sector has been a key player in housing construction and design via the Design, Build and Sell Scheme (DBSS), as well as for Executive Condominiums (ECs). Some of the earliest private sector players include the Kajima Corporation,<sup>61</sup> the P&T Group,<sup>62</sup> the Sim Lian Group<sup>63</sup> and Hoi Hup Realty.<sup>64</sup>

*The Peak@Toa Payoh (background), a DBSS project developed by Hoi Hup Realty.*

*Image courtesy of the Housing and Development Board.*

Having a private sector that is capable of playing a larger role in the system of public housing provision—whether through design, construction, or maintenance—helps to ensure fiscal prudence and sustainability of the overall public housing system, increases efficiency, and allows the public sector to focus more on policymaking and planning, rather than direct provision.

### (ii) Working with the Market while Maintaining a Culture of Integrity

Harnessing market forces rather than working against them has been a core governance principle in providing affordable, quality housing in Singapore. Doing so would necessitate having both an open market and transparent practices. Taking the RDC as an example, while it operated a number of quarries on behalf of the HDB, the HDB did not interfere with RDC's operations and there was no direct line of reporting from RDC to the Ministry of National Development. RDC had to bid for projects via competitive tender in the same way that other fully private companies did. This was a crucial element in fostering healthy competition in the construction industry, while ensuring that GLCs would remain profitable. This culture of integrity is important not only for the HDB, but for the contractors they collaborate with as well. Schemes that reward consistently good performance such as the Merit Star Scheme also have the positive knock-on effect of encouraging companies to increase efficiency and accountability.

The privatisation of the Building and Development Division into Surbana Jurong is a good example of how the HDB allowed market forces

and expertise that reside beyond government to contribute successfully to housing development. Having majority stakeholders of Surbana Jurong being Temasek Holdings and Jurong Town Corporation (JTC) allowed the maintaining of a Singapore-centric approach, where expertise harnessed from the Singapore experience can be applied elsewhere, while ensuring Surbana Jurong continues to play a crucial role in Singapore's own growth and development.<sup>65</sup>

### (iii) Award-Winning Collaborations with the Private Sector

Privatisation and decentralisation have set the stage for increased collaborations across different players in the market in public housing provision. Having each player contribute their own talents and expertise has resulted in a number of award-winning and internationally-recognised housing developments that would not have been possible if the public sector had worked alone. These include the Skyville@Dawson BTO project by WOHA Architects and Hor Kew Pte Ltd that won the President's Design Award, Australian Institute of Architects International Chapter Award, and the International Federations of Landscape Architects (IFLA) Asia-Pacific Landscape Architecture Award for its unique typology for high-rise, high-density public housing that breaks down the scale of high-rise blocks into vertical villages with lush greenery. Other examples include the HDB's Waterway Terraces by Group8 Asia Architects and Aedas, which won the IFLA Asia-Pacific Landscape Honourable Mention Awards, Singapore Landscape Architecture Awards, and the Singapore Good Design Mark Award.

Another earlier recipient of the same award in 2010 is the 50-storey Pinnacle@Duxton by ARC Studio Architecture + Urbanism, RSP Architects Planners and Engineers (Pte) Ltd and Chip Eng Seng Corporation Ltd, with a design selected from an international competition that saw a total of 227 design entries from 32 countries being submitted.<sup>66</sup> Waterway Ridges by Surbana Jurong is another award-winning development along Punggol Waterway, with its blocks of differing heights and orientation designed to create a terrace effect, strategically positioned to maximise views of the waterway.<sup>67</sup> The project was conferred the Outstanding Award of Excellence at the Singapore Land Architects Awards 2017 and the IFLA Africa, Asia Pacific and Middle East (AAPME) Resilience by Design Awards in 2018.

**LEFT TO RIGHT:** *The award-winning Skyville@ Dawson, Pinnacle@ Duxton and Waterway Ridges with its sheltered community garden terraces.*

Images courtesy of the Housing and Development Board and WOHA.



## SHANGHAI'S HOUSING CONSTRUCTION AND INDUSTRY DEVELOPMENT

**As** one of China's 12 pilot cities to modernise the construction industry, Shanghai started relevant research and experiments in 1996. During the early stages, Shanghai focused on resource conservation and general environmental protection while improving the quality of houses. It was then that Shanghai also embarked on China's first prefabrication construction project.

In 2016, under the green and ecological development concept, China issued policies proposing new construction methods and promoted prefabrication construction. Prefabrication construction was promoted to districts and municipalities, primarily for the construction of public housing, henceforth becoming the new direction of development for Shanghai's housing construction industry.

Shanghai's development is based on a principle of integrating the government's leadership role with the market's operational role, and to expand reforms by utilising both regulatory and incentive measures. Through strict regulations, Shanghai is able to hold corporations accountable and encourage stakeholders to participate in developing prefabricated housing. This method of construction produces green and high-quality housing which satisfies the consumers' housing aspirations.

## PREFABRICATION IS THE DIRECTION FOR HOUSING INDUSTRY'S DEVELOPMENT

### (i) Exploratory Stage

Since the mid-1990s, proceeding from housing industrialisation, Shanghai has gone through three stages in its journey to

develop the construction industry, with the first exploratory stage being the period prior to 2010. Then, Shanghai formulated the Shanghai Housing Industrial Modernisation Pilot Work Plan and other documents as an initial framework for the industrialisation of the housing sector. During the piloting stage, which spanned from 2011 to 2013, the city promoted growth of the industry through both regulatory and incentive measures. These efforts intensified in 2014, kick-starting the promotional stage where the use of prefabricated technology was actively encouraged as part of its strategy to advance the manufacturing industry, and build a green and liveable city. Since then, Shanghai has become a leader for prefabrication construction within China.

### (ii) Building the Mechanism

In recent years, Shanghai has rolled out coordinated plans for further advances in prefabrication through policy documents such as the "Implementation Opinions of Shanghai on Promoting the Development of Prefabricated Buildings", "the 3-Year Action Plans for Green Buildings (2014-2016) of Shanghai", and "The Development Plan of Shanghai for Prefabricated Buildings (2016-2020)". In 2014, the Shanghai government established the Shanghai

Green Building Development Joint Conference to formulate and coordinate the development, planning, policy implementation and construction of prefabricated buildings. The Conference provided effective support for policies relevant to the promotion of prefabricated building technology. As a result, Shanghai has formed a working mechanism for promoting prefabricated buildings at the municipal and district levels, designating the main responsibility to the district level government. Shanghai continues to actively explore a management model that combines government supervision and industrial self-regulation.

### (iii) Basic Principles

The first principle in the development of the housing industry is that it should be government-guided but market-led. Shanghai strives to limit the role of the government to planning and coordination, in order to create an environment favourable for stimulating enthusiasm and creativity in private enterprises. This principle also facilitates orderly competition and encourages a positive dynamic between the government and private sector. This has seen comprehensive advancement and breakthrough in key areas. In the early stages, Shanghai used the construction of public housing to promote the use

of prefabrication in buildings. At present, all eligible new residential, public and industrial buildings in the city leverage prefabricated construction methods.

Shanghai strives to achieve breakthroughs in technology, industrial models and industrial value by leveraging its status as a construction hub and sharing its experience. In addition, it also wishes to strengthen industrial linkages and improve production quality. Shanghai has established a management concept for the entire project life cycle that integrates design, manufacturing, construction, decoration, operation and maintenance, so as to comprehensively improve building quality. Finally, emphasis on technology and transformation has led to innovations in management and business models, thereby improving the quality and increasing the efficiency of the industry.

**LEFT:** *Shanghai Fengxian district Nanqiaodong Base 14-10A-04A plot shared property affordable housing construction site.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.

**RIGHT:** *Shanghai Baoshan district Gucuntuozhan Base 0401-18 plot shared property affordable housing construction site.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.



## COLLABORATION BETWEEN THE GOVERNMENT AND MARKET

### (i) Land Transfer as the Starting Point

Following the introduction of a series of documents relating to the development of prefabricated buildings in 2013, the city has leveraged the land supply process to promote said technology. Requirements relating to the utilisation of prefabricated building technology are written into the land transfer contract and incorporated into an official information system to facilitate administration. The city also monitors all processes including land transfer, information submission, map review, construction permits and acceptance

checks to ensure compliance with the relevant technical requirements.

### (ii) Financial Support for Energy Saving Projects

In 2016, Shanghai announced special support measures for the construction of energy-efficient buildings, green building proof-of-concept projects and subsidies for prefabricated building projects. Developments that meet stipulated requirements are eligible for support from the “Energy-saving Projects Special Fund”. Buildings that are rated AA according to Shanghai’s prefabrication rating standards will receive a subsidy of RMB 60 (S\$ 12) per m<sup>2</sup>, while buildings that are rated AAA will receive RMB 100 (S\$ 20) per m<sup>2</sup>.



### (iii) Promoting the Technology in Public Housing First

The Shanghai government released documents relating to the use of prefabricated construction methods in public housing development noting that any resulting cost increase due to the use of prefabrication technologies will be taken into account as part of the base construction cost of the project. In

2018, the city issued documents further promoting construction efficiency in public housing by popularising the use of large open rooms in public housing design, and encouraging the use of fabricated lightweight internal wall partitions. In addition, the standardisation, modularisation and serialisation of building components are also actively encouraged.

### PLOT 39A-02, A LARGE RESIDENTIAL COMMUNITY IN SHEBEI, SHANGHAI

Plot 39A-02 is a large residential community in Shebei developed as a demonstration project for prefabricated building technology, and selected to be part of the Ministry of Housing and Urban-Rural Development's (MOHURD) "Science and Technology Project Initiative". The project was constructed using long-span prestressed composite slabs and prefabricated shear wall structures. Prefabricated construction was used from the first floor onwards. External walls, internal walls, connecting beams, floor slabs, balconies, awnings, air conditioning boards, staircases, elevator shafts, parapets and other parts of the building were all prefabricated in the factory and assembled on site.



**BOTTOM LEFT:** Plot 39A-02, a large community in Shebei, Shanghai.

Image courtesy of Shanghai CITI-RAISE Construction Group.

**TOP RIGHT:** Plot 39A-02, a large community in Shebei, Shanghai.

Image courtesy of Shanghai CITI-RAISE Construction Group.

### (iv) Promoting Fully Furnished Prefabricated Building in Tandem

Policy documents describing measures to strengthen the management of the construction of newly-built fully-furnished residences were issued in 2016. The documents proposed that with effect from January 2017, the ratio of fully-furnished residential units in all new private housing areas in Shanghai shall be 100% in the urban area within the city's outer ring, and 50% in other areas except Fengxian, Jinshan and Chongming District. The proportion for public low-rent housing shall be 100%. In addition, regulations to measure and track the rate of monomer prefabrication and the assembly rate for prefabricated buildings, including the assembly rate for interior decoration and furnishing, had the effect of significantly promoting the development of full furnishing and prefabricated construction.





**(v) Enhancing the Standards**

Shanghai formulated local standards based on the principle of being “technologically applicable, economically reasonable”. Standards and specifications have been established for the entire prefabricated housing process, ranging from design, construction and installation, component production, to completion and acceptance. These standards and specifications complement those issued by the MOHURD, and cater to the needs of prefabricated housing development in Shanghai.

**(vi) Application of New Technology**

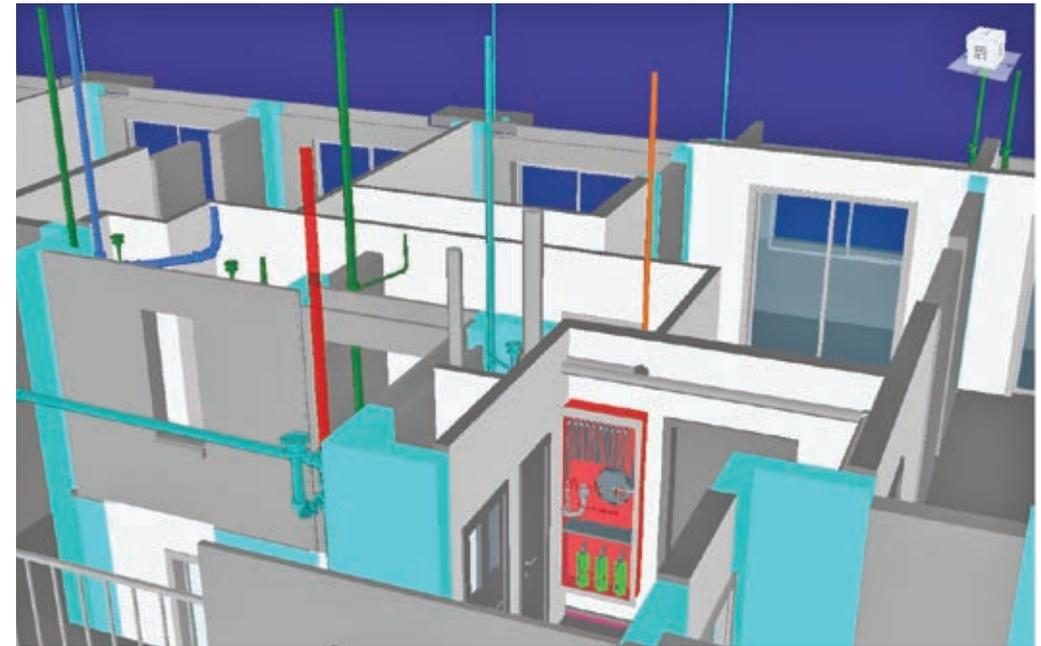
The Shanghai government has published a list of technical innovations to be promoted through exemplary prefabricated building demonstration projects in Shanghai. This helps to promote high-quality development of prefabricated housing by lauding innovative, scientific and technological achievements. The city also actively promotes the development of green building materials and components

**LEFT:** Shanghai Pudong new district Datuan town 17-01 plot resettlement housing project block 1 structural BIM model.

Image courtesy of Shanghai Municipal Housing Administration Bureau.

**RIGHT:** Shanghai Pudong new district Datuan town 17-01 plot resettlement housing project interior utility lines BIM model.

Image courtesy of Shanghai Municipal Housing Administration Bureau.



of the products and equipment of the new technologies, and advances the integrated application of renewable energy sources and buildings. It is

also pushing for the use of Building Information Modelling (BIM), and its integration into the prefabricated housing development process.

**THE PLANNING AND DEVELOPMENT OF XINJIANGWANCHENG RESIDENTIAL DISTRICT**

Located in Shanghai Yangpu District, Xinjiangwancheng occupies 9.45 km<sup>2</sup> of land that used to be the site of a military airfield. In 1998, the main developer of this plot of land, Shanghai Chengtou Group Corporation, acted as a coordinator between the government, enterprise and market. The company first collaborated with the district’s planning authority on integrated planning before undertaking the tasks of being a master developer, marketing and investors attraction. This project was based on a new concept in land development, characterised by the guiding principles of “underground before surface, amenities before accommodation, environment before buildings”. By optimising land usage, it was able to provide quality assurance while increasing the land value, successfully creating a smart, ecological and international community at Xinjiangwancheng.



## QUALITY DEVELOPMENT AS THE GOAL

### (i) Normalising Prefabrication through Project Implementation Requirements

Since 2016, all new construction projects in Shanghai have been required to have a monomer prefabrication rate of no less than 40%, or an assembly rate of no less than 60%. Between 2011 and 2014, about 3.6 million m<sup>2</sup> of prefabricated buildings were completed. However, in 2019 alone, about 34.44 million m<sup>2</sup> (built-up area) of prefabricated buildings were in the process of being constructed.

*A bird's eye view of Shanghai Xinjiangwancheng project.*

Image courtesy of Shanghai Chengtou Group Corporation.

### (ii) Expanding Application of Prefabrication Technology

Shanghai introduced regulations that determine the rate of monomer prefabrication and assembly for prefabricated buildings, and extended the scope of implementation from concrete structure system to the steel, steel-concrete and other structural systems for prefabricated buildings

in Shanghai. The city also actively promotes the use of energy-saving and green construction methods such as the integration of walls and window frames, the integration of insulation into the building, the use of integrated walls, floor slabs, non-masonry internal partition walls, as well as integrated kitchens and bathrooms.

**(iii) Progress in Industrial Development**

The regulations and requirements have catalysed enterprises within the industry to upgrade and transform, and workers to develop more sophisticated skills and capabilities. As the industry continues to improve and mature, cooperation between upstream and downstream enterprises has become closer, creating a new industrial sector with companies that specialise in “engineering, procurement and construction”. As prefabrication capacity continues to increase, 121 enterprises have registered as having capabilities to produce prefabricated concrete components in Shanghai, with a design capacity of about 7 million m<sup>3</sup> and an actual capacity of about 4.5 million m<sup>3</sup> as of the end of 2019.

In 2017, Shanghai was designated as one of China’s first “Demonstration Cities for Prefabrication Buildings”. By 2019, 12 municipality-level and 6 national-level prefabricated building industry bases were established in Shanghai, and 28 prefabricated building technology projects had been selected from the MOHURD “Science and Technology Project Initiative”.

**BOTTOM LEFT:** Practical training in prefabrication techniques for construction workers.

Image courtesy of Shanghai Construction and Development Association.

**TOP RIGHT:** China skills challenge—first Yangtze River delta pre-fabricated construction vocational skills competition (Grout connection project).

Image courtesy of Shanghai Construction and Development Association.

**BOTTOM RIGHT:** China skills challenge—first Yangtze River delta pre-fabricated construction vocational skills competition (Precast component installation project).

Image courtesy of Shanghai Construction and Development Association.





Shanghai has been investing and promoting innovation in prefabrication building technology for a period of time now. In recent years, a technical list of 14 innovative technologies in the areas of construction, structure, interior industrialisation, integrated design, component manufacturing and construction innovation has been collated and tracked. Projects which leverage these technologies not only receive commendations, but are also rewarded with material incentives.

Following the lead of the city government, numerous enterprises and research institutes have been actively investing in research into areas such as seismic performance, dry connection technology, precast prestressed double-T board, recycled concrete component manufacturing, precise adaptive integrated monitoring of precast concrete component installation, and other cutting-edge technologies. The research has been fruitful, resulting in many patents being filed and advanced technology being applied in actual projects.

**LEFT:** *Intelligent production line of flexible precast concrete components of Shanghai Construction Group.*

Image courtesy of Shanghai Construction Material Co., Ltd.

**RIGHT:** *Automatic precast concrete component production line of Shanghai Tunnel Engineering Construction Materials Co.*

Image courtesy of Shanghai Tunnel Engineering Construction Materials Co., Ltd.



#### **(iv) Development in Tandem with Green Building Technology**

Since 2014, Shanghai has been leading the nation in implementing mandatory green building standards. Newly-built civilian buildings in Shanghai must achieve at least a 1-star green building rating, while large public buildings with a single building area of more than 20,000 m<sup>2</sup>, and office buildings of state organisations, must achieve two stars and above. By the end of 2019, the total area of green buildings had reached nearly 190 million m<sup>2</sup> and 726 projects had received green marks.

At the same time, the city issued guiding principles and rating standards on promoting the “green and ecological construction of urban areas”, and a

document entitled “Evaluation Criteria of Green Ecological Urban Areas”. The latter was done with the view to actively promote moving from single green buildings to large-scale green developments.

At the time of writing, a total of 27 ecologically green urban areas have been created or designated in the city, with a total area of about 83 km<sup>2</sup>. Among them, the core area of Hongqiao Business District won China’s first “3-star certification for the operation of green, ecological urban areas”, the Taopu Smart City, the New Good City in Baoshan District and the New Bund in Pudong were the first batch to win the title of “Shanghai Green Ecological Pilot Urban Area”.



**PLOT 63A-03A, QINGPU NEW CITY**

A commercial housing project (Shanghai BaoyeAiduobang project), Plot 63A-03A in Qingpu New City, was designed for prefabricated construction, using BIM technology and other advanced construction concepts. This development leverages a number of green building technologies to ensure that the buildings have energy-saving and environmental protection features. The project has recently been given the Healthy Building Certification of China and the WELL Precertification of the United States of America.



**TOP:** A bird's eye view of Shanghai BaoyeAiduobang project.

**BOTTOM:** Shanghai BaoyeAiduobang project show flat.

Images courtesy of Baoye Group.

# DISTILLING INSIGHTS

**Building** up capabilities and trust between the government and the construction sector has helped raise the productivity and quality standards in housing construction. This has been achieved through measures such as BCA’s training programmes, that have trained young workers entering the construction industry and upgraded the skills of more experienced workers, while putting in place standards, testing and certification protocols.

In addition, schemes incentivising efficiency, workmanship, site management, and safety measures in the construction industry, along with quality assessment tools for construction workmanship such as CONQUAS were also introduced to raise industry standards.

**New** technological innovations and methods in housing construction have been trialed and piloted by the HDB over the years, to enhance the safety and quality of public housing construction. These include pioneering efforts in prefabrication technology that have also helped in the reduction of construction waste, noise and dust levels, and overall inconvenience to residents.

These innovations need to be supported by initiatives that promote their use. These include the Prefabrication Technology Centre that was set up to spearhead the development and use of prefabrication technologies, and the Integrated Construction and Prefabrication Hubs that are currently being built. Another supporting system to promote better design and quality control is the HDB’s Structural Engineering Computer-Aided Design that aids in structural analysis and designing of high-rise buildings.

## SINGAPORE

**Decentralising** certain public housing life cycle functions such as design and construction to the private sector have resulted in creative and groundbreaking developments. For instance, the private sector has been a key player in housing construction and design via the DBSS, as well as for ECs.

Working on public housing projects has benefitted the private sector companies in building up their experience, international recognition, and overseas business demand. In turn, having the private sector take on a larger role has allowed the HDB to ensure fiscal prudence and sustainability of the housing system, raise efficiency and focus more on planning and policymaking instead of direct provision.

**While** the HDB actively partners with the private sector—around 85% of HDB projects have been designed together with private consultants—it is also continually growing its own in-house technical expertise. One example of this is the Centre of Design Excellence under the HDB’s Building and Research Institute which allows the piloting and test-bedding of innovative designs and advanced building technologies and construction methods.

## SHANGHAI

**Shanghai** has taken various measures to strengthen the project implementation process while actively providing opportunities for the transformation and upgrading of upstream and downstream industrial enterprises. These are expounded in recent guiding-policy documents that promote the development of prefabricated buildings and in the “3-Year Action Plans for Green Buildings (2014-2016) of Shanghai”. In addition, the municipal government also organised the “Shanghai Green Building Development Joint Conference” to formulate and coordinate the development, planning, policy implementation and project construction of prefabricated buildings. Currently, Shanghai has established a working mechanism driven at the district government level for promoting prefabricated buildings at the municipal and district levels.

**Shanghai** adopts two basic principles towards housing construction. The first being the adoption of a management model that combines government supervision, industry self-regulation and leadership by the market, so as to create a conducive development environment that taps on and stimulates the enthusiasm and creativity of private enterprises.

The second is the transition from old construction methods to promote the use of prefabrication in the construction of public housing projects. Prefabrication is now required for all new residential, public and industrial buildings across the city where suitable.

**Shanghai** published a series of guiding policy documents to strengthen the collaboration between government and the market. These include having prefabricated building requirements incorporated into the land transfer contract, setting up management nodes within the construction management information system at the point of land transfer, information submission, map review, construction permit and acceptance stages so as to ensure that relevant technical requirements are implemented. Special financial support for the construction of energy-efficient, green and prefabricated building demonstration projects that meet the requirements of the “Energy-saving Projects Special Fund” are now available. In line with Shanghai’s prefabrication rating standards, buildings that are rated AA will receive subsidies of RMB 60 (S\$ 12) per m<sup>2</sup>, while AAA-rated buildings will receive subsidies of RMB 100 (S\$ 20) per m<sup>2</sup>.

**Shanghai** was designated as one of China’s pioneer “Demonstration Cities for Prefabricated Buildings” in 2017. As of 2019, 12 municipality-level and 6 national-level prefabricated building industry bases have been established in Shanghai. At the same time, 28 prefabricated building technology projects were selected to be part of the MOHURD’s “Science and Technology Project Initiative”.

In line with its push for prefabrication, Shanghai has collated a list of prefabrication innovations which includes 14 emerging technologies in the areas of construction, structure, interior industrialisation, integrated design, component manufacturing and construction innovation. Projects that leverage these technologies are commended and given material incentives.



## CHAPTER 4

*One example of a thematic playground and fitness corner found in Singapore's housing estates.*

*Image courtesy of the Housing and Development Board*



IN GOOD SHAPE:  
THE IMPORTANT  
ROLE OF ESTATE  
REJUVENATION  
AND MANAGEMENT

“The aim is to have no disparities between the new and the old estates, so we keep upgrading, improving.”

**Lee Kuan Yew,**

Singapore’s founding Prime Minister on the importance of estate upgrading.<sup>68</sup>

**BRIDGING THE QUALITY GAP WHILE RETAINING ATTRACTIVENESS AND VALUE**

**Following** through on the mission of providing quality homes and a good living environment for the people involves rejuvenating and upgrading the physical infrastructure and landscape over the built environment’s life cycle. In addition, necessary programmes, work functions and tools to ensure that these upgraded buildings and refreshed communal spaces and facilities continue to be well maintained and remain in good shape for years to come also need to be put in.

While building a large number of flats quickly was an urgent priority in the 1960s and 1970s, Singapore’s founding Prime Minister Lee Kuan Yew emphasised that the HDB’s role went beyond just housing communities, but also meeting the housing needs of Singaporeans as they became increasingly affluent. As such, the following decades saw increasing thought and effort being placed in developing newer flats with improved finishes and amenities, with greater variation in flat typologies and design,

better materials and workmanship. Additional design considerations were also made at the town level to enhance its visual identity and improve the overall living environment.<sup>69</sup>

This inevitably gave rise to a quality disparity between flats that were built at different stages of public housing development.<sup>70</sup> During this period, the HDB observed that younger families tended to move out of the more mature estates such as Queenstown and Toa Payoh for more modern flats in newer estates. The subsequent underutilisation of facilities such as schools and sports complexes, and gradual “greying” of towns have resulted in a loss of both economic and social vibrancy. In order to continue providing quality public housing en masse while narrowing the gap between mature and newer estates, the HDB turned its focus towards improving existing HDB flats and estates.<sup>71</sup>

Lee himself pushed for continuous upgrading and rejuvenation of older estates, making estate renewal a key component of public housing in Singapore. Upgrading programmes were hence institutionalised as one of

the strategies for estate rejuvenation<sup>72</sup> as early as 1989, to ensure that public housing in Singapore remains vibrant and well maintained.<sup>73</sup>

By introducing upgrading of the physical infrastructure, younger families could be enticed to remain in, or move to these estates in order to sustain the area’s economic vibrancy. In the process, the rejuvenation could also help in preserving community ties through long-time residents continuing to stay in the older estates and sinking their roots into the community.

Upgrading programmes also serve as a way to share Singapore’s economic growth with the majority of Singaporeans who reside in HDB estates as these programmes are funded by budget surpluses and receive heavy subsidies. The key national imperative of Singapore’s public housing development is that housing goes beyond putting a roof over people’s heads, but also providing them with a tangible stake in the country. As such, the appreciation of the flats’ value over time alongside Singapore’s economic growth and the investment in housing upgrading through budget surpluses exemplify this vision.

## ENHANCING THE COMPLETE LIVING ENVIRONMENT FOR OLDER FLATS AND PRECINCTS: THE MAIN UPGRADING PROGRAMME

The variations in the scale of the different upgrading and rejuvenation programmes undertaken by the HDB over the decades can best be understood by looking at the level of housing development at which the scope of improvement works are targeted at, namely at the flat, block, precinct, and even town level. Despite these varying levels, the overarching goals remain closely tied to the HDB's estate renewal strategy of bridging standards between older and newer estates while ensuring that housing estates remain functional and liveable even as they age.

The HDB's first upgrading programme, the Main Upgrading Programme (MUP), was unveiled in 1990. The MUP was an extensive programme that encompassed improvements both within older flats as well as the surrounding living environment. As such, it required a minimum of 75% of the affected flat owners to vote in favour of the MUP before works could proceed. Only blocks built before 1980 were eligible for the MUP. The programme offered a comprehensive suite of

**BOTTOM LEFT:** *Upgrading and renewal works by the HDB, while carried out at different scales, are aligned to the overall estate renewal strategy of raising the standards of older estates, and maintaining the estates' functionality and liveability.*

Infographic courtesy of Mr Yap Chin Beng.

**TOP RIGHT:** *After MUP, each flat comes with an additional study cum utility room and a drop-off porch for the block.*

Images courtesy of the Housing and Development Board.



improvements from within the flat, to block and precinct level works. Specific examples include toilet upgrading and introducing covered linkways between blocks, drop-off porches and replacing surface carparks with multi-storey carparks to free up space for greenery and recreational facilities. An optional Space Adding Item (SAI) in the form of a balcony, utility room or kitchen extension, was also popular, especially for residents living in smaller flats, as it contributed additional floor area.

The MUP was heavily subsidised by the government with Singaporean residents

paying a small share of the cost, ranging from 7% to 18% (or between 20% and 45% if residents also opted for the SAI), depending on their flat type, which ensures that no one will be deprived of upgrading. Residents who face difficulties in paying their share of the cost can defer payment or extend the payment period, depending on their financial situation.<sup>74</sup> With the completion of the final pre-1980 MUP project in Ang Mo Kio, the programme came to a successful close in April 2012, having benefitted 131,000 households at a cost of S\$3.3 billion to the government.



### INTENSIVE ESTATE REJUVENATION: SERS

Following the MUP, the Selective En-bloc Redevelopment Scheme (SERS) was introduced a few years later in 1995, as part of the government's Estate Renewal Strategy to comprehensively redevelop selected older flats in areas with redevelopment potential.

SERS can be viewed as a more intensive form of estate rejuvenation than upgrading programmes as it involves relocating existing residents and demolishing older flats to make way for new ones. SERS flat owners are offered a compensation package with rehousing benefits, with the option to move to a new home with a new 99-year lease at their designated replacement site. They may also jointly select new flats with their neighbours at the new site; this allows residents to retain community ties and kinship bonds built over the years.

The injection of new homes and facilities further rejuvenates old towns and estates by revitalising the demographic and economic profiles of residents when younger households move into these new flats.

### GIVING HDB BLOCKS A MUCH NEEDED LIFT: THE LIFT UPGRADING PROGRAMME

While the MUP focused on the oldest HDB estates, slightly newer estates were also in need of an uplift. Due to cost considerations and the need to build homes fast, HDB blocks built before 1990 did not have direct lift access for all units. These included high-rise blocks where the lifts stopped at common corridors every four or five storeys, and low-rise blocks without lifts. To get to their homes, residents of these blocks will have to either walk up from the ground floor, or walk up or down a maximum of two floors from the common corridors.

To better tailor upgrading programmes to meet changing residents' needs and provide greater convenience especially for elderly and disabled residents, and families with young children, the Lift Upgrading Programme (LUP) was introduced in 2001. Through the LUP, residents of HDB blocks that did not have full lift access would be selected for the programme, providing them with direct lift access from their HDB flats, wherever economically and technically possible. The complexity and cost of the upgrading and construction works required for some blocks proved more challenging than others. The decision to undergo the LUP would need to be voted on by all the eligible Singaporean citizen households without direct lift access landings in that block, with at least 75% support needed before upgrading works can commence. The majority of the LUP cost is borne by the government, with eligible households paying a small percentage of the costs, depending on their flat types, but capped at a maximum of S\$3,000.

**LEFT:** Through SERS, Blk 79 Toa Payoh Central (left) was redeveloped from a single 10-storey block to five towering 40-storey blocks, with a total of 1,158 units of 4- and 5-room flats.

Images courtesy of the Housing and Development Board.

**BOTTOM RIGHT:** Retrofitting and construction works to provide lift access on each floor of older blocks can be a complex undertaking. Here, a crane is hoisting a section of the lift shaft for installation (left); a block with the new lift shafts installed (right).

Images courtesy of the Housing and Development Board.



## IMPROVING AND RENEWING ACROSS THE HOUSING LIFE CYCLE: THE HIP AND NRP

In its continuous commitment towards looking after the physical conditions of its flats across their lifespan, the HDB introduced targeted programmes for the next batch of post-1980s flats in the form of the Home Improvement Programme (HIP) and the Neighbourhood Renewal Programme (NRP) that would cater to the varying needs of the residents and provide greater choice as to what aspects of their living environment they wish to have enhanced.

In 2007, the HIP was introduced, focusing on upgrading within the flat, together with the NRP which covered the block and precinct level.

### (i) Providing Flexible Options to Residents through the HIP

While the HIP's primary objective is to resolve common maintenance issues associated with ageing flats, it also provides useful improvements within the flat that are valued by residents. Flats built up to 1986 that have not undergone the MUP are eligible for the HIP which comprises three components—Essential, Optional and Enhancement for Active Seniors (EASE) improvements. The essential works are those that are deemed by the HDB as being urgent and necessary for public health, safety and technical reasons such as spalling concrete and structural cracks, with these works being made compulsory should 75% or more residents in a block vote in favour of HIP. For optional works such as toilet upgrading,

**BOTTOM LEFT:** Typical toilet upgrades under the HIP, before (left) and after (right).

Images courtesy of the Housing and Development Board.

**TOP RIGHT:** Other HIP improvements include replacing refuse chute hoppers, and pipe sockets with laundry racks.

Images courtesy of the Housing and Development Board.



and entrance door and grille gate replacements, owners have the flexibility to opt out, although their toilets would first have to pass a water test for leakage as a precaution against ceiling leaks. The EASE improvements, such as grab bars, slip-resistant treatment to floor tiles of toilets or bathrooms, as well as ramps to negotiate level differences in the flat and/or at the main entrance, are to enhance the safety and comfort of seniors living in HDB flats, to facilitate ageing-in-place. It is implemented via two approaches: together with the HIP as additional optional improvements, or through direct applications to the HDB.

By giving residents the option to decide on the improvements they want and those that they do not helps reduce material wastage on unnecessary works. On average, the construction period for

a precinct of 8 to 10 blocks would be around 1.5 to 2 years, while works within an individual flat would take about 10 days or less depending on the types of enhancements selected. The government fully funds the essential improvements and subsidises a major portion (between 87.5% and 95%) of the optional and EASE improvements for Singaporean citizen households.

In 2018, the HDB completed the selection of all HIP-eligible flats built up to 1986. At the National Day Rally speech on 19 August 2018, Prime Minister Lee Hsien Loong announced the extension of HIP to include blocks completed between 1987 and 1997, meaning about 230,000 more flats became eligible for the HIP. As of end 2019, HIP has been announced for 314,000 flats, with 183,000 having already undergone upgrading.



**(ii) Consolidating Requirements, Entrusting Responsibility: The NRP**

The NRP focuses on block and precinct-level improvements in common areas such as covered linkways, playgrounds and fitness corners carried out across two or more neighbouring precincts with full funding by the government. The approach of improving more than one precinct at a time is seen as being optimal both from a cost efficiency perspective as well as being able to reduce inconvenience to residents. While greater economies of scale can be gleaned by pooling work requirements together, disruptions to the residents of neighbouring blocks can also be reduced by having works done simultaneously rather than sequentially.

Town councils are entrusted with the responsibility to implement the improvement works in these common areas. Public consultation is greatly emphasised, with residents voicing their views and suggestions regarding proposed estate improvements through surveys, mini-exhibitions, dialogue sessions and town hall meetings. In terms of the selection process of NRP precincts, the onus also resides with the town councils to nominate the neighbourhoods they feel should be prioritised for NRP when submitting their funding application to the Ministry of National Development (MND) for approval. The number of NRP projects approved within each town council would be based on characteristics such as the age profile of the HDB flats. The town council would then be fully responsible for utilising the funds for their estates' NRP works, from the planning stage to completion.

**TOP LEFT:** For their block repainting under NRP, residents in Teck Whye Avenue opted for the unusual—a mosaic colour scheme inspired by Dutch abstract artist Piet Mondrian's works.

Image courtesy of Xavier Lur.

**RIGHT:** At Punggol Town Square and Waterway, residents can enjoy land and water-based sports and activities at their doorstep.

Images courtesy of the Housing and Development Board.

**REMAKING OUR HEARTLAND**

With a focus on the broader town level, the Remaking Our Heartland (ROH) programme was announced by Prime Minister Lee Hsien Loong at the 2007 National Day Rally. ROH was a new comprehensive blueprint to renew and further develop HDB towns and estates for greater sustainability and vibrancy, where opportunities arise. Dawson Estate (flats built before 1980s), Yishun (flats built in the 1980s) and Punggol (ongoing development since 1990s) were the first three areas to be selected to demonstrate how the ROH plans could bring about holistic developments to towns or estates of different ages.<sup>75</sup> To date, four series of ROH have been announced. ROH 1, which was announced in 2007, involved the towns of Dawson, Yishun and Punggol as noted earlier. This continued with ROH

2, announced in 2011, for the areas of East Coast, Hougang and Jurong Lake, while ROH 3 announced in 2015 focused on Toa Payoh, Woodlands and Pasir Ris. Most recently, Choa Chu Kang, Ang Mo Kio, Queenstown and Bukit Merah were announced in March 2020 to be the fourth series for ROH.

**(i) Waterfront Living at Punggol**

Punggol town was further developed under ROH 1 to realise the vision of a "Waterfront Town of the 21st Century"



while embracing Punggol's rich heritage as a coastal town. One of the key plans under Punggol ROH was to dam up Sungei Serangoon and Sungei Punggol, and introduce a 4.2-km-long man-made waterway through the town to connect these two freshwater reservoirs. This will open up opportunities for waterfront living and water-based activities.

Along the waterway, a 10-m-wide landscaped promenade running along both banks of the waterway also provides a great place for residents to enjoy recreational activities. The promenade connects the housing developments to various facilities, such as schools, town park and commercial nodes. The waterway corridor is now home to an estimated resident population of 40,000, with around 12,700 dwelling units completed, and another 3,100 dwelling units under construction. Since the waterway was completed in 2011, a variety of sports, including canoeing and kayaking, have been organised down the waterway.

One of the key nodes along the waterway is the Punggol Town Centre, which consists of a major retail mall—Waterway Point, a mixed commercial-residential development integrated with Punggol MRT/LRT station; the Punggol Town Square—a community gathering space located next to Waterway Point; and the Punggol Town Hub (to be completed by 2021) that will house various social and community uses. The Punggol Discovery Cube is located at the Punggol Town Square and is a visitor centre that offers a glimpse of the history and development of Punggol.

Another significant project in Punggol is its award-winning Oasis Terraces neighbourhood centre, designed by Serie Architects and Multiply Architects. Officially opened in 2019, this 7-storey 27,400 m<sup>2</sup> development represents the first of HDB's new-generation neighbourhood centres that was designed and created in consultation with the residents, offering a diverse array of unique amenities such as a 24-hour fitness centre, water park, sheltered community plaza for weekly activities, an Entrepreneur Cluster for online-to-offline businesses to set up their shops at lower rental rates, a rooftop community garden as part of National Parks Board's (NParks) Community In Bloom programme, learning spaces and shops and food outlets that open till late. Oasis Terraces is also the first neighbourhood centre to be integrated with a polyclinic and childcare centre, and equipped with smart, environmentally-sustainable features. In December 2019, it won the "Completed Building: Mixed Use Category" award at the World Architecture Festival.



*The award-winning Oasis Terraces is the first of HDB's new-generation neighbourhood centres.*

Image courtesy of the Housing and Development Board.

**(ii) Connecting the Community to the Heartbeat of Bedok**

Another example of the ROH programme is the Bedok Town Centre,<sup>76</sup> on the east coast of Singapore, which has been rejuvenated with a new town square,<sup>77</sup> a large-scale development in the form of Heartbeat@Bedok.<sup>78</sup> Since the inception of the rejuvenation plans in 2011, Bedok Town Centre has

been transformed into a vibrant hub with the completion of various new developments and facilities. Other than Heartbeat@Bedok, these include the Bedok Mall integrated with Bedok MRT station and bus interchange, Bedok Interchange Hawker Centre, Bedok Town Square with Heritage Corner and enhancements to the pedestrian mall.



Bedok Town Centre exemplifies the principles of Transit Oriented Development (TOD) given its location at the confluence of major pedestrian nodes with barrier-free access, sheltered linkways to the Mass Rapid Transit (MRT) station, bus interchange, hawker centre, town plaza and heritage corner, as well as nearby commercial malls and precinct shops. Beyond the town centre, residents can utilise the Outdoor Play Corridor (OPC), which consists of dedicated cycling and pedestrian paths connecting Bedok Town Centre to East Coast Park and Bedok Reservoir Park, on top of the enhanced cycling network that connects to main activity nodes such as the neighbourhood centres. This comprehensive, integrated approach to planning has extended the reach of the town centre, connecting residents from the surrounding neighbourhoods and precincts around Bedok in a more convenient and seamless manner.

Heartbeat@Bedok was designed by local leading architectural firm ONG&ONG<sup>79</sup> and it serves as a lifestyle hub for residents of all ages across different community segments. Kampong Chai Chee Community Club situated within Heartbeat@Bedok,

**LEFT:** *The Bedok Town Square serves as an all-weather venue for community events and provides a sheltered link between Bedok Mall and the hawker centre.*

Image courtesy of the Housing and Development Board.

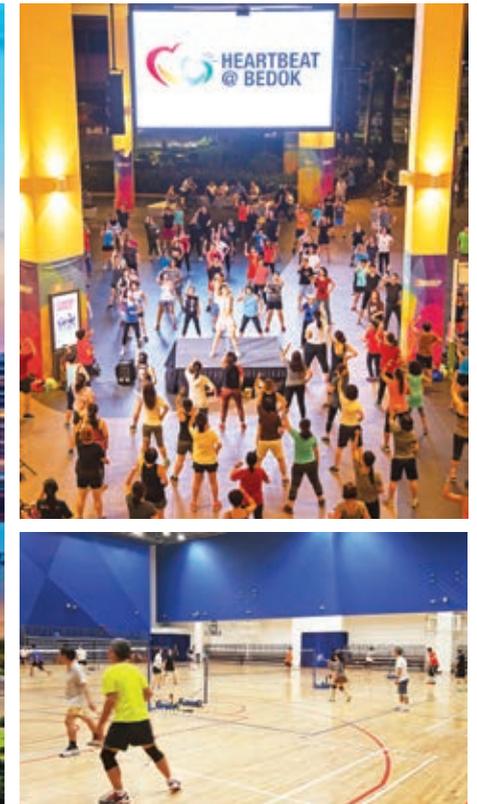
**RIGHT:** *ROH improvements at Bedok Town Centre have increased connectivity for residents to public transport and community facilities.*

Image courtesy of the Housing and Development Board.

engages residents through its myriad of courses and activities catered towards different resident profiles. The Community Club houses multiple agencies that manage different community facilities such as ActiveSG Bedok Sport Centre, Bedok Polyclinic, Senior Care Centre, and the Bedok Public Library, which were previously located across five different sites in Bedok. The approach of “Residents First” to help foster a sense of community is apparent when visitors walk into the new hub with its high-ceilinged, spacious atrium extending as natural thoroughfares across the ground floor. This hub acts as a community node, immediately distinct from the commercially driven shopping centres commonly seen across Singapore. Residents can gather freely to mingle

and attend community events such as free movie screenings and Zumba workouts, or simply to sit and relax. Shops and restaurants, which so often dominate prime ground level space in private developments because of the high commercial returns they generate, are situated at the periphery here.

The diverse array of services offered under one roof at Heartbeat@Bedok allows agencies to move beyond service provision for the residents, but also to collaborate and co-create integrated programmes. From a land efficiency perspective, such integrated developments also free up land space and provide new housing options for young families to inject a more youthful population into mature estates with traditionally older residents.



Bedok is also home to the mixed residential and commercial development of Bedok Mall integrated with bus interchange, MRT station and Bedok Residences, which is developed by CapitaLand. It also serves to demonstrate the principle of seamless connectivity and coexistence of residential, retail, and transportation hub, albeit done on a vertical scale. Bedok Residence's 8 blocks of 15-storey apartments sit atop the Bedok Mall and its over 200 shops, which is in turn connected to the Bedok MRT station in the basement and the Bedok bus interchange above the mall.<sup>80</sup>

**(iii) Toa Payoh: A Model Town Centre**

Toa Payoh Town was Singapore's second satellite town after Queenstown, but was the first town to be comprehensively planned and developed by the HDB as part of its second 5-year building programme. The town has played host to foreign dignitaries over the decades including the United Kingdom's Queen Elizabeth II in 1972 and again in 2006, and Chinese Premier Wen Jiabao in 2007. Although it welcomed

**TOP LEFT TO RIGHT:**  
*Residents are able to access community and sport facilities and participate in community events in Heartbeat@Bedok.*

Images courtesy of the People's Association and the Centre for Liveable Cities (bottom right).

**BOTTOM RIGHT:** *Bedok's integrated, mixed-use development that seamlessly connects residential, commercial and transportation.*

Image courtesy of CapitalLand.



its first occupants in 1966, its neighbourhoods, amenities, public spaces and commercial offerings have been continually refreshed under the various upgrading programmes to meet the evolving needs of the community over the years. It was also the first TOD project implemented in an existing mature town, with a new, fully air-conditioned bus interchange integrated with the Toa Payoh MRT station in 2002.

The HDB Hub at the town centre houses the headquarters of the HDB. Beyond the symbolic significance of having Singapore's housing authority headquartered amidst different generations of public housing blocks at the centre of one of Singapore's earliest towns, HDB Hub has injected renewed vibrancy into Toa Payoh with its over 17,000 m<sup>2</sup> of retail spaces and integrated public transport hub complementing and connecting the many long-standing shops, eateries and amenities such as the public library, sports hall and swimming complex in and around the town centre.

To sustain this vibrancy as the town matures, the ROH programme at Toa Payoh Town features town-wide rejuvenation efforts to provide enhanced public spaces for community bonding, improved connectivity and opportunities to rediscover Toa Payoh's rich heritage.<sup>81</sup> More sheltered walkways, cycling paths and supporting features such as bicycle crossings for residents and Silver Zones for the elderly will also be provided. These plans were drawn up with the residents of Toa Payoh at its heart, through a series of focus group discussions involving residents and community stakeholders across all age groups actively contributing their ideas on how to further improve their town.<sup>82</sup> The ROH programme at Toa Payoh Town is expected to be completed by 2027.<sup>83</sup>

**BOTTOM LEFT:** Proposed ROH improvements in Toa Payoh will provide more flexible open spaces for the community (left) and enliven the environment through upgraded green spaces and amenities (right).

Images courtesy of the Housing and Development Board.

**TOP RIGHT:** Low-rise SIT housing alongside present-day high-rise HDB blocks in Tiong Bahru.

Image courtesy of Kevin Cox.



### REJUVENATING THROUGH CONSERVING THE PAST: TIONG BAHRU

Renewal and rejuvenation does not always necessitate tearing down and rebuilding anew. It can also be achieved through retaining identities and structures of past eras that enhance the character of the neighbourhood. At the same time, these elements serve as visual reminders to newer generations of residents, giving them a historical glimpse into what their estate used to look and feel like.

A prime example is the low-rise 4- and 5-storey blocks of Tiong Bahru Estate which was developed in the pre-war period of the 1930s as Singapore's first public housing estate by the Singapore Improvement Trust (SIT). The flats there were designed based on contemporary European concepts of modern social housing. Its blocks were built on a typical shophouse model with added improvements, featuring rounded balconies, exterior spiral staircases, courtyards, and air-wells. SIT had also built 4-storey walk-up flats at Tiong Bahru Estate during the post-war period in the 1940s to 1950s.

In 2003, 20 blocks of pre-war SIT flats and 36 units of shophouses were granted conservation status by the Urban Redevelopment Authority (URA). This was done to preserve the unique identity of the estate along with the distinctive Art Deco architecture and design of its buildings. Today, the pre-war Tiong Bahru Estate has developed a new charm with the presence of unique and sophisticated bars, shops and cafes while maintaining its old charm and beauty of yesteryears. In addition, two vacated post-war SIT rental blocks (formerly known as Blocks 53 and 54 Tiong Bahru Road) were tendered out by Singapore Tourism Board (STB) for adaptive reuse, and the successful tenderer Chinese firm Hang Huo Enterprise converted the blocks into the Link Hotel.

To inject a greater live-in population into the estate, high-end private housing developments such as the 500-unit Highline Residences at Kim Pong Road by Keppel Land have added a new skyline to the old estate. Nonetheless, Tiong Bahru Estate continues to retain its old world charm and affordable offerings while staving off gentrification. Amenities such as the Tiong Bahru Market which has itself been transformed since it started operating in 1951 as a single-storey zinc-roofed wooden structure to its current Art Deco-inspired 2-storey building which houses the fresh market on the first and food centre on the second level, continues to be a thriving, familiar part of the Tiong Bahru landscape.

## COST SHARING TO CREATE A GREATER SENSE OF OWNERSHIP

A key principle of Singapore’s public sector fee-setting framework, the User Pay Principle, calls for costs to be fully recovered from the user and cross subsidies avoided. However, in light of the extensiveness of housing upgrading programmes, Singapore adopts a cost-sharing approach whereby the government fully funds the majority of essential and common space upgrading works while providing additional improvements at heavily subsidised rates. The cost sharing principle aims to achieve the dual outcome of creating a sense of ownership while encouraging residents to carefully weigh the need for upgrading of their homes and estates.<sup>84</sup>

In line with the fiscally-prudent approach to financing infrastructure development in Singapore, physical upgrading works are rolled out in alignment with the economic circumstances, with upgrading works funded by budget surpluses ramped up during years of good economic performance, and scaled down while not coming to a complete halt during economic downturns. The government’s commitment to continued upgrading despite a weak economy emphasises the priority placed on home ownership and enhancing the assets of Singaporeans.

**LEFT TO RIGHT:** Besides regular estate maintenance works such as block washing, homeowners are also encouraged to take charge of maintenance and renovations within their homes through engaging approved contractors for repairs such as spalling concrete.

Images courtesy of the Housing and Development Board.



Owing to the cost-sharing structure between the HDB and residents for some of the MUP items, residents would need to first vote as to whether they are in favour of upgrading, with the works proceeding only if at least 75% of the eligible voters are in agreement.

## IMPROVING LIVES THROUGH GOOD ESTATE MANAGEMENT AND MAINTENANCE

While upgrading programmes are designed to bring the physical conditions of older estates up to par with those of newer estates,<sup>85</sup> good estate management and regular maintenance are critical to ensure that residents’ living spaces and surroundings are kept clean, healthy and liveable on a daily basis, and that life around the estate continues to operate

smoothly. “Estate management” broadly refers to the daily and cyclical maintenance of public housing estates, starting from within the housing units to the broader living environment. From the early days of the HDB, policymakers saw the importance of good estate management in public housing with the majority of residents having been resettled from villages and squatter settlements, and needing to transition to high-rise, high-density blocks and adjust to the norms of urban living. The HDB also recognised that house-proud residents would likely take greater ownership in ensuring the upkeep of their homes.<sup>86</sup> Up till today, homeowners are still encouraged to take charge of their flats’ regular maintenance to be able to quickly detect and address problems within the flat before they worsen.<sup>87</sup>



### IT TAKES A COMMUNITY: RENEWING TAMPINES NORTH

In 2017, Tampines Town Council Chairman and Member of Parliament for Tampines Group Representation Constituency (GRC), Mr Baey Yam Keng, sought to encourage his residents to share their feedback more proactively with regard to improvements that they would like to see made to their living environment at Tampines North Division as part of the NRP. Over a period of three months, through participatory design approaches, the town council brought together some 4,000 residents and stakeholders to plan and design their living environment.

Tampines Town Council, together with the Centre for Liveable Cities and non-profit design, planning and educational organisation Participate in Design (PID), conducted a series of participatory design activities including expert interviews, walking conversations, stakeholder workshops, pop-up design clinics, community feedback workshops, and idea-board engagements to gather insights that reflected the needs and aspirations of the residents who will be the end-users of the new facilities. Residents also engaged the town council through creative means to generate greater publicity such as capturing residents' stories and hopes for their town onto video and shared across social media platforms to create awareness for the NRP and to highlight not just to Tampines' residents but residents from other estates as well the integral role that they can play in improving their towns. Residents' response to this particular collaborative engagement with the town council was largely positive as they could develop a better appreciation of the challenges and complexities behind neighbourhood renewal.

**LEFT AND RIGHT:** Through pop-up booths and walking conversations, Tampines residents were able to actively share their aspirations for their neighbourhood.

Images courtesy of the Centre for Liveable Cities.

## ADOPTING A SMARTER APPROACH TO ESTATE MANAGEMENT

Traditionally a very labour-intensive endeavour, the work of maintaining the cleanliness and upkeep of housing estates has since been made more efficient through leveraging on advances in automation and smart technologies made by both the public and private sector.

### (i) Smart Technology for More Energy-Efficient, Safer Estates

Smart technologies are being deployed around the HDB estates to achieve greater energy savings while also enhancing the safety and well-being of residents. These include the use of efficient Smart LED lighting with motion sensors at common areas that will brighten when it detects human traffic, as well as the use of analytics to optimise lighting level. Singapore's homegrown urban, infrastructure and management services consulting firm, Surbana Jurong, has leveraged the HDB's existing lift Tele-Monitoring System (TMS) to help town councils track lift performance in real time and manage lift maintenance contractors. On top of the TMS, the HDB is also planning to install additional lift sensors to monitor key lift parameters such as the vibration of the lift car. These parameters would be further analysed to enable a shift from a preventive maintenance regime to a predictive one.

The ubiquity and convenience offered by mobile applications are being leveraged on to address municipal issues around the housing estate through the OneService application developed by the Municipal Services Office, a division under the MND that works with other government agencies, town councils and community partners, to improve customer service and feedback responses to all types of municipal issues reported by residents. Through the application, registered users are not only able to report cases, but can also track the status update of the cases they have filed, be kept up-to-date on municipal activities around their estate, such as block and bin chute washing schedules or maintenance works being carried out, as well as community-based activities such as the HDB block welcome parties or NParks guided nature walks. In the process, smart applications such as OneService have helped to digitally integrate the work flows, responsibilities and responses of the various agencies that form part of the estate management urban system.

**(ii) Eyes in the Sky: Drones for Building Inspection**

Buildings taller than 13 m and older than 20 years will be required to be inspected every seven years, with the implementation of legislation for Periodic Façade Inspection in 2021. In order to improve the building facade inspection process, the HDB has trialled the use of drones and visual analytics technology as a form of “smart building inspection”.<sup>88</sup> This research collaboration between the HDB and HUS Unmanned Systems, a subsidiary of Singapore-based energy storage and robotics company H3 Dynamics, allows for the processing of thousands of façade photos through an artificial intelligence (AI) system using cloud technology. Defects identified would be categorised and tagged to a visual drawing of the building and a report on the severity of the defects would be generated along with possible remedial actions. Leveraging such drone and visual analytic capabilities not only enhances inspection accuracy, but also enables the HDB to monitor previously inaccessible locations, while at the same time reducing the manpower and safety risks associated with carrying out such inspections manually using gondolas. In the event that residents’ images are inadvertently captured during

**BOTTOM LEFT:** Residents are able to report municipal issues and track the status of their cases through the OneService mobile application.

Image courtesy of the Centre for Liveable Cities.

**BOTTOM RIGHT:** Drone inspection of HDB blocks in Jurong East as part of a one-week pilot conducted by drone operators from Performance Rotors, a drone solutions company contracted by HUS, in 2018.

Images courtesy of Performance Rotors.



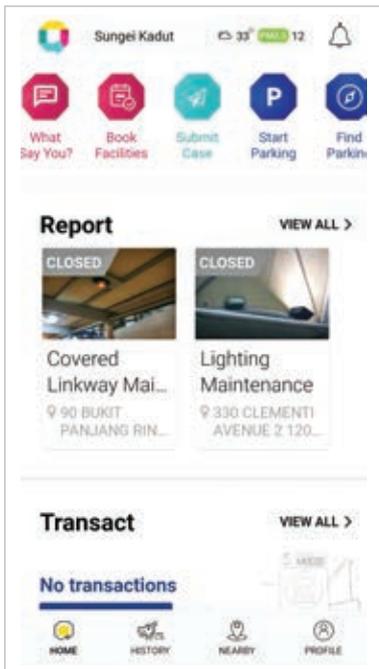
the scanning process, HUS uses masking technology before the data is sent for analysis, thus maintaining the privacy of the residents.<sup>89</sup>

The flow of trash from home to bin centre via the PWCS.

Infographic courtesy of the Housing and Development Board.

**(iii) Pneumatic Waste Conveyance System (PWCS)**

In the past, waste disposal in HDB blocks were manually collected from rubbish chutes and transported to a central bin centre. This labour-intensive and conventional way of Individual Refuse Collection System is being replaced by an automated PWCS.<sup>90</sup> First piloted in Yuhua Place in 2015, the PWCS is equipped with sensors that will transport waste from the HDB blocks to a centralised bin centre through underground pipes using air pressure moving at speeds of 50 to 70 km/h. The waste is then sealed in containers and transported by trucks to the incineration plants. Beyond its manpower savings, the system also creates a more hygienic living environment because it reduces pest infestation.<sup>91</sup> Beginning with the construction of Tampines Greenridges in 2015, the PWCS is now widely implemented for new public housing projects in many towns. It will also be rolled out in Tengah, Singapore’s first smart and sustainable town, which will be home to around 42,000 new housing units across five residential districts.<sup>92</sup>



## RENEWAL AND MODIFICATION OF SHANGHAI'S OLD HOUSES AND BUILDING SAFETY MANAGEMENT

An urban renewal system based on “management and repair of preserved and protected buildings, repair and reconstruction of old houses, and renovation of old districts” has been initially formed, abiding by the following principles:

1. Guide by planning, integrate conservation and improvement work
2. Respect the will of the residents, encourage co-governance and sharing
3. Integrate “measures to suit local conditions”, have “policy differentiation” and “highlight key issues”

“Manage and restore conserved buildings” refers to the establishment of a mechanism to conserve and manage buildings of historical or cultural value. For the *longtang*s (lane) identified for conservation in the masterplan, the programmes must ensure that they are “safe, functional and authentic” while carrying out improvement work. “Renew or modify old houses” refers to expediting three separate renewal programmes that targeting not only the modification of old residences, but also includes comprehensive remediation of estates with multi-storey or high-rise buildings.<sup>93</sup> “Renewal of old districts” refers

to the redevelopment of estates with poor structures, inadequate facilities, weak municipal public infrastructure, and dilapidated houses, in accordance with Shanghai’s urban and rural planning guidelines.

## EXPANDING OLD BUILDING RENEWAL PROGRAMME

### (i) Home Improvement in the 1980s

The “Shanghai Master Plan Framework” issued in June 1982 states that “some of the old *longtang*s should gradually undergo renewal in order to install sanitary and kitchen facilities, and improve conditions for outdoor activities”. Between 1982 and 1984, Shanghai has improved the living conditions for 14,600 households who were facing housing difficulties through measures such as room enlargement, roof raising, attic building and gas stove construction, combined with housing repair and renewal.

### (ii) Modification in the 1990s

Building upon the experience of modifying more than 150 *longtang*s across Shanghai, the city embarked to renovate more *longtang*s which have been designated to be conserved during the urban planning phase. These would be old houses that are still of fairly good quality, but lack sufficient modern facilities to be considered complete houses. Under the pre-condition of conserving the landscape of the *longtang* neighbourhood and the unique characteristic of these buildings, Shanghai adjusted the spatial layout to install kitchen and sanitary facilities. The new facilities provide better segregation between kitchen and toilet facilities, improving sanitation to bring modern living standards to the *longtang*s. Since its pilot, Shanghai has been setting and enhancing the standards for modifications and by 2019, completed more than 4 million m<sup>2</sup> of modifications.

LEFT AND RIGHT: Jing'an district Pengsan residential estate, completed through on-site demolition and rebuild method.

Images courtesy of Shanghai Real Estate Science Research Institute.





**(iii) “Flat to Slope” Reroofing and Other Remediation since the Early 2000s**

Shanghai implemented the policies on reroofing as a modification measure to remediate issues that many multi-storied houses built between 1970s and 1990s were facing. These issues included leaking ceilings, cracking walls, poor insulation and insufficient public amenities in the estate. Modifying the roofs of these houses from flat to slope helps to prevent leakage and improve insulation. At the same time, remediation was carried out to correct issues such as illegal modifications, and repainting of façades which help to improve the neighbourhood’s appearance, facilitating more harmonious blending with the

surrounding environment. Between 1999 and 2004, Shanghai’s reroofing programme provided remediation for 14 million m<sup>2</sup> of residential space, and reformed the water supply system by removing 2,729 rooftop water tanks.

In 2003, Shanghai merged the reroofing programme with other housing modification programmes and through these comprehensive remediations, enhanced the safety and functional aspects of the houses. Works were carried out to ensure the safety of structures, prevent leaking walls, ensure smooth flow in the pipes, the integrity of electrical wirings, and the quality of pavements. At the same time, the neighbourhood environment



was improved by increasing the greenery, installing public amenities and improving estate management standards. Between 2003 and 2007, Shanghai provided remediation for more than 50 million m<sup>2</sup> within old estates.

**(iv) Remediation in 2008 for Shanghai Expo**

In October 2008, Shanghai initiated a 600-day environmental improvement and management programme, in order to prepare for the Shanghai Expo that was to be held in 2010. This programme focused on the remediation and renovation of units in old high-rises and multi-storied houses. Façades of buildings in important areas were upgraded, and a total area of 160 million m<sup>2</sup> (of which, 120 million m<sup>2</sup> were in residential buildings) were remediated, benefitting almost 2 million households, or 5 million people. Work was also carried out on 2 conservation districts, 6 historical roads and 24 historical buildings to ensure these conservation projects’ historic authenticity were restored and remain functional.

**LEFT AND RIGHT:**  
*Tangjiasha Estate pre- and post-“Flat to Slope” reroofing programme.*

Images courtesy of Shanghai Municipal Housing Administration Bureau.

**(v) “Twelfth 5-Year-Plan”: Incorporating the “Three Approaches to Old-Residence Modification” as part of the Affordable Housing Programme**

The “Measures on the Repair Management of Shanghai Residences” was issued in 2011 to raise the standards of modification and enhance the management of repair works on residences. In 2013, Shanghai incorporated the three approaches to renewing or modifying old residences as part of their affordable housing programme. The three different approaches were: complete home renovation; modification of kitchen and sanitary facilities; and reroofing and modification of other amenities. During the “Twelfth 5-Year Plan”, these modifications were made to more than 11 million m<sup>2</sup> of area, benefitting more than 200,000 residential households.

*Buildings around Expo Park after remediation.*  
 Image courtesy of Shanghai Municipal Housing Administration Bureau.



**(vi) “Thirteenth 5-Year Plan”: Entering a New Stage of Housing Renewal of “Preservation, Renovation and Removal”**

During the “Thirteenth 5-Year Plan”, Shanghai continued to renew the old estates. In 2017, the guiding concept of the programme changed from “removal, renovation and preservation” (in that order) to “a concurrent policy of preservation, renovation and removal, but mainly preservation”. This will concurrently preserve Shanghai’s historic landscape and cultural heritage while providing quality upgrades to its functionality.

Shanghai utilised multiple means to improve its residents’ living conditions. It focused its efforts on rectifying housing types with poor facilities, insufficient amenities or potential safety issues—those in pressing need of improvement. The renovation of old estates made great headway thanks to the “Beautiful Homeland” 3-Year Action Plans, the remediation campaign in preparation for the China International Import Expo, and efforts to do away with chamber pots and safety hazards in old residences.<sup>94</sup> As of end 2019, more than 31.5 million m<sup>2</sup> of area had undergone three types of modification for old residence modifications, benefitting more than 630,000 households.

**ENSURING BUILDING SAFETY**

In order to ensure the safety of the houses and community, Shanghai started projects to address potential housing safety issues through upgrading safety facilities within the community, implementing safety evaluation, upgrading and renewal of lifts, surveying and repairing façades’ heat insulation, and rectifying the potential of objects dropping from high-rise buildings within the estate.

Safety checks on old houses are performed regularly in Shanghai. In the first half of 2014, safety checks were performed on 173 million m<sup>2</sup> of old houses. In June 2015, checks were conducted on all the houses in the city. In February and October 2016, two more checks were conducted on the old houses. By the end of December 2019, Shanghai had already started collecting relevant data from the housing estates in order to establish a safety information



system that will be used to monitor building safety during the whole life cycle. This data will enable the city to improve its response to maintenance issues and upkeep requirements.

In addition, Shanghai is also committed to improving the relevant legislations of building safety management to clarify the principal responsibilities of homeowners with regards to safety, establishing an accountability system, providing clear supervision guidelines and improving management measures. These guidelines clarify the jurisdiction of the various levels of government while facilitating inter-agency collaborations, encouraging homeowners to be more proactive and incentivising the estate managers to be more diligent. They also regulate works such as safety checks, surveys, planned maintenance, resolve potential safety issues and provide checks and balances to law enforcement.

## REMOVING BUILDINGS BEYOND REPAIR

Buildings beyond repair that were built between the 1950s and 1970s, that lacked amenities, and had potential safety issues were not designated for conservation. They were deemed to have little restoration value and were difficult to modify to meet modern standards. As a result, they were demolished and replaced with reconstructed structures.

**LEFT AND RIGHT:** *Public housing estate during and after lift installation.*

Images courtesy of Shanghai Real Estate Science Research Institute.

Since 2001, Shanghai had implemented a reconstruction project in the centre of the city, targeting old neighbourhoods of grade two and below. During the “Tenth 5-Year Plan” (2001-2005), Shanghai took the opportunity to redevelop old districts while constructing pavilions and facilities for the World Expo. As many of the houses to be demolished were small and overcrowded, and the compensation that residents received for these units was often insufficient for the purchase of new units, Shanghai explored the idea of utilising rental houses as a form of resettlement accommodation.

During the “Eleventh 5-Year Plan” (2006-2010), Shanghai sustained redevelopment in its old districts by tapping on land reserves. It also implemented two rounds of consultations, during which the first round of consultation with the residents was to agree on resettling, while the second round discussed the compensation and resettlement

package. Resettlement would only begin after these consultations had been completed. The consultations motivated the residents to participate in making decisions and taking charge of their community.

During the “Twelfth 5-Year Plan” (2011-2015), while development efforts remained focused on old neighbourhoods that were grade two and below in the city centre, Shanghai also started to reconstruct old towns in the suburban areas, pushing for renewal of old and dangerous state-owned farms. In 2013, Shanghai piloted the upgrading of “urban villages”. Between 2001 and 2017, 15.2 million m<sup>2</sup> of grade two neighbourhoods<sup>95</sup> were redeveloped.

In 2017, Shanghai entered a new phase of the “concurrent policy of preservation, renovation and removal, but mainly preservation”. This enhanced the city’s concept of urban renewal and heritage conservation, promoting greater effort in modifying old buildings and restoring the *longtang* houses.

## MULTIPLE STRATEGIES TO EFFECTIVELY IMPLEMENT BUILDING RENEWAL

### (i) Improving Management System

Shanghai has been continuously improving the governance frameworks of old housing retrofitting, while strengthening supervisory bodies on retrofitting works. It established the “1+1+1” maintenance management system, in which 1+1+1 refers to the Shanghai Municipal Housing Administration Bureau, together with the Shanghai Municipal Quality Affairs Center for Residential Renovation

Projects and Shanghai Municipal Quality Inspection Center for Residential Renovation Projects. The first “1” acts as the administrator, the second “1” provides regulatory supervision while the third “1” provides technical support. Shanghai has also continuously improved the technical standards for the maintenance and renovation of old houses while formulating policies to support construction management processes, technical specifications, contracting and outsourcing management, construction site management, and public engagement.

**(ii) Expanding the Scope of Reconstruction**

Shanghai is constantly setting, improving and revising standards relating to old estates. In 2014, it issued the “Technical Guidelines On Complete Set Renovation, Kitchen And Sanitary Renovation and Façade Structure Renovation” where it listed seven areas for upgrades, namely, roofing, façade, load-bearing components, public spaces, amenities and estate facilities as items of renewal, along with 50 other maintenance items and more than 100 sub-items. In 2017, Shanghai issued the “Shanghai *longtang* Restoration And Modification Technical Guide” targeting issues that were specific to *longtang*s. It listed the items within a *longtang* that were to be upgraded, while providing relevant technical specifications in order to enshrine the principles of being “safe, functional and authentic” in the course of upgrading the living environment in *longtang*s.

**(iii) Planning and Land Policy Support**

For projects involving the redevelopment of the historical

landscape, Shanghai allows the development rights of these protected historical features to be transferred, and the prescribed purpose of the associated land adjusted to facilitate redevelopment and optimisation of their usage. Developers who take up such projects can look forward to incentives such as bigger gross floor area. Under the conservation and renewal model, eligible land parcels and the conserved buildings can be transferred to developers through various methods such as public bidding, auction, listing with schemes, targeted listing, and compensation for stock land price.

**(iv) Financial and Taxation Support**

Shanghai has set up dedicated funds at both municipal and district levels for conservation and urban renewal projects. For key redevelopment projects, both the municipal and district governments collaborate on land and financial resources. If land in the redevelopment district is transferred for commercial use, the proceeds are to be divided between the municipal and district governments in accordance to the proportion of funds they had respectively invested, and part of the funds can be redirected into the redevelopment project. In addition, redevelopment and resettlement housing projects will enjoy some tax rebates and exemptions.

**(v) Promoting Community Participation**

Shanghai is committed to engaging the community in its effort to provide comprehensive renewal to old estates. Renewal projects are subject to checks and balances by the professionals, residents and general public through mechanisms such as the “Three-Meetings System”,<sup>96</sup> “Ten-Openness System”,<sup>97</sup> and “Citizen Supervision System”.

**THE POSITIVE IMPACT OF BUILDING RENEWAL AND SAFETY MANAGEMENT**

Building renewal and safety management are important to stabilise growth, improve people’s livelihoods and boost domestic demand. Firstly, by adopting the concept of urban development and heritage conservation, Shanghai’s historical landscapes and buildings are enhanced, protecting its cultural heritage. Secondly, improving the functionality of the buildings by removing potential housing safety hazards significantly improves residents’ living conditions and enhances the

urban landscape. In 1990, only 30% of Shanghai residents lived in houses with complete facilities. In 2000, this had increased to 74% and by 2017, reached 97.3%.<sup>98</sup> This helps to build a strong foundation for comprehensive community governance and estate management. By promoting community participation through the renewal programme, it encourages residents to take part in estate management, which increases co-governance and promotes a sense of ownership. Lastly, this also helps to develop the construction industry, increase domestic demand and promote investment into the development of related industries.

**COMPREHENSIVE REDEVELOPMENT OF OLD DISTRICTS IN BEIZHAN NEW TOWN, JING’AN DISTRICT**

This project redeveloped the last neighborhood that was grade two and below in the Suhe Bay area, where various houses and lanes have a rich history and cultural heritage value. As the pilot project for large-scale conservation in Shanghai, the municipal and district governments co-invested in land and provided financial resources at a ratio of 6:4.

There were houses in the area that did not meet the requirements for complete redevelopment. Some of the buildings are located in conservation district and lanes; two buildings in particular are considered cultural relics. Hence, there was a strict no-demolition policy for the project and after the buildings were acquired, their inhabitants were resettled.

In September 2017, Jing’an District carried out a round of consultation with residents on the land requisition and received a high approval rate of 99.07%. In December 2017, the district government officially launched the second round of consultation, along with contract signing procedures with residents in Beizhan New Town. The proceedings went smoothly, with 99.58% of the residents signing the contract.

This project was carried out under a mode-of-transfer scheme whereby the conserved buildings and associated land titles were jointly transferred to the developer. The district government then ensured that the developer had to fulfil its obligations both in terms of development and conservation.

### COMPREHENSIVE RECONSTRUCTION PROJECT OF OLD HOUSES IN CHUN YANG LI

Built between 1921 and 1936, the original houses in Chun Yang Li were zoned within the historic protection area of Hongkou District. In 2016, it was designated as a conservation neighbourhood with a total of 1,181 households and a total area of 22,472 m<sup>2</sup>. Most of the buildings in the neighbourhood were 2-storied houses, with some being 3-storied with an attic. Over the years, the original appearance of the buildings had been damaged. While the overall preservation of the buildings' external façades was still in good condition, the decorative surface of the external wall, the structure, and the internal pipelines were generally ageing. There was also a lack of kitchen and sanitary facilities. Some illegally constructed sections were deemed potential safety hazards. There was urgent need to restore the outer appearance, but some of the outer walls had also suffered wear and tear. As such, it had been designated as a priority conservation and modification project.

To carry out the overall internal renovation of the Chun Yang Li style conservation area, it was necessary to retain the historical architecture style outside the building while solving the safety problems inside the building. Firstly, the building would be modified so that each household had its own kitchen and bathroom. The staircase and original public space had to be fully utilised in order to install these additional modern facilities. Secondly, comprehensive internal modifications were made to address potential safety hazards. For example, the original brick structures were replaced with steel and concrete to improve the safety of the structure, boost its fireproof ability, and heat insulation. Thirdly, its historical appearance should be conserved, so measures had to be taken to protect and restore the external façade, to preserve its original look while the internal structure was being modified. Fourthly, new technology and new materials were used in building the attached kitchen and bathroom to increase the comfort level for the residents.

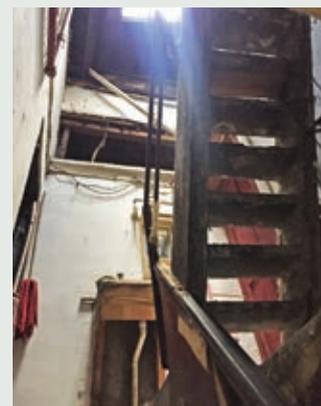
The Chun Yang Li comprehensive reconstruction project was implemented sequentially and separately for each residential building after consultation and agreement with the residents. The four-phased renovation projects had distinctive focus areas.

- (a) Phase One focused on the pressing issue of modifying the interior in order to provide each house with a private kitchen and bathroom.
- (b) Phase Two allowed residents to put their assets in the hands of a professional agency to run and rent out these old houses after modifications. This provided residents with a stable rental income while the agency could also profit, resulting in a win-win situation. For example, street-facing units that were about 15 m<sup>2</sup> would fetch a monthly rent of RMB 1,200–1,500 (S\$ 240 to 300) prior to the modifications. After modification, the rental returns for the original residents increased to about RMB 4,000 (S\$ 800) per month. The agency could subsequently rent it out for about RMB 4,500–4,800 (S\$ 900 to 960) per month. At present, the agency has a housing stock of 37 units and has rented out 27 of them.
- (c) Phase Three pushed for integrated management reform of Chun Yang Li. Previously, state-owned houses were managed by relevant government departments for different aspects. The reform brought in professional estate management companies. This is an effort to establish a new management model that can “ensure cleanliness, safety, maintenance and integrated management”, and ensuring there is a single management unit providing long-term professional service to even the most disadvantaged household. This enabled the government to move away from the old practice to establish a more dynamic system where the government supervises, the private enterprise Hongfang (Group) Co., Ltd. implements, and the public actively participates.
- (d) Phase Four addressed the overcrowding issue by resettling some households through balloting, and the construction of additional levels where possible to provide more space and introduce variety to the housing typology.

Before renovation



After renovation



TOP TO BOTTOM: Comprehensive reconstruction project of old houses in Chun Yang Li, exterior, kitchen and staircase.

Images courtesy of Shanghai Construction No. 4 (Group) Co., Ltd.

# DISTILLING INSIGHTS

## SINGAPORE

**Introducing** upgrading and rejuvenation works at different scales from the flat, block, precinct to town-level and time junctures through programmes such as the MUP, NRP and HIP, has helped keep the physical infrastructure within homes and around the housing estate in good shape across its life cycle.

In addition, rejuvenating older estates helps sustain economic vibrancy and community bonds by enticing younger families to live in or move into these estates, and preserve community bonds among long-time residents who may also choose to remain in the estates.

**Sharing** upgrading costs with residents can create a greater sense of ownership over the improvement works being done and a desire to maintain the physical well-being of their estate. Yet, these are kept at nominal amounts so that all residents will have the opportunity to upgrade their homes, with Singapore citizen (SC) residents paying between 7% to 18% of the basic upgrading costs

under the MUP, depending on flat type. For the HIP, SC residents pay between 5% to 12.5% of the optional and EASE improvements, while essential improvement works are fully funded by the government.

Options to defer payment or extend payment period are also offered by the HDB to residents who face financial difficulties in paying their share of the cost.

**While** town-wide rejuvenation programmes such as ROH have brought a variety of unique activity nodes and award-winning community spaces to new towns like Punggol, ROH also offers the opportunity to bring about greater integrated planning and connectivity between existing and newly built amenities within older towns like Toa Payoh and Bedok.

Enhanced cycling paths and networks, sheltered pedestrian linkages, and barrier-free access help in connecting residential blocks to key activity nodes such as neighbourhood and town centres, hawker centres and commercial malls, and to transport nodes such as bus terminals and MRT stations as part of TOD projects.

## SHANGHAI

**To** further improve residents' housing conditions, Shanghai has implemented a reconstruction and improvement programme for old housing that can be applied in three ways, "complete set renovation" (成套改造), "kitchen and sanitary renovation" (厨卫等综合改造) and "facade structure renovation" (屋面及相关设施改造). The comprehensive renewal of old houses and estates has helped in conserving Shanghai's historical landscape and buildings. The functionality of these old buildings have been greatly improved while concurrently developing the local construction industry.

**To** support the rejuvenation of old districts and houses, Shanghai has set aside dedicated funds for municipal- and district-level conservation and urban renewal projects. Aside from subsidies, various tax reduction and exemption schemes have also been put into effect. This broad-ranging financial and taxation policy has facilitated in the renewal of old houses and brought about economic benefits. For example, after the second phase of the Chun Yang Li comprehensive reconstruction project, the properties operated by professional agencies and were able to generate higher rental incomes.

**For** comprehensive reconstruction projects, Shanghai carries out extensive community engagement programmes with residents prior to project initiation, during project implementation, and also after project completion. Information relating to the reconstruction project is made available to residents under the "Ten-Openness System", empowering their direct participation in the project. Shanghai has also put in place a "Three-In-One" supervision mechanism for urban renewal projects involving residents and experts. These measures foster a strong sense of co-governance and co-ownership among the residents.

Support from the residents has been resounding. A reconstruction project in Beizhan New Town saw a high approval rating of 99.07%, with 99.58% of residents signing the contract.



## CHAPTER 5

*Visitors to Bishan-Ang Mo Kio Park interacting with water and nature.*

Image courtesy of the National Parks Board



# STRENGTHENING COMMUNITIES AND MEETING ASPIRATIONS

SERS - MACPHERSON				MAY 2019 BUILD-TO-ORDER				Selection of Flat	
GEYLANG 4 ROOM				TANGAH 5 ROOM				NOV SERVING	ROOM / COUNTER
BLK 758L CIRCUIT RD				BLK 231A TENGGAH DR				JC021	105
Ethnic Available: M=47 C=153 IO=25				Ethnic Available: M=5 C=0 IO=3				MQ004	210
14-166	07-166	18-166	11-174	09-499	10-501	08-503	09-517	V2117	113
15-166	08-166	19-166	12-174	10-499	11-501	09-503	10-517	V2115	117
16-166	09-166	02-174	13-174	11-499	12-501	10-503	11-517	HA350	111
17-166	10-166	03-174	14-174	12-499	13-501	11-503	08-519	MQ001	108
18-166	11-166	04-174	15-174	13-499	14-501	12-503	07-519	MQ002	101
19-166	12-166	05-174	16-174	14-499	02-503	13-503	08-519	V2111	211
02-166	13-166	06-174	17-174	05-501	03-503	14-503	09-519	V2108	213
03-166	14-166	07-174	18-174	06-501	04-503	05-517	10-519	JC020	200
04-166	15-166	08-174	19-174	07-501	05-503	06-517	11-519	Missed Queue Numbers	
05-166	16-166	09-174		08-501	06-503	07-517		V2100	V2074
06-166	17-166	10-174		09-501	07-503	08-517		V2048	V2043
BLK 76A CIRCUIT RD				BLK 231B TENGGAH DR					
Ethnic Available: M=15 C=43 IO=8				Ethnic Available: M=1 C=1 IO=3					
02-106	04-106	06-106	08-106	06-533	08-533	10-533	12-533		
03-106	05-106	07-106	09-106	07-533	09-533	11-533	13-533		

## BUILDING COMMUNITIES THROUGH PUBLIC HOUSING

While public housing in Singapore was first developed with a utilitarian purpose in mind, that of providing residents and their families with a shelter over their heads, it continues to play a vital role in building more cohesive, inclusive communities. With over 8 in 10 Singapore residents living in public housing, all hailing from different ethnic and age groups, with different religious and cultural beliefs and diverse financial means, yet united by a common thread of calling Housing and Development Board (HDB) estates their home, this presents both challenges and opportunities for building bonds of trust and mutual understanding across the different communities. The HDB has continually striven to do so over the decades by applying combinations of policy levers, planning, and design principles, while also working together with and empowering the community.

Information on the number of flats available for booking by different ethnic groups is on display at the HDB Hub.

Image courtesy of the Housing and Development Board.

## POLICY AND DESIGN INTERVENTIONS FOR A MORE INCLUSIVE COMMUNITY

### (i) Bringing Together Residents From Diverse Socio-economic Backgrounds

HDB neighbourhoods are intentionally planned and laid out to bring together residents of different social groups into a shared physical space to encourage greater interaction. Different flat types, 3-room, 4-room and 5-room units for instance, are interspersed across the same block. Blocks of rental and purchased flats are built in the same neighbourhood, giving residents equal access to common areas and neighbourhood facilities regardless of flat type and income levels. Since 2014, the HDB has also trialled having “integrated blocks” that comprise both rental and purchased flats within the same block. These pilot blocks are aimed at enhancing the socio-economic mix and facilitating interactions at the block level.

In line with Singapore’s multicultural society and to discourage the formation of ethnic enclaves, the Ethnic Integration Policy (EIP) has been in place since 1989 to ensure a balanced resident mix of ethnic groups in HDB towns and blocks.<sup>99</sup> Guided by the national ethnic demographic make-up, quotas are set for each ethnic group at the block

and neighbourhood levels. Buyers can purchase a new or resale flat as long as they are within the EIP proportion for that particular block or neighbourhood. Should the limit for a particular ethnic group be reached, transactions on the open market can only be made between a buyer and seller of the same ethnic group.

### (ii) Harnessing Physical Design and Planning to Encourage Vibrant and Cohesive Communities

Community spaces that promote neighbourly interactions, whether built into the HDB block or found in its surroundings, are common sights in Singapore’s housing estates. Void decks, for instance, were introduced in the 1960s and continue to function as a hive of activity and an informal gathering point for residents. Senior activity centres, childcare and preschool centres, minimarts, coffee shops, and even community kitchens for stay-alone seniors can be found at various void decks.<sup>100</sup> Furthermore these spaces also play host to important social and religious milestones such as weddings and funerals. In newer developments, precinct pavilions have been introduced to provide large sheltered spaces for community events, while the void deck has been enhanced with attractive furniture to create Community Living Rooms. Taller blocks may have sky gardens at the intermediate floors or on the roof, in addition to the traditional ground floor spaces.

Beyond the HDB block, the variety of amenities made available for residents continues to grow. Besides the precinct pavilions, these include green spaces, playgrounds, multi-purpose halls, garden shelters, inter-generational playgrounds and exercise corners, catering to the different needs of the residents. The HDB towns have been designed for self-sufficiency with the provision of places of worship, heartland retail shops and small businesses, schools, food courts, and affordable neighbourhood cafes.

Neighbourhood Centres (NCs) are also an integral part of HDB towns, offering a wide variety of food, dining, shopping and healthcare options to meet residents' daily needs, and promoting social interaction among residents. The first NC was built by the HDB in 1967 in Toa Payoh. Since then, the HDB has built and progressively upgraded over 100 NCs, in tandem with the development of its towns. In 2000, private developers took on the building of NCs as part of the HDB's efforts to tap on their expertise in developing suburban commercial malls. However, many private developers were not keen to build NCs in new towns until a critical mass of residents had moved in. In 2015, the HDB resumed the building of NCs, thus ensuring that residents would have access to amenities when they move into their homes. This also allows the HDB to design attractive community spaces that are well integrated with transportation nodes and the overall plans for the towns.

Many Social Community Facilities (SCF) are designed and integrated into the public housing precincts. They include childcare centres, kindergartens, social services centres, as well as eldercare

centres. By providing such amenities for residents right at their doorstep, the HDB not only offers great convenience to people of all age groups, but also increases opportunities for interaction amongst residents while contributing to place-making for the community at large.

Further elevating this concept is Kampung Admiralty, Singapore's first integrated public development project that brings together housing units with a mix of facilities and services under one roof. Developed by the HDB and designed by WOHA, Kampung Admiralty strives to provide for the diverse needs of the community within a one-stop location.<sup>101</sup> This groundbreaking public housing development, which is situated in Woodlands, integrates healthcare and childcare facilities, community spaces, rooftop vegetable farms, a 900-seat hawker centre, and close to 20 dining and retail outlets with elderly-centric housing that enables seniors to age-in-place and provides opportunities for inter-generational interaction. It was awarded the World Building of the Year at the 2018 World Architecture Festival.

With different amenities housed under one roof, it presents the various agencies and tenants with the opportunity to run community-wide programmes and activities that encourage volunteerism within the premises, along with micro-job opportunities such as working at the on-site supermarket or hawker centre below for short periods of time. The HDB is continually exploring ways to integrate various amenities and uses within its housing estates.



*HDB's vibrant void decks bring together residents of all ages for fun, relaxation and food.*

Images courtesy of the the Centre for Liveable Cities and Housing and Development Board.



**(iii) A Community of Blue and Green: ABC Waters at Bishan-Ang Mo Kio Park**

Taking a softer approach to planning community spaces, by blending in the existing natural features of a town with the residential estates, can also have a significant positive impact on the mental and physical well-being of residents while offering unique spaces for community activities. A prime example is Bishan-Ang Mo Kio Park that was designed by Singapore-based Ramboll Studio Dreiseitl<sup>102</sup> as part of the Active, Beautiful and Clean (ABC) Waters programme. Initiated by PUB (Singapore's National Water Agency), the ABC Waters programme seeks to transform bodies of water near HDB estates from mere water catchment sites and drains into vibrant locations for recreation and community interaction.<sup>103</sup>

*The award-winning Kampung Admiralty with its co-located services and amenities such as childcare, eldercare and hawkler centre.*

Images (from top) courtesy of WOHA, NTUC Health, and the Centre for Liveable Cities.



An integral part of the ABC Waters programme, the stretch of the Kallang River flowing through the 62-hectare Bishan-Ang Mo Kio Park was transformed by PUB and National Parks Board (NParks) from a once utilitarian concrete canal into a scenic park space. Redesigned as a flood plain, a combination of plants and wildflowers, and natural materials such as rocks were introduced, while civil engineering techniques helped to soften the edges of the waterway, giving it a more natural

stream-like appearance with lush riverbanks. With the 3-km river naturalised, wildlife such as smooth-coated otters now frequent the river and its banks adding further biodiversity to the park. A popular spot for the residents to exercise, picnic and play, Bishan-Ang Mo Kio Park has brought the residents closer to water while having an upward effect on property prices of both the public and private housing estates encircling the park.

Bishan–Ang Mo Kio Park, along with the wider ABC Waters programme, serves as another example of working across urban systems to develop groundbreaking innovation, one that goes beyond just improving the water system. It requires engineers to work with landscape architects and urban planners to design and implement pioneering urban systems projects that the residents living in the vicinity can be proud of and identify with.

## TOWARDS A MORE ACTIVE CITIZENRY THROUGH COMMUNITY ENGAGEMENT

### (i) Using the Grassroots Approach as the Starting Point

One of the fundamental ways in which the community or *kampong* (Malay for “village”) spirit has been actively fostered in the housing estates is through grassroots organisations such as the Residents’ Committees (RCs). RCs were introduced in 1978 to “promote neighbourliness, racial harmony and community cohesiveness amongst residents living in HDB estates”.<sup>104</sup> Led by resident volunteers, RCs look after the physical and social well-being of their fellow residents in the estate, often becoming a key feedback channel to the HDB and other authorities on a wide range of estate issues.<sup>105</sup> As RC members would be most familiar with the other residents and their concerns, they are best placed to serve as community champions to promote greater community participation and neighbourliness.

One of the HDB’s longstanding collaborators in engaging citizens and strengthening community spirit has been the People’s Association (PA). PA was set up on 1 July 1960<sup>106</sup> as a statutory board under the Ministry of Culture, Community and Youth to promote racial harmony and social cohesion in Singapore and is currently chaired by Prime Minister Lee Hsien Loong. Over the decades, PA has worked tirelessly with grassroots leaders through Community Centres or Community Clubs (CC) located in the HDB estates, which have also played a crucial role in promoting community bonding for residents with the variety of programming, recreational facilities and spaces offered to residents at no or minimal cost.



*Bishan–Ang Mo Kio Park brings residents closer to water, greenery and wildlife.*

Image courtesy of National Parks Board.

The HDB also incorporates engagement activities into the home ownership process. In partnership with PA and the local grassroots, MyNiceHome roadshows are held to share useful information that can better prepare homeowners-to-be before they move into their new home and neighbourhood, while providing them a platform to get to know their future neighbours. Activities include an exhibition showcasing the surrounding amenities in their neighbourhood and town, features of their new home and town, interactive 360 degrees virtual tours of the new flats and informative

talks on renovating and maintaining their home, and local community initiatives. Surveys are also conducted to solicit feedback from residents to ensure the programme meets the changing needs of the homeowners-to-be. The engagement efforts continue after the residents move in with precinct Welcome Parties organised by the HDB along with grassroots organisations for them to meet their neighbours, advisors and grassroots leaders while engaging in bonding activities such as block mural painting, stage performances and fringe activities for all ages.

**(ii) Decentralising Estate Management Functions to Town Councils and Residents**

Estate management had been under the sole purview of the HDB since its inception up to the late 1980s, with operational responsibilities cascaded down to a network of HDB Area Offices located across the different housing estates. Since 1989, with the formation of Town Councils (TCs) under the Town Councils Act, elected Members of Parliament (MPs) and residents have since been empowered to manage their estate collectively.<sup>107</sup> This gave residents a greater say in the day-to-day running of their estates, and the opportunity to be part of the decision-making process if appointed to their respective TCs, where residents are required to occupy at least two-thirds of the council's membership. The Service and Conservancy Charges (S&CC) also continues to provide residents with a stake in their immediate living environment.<sup>108</sup>

**LEFT AND RIGHT:**  
*MyNiceHome Welcome Parties, roadshows and community bonding activities such as void deck mural painting provide residents opportunities to familiarise themselves with their new living environment, pick up renovation tips and get to know their new neighbours.*

Images courtesy of www.socialcreatives.com that organised this Void Deck Art Gallery and the Housing and Development Board.





S&CC are fees collected by TCs from lessees and tenants of HDB flats, shops/offices and market/food stalls and these go towards the maintenance and upkeep of the common property and are based on amounts decided upon by individual TCs. In addition, the government provides the TCs with S&CC Operating Grants to help them meet their operational needs. This grant, in the form of subsidies, is allocated by the government based on the number of HDB flats and flat sizes in a particular town. Smaller flat types receive higher grants as they tend to house lower-income families.

To involve all residents, the TCs organise a variety of engagement activities such as public dialogue sessions and the publication of quarterly newsletters featuring the goings-on

**TOP LEFT:** Utilisation of Town Council funds.

Infographic courtesy of the Ministry of National Development.

**RIGHT:** The varied roles and responsibilities of Town Councils in the upkeep of estates.

Infographic courtesy of the Housing and Development Board.

within the town. Through close collaboration with grassroots organisations, TCs play an active role in engaging residents on the estate improvements they wish to see, and in seeking feedback on the performance of estate management services and contractors.<sup>109</sup>

TCs are responsible for the control, management, maintenance and improvement of the common property of the residential and commercial properties within its town for the benefit of the residents. Some key works undertaken by TCs are:

-  Routine Repairs, Servicing and Maintenance (e.g. building maintenance, periodic lift servicing, essential maintenance and emergency repair)
-  Horticulture, Conservancy and Cleaning Works (e.g. grass cutting, pruning and landscaping, washing of common areas, refuse collection and pest control services)
-  Town Improvement and Upgrading Works (e.g. provision, upkeep and upgrading of facilities/amenities in the estate such as community gardens, playgrounds, covered linkways)
-  Cyclical Maintenance Works (e.g. façade repainting, reroofing and electrical re-wiring, replacement of lifts and their components)

TCs are also responsible for the financial management of their funds. TCs are required to keep proper accounts and records of their transactions and to ensure proper financial control over their payments, expenditure and assets. TCs also need to ensure that sufficient funds are kept for the operations of the TC.

TCs are allowed to appoint managing agents to handle daily estate management operations through an open competition tender. This ensures public accountability in the use of TC funds, and allows for competitive bidding through a transparent, open and

fair process. Managing agents such as EM Services Pte Ltd, one of the major estate management service providers in Singapore, are assessed based on track record, staff competency, management systems and managing fees. The dynamic and interdependent relationship between the TC, grassroots, managing agents, contractors and the residents themselves serves as a further example of a systems approach being adopted, this time in the area of keeping estates well maintained and smoothly functioning.

**(iii) Giving Residents a Say Through Voting and Public Consultation**

Another means through which residents are able to feel a sense of empowerment and ownership over decisions that directly affect their living environment is through having open, two-way discussions with the authorities and allowing them to vote on major decisions that impact their daily lives. The popular Home Improvement Programme (HIP) and Neighbourhood Renewal Programme (NRP) for instance originated from such an exercise, the HDB Heartware Forum that was held in 2007 where numerous public consultations were held to engage residents on ways to build stronger and more cohesive HDB communities. Two of the key thrusts arising from the forum were those of enriching the towns and enhancing precincts. More specifically, residents expressed their desire for greater flexibility in flat upgrading, and to be able to opt out of certain items if they had recently carried out

**LEFT AND RIGHT:** Resident engagement activities are an important part of the NRP process.

Images courtesy of Participate in Design (PID).

their own renovation works. There were also requests for greater consultation and less duplication for facilities at the block and precinct level.

The NRP also involves extensive consultation with residents, where their views are actively sought on the design proposal and facilities that are to be upgraded and/or provided. This is done through a series of town hall meetings, surveys, exhibitions, and dialogue sessions as platforms for residents to voice their views and concerns regarding their estate and the types of upgrading works proposed.

Other than the NRP, the HDB engages residents under the Remaking Our Heartland (ROH) programme. The HDB gathered feedback via surveys during public exhibitions for the ROH 1 and ROH 2 towns and since ROH 3, the HDB undertook a deeper form of engagement by consulting residents and stakeholders first through a series of focus group discussions. A total of 11 discussion sessions were conducted, involving some 400 residents and community stakeholders from Woodlands, Toa Payoh and Pasir Ris towns. A diverse group of residents between 17 and 81 years old participated in the sessions, putting forward their ideas on what they would like to see in their town.





Such focus group discussions helped the HDB refine the plans for each town, ensuring that the improvements would benefit residents of all ages. The finalised plans took into account the local context, distinctive character and specific requirements of each town. Further engagements were carried out during the exhibitions held in April and May 2017 to showcase the ROH proposals.

Public engagement continues to play a key role in the HDB's efforts to rejuvenate Singapore's housing estates. As the ROH plans will shape Singapore's future public housing landscape, it is vital that the improvement plans implemented are relevant to and supported by town residents, and take into account their views and suggestions. Going forward, there will be more public engagement sessions held for the ROH programme. For example, for ROH 4, residents will co-create the plans to enhance the living environment of their towns.

**TOP LEFT:** *The Tudor-inspired painted blocks of Tampines Avenue 9 as voted on by the residents themselves.*

Image courtesy of the Ministry of National Development.

**RIGHT:** *The residents of Canberra Estate were heavily involved in the process of building their playground, from ideation to completion.*

Images courtesy of the Housing and Development Board.

Another example of how resident empowerment has been channelled into a creative physical outcome decided on by the residents themselves can be seen in 30 blocks of flats at Tampines Avenue 9. As part of the block repainting exercise carried out every seven years under the cyclical works undertaken by TCs to rejuvenate estates, these blocks had their traditional red brick façades that were in place for over two decades repainted with an eye-catching

Tudor-inspired black and white design in 2016, with the works being carried out by Tampines Town Council. This was the result of residents being given the opportunity to vote on the colour scheme of their choice. Ballot forms were sent to all affected households, with a healthy 40% of households casting their votes, an improvement over turnout rates from 15 years earlier when only around 20% of residents participated in a similar exercise.



**(iv) Growing Community Bonds From the Ground Up**

In recent years, Singapore has seen a shift and greater emphasis being placed on encouraging ground-up initiatives established and driven by the community and civil society, ranging from nature and greening, to heritage conservation, to recycling and animal welfare. The area of public housing is no different. The Build-A-Playground (BAP) initiative is one such programme through which residents are able to actively shape the environment they live and play in. The BAP pilot in Sembawang’s Canberra Estate brought together around 2,000 residents to conceptualise, design and build their own playground. The engagement process included activities such as design workshops, roadshows and surveys. At the official opening of the playground, residents shared how their participation in the BAP had helped them to know their neighbours better, and how their involvement

**LEFT:** One of the over 1,500 community gardens that have bloomed across Singapore since the inception of the Community In Bloom programme in 2005.

Image courtesy of the Housing and Development Board.

**RIGHT:** Community Living Rooms are additional social spaces for residents to mingle and develop a sense of ownership over public spaces. These are often situated in high-traffic areas such as near letter boxes or lift lobbies.

Image courtesy of the Housing and Development Board.



gave them a deeper appreciation for the playground as they understood the hard work behind the scenes in developing it.<sup>110</sup>

Other initiatives such as the Community In Bloom (CIB) programme, done in collaboration with the HDB and NParks, has encouraged community farming efforts in housing estates since 2005. This has played a substantial role in fostering social cohesion and bonding between residents.<sup>111</sup> Today, there are over 1,500 community gardens across Singapore under the programme, engaging close to 36,000 gardening enthusiasts.<sup>112</sup> Around 80% of these

gardens can be found in HDB estates. The target is to grow to 2,000 community gardens by 2030.<sup>113</sup>

The provision of funding is also key in getting ground-up efforts off the ground. Through the Lively Places programme, residents are offered up to a maximum of S\$20,000 to organise their own self-initiated projects that seek to enliven Singapore’s public spaces. For instance, converting void deck spaces into community living rooms and workshop spaces.



**INTEGRATING COMMUNITIES THROUGH LIFESTYLE HUBS:  
OUR TAMPINES HUB**

In recent years, the construction of integrated community and lifestyle hubs such as Our Tampines Hub and Heartbeat@Bedok have emerged as the next evolution of comprehensive, purpose-built physical spaces for communities to come together, bond and interact.

Tampines, now home to more than 230,000 residents, has transformed to become one of the largest and busiest towns in Singapore over the last 40 years. To cater to this sizeable resident population, Our Tampines Hub was opened in 2017 and houses a broad range of services and facilities. They include a public library, common spaces for community events, food and beverage outlets, aged care services, a polyclinic, a sports stadium, a gymnasium and even a swimming pool within its 5.7-hectare plot area. Tampines Central Community Club subsequently moved into Our Tampines Hub from 1 July 2018, as part of the integrated hub concept. The driving objective behind its development was to create a space to encourage community building and create a sense of belonging for residents, highlighting Tampines in a meaningful way as a space of collective social memories for the residents in the years to come.

This 4P approach of Policies, Planning, Programming and Participation adopted in Singapore’s systems approach to public housing has helped keep the spirit of mutual trust and understanding between residents—and also between residents and authorities such as the HDB—strong as they see themselves playing an increasingly critical role in the overall housing system. In the process, these contribute to the residents being better able to meet the aspirations that they hold for the type of physical environment and community that they want to be a part of. All of which are essential ingredients for maintaining a harmonious living environment and cohesive society.

**RIGHT:** *Our Tampines Hub is another example of the new model of integrated, community-focused developments that are being adopted more widely in Singapore.*

Images (from top) courtesy of the People’s Association and the Centre for Liveable Cities.



## SHANGHAI'S ESTATE MANAGEMENT AND COMMUNITY GOVERNANCE

An estate community is the primary place of a citizen's daily life. It is the basic unit of a social community and an important component of urban governance. Shanghai has been pragmatic yet innovative in estate community governance, optimising its estate management model since the early days of public housing and throughout the subsequent housing reform period. By integrating estate management into comprehensive community governance and public service, Shanghai has sought to improve residents' living environment while concurrently improving the city's urban governance standard.

### A WIDENING ROAD: THE STARTING POINT OF ESTATE MANAGEMENT

Prior to the Chinese economic reforms,<sup>14</sup> Shanghai's public housing system was such that its agency was in charge of all functions including allocation, management and maintenance. Following the reforms, Shanghai took the opportunity to enhance as well as widen the coverage of its housing and estate management systems.

Anjule Property Management Co., Ltd., the first Shanghai-Hong Kong joint venture in estate management, was founded in 1991. Since then, Shanghai has gradually abolished its almost 40-year-old administrative and welfare-based estate management system, and adopted a new estate management model. In 2007, Shanghai brought further innovations into its management policy, incorporating estate management as part of community governance, and promoting the concept of comprehensive estate community governance.

Since China's reform and opening-up, the laws and regulations related to estate management services have been enhanced over time, and the rule of law has steadily improved. The relevant laws and regulations include "Property Law of the People's Republic of China", "Regulations on Estate Management", and "Provisions of Shanghai Municipality on Residential Estate Management", covering areas such as administrative law enforcement, neighbourhood committee management, owner self-governance, industry supervision, tender management, maintenance fund management, parking management, renovation management and price evaluation.

In terms of the division of responsibilities, the "municipal-level housing administrative bodies" are responsible for the supervision and administration of facilities management in Shanghai while the "district-level housing administrative bodies" are responsible for its jurisdiction. In addition, district-level authorities guide and supervise the town and sub-district offices, ensuring that they implement relevant policies, regulate the estate management measures, and safeguard the legitimate rights and interests of the owners and estate management service providers.

### ESTABLISHMENT OF THE PROPERTY MANAGEMENT INDUSTRY IN SHANGHAI

Anjule Property Management Co., Ltd., the first Shanghai-Hong Kong joint venture in property management, was founded in October 1991, marking Shanghai's transition from an administrative and welfare-based estate management system—in place for nearly 40 years prior—to a new estate management mode. By the end of 2019, the total residential area within Shanghai was 690 million m<sup>2</sup> spread across 13,100 estates, of which 12,200 or about 93.29%, were managed by professional estate management companies. There were 1,861 estate management companies registered in Shanghai, with close to 300,000 employees.

## PRAGMATISM AND INNOVATION

In recent years, Shanghai has continued to improve its estate management system and homeowners' self-governance system. It also strongly promotes the use of grid management and smart estate management strategies in the city.

Measures to better monitor the performance of the estate management industry include standardising the entrance security and management offices in the estates, expediting the construction of housing emergency maintenance centres and improving the price transparency and price negotiation mechanism. Shanghai is also developing the estate management service industry by regulating the tender process for estate management companies, and helping quality brand names export their services. In terms of promoting homeowners' self-governance, the main measures include actively utilising the grassroot organisations and neighbourhood committees to remove illegal modifications within the estates, updating estate management regulations, updating the rules and procedures for the owners' congress, and refining the regulations on the management of special maintenance funds.

The establishment of Smart Estate Management was listed as a government priority in 2019 and is an important component of Shanghai's smart city plan. Shanghai is committed to the concept of grid management and has incorporated it in the operation of smart estate management. To centralise efforts and resources where possible, the district government is establishing a specialised department to deploy "grid supervisors". These grid supervisors will be responsible for the facilities and events within their grid and will report any issue that requires attention to the relevant authority through a special urban management information system. Following that, the grid supervisors will also be responsible for follow-up actions, such as evaluating if the issue was satisfactorily resolved. After more than a decade of hard work, Shanghai's grid management now covers the three administrative levels: municipal, district and sub-district/town. This includes the additional sub-level of estate or village, thus providing a total coverage for all estates, villages and their public spaces. This has become an important feature of Shanghai's long-term management and plays an important role in its urban governance.

**BOTTOM RIGHT:** User interface of Shanghai Property Management Bidding Platform.

Image courtesy of Shanghai Municipal Housing Administration Bureau.

With the emphasis on using a "unified management under one network" to assist in the governance of this megacity, Shanghai Municipal Housing Administration is establishing a multi-

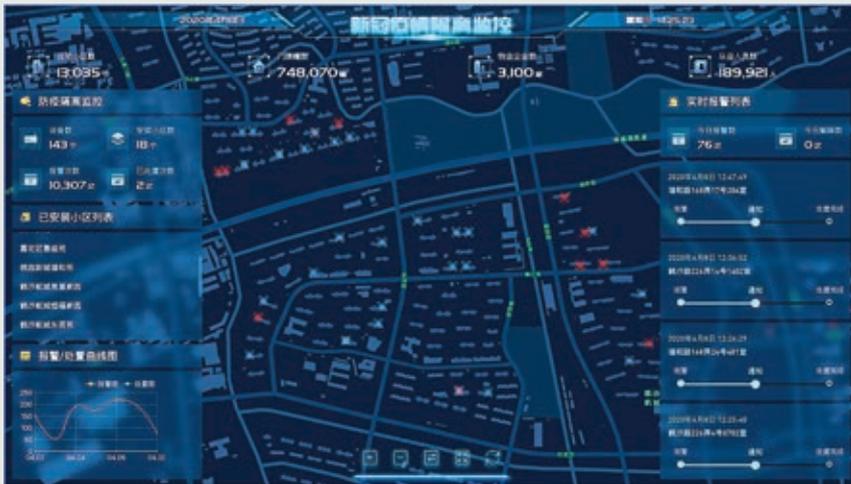
level pilot platform that can provide information on the various scenarios that may occur in running a smart estate. The participating agencies and entities are as follows:

ENTITY	ROLE
Hongkou district	Pilot district
Jing'ansi Sub-district	Pilot sub-district
Shanghai Weibai H (Group) Limited	Pilot company
China Construction Bank	Pilot bank
Shanghai Yonglv Property Co., Ltd	Pilot estate management company
Jiading District's Market Supervision Administration	Pilot department in charge of monitoring the estate's lift system
Shanghai MCHURDM's comprehensive governance platform	Pilot comprehensive platform

### SHANGHAI PROPERTY MANAGEMENT BIDDING PLATFORM

According to the "Management Measures of Shanghai Estate Management Bidding" that came into effect on 1 January 2016, the appointment of an estate management company shall be done via a designated open tendering platform. This is to regulate the participating companies' bids, protect the rights and interests of all stakeholders, and promote fair competition. The exception would be cases where the developer and owners' congress decide to appoint an agent through mutual agreement or cases where the contract of the existing agent is extended.





### A SMART ESTATE MANAGEMENT PILOT TEST BASED ON GRID MANAGEMENT DATA PLATFORM

Utilising the grid management data platform, Shanghai Jing'an District's Jing'ansi Sub-district collected housing data in the entire sub-district, and incorporated it with data from Internet of Things (IoT) sensors that were then mapped and synced at the Shanghai estate management centre. The image above shows the distribution of neuron sensors, monitoring information on structure vibration, water meters, smoke detectors, ultrasound car sensors, manhole covers, flooding and break-ins. It can reflect the situation on the ground in real time to enable smart management.

The Smart Estate Management System was used in implementing control measures during the COVID-19 pandemic, such that the risks of infection can be closely monitored and pinpointed to household units and personnel through the grid management data platform.

**TOP:** *Shanghai Smart Estate Management Pilot Test—Distribution of neuron sensors in Jing'ansi Sub-district.*

Image courtesy of Shanghai Municipal Housing Security and Administration Bureau.

**BOTTOM:** *Application of Smart Estate Management System for household and community monitoring during the COVID-19 containment measures.*

Image courtesy of Shanghai Municipal Housing Administration Bureau.

## IMPACT AND CONTRIBUTION OF ESTATE MANAGEMENT

For more than 40 years since China's reform and opening-up, the estate management industry in Shanghai has undergone major transformations. Having evolved from China's planned economy system of yesteryear to the current Chinese version of a market economy system, the service providers have also progressed from a bureaucratic estate management office to being professional, socialised, and market-oriented service providers. The range of services provided has extended to cater for greater diversity. Shanghai's estate management industry has achieved outstanding results in terms of industry regulations, industry development, employment, business models, and capabilities. This has contributed to Shanghai's improvements in urban governance, better living environment, a robust domestic economy, as well as increased employment and social stability.

Shanghai's estate management industry has experienced significant growth due to its efforts in reform and innovation. This is reflected in the increase in both scale and quantity of active enterprises. Another indication is the growth of non-residential facility management services which has played a pivotal role in the industry's transformation and development. Adhering to the tenet of people-centric service, the industry has worked on improving its service and now addresses estate safety, environment and maintenance issues in more sophisticated ways, so as to improve the quality of residents' homes, earning their satisfaction. The industry has been able to maintain the quality of its fundamental services while expanding operations and increasing revenue. At the end of 2018, 80% of residential estates were managed by professional estate management service providers. The industry's revenue for that year was RMB 97.8 billion, accounting for 2.99% of Shanghai's gross domestic product, an increase of 0.48% compared to 2014.<sup>115</sup>

## INNOVATIVE ESTATE MANAGEMENT MEASURES, IMPLEMENTING COMPREHENSIVE COMMUNITY GOVERNANCE

Since 2007, Shanghai has implemented three rounds of "3-Year Action Plans" in estate communities and innovatively incorporated estate management into "Comprehensive Community Governance". This is a project to improve residents' living environment and quality of life by bringing together governmental, market and social resources. It taps into the

strengths of relevant administrative and regulatory bodies, service providers and the general public to optimise estate management and enhance owner self-governance.

The first round of the “3-Year Action Plans” covered the period of 2007 to 2009 and focused on governance issues at the top. The purpose was to develop a comprehensive estate community governance system and estate management service model befitting its socio-economic level. It proved to be effective in enhancing the system of governance by assigning responsibilities in estate management, promoting models of self-governance by the estate owners, and improving methods for the estate management industry.

From 2015 to 2017, Shanghai initiated another “3-Year Action Plans” to improve the governance model suited to a megacity such as Shanghai. This round of the “3-Year Action Plans”

**LEFT AND RIGHT:** *Minxing district Kangcheng community joint residential conference.*

Image courtesy of Shanghai Kangcheng Residential Committee.



focused on social comprehensive governance at the grassroots level. It resolved issues found in the estate management service provider market, self-governance, and other prominent issues the residents had with their living environment.

After evaluating earlier rounds of the “3-Year Action Plans”, Shanghai initiated the last round of the “3-Year Action Plans” which runs from 2018 to 2020, based on the theme of “Beautiful Homeland”. This action plan lists three dominant goals, which are to be “safer, better organised and cleaner”. The plan also lists more concrete and quantifiable

outcomes that focus on rectifying shortcomings in people’s livelihoods, enhancing the market and strengthening community co-governance.

After three successful rounds of the “3-Year Action Plans”, Shanghai has gradually established positive interactions between government, society and market through the estate management framework.

## IMPROVING BOTH MANAGEMENT MECHANISM AND QUALITY OF LIVING ENVIRONMENT

### (i) Promoting Public Engagement and Community Governance

Shanghai continuously optimises its comprehensive community governance system, seeking to improve its efficiency and promote inter-agency collaboration, grid management and its issue-handling mechanism, and its efficiency in estate law enforcement.

Shanghai is establishing a governance body comprising multiple stakeholders that aims to strengthen guidance provided by neighbourhood committees for owner committees. The group also advocates for qualified members of neighbourhood committees to concurrently become members of owner committees. A guidebook on the homeowners’ self-governance has been prepared to help regulate the daily operation of the owners’ congress and empower owners to take charge of their home. Training and support is given to professional social service providers, so that they can deliver high-quality service levels in their role of organising matters of public interest within the communities.

### KANGJIAN YULANYUAN COMMUNITY GARDEN: A PROJECT THAT ENHANCES COMMUNITY COHESIVENESS

Yulanyuan is a mixed-estate community located at Guijiang Road of Xuhui District. In 2019, Kangjian Sub-district utilised the good urban greenery around the community and initiated the Kangjian Yulanyuan Community Garden project. The residents of Yulanyuan approached this starting from community engagement, working gradually from the bottom up to “renew and build our beautiful home” through participating in the design of the community garden. Experts from Tongji University’s community garden and community engagement laboratory provided guidance and training for the project. Volunteers from the grassroots, local residents, non-governmental organisations (NGOs), institutes of higher learning and secondary schools came together to run activities in the form of workshops. The community was also undergoing a remediation renewal programme at the time, and it used the opportunity to consult widely with the residents on the design and areas for renewal while the design unit and relevant third parties provided professional guidance and oversight. This created more opportunities for increased resident participation, enhancing citizen engagement and promoting greater community cohesion.<sup>116</sup>

#### (ii) Improving Safety and Quality of Living Environment

Shanghai is committed to resolving any outstanding issues faced by residents. It seeks to improve the safety and quality of living environment through renewal programmes, facilities upgrades, continuous improvement in the quality of public service, comprehensive remediation, strengthening of waste management and easing of parking challenges within the estate.

### PROMOTING CO-GOVERNANCE AND IMPROVING THE LIVING ENVIRONMENT

Following the development of mechanisms for community governance in Shanghai’s estates, a relatively comprehensive policy-making system has been established at both municipal and district levels. Since then, the community co-governance mechanism has been further enhanced and the level of community governance and the owners’ ability to participate in self-governance has increased.

### A CASE ON COMPREHENSIVE MANAGEMENT OF RESIDENTIAL COMMUNITIES IN SANLIN TOWN

Sanlin Town is one of Shanghai’s biggest town in terms of long-term resident population and residential property area. In recent years, it has played a leading role to promote the Beautiful Homeland programme and push for a comprehensive governance framework involving estates, residents and the society. Sanlin Town established a multi-stakeholder joint office and held monthly joint meetings and evaluation meetings on implementing the Beautiful Homeland programme. Leaders of relevant departments, estates and resident communities came together to collaborate on the project. By the end of 2017, 35 service stations near residential communities had been established across the town and 93%<sup>117</sup> of residential estates had established owner committees.

The living environment of citizens is continuously improving. A number of issues reflected strongly by residents had been resolved through community comprehensive governance, bringing about significant improvement to the estate facilities, environment landscape and operational safety. The estates have become “safer, cleaner and more orderly”, bringing about a better quality of life for the people.

# DISTILLING INSIGHTS

## SINGAPORE

**With** HDB estates being home to residents of different ethnic, religious, age, and socio-economic groups, integrating these diverse groups requires “hardware” measures such as policies, planning and physical design. These include the mixing of flat types within the same block and the EIP to ensure a healthy racial mix; the formation of RCs; the provision of spaces for interaction such as void decks and precinct pavilions; and the planning and design of attractive and well-integrated NCs, the last which the HDB has resumed building in 2015.

Equally important are community-building programmes such as MyNiceHome activities, ranging from welcome parties to void deck mural painting that provide opportunities for residents to gather and interact, while helping to build “heartware” in the towns, strengthening communities and social ties.

**Residents’** sense of ownership over decisions made regarding their living environment can be strengthened by allowing them to vote on major plans before these are implemented. An example of which is the block repainting undertaken by town councils every seven years under the cyclical works to rejuvenate estates.

Engaging residents through regular public consultation and focus group discussions also helps the HDB in refining their plans for each town and in understanding the different needs and aspirations of residents, such that improvements made would benefit all residents.

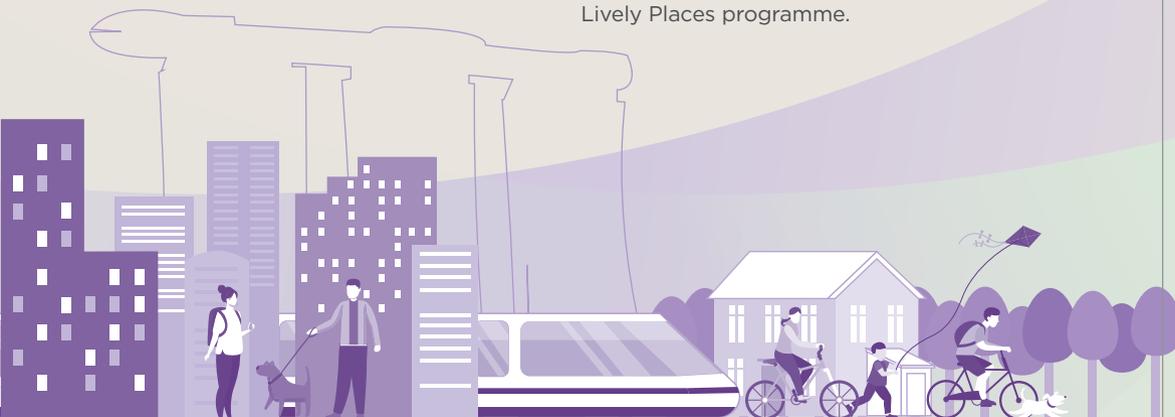
**Having** more opportunities for ground-up, resident-driven projects around the housing estate, regardless of scale, allow residents to proactively shape the type of environment and community that they themselves aspire to live in. For instance, the Community In Bloom programme by the HDB and NParks has encouraged community farming among gardening enthusiasts in HDB estates since its inception in 2005, while funding of up to S\$20,000 is made available for projects initiated by the residents themselves aimed at injecting more vibrancy into common HDB spaces as part of HDB’s Lively Places programme.

## SHANGHAI

**The** estate management system in Shanghai is governed by a comprehensive legal and regulation system, covering areas such as administrative law enforcement, neighbourhood committee management, self-governance by homeowners, industry supervision, tender management, maintenance fund management, parking management, renovation management and price evaluation. Shanghai has also improved the estate management system by leveraging on grid management technique and promoting the establishment of Smart Estate Management. Shanghai’s grid management covers three administrative levels: municipal, district and sub-district/town. Any problems detected will be reported through a special urban management information system to the relevant department for follow up.

**Shanghai** has implemented three iterations of the “3-Year Action Plans” to enhance community governance and to improve estate management. Each action plan is designed to enhance the community co-governance mechanism by improving community governance standards and increasing the owners’ ability to self-govern.

**Shanghai** has established a multiple stakeholder governance system through the optimisation of its grassroots organisation and enhancement of the homeowners’ self-governance system. The Kangjian Yulanyuan Community Garden project is an example of a bottom-up approach to engaging the resident in building up the community as their home. Various stakeholders such as volunteers from the grassroots, local residents, NGOs, institutes of higher learning and secondary schools were involved in the process. With professional guidance, more opportunities were created for residents to participate.



## CHAPTER 6

*The vibrant  
Punggol waterway  
in Singapore.*

Image courtesy of  
the Housing and  
Development Board



BUILDING ON THE  
PAST, PREPARING  
FOR THE FUTURE:  
INSIGHTS FROM  
SINGAPORE AND  
SHANGHAI



## THE FUTURE OF PUBLIC HOUSING IN SINGAPORE

**The** provision of public housing is a vital component of a country's national development, and will be as pertinent for the future as it was for the past. This is a view that both Singapore and Shanghai embrace; two cities possessing high-density populations and highly urbanised landscapes. Both are global cities operating with high-performing economies and as such, encounter similar sets of challenges alongside these strengths. In Singapore, the most immediate concerns for public housing are aligned to broader national-level considerations and strategies in areas such as: exploring different typologies for developments that can optimise land use through higher densities while ensuring a quality environment; providing a seamless and efficient transit system for both people and goods; achieving eco-friendliness and sustainability; and improving quality and increasing productivity through the use of progressive construction technology. Some of the Housing and

*An example of an integrated transit and residential hub is the upcoming Woodleigh Village in Bidadari Estate.*

Image courtesy of the Housing and Development Board.

Development Board's (HDB) projects, a number of which are carried out in partnership with the private sector, aim to address these challenges in innovative ways.

At the same time, Singapore, much like most developed cities around the world, will have to grapple with the effects of an increasingly ageing population as well as evolving societal norms such as the growing trend of singlehood. Emerging trends such as these would undoubtedly have significant downstream implications on public housing provisions.

## INTEGRATING COMMERCIAL, RESIDENTIAL AND TRANSIT INTO A SINGLE DEVELOPMENT

The HDB's new integrated development typology has shown that it can bring about significant physical and social benefits for its residents and the community at large. The HDB is therefore seeking more opportunities to plan for developments that integrate multiple functions and amenities in a single plot of land. For example, an upcoming development, Woodleigh Village, represents another advancement in integrated developments. Located within the Bidadari Estate, Woodleigh Village is bounded by Upper Serangoon Road, Woodleigh Link and Bidadari Park Drive. It comprises 3 residential blocks

that are 13 storeys high and offers 330 units of 3- and 4-room flats.

Woodleigh Village is designed with landscaped spaces which serve as communal areas where one can meet, mingle and interact with others. The name "Woodleigh Village" brings to mind a close-knit community where a myriad of activities and exchanges take place. The existing Upper Aljunied Road will become part of the Heritage Walk, preserving the canopy of mature trees, and showcasing the history of Bidadari. This will be done after a new road is built in parallel, to the south of the existing one. Residents can take a stroll, jog or cycle down the Heritage Walk flanked by conserved rain trees and other greenery.

Transit-oriented developments, whereby public housing is built around highly accessible transport hubs that are well-integrated with other developments and the spatial design of the surrounding neighbourhoods, can create towns which are self-sustaining and at the same time spark urban renewal of the existing physical infrastructure. This is the vision for Woodleigh Village, which has been designed to be an integrated transport and residential hub with a bus interchange and hawker centre, and linked to Woodleigh MRT station. To ensure residents have their privacy, the dwelling units are set on higher floors with an environmental landscaped deck while the public facilities are located on the lower floors.



## ENHANCING SUSTAINABILITY AND CLIMATE RESILIENCE IN PUBLIC HOUSING

### (i) Every Estate an Eco-friendly Estate: HDB Green Towns Programme

Putting sustainability as a key agenda in township development, and leveraging on innovative building and smart technologies, are important strategies towards the development of better environments. In recent years, the HDB has pursued the creation of more eco-friendly or “green towns”<sup>118</sup> to enhance sustainability of housing estates and the quality of life of their residents. These efforts have proven to be important steps towards reducing annual energy consumption in HDB estates, which has dropped by 10% since 2005.<sup>119</sup> The HDB targets to reduce this by a further 15% within 10 years as part of the HDB Green Towns Programme announced in March 2020 that will make sustainable living a part of all existing HDB towns through the implementation of green features.<sup>120</sup> This will include features, trialed successfully in some HDB estates, such as the installation of solar photovoltaic (PV) systems at HDB blocks under the SolarNova programme led by the HDB and the Economic Development Board (EDB) to generate more clean energy and reduce

**TOP LEFT:** Solar panels installed on HDB rooftops by the Sunseap Group under the HDB-EDB SolarNova programme.

Image courtesy of the Housing and Development Board.

**BOTTOM RIGHT:** Smart HDB Town Framework.

Infographic courtesy of the Housing and Development Board.

carbon emissions while contributing to climate change mitigation. Currently, 5,500 blocks have been fitted with or are in the process of having these solar panels installed which has brought clean energy to more than half of the HDB blocks in Singapore, and a targeted 70% of blocks island-wide by 2030.

Smart LED lighting is another one of HDB’s innovative solutions to reduce energy consumption in the common areas of HDB estates. They come equipped with smart motion sensors and analytics capabilities that can automatically adjust the luminosity of the LED lights depending on the motion detected. The use of Smart LED lighting can reduce energy used for lighting by up to 60% compared with conventional LED lighting.

### (ii) Singapore’s First Smart, Sustainable Town: Tengah

Since its introduction in 2014, the Smart HDB Town Framework has guided the deployment of Smart technologies

in the planning, development and management of HDB towns. Coverage includes “smart planning” through the use of computer simulation and data analytics tools which can aid planners and architects in designing more comfortable, liveable towns; “smart environment” with sensors capturing real-time data on environmental factors; “smart estates” for improved estate management and maintenance as discussed in chapter 4; and “smart living” which provides digital infrastructure within the homes and allows for smarter home applications that can improve the daily lives of residents. A fifth domain on “smart community” was later incorporated to leverage technology to better understand residents’ needs and responses to their living environment, through a combination of big data and advanced modelling tools. Insights gleaned will help steer future town planning and housing designs that will enhance the living experience in the HDB heartlands.



Located in the western part of Singapore, Tengah is the next HDB town being developed after Punggol. Tengah is also the country's first HDB town to be planned with sustainable design and smart technologies from the outset. Residents can be "at home with nature"<sup>121</sup> and enjoy quality living and connect with the community in a myriad of amenities and green spaces. When completed, Tengah is expected to provide around 42,000 new homes across 5 residential districts. Tengah will be equipped with smart energy management capabilities that leverage on artificial intelligence (AI) to optimise energy use and conservation across the

town while enabling residents to track their energy usage with greater accuracy through mobile applications. Other innovations discussed in earlier chapters such as smart lighting and automated waste collection will be commonplace features in Tengah.

For the first time, Singapore will see a car-free town centre in an HDB town. The Tengah Town Centre will be designed amidst a lush park setting, with vehicles plying beneath the town centre. It will offer a greener, car-lite, pedestrian-friendly and people-centric environment, for residents to enjoy seamless and safe connections when walking or cycling.

**(iii) Making Estates Cooler Through a Smart Planning and Centralised Cooling**

No one is spared from the far-reaching and increasingly serious threat posed by climate change. The phenomenon of the Urban Heat Island (UHI) effect, in particular, is of concern to tropical countries such as Singapore, where built-up areas, roads and vehicles within urban areas contribute to rapid heating of the environment, lasting into the night, keeping temperatures significantly higher than in non-built-up areas. New and innovative design strategies such as the use of smart planning tools consisting of simulations and data analytics to refine planning and design considerations of HDB blocks and towns with the aim of optimising wind flow while dissipating heat are increasingly adopted to help cool HDB estates. A centralised cooling system that regulates temperatures within flats and reduces the reliance on individual air-conditioning units will be piloted by the HDB to reduce heat levels and allow for greater energy efficiency. The use of cool coatings—paint which contains pigments that reflect heat from the sun—is also being piloted on building façades, roofs and pavements in selected HDB estates to enhance the thermal comfort of residents.

*Artist's impression of Tengah's car-free town centre.*

Image courtesy of the Housing and Development Board.



**3D-PRINTED HOMES OF THE FUTURE**

Targeted to form a significant part of the construction process for upcoming housing estates in Tengah and Bidadari,<sup>122</sup> 3D-printing technology will be utilised to build landscape furniture and architectural features that would not only allow for faster and less labour-intensive construction, but will also increase the potential for more unconventional designs compared to traditional precast methods. In addition, such technological advances can contribute to higher productivity in the construction industry.

While 3D printing for construction is still a relatively new technological application in Singapore, the HDB is continually exploring its potential with relevant experts in the field such as Nanyang Technological University,<sup>123</sup> local prefabrication company Robin Village Development and Dutch engineering firm Witteveen+Bos. It is suitable for manufacturing complex volumetric components and free-form structures, which could typically involve the time-consuming and tedious process of steel mould fabrication. 3D printing also reduces material wastage as the HDB can print only what is needed.

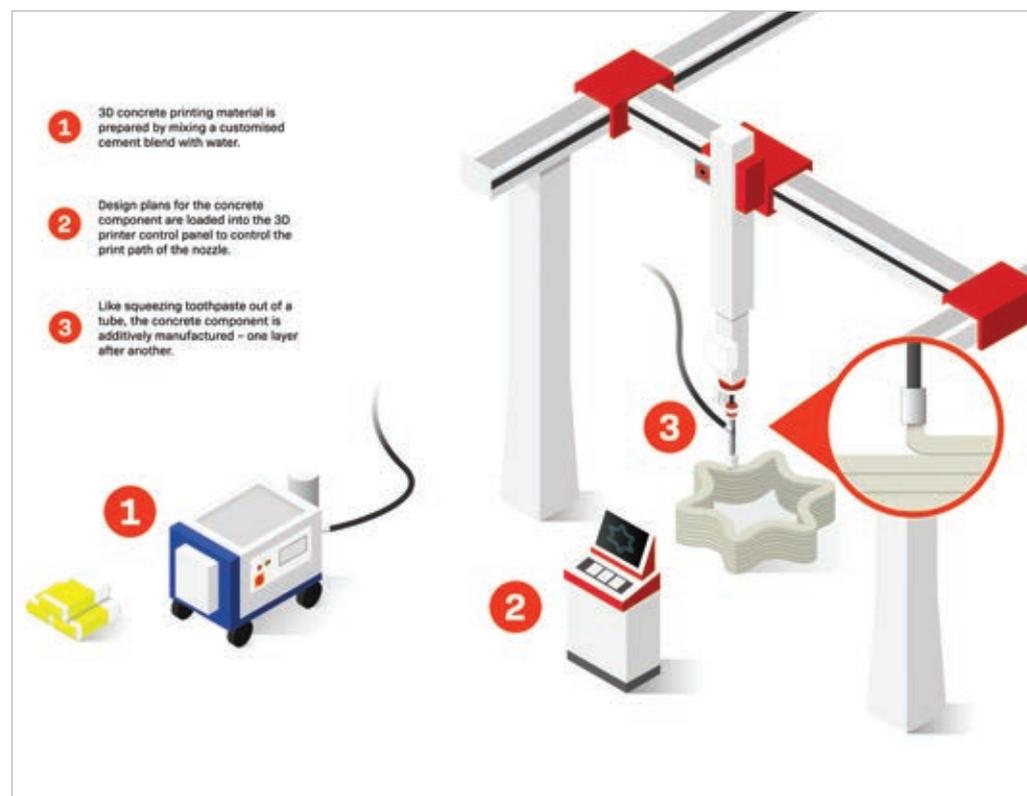
## SHIFTING DEMOGRAPHICS AND SOCIETAL NORMS

Another insight into Singapore's public housing programme is that housing policies are not static, but are continually reviewed and adjusted to address demographic and societal shifts. One of the challenges that Singapore faces in providing public housing lies in its rapidly ageing population where at least a fifth or more of its population is projected to be aged above 65 years by 2030. This is due to a number of interrelated factors—increased longevity and lower fertility rates caused by changing attitudes of Singaporeans towards marriage and having children.

A greying population would have considerable implications for the construction and development of public housing. This would require adopting an increasingly elderly-centric approach to the design of homes and the surrounding

**LEFT AND RIGHT:** 3D concrete printing will potentially enable more creative design features such as customised sunshades to be built at HDB estates, which would be challenging to create using conventional construction techniques.

Images courtesy of the Housing and Development Board.



environment. Due to the significantly higher proportion of elderly persons, ensuring ease of mobility and accessibility has to be a guiding principle that should inform all future approaches to housing design. In recent years, this has been realised to some extent in the refurbishment of HDB estates with higher concentrations of elderly residents with more age-friendly features and barrier-free access, such as ramps, handlebars and elevators at overhead bridges around the estate. The Lift Upgrading Programme (LUP) has enhanced the vertical mobility for HDB residents, especially the elderly and less mobile.

Adding further complexity to the ageing conundrum is the rising trend of singlehood in Singapore where over time Singapore will not only see a growing proportion of elderly persons, but also elderly singles. More consideration may have to be given to the way housing estates have been planned and activated in the past to encourage a sense of community and inter-generational relations, as these may need to be increasingly extended beyond traditional families and kinship ties.



To address this, the Ministry of National Development and the Ministry of Health have been studying the concept of assisted living and are planning to launch a pilot project in Bukit Batok, where housing is integrated with care and support services. For this new assisted living typology, the block will be designed with large communal spaces on every floor for residents to socialise with their neighbours, while the flats will be enhanced with elderly-friendly fittings, larger bathrooms, and other features to accommodate those with mobility needs. Seniors will also be able to access a range of services, including 24/7 emergency response, and have an on-site community manager to monitor their health status, link them up with relevant care services, and curate programmes. Additional care service options, such as after-hours care, could possibly be made available to seniors who require them.

Public housing policies have also evolved to meet the needs of other demographic profiles in the society. Since 2013, first-time buyers who are single who are at least 35 years old are allowed to buy a 2-room Flexi flat in non-mature estates from the HDB. To further assist singles in their home purchase, the Enhanced Central Provident Fund (CPF) Housing Grant (which replaced the previous Additional CPF Housing Grant and the Special CPF Housing Grant) was extended to them as well. In addition, support is provided to unmarried parents who are at least 21 years old and they are now able to buy a 3-room flat in non-mature estates from the HDB, instead of only 2-room Flexi flats previously,<sup>124</sup> on a case-by-case basis after taking into consideration a holistic assessment and the best interests of the children.



*In the face of an ageing population, elderly-centric features such as wheelchair ramps are becoming increasingly commonplace in HDB estates.*

Image courtesy of the Building and Construction Authority.



## THE FUTURE OF HOUSING IN SHANGHAI

**Shanghai** has grown into a metropolis facing a strain on resources, particularly land resources, as its population growth has outpaced the growth of its useable land. Land scarcity will be a significant challenge in Shanghai's effort to ensure the suitable housing needs of its citizens. Shanghai's housing development policies will need to be aligned with urban development trends while going beyond basic needs in order to focus on substance, adaptability and quality in order to realise its housing vision.

### A HOUSING DEVELOPMENT POLICY ALIGNED WITH URBAN DEVELOPMENT TREND AND REQUIREMENT

In its pursuit to become a global city, Shanghai's housing development will centre around President Xi Jinping's strategic direction whereby "Shanghai's development will focus on such aspects as the central government's strategic positioning of Shanghai's future development, the economic globalisation, the general pattern of national development, and the state's overall development plan for the Yangtze River delta region".

*Huangpu River panorama.*  
Image courtesy of CGEMA.

To meet challenges presented by trends such as an ageing population, internationalisation, high mobility and

smaller families, Shanghai's housing development seeks to create a positive dynamic between demographic structures and housing resources, advocating for greater housing diversity to meet the housing needs of different segments of the demographic.

A steady improvement in people's living standards has led, naturally, to increased aspirations for better living environment and housing quality. In order to satisfy these growing aspirations, new housing developments now look to optimise facility layouts and spatial arrangements within housing structures, as a way of enhancing the housing quality and building a liveable, business-friendly city.

### FOCUS ON BASIC NEEDS, SUBSTANCE, ADAPTABILITY AND QUALITY

#### (i) Basic Needs

The Shanghai government focuses on providing a safety net and social equity, while further reforming housing

supply policies based on the principles of developing ordinary commodity housing to be purchased by citizens for their primary residence. Shanghai is determined to meet its citizens' basic housing needs within the constraint of total land use area.

#### (ii) Substance

Shanghai seeks to optimise its housing supply structure in order to provide different housing options to various groups and families. The strategies used to realise this include efficient use of spatial layout within housing units, optimisation of commercial to residence space ratio, and the integration of residential, public service facilities and commercial activities through mixed use development.

#### (iii) Adaptability

Shanghai will need to determine the scale and structure of its housing supply based on a combination of factors such as demographics, employment, housing and public service facilities. It needs to construct a dynamic adjustment mechanism for housing development, and improve multi-scenario development strategies, so as to meet the diverse, multi-level housing needs of its residents.

#### (iv) Quality

Shanghai's housing development plans are shifting from "quantity growth" to "quality improvement". Shanghai is committed to meet the increasing material, spiritual and cultural needs of its citizens by improving the quality of urban life, accelerating the improvement of the community's environment, and modernising governance systems and capabilities.

## ESTABLISHING A HOUSING DEVELOPMENT VISION ALIGNED WITH URBAN DEVELOPMENT GOAL

Shanghai’s vision is to transform itself into a vibrant city of excellence, an inspiring city of innovation, culture and ecology, and a modern socialist metropolitan city with global influence. To this end, Shanghai is adopting a more people-centric approach to implement quality improvement programmes and dynamic governance in housing development, so as to become a city where all citizens can live in affordable, high-quality housing.

*District-level Integrated Planning of the Xinjiangwancheng Project.*

Image courtesy of Shanghai Chengtou Group Corporation.



This people-centric approach—which echoes the concept proposed by President Xi Jinping’s during his 2019 inspection tour of Shanghai, of having “cities built by the people, for the people”—examines livelihood issues closely to find the right entry point for policy implementation. Policies that support a variety of entry points will improve housing availability and affordability for a diverse group, so as to achieve the goal of “Housing For All”. Meanwhile, quality improvement programmes emphasise the improvement of urban and rural living environment. A high quality of life requires that the living environment is safe, functional and liveable while fostering a sense of belonging and developing strong community bonds among residents. In line with President Xi Jinping’s vision for Shanghai “to constantly enhance its urban governance capacity as a modern socialist metropolis”, more efforts will be made to improve the system of dynamic governance to create a community culture that reflects Shanghai’s characteristics.

## INSIGHTS GLEANED FROM SHANGHAI’S HOUSING SYSTEM

During a fruitful study visit by a Singapore delegation—led by the Centre for Liveable Cities and comprising representatives from the HDB and Building and Construction Authority (BCA)—to Shanghai Municipal Commission on Housing and Urban-Rural Development and Management (MCHURDM) in September 2019,<sup>25</sup> delegates were able to benefit from the shared knowledge and experiences. A number of insights were gleaned from Shanghai’s approach to housing provision, while taking into consideration the different contexts of both cities.

### (i) The Role of the Private Sector

Shanghai’s private sector takes the driver’s seat on a number of affordable housing projects. An example is the development of public low-rent housing within industrial parks to cater to the migrant workers and imported talent who work for Shanghai Lingang Economic Development Co. Ltd. The municipal government also entrusts state-owned enterprises (SOEs) to lead the development of new housing estates in a one-stop fashion through integrated planning at the district level, as seen in the Xinjiangwancheng project developed by Shanghai Chengtou Group Corporation, an SOE that managed the planning, design, and construction as well as the overall project investment, marketing and sales. Benefitting from the creativity and resources of the private sector, the Xinjiangwancheng project has set a high bar in the local property market by incorporating eco-friendly and low carbon smart-city concepts.

Private enterprises in Shanghai are highly proactive in developing new technologies and methods in the area of prefabricated building construction, often done in collaboration with research institutions. The municipal government encourages such technology development by regularly updating building codes, technical standards, and allowing new technologies to be applied in demonstration projects. This has translated to booming growth in Shanghai’s prefabricated building industry with the establishment of national-level prefabricated construction industry bases and numerous specialised local enterprises.

**(ii) A Two-System Approach to Affordable Housing**

Providing affordable housing is a key imperative for many cities across China. In the early 1980s, most Chinese cities adopted the Hong Kong model where homes were built and sold as commercial products in the private market. Land was sold to developers through auctions. Only a small portion of cheap rental flats was set aside for the lower-income earners. Today, cities like Shenzhen have moved away from the Hong Kong model and begun to look at Singapore’s housing policy where the majority of its people live in affordable public housing.<sup>126</sup> Realising that very few can afford to buy housing in the private market, Shanghai has, since 2011, been building up its stock of public housing under the “Two Systems”—namely the housing market system (private housing), and housing security system (public housing). This supports the fundamental notion that houses are to be lived in, rather than for speculation.

In addition to placing greater emphasis on developing affordable public housing, Shanghai has implemented a comprehensive people-centric, affordable housing system targeting different groups of people where the application criteria are differentiated by income and assets. The challenge that Shanghai now faces is in providing adequate affordable housing for two groups of people—local low- and middle-income families who have difficulties in securing housing, and permanent residents of Shanghai without household registration certificates, especially young talent who have contributed significantly to the city’s development. To address this, Shanghai has developed a housing system where it provides transient residency for these target groups of people, which may range from low-rent housing to commercial low-rent housing. This demonstrates the dynamic and flexible approach being taken to meet the needs of different groups in Shanghai.

**(iii) A Fine System of Urban Management**

As observed during a visit to Jing’an District’s Operation and Management Centre (静安区城市运行综合管理中心), Shanghai deploys a “grid management” model as an important component of their system known as “fine urban management”. “Fine” here refers to the level of granularity in urban management. In this model, each district is divided into smaller zones, with a person-in-charge taking care of municipal issues in each zone. The Centre works horizontally



*‘Fine urban management’ with smart technologies.*

Image courtesy of Jing’an District Urban Operation and Management Centre.

across with other relevant departments in the district, and vertically with these persons-in-charge to manage daily operations and maintenance of several urban systems at any one time. These urban systems include gas, water, waste management and public security, all of which are managed with the aid of technology that pulls data from a network of sensors and closed-circuit televisions. Similar to Singapore, the Centre also deploys drones to inspect the glass façades of buildings for maintenance and repair.

**(iv) Urban Conservation and Rejuvenation can go Hand-in-hand With Public Housing**

Chun Yang Li in Hongkou District (虹口区春阳里), an old settlement with traditional residential housing, serves

as a visual example of how housing development policies in Shanghai have evolved over the years. In the past, the principle of “demolish first, renovate later, conserve last” (拆改留) was often applied for housing development in Shanghai. However, after several decades of radical urban redevelopment and the consequent realisation of the loss of cultural heritage, Shanghai authorities have moved to embrace conservation.

Current housing development policies adhere to the principle of “conserve first, renovate later, demolish last” (留改拆) when options run out. The example of Chun Yang Li provides a good case study to support urban conservation practices, where urban rejuvenation efforts do not require

the destruction of old buildings. This is similar to the discourse and experience in Singapore where potential for older yet usable buildings are being refurbished and conserved, and subsequently given a new lease of life as affordable housing.

**(v) Designing Public Spaces for Active Mobility**

A visit to the North Bund area in Shanghai along the west bank of the Huangpu River, showed that the two banks of the Huangpu River had been pedestrianised and equipped with cycling and running tracks. This has provided both residents and visitors with convenient access to a 46-km-long walkway, free from the disruption of vehicular traffic. These enhancements have since inspired fresh ideas for the creation of alternative spaces for greater walkability and mobility along the Huangpu River. In many ways, Shanghai's efforts mirror and validate ongoing projects in Singapore in areas such as the Singapore River and the Bishan-Ang Mo Kio Park, where improvements to the natural landscape surrounding existing rivers have resulted in the opening up of new recreational spaces. These recreational spaces have quickly become valued amenities to residents of the surrounding housing estates and beyond. Such transformation efforts are also closely aligned to Singapore's vision to create more cycling towns, such as Ang Mo Kio.

**BOTTOM LEFT:** *The restored houses at the Chun Yang Li pilot site (right) and the houses pending restoration (left).*

Images courtesy of Shanghai Construction No. 4 (Group) Co., Ltd.

**RIGHT:** *Pedestrian- and cyclist-friendly features have been introduced at both banks of the Huangpu River to encourage active mobility and greater vibrancy.*

Images courtesy of Yangpu District Huangpu Riversides Development Coordination Office and Pudong New District Huangpu Riversides Development Coordination Office.



Shanghai's efforts in enacting improvements to areas such as housing policy, estate management, conservation and landscape enhancement echo the importance of taking an urban systems approach to public housing provision. This approach has been the cornerstone of Singapore's own experience in providing public housing to its people over the past six decades and counting. The approach relies on comprehensive planning, inter-agency collaboration, working across sectors, a spirit of innovation and active community involvement to achieve its housing and urban development objectives effectively and efficiently for the benefit of all.

## INSIGHTS GLEANED FROM SINGAPORE'S HOUSING SYSTEM

Through the study visit and relevant research on Singapore, including learning journeys to HDB towns, much has been learnt about the city's housing system. Insights were gleaned by Shanghai from Singapore's strong emphasis on housing—its housing development model and estate management.

**LEFT:** *The neighbourhood centre at Bukit Batok Street 11 was upgraded under the Remaking Our Heartland (ROH) programme. It now sports a community pavilion with a green roof, community herb gardens and a 3-Generation playground.*

Image courtesy of the Housing and Development Board.

**RIGHT:** *The once-sparse areas in this neighbourhood centre at Yuhua Place were rejuvenated with new street furniture, landscaping, floor finishings and facilities to create more bonding opportunities among residents.*

Image courtesy of the Housing and Development Board.



### (i) Attach Greater Importance to Housing Development

Housing development in Singapore is not only a matter of improving living conditions, but also a crucial political and economic issue. Therefore, housing policy plays an important role in Singapore's governance system. For example, in order to develop public housing, Singapore has fully mobilised various resources, such as land, planning, capital, community management, and supporting public services, so as to make public housing available to its residents. Moreover, the Singapore government has entrusted the HDB with a wide range of responsibilities, including planning, land construction and allocation, supply,

and management of public housing. As a megapolis, Shanghai should attach greater importance to housing development and its significance in advancing the modernisation of urban governance system and capabilities.

### (ii) Formulate a Long-term Housing Development Strategy Through Concept Planning

Singapore has a comprehensive and long-term land use strategy to cater to the growth of the nation and to support the needs of its growing population housed largely in public housing. In 1971, Singapore drafted its first concept plan, a comprehensive land use and transport blueprint, and used it to plan and develop different

parts of Singapore including HDB new towns, while balancing residential, commercial, transport and other competing land uses.

Shanghai should integrate its housing development planning with its overall long-term development strategy, coordinating the development of various aspects such as land, transport, housing and education, meeting residents' various needs such as accommodation, work and entertainment.

### **(iii) Build a Housing System Befitting its Situation**

With the institutional framework of the HDB and the Central Provident Fund Board, Singapore has established a housing system dominated by public housing, and is helping Singaporeans realise their "home ownership" dream. Currently, about three quarters of the housing stock in Singapore is classified as public housing, which accommodates about 80% of the country's residents. After decades of development, Shanghai has evolved its housing framework into one that integrates "One Positioning, Two Systems, Three Focuses and Four-in-One" system. It promotes both home ownership and renting, has resulted in remarkable housing development achievements.

In the future, Shanghai will continue to diligently strive to promote housing development, focus on overcoming its shortcomings, gather relevant resources to make breakthroughs, and continuously improve the housing development model in line with market conditions.

### **(iv) Use Urban Renewal Concept to Upgrade Old Districts**

In 2007, Singapore rolled out the Remaking Our Heartland programme to comprehensively renew and further develop existing HDB towns and estates. Through renewing whole towns, Singapore was able to improve the living environment, provide new facilities and at the same time, enhance connectivity, public space and promote social integration and interaction. Similarly, Shanghai also sought to rejuvenate its old residential districts through urban redevelopment, thereby further developing Shanghai as a whole, and improving living conditions and the environment for its residents. Shanghai's efforts in redeveloping its older estates focused more on reconstructing public spaces and amenities, improving the environs and functionality of the neighbourhood, and providing more fundamental municipal facilities and public services.

### **(v) Make Gradual Improvements to the Management System of Communities**

Prior to 1989, the management of public housing estates was centrally managed by the HDB. In 1989, town councils were established to allow elected Members of Parliament and residents to determine how they want to manage their towns so that each town can develop its own distinctive character. Currently, a typical town council manages approximately 70,000 residential properties, 2,000 commercial properties, 60 multi-storey carparks, 10,000 above-ground parking spots, 14 hawker centres and markets, and 1,400 elevators. Town councils are primarily responsible for the management, maintenance, improvement and control

of the common properties in public housing estates, including repair and management, preventive and regular maintenance, protection and cleaning, landscaping and gardening, 24-hour basic maintenance services, control of public space usage, environment improvement and report of residents' opinions and suggestions. After three rounds of the "3-Year Action Plans", Shanghai attained significant achievements in comprehensive estate management and community governance. To continue providing a satisfying living and working environment, as well as a stable and orderly society, Shanghai still needs to further refine the estate management system, community governance and service mechanisms.

# CONCLUSION: HOUSING PROVISION AS AN URBAN SYSTEM



As evident from both Singapore and Shanghai's experiences and approaches towards public housing provision, the achievements of both cities can be attributed to a spirit of innovation mixed with intuition, moving beyond boundaries and continually building upon, both physically and tacitly, the experiences, approaches and knowledge of the past for the next housing project and development. Yet these roles are not only anchored within the respective housing authority or housing experts alone, but have involved both cities adopting a holistic systems approach to housing where players from a variety of urban systems are brought into the fold of affordable housing to contribute their expertise, resources and ideas from their domains. From urban planning, transportation, sanitation, commercial, healthcare, environment, social services and education, among a myriad of others, from both the public and private sectors, all have contributed in significant ways to housing development.

For instance, Singapore's Housing and Development Board's comprehensive master planning for their towns which are designed for self-sufficiency to meet residents' live, work and play needs, is implemented in partnership with different agencies as well as the private sector who help to develop services, amenities and infrastructure such as transit, recreation, and commercial use. These are integrated and seamlessly connected to one another. In Shanghai, the private sector operates the public low-rent housing provision for young workers, introduced talents, migrant workers and permanent residents, with support from the government. To support the industry in the development and construction of affordable housing, China Development Bank provides preferential loan rates to developers, while teaming up with other commercial banks to offer joint housing loans for residents.

Both cities have supported their industries through training and capability building to encourage the testing and adoption of innovative technology and methods for housing

construction, such as prefabrication technology. At the same time, the well-being of residents and the environment are not overlooked; the establishment of stringent quality and safety standards and the use of sustainable materials and processes, and environmentally-friendly designs attest to that. In managing and maintaining estates, Shanghai sought to enhance a system of self-governance among residents and homeowners through the grassroots, while Singapore adopted a combination of nominal cost sharing, voting by residents and extensive public consultations to increase the sense of ownership of residents over their living environment and improvement works carried out. Cutting-edge tools and innovation from the realms of science, data analytics and smart technology are also leveraged on by both cities to increase the level of efficiency in estate management and the liveability of the housing estates.

To strengthen community bonds and cohesion among residents, both Singapore and Shanghai have partnered with grassroots organisations, government agencies and non-governmental organisations (NGOs) to develop community-level initiatives such as Singapore's "Community In Bloom" and "Lively Places" programmes, and Shanghai's "Kangjian Yulanyuan Community Garden."

Whether in the area of neighbourhood planning, affordability, housing construction and design, estate rejuvenation and management, or community building and resident engagement, the willingness to break down traditional knowledge silos and collaborate across different systems, or in the case of producing this publication, learning and sharing knowledge across different cities, is critical for a successful housing system. While society, technology, and challenges will continue to evolve, this spirit of partnership has and will continue to stand both Singapore and Shanghai in good stead by providing quality and liveable homes for all well into the future.

# EPILOGUE

**Singapore** and Shanghai are young cities which have carved out new approaches to sustainable urbanisation for liveable cities with high population density. Both cities are dynamic, innovative and enterprising, so there is much to learn from each other to meet new challenges such as climate change and demographic diversity. Providing quality public housing for every citizen lies at the heart of a liveable city, but such a complex task requires cities to work effectively across different urban systems with multiple stakeholders.

*Providing Homes for All: Insights from Singapore and Shanghai* is a joint effort by the Centre for Liveable Cities (CLC) and the Shanghai Municipal Commission of Housing, Urban-Rural Development and Management (MCHURDM) to draw out key lessons and insights on providing affordable housing for sharing between Singapore and Shanghai, and internationally. This publication is a key deliverable under the Urban Governance Working Group of the Singapore-Shanghai Comprehensive Cooperation Council (SSCCC) where CLC and the Shanghai MCHURDM are the joint leads of this working group. A series of reciprocal study visits involving housing researchers, leading practitioners, and public and private sector experts from both cities were organised for this research collaboration.

The first five chapters examine how Singapore and Shanghai have applied a “systems approach” in providing quality public housing for their residents, and distil common lessons from both cities’ efforts in overcoming their past and present housing challenges. The final chapter seeks to explore the future of public housing in both cities in response to emerging trends and draw the key insights gleaned from their experiences.

It is our hope that the contents will be a useful and practical reference to other cities interested in this topic on providing affordable housing.

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# ENDNOTES

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