

Urban Systems Studies: Planning and Building Liveable & Sustainable Cities



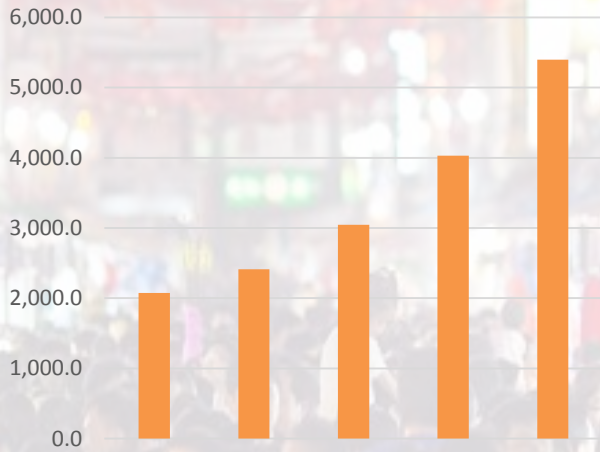
Dr. Limin Hee
*Director
Centre for Liveable Cities
Ministry of National Development
Singapore*



about

Singapore

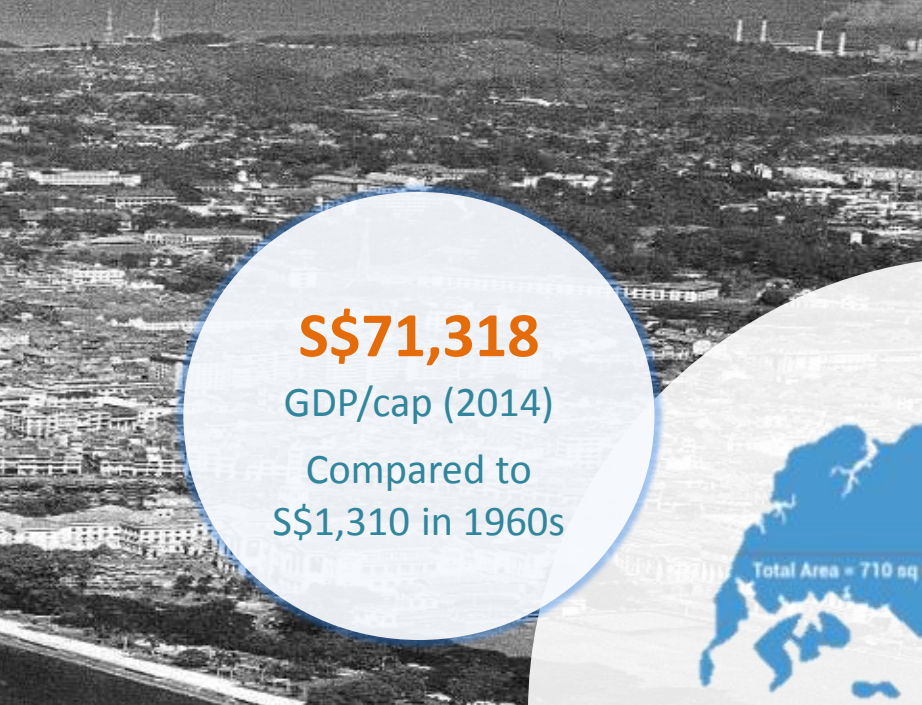




5.54 mil population



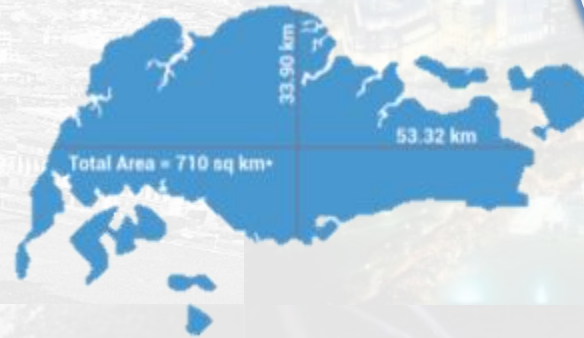
7,697 persons/km²
density



S\$71,318
GDP/cap (2014)
Compared to
S\$1,310 in 1960s



90.3%
home
ownership
(2014)



719.1 km² land area
5.54mil population
7,697/km² density



2.0%
unemployment
rate (2015)
Compared to
8.6% in 1960s



100%
access to
clean water



**High
Density**
7,697pax/sqm



**High
Liveability**
#26 on Mercer
Quality of Life
survey 2015



**Centre for Liveable
Cities**



CENTRE for
LiveableCities
SINGAPORE

Distil, create and share
knowledge on

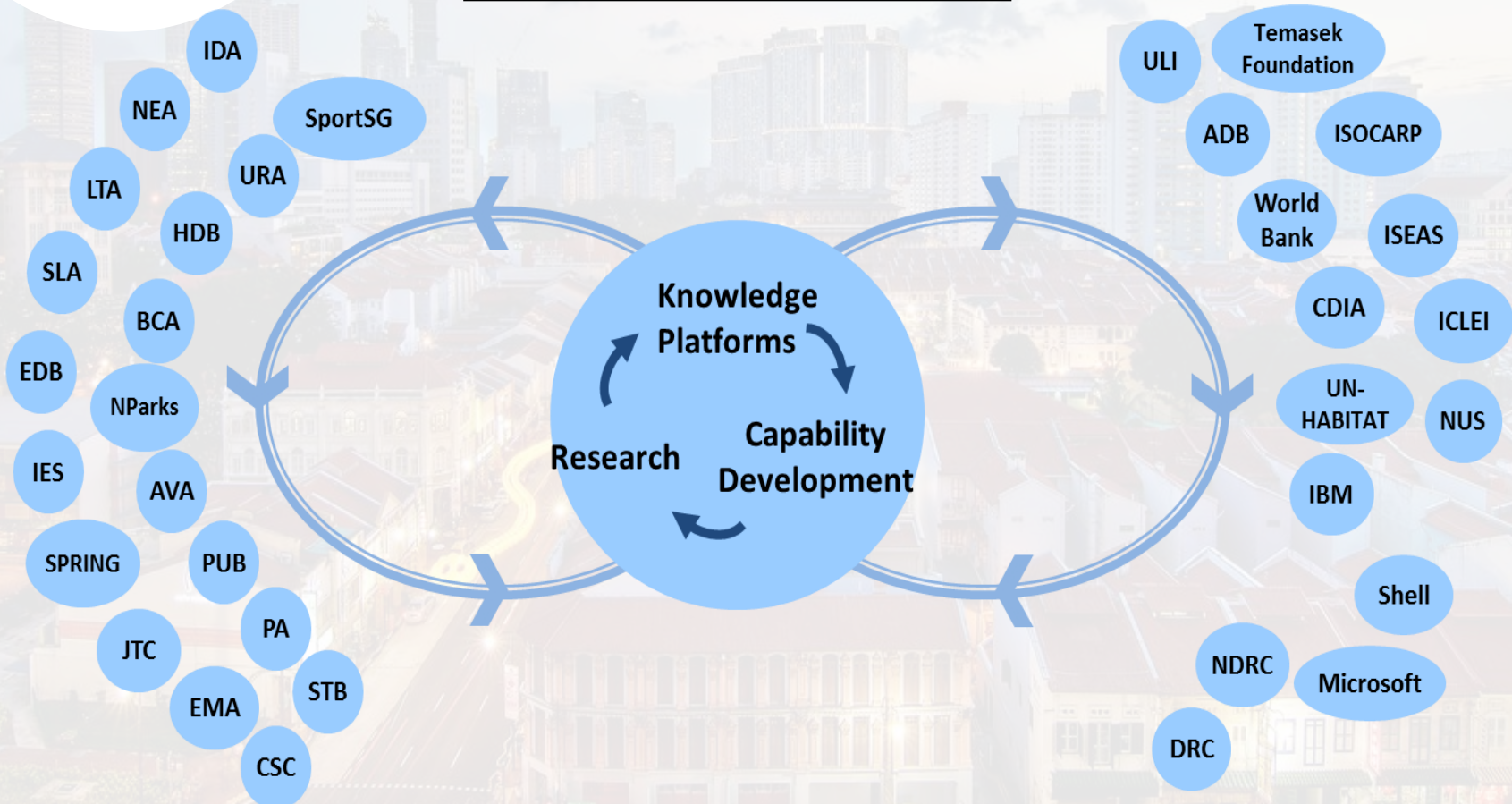
**liveable and
sustainable cities**



Ministry of the Environment
and Water Resources

*To distil, create and share knowledge on
liveable and sustainable cities*

Our Stakeholders & Partners

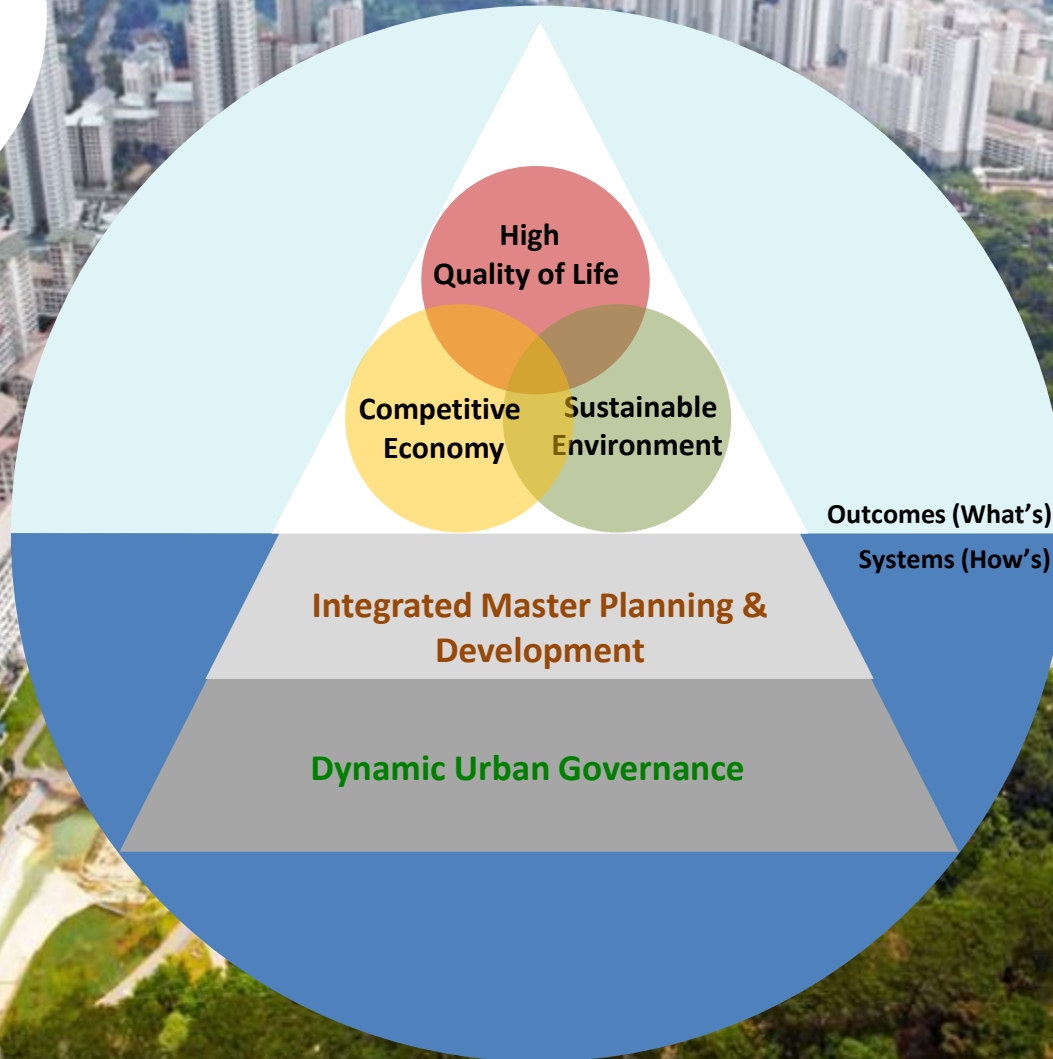


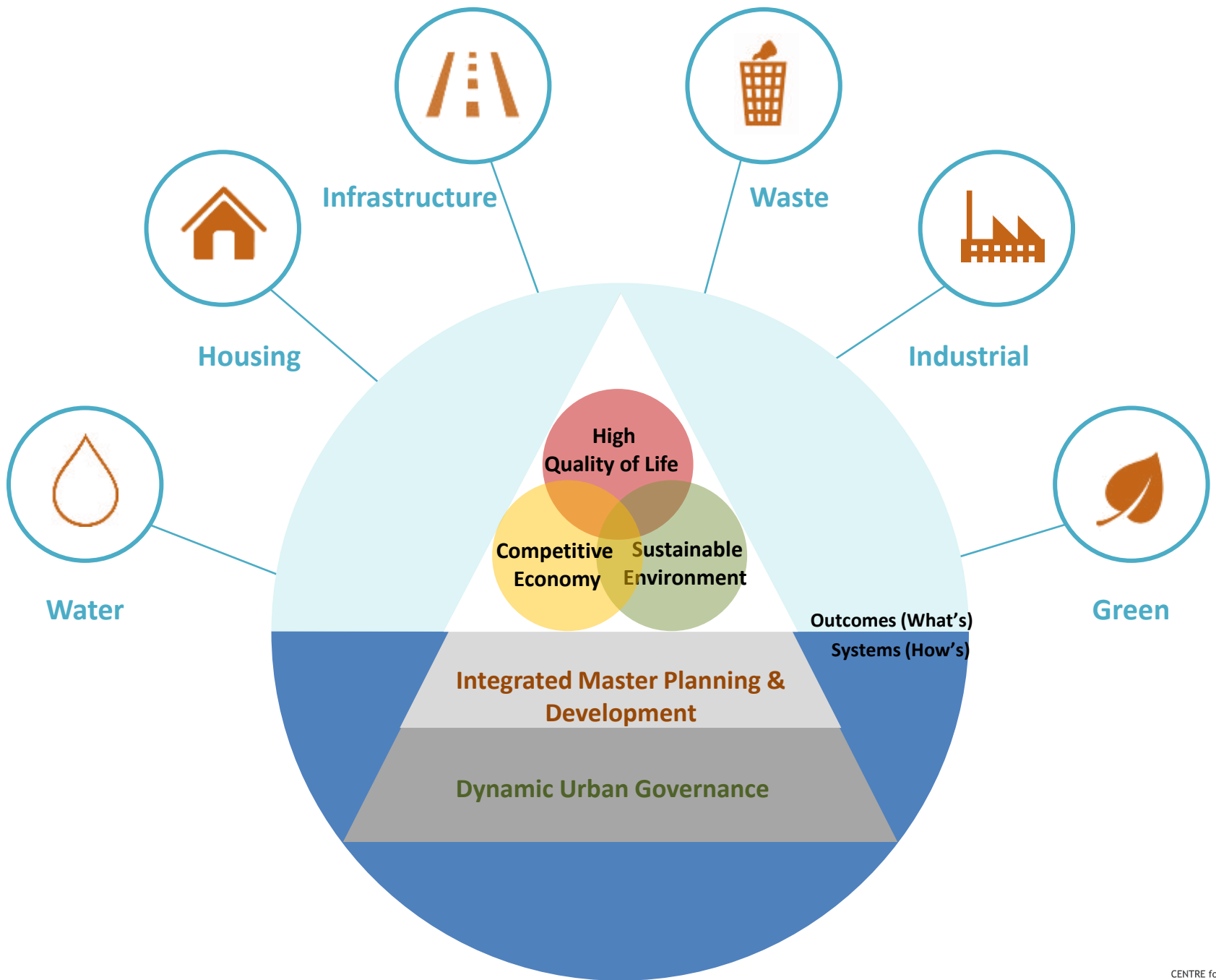


CLC

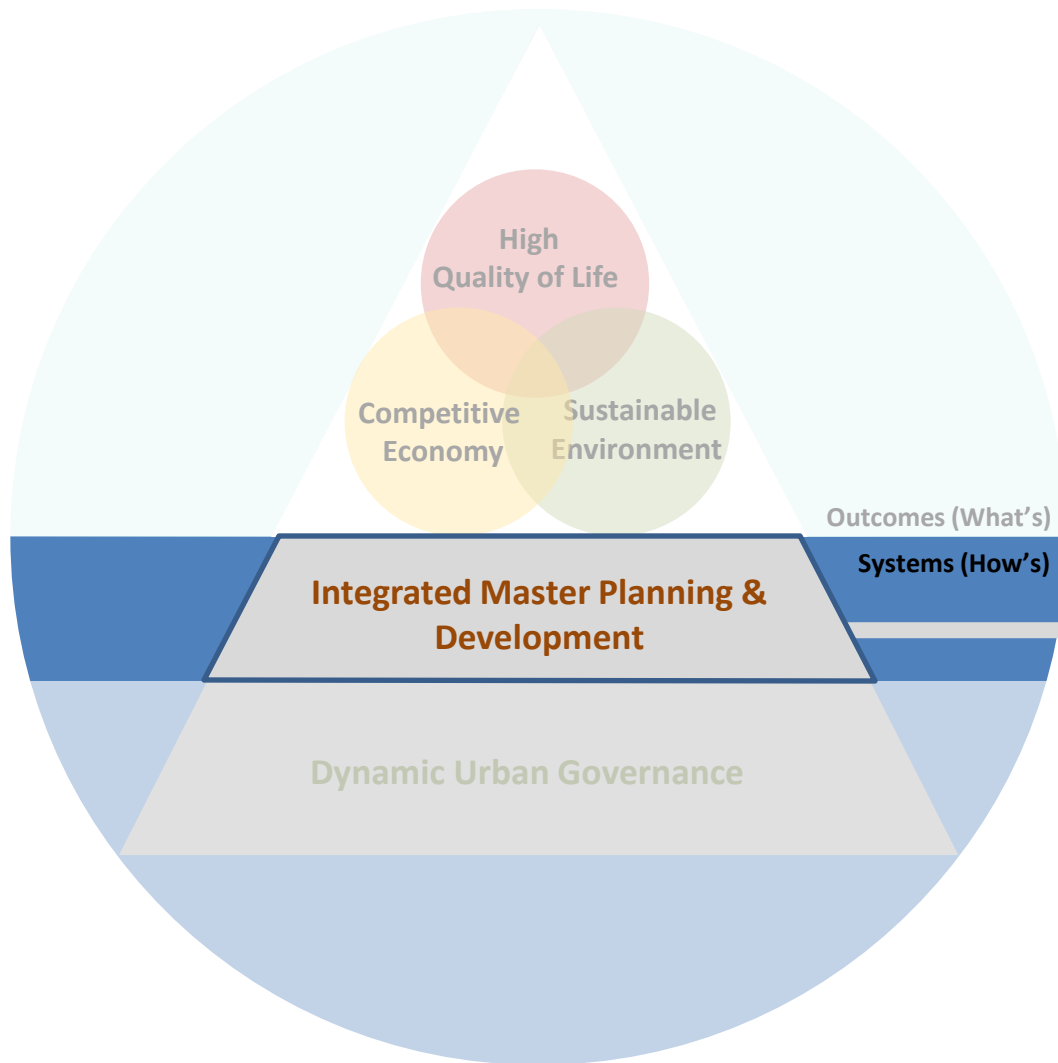
**Liveability
Framework**

CLC's
framework in
city building





Integrated Master Planning & Development



Integrated Master Planning & Development

1. Think long term
2. “Fight productively”
3. Build in flexibility
4. Execute effectively
5. Innovate systematically

Integrated
Master
Planning
& Devt

Whole-of-Government Efforts



Ministry of Education
SINGAPORE



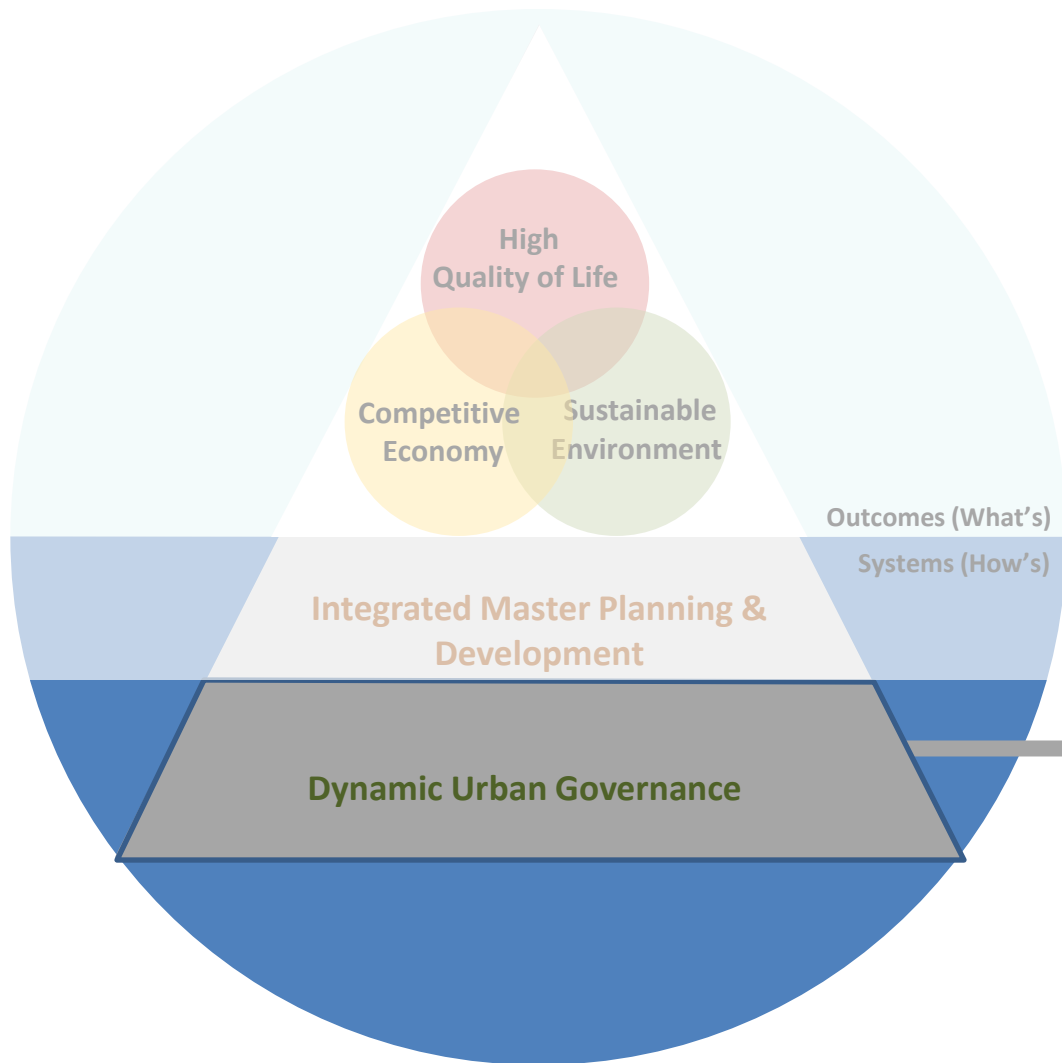
URA as the
planning
authority

However, land use
planning is a
multi-agency
effort

Mechanism/
platforms in place
to facilitate this
**whole-of-
government
approach** and to
iron out conflicts
and trade-offs

Example
Master Plan
Committee (MPC)
Garden City
Action Committee
(GCAC)

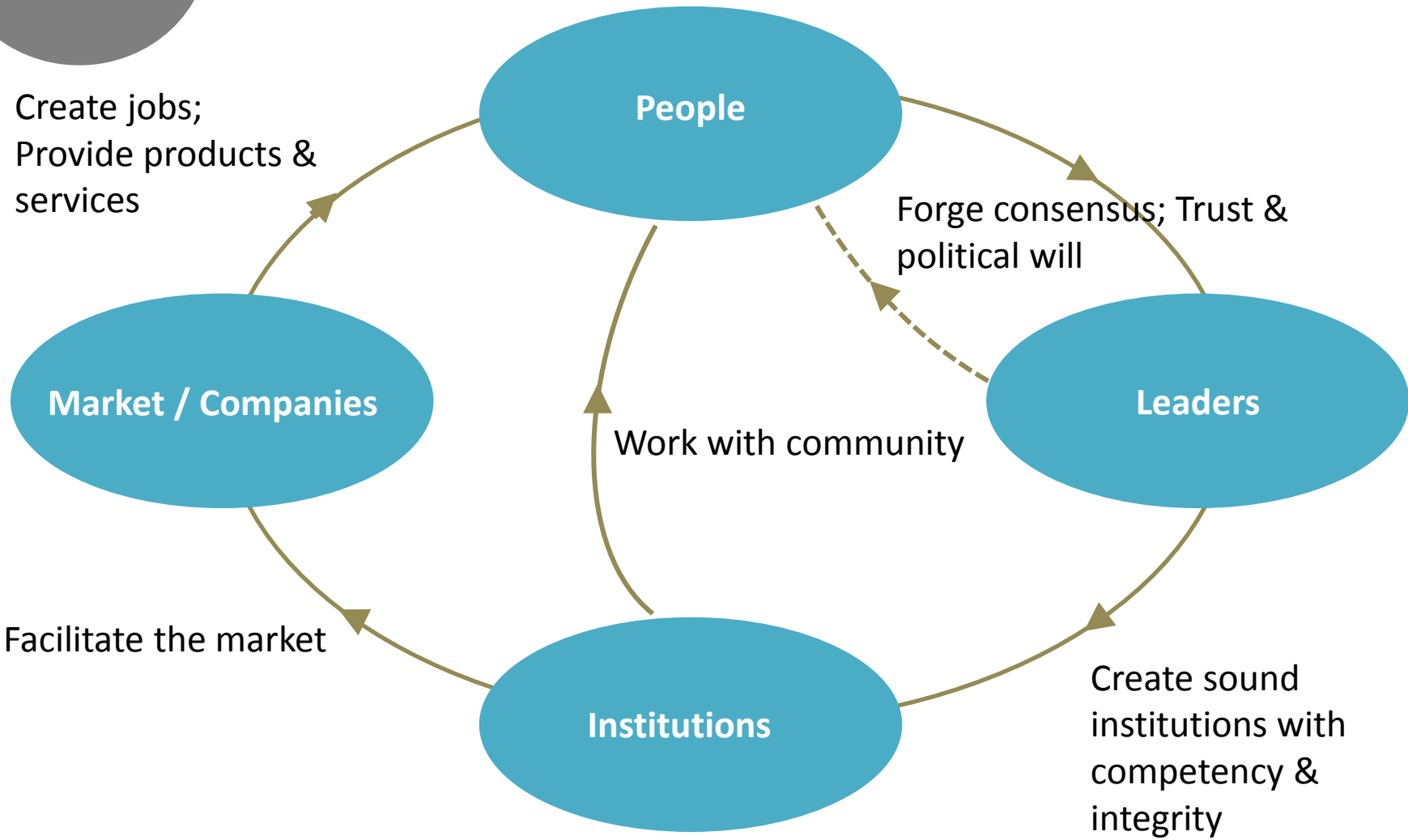
Dynamic Urban Governance



Dynamic Urban Governance

1. Lead with vision and pragmatism
2. Build a culture of integrity
3. Cultivate sound institutions
4. Involve the community as stakeholders
5. Work with markets

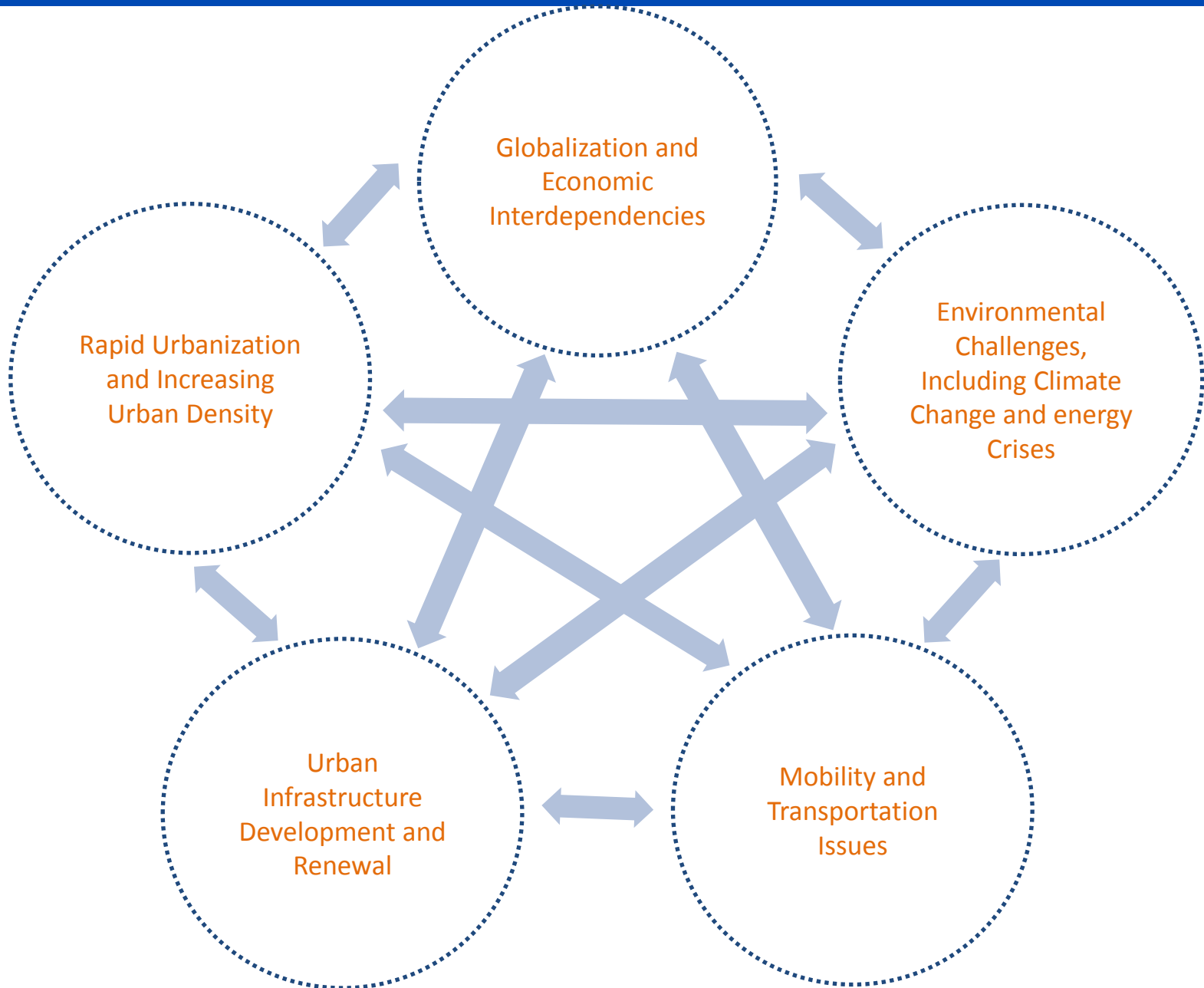
**Dynamic
Urban
Governance**





Urban Challenges
in the 21st Century

Challenges Ahead





Building with Nature

Beyond traditional
urban planning



**Building a
City with
Nature**



Singapore's Water Story

“I had a unit in my office which coordinated the whole of government. This dominated every other policy-making. Every other policy had to bend at the knees of our water survival.”

- Late Mr. Lee Kuan Yew at the Singapore International Water Week (2008)

**4 National
Taps:
Closing the
Water Loop**



An aerial photograph of Singapore's Marina Bay Sands and Marina Barrage. The Marina Barrage is a long concrete structure with several gates across the water. To the left, the Marina Bay Sands hotel is visible with its distinctive three towers. The background shows a dense urban skyline with various skyscrapers under a clear blue sky. Two white circular callouts are overlaid on the image, containing text.

Marina Bay &
Marina Barrage:
First In-City
Reservoir

catchment area
of **10,000**
hectares, or
one-sixth the
size of
Singapore

Mainstreaming ABC Waters Programme

Water

A VITAL INGREDIENT IN LIVEABLE CITIES

Chef for Liveable Cities researcher Lee Yeng Sheng says urban planners, like the best chefs, need to consider how they can push the boundaries to better integrate water and its related infrastructure into the heart of cities.

Urban planning and development is like cooking. For great food, skill is needed. Experienced chefs are able to use a combination of good ingredients, cooking temperature and time to produce delicious food. Similarly, good urban planners are able to create the right mixture of infrastructural and architectural elements to build a liveable city within geographical and socio-economic planning parameters. It is without question that the quality of the ingredients is very important. Your chilli crab does a lot better when it is cooked with fresh crab, just because the crab is fresh. A good chef sources for the best ingredients. For this, the availability of a range of good ingredients in the market is essential.

Water – our drainage infrastructure, waterways, water bodies – is one such ingredient in urban planning. If used poorly, the urban landscape could be scarred with unattractive-looking concrete channels. If used well, it has phenomenal potential in enhancing the cityscape. Water can help soften the city's appearance, cool the city, and provide nodes of habitat for urban biodiversity. Importantly, water connects emotionally with the people: peaceful waters bring calm, while chuggy or rushing waters lead to fear and anxiety.



“ ... in the urban planning process, water, our drainage infrastructure, our waterways and waterbodies, is one ingredient in urban planning ... If you use it poorly, ... you end up with most of the kind of urban landscape that we see – scarred with utilitarian looking concrete channels ... if you use it well, ... it has phenomenal potential in enhancing the cityscape.”

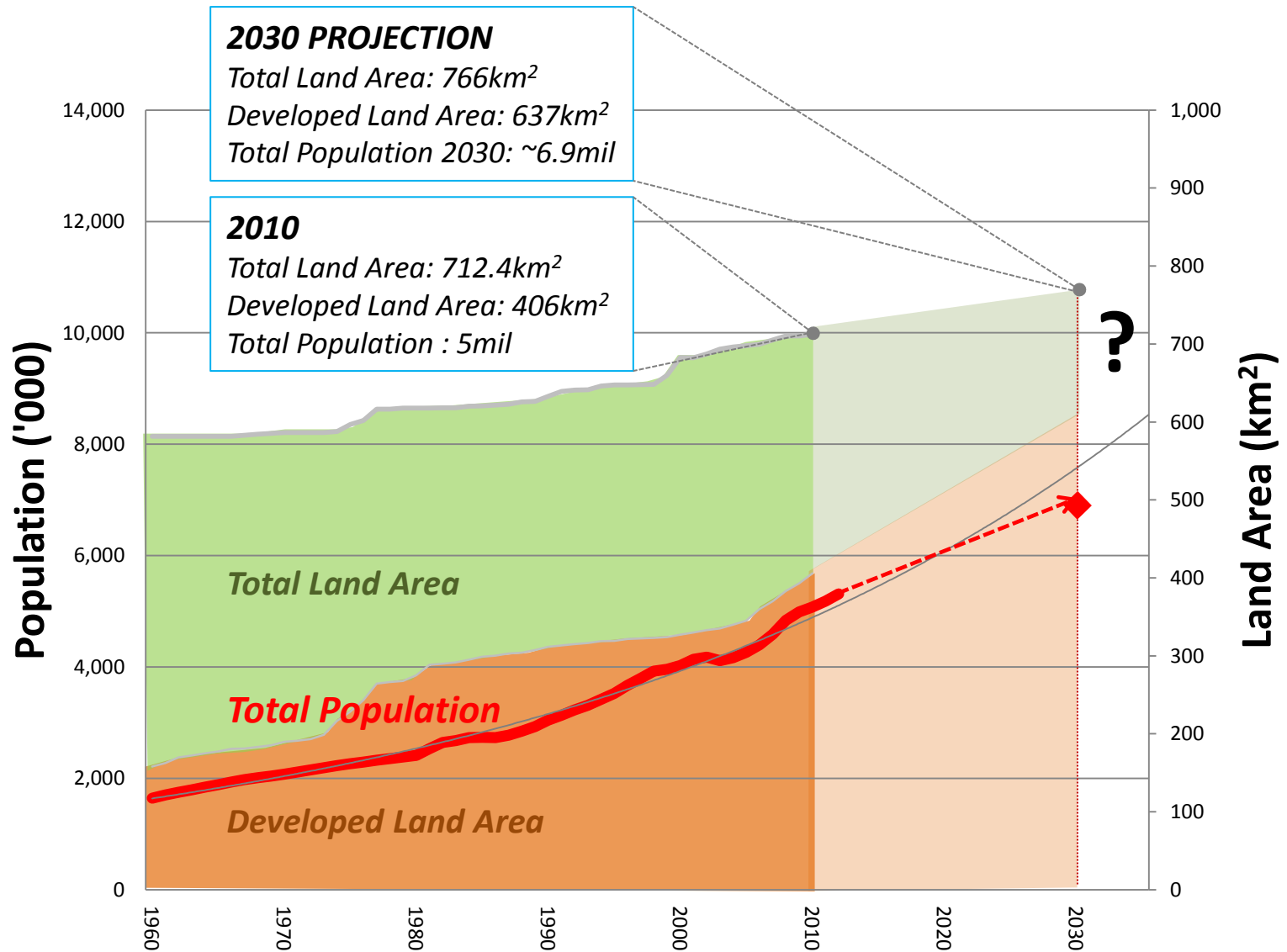
– Khoo Teng Chye, Executive Director/CLC

**Mainstreaming
ABC Waters
Programme**

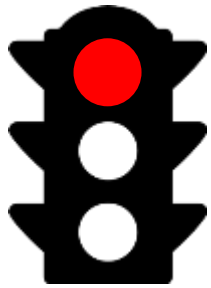




Building a **Car-Lite**
Society



**Growing Population & Economy,
 Limited land**



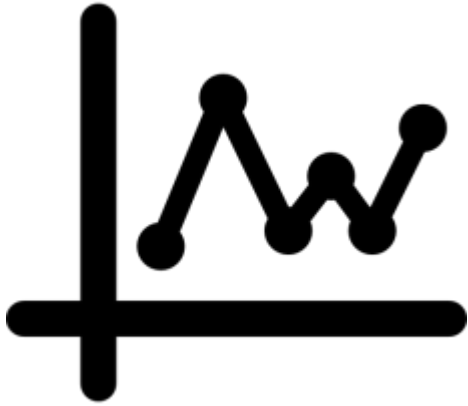
Increasing Travel Demand

| | Population | No. of Daily Journeys | No. of Journeys Per Person |
|------|------------|----------------------------------|----------------------------|
| 1981 | 2.32 mil | 2.7 mil | 1.16 |
| 1999 | 3.95 mil | 7.7 mil | 1.94 |
| 2013 | 5.4 mil | 12.5 mil | 2.3 |
| 2030 | | Projected 18.7 mil (+50%) | |



Rising Car Ownership

| | Car to Population Ratio | % of Car Owning Households | % of Car to Total Vehicle Population |
|------|-------------------------|----------------------------|--------------------------------------|
| 1968 | | 21% | |
| 1980 | 1 to 16 | | 41% |
| 1990 | 1 to 13 | 28% | 50% |
| 2000 | 1 to 10 | 32% | 57% |
| 2010 | 1 to 8.5 | | 62% |
| 2013 | 1 to 8.7 | 46% | 63% |



**Growing
Population
and Economy**

5.5mil in 2015;
6.0mil by 2020;
6.9mil by 2030



**Tighter Land
Constraints**

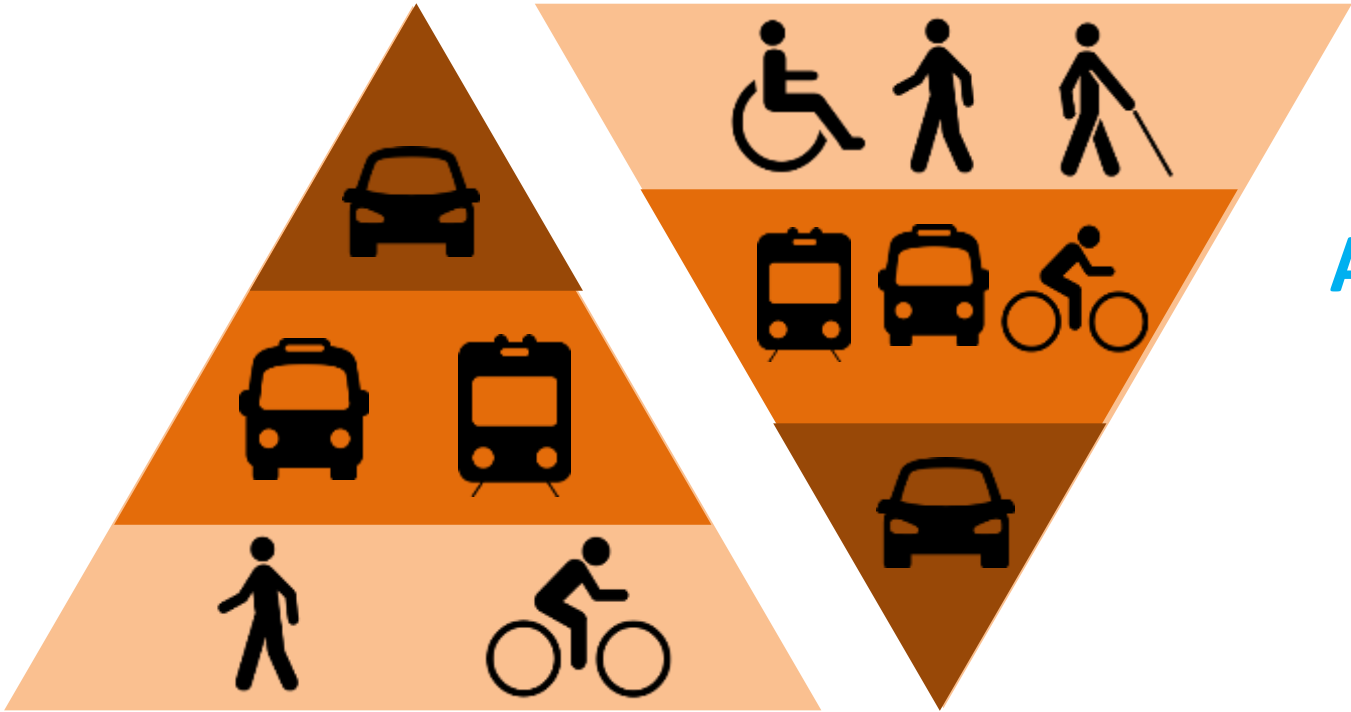
12% of land for
roads v. 14% of
land for housing
(2010)



**Changing
Commuter
Expectations and
Norms**

Need for commuter-
centric and inclusive
transport system

Future



Current

**A Paradigm
Shift in
Urban
Mobility**

↑  Bus interchange



**Make Public
Transport a
Choice Mode**



**Enhancing Inclusive
& Sustainable
Mobility**

**Creating a
People-friendly &
Car-lite Singapore**



**Manage Road
and Vehicle
Growth**



**Car-lite
developments**

↑  Bus interchange



**Make Public
Transport a
Choice Mode**



Enhancing Inclusive
& Sustainable
Mobility

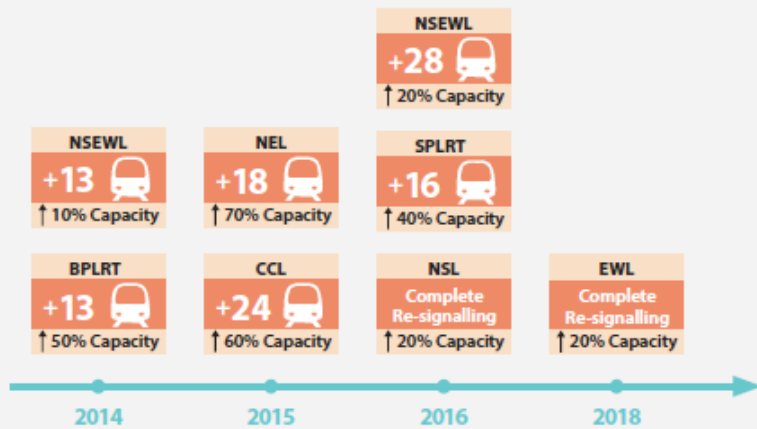
Creating a People-friendly & Car-lite Singapore



Manage Road
and Vehicle
Growth

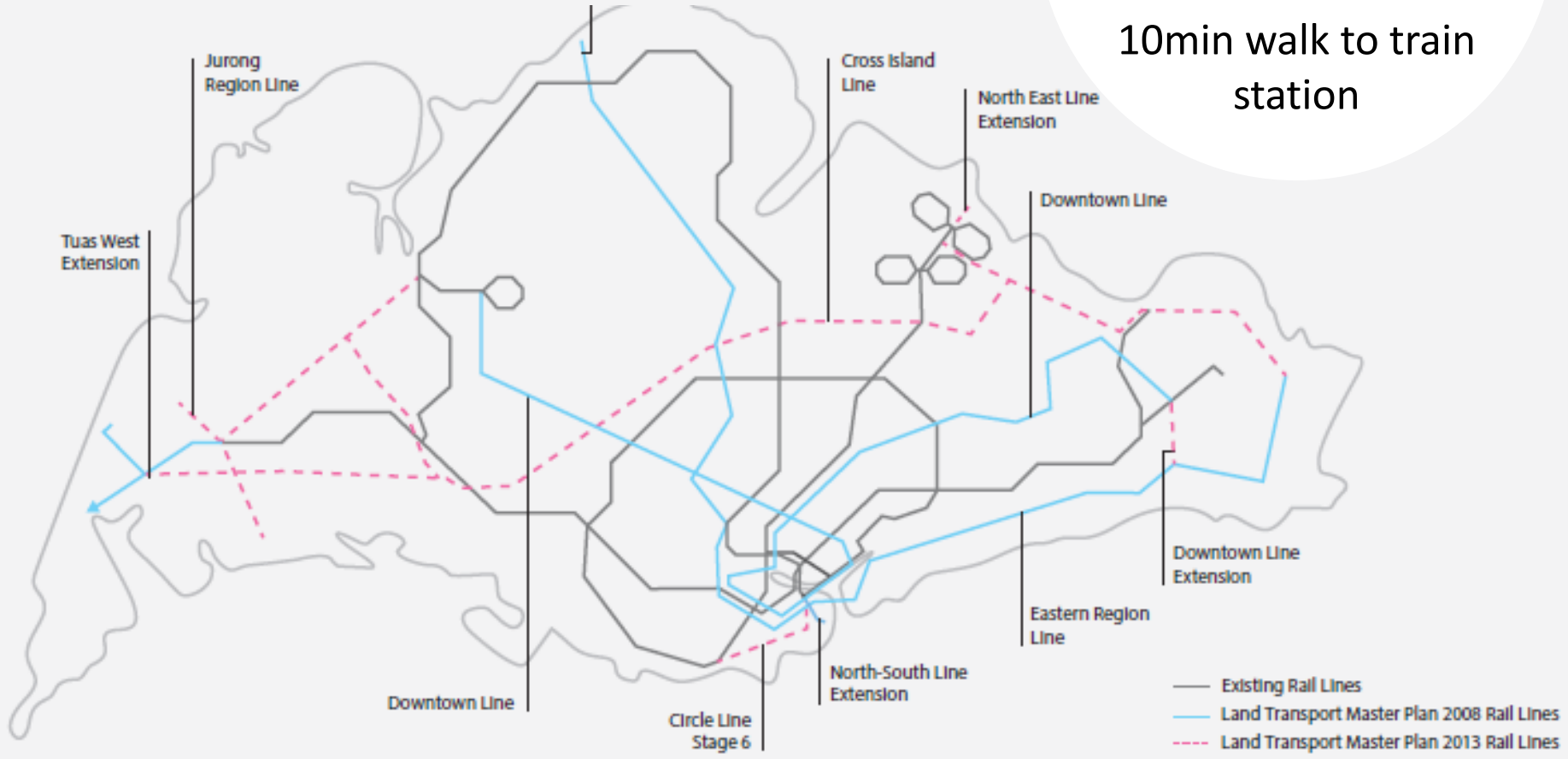


Car-lite
developments



- NSEWL: North-South and East-West Lines
- NSL: North-South Line
- EWL: East-West Line
- NEL: North East Line
- CCL: Circle Line
- BPLRT: Bukit Panjang LRT
- SPLRT: Sengkang and Punggol LRTs

Doubling the rail network
 182km to 360km by 2030; 8 in 10 households within 10min walk to train station



Note: LTMP 2008 Rail lines include Thomson Line, Eastern Region Line, Tuas West Extension, and North-South Line Extension.

↑  **Bus interchange**



**Make Public
Transport a
Choice Mode**



**Enhancing Inclusive
& Sustainable
Mobility**

**Creating a
People-friendly &
Car-lite Singapore**



**Manage Road
and Vehicle
Growth**



**Car-lite
developments**





Control Road Growth

Moderate road growth to serve only new areas, due to land constraints

Allocate Road Space

Prioritise public transport users within existing road space e.g. more bus lanes

Discouraging private car ownership & usage

Control Car Park Supply

- Closure of Car Park Hubs
- Under review: Allow conversion of surplus parking to usable space

Control Car Usage

Other measures to discourage private car usage e.g. distance-based ERP2 based on satellite tracking



**Bridge gap
between
private cars &
public transport**



Car sharing

Allow access to a car when desired, without need for private ownership

Autonomous Vehicles

AV shuttle trials at One-North and Gardens by the Bay

Enhancing taxi services

Better geographical matching of supply and demand with smartphone technology



Bus interchange



Make Public Transport a Choice Mode



Enhancing Inclusive & Sustainable Mobility

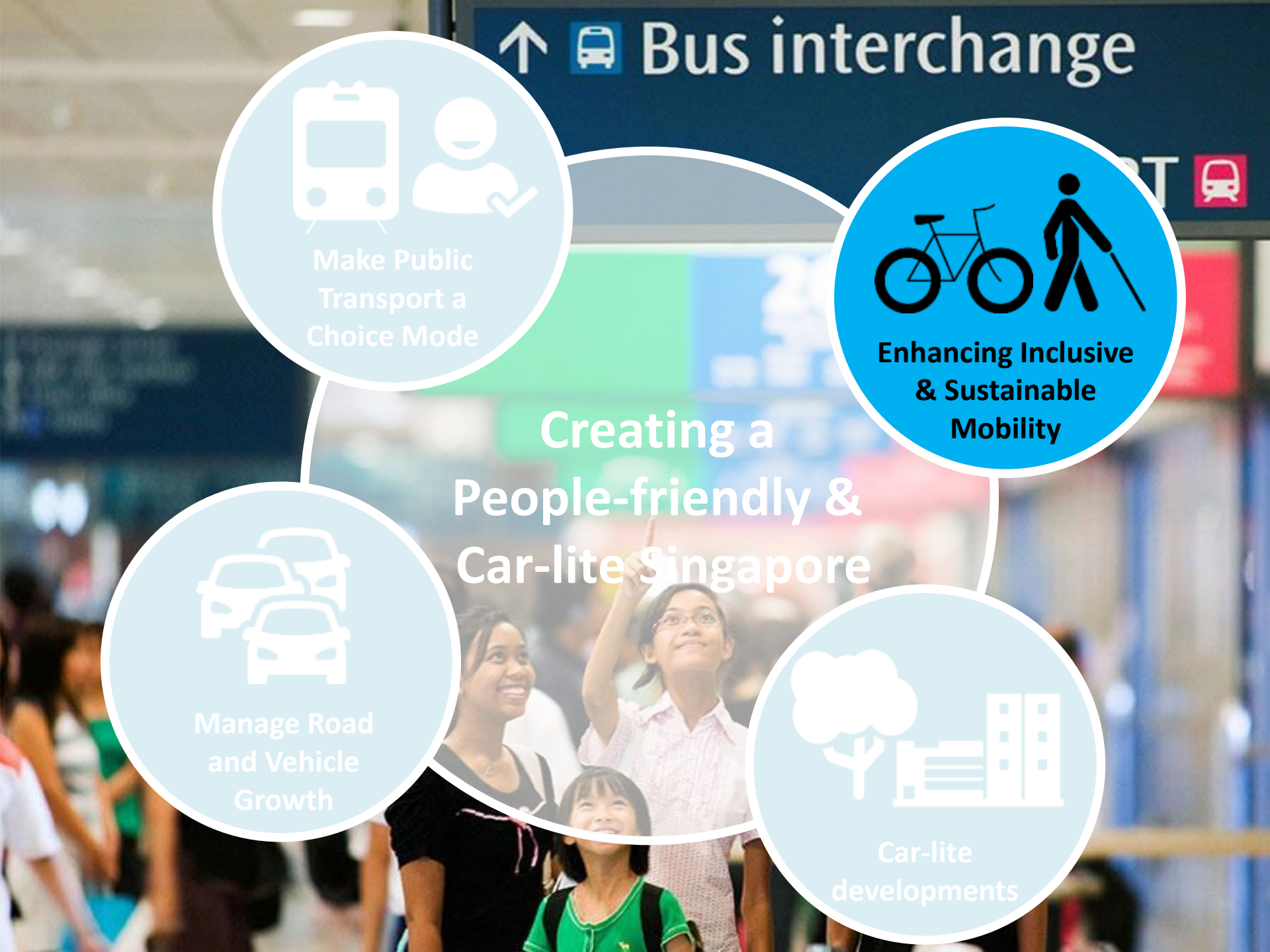
Creating a People-friendly & Car-lite Singapore



Manage Road and Vehicle Growth



Car-lite developments



WALK & CYCLE singapore

Inter-agency effort by Urban Redevelopment Authority (URA) and the Land Transport Authority (LTA), supported by the Housing and Development Board (HDB) and National Parks Board (Nparks) to make Singapore more walking and cycling friendly, in line with the Sustainable Singapore Blueprint.



Setting up of Active Mobility Unit within Land Transport Authority to coordinate all cycling and walking-related policies.

LTA's Walk2Ride

- Sheltered walkways from transport nodes to destinations
- To be expanded from 200m to 400m from transport nodes; 46km to 285km in total by 2018



Enhancing Walkability

Underground Pedestrian Network to be expanded in downtown areas

Barrier Free Accessibility
All MRT and bus interchanges are already barrier free
All public buses to be wheelchair-accessible by 2020

↑  Bus interchange



Make Public Transport a Choice Mode



Enhancing Inclusive & Sustainable Mobility

Creating a People-friendly & Car-lite Singapore



Manage Road and Vehicle Growth



Car-lite developments

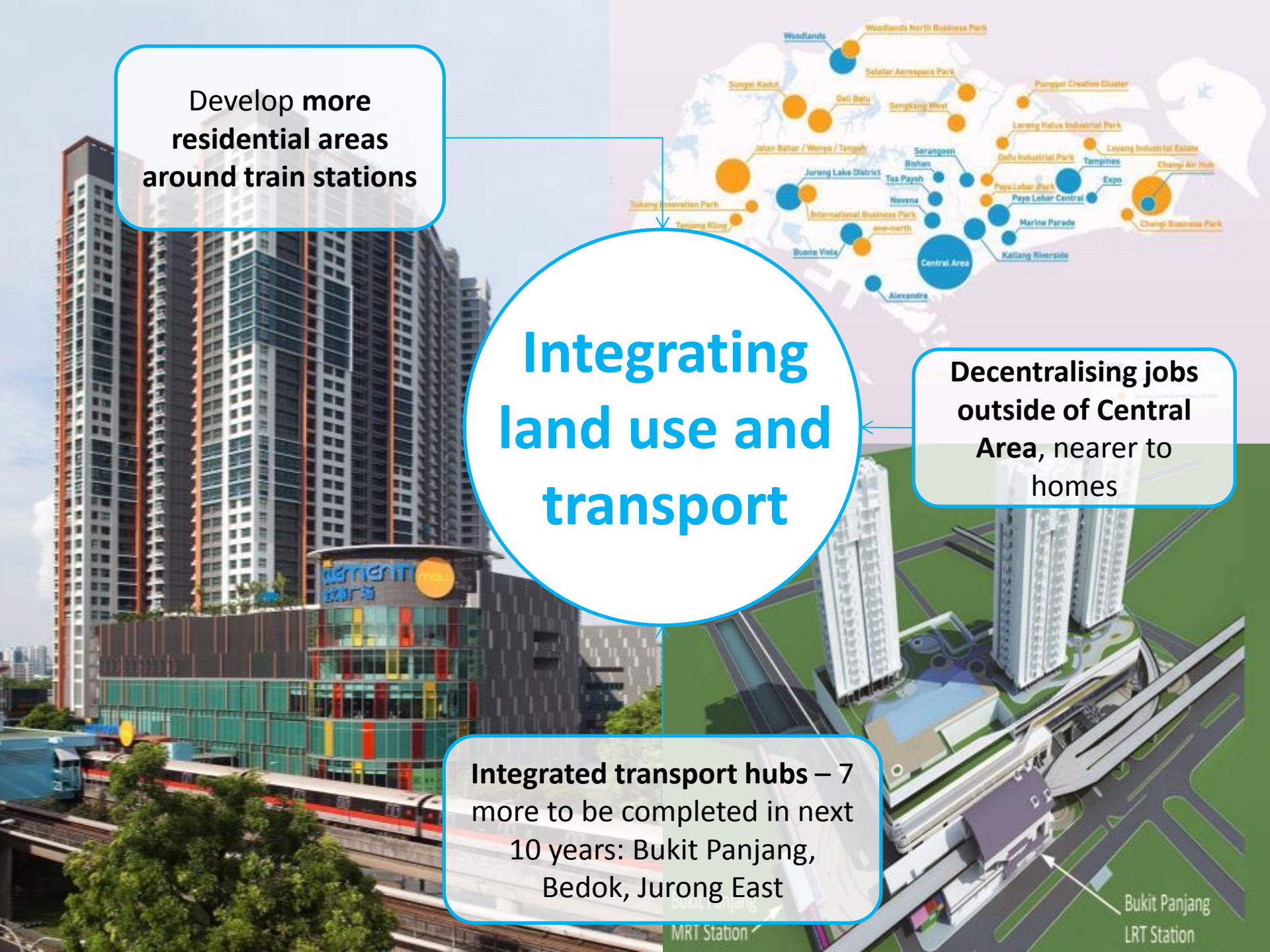


Develop more residential areas around train stations

Integrating land use and transport

Decentralising jobs outside of Central Area, nearer to homes

Integrated transport hubs – 7 more to be completed in next 10 years: Bukit Panjang, Bedok, Jurong East





New residential developments – Kampong Bugis & Bidadari

Easy access to trains and buses

Enhanced pedestrian and cycling connectivity

Reduced parking supply

**Upcoming
Car lite
Residential
Precincts**



A photograph of a road with yellow zebra crossings and a blue circular callout box. The road is paved with asphalt and has yellow diagonal stripes for the crossings. There are trees on both sides of the road, and a blue building is visible in the background. A blue circular callout box is overlaid on the left side of the image, containing the text 'Creating more inclusive streets'.

Creating more inclusive streets

Silver zones

- Senior-friendly road safety features at areas with higher percentage of elderly population
- E.g. Lowered speed limit (40km/h); 2-stage crossings
- 15 silver zones by 2017; 35 by 2020

Streets for People

- Community –initiated programme for car-free zones within the neighbourhood

Car free zones

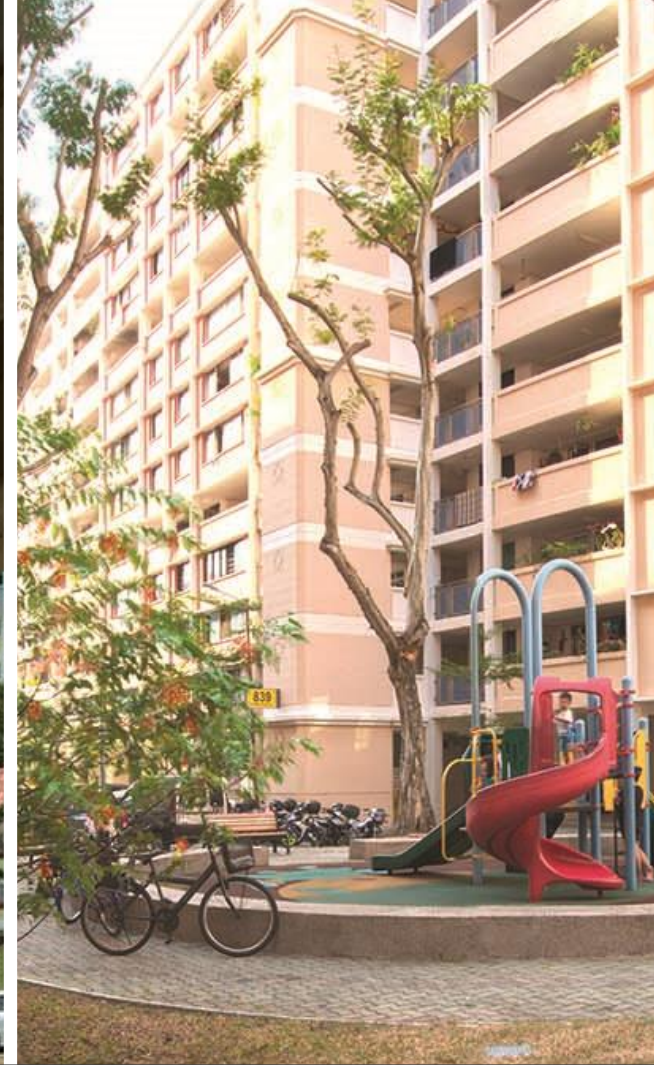
- Regular road closures at 13 locations throughout the city at night/weekends
- E.g. Kampong Glam; Orchard Rd; Civic District (upcoming)

Transforming streets into liveable spaces

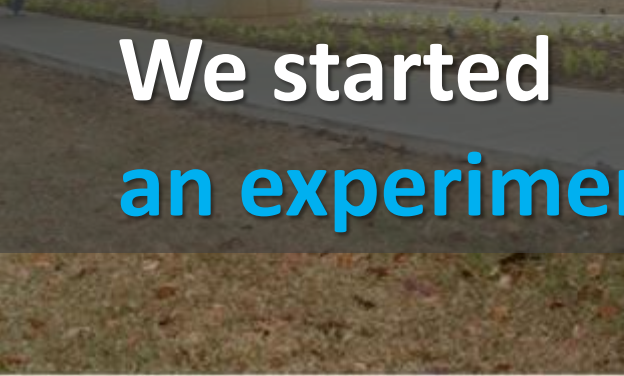


Reimagining Tampines

bringing sustainable
solutions to the local
community



**We started
an experiment in Tampines...**





... in making
people the center of developments



... by creating sustainable solutions through a pilot local planning process

A people-oriented approach for a mature town like Tampines



TAMPINES



Advisors,
Town
Council



Public
Agencies

> creating open platforms for discussions



Private
Practitioners



NUS Architecture

0 100 m
Scale 1:2500



People-Oriented Planning

Make it inviting.
And people will come.



Evidence-based Studies

Observe the people.
Collect data
systematically.



Pilot Projects

Engage the
community.
Test it out.

> multi-stakeholder workshops



> working sessions with students





> a **“Liveability Blueprint”** for Tampines





**Prioritise
Pedestrians**



**Continuous
Sheltered
Connections**



> active & healthy lifestyle



**Reduced Surface
Parking**



Traffic Calming





Active
Programming



> community spaces



Inclusive Spaces

It takes a village...

Advisors,
Town
Council



Private
Practitioners



NUS Architecture



Liveable and Sustainable Cities: Innovative Cities of Opportunity



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- **Lee Kuan Yew World City Prize**
- **Young Leaders Symposium**

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MORE THAN



20,000

Attendees

including 128 mayors and city leaders and 26 ministers



133

Countries/Regions Represented



800

Participating Companies



S\$14.5B

Business Announcements

