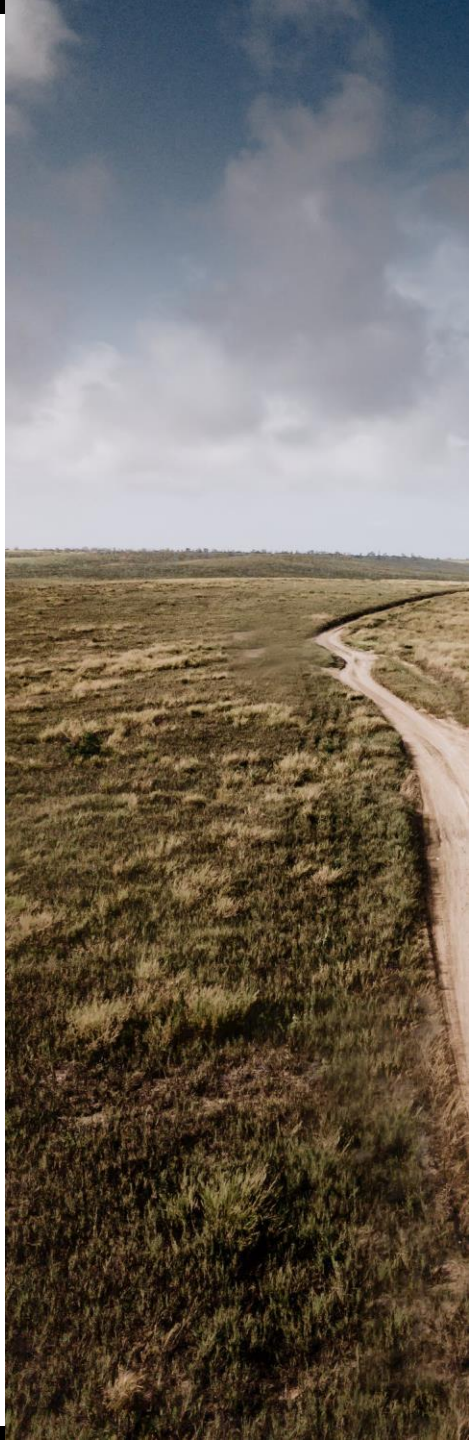
DR ALI GHAFFARIAN
DR AMIRHOSEIN GHAFFARIAN

AHK Repräsentanz der Deutschen Wirtschaft German-New Zealand Chamber of Commerce Inc.

RESPONSIVE + GREEN RG UBE URBAN BUILT ENVIRONMENT LAB

BUILT ENVIRONMENT ENGINEERING AUT

EXTROVERTED INTELLIGENT TECHNOLOGIES FORMING INTROVERTED SMART CITIES




AUT
BUILT
ENVIRONMENT
ENGINEERING
AUT


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

MERCER
MAKE TOMORROW, TODAY

3

Recreation

Housing

Economic environment

Consumer goods availability

Public services and transport

Political and social environment

Natural environment

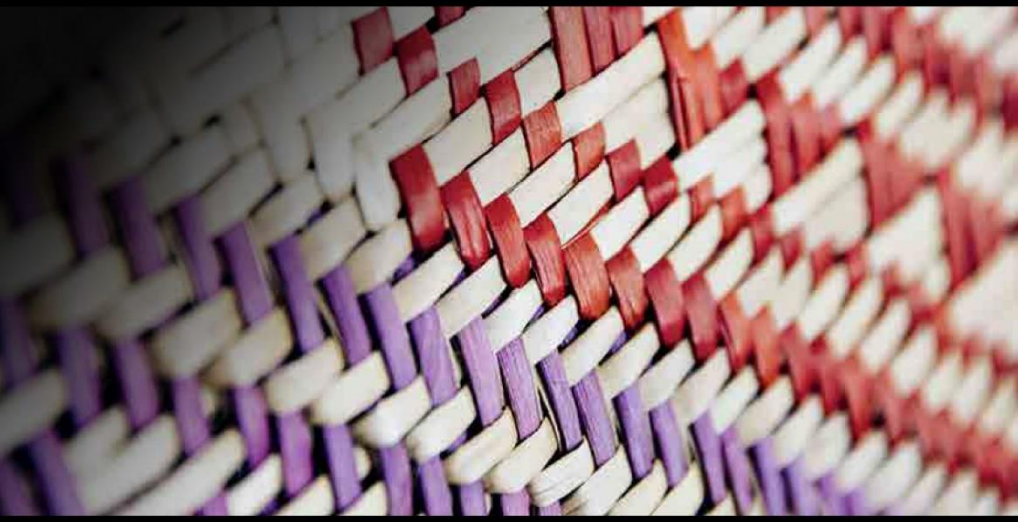
Socio-cultural environment

School and education

Medical and health considerations

QUALITY OF LIVING CITY RANKING (2019) - Source [1]

AUCKLAND PLAN 2050



Auckland Plan 2050

June 2018

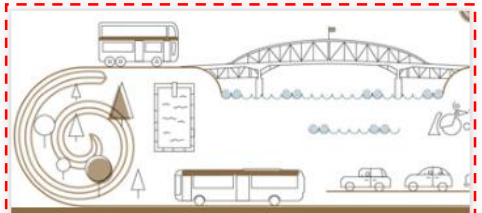
Auckland Council
Te Kaunihera o Tāmaki Makaurau

Our six outcomes

Outcome: Belonging and Participation

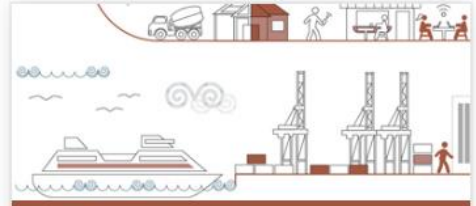
Outcome: Māori Identity and Wellbeing

Outcome: Homes and Places



Outcome: Transport and Access

Outcome: Environment and Cultural Heritage



Outcome: Opportunity and Prosperity

Source [2]

Direction 1: Develop a quality compact urban form to accommodate Auckland's growth

Direction 2: Accelerate the construction of homes that meet Aucklanders' changing needs and preferences

Direction 1: Better connect people, places, goods and services

Direction 2: Increase genuine travel choices for a healthy, vibrant and equitable Auckland

Direction 3: Shift to a housing system that ensures secure and affordable homes for all

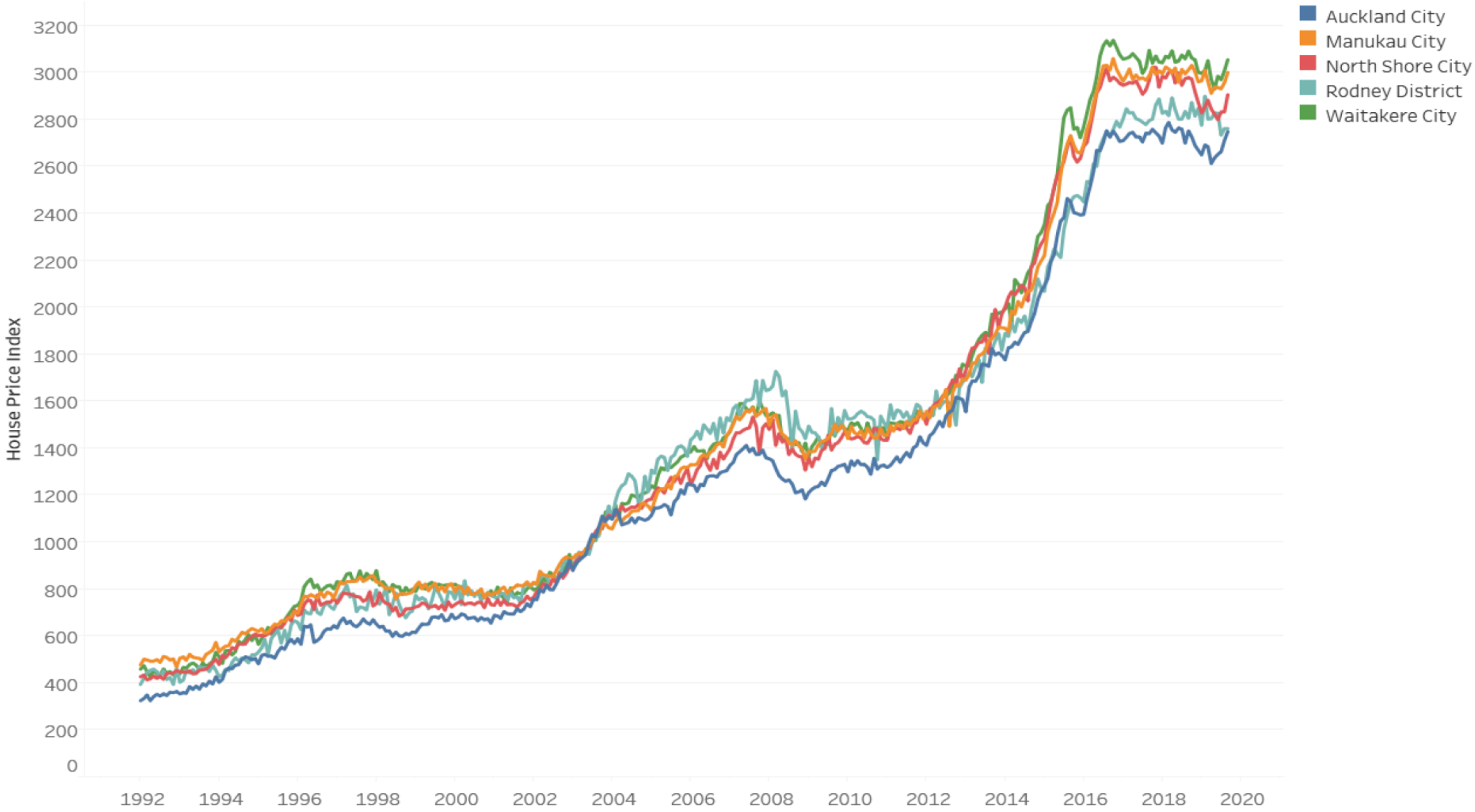
Direction 4: Provide sufficient public places and spaces that are inclusive, accessible and contribute to urban living

Direction 3: Maximise safety and environmental protection

Source [2]

AUCKLAND COUNCILS HOUSE PRICE INDICIES

MONTHLY CALCULATED HOUSE PRICE INDEX FIGURES FOR COUNCILS (OCTOBER 2019) – Source [3]



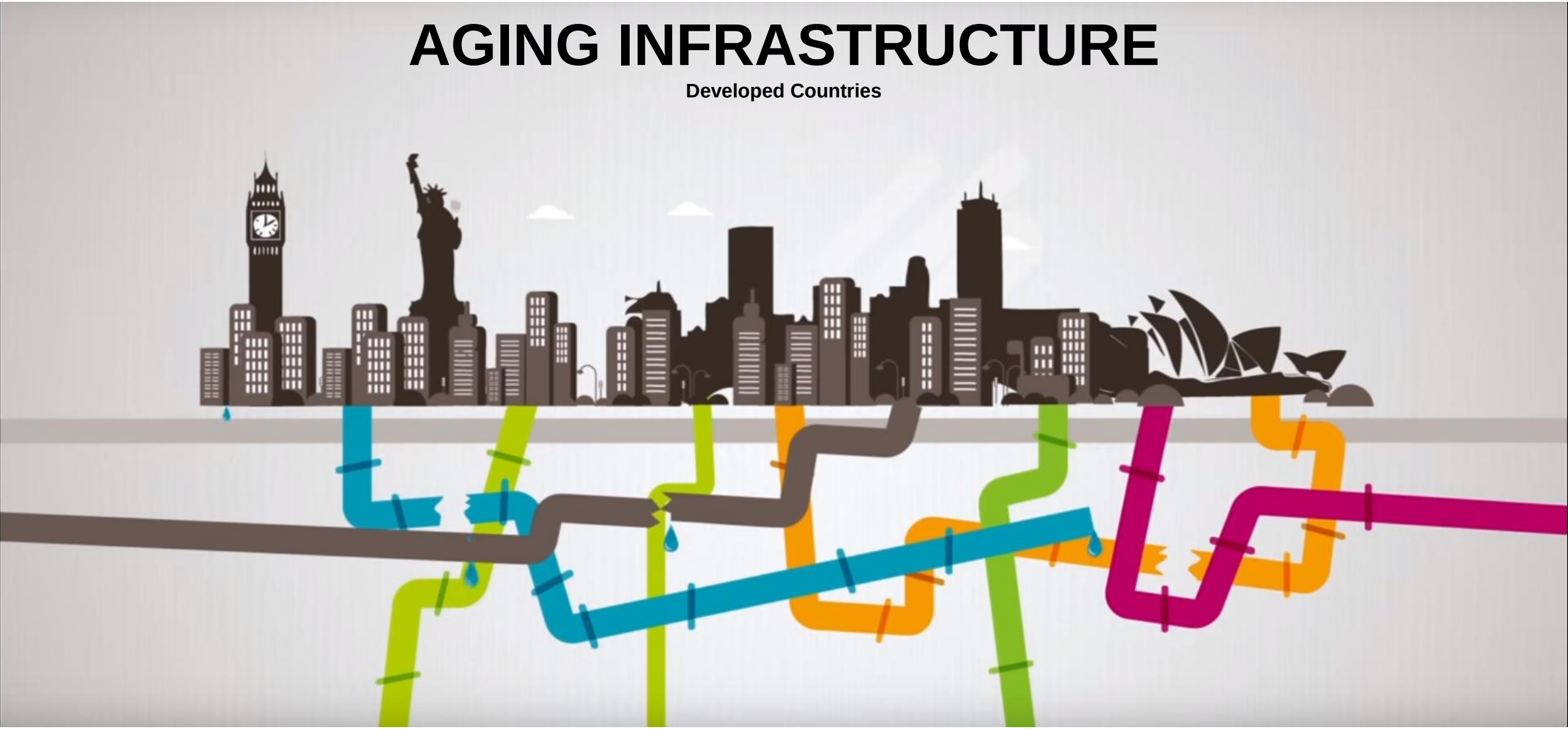
AFFORDABILITY

SUSTAINABILITY

AFFORDABILITY

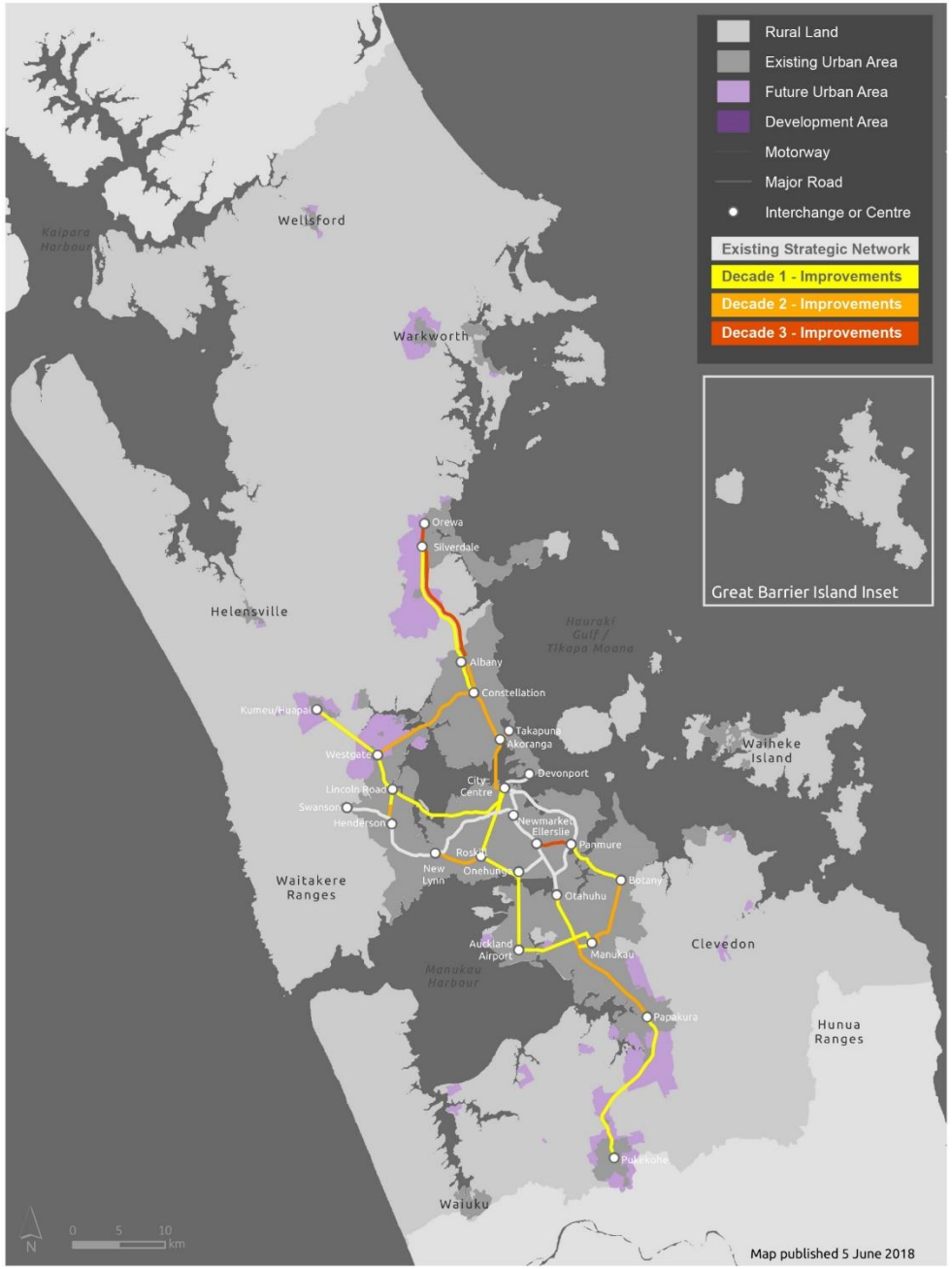
AGING INFRASTRUCTURE

Developed Countries



Source [4]

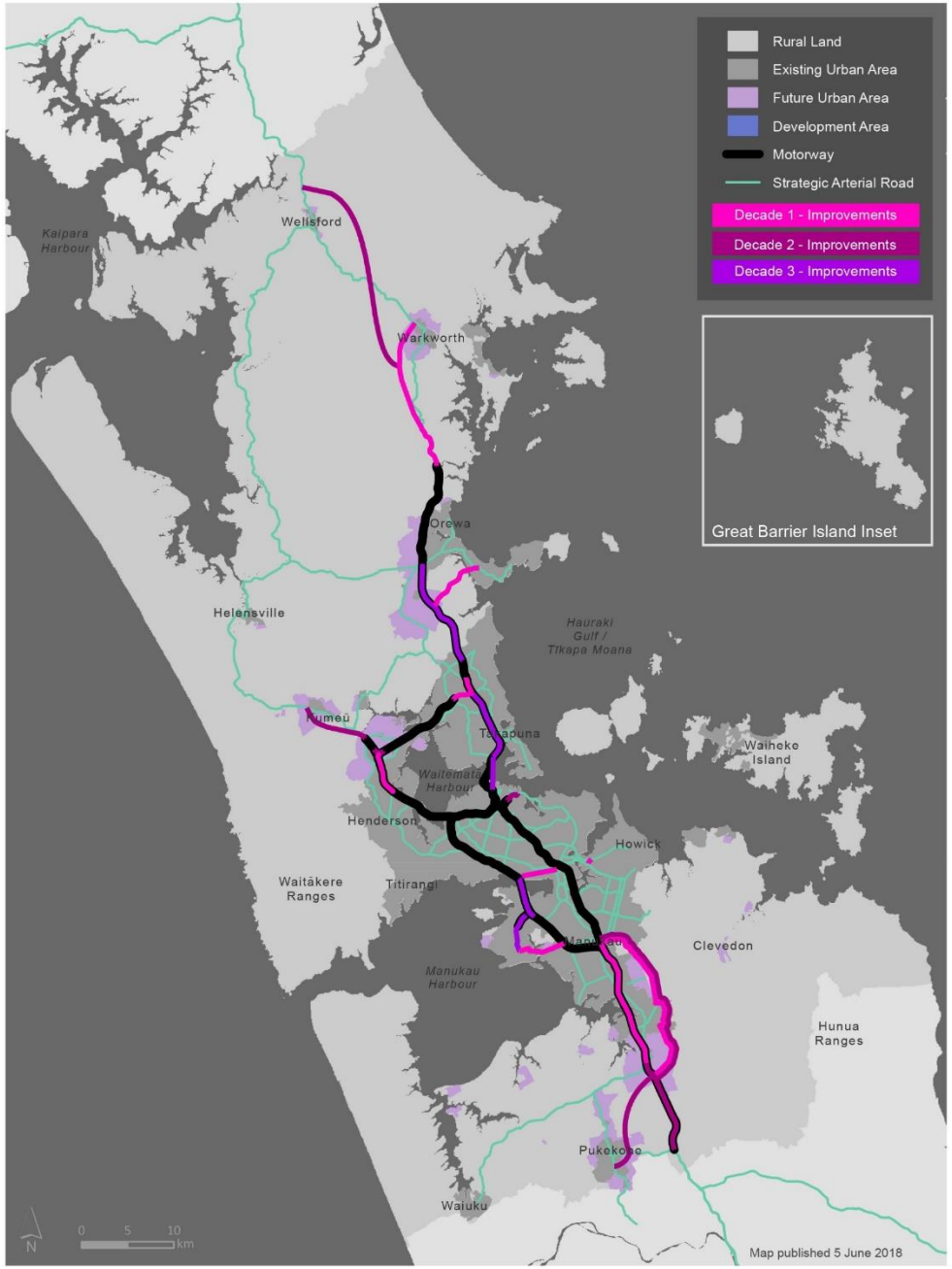
AUCKLAND PLAN 2050 | Development Strategy | Strategic Public Transport | Map 19

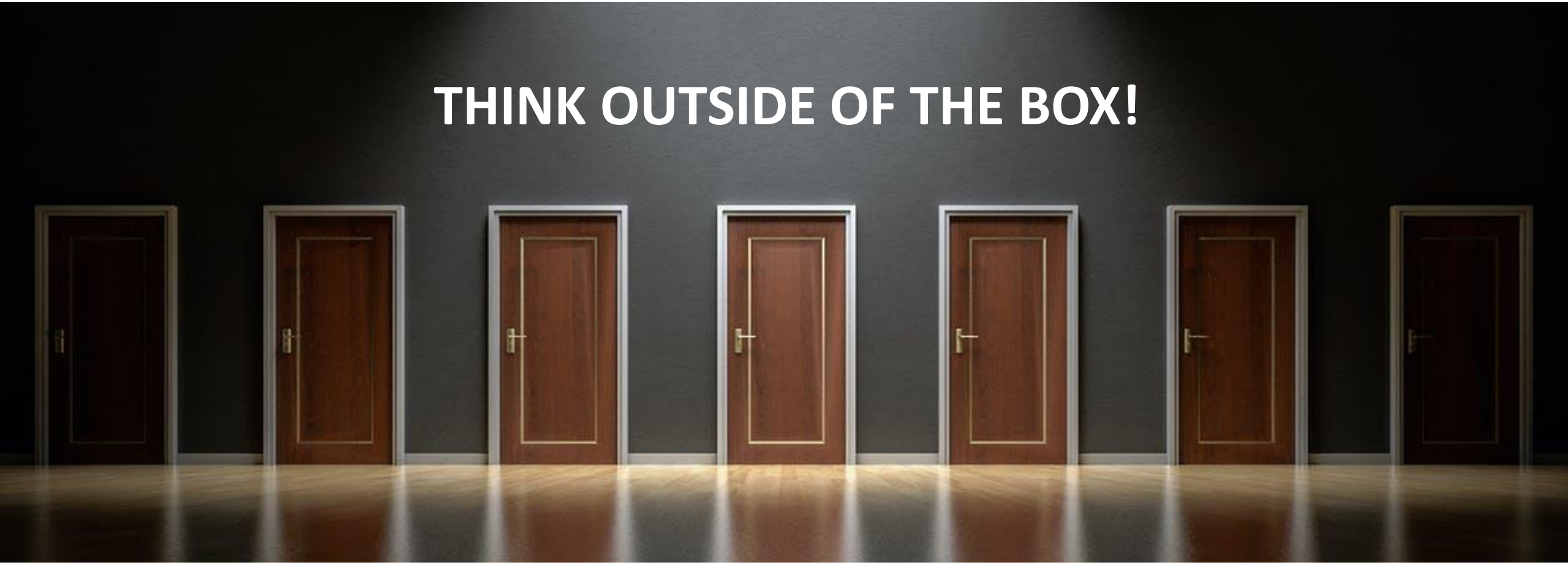


THE NEED FOR UPGRADE

(e.g. PUBLIC TRANSPORTATION) - Source [2]

AUCKLAND PLAN 2050 | Development Strategy | Strategic Road Network | Map 20




THINK OUTSIDE OF THE BOX!

https://rivian.com/

CULTURAL CHANGE

(e.g. PRIVATE TRANSPORTATION)

GOVERNMENT TO INCENTIVISE AND SUPPORT SUSTAINABLE LIFESTYLES

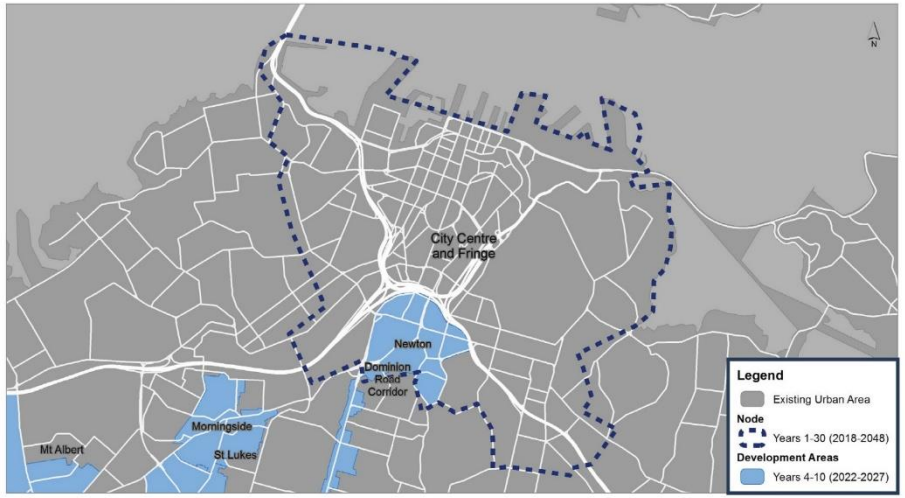
https://sustainableliving.org.nz/

Node – City centre

The city centre is an international centre for business and learning, innovation, entertainment, culture and urban living.

Population increases of over 58,400 people are expected in the centre and fringe areas by 2048, along with approximately 25,000 additional dwellings. Total jobs may increase by over 75,800 by 2048, which is over one quarter of all employment growth in the region. There is strong current development interest in the city centre. Many private sector, local and central government and other agency projects are already underway.

There is a feasible capacity of approximately 220 dwellings.



Anticipated household growth 2018-2048 [1]	25,240
Anticipated population growth 2018-2048 [1]	58,430
Anticipated employment growth 2018-2048 [1]	75,850
Average no. jobs accessible within 45min morning peak public transport by 2026 [2]	Over 300,000
Enabled housing capacity* [3]	12,540
Feasible development capacity 2017 [3]	220
Timing / Sequencing	1-30 Years

*does not include centres or mixed use zones

[1] Source: Household, population and employment growth figures are based on Auckland Council's land use scenario i11 v3

[2] Source: Auckland Transport Alignment Project Evaluation Report 2016

[3] Source Enabled housing capacity and feasible development capacity are based on the housing and business development capacity assessment for Auckland (December 2017)

CBD TRACTION - Source [2]

LESSENING the significance of current central urban focal points

(from a functional perspective)

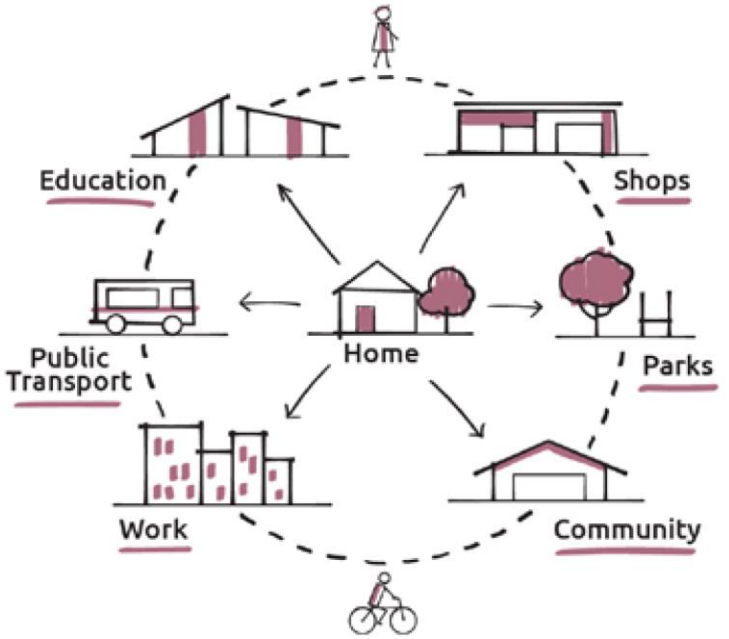
RELAXING the need for a daily commute to the CBD

- Reduced TRAFFIC congestion and respective carbon emissions
- Lower public STRESS levels
- Many more!

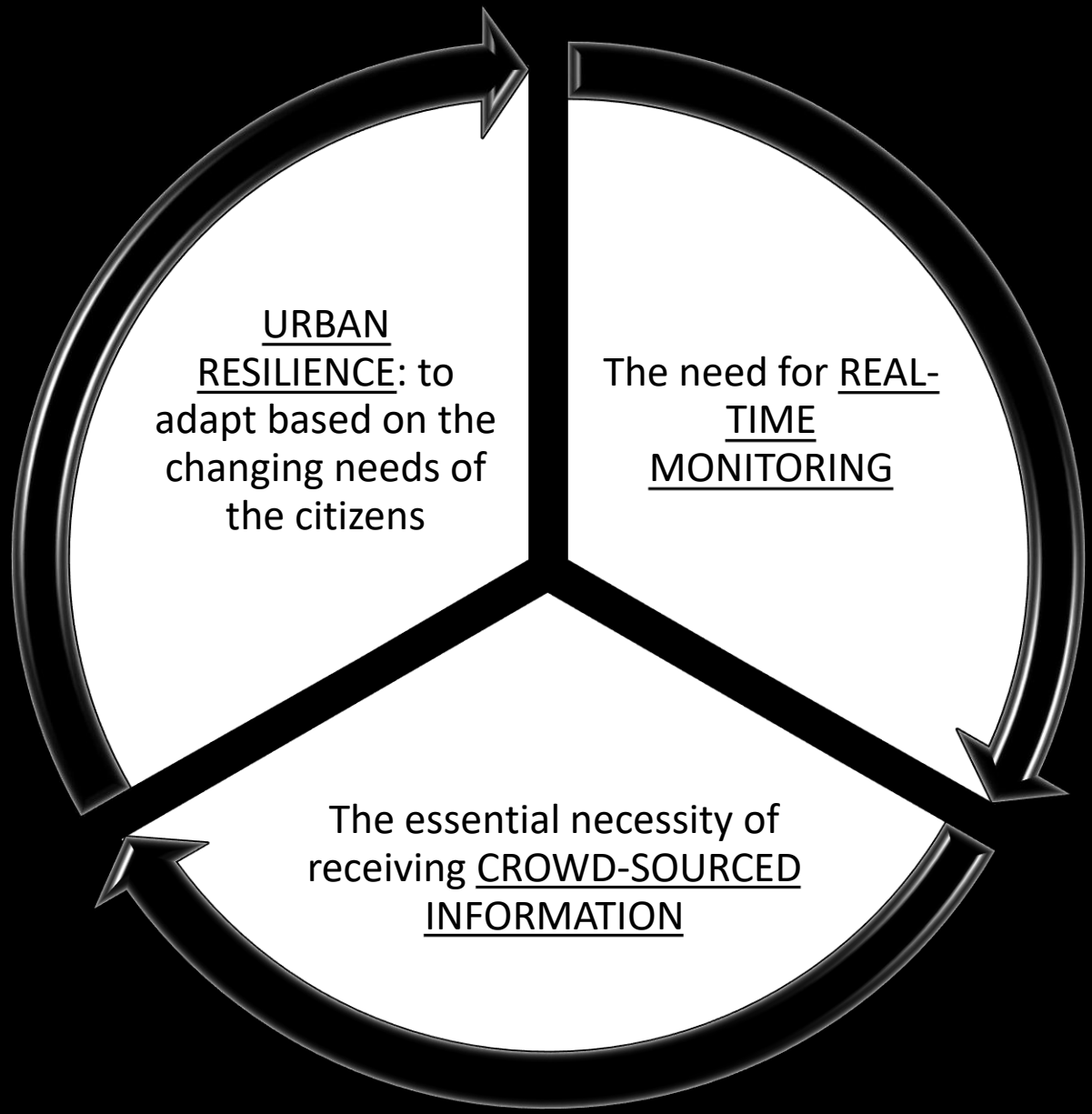
Sustainable LOCALIZED AMENITIES and division of the city into smaller COHERENT REGINAL SECTIONS

THE CITY

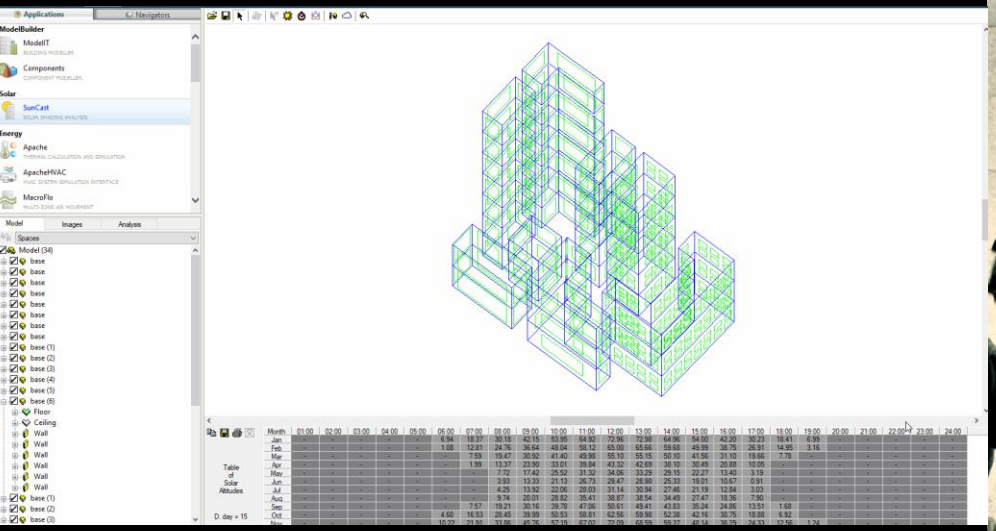
A SERIES OF SELF-SUSTAINED INTEGRATED NEIGHBORHOODS COMPLEMENTING ONE ANOTHER TO FORMULATE A UNIFIED URBAN STRUCTURE



Equal access to facilities, education and employment opportunities – Source [2]



Potential **ADVANTAGES** and **CHALLENGES** of this concept must be comprehensively EVALUATED prior to endorsement of a tangible proposal



ARCHITECT / INTERIOR DESIGNER

- program *(architecture + interiors)*
- budget analysis
- zoning review
- as-built drawings
- interiors concept development

- floor plans *(architecture + interiors)*
- contractor recommendation
- preliminary cost estimate
- 3D massing
- interiors conceptual images

- 3D model of exterior
- selected ceiling plans
- consultant's drawings
- cost estimate revision by contractor
- develop interior finish palette (source materials)
- refine interior layouts
- finishes, fixture, appliance selection

- hardware, lighting & accessory selection
- cabinets & builts-ins design
- detail drawings

- contractor to provide final pricing
- review shop drawings
- work with fabricators
- answer contractor questions

- provide additional drawings & design
- review shop drawings
- punch list

CONCEPTUAL DESIGN | SCHEMATIC DESIGN | DESIGN DEVELOPMENT | CONSTRUCTION DOCUMENTS | CONSTRUCTION BIDDING | CONSTRUCTION ADMINISTRATION

CLIENT

- client questionaire
- provide imagery
- approve program

- floor plan approval
- contractor selection
- budget review

- cost estimate review

- finishes, fixture, appliance approval

- hardware, lighting & accessory approval
- cabinets & builts-ins approval
- contractor contract

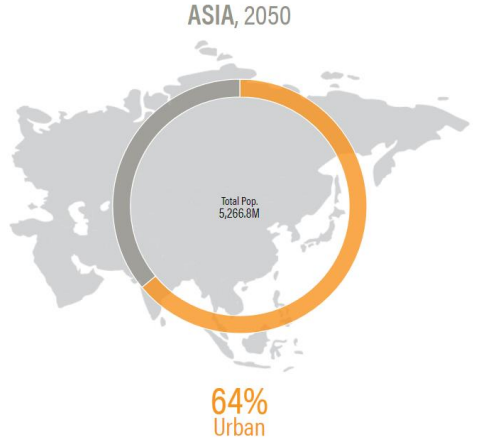
- site meetings with contractor & architect

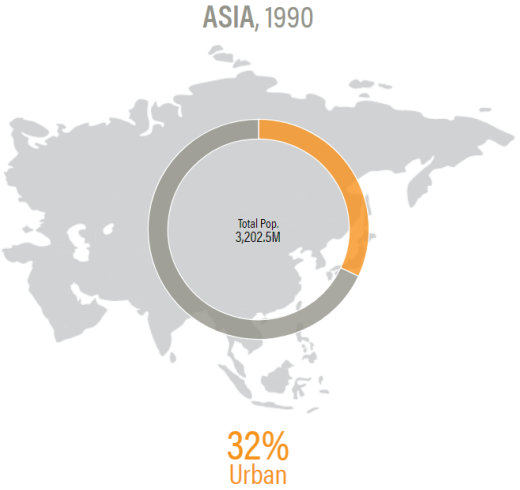
From building-scale focus to urban/city-scale studies

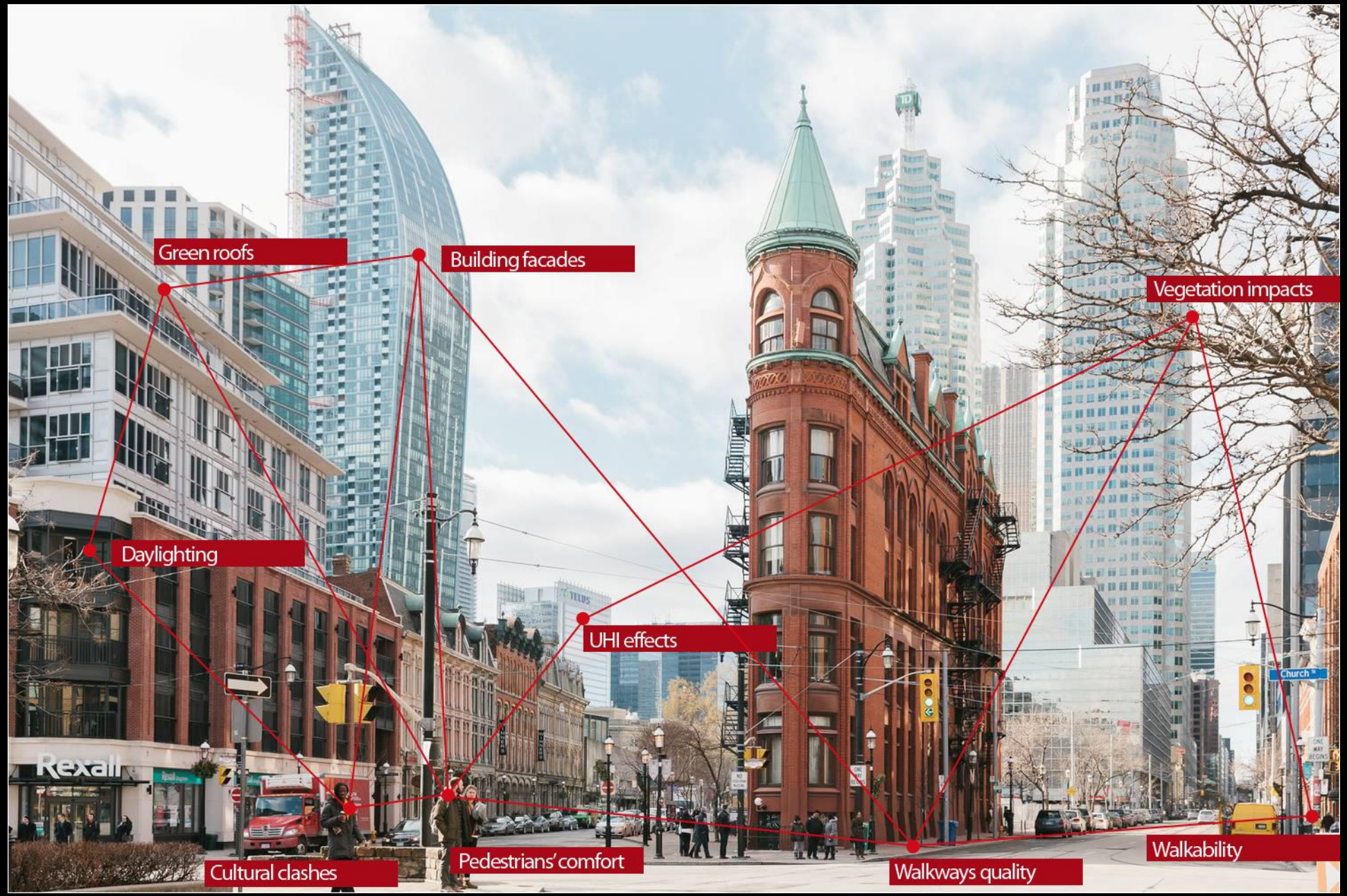
CITIES OF TOMORROW

Image Source: http://hmhai.com/design-phases/

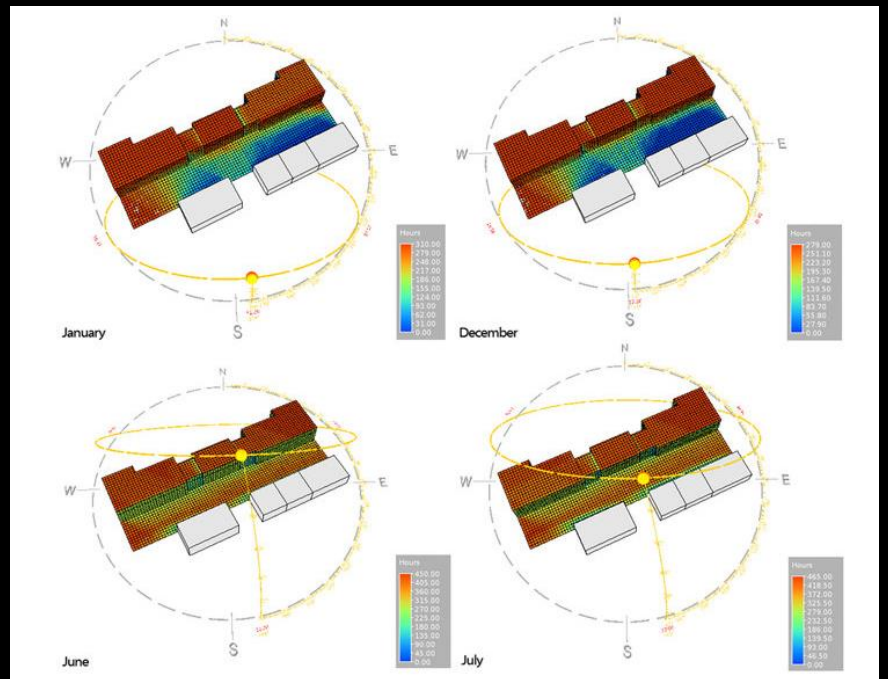
Image source: http://publications.wri.org/buildingefficiency/ + http://www.atlasofurbanexpansion.org/historical-data






Green roofs
Building facades
Vegetation impacts
Daylighting
UHI effects
Cultural clashes
Pedestrians' comfort
Walkways quality
Walkability
Rexall
Church St


Energy Efficient
Sustainable
Zero-Energy
Env-Friendly
Zero-Carbon
Sustainability Assessment Tools
LEED, BREEAM,...
Health-related Assessment Tools
WELL,...
Green Buildings
Intelligent Buildings
Healthy Buildings
Smart Buildings
Satisfaction & Health
Happiness
Productivity
Social Well-being
Transition to City Level
Intelligence
Smartness
Smart Mobility
Smart Governance
Digital Tech & ICT
Internet of Things
Virtual Tech
Smart Citizens
Smart Infrastructure
Emerging Areas
Unexplored Potentials
Intelligent Cities
Smart Cities



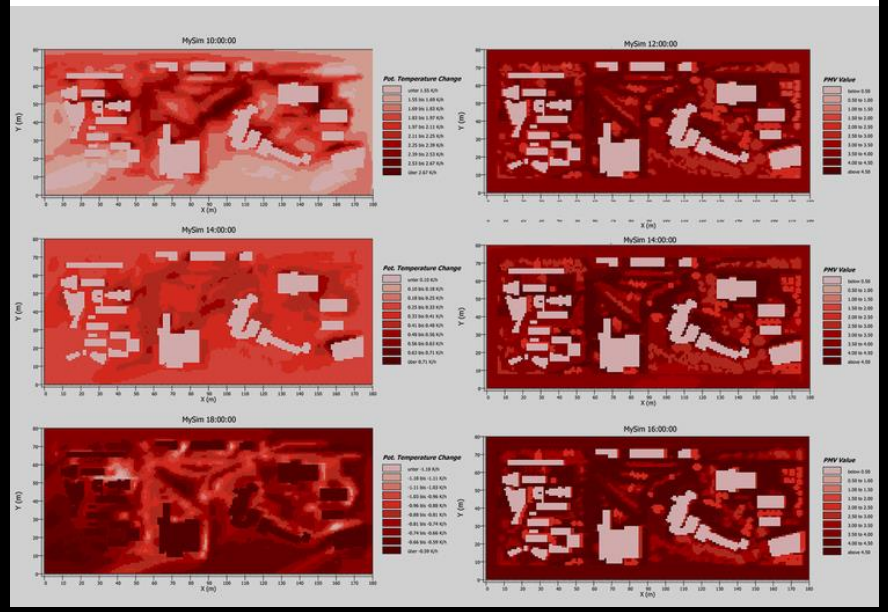


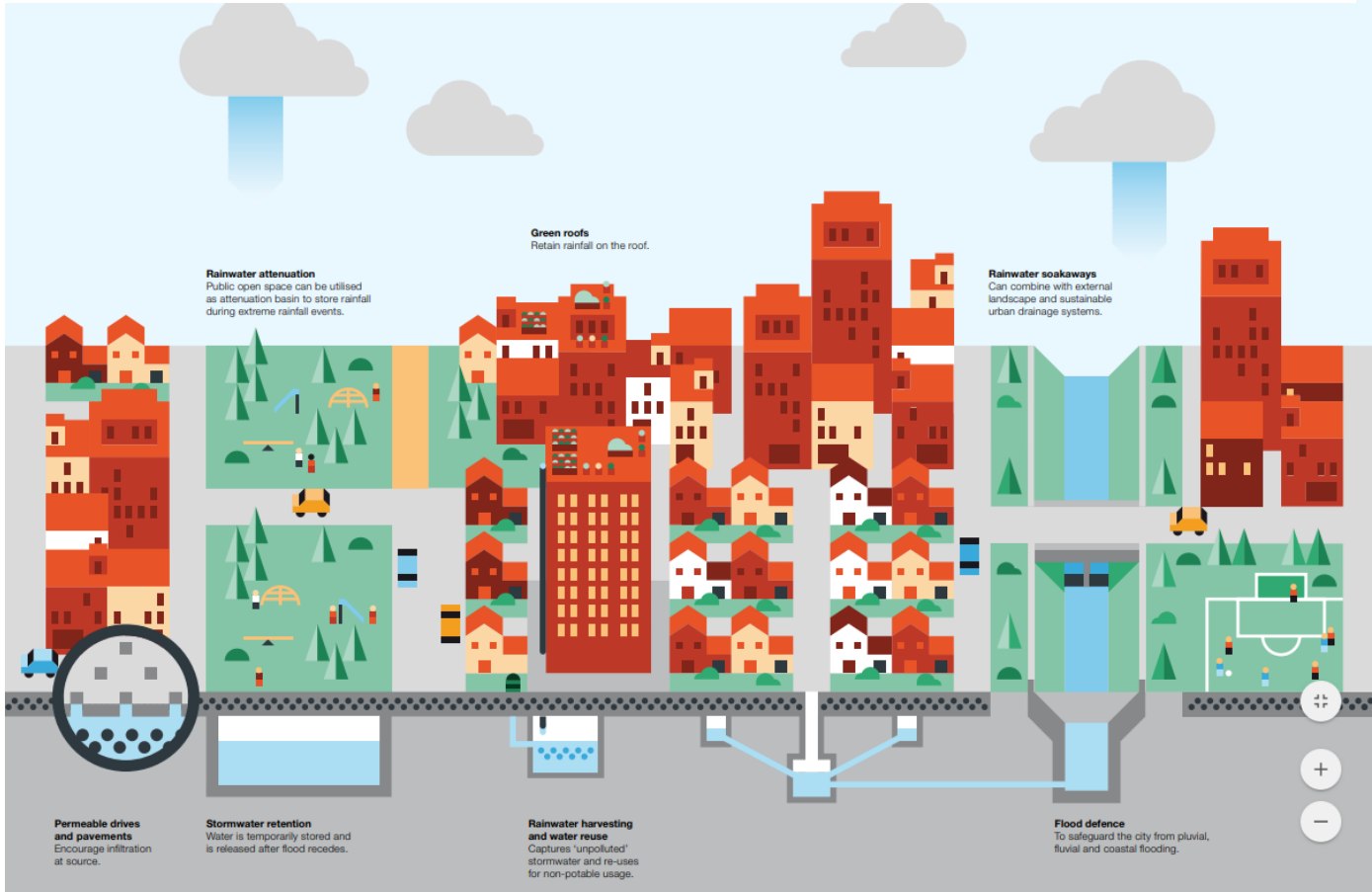
Image source: ARUP DESIGN YEAR BOOK + WGBC

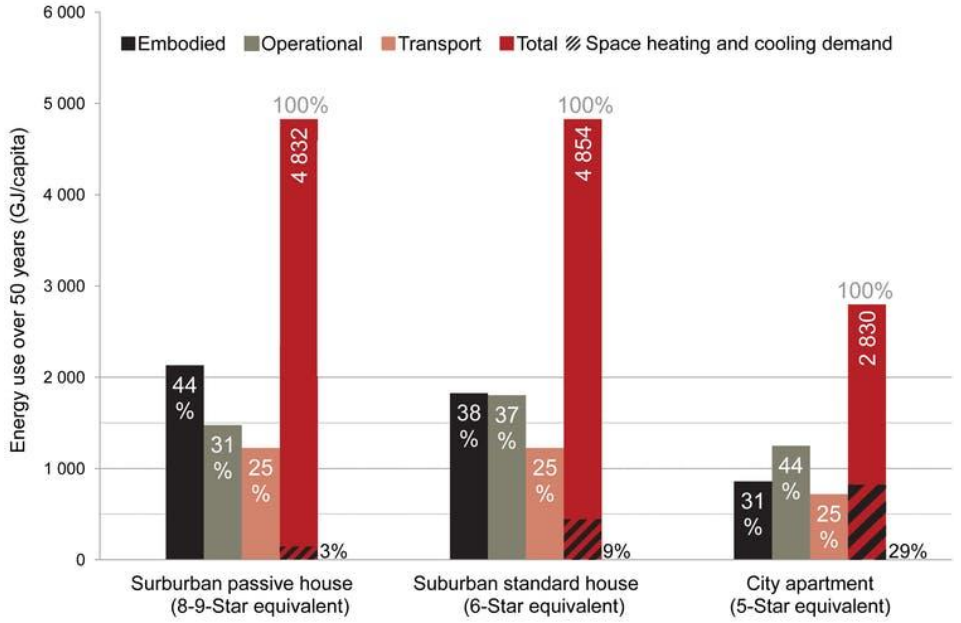
WORLD GREEN BUILDING COUNCIL

ABOUT GREEN BUILDING ABOUT US OUR GREEN BUILDING COUNCILS OUR WORK

Home > News & Media > Every building on the planet must be 'net zero carbon' by 2050 to keep global warming below 2°C - New report

Every building on the planet must be 'net zero carbon' by 2050 to keep global warming below 2°C - New report





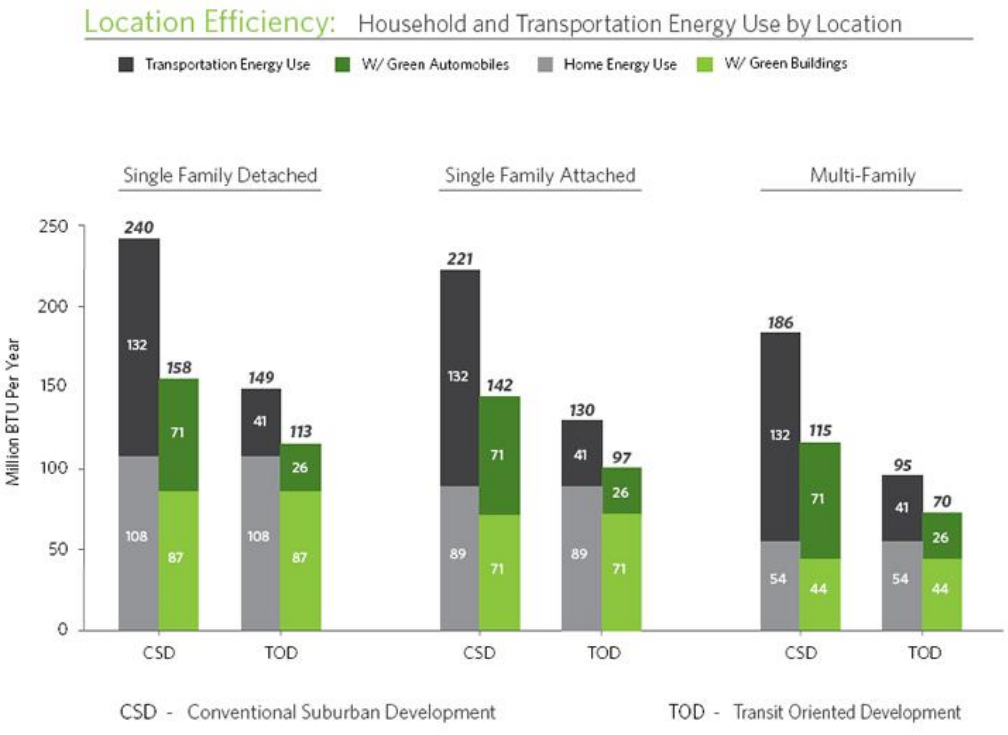
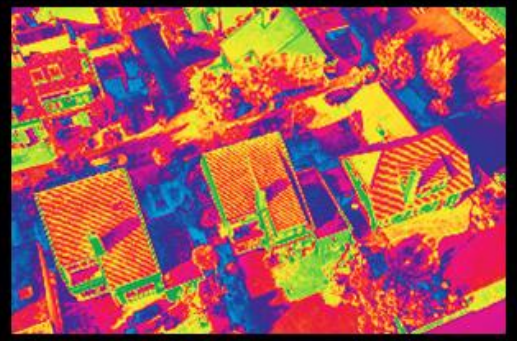
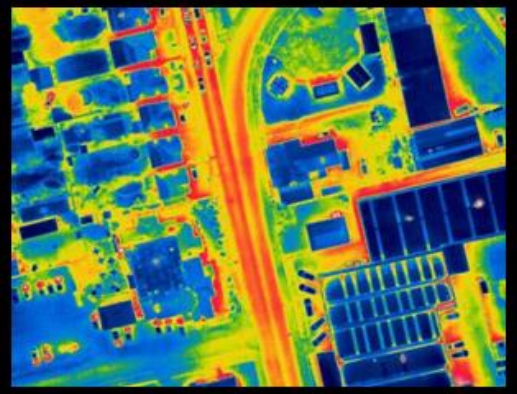
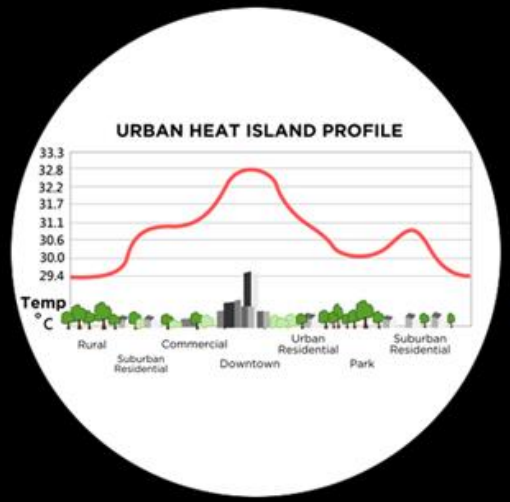


Image source: https://www.treehugger.com + http://theconversation.com







What is UHI?

Oversimplified Definition of UHI

Diurnal & seasonal variability
Dependence on UCZ models
Surface vs. air temperature heat island
Geographic and topographic causations
Other climatic parameters: i.e. RH, Tmrt, PET

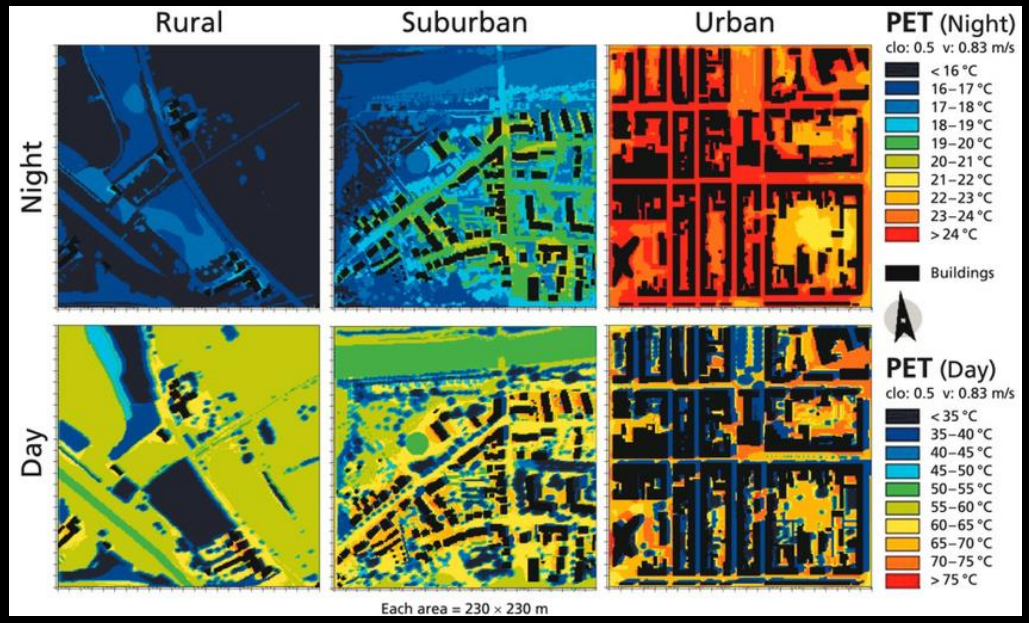


Image source: https://www.researchgate.net/publication/280298252

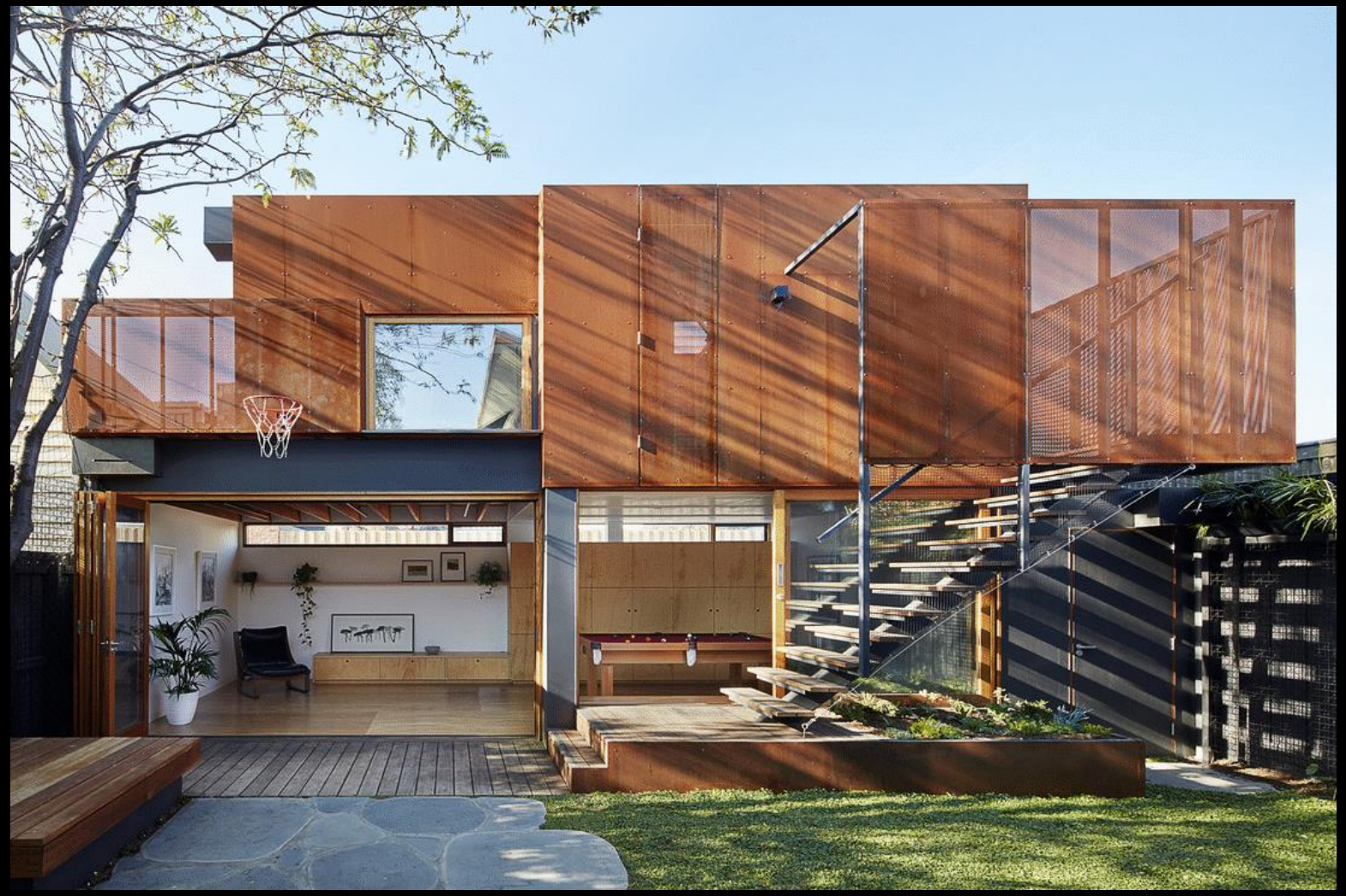
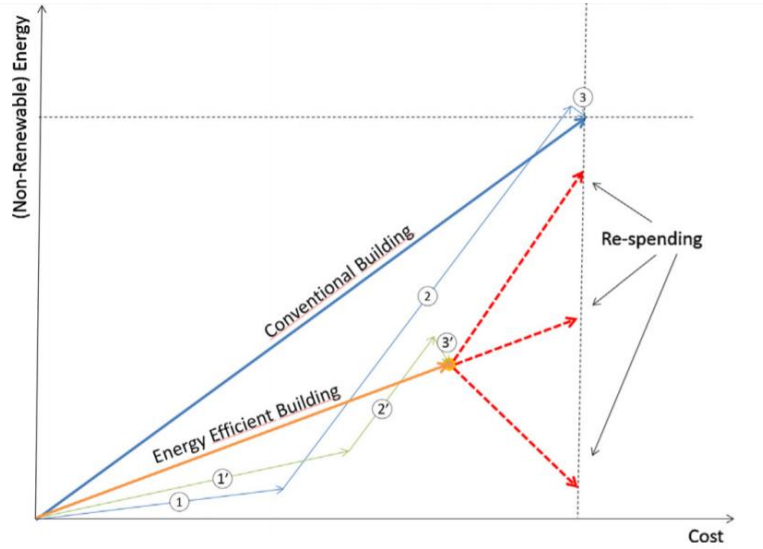
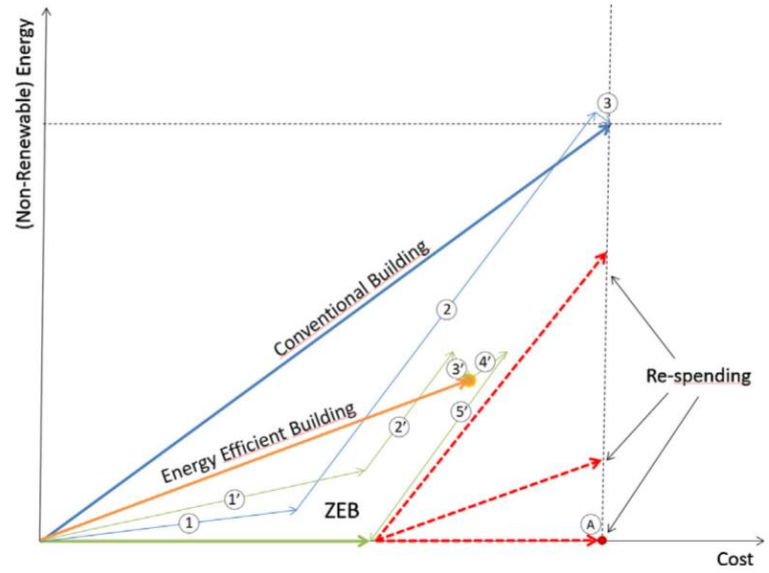


Image source: https://www.archdaily.com/887077/studio-house-zen-architects

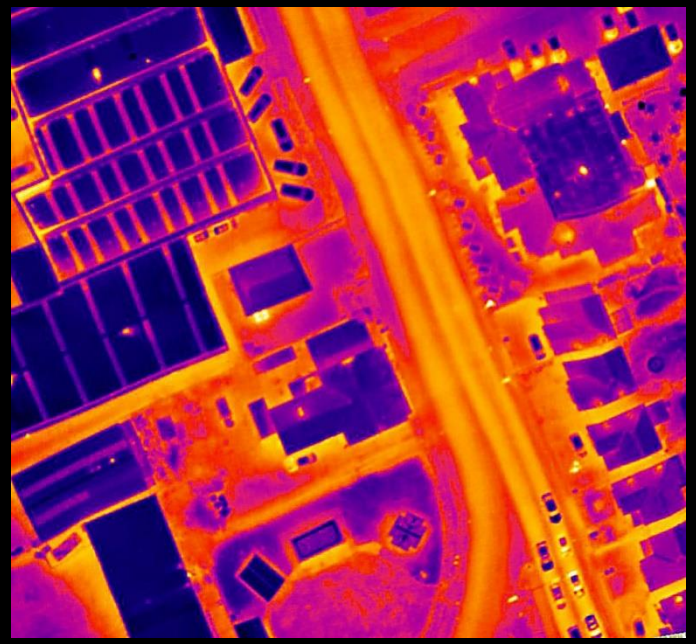


Possible rebound effects resulting from the cumulative life cycle energy/cost of a reference building and an energy efficient building. All vectors are E2 vectors illustrating the relationship between cost and non-renewable energy for the different building phases: Manufacturing/transportation/construction (1 and 1′),



Partial re-spending in renewable energy supply technologies leading to ZEBs. Manufacturing/transportation/installation of renewable energy supply systems (4′) and renewable energy fed back into the grid (5′).

Image source: http://www.architecturelist.com



Towards a sustainable + healthy urban future...

BUILT ENVIRONMENT ENGINEERING

AUT

DR ALI GHAFFARIAN + DR AMIRHOSEIN GHAFFARIAN

Image source: https://www.newdelhitimes.com/thermal-imagery-aids-in-intelligence-gathering/

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2. Council, A., *Auckland Plan 2050*. 2018. p. 50.
3. REINZ, *Monthly House Price Index Report*, R.E.I.o.N.Z. (REINZ), Editor. 2019. p. 7.
4. Robeco Asset Management, R.A. *WATER our most precious resource*. 2014.