



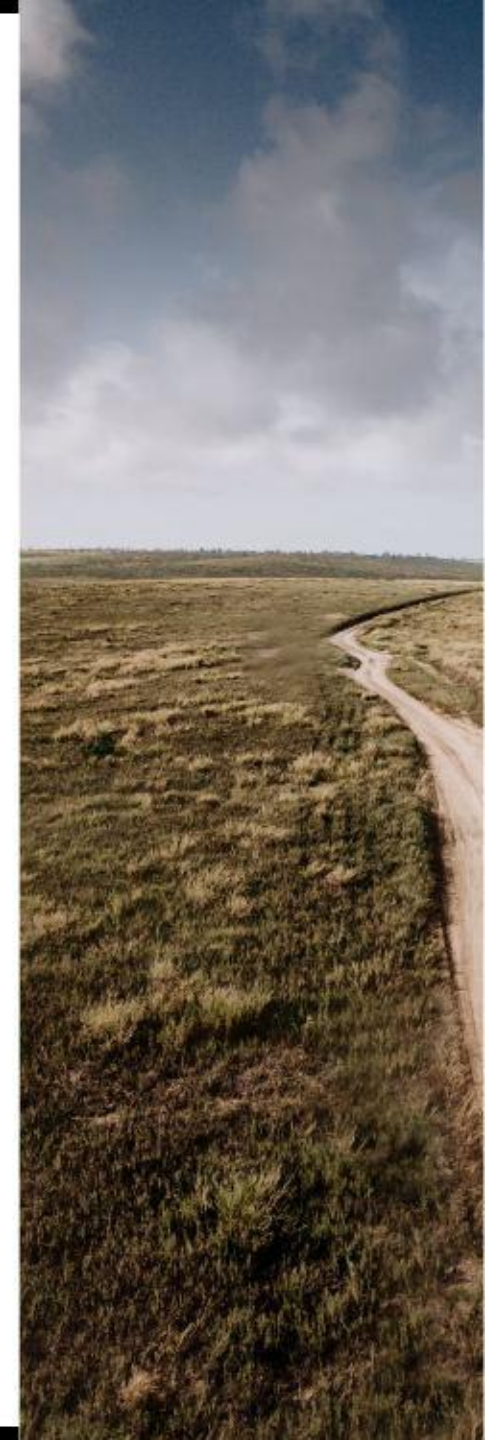
Repräsentanz der
Deutschen Wirtschaft
German-New Zealand
Chamber of Commerce Inc.

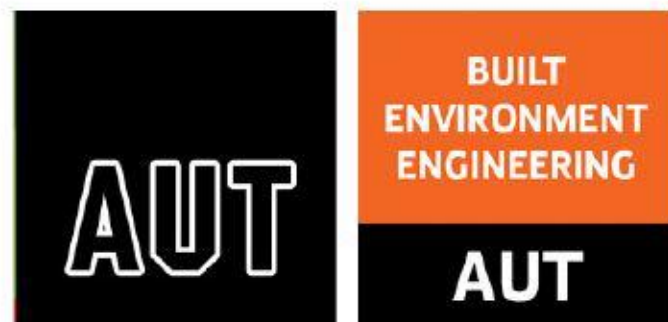
DR ALI GHAFARIAN
DR AMIRHOSEIN GHAFARIAN

RESPONSIVE
+ GREEN
URBAN BUILT ENVIRONMENT LAB

BUILT
ENVIRONMENT
ENGINEERING
AUT

EXTROVERTED INTELLIGENT TECHNOLOGIES FORMING INTROVERTED SMART CITIES







SUSTAINABLE DEVELOPMENT GOALS





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



AUCKLAND PLAN 2050

Our six outcomes



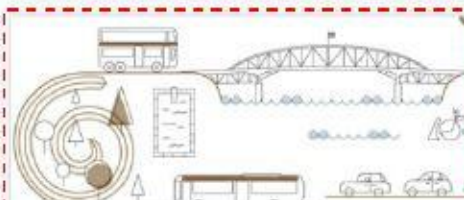
Outcome: Belonging and Participation



Outcome: Māori Identity and Wellbeing



Outcome: Homes and Places



Outcome: Transport and Access

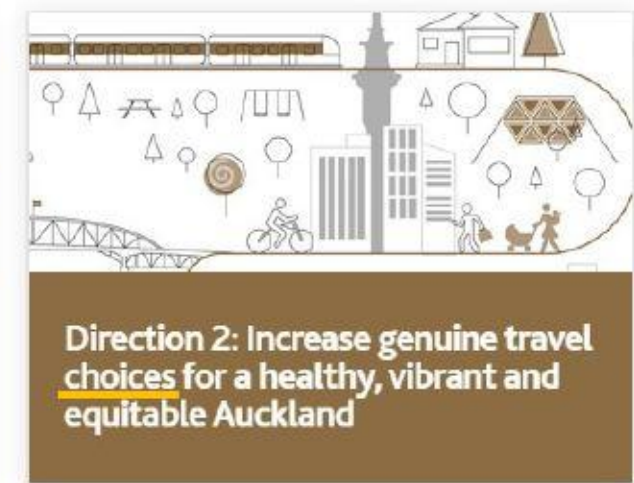


Outcome: Environment and Cultural Heritage



Outcome: Opportunity and Prosperity

Source [2]





AUCKLAND COUNCILS HOUSE PRICE INDICIES

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



AFFORDABILITY

SUSTAINABILITY

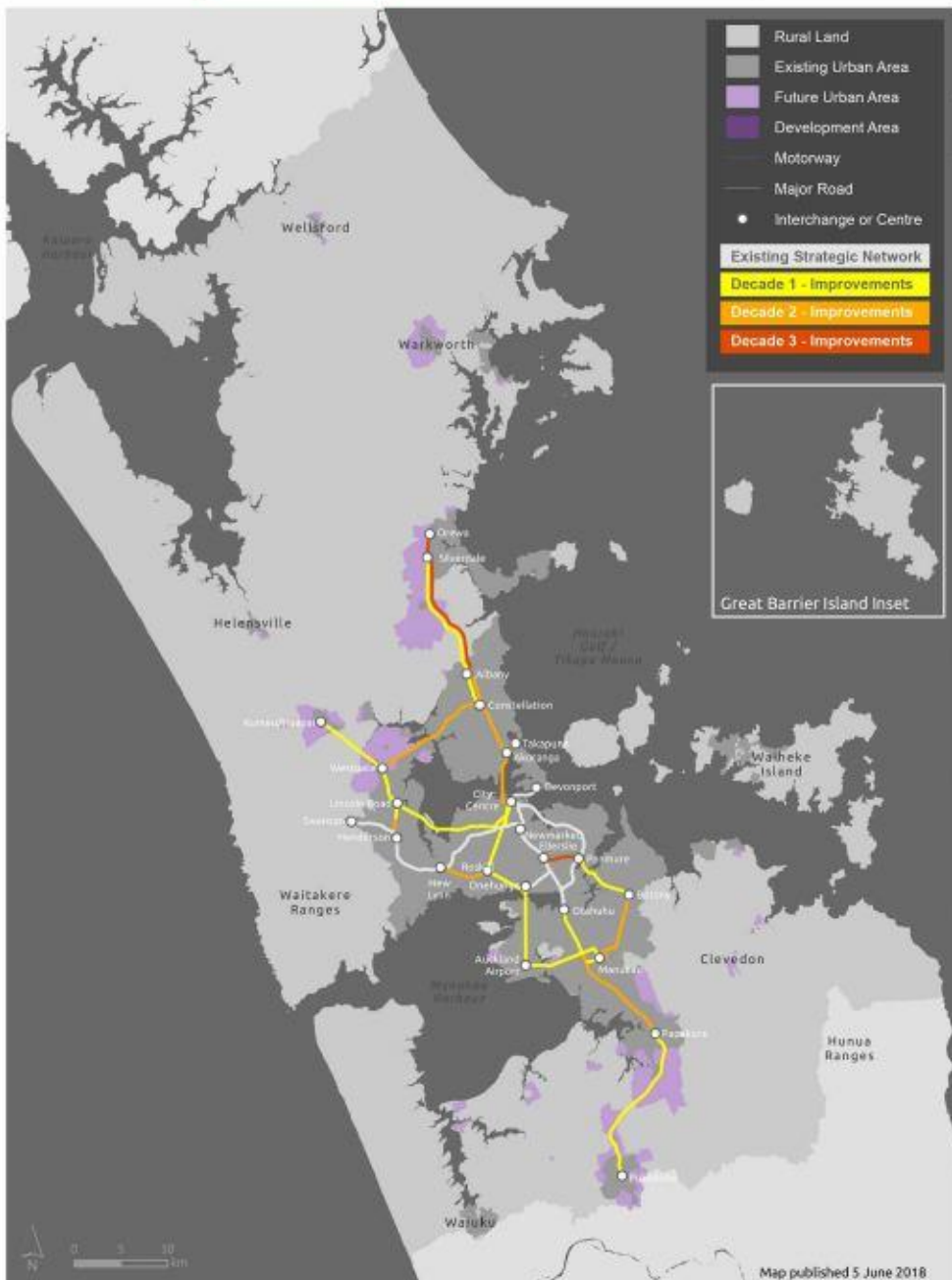


AFFORDABILITY

AGING INFRASTRUCTURE

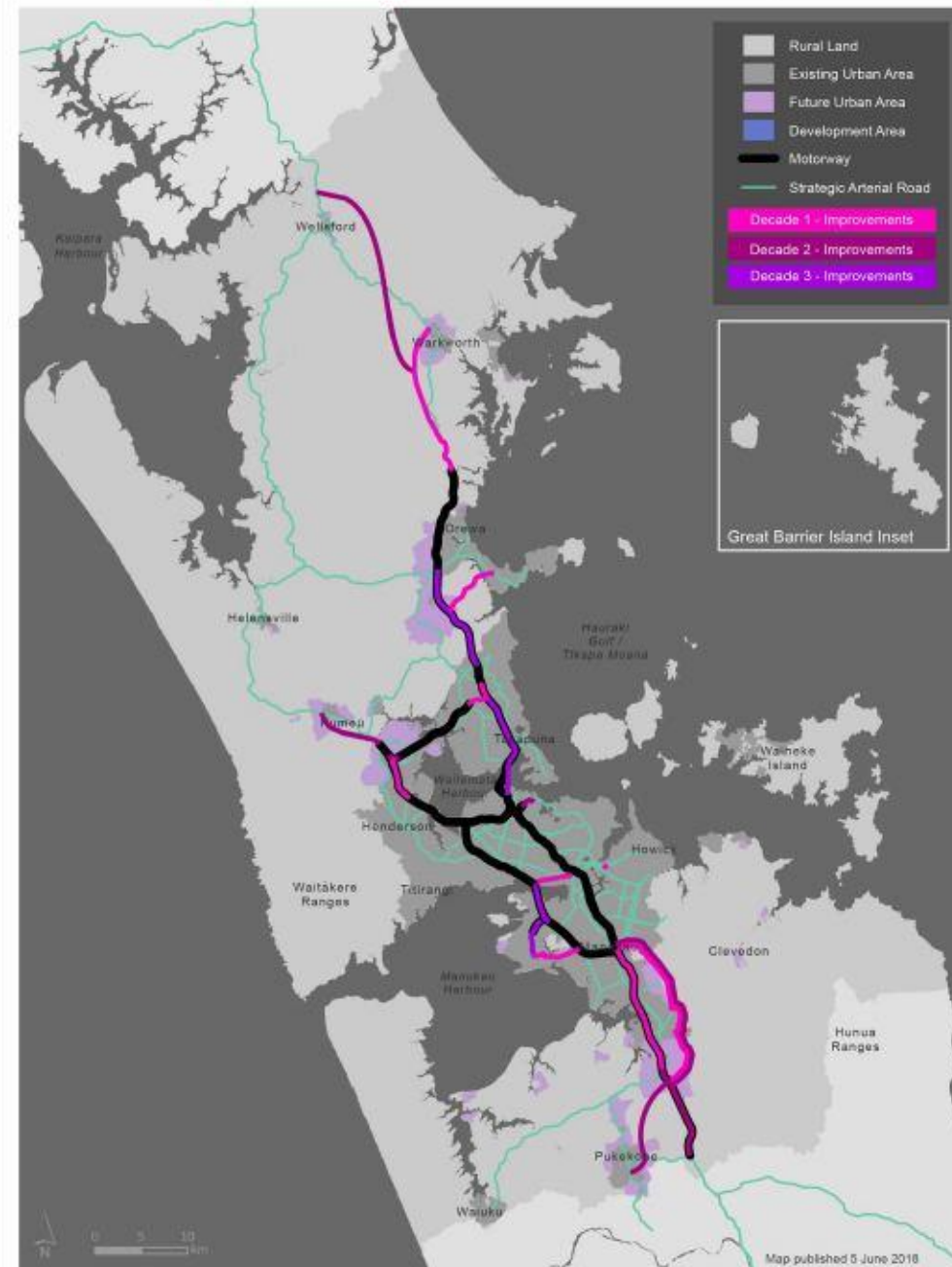
Developed Countries





THE NEED FOR UPGRADE

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



THINK OUTSIDE OF THE BOX!





CULTURAL CHANGE

(e.g. PRIVATE TRANSPORTATION)



GOVERNMENT TO INCENTIVISE AND SUPPORT SUSTAINABLE LIFESTYLES

1

Avoid energy waste & global warming from fossil fuels



▶ LEARN: Power bill savings and lower-carbon travel

▶ DO: Take a sustainability action!

2

Divert useful stuff from landfills



▶ LEARN: Minimise waste, invest in resilience

▶ DO: Take a sustainability action!

3

Make gardens into food producers



▶ LEARN: Grow spray-free and change food shopping habits

▶ DO: Take a sustainability action!

4

Keep our drinking water and waterways clean



▶ LEARN: Water conservation and home eco-design.

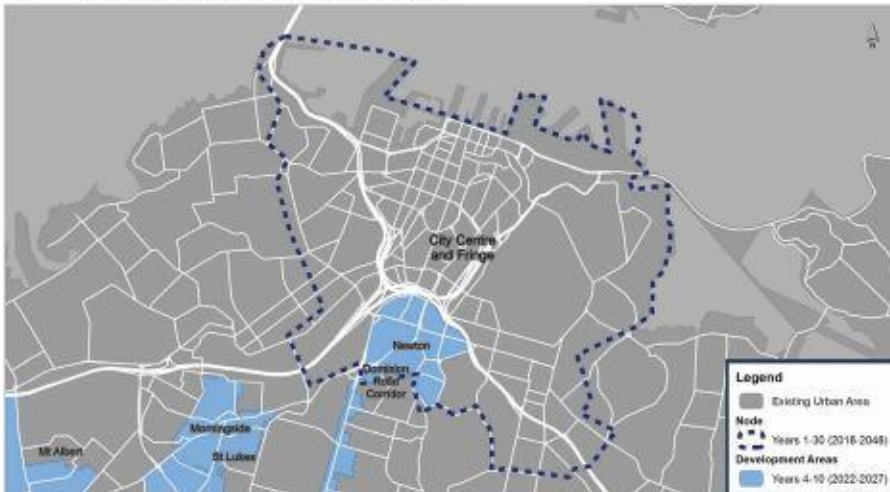
▶ DO: Take a sustainability action!

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 i71 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

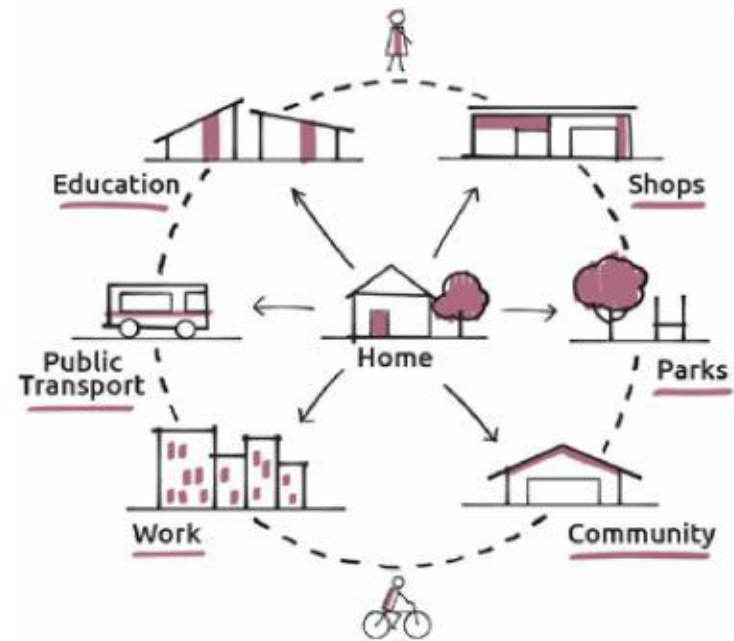
Many more!

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

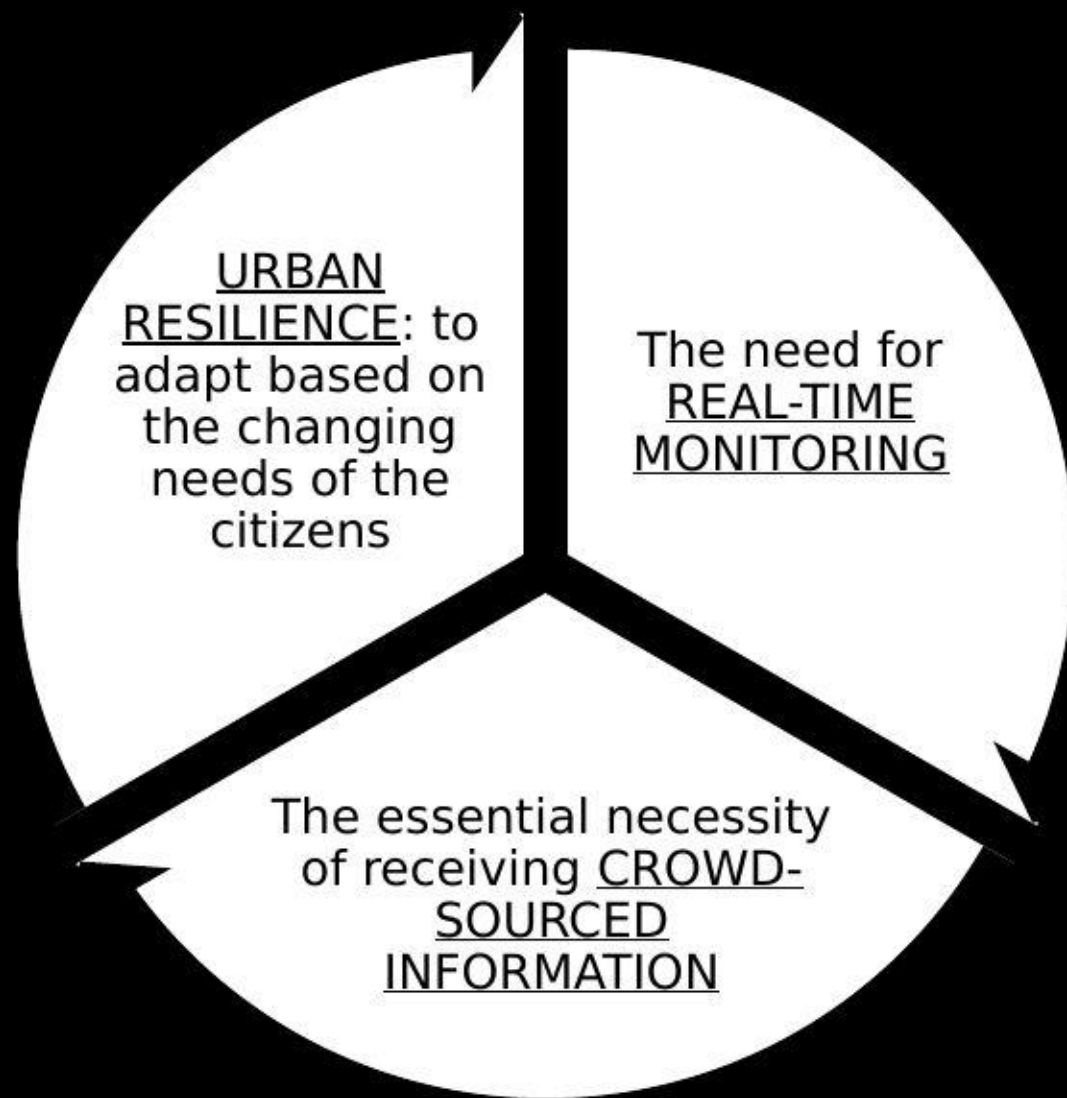


THE CITY

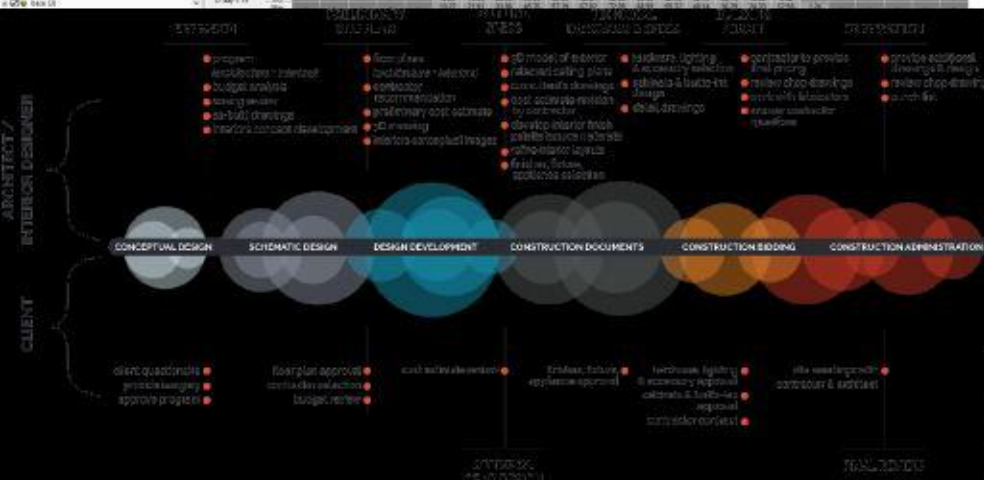
A SERIES OF SELF-SUSTAINED INTEGRATED NEIGHBORHOODS COMPLEMENTING ONE ANOTHER TO FORMULATE A UNIFIED URBAN STRUCTURE



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



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



CITIES OF TOMORROW

Image source: <http://hmbai.com/design-phases/>



Image source: <http://publications.wr.org/buildingefficiency/> + <http://www.atlasofurbanexpansion.org/historical-data>

ASIA, 2050



64%
Urban

ASIA, 1990

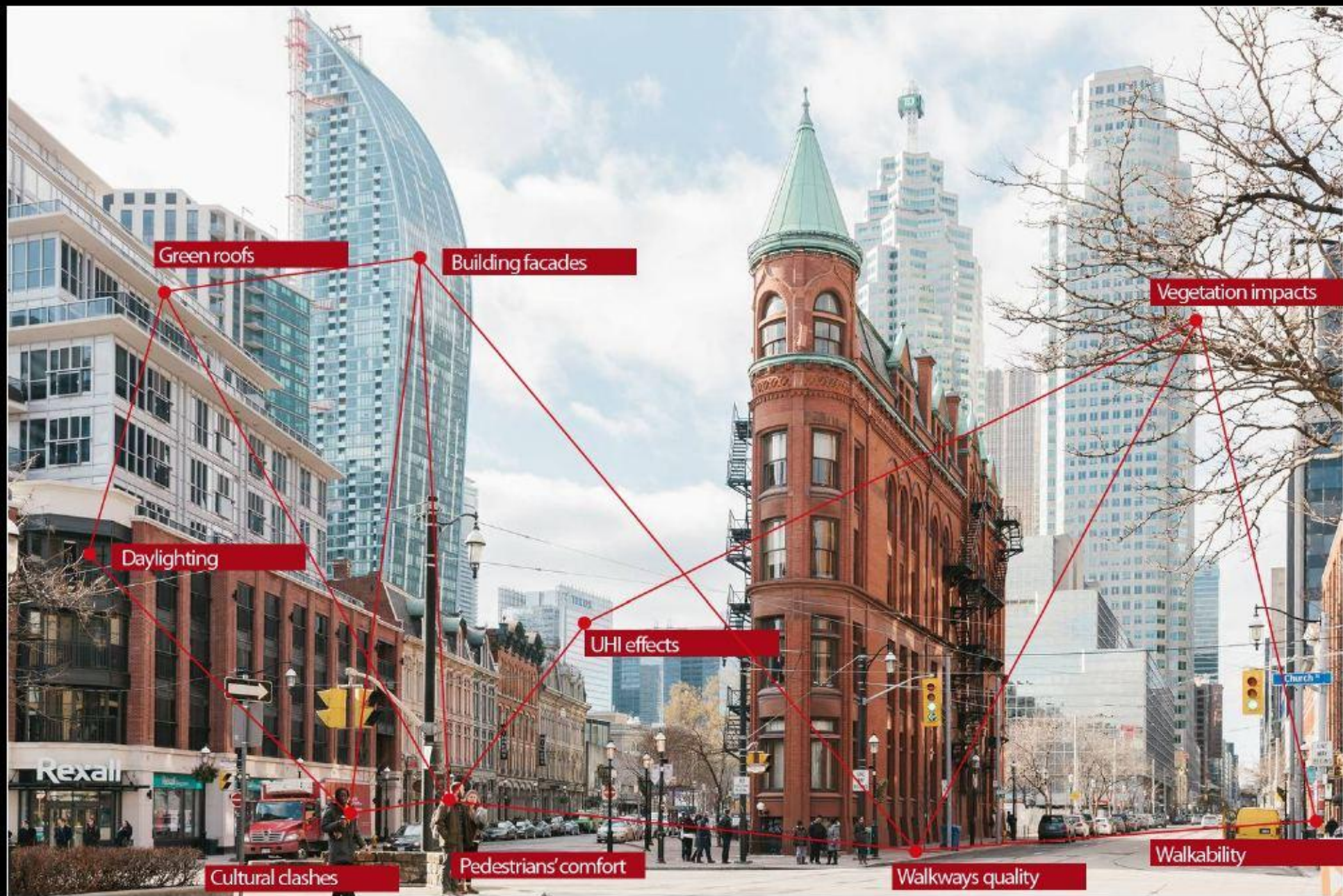


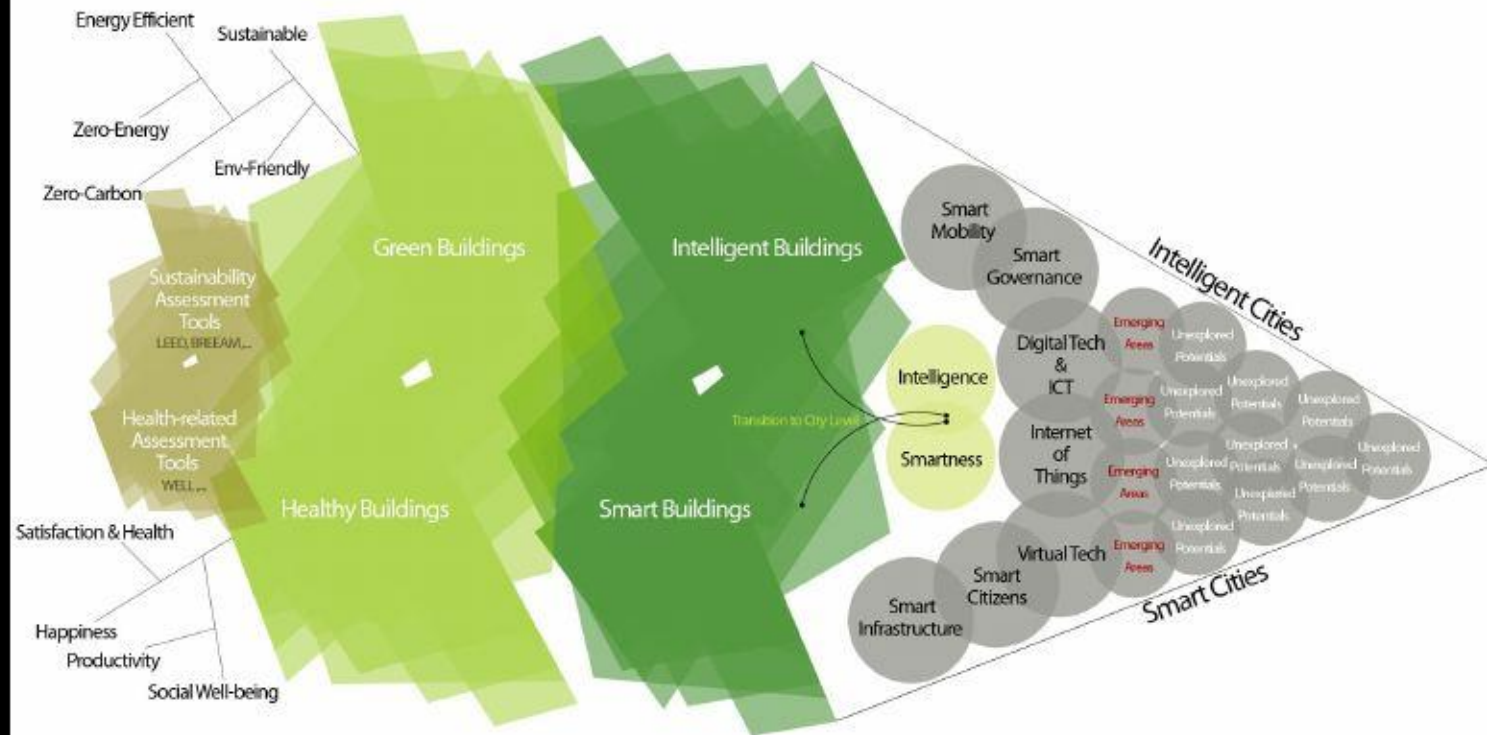
32%
Urban

Sydney

1808





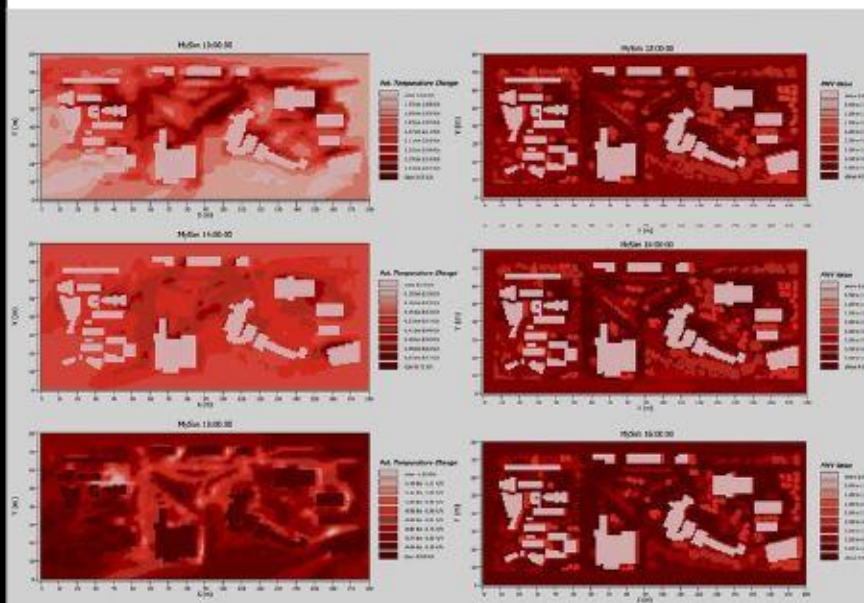
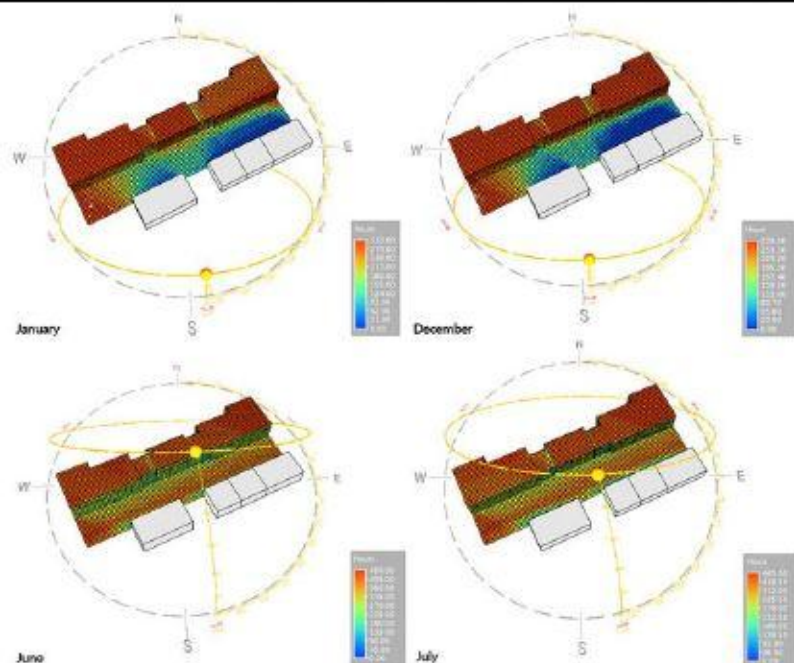


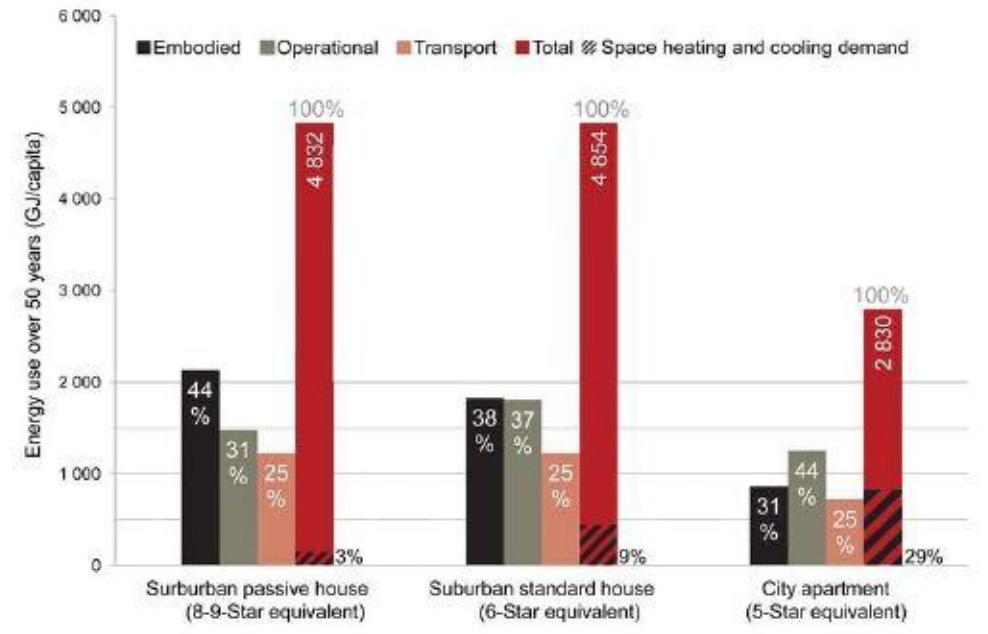
Home > News & Media > Every building on the planet must be 'net zero carbon' by 2050 to keep global warming below 2°C - New report

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



Image source: ARUP DESIGN YEAR BOOK + WGBC

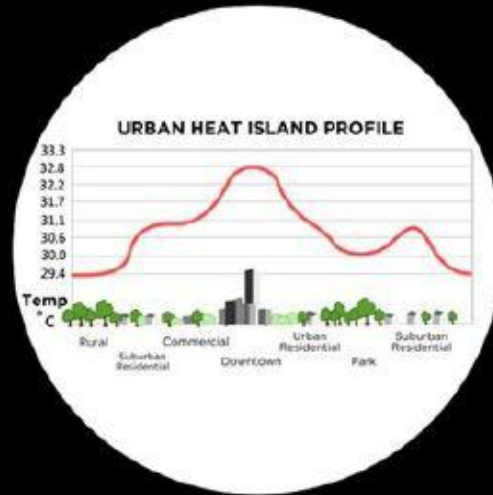
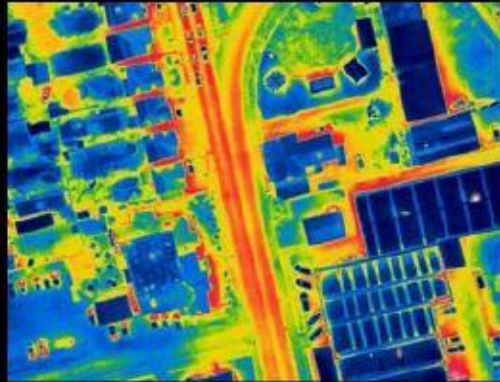
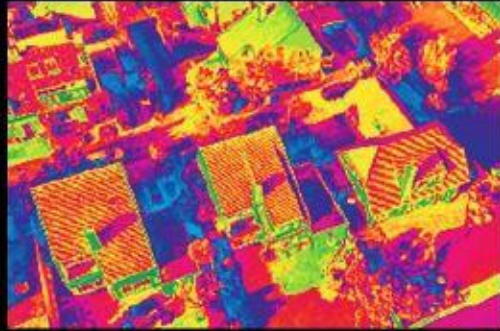




Location Efficiency: Household and Transportation Energy Use by Location



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

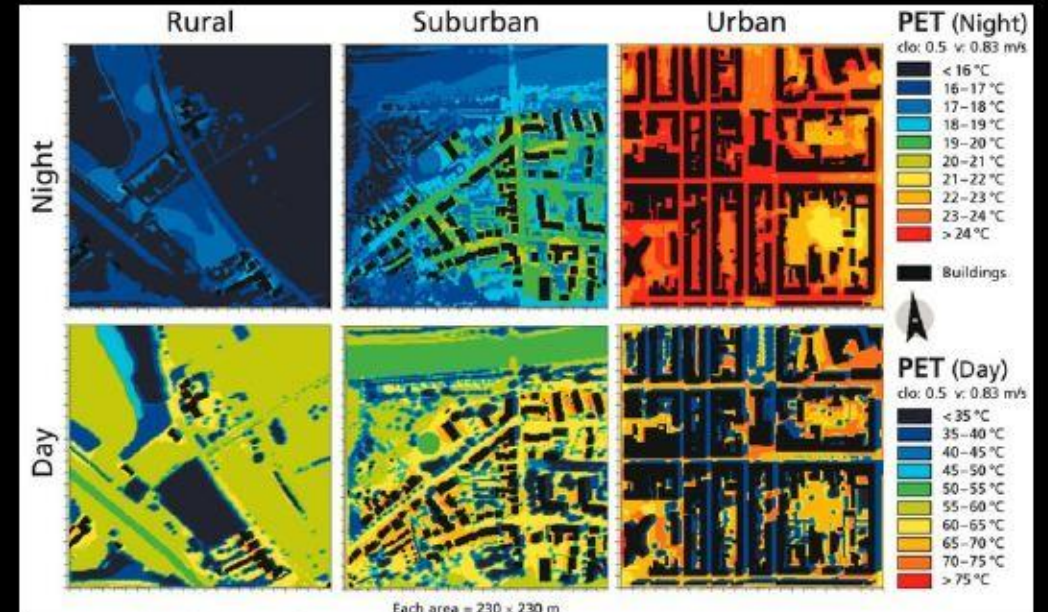
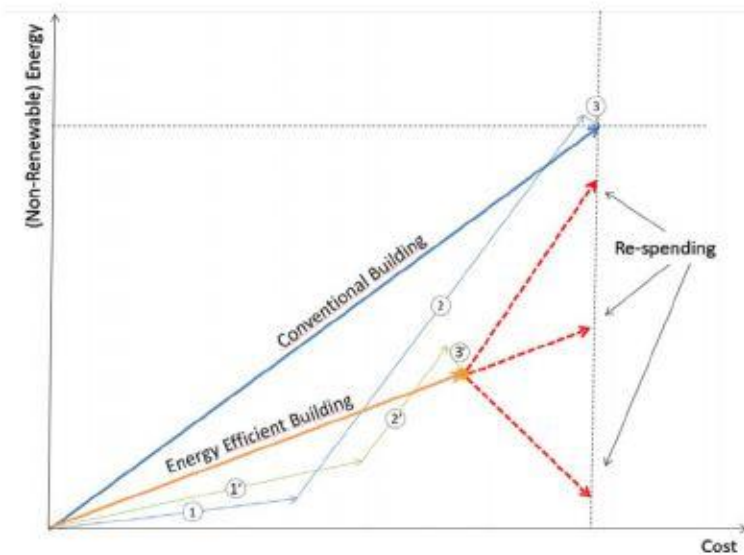


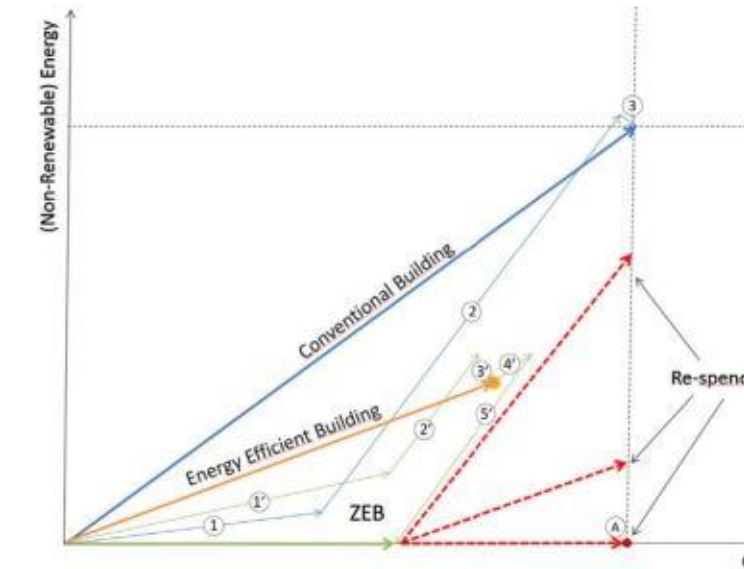
Image source: <https://www.researchgate.net/publication/280298252>



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

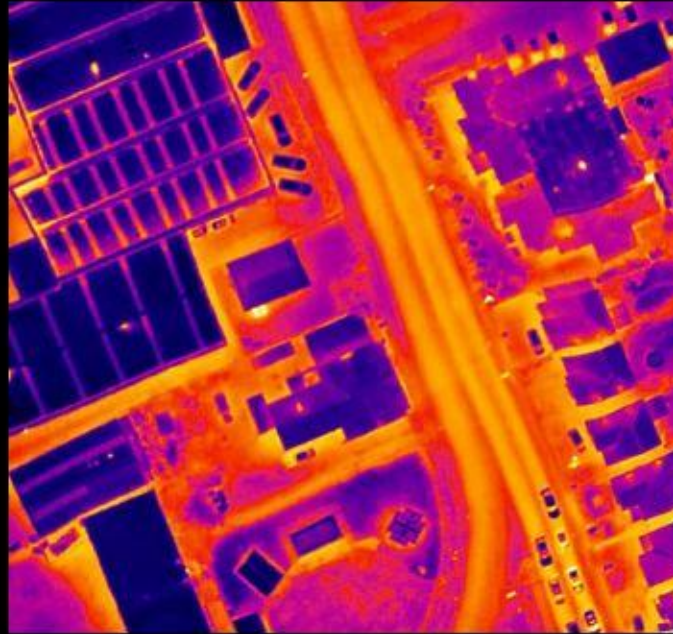


Possible rebound effects resulting from the cumulative life cycle energy/cost of a reference building and an energy efficient building. All vectors are E2 vectors illustrating the relationship between cost and non-renewable energy for the different building phases: Manufacturing/transportation/construction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



**Towards a sustainable + healthy urban
future...**

BUILT
ENVIRONMENT
ENGINEERING

AUT

DR ALI GHAFFARIAN + DR AMIRHOSEIN GHAFFARIAN

REFERENCES

1. Mercer. *2019 Quality of Living Ranking*. 2019 [cited 2019 18/10]; Available from: <https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings>.
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.