homes and more shared space, but closer to jobs
and amenities.

As a result, there are often understandable reservations in
parts of the community regarding the potentially adverse
impacts of population growth and corresponding land-use
outcomes, such as increased housing density or longer
travel times.

Scenario planning tools can provide the
community and decision makers with a more
robust picture of what the future could look like.

Scenario planning is a strategic tool that presents the public
and decision makers with a range of different options for
what the long-term development of a city could look like.
Each scenario is a potential portrait of the future, which
details how the city could perform under a unique set of
conditions. The use of scenarios is based on a recognition
that the future is difficult to predict with certainty, and that
several outcomes are possible and should be considered.

The process has two clear benefits for cities facing
significant and uncertain change:

- It allows decision makers, as part of the process of
  articulating and implementing a long-term vision for
  a city, to consider a range of possibilities and build
  necessary flexibility into policy and investment decisions.

- It enables a more transparent public discussion of the
  choices and trade-offs inherent within different
  approaches to growth. This can help governments to
  have a more holistic public discussion about what growth
  means and provides a more transparent process for
  defining preferred future directions.11

While Australian governments are increasingly using
scenario tools, it has yet to become an established practice
when planning for our cities, and there has been only a
limited sample of this work made publicly available.

Infrastructure Australia has used scenario
planning to evaluate the trade-offs inherent
within potential long-term growth pathways for
Melbourne and Sydney to 2046.

Infrastructure Australia has developed six hypothetical
growth scenarios, three each for Melbourne and Sydney. The
scenarios seek to test commonly posed questions about how
Australian cities could grow and change, including:

- Should our cities expand outwards, at a low density, or
  consolidate inwards at a higher density?

- Should we seek to locate jobs in centres or distribute them
  more evenly across the metropolitan area?

- What mix of modes and network structure is best suited
to meet the needs of a larger city?

They assume consistent metropolitan boundaries and
common population and employment growth totals for each
city. They then focus on three variables, which differ across
the scenarios:

- Where each city's additional population lives and the
  intensity and style of development they live in

- Where each city's additional jobs are located

- The future structure of the transport network.

The scenarios, tailored to match the unique characteristics of
Melbourne and Sydney, are:

1. The Expanded Low Density scenario: This scenario
tests a future in which population growth is distributed
with the aim of minimising the impact on existing urban
areas. In essence, the scenario directly caters to the
desire of some in the community for the character of
their immediate environment to remain unchanged.

2. The Centralised High Density scenario: This scenario
tests a higher density, inner-city growth future which
aims to enable more people to live and work closer to
existing transport infrastructure and major employment
centres. The scenario envisages a lifestyle shift for many
in these suburbs, with increased apartment living,
active and public transport use and a greater reliance
on shared (rather than private) services and spaces
becoming the norm.

3. The Rebalanced Medium Density scenario: This
scenario aims to rebalance each city's spatial structure
by distributing new housing and employment more
evenly across the whole city. It seeks to test the
feasibility and outcomes of first, locating jobs closer to
where people live, and second, more evenly distributing
the impact of new housing, by focusing development at a
medium density across the city.

By focusing on Melbourne and Sydney, the paper does not
disregard the significant level of growth set to occur in
Australia's other large cities, namely Brisbane and Perth.
Instead Melbourne and Sydney are presented as case studies
of the choices and trade-offs that will be faced across
Australia's four largest cities as they each grow and change
in coming decades.

Precisely predicting the future is an impossible task and
the three scenarios presented in this paper should not be
viewed as an exact vision of the future. In reality, a complex
interplay of policy decisions and unforeseen factors will
shape the long-term development of Australia's cities. This
could include the decentralisation of population growth to
neighbouring cities, such as Geelong (VIC), Wollongong
(NSW), the Gold Coast (QLD) or Peel (WA), or deviations
from the projected population growth levels because of
external factors such as changes to migration policy, or
shifting domestic or global economic conditions.
Table 1: Summary of indicators used to compare the relative performance of scenarios

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance of the transport network</td>
<td>Uses a range of data points to identify how different configurations of the public transport and road networks perform, including mode share, congestion and travel times, under each scenario.</td>
</tr>
<tr>
<td>Access to jobs</td>
<td>Identifies how access to jobs changes in different parts of the city under each scenario.</td>
</tr>
<tr>
<td>Environmental performance of the road network</td>
<td>Calculates the relative CO₂ emissions of the road network under each scenario.</td>
</tr>
<tr>
<td>Access to and demand for social infrastructure</td>
<td>Identifies how the demand for and access to existing key social infrastructure assets such as hospitals, schools, and tertiary education facilities, change under each scenario.</td>
</tr>
<tr>
<td>Access to and demand for green space</td>
<td>Identifies how the demand for and access to existing green space, such as parks and gardens, change under each scenario.</td>
</tr>
</tbody>
</table>

Findings from the scenario analysis and *Australian Infrastructure Plan* have informed an urban reform agenda for Australia’s largest cities

Nine key findings have emerged from the scenario analysis of Melbourne and Sydney. These provide valuable insights for all Australian cities experiencing rapid population growth and change, regardless of the future growth scenario that is followed. Infrastructure Australia has combined this evidence base with analysis from the *Australian Infrastructure Plan* to develop 15 recommendations and an urban reform agenda for Australia’s largest cities.

This agenda provides all levels of government with advice on how to successfully meet the demands of population growth in Sydney, Melbourne, Brisbane and Perth in coming decades, through changes to urban planning, policy, investment and delivery processes.

The findings and corresponding recommendations are:

**Finding 1**

Unplanned growth delivers the worst outcomes for Australia’s fastest growing cities. The scenario analysis shows that well-planned cities, where the location of jobs, homes and their supporting infrastructure networks are coordinated to maximise accessibility and liveability, will deliver the best outcomes for Australian communities. For both Melbourne and Sydney, the scenario which delivers the greatest proportion of greenfield development, the lowest population densities, and the lowest integration between land use and infrastructure has poorer job and infrastructure access outcomes for future residents. This makes clear that if our largest cities are going to successfully respond to growth, changes to their structure and operation, and the processes used to deliver these, will be needed.

**Recommendation**

The Australian Government should establish a consistent framework of incentives to drive the delivery of national benefits within our cities at the project, place and reform level, such as National Partnership and Project Agreements, City Deals and Infrastructure Reform Incentives.

**Recommendation**

Australia’s largest cities should establish institutions and processes which enable the delivery of metropolitan-scale governance.

**Recommendation**

Australian governments should improve the flexibility, transparency and sophistication of current strategic planning tools and practices to improve decision making and deliver better planning outcomes for the long-term growth of our cities.

**Recommendation**

Australian governments should improve the quality and accessibility of community engagement at the strategic planning stage of a city’s development.
and the community will face a series of choices about the sequencing, type and location of infrastructure to support growth. Problems arise when new developments and infrastructure are planned and delivered in isolation. A place-based approach which considers interrelated elements and the broader needs of an area can deliver better community outcomes.

**Recommendation**

Australian governments should adopt a place-based approach when translating metropolitan visions into the sequencing and delivery of development with infrastructure.

**Finding 6**

*Well-planned infrastructure to service employment centres enhances the job accessibility of our cities and can deliver national benefits.* The three scenarios present a spectrum of economic geographies ranging from single central business districts to several distributed employment centres. Across the scenarios, the analysis shows that access to jobs is improved when cities are serviced by an established set of employment centres, particularly when connected by public transport, rather than a dispersed employment structure, requiring private vehicle access.

**Recommendation**

Australian governments should take an active role in supporting employment centres in our largest cities, serviced by public transport.

**Finding 7**

*Land-use and infrastructure planning can help to address inequality of access across our largest cities, but supporting social and economic policies are also required.* Spatial inequality, in terms of access to jobs, health services, education and green space, is evident within all scenarios, and particularly stark for those who live on the outskirts of our cities. Across both cities, the scenario which sees housing and jobs distributed more evenly across the city delivers the most equitable level of access in traditionally job-poor areas. However, disparities are still present, indicating that complimentary social and economic policies, alongside land-use and infrastructure changes, are required to effectively address this issue as our cities grow.

**Recommendation**

Australian governments should focus on improving the access to jobs, health services, education and green space for the outer areas of our largest cities.

**Finding 8**

*As our largest cities grow and densify, green and public spaces play an increasingly important role in maintaining liveability.* The scenario analysis shows that regardless of the way in which these cities grow, population growth on the scale projected will see access to private space decrease while demand for green and public space increases. This transition will place a much greater emphasis on each city’s public realm. It is critical that these assets are protected and enhanced to ensure that the liveability of Australia’s largest cities is maintained.

**Recommendation**

As our cities grow, Australian governments should focus on maintaining and enhancing green infrastructure and the public realm to ensure they remain liveable.

**Finding 9**

*Land-use changes can play some role in addressing the amount of carbon emissions our cities generate.* Australian cities are the principal generators of Australia’s carbon emissions and, without significant change, the growth of these cities will only increase this trend further. The scenario analysis shows that different land-use and transport infrastructure choices can improve the environmental performance of our cities’ transport networks. Higher density spatial patterns that encourage mode shift away from private vehicles towards active and public transport generate lower carbon emissions, reducing the city’s impact on the environment.

**Recommendation**

Australian governments should work collaboratively to establish a stable national framework to respond to climate change and reduce emissions in line with our international commitments.
For practical purposes, and to ensure the scenarios for each city compare ‘like with like’, the total population and employment numbers used are based on the respective state government projections, and remain constant across the three scenarios for each city.

The scenarios are tailored to match the unique characteristics of Melbourne and Sydney. Table 4 outlines the key characteristics of the three scenarios.

<table>
<thead>
<tr>
<th>2046 Scenarios</th>
<th>Key themes</th>
<th>Distribution of population and housing</th>
<th>Distribution of employment</th>
<th>Structure of the transport network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded Low Density scenario (2046)</td>
<td>Tests a future in which the largest proportion of development (compared to other scenarios) is placed in outer greenfield areas, with the aim of minimising the impacts of growth on existing areas.</td>
<td>Melbourne: 60% infill 40% greenfield</td>
<td>The distribution of employment follows the existing patterns of the city’s economic geography.</td>
<td>Additions to the network are structured with a focus on connecting the city’s expanded geographic footprint. As a result, the network is relatively road focused, but there is also investment in public transport.</td>
</tr>
<tr>
<td>Centralised High Density scenario (2046)</td>
<td>Tests a higher density, inner-city growth future which locates people closer to existing transport infrastructure and major employment centres.</td>
<td>Melbourne: 80% infill 20% greenfield</td>
<td>Employment is intensified around existing major employment centres, particularly the inner-city CBD and surrounding areas.</td>
<td>By concentrating development at key transport nodes the scenario aims to capitalise on areas already well-serviced by infrastructure. Additional investments are required, however, to expand the capacity of the existing network.</td>
</tr>
<tr>
<td>Rebalanced Medium Density scenario (2046)</td>
<td>Tests the outcomes of rebalancing a city’s spatial structure by spreading the impact of new jobs and houses more evenly across the metropolitan area, around key centres.</td>
<td>Melbourne: 70% infill 30% greenfield</td>
<td>The economic geography of the city is altered, with a proportion of job growth being moved to new employment centres. The aim of this scenario is dispersing new jobs closer to where the population lives.</td>
<td>The city’s transport network is enhanced to connect the city’s expanded economic and demographic geography.</td>
</tr>
</tbody>
</table>

| Sydney: 70% infill 30% greenfield | New housing is distributed more evenly across the metropolitan area, at a medium density, along public transport corridors. | New housing is focused in inner and middle ring areas at high-medium densities, close to high capacity transport nodes. | New greenfield areas are grown to their fullest extent, at a density comparable to current new suburban development. | New greenfield areas are grown to their fullest extent, at a density comparable to current new suburban development. |