URBAN SYSTEMS TRANSFORMATION

DARWIN

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THE URBAN CHALLENGE

Future Earth Australia, hosted by the Australian Academy of Science, is leading a process to co-design a national strategy for Australian sustainable cities.

Australia is already one of the most urbanised countries in the world, with 89% of the population living in urban areas (UNDESA, 2014) and 67% living in the capital cities. Australia's estimated resident population of 24.6 million people (June 2017) is projected to increase to between 37.4 and 49.2 million people by 2066 (ABS, 2018a). All capital cities are projected to grow at a greater pace than the rest of their respective state or territory (ABS, 2018a). Some are seeking to constrain growth; others, including many regional centres, are looking for extra or renewed growth.

Our urban environments are an interrelated system comprising social, economic, ecological and technical spheres. Urban systems transformation is needed to ensure that people can move around efficiently, live in safe and healthy homes, receive adequate education and medical care and enjoy lives of social equity in a healthy and biodiverse environment.

The metropolitan plans for most Australian capital cities include consistent sustainability planning and design principles such as containing urban sprawl, reducing car dependency and providing greater housing choices. However, in practice, urban decision-making is subject to numerous complex drivers—social, environmental, economic, institutional, technological—with the potential to create barriers to sustainable development.

The challenge lies in ensuring effective and consistent urban policy and decision-making in the complex urban institutional environment (across spatial scales and decision-making levels, and across sectors), with genuine stakeholder and community engagement that understands the many and varied underlying aspirations and values. In turn, this process needs to be guided by a shared vision of our urban futures, underpinned by approaches to co-produce, share and implement knowledge to inform decision-making. In this context all decision-makers and stakeholders are both providers and users of knowledge.

However, current urban development and decision-making is characterised by a lack of shared vision and excessive fragmentation in institutional arrangements and in relevant knowledge development, translation and use.

RESPONDING TO THE CHALLENGE

Future Earth Australia is working to improve the appreciation of the underlying barriers and enablers to sustainable urban development, and the supporting development, synthesis, translation, accessibility and application of relevant knowledge. Through a nationwide consultative process, it is co-developing a national strategy for the sustainable development of Australia's cities and communities over the coming decades.

Through a series of workshops in the capital cities, Future Earth Australia asked policymakers, practitioners, researchers, businesses and community stakeholders to contribute to the development of local and national strategies. Each workshop included a special focus on the specific city and the surrounding region, as well as implications for a national approach.

THE IMPORTANCE OF A NATIONAL STRATEGY

To be successful, transformational strategies will need to include shared urban visions of feasible and desirable futures, with a focus on:

- key systemic leverage opportunities
- collaborative and aligned urban governance integrated across systems, sectors and scales
- effective stakeholder and community engagement across multiple goals and diverse values
- co-produced knowledge development and use by policy and urban decision-makers.

These elements should all be supported by continuing learning and adaptive management. A national strategy will provide governments, practitioners, business, communities and researchers with recommendations for cost-effective and integrated urban systems transformation.

To help us achieve these goals, workshop participants are asked to consider:

- current issues and future visions for their city and region
- how to improve engagement outcomes with stakeholder and community groups by policy and decision-makers
- actions that if taken locally (at state/territory level) and nationally would increase the sustainable development of the city/region
- how such actions might contribute to a national strategy for urban systems transformation

A national strategy will also help Australia meet our commitments under the United Nations' Sustainable Development Goals (SDGs). SDG 11 is to 'make cities and human settlements inclusive, safe, resilient and sustainable', but transformation is underpinned by integration of all 17 of the goals.

Darwin workshop

On 18 February 2019 Future Earth Australia held the seventh in a series of national workshops for its project 'Urban systems transformation: sustainable cities' in Darwin. The workshop was hosted by Charles Darwin University and included participants from the state government, councils, universities, local businesses, NGOs and research groups.

This document summarises discussions grouped under the following workshop themes: urban visioning initiatives and pathways; collaborative governance and decision-making; stakeholder and community engagement; and co-produced knowledge development, usage and learning.

SPEAKERS

Professor Simon Maddocks, Vice-Chancellor and President, Charles Darwin University

Professor Maddocks acknowledged the traditional owners of the Larrakia nation, past, present and emerging. He welcomed Future Earth Australia and participants to the university.

Charles Darwin University (CDU) has deep roots in the community and is a dominant provider of vocational and higher education and research in the region. CDU is vital for innovation and is one of the largest businesses outside government in the Northern Territory (the Territory). It was formed in the 1960s after the community had lobbied for its own university. The Commonwealth government was originally sceptical, so the Territory took the government to court and won.

Today, one in eight Territorians have studied at CDU in some form. CDU has 25 000 students per year and has graduated 18 000 international students. International education is vital to the Territory; in 2017 the education sector created $290 million in revenue and 2000 full-time equivalent positions (Boyle and Golebiowska, 2017).

CDU is in the top 3% of universities nationally and came in at ninth place in the Times Higher Education Young University Rankings 2018: Millennial Universities. The other universities in the top 10 are in Europe and Asia.

It is one of the leading universities for graduate employment and starting salary impact, and is a new world university with deep engagement in Asia. The campus is part of the fabric of the Territory's urban and regional economies.

CDU is part of the *Darwin City Deal* (Australian Government et al., 2018) and Darwin's 10-year strategic plan; $100 million has been invested into developing the city centre campus. The new campus must be innovative, future ready and a city landmark. The campus strategy positions the development as a catalyst for urban renewal and supporting sustainability and cultural and economic development.

Dr Alexandra Murray, Office of the Deputy Vice-Chancellor Research and Innovation, Charles Darwin University

Although Darwin may be somewhat transient, there are ways to get involved and stay involved. CDU has a role in education, training and research, and is hoping to develop a local workforce that will remain in the territory for a significant period. CDU is working with the Darwin Innovation Hub[1], environmental community groups and the Chamber of Commerce to plan and build this capability.

PANEL DISCUSSION

Several regional experts were asked to give a short presentation on the current issues and visions for Darwin and the Territory and to give their insights on the major challenges for achieving sustainable development.

Ms Alicia Boyle, Northern Institute, Charles Darwin University

Ms Boyle is part of a multinational team working with the Regional Australia Institute. She is currently working on a one-year case study of Katherine and its 'missing workers'.

Katherine has a remarkably high turnover of people and sustaining jobs can be difficult. There is a high demand for people to fill key professions, but runover is often less than 12 months, and even with subsidised housing and high salaries, Katherine struggles to retain people. The project is assessing the future of both work in the region and education and training pathways. The challenge is providing pathways with opportunities within industries that are likely to grow, such as agriculture, defence, mining and resource extraction.

There has been much intervention in education and training space across the Territory. Half of the

1. https://darwininnovationhub.com.au/#overview

population is Indigenous, so there have been many interventions, many of these unsuccessful. Money for vocational training has been reduced, which is challenging for institutions. Enrolment and completion rates for vocational education and training are very low. The digital divide means that there is no way to deliver reliable digital education, as people can't rely on internet access.

There are boarding facilities in Katherine for school children from remote regions and School of the Air to year nine. Findings show that that, once a child leaves the region for education, they do not return. Sixty-five per cent of enrolments in Katherine High School are Indigenous, the highest rate in Australia. There are school-based apprenticeships, but many students are not ready for work.

The Northern Territory Council of Social Service has set up a program with mentors to keep young people in the pastoral industry. Community services is a growth area, with positions in aged care and health, and migration is essential for these jobs and others, such as fruit picking.

The project recommends to evaluate past experiments and policies, as governments should try to learn from the past and use local knowledge. Recent destruction of houses that were built ten years ago demonstrates what can happen if local knowledge is ignored.

New government policies are constantly enacted within the region, with numerous duplications. There are not enough yet in place multi-agency partnership agreements with local Indigenous communities—more are needed. The region needs local voices for local solutions.

Ms Louise Taylor, Northern Territory Government Department of the Chief Minister

Ms Taylor discussed the role of the cities team within the Department of the Chief Minister in coordinating the Northern Territory (NT) revitalisation program and the 'reactivation' of the city centre.

The *Darwin City Deal* was signed in 2018. Underpinning the deal is the goal to grow the Territory's population, create more jobs and make Darwin prosperous. The deal proposal was drawn partly from meetings with the community, through consultative workshops and open days attended by residents and members of the business. The council held an expo that was attended by 3000 people following the signing of the deal.

Key features of the deal are cooling and greening of the city centre and creating a liveable and walkable city. There is a strong commitment to develop a new education precinct, to activate laneways in the central business district (CBD), to enhance digital access, to construct multi-level carparks to replace hot bitumen carparks and to knock down old, poorly designed and hot buildings.

University of New South Wales researcher Professor Mat Santamouris has studied the urban heat island effect, and he and his team have been trialling heat mitigation scenarios in the city centre. The 55-metre shade structure on Cavenagh Street—sometimes known as the 'river of fire' due to the intense heat that develops—contains multiple heat sensors to monitor effectiveness. The results will be used to inform other heat mitigation trials.

The CSIRO-led Urban Living Lab will test the effectiveness of heat mitigation measures and the effectiveness of different tropical urban designs and heat mitigation technologies. It is a collaboration between CSIRO, CDU, industry and government and has strong ties with Singapore.

The heat mitigation work aims to encourage people to spend more time in the city centre. Each project and strategy of the deal aims to increase liveability.

Ms Caitlin Perry, Northern Territory Council of Social Services

Ms Perry works for the Northern Territory Council of Social Service, a peak body for community services that promotes a fair, inclusive and sustainable Territory. The council advocates on behalf of member organisations and clients, focusing on disadvantage and vulnerable people, and provides services across the Territory. Membership includes Indigenous, community-controlled, faith-based and secular bodies. Some of the partners are very experienced and some are new, but all are committed to challenging disadvantage and changing peoples' lives. Policy issues include justice, youth, housing, child protection and, recently, economics. Climate change underlies all of these policies.

It is important to ensure that nobody is left behind, but during periods of transition to new technologies

or in moments of crisis, often the most disadvantaged in the community are. For example, during the global financial crisis many residents lost their jobs, houses and communities.

The NT Government is developing a climate change strategy to provide clarity to business and for social development. Policies must include everyone and the benefits of change must be shared. Better town planning is needed with better building standards and more sustainable developments, with an ensuing mix of tenures and structures. Urban policies must focus on education, health, safety and well-being, universal access, addressing the growing digital divide, justice, public amenities and transport. When considering sustainability, we must always ensure that no one is left behind.

Questions asked to the panel

Are we water smart?

Currently, water usage and storage are not being considered, but should be included in the work of the Urban Living Lab. Water usage in Darwin is too high, and two-thirds of dam water is lost to evaporation—but this is difficult to reduce. There are plans for an additional water source, but the cost of bringing a new dam online is incredibly high.

What is biggest sustainability issue for Darwin?

Ensuring that everybody is part of sustainable developments is essential, otherwise there will be further disconnection between the haves and have-nots. Inclusiveness and fairness are paramount. The local workforce needs to be skilled up to be able to create, maintain and fully utilise sustainability projects. People need to be able to physically move around the city healthily and happily, and for this to happen the worsening urban heat island effect must be tackled.

Why is churn such an issue in Katherine?

Regional and remote postings can accelerate careers for teachers and nurses, but many leave for busier places with greater amenities once their minimum two-year placement is completed. Most of the people who arrive are young professionals, not families. The Katherine CBD revitalisation program needs a cultural boost, but the environment can be harsh. Young trainee teachers can struggle, especially if there is pushback or a lack of response to their (sometimes naïve) efforts to 'change the world' regarding Indigenous affairs.

A VISION FOR DARWIN

Workshop participants were asked to consider their vision for a sustainable future for Darwin and to use their devices to enter applicable words into an online poll to generate a word cloud. The words most frequently entered were *water, shade, jobs, energy and population* (word cloud 1).

Water is an issue, both in terms of usage and wastewater treatment. Sewage is still discharged directly into Buffalo Creek, but to upgrade the current treatment system would cost $1.5 billion.

Word cloud 1: What is your vision for a sustainable future for Darwin?

Darwin's economy has historically cycled through times of boom and bust. The working population is transient due to several factors. For example, the Australian Government Department of Defence is a significant employer, but postings are temporary and large infrastructure developments in the resources sector lead to a boom in employment availability, such as the INPEX Ichthys LNG Project, which supported a jobs boom during its eight-year construction phase. But what happens when these projects finish? How do you get people to stay? Temporary residents harvest the opportunities, harvest the money and then leave. Darwin needs more people to grow the economy and reap social benefits.

When asked about their vision for Darwin in 2030 to 2050, the group overwhelmingly responded *innovative* (word cloud 2).

Word cloud 2: What is your vision for 2030–2050 in Darwin?

There is pride in being a Territorian. Even though there is focus on the downturn, people are proud of the diversity, openness and spirit. But greater innovation and more systems thinking is needed. For example, there is no local food economy for food, which is all trucked up from the south. The Territory's economy needs to be diversified to stabilise the boom and bust cycle. The NT Economic Development Framework[2] includes investments in tropical health, creative industries, renewable energy, environmental services and the human services industry.

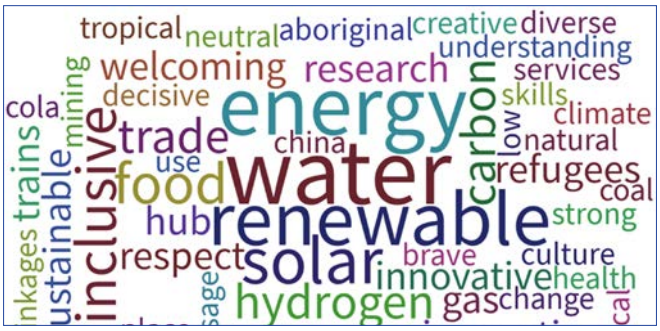
Australia doesn't have an economic model that works in remote areas—only in capital cities. As regional areas tend to be overshadowed by capitals, this is where innovation should come in. Although there are many successful Indigenous Northern Territorians, remote communities often do not have the same opportunities. We should ensure that services and opportunities are shared equitably with these communities to allow people to continue to live on country. There are many innovative developments, such as access to telehealth to allow people to remain in their communities and not travel for all appointments, and current trials using drones for pharmaceutical deliveries. These innovations will be important for the future of the Territory.

Economic development plans miss out on the positive contribution of Aboriginal and Torres Strait Islander culture, such as carbon sequestration in native lands, ecosystem services, the protection of biodiversity and fire management. The Territory is always so eager to connect with the south that it misses the value of its Indigenous culture.

Darwin and the Territory need to be better connected to the rest of the country. A train line would not be cost effective; a more viable option is freight via shipping. But rather than concentrating on becoming a trade hub, consideration should be given to adding value to what is already established. The Territory exports raw materials but does no processing. Darwin could function more as a transition point between Asia and Australia.

The NT Government has invested $100 million to turbocharge tourism, but Darwin itself is not sold as a destination other than a one- or two-day stop on the way to Kakadu. The city experiences tourism peaks and troughs. During major events hotels are full and many more people would come if they could. How can we get people to stay for longer in the city?

When asked what would be important for a sustainable Australia the top suggestions were *water, energy, renewables, dollar, inclusive and hydrogen* (word cloud 3).



Word cloud 3: What is your vision for a sustainable future nationally?

The main issue for a sustainable Australia is to understand and develop the energy–water–food nexus.

WHAT ARE POTENTIAL CO-PRODUCED SOLUTIONS?

Participants broke into groups to discuss the knowledge needed for more sustainable planning and co-produced solutions to transform the urban environment. Much of the focus was on power, energy, water and business, and an emphasised need for a longer-term perspective.

KNOWLEDGE GOALS

The Territory offers ample opportunities to pilot and trial new systems and products in wet and dry tropics environments. The City Deals process offers opportunities for co-developing projects and co-producing sustainable solutions.

Research is lacking with regards to the complex nexus of food, energy and water. More information is needed about: water over-allocation and the current capacity and recharge capacity of storage units; accurate population projections; blue carbon (such as using mangroves to store carbon); the circular economy; using waste products as building materials and revising and updating building efficiency standards; renewables research, including renewable hydrogen and local uptake of solar; and the infrastructure of energy and its distribution around the Territory.

2. https://edf.nt.gov.au/

We don't know enough about what our environment should and could look like. There has not been enough work on the importance of the natural environment to different communities. Meaningful engagement with Indigenous communities is essential if we are to fully realise this.

NO ONE LEFT BEHIND

A systems approach is vital for the transformation to sustainable environments to work. Co-production of solutions should mean not leaving anyone behind. There needs to be a clear vision of society and a clear definition of stakeholders. To achieve co-production of projects and policies, education, industry, government and logistics must work together. When considering initiatives like reducing waste, all of the stakeholders should be given a chance to have their voice heard.

BEING CLEVER

We need to know what we are good at and utilise those knowledge systems. Darwin may be small, but it can be smart—we can't do everything, but what we do, we can do well. To be smart and efficient requires the ability to be adaptive. From the start we need to forecast what opportunities and challenges will arise during planning projects. A significant knowledge gap exists in how to collaborate across cultures.

The Darwin economy expands and contracts mainly due to factors outside its control (for example, defence movements and large infrastructure projects). The city and region must learn how to attract and retain investment. How is Darwin responding to and taking advantage of disruptive tech? Can we identify things that have been trialled elsewhere, such as distributed decision-making and subsidiarity?

BUILDINGS AND SERVICES

An ongoing issue is how to bring services to all across very great distances and without using polluting cars and trucks. In the city, the issue is more about how to encourage people to live in the centre without compromising their desired lifestyle; the Australian dream has typically centred on living in houses rather than units or apartments.

The design of new buildings should strictly adhere to energy efficient principles, such as appropriate insulation, structures that capture natural breezes and use of recycled materials.

Clear messaging about efficient housing design and the concept of 'reduce, reuse, recycle' is needed. The community should be educated about building supply chains and understand where they can make a difference.

COLLABORATIVE GOVERNANCE AND DECISION-MAKING

BUILDING TRUST

For collaborative governance and decision-making to work, there needs to be real representation and targets. To build trust, consultation needs to include all groups and reflect diversity, and there needs to be bilateral, long-term agreement. Plans must prove that they have taken past actions into consideration and learnt from past mistakes. They must be evidence-based and developed using credible data and research.

A key priority is gaining trust by operating in an open and inclusive way to ensure that stakeholders agree on actions, strategies and agendas.

COLLABORATIVE BOARDS AND STRATEGIES

Collaborative boards and strategies could be used to give the environment a financial currency. The current election cycle for boards is too short to allow for long-term planning. Collaboration between groups increases the strength and validity of sustainability messages.

DATA AND RESEARCH

The value of participation and investment in data gathering, storage, analysis and communication needs to be clearly stated to government and industry. Data gathering exercises must be properly planned, consistent and, where necessary, long-term and continuous. Stakeholders should always be made fully aware of the purpose of data gathering. Funding needs to be of a magnitude and length of time to fully realise the aims of data-gathering exercises. To accomplish this, a data policy is required.

Of great importance is collaboration between government departments, publicly funded research organisations and universities. Universities can provide a safe test-bed environment, as is the case for CDU's collaboration with the NT Government.

ECONOMIES AND GOVERNANCE

Economies need to be agile, and to be agile they must be diverse. This can only happen when policies and

legislation are fit for purpose and government systems are resilient. In support of resilience and sustainability are issues such as opening and sharing data, using appropriate land-use practices that manage fire and water and keep people on their land, managing for population fluxes, creating a renewables economy and creating stability in the face of political change.

STAKEHOLDER AND COMMUNITY ENGAGEMENT

The participants formed into new groups to discuss barriers and opportunities for stakeholder and community engagement.

METHODS

Surveys and census of beliefs are traditional methods for engaging stakeholders and can provide useful data when response levels are statistically adequate. Social media offers an effective engagement tool, however negative aspects of social media (such as loss of objectivity and discussions becoming segregated along belief lines) may turn debates into echo chambers.

It is important to share information between agencies so that work is not duplicated. For example, Aboriginal and Torres Strait Islander communities are often surveyed multiple times. Where local knowledge is sought, make sure that it is used. Often we don't action the data and information we have.

COMMUNITY OWNERSHIP

It is important to be up front with communities about how much control they have over outcomes. Don't go to the community if their input is not going to change the output. Recognise that not all decisions need to go to community, as repeated questioning of beliefs can lessen the impact of meaningful surveys. The Council has received feedback with the message 'you are the Council, just make the decision'. The council has a new strategic plan to actively target stakeholders in a way that is appropriate to their culture.

The high turnover of people living within the Territory does create problems in maintain relationships. Rapport with communities must be nurtured over time.

THE POWER OF LANGUAGE

Language must be audience appropriate and care must be taken to fully explain why community opinion is being sought, what the problems are and what the objectives of the survey, workshop or interview are. People want to hear positive messages about small actions that they can adopt that will lead to change.

LOOK AT THE POSITIVES

Be proactive in planning. A powerful driver of sustainability is for people to see the potential benefits. The 2010 Top End Sustainable Living Festival, which was held at the George Brown Darwin Botanic Gardens, was a successful example of bringing sustainability issues and methods to a wide audience. Agricultural shows offer a good opportunity to engage with the community and to display sustainability initiatives. The Darwin Council organised a tree planting day and gave trees away, while the 2018 Nightcliff Seabreeze festival highlighted the issue of single-use plastics.

MOTIVATION TO CHANGE

How can we motivate people to change? Open forums, both in person and online, can be used to directly engage. Community engagement is needed to entice people to want to become involved and contribute to the future of their home. It is important to engage with the next generation, to discuss with young people the sustainability issues and potential avenues for transformation and to canvas their ideas. Likewise, it is important to learn from the past and engage older generations in discussions.

KEY PRIORITIES FOR A NATIONAL STRATEGY

Keep stakeholder engagement positive and use real-world examples to demonstrate the power of sustainability. Be willing to move with the times and use social media, but be aware of its limitations. Engage with all generations—learn from the past and be influenced by the young. Meaningful engagement with Indigenous communities is essential. Clear messaging about efficient housing design and the concept of 'reduce, reuse, recycle' is needed.

Collaborative governance and decision-making must be based on consultation that reflects diversity and aim to create bilateral, long-term agreements. Always consider past actions and demonstrate that past mistakes have been considered. Planning projects must be evidence-based, using credible data and research.

Fund data gathering, storage and analysis with sufficient equipment so that data gathering exercises are well planned and open from the start.

DARWIN: BACKGROUND INFORMATION

Darwin is NT's capital and sits on the coast to the Timor Sea. The population is spread between older sections of the city on the coast and newer suburbs to the north. Darwin has a tropical climate, experiencing a distinct monsoon season between December and March and a dry season from May to September.

FACTS AND FIGURES

Darwin City has an area of 143 km^2 and had a population of 78 000 in the 2016 census. However, the population of Greater Darwin (as the Significant Urban Area unit measured by the Census) was projected to be around 123 574 in 2016 (ABS, 2018b) and has a slow overall growth rate of less than 1% (ABS, 2018b). People leave Darwin to move interstate, and population gains are the result of international migration. Darwin's satellite cities and suburbs have recently experienced strong growth between 2016 and 2017, of around 25% in Palmerston and 10% in Lyon (ABS, 2018b). Around 58% of the Territory's population lives in Darwin (Northern Territory Department of Trade, Business and Innovation, 2018).

Greater Darwin includes three major local governments—Darwin, Palmerston and the north-west part of Litchfield. Darwin has the highest proportional population of Aboriginal and Torres Strait Islander people of any capital city, 9.7% in 2016 (ABS, 2018b). It has a population of diverse ethnic background (20% of the 2016 population was born overseas): Northern and Western Europeans (5.5%), Southeast Asians (5.8%, particularly Filipino people), people from other parts of Oceania (2.7%) and Southern and Eastern Europeans (1.7%) (ABS, 2018b). Darwin is a relatively young city with a median age of 33 years, compared to the Australian median of 37 years (ABS, 2018b).

Most people in Darwin are employed in state government, defence, hospitals, primary education and construction (ABS, 2018b). There is a relatively large proportion of workers who are non-residents, such as fly-in-fly-out workers and those who are employed in the Air Force and mining—in 2016 this was estimated to be around 8700 state-wide, with the vast majority located in Darwin (Northern Territory Department of Trade, Business and Innovation, 2018).. Tourism and other industries associated with encouraging trade and participation in Asian markets are expected to have significant future growth (City of Darwin, 2018).

REGIONAL CHALLENGES

Low-activity CBD

Darwin's CBD is at risk of becoming a ghost town, negatively affecting the economic activity of the capital and its desirability for prospective residents and businesses. Residents note that there is a large proportion of shops in the CBD that are not in use and that there is a distinct lack of vibrancy.

While there is conjecture about the main cause, some of the oft-stated contributing factors include low population, the existence of competing commercial activity centres and poor urban design, which is exacerbated by excessive regulation (Aikman, 2018). The CBD also has a reputation for hot streets and insufficient greenery (Aikman, 2018). These contribute to creating a CBD that people are not attracted to living or investing in.

In November 2018, the Commonwealth and NT governments announced a $200 million investment to move Charles Darwin University from the suburbs to the city as part of the *Darwin City Deal*. The aim of this move is to attract international students to increase economic output, while also revitalising the Darwin CBD for all residents.

Urban heat

While urban heat is a feature of most Australian cities, in Darwin it is particularly pronounced due to the combination of high temperatures (the average maximum temperature never dipping below 30°C) and high humidity (sitting near 80% in summer and 60% in winter) (Bureau of Meterology, 2019). The surface temperature of tarmac and buildings can exceed 60°C, as found by a University of New South Wales report for the NT Government's Heat Mitigation Program

(Santamouris, 2017), and this will be exacerbated by climate change. A hot city has profound health impacts, with each degree of extra heat increasing hospital submissions by 263% (Aikman, 2018).

The NT Government has begun trials of heat mitigation strategies in Darwin's CBD in Cavenagh Street, the findings of which will inform a strategy to be used more broadly to bring down urban temperatures.

Figure 1: Cavenagh Street Redevelopment, Stage 2 (NT Government, 2018)

Despite having to combat urban heat effect, particularly in the CBD, a very high proportion (92%) of greater Darwin residents have good access to green space and a high amount of green space (284 m^2 per capita) relative to other capital cities (Australian Government, 2016).

Figure 2: The 50-metre canopy structure is designed to reduce ambient temperatures in the CBD, NT Government

Difficulty attracting balanced and productive population

The NT and Darwin have had relatively low population growth since 2007. Between 2016 and 2017, Darwin's population grew by just 700 people (0.5%), making it Australia's slowest growing city (ABS, 2018b).

In 2016, the Northern Institute at CDU described the key characteristics that had defined population changes in Territory (Taylor and Wilson, 2016). Low rates of population growth are occurring due to more people choosing to move interstate than are gained, with around 35% of net migration loss being accounted for by Darwin's suburbs and a little over 10% in the city.

The largest absolute numbers for people moving interstate was in the 20- to 39-year bracket, and there is a pronounced gender imbalance (13 less women per 100 men in 2016), as women in the Territory are more likely than men to plan their education and careers and pursue them elsewhere (Taylor and Wilson, 2016). There is a deficit of skilled workers in Darwin, and those who do come most likely have immigrated from overseas, rather than other parts of Australia (Taylor and Wilson, 2016).

In 2018, the NT Government released a $50.4 million 10-year *2018–2028 Population Growth Strategy* (NT Government, 2018), underpinned by the goal to reach an ongoing average of 1.4% population growth. The strategy is based on five streams: publicising and promoting virtues of the Territory ($4.6 million); attracting investment and creating resident jobs ($8.5 million), retaining migrants ($13.8 million); enhancing liveability ($23 million) and understanding drivers of population change ($0.5 million).

High Cost of Living

Darwin generally has high costs associated with food, fuel and home rentals compared to other Australian cities, despite fluctuations year to year.

In 2017, despite having a rental vacancy rate of 7.1% (double the national average), Darwin also had high rental prices—the median weekly rental price for a three-bedroom house was $494, on par with Sydney. However, there have been reductions since 2016 (PRD Nationwide, 2018), most recently seen as a 5.8% decrease (NTCOSS, 2018). While rental prices have lowered, they remain high compared to other capital cities.

Petrol in the NT is substantially more expensive than in other states, with the average price in August 2018 in Darwin being 11 cents higher than the national average (NTCOSS, 2018).

MAJOR PLANNING DOCUMENTS

Darwin City Deal

The *Darwin City Deal* is a funding agreement between the NT Government, the Australian Government and the City of Darwin, established in November 2018. It comprises a 10-year, $200 million deal to strategically invest in measures that address barriers to long-term sustained economic growth in Darwin. An implementation plan is being prepared by the three levels of government for mid-2019.

The deal aims to revitalise the city centre and undertake planning to encourage private investment, population growth, tourism and business activity.

Key commitments for co-funding include:

- a new education and civic precinct, including a new CDU campus, to attract international students
- redevelopment and greening of State Square to reduce urban heat, and a new art gallery for tourism
- introduction of climate-appropriate urban design to cool and green the city
- increasing the share of jobs held by Indigenous Australians through employment targets in City Deal projects, promotion of Larrakia culture and development of a cultural centre
- development of dormant sites to activate the harbour foreshore.

Darwin Regional Land Use Plan 2015

The *Darwin Regional Land Use Plan (2015)* is incorporated in Schedule 2 of the NT Planning Scheme. This plan identifies the key characteristics and major needs that will shape future development in Darwin and the region and constitute a framework for that development. Responding to human and environmental needs into the future, the plan is a foundation for long-term use of land and other resources. It provides guidance to interpretation of the NT Planning Scheme, along with more detailed Area Plans for certain localities.

The plan details that housing development in Darwin city will be comprised mainly of infill and redevelopment in the future as broad hectare land is virtually exhausted. Maintaining the character of neighbourhoods will be prioritised, while maximising self-containment by developing local economies close to public transport.

Northern Territory Infrastructure Strategy 2017

The *NT Infrastructure Strategy* is a key document that sits within the NT Economic Development Framework, which articulates the high-level vision and objectives that underpin planning, assessment, selection, prioritisation and investment in infrastructure in the Territory. For the sake of enhancing living standards, infrastructure should be planned and efficiently delivered to advance economic development and diversity. This vision is exercised through infrastructure objectives, which are then manifested in the key infrastructure areas.

In analysing policy drivers, the strategy specifies:

- when investment in infrastructure should take place (a flexible approach to efficiently provide where demand can be shown to exist, or pre-emptively deliver infrastructure to capture opportunity)
- how to make the most of existing assets, carry out respectful processes for Aboriginal land and use value capture methods to fund work
- what constitutes the right kind of infrastructure to invest in (strategic criteria)
- who should invest where and in what (role or government vs private sector).

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