



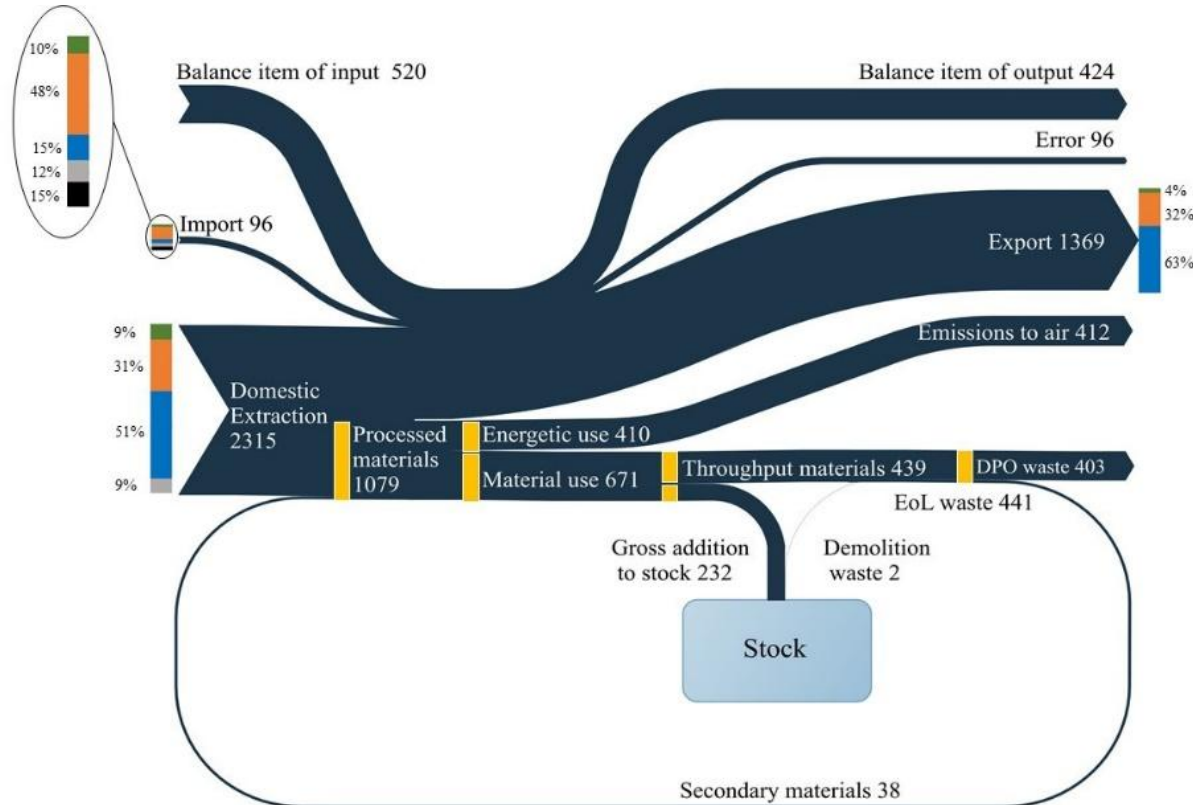
Australia's National Science Agency

Australia's effort to transition to a net-zero circular economy: opportunities and challenges for cities and regions

Seventh Annual Session of the Global Forum on Human Settlements and Sustainable Cities

Heinz Schandl | 16 December 2022

Australian Material Flow Balance 2018



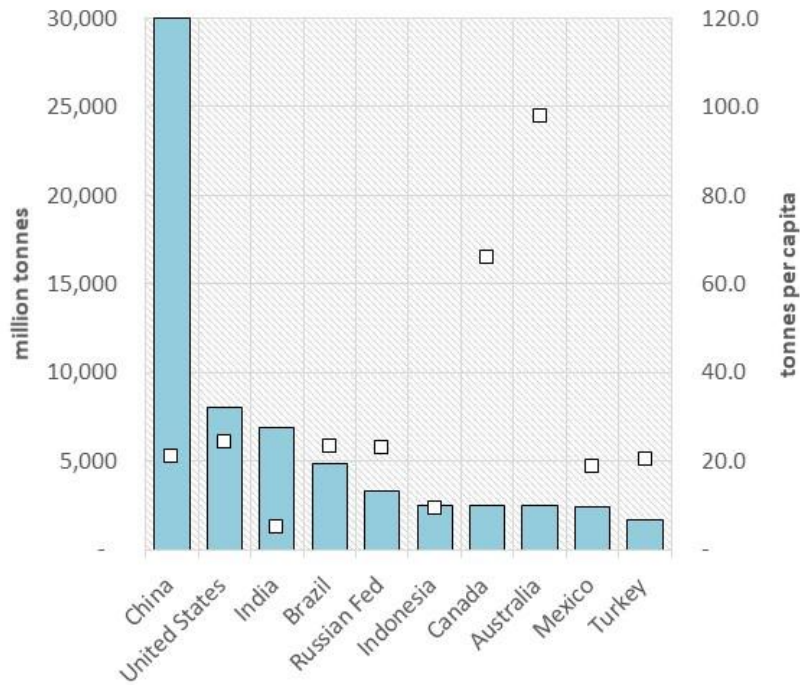
8.0% Recycling Rate

3.5% Circularity Rate

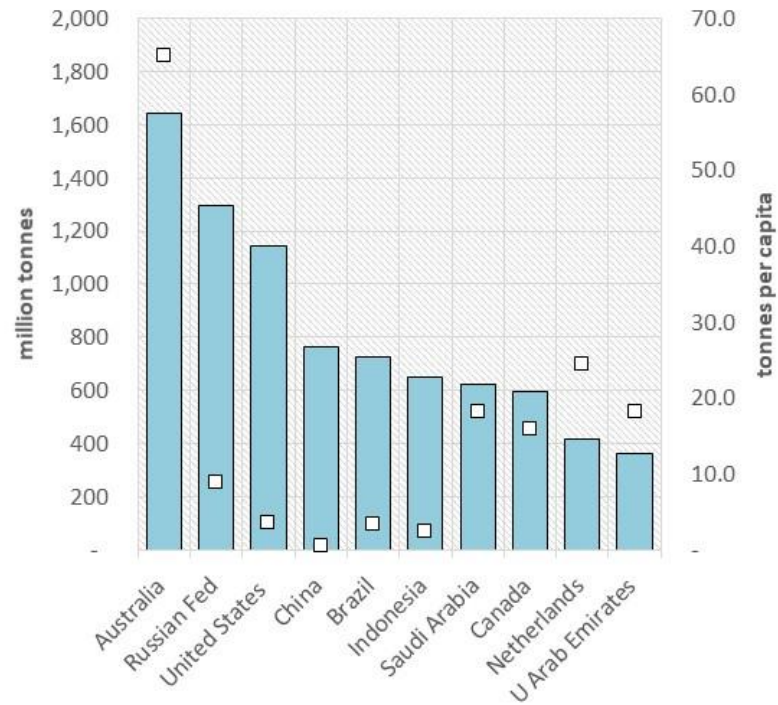
20% Circularity Potential

Top-10 primary material extractors and exporters

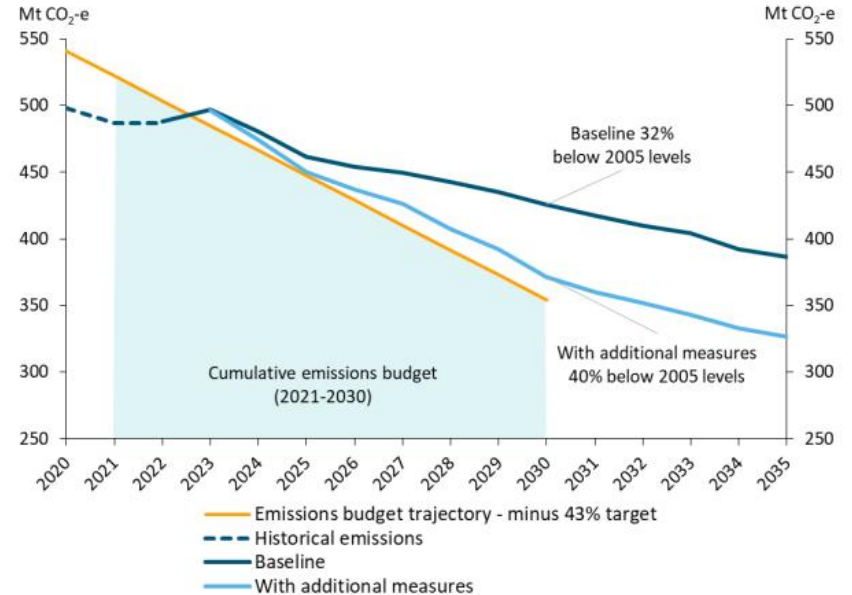
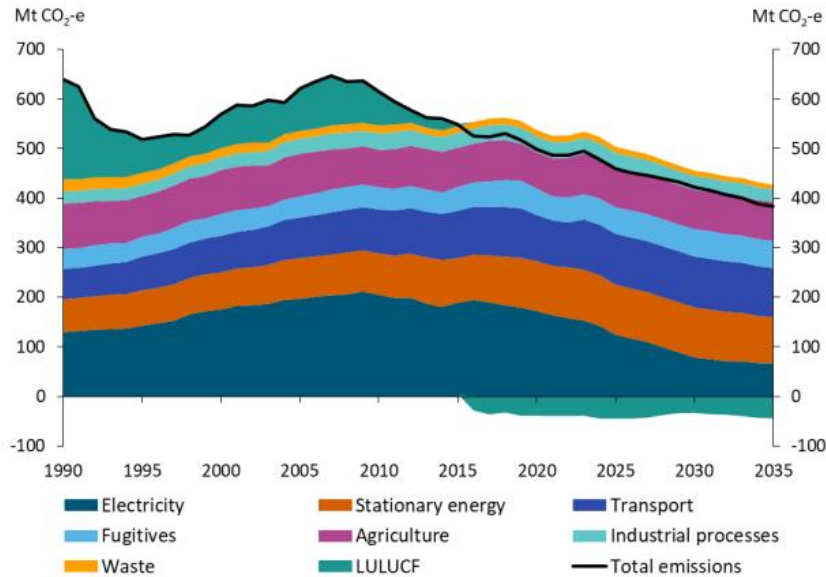
Domestic Extraction



Exports



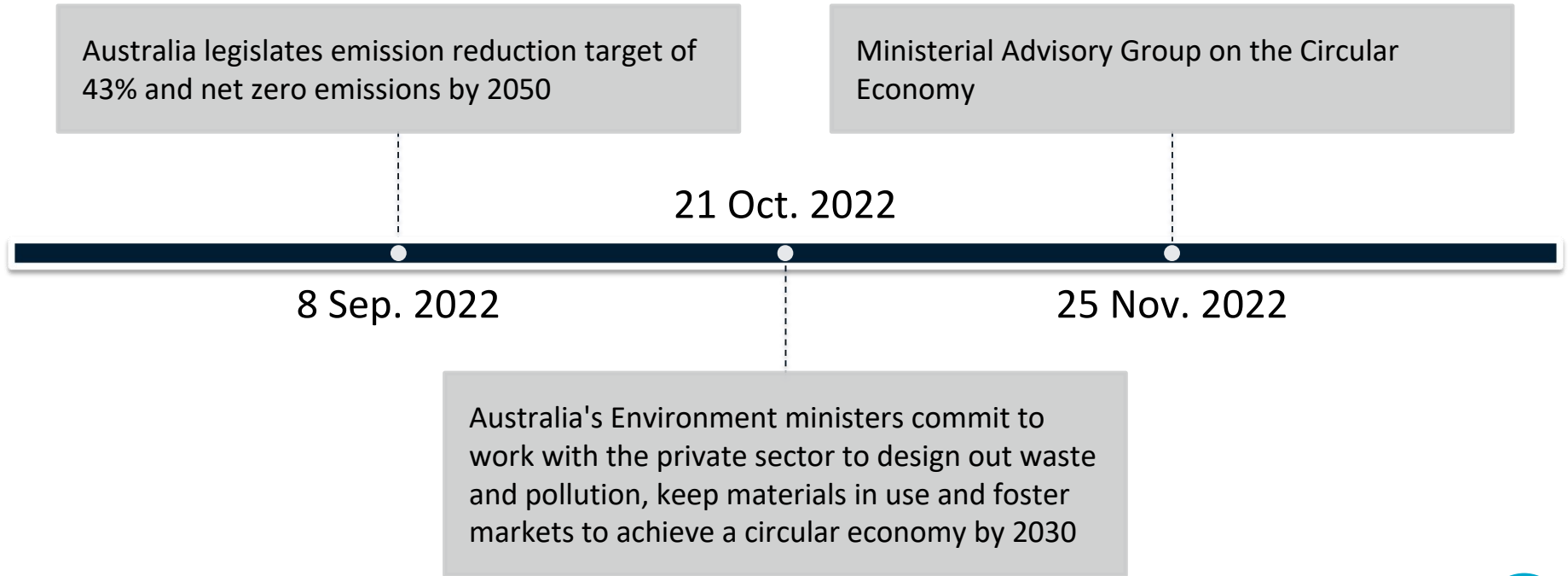
Australia's Emission Projections



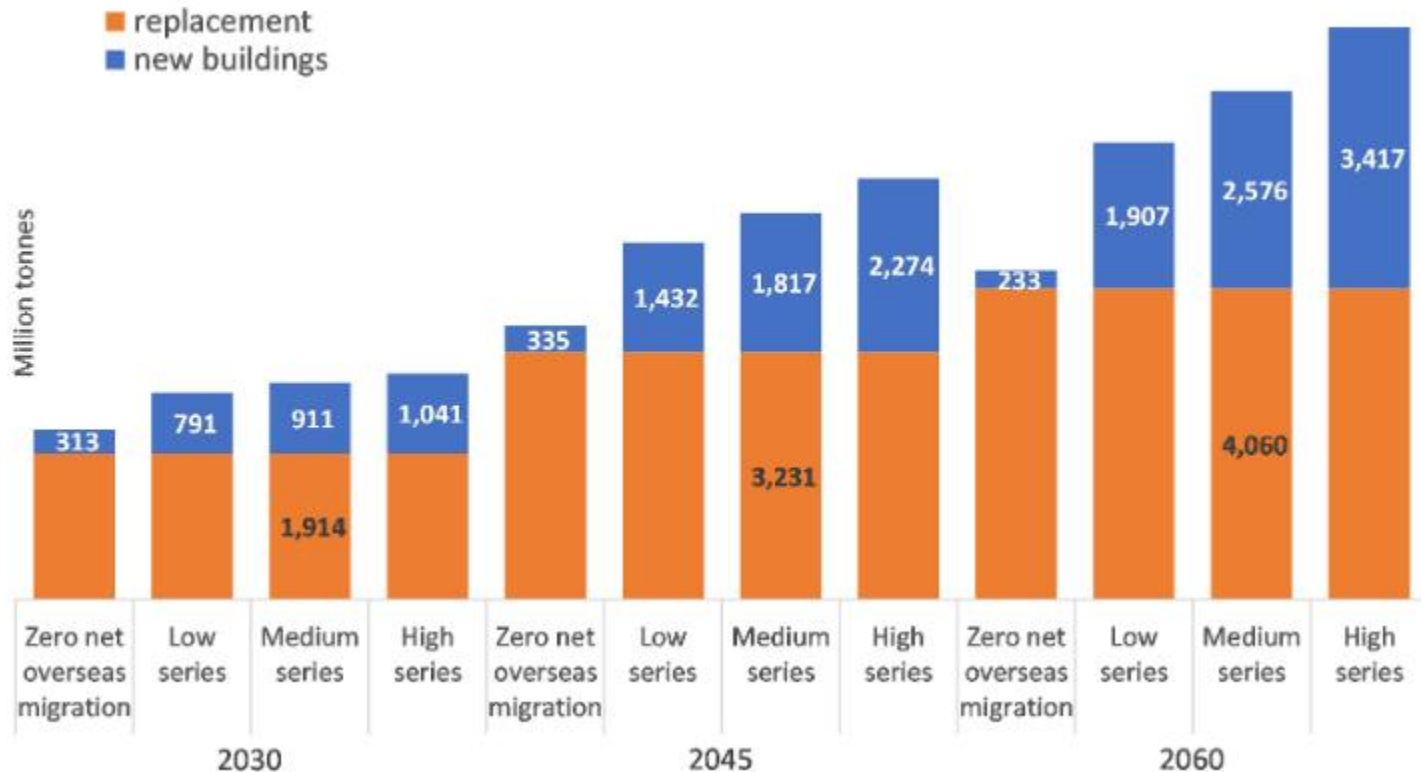
National, State and Regional CE Policy Initiatives

- National Waste Policy (2018) and National Waste Policy Action Plan (2019) with seven national waste reduction targets enabled through circular economy
- Large investment in recycling infrastructure – Recycling Modernisation Fund
- Recycling and Clean Energy one of six priorities of the Modern Manufacturing Initiative (2021)
- Circular Economy initiatives in Victoria, New South Wales and South Australia
- City deals for nine urban agglomerations aligning three levels of government
- New South Wales Special Activation Precincts - advanced manufacturing, renewable energy and resource recovery

A national effort to transition to a low carbon circular economy

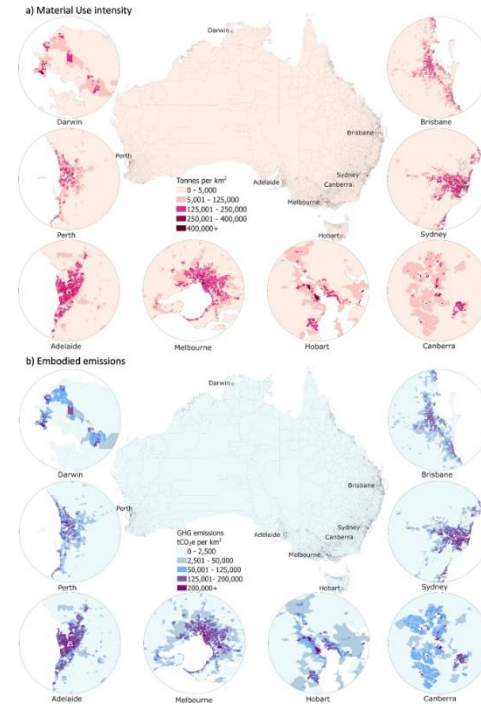


The role of cities for net-zero and circular



Cities material and emission intensity

- Metrics to measure the material and carbon intensity of the built environment
- Spatially explicit models of urban metabolism
- Identifying opportunities for low carbon and circular solutions in housing and mobility



Australia National Outlook 2019

Slow Decline

In *Slow Decline*, Australia drifts into the future. Economic growth, investment and education outcomes are all relatively weak. Australia's economy is increasingly vulnerable to external shocks. Total Factor Productivity (TFP) growth remains well below the global frontier and wage growth is relatively low.

Australia's cities sprawl outwards, making it more difficult for people in the outer suburbs to access jobs, education and services. Housing affordability remains a major concern. This deepens social divisions and polarisation. Trust in institutions remains low.

Although energy policy issues are resolved domestically, the low-emissions energy transition is stymied by a lack of global cooperation on climate change. Both energy and agricultural productivity remain relatively low.



Real wages are **40% higher** in 2060 than today



Cities sprawl with **little change** in density

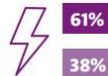


Average urban vehicle kilometres travelled per capita **falls by less than 25%**



Net emissions **decrease to 476 MtCO₂e** by 2060 (-11% on 2016 levels)

61% increase in **total energy use** by 2060 (on 2016 levels), with only a modest improvement in energy productivity



Households spend **38% less** on electricity as a percentage of income

Returns to landholders increase by around **\$18 billion** between 2016 and 2060



Minimal environmental plantings in 2060

Outlook Vision

In the *Outlook Vision*, Australia reaches its full potential. Economic growth remains strong and inclusive as Australian companies use technology to move productivity towards the global frontier and create new globally competitive, export-facing industries. Improved educational outcomes give Australians the skills they need to compete in this technology-enabled workforce.

Australia's cities are dynamic and diverse global centres with higher-density populations, a diverse range of affordable housing options and equal access to high-quality jobs, recreation, education and other services.

Australia successfully transitions its energy system, with high reliability and affordability and lower emissions.

If the world cooperates to limit climate change to 2°C, Australia can go even further and reach 'net zero' emissions by 2050, driven by significant shifts in land use to carbon plantings.



Real wages are **90% higher** in 2060 than today



Average density of major cities **increases 60–88%**



Average urban vehicle kilometres travelled per capita **reduced by 33–45%** with greater uptake of mass transit



Australia reaches **net-zero emissions** by 2050 under a cooperative global context, with the potential for net-negative emissions by 2060

6–28% increase in **total energy use** by 2060 (on 2016 levels) with more than a doubling of energy productivity per unit of GDP



Households spend up to **64% less** on electricity as a percentage of income

Returns to landholders increase by **\$42–84 billion** between 2016 and 2060



11–20 Mha of environmental plantings in 2060 under a cooperative global context (12–24% of intensive agricultural land)

Five Key Shifts



Thank you

Environment

Heinz Schandl

heinz.schandl@csiro.au

<https://people.csiro.au/S/H/Heinz-Schandl>

Australia's National Science Agency

