CSIRO Australian National Outlook
Economic activity, resource use, environmental performance and living standards, 1970–2050
November 2015

Slide pack of all figures in the main report and the chart overview

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Helping to navigate Australia’s future
Exploring the “Water-Energy-Food nexus”

The National Outlook is a new initiative, which is intended to contribute to the evidence base and understanding required for Australia to navigate the complex and often intertwined challenges involved in achieving sustainable prosperity.

The analysis explores the prospects for Australia’s materials- and energy-intensive industries, which account for one quarter of economic value and employment, and around three quarters of our use of energy, water, and materials.
Our analytical framework

The *National Outlook* is the most integrated and evidence-based national scenario assessment of these issues yet attempted. The analysis uses nine linked models to explore global and national trends and uncertainties.
Issues and scenarios explored

FIGURE 4 OVERVIEW OF THE NATIONAL OUTLOOK SCENARIOS

- Each row is a different combination of domestic drivers
- Each column is a different combination of global drivers
- These combinations present 20 core scenarios that we have modelled in detail
- The four touchstone scenarios (in solid colours) illustrate a clear range of outcomes


The analysis for the National Outlook adopts a scenario based approach to explore multiple uncertainties.
Australia’s choices will shape our prosperity
Projected global demand for our exports trebles to 2050

By 2050 the world economy is projected to grow to be around three times larger than it is today, with average global income per person more than doubling from 2010 to 2050 across all scenarios.

Demand for our minerals and energy-intensive exports will be strong, but prospects for specific commodities are uncertain.

The outlook for coal and gas is uncertain. The global outlook for fossil fuel based electricity generation ranges from a small decline to a doubling from current levels, with larger differences for coal.
Agricultural prices are projected to trend upwards

Looking ahead, an upward trend in agricultural prices is likely as global supply falls behind the growth in global demand.

... and we can increase agricultural output

Australian agricultural output volumes (and incomes) are projected to rise by at least 50% by 2050, with productivity improvements in line with long-term trends. New land markets increase land sector incomes.

Sustainability and economic growth can be partners not competitors
Energy, water and food

We find Australia can continue to enjoy strong trend growth in national income, while reducing pressures on natural resources and ecosystems.
Australian average income projected to rise in line with historical trends

We project that the total value of Australian economic activity will increase by a factor of ten over the 80 years to 2050.

Scenario drivers help boost national income

Average income per person is projected to increase by 12 to 15% above inflation per decade, with choices about working hours making up two-thirds of the differences in income.

Energy and transport affordability can be maintained or improved

Big improvements in the affordability of electricity could be achieved through better managing peak demand, and associated network infrastructure costs.

Electric vehicles and biofuels

Uptake of electric vehicles and biofuels could reverse mounting transport imports, reduce costs, improve air quality, and reduce greenhouse gases.

Decisions we make as a society matter – and will shape Australia’s future more than the decisions we make as businesses or individuals.
Meeting the water-energy-food nexus will produce challenges and opportunities for rural land use and communities.

We can transform and enrich our economy and regional communities by meeting national and global food, fibre, energy, carbon sequestration, and conservation needs through new land sector markets, if we manage these transitions well.

Policies and institutions are central to unlocking benefits, and managing trade-offs and risks.

Figure 15: Policy settings and choices drive different outcomes for carbon, native habitat, and water – even with the same level of abatement incentive.

Native habitat, carbon sequestration and water interceptions from new plantings

Outcome in 2050 as a share of maximum achieved

- New native habitat
- Cumulative carbon sequestration
- Total new plantings
- Water interceptions in water-limited catchments

Calculating the contribution of different choices

**FIGURE 16** COLLECTIVE CHOICES ACCOUNT FOR THE MAJORITY OF PROJECTED DIFFERENCES IN RESOURCE USE AND ENVIRONMENTAL PRESSURES IN 2050

Policy choices (in Australia and globally) account for 50 to 90% of the range of projected resource use and environmental outcomes.

Rising water demand can be met, while enhancing water security.

Projected increases in water demand need not lead to increased pressure on water-limited catchments.

Technology is crucial to achieving sustainable prosperity.

Policy settings and market factors will drive the deployment of a portfolio of technologies for energy, water, transport, agriculture and other industries, and to support continuing innovation.

We can reduce our greenhouse gas emissions significantly through actions across all major sources, while maintaining strong economic growth.

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Shifting from current global efforts to stronger global emissions reductions could yield economic and environmental benefits for Australia. Weaker global emissions reductions are projected to boost near term economic performance, but would risk damaging assets that underpin our long term wellbeing and economic security.

Abatement incentives can be harnessed to restore Australia’s globally significantly ecosystems.

Australia’s ecosystems are unique and globally significant. Providing incentives for restoring native habitat as well as carbon sequestration could significantly reduce the impacts of climate change on Australia’s unique ecosystems and native species.

Carbon payments can be harnessed to protect our biodiversity

Biodiversity benefits – including reductions in extinction risk – are broadly proportional to the area of new native habitat restored.

Appendix A: Our analytical framework
The National Outlook focuses on modelling 20 core scenarios, supplemented by targeted sensitivity analysis. Though not exhaustive, this set covers a wide range of plausible socio-economic and biophysical outcomes, and allows us to assess the effects of each scenario driver.
Population assumptions

Total population increases from 22 million people today to 36 million in 2050. This is an increase of 64% over four decades, a little slower than the 76% increase experienced from 1970 to 2010.
Changes in climate variability – the intensity and frequency of droughts, floods, storms – will have impacts for agriculture.

The impacts of changed frequency and severity of extreme weather and climate events may be very significant, and may outweigh the benefits of productivity improvements in some regions.


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The different levels of global abatement effort have a significant impact on per capita emissions in 2050, but the full climate implications – and impacts – of the different emissions trajectories do not occur until later in the century.

Abatement impacts offset by population growth

Average global income in 2050 varies by 8% across the different global context scenarios, with differences in population growth accounting for most of this difference.

Additional figures from the Chart Overview
As the number of people in high income countries triples to 2050, so does the demand for Australian exports.
Energy and resources

D1. CHANGE IN ELECTRICITY AFFORDABILITY TO 2050

Affordability is not sensitive to carbon intensity, but could improve by 30% with better management of peak demand.

Energy and resources

<table>
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<tr>
<th>CCS available</th>
<th>Change in coal fired electricity, from 2010 (percent and GWyr)</th>
<th>Change in gas fired electricity, from 2010 (percent and GWyr)</th>
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Carbon capture and storage (CCS) may allow coal-fired power to grow even with very strong global abatement.

At CSIRO, we shape the future. We do this by using science to solve real issues. Our research makes a difference to industry, people and the planet.

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We ask, we seek and we solve.

FOR FURTHER INFORMATION
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