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Copies of the full CSIRO report are available at *www.dsf.org.au* and *www.acfonline.org.au/GreenCollarJobs*

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Growing the Green Collar Economy

Skills and labour challenges in reducing our greenhouse emissions and national environmental footprint

Executive summary

Reduce emissions, improve the environment and grow jobs

1. Australia's potential for green job growth

The vast majority of Australians now accept that achieving environmental sustainability – avoiding dangerous climate change, using our natural resources efficiently, managing our water supplies wisely, keeping our rivers and landscapes healthy and protecting our biodiversity – will mean substantial economic change.

Economists Sir Nicholas Stern and Professor Ross Garnaut have warned that while the cost of this change will be significant, the cost of doing nothing will be far greater. Both these respected economists have shown we can tackle climate change and continue to grow our economies.

This report builds on the work of Stern and Garnaut. It shows we can take strong action to tackle climate change **and** create millions of new job opportunities in Australia.

Australia can take bold steps to reduce greenhouse gas emissions and improve environmental outcomes without endangering overall employment growth BUT this will require a very significant transformation of the nation's skill base.

Using the latest CSIRO modelling, the Dusseldorp Skills Forum and the Australian Conservation Foundation find that, in order to make deep cuts in Australia's greenhouse gas emissions, it will be essential to identify and provide the green skills needed by the 3.25 million workers in industries that currently have 'high environmental impacts'.

Greening our economy is not merely about creating new jobs in new industries. It must be about re-orienting existing jobs and industries.

It will take concerted action by governments, businesses, unions, environment organisations and education and training institutions to develop and implement new approaches to green education, training and job design.

Current efforts are clearly insufficient. It's a huge challenge, but it can be done.

"…we can take strong action to tackle climate change *and* create millions of new job opportunities"

…by employing new knowledge, skills and technology

2. Skills and the transition to an environmentally sustainable economy

A range of national policies are needed to drive the transition to a clean economy. Emissions trading, energy efficiency programs and renewable energy targets are being examined and implemented, to varying degrees, by Australian governments. To date, the skills transition has been largely ignored.

The importance of skills to a clean, green economy can be understood by looking at history.

In the Nineteenth Century, western societies experienced profound change. Within the space of one or two generations pre-industrial economies, powered by the water wheel and the horse, were replaced by industrial economies powered by the burning of fossil fuels.

Skills that had driven economies for centuries – like those of handloom weavers and the wheelwrights – disappeared to be replaced by new types of skills – like those of boiler makers, mechanical engineers and electricians.

The Industrial Revolution demonstrated that economic transformation isn't just about technology, it's about people. Without the right knowledge and skills to turn them to proper use, new technologies remain interesting but amusing toys.

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So what needs to be done?

5. Policies to prepare Australia's workforce for the 21st century

It is possible to predict where the demand for new skills will arise:

- Demand will increase for the design and construction of energy and water efficient buildings and infrastructure, renovations and retrofits, and the installation and maintenance of efficient appliances and machinery.
- Decentralised and renewable energy systems will require new know-how and skills.
- Developing alternative transport systems and changing ways in which nutrition is provided will further add to increased demand for new skills.
- Technical and trade skills, design and engineering, assessment and accreditation, reliable product and market knowledge, and supply and post-sale support will all be in demand as our economy makes the transition to clean and green.

Many of the jobs in 'low environmental impact' industries – which will grow at a faster rate than those in high environmental impact jobs – will increasingly also be 'green collar' jobs.

Until recently, only jobs in niche industries like green plumbing, green construction, recycling and eco-tourism were considered 'green jobs'. By 2050, if not well before, most jobs will be varying shades of green. This makes the environmental re-skilling challenge one for the entire economy.

Meeting Australia's sustainability goals and increasing our living standards will mean meeting five key tests:

- Establishing the right incentives, including: emissions trading, a strong renewable energy target, planning and building regulatory change, corporate disclosure and accreditation standards.
- Creating new data measurements against which sustainability performance can be measured.
- Creating sustainable supply chains to improve the availability of necessary sustainable goods and services at affordable costs.
- Promoting a strong innovation culture.
- **Mobilising – on a massive scale – environmentally-relevant skills throughout the Australian workforce.**

To start the process of 'greening' Australia's workforce training systems, DSF and ACF recommend:

1. The independent statutory body Skills Australia should lead a national program to identify and stimulate the green skills, knowledge and work needed for a low carbon economy, with special emphasis on the building and construction, transport, agriculture and food, energy, and manufacturing sectors.
2. By the end of 2010, at least 40,000 training opportunities in the Federal Government's Productivity Places program should be allocated to the development of green skills in priority areas, like renewable energies, environmental sustainability auditing and accounting, building and construction trades and planning, design, architecture and facility management professions, manufacturing, infrastructure and engineering, agriculture and food.
3. With support, training and incentives from government all large and medium enterprises should create 'green teams' to innovate and develop environmentally sustainable workplaces, products and services. This should include the development of a national green mentoring program to help small enterprises and sole traders make similar changes.
4. Allocation of immediate funds for sustainability training, skills and workplace programs, to be boosted from 2010 with a proportion of revenues from Australia's proposed emissions trading scheme.
5. Australia's universities, TAFE and training sectors should create 'green collar partnerships' to advance the workplace and industry skills, knowledge and innovations required for the transition to a low carbon economy.

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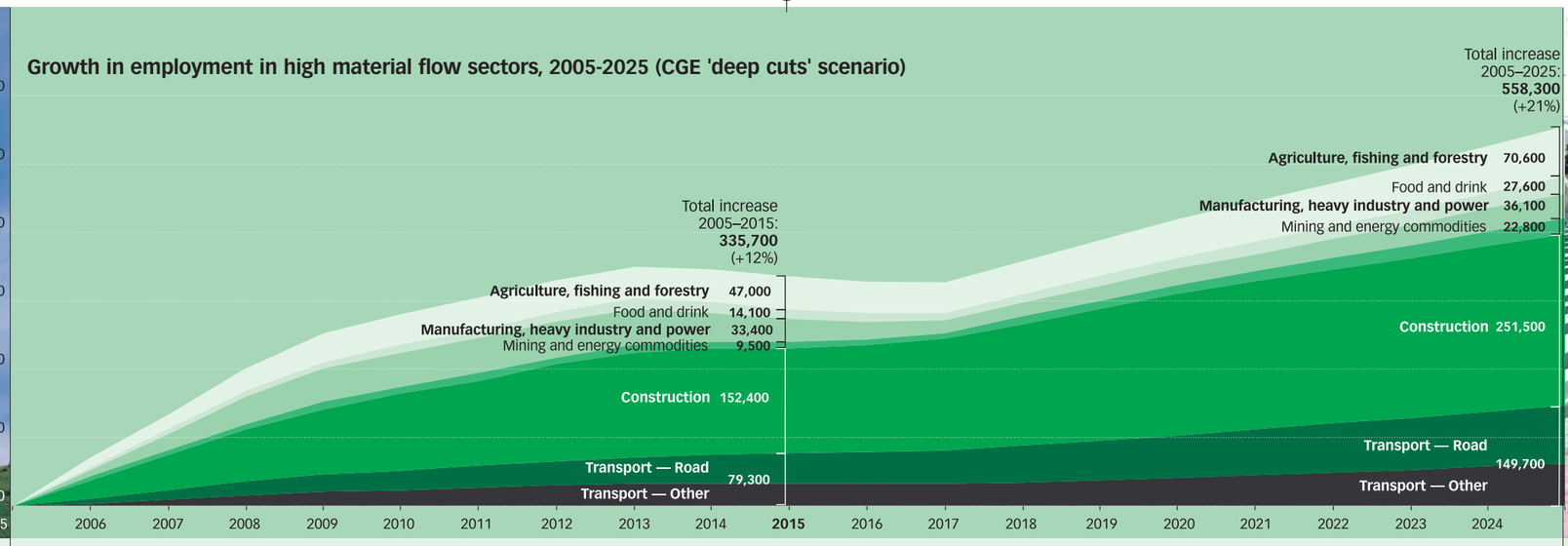

New job opportunities – what kind of jobs, and how many?

The transformation we are undergoing from a high-carbon to a low-carbon economy will be no different.

Today human capital is regarded as the most valuable component of the economic wealth of nations, accounting for more than 75 per cent of the total asset base of high income nations like Australia.

Human capital in the form of labour, skills and knowledge is driving the extraction and transformation of resources, the production of goods and services and the generation of waste and greenhouse emissions.

These same human resources hold the answer to solving the problem. By employing new knowledge, skills and technology, we can reduce Australia's impact on the environment in a way that increases living standards and employment growth.

Unless we modernise our human capital base we have little chance of meeting the Australian Government's target of a 60 per cent reduction in emissions by 2050 – a target Professor Ross Garnaut has indicated may need to be strengthened.

Market forces provide some of the answer but they must be accompanied by government intervention and social partnership if changes of the necessary magnitude are to be achieved.

3. Two economic models — both predict jobs growth across the workforce

To explore the scale of the changes required in the transition to a sustainable economy, DSF and ACF have drawn on existing national modelling of major environmental reforms.[1]

Emissions reductions

The Monash University MMRF-Green model – a computable general equilibrium (CGE) model of the Australian economy – was used to generate two scenarios:

- 'Deep cuts' – a 60 per cent reduction in emissions without significant tax reform
- 'Carbon neutral' – a 100 per cent reduction in net emissions and one-off tax reform to increase employment and participation.
- The modelling covers the production of goods and services across 52 Australian industries between 2005 and 2050.

Resource efficiency

The CSIRO Australian Stocks and Flows Framework (ASFF) – a technology focused physical model of the Australian economy – was used to calculate the impact on the Australian economy and employment levels of the adoption of a 'Factor 4' approach (i.e. doubling output and halving energy and material inputs).

It assumes a number of significant achievements in sustainability between now and 2050, including:

- A decisive shift from coal powered electricity to gas and renewables;
- Uptake of energy efficient building design incorporating solar passive living, with extensive retrofitting of the existing building stock;
- A shift to more efficient transport, including a reduction in the share of private vehicles used for commuter travel from 85 per cent to 60 per cent;
- Changes in eating habits to emphasise healthy fresh food, with increased consumption of fruit, vegetables and cereals and reduced consumption of meat; and
- Long term reductions in extraction and export of minerals (reflecting reduced world demand) from 2030.

1. Full details of the modelling and data sources can be found in the full CSIRO paper accompanying this publication at http://www.dsf.org.au and http://www.acfonline.org.au/GreenCollarJobs

The results

Under all scenarios, jobs continue to grow strongly.

In all cases GDP continues to grow – with only minor variations from 'do nothing' scenarios – while significantly reducing pressure on the environment.

This suggests economic growth can be decoupled from environmental impact. In other words, with the right policies we can grow our economy and simultaneously reduce our environmental impact.

The CGE modelling projects employment growth of between 2.6 and 2.7 million jobs by 2025. The ASFF modelling projects employment growth of 3.3 million jobs by 2026 and 7.5 million by 2050.

To determine how the transition to a clean economy will affect jobs growth in various sectors, industries were examined using two groupings:

- **High material flow sectors** that have a comparatively heavy impact on resources and produce high levels of greenhouse emissions: agriculture, fishing and forestry; food and drink; mining and energy commodities; manufacturing; transport; construction.
- **Low material flow sectors,** with lower resource and greenhouse impact: business and finance; communications; hospitality; public services; retail and wholesale trade.

All the modelling scenarios predicted strong jobs growth in the environmentally crucial high material flow industries, although their share of the overall labour market is projected to decline slightly.

According to the 'easiest to achieve' option – the CGE deep cuts scenario – significant jobs growth will occur in high material flow industries by 2015 and 2025 – as shown in the graph above.

The jobs outlook for 'low material flow sectors' (business services, communications and finance, trade and hospitality, and public services) is even more positive, with growth of +17% (1.1 million jobs) and +31% (2.08 million jobs) by 2015 and 2025 respectively.

…and what kind of skills are needed?

4. The 'green collar' skills challenge

The growth in 'green collar' jobs will mean an expansion of some industries, like solar energy installation and 'green' plumbing, and a re-orientation of others.

By 2015 the total number of jobs in the industries that account for around 70 to 80 per cent of overall carbon emissions and environmental impact will increase by 335,700 – from 2.9 million to more than 3.25 million.

And by 2025 they will increase by 558,000 to a total of 3.45 million.

Many 'high environmental impact' jobs – not just the new ones – will need to be turned into various shades of 'green collar' jobs.

The 'green jobs' story is not about shutting down 'dirty' industries, but re-skilling to enable them to become clean industries. Workers in these sectors are crucial to making the difference. In greenhouse intensive sectors like cement manufacture, transport and agriculture, less carbon intensive ways of working and producing will be necessary.

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"…most jobs will be varying shades of green"