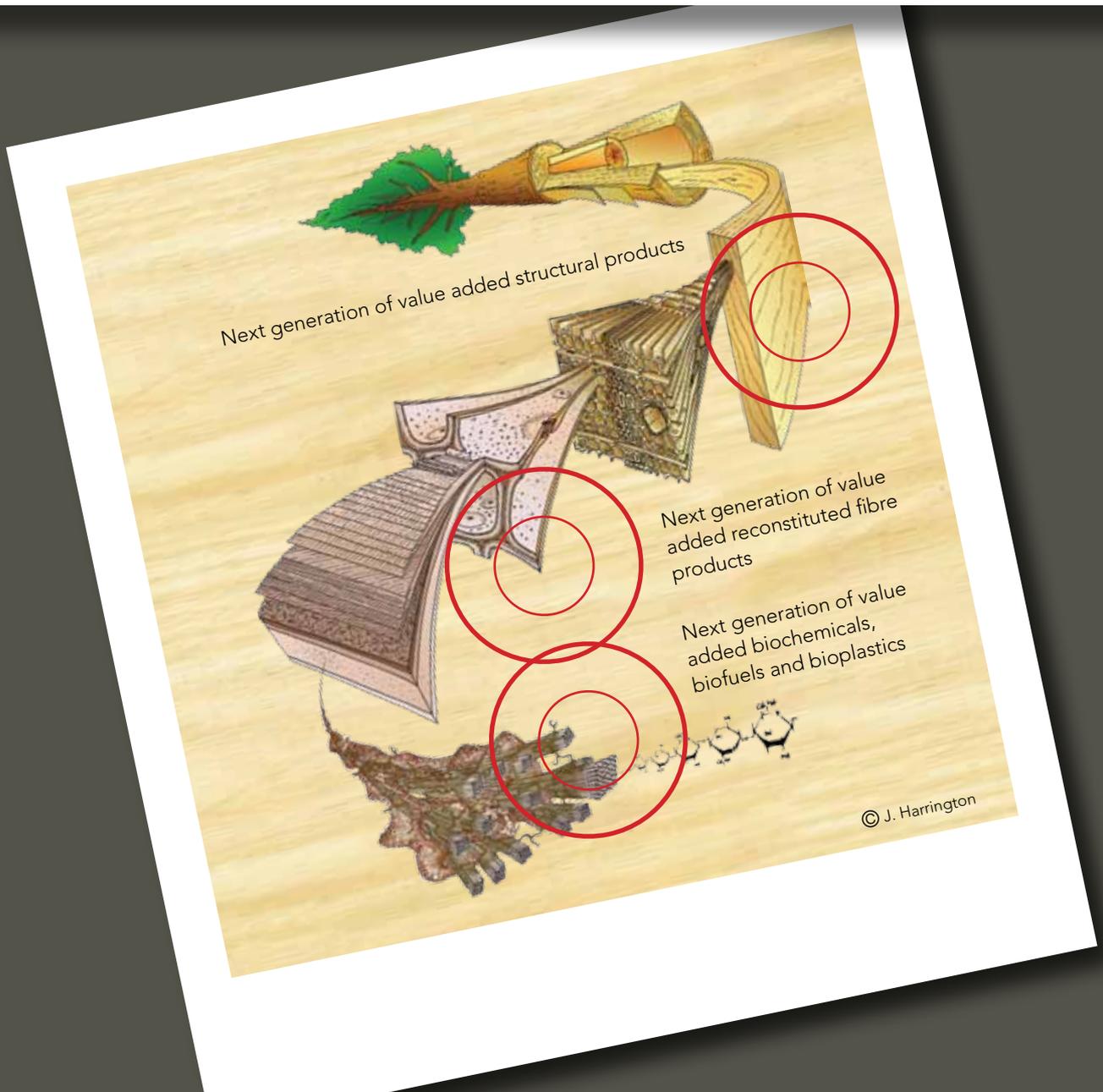


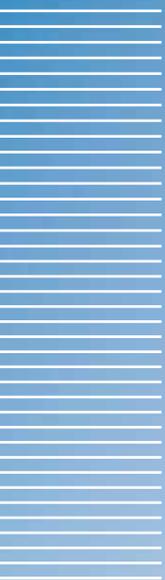
# A NATIONAL INSTITUTE FOR FOREST PRODUCTS INNOVATION

BACKING OUR NATURAL STRENGTHS

NEW POLICY PROPOSAL FOR THE AUSTRALIAN GOVERNMENT 2016 BUDGET



“What we need is a nationally organised, well-funded, future-focused, research and development (R&D) organisation of sufficient scale to grasp the opportunities of the environmentally focused 21st century...”



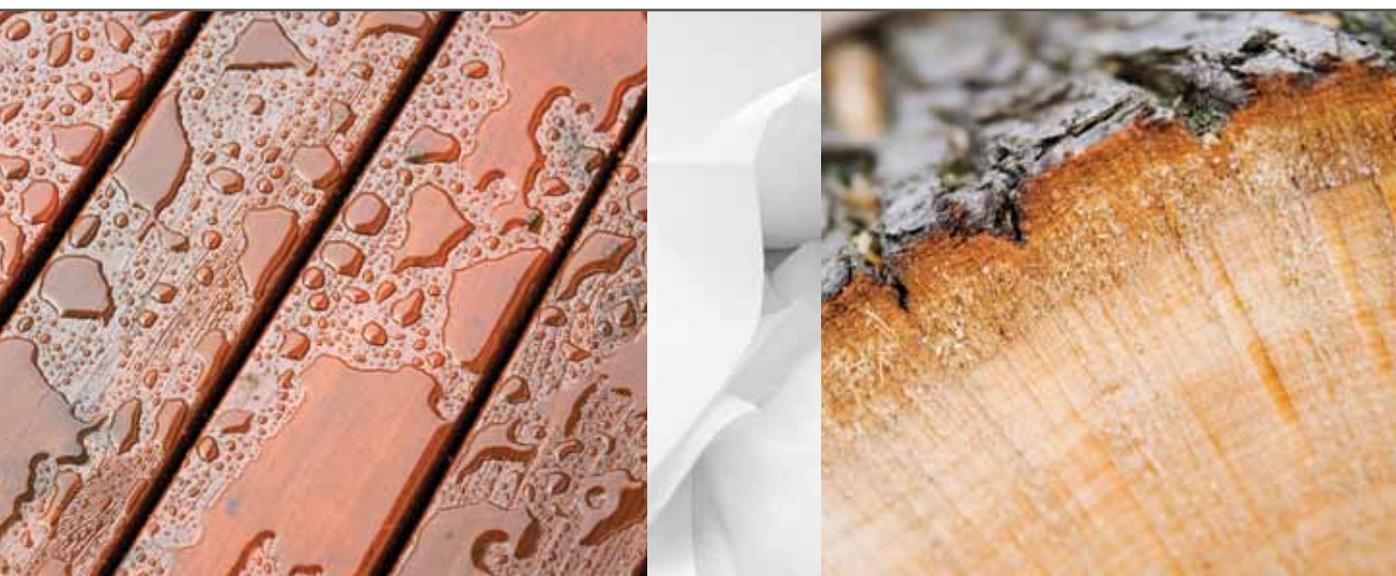
# INTRODUCTION

**World demand for forest products, as well as the vast range of emerging new generation bio-products which can be derived from our renewable forest resources, is accelerating.**

Australia has a competitive advantage in growing trees and producing timber and other wood-based products.

We have the arable land, suitable climate, access to water resources in many places, infrastructure, highly skilled workforce and established institutions.

What we need is a nationally organised, well-funded, future-focused, research and development (R&D) organisation of sufficient scale to grasp the opportunities of the environmentally focused 21st century and drive the Australian forest products industry to the front of the pack.



## THE PROPOSAL

### A NATIONAL INSTITUTE FOR FOREST PRODUCTS INNOVATION

Bringing together dispersed forestry and wood fibre research efforts under one governance structure, coordinating scarce resources and

maximising impact in traditional areas such as tree growth and wood products, and cutting edge fronts such as biomaterials, biochemicals and biofuels.

The new National Institute for Forest Products Innovation would focus on key areas of competitive strength and accelerate the transition of the sector into a smarter, higher value focused industry. It would deliver on the national innovation agenda and importantly link the agribusiness and manufacturing parts of the supply chain via tree growing and forest management through to timber processing, wood fibre recovery for new markets and advanced manufacturing.



“If the 19th century was the century of steel, and the 20th century of concrete, then the 21st century is about engineered timber”

*Alex de Rijke founder of dRMM Architects, London*

#### **THE BIO-ECONOMY TRAIN IS LEAVING THE STATION**

**The potential for the forest, wood and paper products industry to contribute to both Australia's, and indeed the world's, economic and environmental future is enormous.**

The benefits of using renewable timber and wood fibre-based products over alternative energy intensive products are being recognised around the world.

Timber and wood fibre-based products have enormous potential to make a positive contribution in reducing carbon emissions, and offsetting those from other sources, in the new carbon constrained global economy.

As analysts have observed if we discovered timber today it would be considered the miracle material of the 21<sup>st</sup> century.



## HERE ARE JUST TWO EXCITING EXAMPLES OF THE INNOVATIVE USE OF WOOD FIBRE IN NEW MARKETS

### EVERYTHING CURRENTLY MADE FROM PETROLEUM-BASED PLASTICS

**1** Biomaterials are emerging as new opportunities for wood fibre. Most major car manufacturers including General Motors, Ford, Toyota, Honda, BMW, Fiat, Volkswagen, and Mazda, are replacing traditional petroleum-based plastics with biomaterials in the production of car parts. Europe is leading the way with regulations that require the automobile industry to increase its volume of recyclable materials to 85% by 2015. General Motors is using polypropylene made from wood for

seat backs. Mercedes-Benz models use plant-based polyethylene in the engine and transmission cover and in underbody panels.

A similar bio-polyethylene is used by Lexus in its luggage compartment, speakers and floor mats. The use of biomaterials is also expanding rapidly in other areas that have traditionally used petroleum-based products, such as packaging, paint and coating. For example, in parts of Europe and the United States, Heineken and Coke are using bottles made from plant-based materials.

### ADVANCED TIMBER CONSTRUCTION TECHNOLOGY

**2** Advances in building technology and the development of new engineered wood products is also opening up a range of new opportunities for the use of wood in high-rise residential and commercial buildings. Construction of these buildings has traditionally been dominated by concrete and steel. However, the development of cross laminated timber (CLT) and increasing use of glue-laminated

beams (glulam) is making the construction of entire buildings from timber a reality. Another advantage of the use of CLT is that because they are pre-fabricated structural panels, construction time is substantially reduced, allowing construction of the building structure in a matter of days or weeks, rather than months using traditional concrete and steel construction. Recent examples include Lend Lease's Forte building and Library, in the Docklands precinct in Melbourne.



Our competitor nations are banking on fibre and forestry industries to be a major part of their national growth plans – and backing the rhetoric with a serious focus on research and development.

# WHERE IS THE REST

## CANADA

### FPIINNOVATIONS

**People:** 600

**Budget:** \$97 million per year  
(64% government / 36% industry)

FPIInnovations was created in 2007 through the merger of Canada's four major forest research institutes: Forintek; Forest Engineering Research Institute; Pulp and Paper Research Institute; and the Wood Fibre Centre of Natural Resources. It acts as an innovation hub for the forest products sector, involving industry, governments, universities and other research suppliers. It concentrates Canada's forest research and brings together the three essential strengths for the sector's future development and market alignment, namely: industry initiative and capital, innovative R&D and engineering resources, and financial support from government partners.

FPIInnovations' focus is managed through a member driven, advisory process, which coordinates the collaborative research programs. The National Research Advisory Committee (NRAC) brings together industry members, government partners and university representatives from the eight forest sector R&D networks. Program Advisory Committees (PACs) that report to the NRAC are charged with the task of seeing that the various FPIInnovations research programs are relevant to the industry's greatest needs. Composed of representatives from FPIInnovations' industry

members and partners, these committees also ensure that research activities are geared towards operational improvements, best practices and technology transfer.

FPIInnovations' organisational structure is closely interlinked with the consultative work of the PACs and is built around 11 research programs and two areas of focus.

The research programs include:

- Resource Assessment
- Wildfire Operations
- Primary Wood Products Manufacture
- Market Pulp
- Biomaterials
- Performance Innovation Transport
- Forest Operations
- Advanced Building Systems
- Secondary Wood Products Manufacture
- Paper, Packaging and Consumer Products
- Biorefinery and Energy

The two areas of focus include:

- Environment and Sustainability
- Value Maximisation and Decision Support



# OF THE WORLD?

## NEW ZEALAND

### SCION

People: 299

**Budget: NZ \$43.7 million per year (62% Government / 38% industry)**

Scion was launched in 2005 through a rebranding of the New Zealand Forest Research Institute. It brings together the bulk of forest research in New Zealand and is delivering breakthroughs in forestry, wood products and wood-derived materials and other biomaterial sectors. Scion is driving innovation and growth, building the industry's economic value and contributing environmental and social outcomes for New Zealand.

Areas of research include:

- Sustainable forest management and tree improvement
- Forestry biosecurity, risk management and mitigation
- Wood processing, wood-related bioenergy, waste streams and other biomaterials
- Forestry and forestry-based ecosystem services to inform land-use decision making



**URGENT**

## THE NEED IS GREAT AND

**Investment in forest industry R&D has deteriorated dramatically over the past decade.**

This failure is compounded by a lack of national coordination in forest industry R&D effort.

In effect, the Australian forest, wood and paper products industry is living off the research and development capital of years past.

The decline has been rapid and serious.

In 2007-08, around \$100 million was committed by governments and industry to R&D, including research into wood processing and wood products, tree genetics and forest management.

This has collapsed to an estimated \$30 million in 2014-15.

**There has been a similar decline in research capacity, with the number of forestry researchers collapsing from more than 730 to fewer than 250 over the same period.**

This dramatic decline in R&D capacity has largely been driven by downsizing and restructuring of R&D within many state and federal research agencies, particularly the CSIRO.

It has been further compounded by the loss of the CRC for Forestry.



## THE CASE FOR NEW INVESTMENT IN FOREST INDUSTRY RESEARCH

**The forest products industry has the potential to be a major growth sector of the 21<sup>st</sup> century Australian economy.**

It can build jobs and income in traditional growing, harvesting, processing and manufacturing in regional areas, and can play a large role in producing the next generation of environmentally friendly materials which will be vital for the 21<sup>st</sup> century.

The industry directly employs 120,000 people across the full value chain, mainly in regional areas.

The expansion of the industry will create new jobs and stimulate rural economies.

**The industry must continue to innovate and seek productivity improvements to boost competitiveness and capitalise on the demand for traditional and new products. The new global bioeconomy, for example, is estimated to be worth \$200 billion in the near future.**

### THE ANSWER: A NATIONAL INSTITUTE FOR FOREST PRODUCTS INNOVATION

Australia needs to reinvest and rebuild its forest products R&D capacity. We must:

- build the critical mass of researchers and facilities to better deliver R&D outcomes for the forest, wood and paper products industry, as well as providing researchers with attractive career paths, a creative research environment and adequate resources;
- strengthen the coordination and planning of R&D capacity and implementation of priority industry research at the national level;
- accelerate commercialisation pathways through extension and technology transfer programs to better capture strategic breakthrough technologies and productivity improvements; and
- encourage global networking to ensure the sector is well placed to take advantage of innovations created internationally.

# THE SIZE OF THE PRIZE

## SECTOR GROWTH

The global demand for traditional wood and paper products is forecast to grow strongly over the next 10 to 20 years, led by increasing consumption in Asian economies.

A recent study by Global Perspectives and Oxford Economics indicated that the world construction market will grow by more than 70% between now and 2025 to hit US\$15 trillion. This will be driven by strong Asian demand, with forecast demand for 270 million new homes in China and India as well as demand for new commercial premises and infrastructure.

Pulp and paper demand is also expected to grow strongly. Recent research by UK based AMEC forecasts that paper and tissue consumption in Asia will rise 50 per cent, from current levels of 400 million tonnes to 600 million tonnes in 2030. This takes into account a decline in newsprint in more developed markets.

There are also opportunities to expand wood consumption by developing new generation value added products such as biomaterials, biochemicals and bioenergy. These opportunities include innovation in:

- food packaging and coated papers;
- new textiles and fabrics sourced from wood fibre;
- new wood-based chemical compounds for use as adhesives and detergents; and
- new materials and fibres for high performance composites (e.g. nano-cellulose).

As well as the increasing consumption of forest products through the expansion of traditional and new markets, there is also significant potential to increase the plantation resource through plant breeding, identifying and propagating 'super successful trees' and technology. Australia led the world in growth rates 75 years ago but we are now being outstripped by many competitor nations. **This must change if we are to lift the productivity of the tree growing sector.**

## NATIONAL INCOME

The forest products industry makes a significant contribution to the Australian economy, particularly in rural and regional Australia. The total sales turnover of the wood and paper products industry was more than \$20 billion in 2013-14, with an industry value added of more than \$6 billion. This represents 0.5% of GDP or 6.1% of total manufacturing output.

Despite its sizeable naturally regrowing forest and plantation resource, Australia is a net importer of forest products.

In 2013-14, the Australian trade deficit in forest products was \$2.1 billion, with exports of around \$2.5 billion of forest products and imports of \$4.6 billion.

A key factor contributing to this trade deficit is limited high value processing and manufacturing capacity in Australia. Exports are mainly lower value raw materials (e.g. logs and woodchips) or paper packaging products, while imports are typically higher value transformed products, such as printing and writing paper, sawnwood and plywood.

The research and development provided through a National Institute for Forest Products Innovation has the potential to boost productivity by up to 20% over the next decade.

This has the potential to raise total sales turnover by more than \$4.5 billion and industry value added by \$1.4 billion.

This increase in domestic production and sales will also go some way to addressing the trade deficit in forest products.



“As well as the increasing consumption of forest products through the expansion of traditional and new markets, there is also significant potential to increase the plantation resource through plant breeding, identifying and propagating ‘super successful trees’ and technology”

# NEW JOBS

The forest industry supports 120,000 direct jobs across the full value chain, mainly in regional areas.

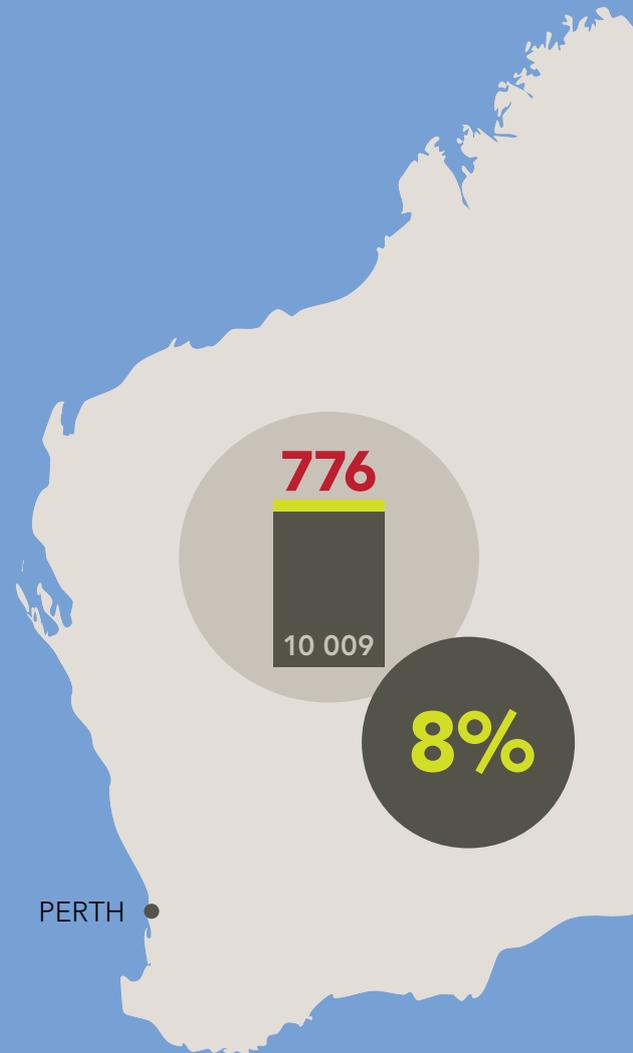
There are around 25,000 employed in forestry, logging and haulage, 13,000 in sawmills and 61,000 in the manufacture of other wood products (including wood based panels and frame and trusses).

The pulp and paper manufacturing sector employs a further 21,000 people.

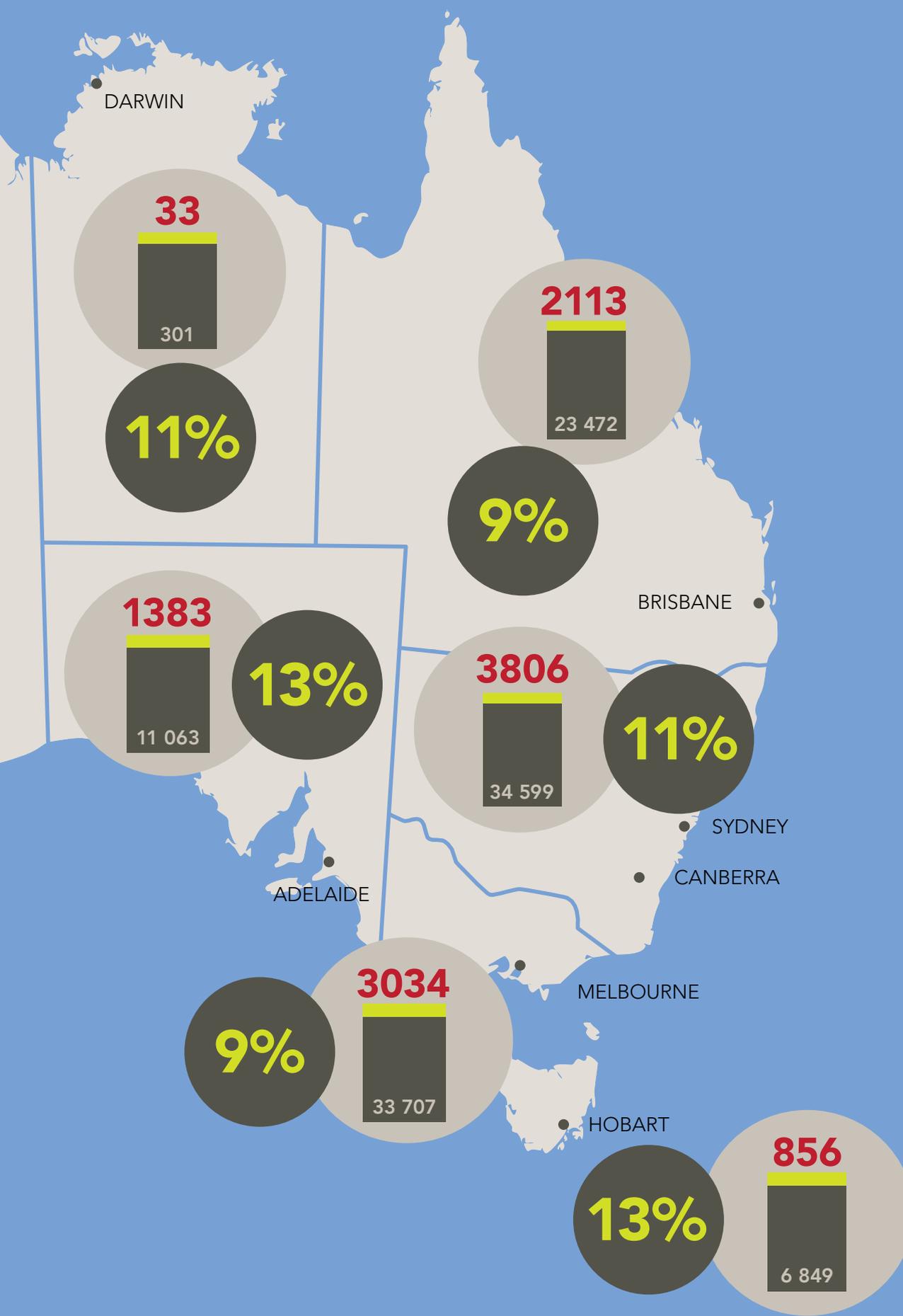
The National Institute for Forest Products Innovation has the potential to drive employment growth of more than 10% over the next 10 years.

This new employment growth would be generated across each of the states and territories providing much needed jobs and benefits in many regional areas.

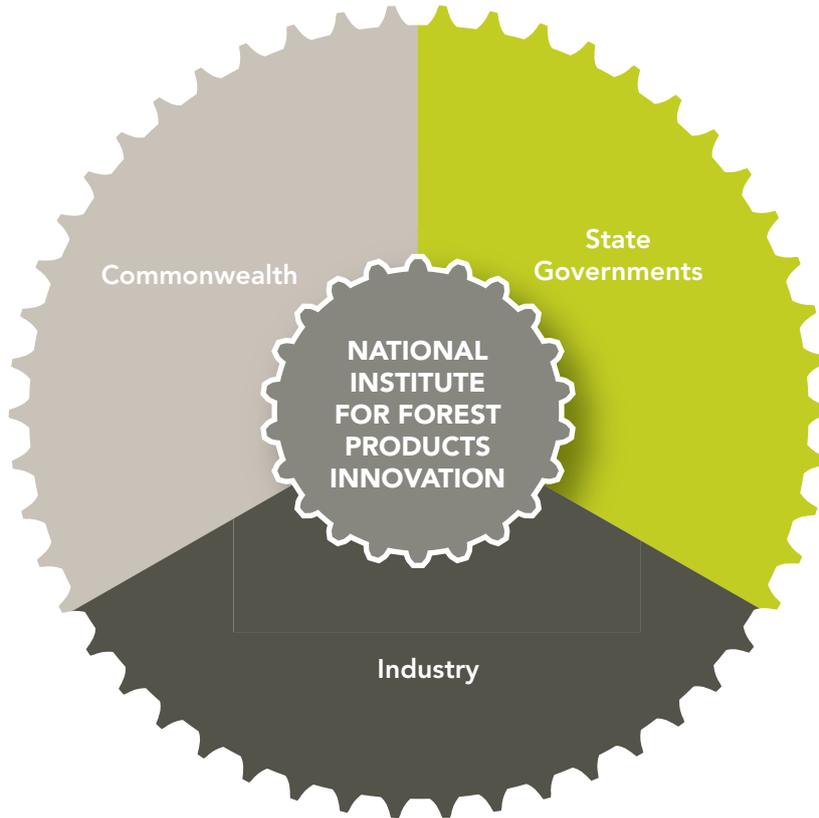
# POTENTIAL



# NEW JOBS BY STATE



# THE POTENTIAL MODEL FOR FOREST PRODUCTS INNOVATION



The National Institute for Forest Products Innovation would adopt a macro cooperative model. Over time, it would allow all of the major research providers and entities to partner within a single strategic framework that pools funding contributions for specific strategic and national goals. A key feature of the Institute would be a governance structure that links strategic decision makers amongst the key stakeholders, primarily

industry and governments, with the research providers.

The Institute would pool existing capabilities and promote better synergies across the various providers, offering a more direct mechanism for public and private sector investment in forestry and forest products R&D. Funding for the Institute would be drawn from the Commonwealth, state governments and industry.

## FUNDING

Core funding partners	Proposed co-investment
Commonwealth	\$40 million of new funding over 4 years
States and industry	\$40 million over 4 years (based on leveraged and in-kind resources from state governments and industry)
<b>TOTAL</b>	<b>\$80 MILLION OVER 4 YEARS</b>

# BRINGING IT ALL TOGETHER



## LEGEND

- |                |  |                |  |
|----------------|--|----------------|--|
| <b>FWPA</b>    | Forest and Wood Products Australia                           | <b>IPMG</b>    | Industry Pest Management Group (Western Australia)     |
| <b>NSW DPI</b> | NSW Department of Primary Industries                         | <b>STBA</b>    | Southern Tree Breeders Association                     |
| <b>QDAFF</b>   | Queensland Department of Agriculture, Fisheries and Forestry | <b>AFORA</b>   | Australian Forest Operations Research Alliance         |
| <b>FPC WA</b>  | Forest Products Commission of Western Australia              | <b>BioPRIA</b> | Bioresource Processing Research Institute of Australia |
| <b>SARDI</b>   | South Australian Research and Development Institute          |                |  |



"...areas of forestry and forest product research expertise and capability would be able to better coordinate their efforts with industry as well as benefit from co-investment models for intellectual property rights and future royalty payments from successful research."

# STRUCTURE OF THE INSTITUTE

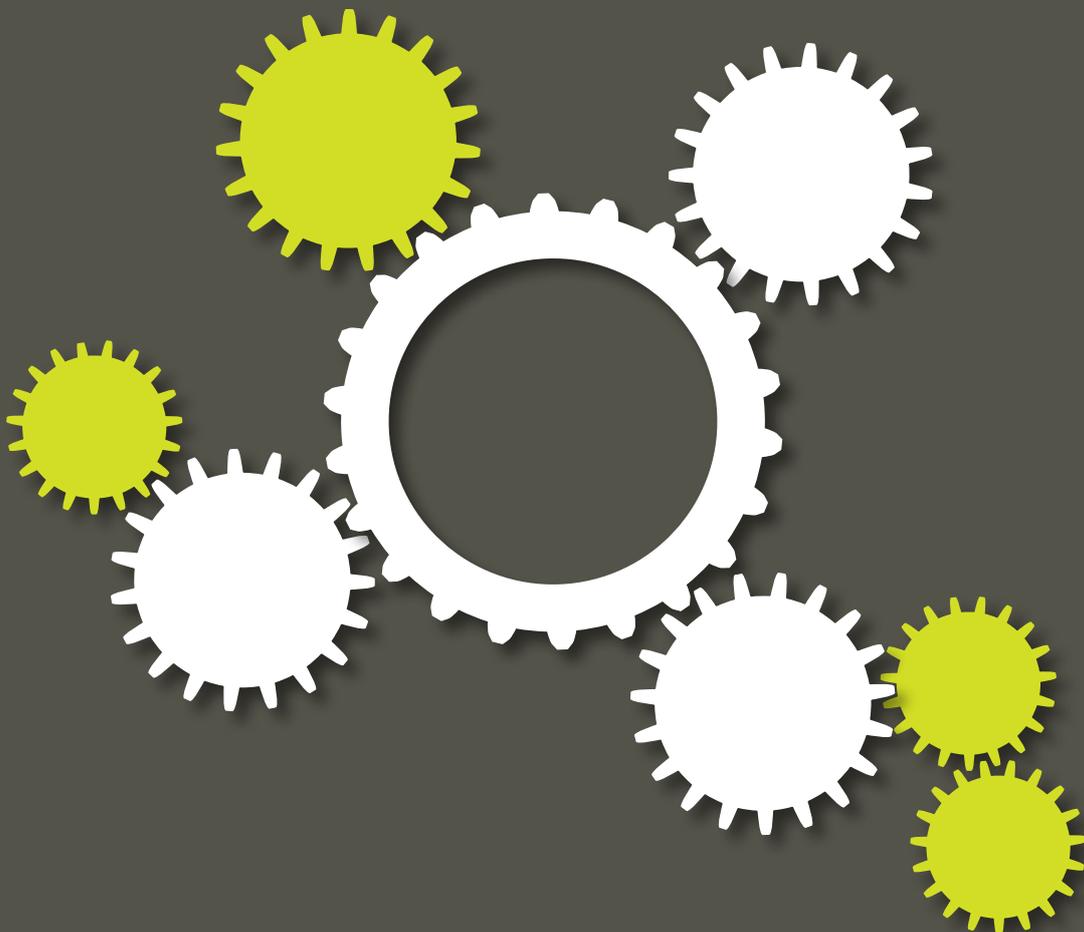
The structure of the new National Institute for Forest Products Innovation would be based on a strategic hubs and spoke model, with the governance arrangements delivering coordinated outcomes and efficiencies while researchers would operate at a number of research sites.

The Institute would provide an over-arching framework for existing and new forestry and forest product R&D providers to strategically partner in accordance with the agreed structure and governance arrangements of the new Institute.

Relevant areas of forestry and forest product research expertise and capability would be able to better coordinate their efforts with industry as well as benefit from co-investment models for intellectual property rights and future royalty payments from successful research.

The Institute would be directed by a Board, with a mix of research leaders, industry expertise and business acumen. The Board would direct and coordinate forestry and forest products research funding across the whole value chain, to deliver synergies and efficiency in research delivery.

The National Institute for Forest Products Innovation would be managed by an executive team with a strong industry liaison and research commercialisation role.



# R&D PRIORITIES

Some initial research priorities have been identified by the National Primary Industries Research, Development and Extension (RD&E) Framework, a working group of the Primary Industries Ministerial Council (PIMC).

These priorities were developed in consultation with governments, rural R&D corporations, CSIRO and universities and aim to support innovation, advanced technology and industry competitiveness.

## More volume and value from the existing and an expanding estate

- Continued development of commercially valuable genotypes.
- Develop integrated genotype x environment x management regimes adapted to future growing conditions or new environments and that minimise losses from pests and diseases.
- Widen the base of forest producers through fostering wood production (and carbon storage) in indigenous communities and the integration of forestry within agriculture and conservation land uses.
- Increase the value recovery from the available forest resources.
- Supply chain optimisation and manufacturing productivity.
- Innovation through new technology, and efficient manufacturing to reduce the costs and increase profits in existing manufacturing operations.
- Improve the efficiency and reduce the costs of harvesting and transport operations.
- In-field log segregation and pre-process options to minimise processing costs.
- Know, grow and diversify the market.
- Develop an improved understanding of international technological developments to aid their deployment in Australian industry.
- Identify opportunities to use wood fibre based products and systems in the built environment and to refine building standards accordingly.
- Research to identify barriers to innovation and support the development and introduction of new wood fibre based products including bio-materials, chemicals and energy.

## Resource risk management and biosecurity

- Improve understanding of risks and appropriate mitigation strategies across the value chain.
- Develop models to predict and assess impacts of key risks, particularly changing incidence of pests, climate change and attendant risks of increased fire incidence, changing rainfall patterns and drought.
- Contingency and response plans for exotic pests.

## Environmental and social sustainability

- Development of improved measures to assess forestry as a sustainable land-use and approaches to manage environmental impacts.
- Provide the knowledge-base to underpin improved forest industry policy.
- Research to understand the social concerns about production forest management and to enable managers to develop new management approaches that respond to these concerns.

A number of other known opportunities for improved efficiency, diversification, value-adding and innovation with respect to wood and paper products include:

- bioenergy for electricity and heat production;
- cogeneration of electricity and heat in pulp and wood processing operations;
- composite wood products and building systems;
- new structural and panelling technologies that utilise small-wood and residues in timber construction in commercial and high-rise buildings;
- log assessment and grading technologies;
- higher product recovery from harvesting, processing and manufacturing operations;
- innovative tissue, paper and packaging products; and
- biochemicals, including applications in textiles, solvents, plastics, lubricants, fragrances, and other potential outputs from 'bio-refineries'.



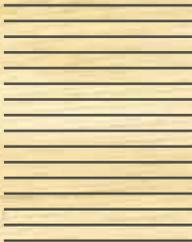
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