

CREATING LONG-TERM, EXPORT-DRIVEN, REGIONAL JOBS THROUGH A TRANSITION TO CARBON INNOVATION



GENERATING SUSTAINABLE REGIONAL JOBS

Developing sustainable regional jobs depends on a successful transition from declining legacy industries to new, long-term, high-value job creation.

Regional employment sustainability will be driven by 21st Century, export oriented and import replacement, manufacture and processing. Retaining and developing regional job skills, that assist in such decentralisation and generational community stability, is critical.

The route to ongoing job creation is identifying the most effective sustainable use of Victoria's natural resources to target global product/material demand.



UTILISING THE NATURAL RESOURCE ASSET

Victoria's brown coal assets are some of the largest in the world, valued in the billions of dollars. Latrobe Valley coal is available in wide seams, is close to the surface and is exceptionally low in mineral and chemical impurities.

An unused, or stranded asset, is worthless. In the face of climate change current use of the Latrobe Valley coal resources is likely to have a very limited future. Therefore, alternate uses for the resource must be found. Such uses require new technologies applied in commercially viable ways.

Australia should not be positioned as a 'technology taker'. The domestic research technology community offers both a great knowledge base and an understanding of local conditions. Such knowledge must be used for the benefit to the local economy, not just through breakthrough R&D, but also by accelerating commercial development and local application technologies that can support a 21st Century relevant workforce.



R&D INVESTMENT HAS DELIVERED

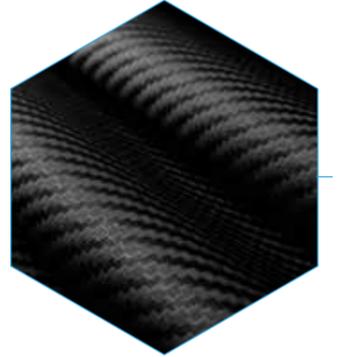
Recognising the need for such R&D, there has already been State, Commonwealth and private sector investment. For an investment of less than \$17m, BCIA has delivered more than \$58m worth of research and development; a leverage factor of 3.4-1, far better than comparable research funding models.

That investment has also delivered 90 direct jobs, along with funding for 18 PhD students who have engaged in new, fundamental research.

There has been transformational research, in coal to alternate products such as:

- Brown coal for alternate energy sources (hydrogen, low-emissions fuels)
- Brown coal upgrading for value-added products (chemicals, iron, steel)
- Agricultural applications for coal (fertilisers, soil conditioners, feed-lot remediation)
- Carbon capture and use technologies (use in high-value horticulture)
- Feed source for high-tech materials such as Carbon Fibre

BCIA has been working with project participants to ensure that, as R&D is taken from the laboratory to field deployment, the best outcomes are achieved.



WHERE ARE THE NEW OPPORTUNITIES?

There is the potential to use lignite and biomass waste products, upgraded through high temperature processes such as, gasification and pyrolysis, to produce hydrogen, syngas, chars and hydrocarbon liquids.

Hydrogen and carbon monoxide (i.e. synthetic gas) can then be converted into a range transport fuels, bio-stimulants and fertilisers and used in speciality plastics production.

Hydrogen production can create an energy export opportunity. Hydrogen can also be used as a power source in gas turbines and fuel cells.



Captured carbon dioxide can be converted into new products and can be used in high volume horticultural production, such as enhanced fruit and vegetable production for greenhouses.

Agricultural uses include granulated carbon or carbon/fertiliser blends, water-soluble extracts of humic acid and fulvic acid soil conditioners/plant growth promoters, and to create urea fertiliser.

High-value carbon material can be used in the production of lithium-ion battery anodes, air and water purifiers and in the production of Carbon Fibre used in aerospace, motor vehicle and wind turbine production plus in the manufacture of various military products.

SUPPLY AND VIABILITY

Generations of resource providing scale for numerous projects. Continued global demand and the conditions to combine a trained workforce with mature infrastructure to deliver globally.



CO2 GLASSHOUSES

AGRICULTURE

CARBON FIBRE



ALTERNATIVE USE R&D

Mature R&D into CO2 capture, storage and use, agricultural bio-supplements and carbon fibre manufacture, demonstrate prospects for job creation. A single project can deliver 400 jobs.

INCREASING DEMAND FOR HIGH TECH PRODUCTS

Materials and components for new products feeding growing world-wide aspirational markets.



BROWN COAL DERIVATIVES AS KEY INGREDIENTS

R&D tested processes creating valuable source materials and end products.



CREATE THE LINK FROM R&D TO MARKET

Detailed commercial modelling, a critical step in attracting industry investment.



UNLOCKING VALUE FROM RAW MATERIAL

Creating local capacity to maximise value and input, prior to export.



LONG-TERM REGIONAL DEVELOPMENT

Creating sustainable economic activity close to a major resource and supporting decentralisation.



GENERATING JOBS

Long-term skilled and semi-skilled, 21st Century manufacturing and processing, export-driven employment.

MODEL ALREADY PROVEN

Academia, government and industry co-operative model created, Geelong based, global centre of excellence in carbon-fibre component manufacture.



AUSTRALIAN CARBON INNOVATION

TRANSITIONING TO CARBON INNOVATION

THE NEXT STEPS

- Develop the commercial demonstration capability that will bridge the gap between the relatively inexpensive R&D stage and the high cost demonstration projects required to motivate private enterprise investment in local production that can be scaled to meet current and emerging market demands.
- Partner with research bodies and industry to further develop Victoria's skill base in science and technology through, PhD scholarships, innovation training for engineering professional and pathways from secondary education to higher degrees
- **In partnership with Federation University, establish a Regional Carbon Innovation Centre (RCIC) in the Latrobe Valley to deliver on the unique opportunity to transition the economy of the region away from a declining power sector to one that enhances existing industry and diversifies into emerging markets.**

WHAT IS A RCIC?

A RCIC will create a hub for innovation, research and development, offering organisations the opportunity to develop early stage technologies to a demonstration and pre-commercialisation stage. It will provide a collaborative space fostering a new generation of investment, growth and jobs for the Latrobe Valley.

Located close to core resources, industry and R&D facilities, a centre will combine the skills and capabilities of regional business, academia, government and community to realise the long term value of the resource within a sustainable, low carbon environment.

A RCIC's focus will be on products and technologies that support a low carbon economy including wind, solar, hydrogen, alternative fuels, high value materials, capture and use of CO2 in horticultural production and agricultural feedstock industries.

THE NEXT STAGE FUNDING MODEL

A matched Commonwealth/State funding contribution of \$7 million pa. each is required. A minimum equivalent private sector contribution (\$7 million) could be leveraged, following from confirmed State and Commonwealth funding.

There are a number of funding options available to the State and Commonwealth both on budget and off budget. Each has advantages and disadvantages.

Comparable research levy rates in other sectors (meat & livestock, dairy, grains etc) are in the order of 0.5% of retail price with black coal carrying a 5 cents per tonne research levy.

Whatever model is selected there is demonstrated evidence that government receives in excess of a 3 to 1 return on the investment made. It is anticipated that establishment of the Regional Carbon Innovation Centre will further strengthen the return both in terms of dollars invested and in long term employment opportunities.

Priorities would take into account State and Commonwealth energy and resource policy directions and have heed to the social and economic outcomes for the Latrobe Valley.



THE BENEFITS

Such investment can deliver significant economic benefit to the Latrobe Valley, through sustainable resource use that contributes export income, broadens the economic base and creates jobs. It can also deliver revenues from tax and royalties, support improvements in the manufacturing and agricultural sectors and minimise environmental impacts.

A RCIC will deliver coal and other carbon derived products for new markets, create new export opportunities and greatly improve the local talent pool through skills development.

The Geelong experience provides a clear example. In the 5 years since inception and during a difficult period of industry transition, Geelong's Carbon Nexus precinct is credited with the creation of 1000 new jobs.

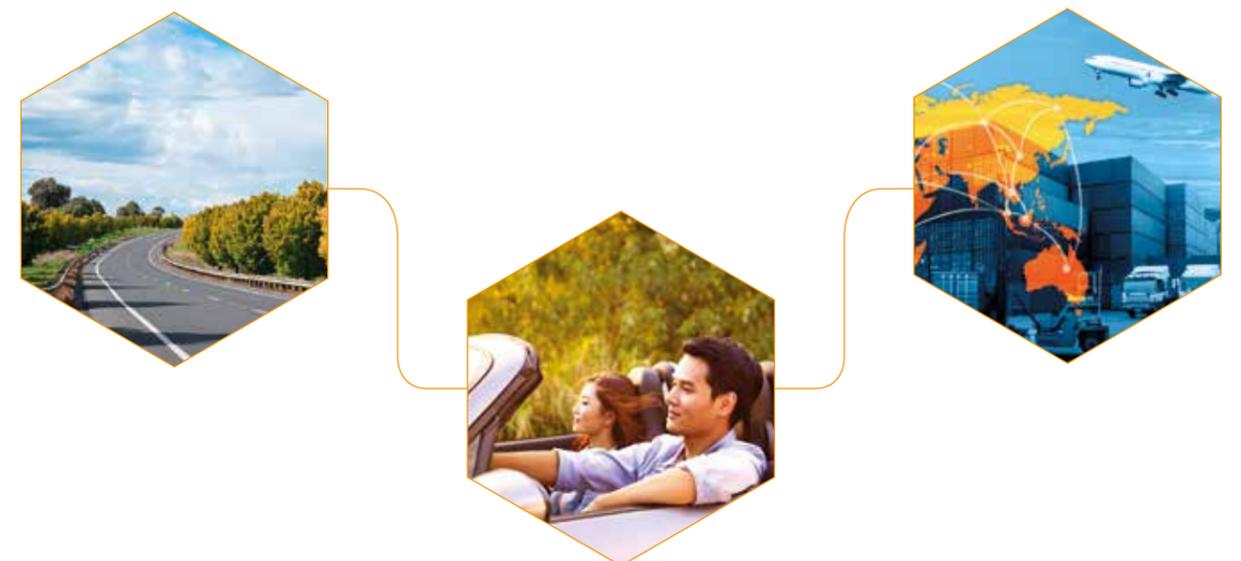
The combined benefits of abundant resources, multiple product streams, supportive industry and a skilled workforce suggest that the RCIC can at least replicate, if not exceed the Carbon Nexus success.

Creating such innovation capability will not only contribute to regional jobs security, but also enhance socio/economic stability and deliver a social support dividend whilst encouraging decentralisation.

A feasibility study, currently underway, already highlights several key factors that enhance the likelihood of success:

- Suitable physical locations exist within the region to develop and expand as required
- Existing strong support from Industry, Research and community stakeholders
- Significant current demand from potential users with large, diverse and expanding addressable markets
- Precedent for successful implementation of similar innovation centre models both within Victoria and Internationally

The opportunity for a RCIC to advance the transition to long-term industry and jobs is significant. Government support will ensure that a significant regional development potential is realised.





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