



Carbon Down

Resilient Regions and Small Business Futures in a Low Carbon Economy

A Carbon Down Research Report
October 2010





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About Carbon Down

Carbon Down is a joint initiative of the Victorian Employers' Chamber of Commerce and Industry (VECCI), the Victorian Government and its agency, Sustainability Victoria. The initiative was established in 2008 and is operated by VECCI's Sustainability Services.

Carbon Down partners with large companies and organisations to develop projects that help small to medium sized businesses (fewer than 100 employees) reduce their carbon footprints. Carbon Down's mission is to empower the Victorian business community to work together to reduce Victoria's carbon emissions.

Acknowledgements

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Carbon Down



Report Context

There is an ongoing discussion in Australia over the extent to which climate change impacts are already observable and the relative responsibility for those changes, and environmental damage more broadly. Carbon Down acknowledges the public debate that is occurring, and believe that it reinforces the need for continued rigorous scientific research to inform ongoing discussion.

While actions to limit the growth of emissions and reduce them over time will have a cost for business, these can be offset by taking advantage of the opportunities and improving material and resource efficiency. Opportunities will come from moving towards a low carbon economy - including in the transition - as well as through managing and mitigating the risks from climate change impacts.

While Victoria's regions have much to gain if a well informed approach is taken that focuses on the opportunities, leverages existing strengths and identifies links that will build in resilience to fit into a range of possible futures.

How small businesses are responding and how they can be empowered to respond are of prime importance to VECCL, and key reasons behind establishing the Carbon Down partnership with the Victorian Government.

This is a timely report that will inform State, Federal and Local Governments and businesses and communities as they grapple with the regulatory and real impacts of climate change.



Report Methodology

This research project focussed on identifying the major risks, transition opportunities and indicators for regional small businesses as they respond to the impacts of climate change and carbon price related drivers.

The project included analysis of relative 'resilience' in each region with regard to climate and carbon adjustment capacity. This was achieved by looking specifically at industry diversity and business structures, access to markets and prospects for emerging industries.

Consultancy research projects reviewed the current state of regions, industries, policy-settings and emerging industry projects. Existing research and literature on risks and opportunities in industry transitions and emerging industries were reviewed. Research and literature on climate change predictions, climate impacts and responses to change in general were also analysed and assessed in relation to this project.

Preliminary research findings were evaluated through stakeholder consultations and internal reviews.

A facilitated workshop was also held to test key recommendations and assumptions as well as to road-test preliminary findings and ideas with Carbon Down stakeholders.

Those discussions and deliberations, consultancy research reports and stakeholder reviews all contributed to this final report.



Executive Summary

This report outlines key strategies to support transition approaches that are appropriate, reflective and responsive to the needs and realities of business and industries in the regions in question.

The Victorian regions of the Northern Rivers (Mildura-Mallee), City of Greater Geelong and the Latrobe Valley are - like many other regions - vulnerable to climate impacts, such as reduced water availability, temperature changes and changes to productive capacity. These regions also face considerable potential impacts to regionally significant industries via the introduction of a carbon price, or as is currently the case, an uncertain approach on a carbon price.

All three can be shown to be exposed to a range of risks, but equally have the potential capacity to mitigate challenging circumstances and to respond to opportunities.

This report, and preceding research, focused on understanding climate change impacts on the three regions, opportunity and capacity for SMEs (Small and Medium Enterprises) to respond and the links that are needed to enable them to respond and take advantage of those opportunities and to mitigate risks.

Based on the research, analysis and stakeholder input, five core components were identified - building blocks - that are important in enhancing existing adaptive capacity and business resilience. They provide necessary linkages between the current state, the transition to a lower carbon future, and in meeting that future with strong, sustainable business growth.

To connect this theory to reality, the researchers reviewed the three regions' present state (including the depth and diversity of small businesses in the regions), identifiable risks and opportunities. This research was cross-referenced with stakeholder input to develop tables that summarise the research and input for each region.

A related set of stakeholder comments and short industry case studies provide personal insights into the region's strengths and opportunities.



Introduction and Context

Victoria's regions will each be affected differently by carbon pricing, future climate change and broader global forces.

As a result of climate change, Victoria is predicted to experience a variety of changing environmental conditions. These changing conditions include, amongst others, rising average temperatures and increasing frequency and severity of extreme weather events such as floods, storms, drought, heat waves and bush fire weather. Such events will increasingly impact on industry throughout Victoria and, in particular, those in regional areas.

While each region will face a different set of risks and opportunities, the way these forces develop, interact with each other and impact on communities is uncertain. This makes long-term planning difficult, but not impossible, for industries, business and Governments in those regions and surrounding communities.

The ability of regional economies and communities to manage and adapt to a range of different forces will depend, to a large extent, on how they are able to position themselves in the face of this uncertainty - their relative level of resilience.

Resilience is, in turn, strongly influenced by each community's current economic, social and environmental characteristics as well as the nature of the forces driving change.

Clearly important is the need to link financial investment, infrastructure, and services to the existing ready and skilled workforce, educational facilities and to focus on ensuring that supporting business development is strategically aligned to capitalise on emerging opportunities.

There are core components that are important to ensure that the best building blocks are in place to drive resilient, sustainable business growth (see page 8).

In the context of a sustainable transition to a low carbon economy, it is necessary to establish pathways that ensure ongoing benefits for our workforce, community, environment and the economy. All elements are mutually reinforcing in terms of delivering sustainable business growth.



About Small Business

Carbon Down primarily focuses on small to medium enterprises up to 100 employees. SMEs operate in all industries, and are the largest employer by sheer numbers in the State.

The nature and specific needs of small to medium enterprises vary greatly from one business to another. Their diversity drives capacity and entrepreneurship, but also may open up vulnerabilities in terms of access to skills and resources necessary to their business' ongoing viability.

In general SMEs are also often closely linked to the owner and their social status and networks, with stakeholder relationships often based on trust rather than formal contracts. SME employers may even regard employees as extended family. In regional Victoria, these factors are enhanced by close-knit and mutually reinforcing relationships across family, business and local government relationships.

Small businesses in the three Victorian regions

Analysis conducted for this project shows SMEs are most heavily represented across all three regions in property and business services, construction, retail, forestry and fishing, and agriculture with the latter showing a far higher incidence in the Northern Rivers region.

Conversely, industries with the lowest SME numbers, which were not unexpected, were in mining and utilities, with low numbers also evident in communication services and education.

Across all three regions there is evidence of an increased level of adaptive capacity (resilience) in recent years. This has occurred in parallel as more diverse businesses have established around multiple industries that, in parallel, appear to be trending towards more diverse structures.

While diversification does not necessarily equate to resilience, analysis of the three Victorian regions shows a *high correlation* between industrial diversity, access to markets and education services, and the capacity to adapt to changing business and industry conditions. In the context of a low-carbon transition, driving stronger opportunities and diversification is likely to enhance that correlation.¹

¹This should not be taken to mean that it is recommended diversification be pursued to the exclusion of all other strategies, but rather that it is a key element alongside other supporting structures including market access, community strength, education rates and business opportunities in general.



Building Blocks for Resilient Regions

→ **Adaptive capacity.**

How easily a community is able to effect the changes required to reduce exposure to a given stress depends on existing and future “adaptive capacity”.

This can also be used to measure the relative level of resilience in the community. Adaptive capacity and resilience are influenced by factors such as the community’s diversity, flexibility, ability to learn and change, and general levels of social and economic advantage (and disadvantage), across human, social, financial, natural and physical capital.

Existing adaptive capacity will influence the relative ease with which a region is able to manage and respond to a range of expected, and unexpected, challenges.

→ **Diversified economic base.**

A diverse economic base enables communities to minimise the impact of uncertainty and, through natural (organic) business growth, create a more resilient economy.

The ability to diversify is also *path dependent*, as it is linked to the current economy of the region.

Developing resilience also involves capitalising on the opportunities presented by both climate change and a carbon constrained economy, and is best served by adopting a portfolio approach, with a diverse array of industries co-existing - to spread the risk across a number of opportunities and sectors. This diversification will benefit the community as a whole in preparing for a range of future outcomes.

→ **Government assistance.**

Many of the opportunities that arise from these transitions involve risk, especially where they are based in some form of experimental technology and/or where the “future” industries are not yet commercial.

To this end, a number of transitions will require some level of government assistance, including for infrastructure, across multiple opportunities, industries and regions.

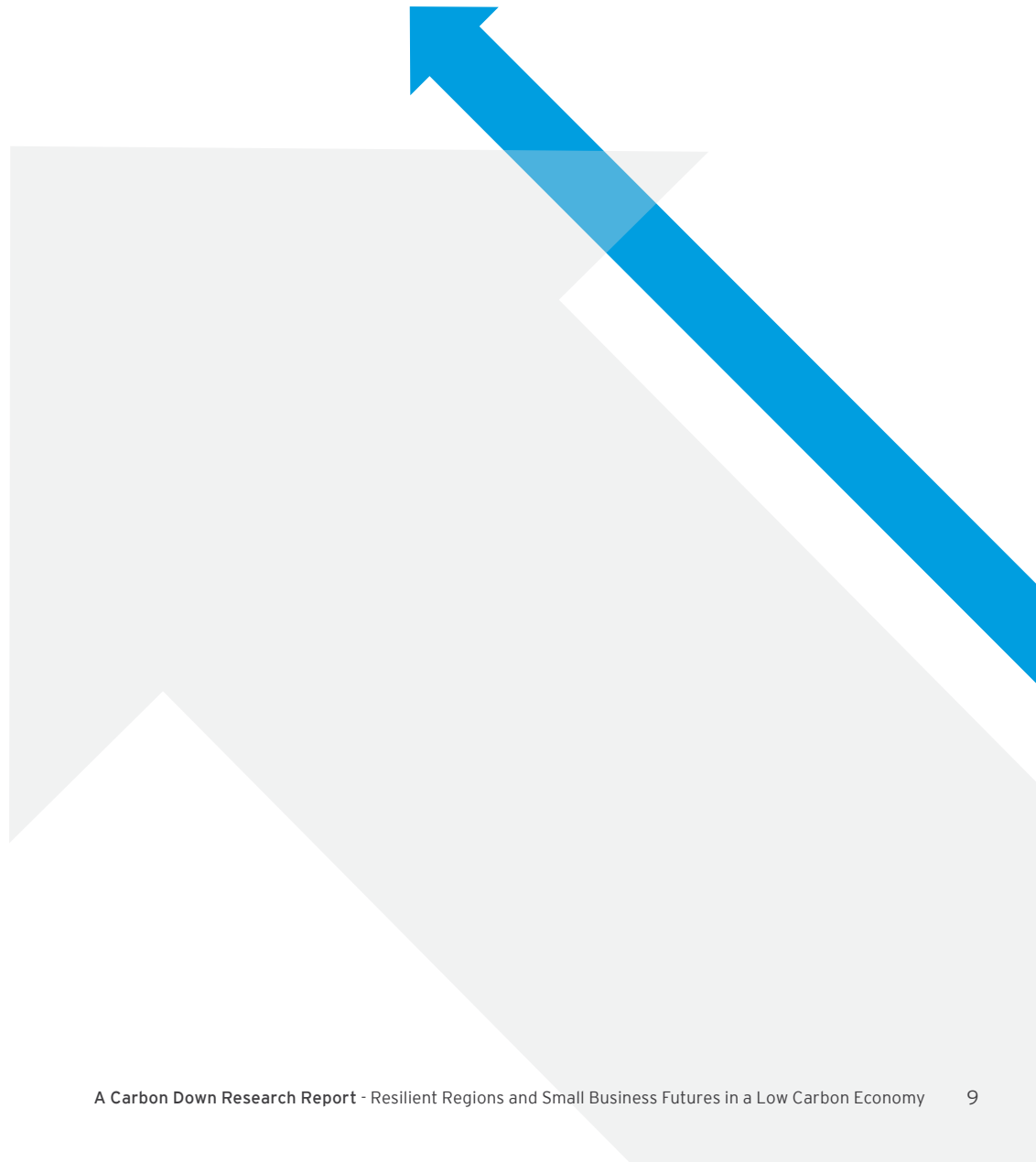
→ **Managing and mitigating uncertainty.**

Uncertainty is often highlighted in relation to climate conditions, future global influences and carbon mitigation schemes. A key element in managing these transitions will be eliminating, and reducing unnecessary uncertainty.

→ **Strategies for an ageing workforce and skill development.**

A recurring theme across the regions involved their ageing skilled workforce, and a skills gap in key industries. Exacerbating this trend, no region seems to have a clear strategy to retain links to retiring skilled workers for training or mentoring purposes.

As the regions move to exploit new opportunities, there needs to be a strategic effort to ensure the existing workforces' skills are constantly renewed and upgraded, through an approach that fosters career-long learning and development. This will ensure more of the workforce is not left behind, as industry and skill requirements change over time.





Regional Business Resilience

International studies of major regional transitions (e.g. following the loss of international competitiveness of heavy industry in the “rustbelt” of the American mid-west) emphasise that the resilience of regional economies and communities plays an important role in the success or failure of their transitions.

These studies have shown that the diversity of knowledge and skills available in a region, the quality of community networks, the level of social capital and the dominance of a small number of signature industries (or even just one industry) in the regional economy are all central to identifying the risks that regions face and their capability to grasp opportunities that arise during a period of transition.

In a regional Victorian context, looking specifically at Northern Rivers² (Mildura-Mallee), the City of Greater Geelong³, and the Latrobe Valley⁴, the current status and potential for each region to transition to a more resilient, diverse and more sustainable future is examined.

Adapting to climate change and pursuing industry and business innovation for competitive advantage alongside the development of emerging industries are not without challenges in these regions, many existing features will enable those risks to be mitigated.

Stakeholder consultations and research for this project focussed on the following features:

- Social and community resilience, built through existing or previous challenges
- Diverse industrial make-up and expansion of industry diversity and economic strength , proximity and access to markets and distribution centres.
- Strengthening and growing SME sectors supporting larger industries
- Educational and workforce skills factors
- Current and future climate change
- Emerging industry development and support structures

The extent, depth and length of the transition to a lower carbon future for each region is significantly determined by its current economic and social makeup - the interaction between business, community and major industries.

² Defined as the statistical divisions of Mallee, Wimmera and Loddon.

³ Defined by the City of Greater Geelong local government boundary.

⁴ Defined by the statistical sub-division Latrobe Valley.



Regional Industry Charts and Summary Tables

The following charts provide graphic representation of small to medium enterprises across all industries in the regions. A summary chart compares the density of SMEs in these industries across the three regions.

The tables that follow summarise the existing conditions, challenges and opportunities across the regions in relation to the six features outlined in the table on the previous page and incorporate stakeholder input and comments. Regional industry vignettes are outlined following each regional summary to provide further context.



Northern Rivers (Mildura-Mallee)

INDICATOR: Community, Demographic & Social

PRESENT SITUATION

- Aging population – proportion of farmers under 30 fell 80% 1976-2001.
- By 2030 around 25% of population likely to be over 75 years of age.
- Unemployment consistently higher than state average, but reflects shifting labour demands of seasonal employment requirements in agricultural and horticultural businesses.
- Social and community impacts are closely driven by issues and risks in agriculture.
- Many years' experience in adapting to the changing environment, with particular efforts in water efficient practices and technologies.

EXISTING AND EMERGING CHALLENGES / RISKS

- Water buy-back, farm 'drought assistance' driving social and community impacts (suicide, mental health, financial hardship etc).
- Varying levels of climate change knowledge and understanding amongst farmers.
- Farmers in this region less likely to agree with the notion of human-induced climate change (only 30% agree).
- New skills may be required to deal with potential changed agricultural profiles resulting from climate change impacts.

EMERGING OPPORTUNITIES

- Strong community support for solar energy opportunities will help enable strong community response to solar project initiatives, but need to be consulted along the way.
 - Workforce and education opportunities associated with solar and renewable energy industry via vocational training and trade opportunities, and linkages to "world-class" energy industry.
- 

INDICATOR: Economy & Industry

PRESENT SITUATION

- Relatively remote with distribution capacity reliant on road, rail and air freight.
- One third of businesses are involved with or in agriculture, others include food and beverage processing, advanced manufacturing, transport and storage, mining.
- Gross Regional Product (2008) approx \$2.8 billion mainly via agriculture and horticulture, advanced manufacturing, logistics and services.

EXISTING AND EMERGING CHALLENGES / RISKS

- Numerous farms/paddocks are 'closed' for grazing/growing reflecting the impact of drought - sunk capital.
- The strong dominance of agriculture and downstream (linked) industries creates risks due to narrow economic base.
- Industrial base is highly exposed to climate impacts (drought, soil, temperature, evaporation rates etc).
- Limited natural resources.
- Declining water availability and rising water costs leading to rising production costs.
- Rising fuel and distribution costs, which are likely rise by further with a carbon price.
- Workforce attraction/ retention in non-mining occupations affecting local industries and economy.

EMERGING OPPORTUNITIES

- Existing investment interest in large scale solar projects and potential for further solar and renewables exploitation at mid to large scale.
- Potential development of renewable grid links.
- Expansion of non-farm opportunities for solar and other renewables.
- Potential to exploit new agricultural opportunities via land-carbon sequestration and biodiversity schemes.
- Explore potential mining and mineral opportunities (mineral sands, salt mining).
- Additional development of low-water (drought tolerant) and heat-tolerant crop varieties.



Northern Rivers (Mildura-Mallee) continued

INDICATOR: SME Sector

PRESENT SITUATION

- 25% of employed population works in agricultural sector many of which are SMEs.
- There are 29,400 SMEs across all industry sectors.
- Succession planning a major concern in farm businesses, particularly on family farms.
- SMEs largely price-takers in a long supply chain. Impacts through supply chains may have significant down-stream flow on effects for SMEs (may be positive or negative).

EXISTING AND EMERGING CHALLENGES / RISKS

- Exposed to climate impacts, many in, or highly dependent on, agriculture.
- Market and capital obstacles to new business ventures limiting ability to diversify - compounded by ongoing impact of drought.
- Age profile of farm business owners/managers (+50-60) and succession planning likelihood relatively low across many farms.

EMERGING OPPORTUNITIES

- Alternative agriculture/horticulture industries (organics, biodynamic etc), and non-farm options (renewables).
- Renewable energy (small to mid scale) services/supplier opportunities.
- Education and community opportunities.
- Land-based sequestration and biodiversity.
- Natural amenity and landscape potential for leveraging to expand tourism and related sectors (food, sporting, events).

**INDICATOR:
Workforce**

PRESENT SITUATION

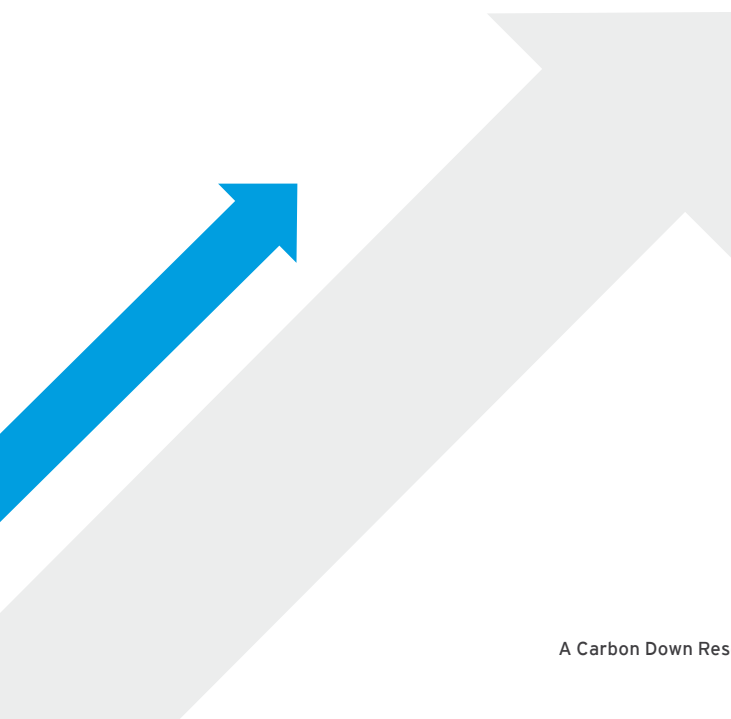
- Ageing workforce, with lowest education levels in State and skills shortage.
- Transient young population see limited opportunities.
- Difficulty (anecdotally) to attract, retain skilled staff to non-mining occupations.
- Anecdotal evidence of difficulty in attracting/retaining trade apprentices for non-mining sectors.

EXISTING AND EMERGING CHALLENGES / RISKS

- Ensuring relevant skills.
- Retention/attraction for younger workers.
- Improving/enhancing education levels and skills among workforce population.

EMERGING OPPORTUNITIES

- Enhanced education and associated industry opportunities and potential links with community and industry projects.
- Skills and training opportunities to support emerging and new industries, and to transition workers from existing industries into new business opportunities.





Northern Rivers (Mildura-Mallee) continued

INDICATOR: **Climate**

PRESENT SITUATION

- Water-limited, fragile environment.
- High levels of solar radiation and rising temperatures.
- Recent drought alongside periods of increased temperatures (0.4°C above long term average).
- At risk from climate change impacts including increasing temperatures, water scarcity, extreme weather (droughts, floods), changes to growing zones and productive capacity.
- Increasing frequency and severity of drought impacting economic viability of highly agricultural industry base.

EXISTING AND EMERGING CHALLENGES / RISKS

- Climate change impacts on businesses and agricultural productivity.
- Regional food security impacts risk consequences to the state in terms of productivity and cost.
- Declining water availability.
- Temperature affects (up to +1°C by 2030 and 2.8°C by 2070) and reductions in average.
- Declining water availability (rainfall reductions of -7% in 2030 and even further by 2070).
- Increasing frequency and severity of drought conditions.

EMERGING OPPORTUNITIES

- Link environment remediation opportunities to farming and industry that reduces reliance on irrigation water.
- Solar radiation rates and high temperatures to provide key power 'hub' that 'wins' in climate change.
- Enhancing the area's biodiversity value through frameworks that reward conservation services.
- Growing non-farm industries eg. renewable energy, tourism and 'climate sensitive' advisory services.
- Build farmers' awareness and understanding of climate change and the possible longer-term impacts and implications.



INDICATOR:
Emerging Industry & Support Structures

PRESENT SITUATION

- Existing strengths in community and business could underpin a number of new opportunities and, in parallel, addressing a number underlying challenges.

EXISTING AND EMERGING CHALLENGES / RISKS

- Renewable energy policies and a carbon price add risks to community (cost impacts) and industry through cost impacts and potential to drive more non-food agriculture.
- Climate change and impacts on agriculture require policy links to water, food and human resource security.

EMERGING OPPORTUNITIES

- Continued diversification is expected to occur, particularly in manufacturing, wholesale trade and service sectors with strong potential links to emerging renewables and environment services.
- Industry development policies have potential to drive a more diverse (and resilient) economic base into more non-farm business opportunities.



Northern Rivers (Mildura-Mallee) continued

Northern Rivers Stakeholder Comments

- *“Climate change is just one factor, amongst many others that people [and businesses] are already planning for and adapting to.”*
Anne Mansell, CEO, Mildura Development Corporation
- *“You can’t just force change upon people unless they understand the context from where it’s coming from”.* (not attributed)
- *“The combination of rising temperatures, decreased rainfall, changing market conditions and the cost of water may be pushing some people out of business”.*
David Griffin, DPI

Northern Rivers Opportunities

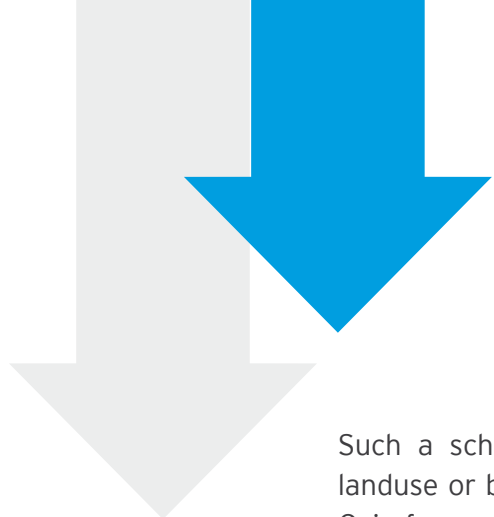
Water policy supporting transitions

Water allocation and availability in the Murray Darling Basin, in particular how the national water market evolves, are keys to the area’s viability, with regional profitability in the basin highly dependent on the impact of policies upstream. In short, with profits in some states equate to losses in others. Adding to this, policies at various levels of government and market incentives may, in fact, encourage water rights being sold out of regions, resulting in stranded assets and isolated communities. There is a general feeling in the Mallee that this is already occurring in some small towns. There is growing concern at how this will impact through broader communities if there is no accompanying assistance to transition farmers, but rather just a financial lump sum.

Soil carbon, sequestration and competing land-use

Some options for land use in the Mallee are not necessarily complimentary and following one option may actively preclude another. A case in point is the carbon market’s inclusion of land-based forestry (carbon) sinks which focus on carefully planned monoculture of well-documented and understood species to provide quantifiable, verifiable carbon offsets. To this end, there is a view that preservation of native vegetation for biodiversity purposes may limit use of the vegetation for carbon sequestration. This may be at odds with biodiversity preservation, which usually requires a highly complex ecosystem to provide maximum benefits. In addition, the impact of soil carbon techniques on actual sequestration remains in its infancy. That being said, investing in pilot projects that will deliver soil and eco-system improvements, on the face of it, makes practical and pragmatic sense. To link these issues, a possible model is the US Conservation Reserve Program, run through the Natural Resource Conservation Service. Under this, farmers receive annual rental payment for the term of a contract for implementing land conservation practices on their farm.⁵

⁵ www.nrcs.usda.gov/programs/crp/



Such a scheme could possibly evolve from BushTender program, and other landuse or biodiversity policy initiatives such as the Victorian Government's Net Gain framework or the Federal Government's *Caring for Country* initiative, which encourages landscape scale conservation. Enhanced conservation initiatives, and improved environmental amenity may also improve the potential for nature-based and eco-tourism.

Exploiting the region's renewable energy potential.

The Mallee in particular has renewable energy potential, both through exploring biofuels and also solar energy. The Mallee's proximity to the National Electricity Grid means it is able to support large-scale solar. This potential is demonstrated through the Mildura solar project - a \$420 million, 154-megawatt project that aims to be the world's largest and most efficient solar photovoltaic power station. Despite the original project owner - Solar Systems - failing to attract sufficient investor backing during the height of the 2008-09 global financial crisis, the project has now been acquired by Silex Systems and appears to be back on track thanks in part to policy certainty on the Enhanced Renewable Energy Target legislation.

Waste resources drive innovative business

Australian Tartaric Products manufacture and supply tartaric acid, natural cream of tartar and pure food grade spirit to the Australian wine industry. Established by the Randi family in 1991 at Colignan, just out of Mildura, the Australian Tartaric Products has quickly grown to Australia's largest manufacturer and supplier of tartaric acid. The facility processes considerable volumes of waste and by-products created from the wine making process, producing a completely natural product from material which would otherwise end up in landfill. The company collects waste products from the Sunraysia, Riverland, Riverina and Barossa Valley wine growing regions. The tartaric acid produced in the Mildura region is sold mainly to Australian wineries, with smaller quantities taken up by pharmaceutical companies and food manufacturers. Food grade spirit is also sold both to Australian wineries and internationally to be used in wine fortification and brandy production.



City of Greater Geelong

INDICATOR: **Community, Demographic & Social**


PRESENT SITUATION

- Increasingly diverse economic base, established and expanding infrastructure (eg. Avalon airport, rail links etc), proximity to Melbourne and other large markets.
- Strong community, with expanding social and education opportunities - especially linked to higher education facilities.
- Significant growth in population and demand.

EXISTING AND EMERGING CHALLENGES / RISKS

- Infrastructure pressure from more dispersed/divers emerging business and workforce opportunities.
- Rising population impacts on social and community infrastructure as well as job challenges (55,000 new jobs needed by 2050).
- Strong presence of and reliance on carbon intensive industries.
- Potential pressure on transport infrastructure and decentralised business services/infrastructure (also an opportunity).

EMERGING OPPORTUNITIES

- Community engagement to increase school students' understanding of what they need to do to get a job (achieved through engagement and education of parents and careers advisors etc).
 - Expansion of transport and distribution to drive ongoing, diverse business opportunities.
- 



INDICATOR:
Economy & Industry


PRESENT SITUATION

- Manufacturing sector employs over 13,000 people and remains highly important, across food, automotive, textiles, aluminium, petroleum, cement, chemicals, timber and engineering, generates \$11.5 billion of Gross Regional Product.
- Broad manufacturing base is supported via good access to ports and other infrastructure for distribution.
- Natural environment a key feature of regional tourism industry.

EXISTING AND EMERGING CHALLENGES / RISKS

- High concentration of carbon intensive, trade exposed industries such as oil refining, aluminium refining and cement production.
- Key industry sectors and companies will be highly exposed to carbon price on top of trade impacts and pressure to reduce emissions which will have flow-on risks for SMEs that supply goods and services to these larger companies.
- Policy uncertainty hindering new investment options, decreasing exposure to shocks to car industry.
- Rising resource costs including energy and water.

EMERGING OPPORTUNITIES

- Exploiting proximity to educational institutes to forge new partnerships.
 - Significant existing R&D capacity to enable development of new industries, in close partnerships with businesses and existing education institutes.
 - Niche and advanced manufacturing to provide key local industry opportunities in support of state, national and international industry developments. eg. carbon fibre, advanced materials, automotive components and servicing in low carbon vehicles.
 - Renewable energy (especially geothermal), carbon storage industry and research opportunities.
- 



City of Greater Geelong continued

INDICATOR: SME Sector

PRESENT SITUATION

- Heavily dependent on SMEs with, 96.3% of all businesses employing less than 20 people and 99.8% less than 200.
- Large SME business population of around 21,400 across all industry sectors.
- SMEs largely price-takers in a long supply chain. Impacts through supply chains may have significant down-stream flow on effects for SMEs (positive or negative).

EXISTING AND EMERGING CHALLENGES / RISKS

- SMEs capacity to respond/adapt to global competition and other global level influences.
- Diversification may challenge existing SMEs due to capacity or other constraints that may limit their ability to respond to changing market conditions, and to identify new opportunities.

EMERGING OPPORTUNITIES

- Spin-off opportunities from larger businesses; ongoing significant government investment in transitioning automotive industry; research sector creating niche, high-end technology opportunities.

**INDICATOR:
Workforce**

PRESENT SITUATION

- Labour force growing 3% faster than Victorian average.
- Existing technical experience and skilled workforce within current industries.
- Skills shortage especially in some industries that need higher level of skill and experience from new employees and less for lower skilled positions.
- Majority of current jobs and employment opportunities centrally located.

EXISTING AND EMERGING CHALLENGES / RISKS

- Skills issues in matching skills needs to workforce capacity, aging workforce (in some industries), and ensuring education sector matches industry needs.
- Ageing workforce in key industries.
- Future workforce and students provided (and choosing) skills for (emerging) industry opportunities.
- Dispersion of job opportunities for the regional workforce to a broader geographic area.

EMERGING OPPORTUNITIES

- Existing skilled workforce.
- Proximity to Melbourne and readily accessible larger workforce.
- Education and skills development opportunities are high, given good education facilities and diverse business community.



City of Greater Geelong continued

INDICATOR: **Climate**

PRESENT SITUATION

- Higher frequency and severity of extreme weather events.
- Rising sea levels and changes to ocean circulation patterns are likely to cause increasing coastal erosion and flooding incidents.
- Rising temperature impact on much of the region's indigenous flora and fauna driving economic affects for agricultural, aquaculture and tourism industries.
- Continued water shortages alongside reductions in river run-off in the Barwon and Otway (between 7% to 24% by 2030 and 12% to 51% by 2055).

EXISTING AND EMERGING CHALLENGES / RISKS

- Climate impact risks especially for high-volume regional tourism and nature-based tourism.
- Water and other resource demand to increase with a rising population, enhancing water management issues (cost, supply, quality).
- Increasing frequency and severity of heatwaves.
- Encroachment of tidal/storm surge on coastal zones.
- Rising temperature impact to vegetation and crops.
- Low level business/community awareness of opportunities associated with climate change.

EMERGING OPPORTUNITIES

- Access to extensive geo-thermal and other sources of renewable energy.
- Wind energy technology opportunities - significant opportunities for job creation in maintenance and servicing with Geelong's engineering background.
- Enhance awareness of opportunities from low-carbon and renewable energy industries, advanced automotive and manufacturing.
- Enhancing the area's biodiversity value through frameworks that reward conservation services at landscape scale.
- Link environment remediation opportunities to farming/forestry and industries for economic and environmental benefit.



INDICATOR:
Emerging Industry & Support Structures

PRESENT SITUATION

- Existing strengths in diverse industry and business in addition to good access to markets and education facilities could underpin a number of new opportunities and, in parallel, addressing a number underlying challenges.

EXISTING AND EMERGING CHALLENGES / RISKS

- Renewable energy policies and a carbon price add risks to much of the region's trade-exposed industry through cost impacts in addition to global competition challenges.
- Climate change impacts on water availability and coastal zones a key concern with rising population pressures.

EMERGING OPPORTUNITIES

- Niche and advanced manufacturing to provide key local industry opportunities in support of state, national and international industry developments. eg. carbon fibre, advanced materials, automotive components and servicing in low carbon vehicles.



City of Greater Geelong continued

Geelong Stakeholder Comments

- *“Many small and medium sized businesses would like to undertake initiatives that will assist transition but they need a clear pathway to follow. Businesses want some very clear guidelines and suggestions as to how to address this”.*
G21 Alliance.
- *“Although the cost of energy has been low and stable, with good outcomes for some time, this is about to change - and changes will increasingly require businesses to better understand their own energy usage and how energy relates to them”.* (not attributed)
- *“The demand for lower skilled jobs is decreasing. We need to make sure that the skills match the needs of industries”* **G21 Alliance.**

Geelong Opportunities

The Carbon Fibre Centre

A joint venture between Deakin University, CSIRO and the Victorian Centre for Advanced Materials Manufacturing. This \$112 million research facility, which recently secured \$37 million in Federal Government funding to develop the carbon fibre research centre, will be the first of its kind in the world, and will focus on exploring the potential of carbon fibre. The Centre has the potential to establish Australia as a “hub” for this new material, which can be used across a wide range of advanced manufacturing and technology industries in products such as wind turbine blades, airplane fuselages and biomedical products. CSIRO Chief Executive, Dr Megan Clark says “The Centre will ensure a world-class fibre and manufacturing capability is established in Geelong with the resources to significantly improve the competitiveness of the textile and materials manufacturing sector, and the advanced composites and biomedical industries. Research at the Centre will aim to generate, for example: advanced composites capable of producing high-temperature, high-strength materials; new materials for medical applications like tissue engineering scaffolds; environmental applications such as toxic chemical and heavy metal removal technologies; and, advanced body armour materials designed to protect Australian soldiers. The centre is expected to employ up to 270 additional researchers and create 120 construction jobs.



Geelong Geothermal Project

Currently being developed by Greenerth, the Geelong Geothermal Project could potentially power up to 100,000 homes with geothermal zero emission energy. According to the Victorian Department of Primary Industries “the development of projects like this is great news for all Victorians who will see not only the environmental benefits from developing cleaner electricity generation, but the economic benefits from new renewable energy jobs”. However, community concern earlier in 2010 following publication of ‘option’ overlays for the location of the site underscores the need by Government, as well as project proponents, to provide clear, early consultation with the local community. Such consultations are of vital importance to build broad understanding and, importantly, to enable the business community to identify potential opportunities.

Education and Opportunity Awareness Among Students

While there are many opportunities, including those at a tertiary education level, for people to develop the skills and experience necessary to find work in the region, school students and their parents need to be aware of these in order to make the well-informed decisions. The G21 Alliance believes that a greater level of education and engagement is required to ensure Geelong’s younger demographic understand how to best position themselves to take advantage of changing employment opportunities and rising skill requirements. According to G21 “we need to shift the focus from the providers [the universities], it’s about getting the information out there so that school children understand the situation and make the right decisions.” Parents, career advisors and school students need to understand what the new economy will look like. They must also be aware of the sorts of industries likely to emerge and the skills, knowledge and experience that future job seekers will need, in order to gain employment in these industries.



Latrobe Valley

INDICATOR: **Community, Demographic & Social**

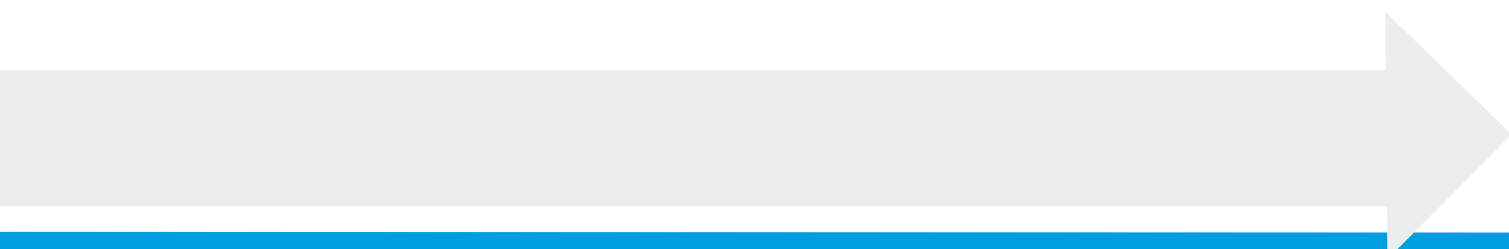

PRESENT SITUATION

- Population of over 73,000, with 45% under 35 (but 28% of these under 10 years old). A growing proportion of residents are over 50.
- Essential role in providing over 90% of Victoria's energy needs.
- Growing population and emergence of 'lifestyle' farms and diversification of industries (especially at SME level).
- Good education facilities and expanding higher/vocational education opportunities.
- Social disadvantage remains but has recovered significantly in past ten years.
- Remaining community concern largely stemming from utility restructure of 1990's that saw job losses, population decline, and a subsequent impact on spending.

EXISTING AND EMERGING CHALLENGES / RISKS

- Impact of a carbon price on its major industries of energy and mining.
- Population pressure from projected 90,000 by 2030.
- Greater water and energy demand combined with declining water availability and increasing energy and resource costs in the future.

EMERGING OPPORTUNITIES

- Existing community skills base to transition to lower carbon industries and clean coal opportunities.
 - Strategic skills shift to new industries and/or other opportunities in replacement industries and parallel energy industry investment in the region.
 - May be opportunities in new energy 'hubs' in other Victorian regions and need for skills transfer (or advisory roles) from Latrobe to those regions.
 - Due to the region's cooler climate some aspects of primary production may be advantaged compared to warmer regions.
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INDICATOR: Economy & Industry

PRESENT SITUATION

- Dominant industries of energy and mining sectors remain electricity, gas and water supplies, together with manufacturing and mining.
- Region's vast brown coal reserves underpinning energy industry - still most dominant industry at 23.5% of GRP, 22% employed (direct + indirect) in this industry.
- Industry diversification occurring as shown in growing (strong) services, retail and manufacturing sectors.
- Rich in natural resources including water forestry and productive agricultural land particularly suited to cattle and dairy production.
- Broad manufacturing base; good access to ports and other infrastructure.
- Natural assets also key element in tourism and recreational services.
- Proximity to Melbourne and broader infrastructure enabling the more diverse economic base to expand.
- Strong links to skills development, research institutes and education providers.
- Key role in providing electricity supply security through major network assets and electricity generation plant.

EXISTING AND EMERGING CHALLENGES / RISKS

- Reliance on carbon intensive industry, in particular brown coal energy generation, and impacts on economic, industry viability.
- Energy policy directions (also an opportunity).
- Climate impacts on natural resource-reliant industries (forestry, agriculture, water, mining, tourism), infrastructure from flood, fire, ambient temperature increase, decreased water availability/access.
- Energy supply system efficiency reduced by higher temp and water shortage for cooling from increasing drought.
- Regulatory and policy uncertainty impacts on new investment options and strong reliance on low carbon opportunities development driving future of coal-based industries.
- Government 'pay out' deals devaluing assets and "strong" companies which may have significant impact on population/workforce.
- Decreased surface water runoff combined with higher water demand.



Latrobe Valley continued

INDICATOR: **Economy & Industry continued**

EMERGING OPPORTUNITIES

- State Government plans to phase down (pay out) coal fired plant and parallel support for clean coal technology development, alternative uses for coal.
- Access to renewable and alternative energy sources such as forestry waste, geothermal, wind, wave and solar.
- Growth and diversification of manufacturing industry.
- Opportunities for brown coal in coal to liquids, agricultural applications, development of bio-algae and biofuels.
- New port infrastructure to enhance opportunities across many industries.
- Existing infrastructure and workforce to enable ongoing energy industry development to clean coal, gas and renewables.
- Enhancing industry-relevant research and workforce skill transition partnerships.
- Expansion of regional tourism opportunities within broader sustainable industry development agenda.

INDICATOR: SME Sector

PRESENT SITUATION

- Around 4,500 SMEs across all industry sectors.
- Some SME activity is tied to large businesses outsourcing some of asset maintenance, training and specialist services to niche providers.
- Many SMEs engaged in retail, manufacturing, construction, business services sectors, hospitality and finance.
- SMEs largely price-takers in supply chains. Impacts through supply chains may have significant down-stream flow on effects for SMEs (+ve or -ve).

EXISTING AND EMERGING CHALLENGES / RISKS

- Policy uncertainty re: carbon and climate change.
- Business planning and skills.
- SMEs reliant on energy industry unclear on transition support and supplementary replacement industries and investment.
- Large variation in SME understanding of climate change and related impacts.

EMERGING OPPORTUNITIES

- Servicing existing and new low carbon and renewable energy businesses and research projects.
- Presence of carbon sink and niche opportunities for alternative uses of brown coal and significant research in this field.
- Spin-off opportunities from larger businesses.
- Government investment in transitioning energy industry.
- Research sector creating niche, high-end technology opportunities and related service opportunities.



Latrobe Valley continued

INDICATOR: Workforce

PRESENT SITUATION

- 30,000 employed in an increasingly diverse range of roles in retail, education and health services.
- Over 10% of jobs rely directly on power industry.
- Aging workforce a concern, particularly in the power industry (average age is above 50).
- Gap between apprentices entering and those expected to retire from mining and energy industry.
- Proximity to Melbourne and reasonably accessible larger workforce.

EXISTING AND EMERGING CHALLENGES / RISKS

- Impact of a carbon price on jobs in major energy and mining industries.
- Workforce pathways to new industries expectations of strong needs in re-skilling.
- Ageing workforce/skills 'drop off' replacement.
- Transferability of existing skills.

EMERGING OPPORTUNITIES

- Existing skilled workforce.
- Successful re-skilling and workforce transition strategies will support emergence of new industries, and potentially provide new opportunities for workplace-focussed education businesses.
- Existing research collaborations on bio-sequestration, carbon capture, energy generation technology projects.
- Continued investment in alternative industrial uses for brown coal and low-carbon energy industry providing new business and industry opportunities and driving skilled jobs growth.



INDICATOR:
Climate

PRESENT SITUATION

- Temperature rise across the Gippsland region of 0.5 to 1.1°C by 2030 and 0.9 to 3.6°C by 2070.
- Rainfall is predicted to decrease by 0 to 8% by 2030 and up to 23% by 2070.
- Water impacts on ground-water, soil moisture and higher evaporation rates in the Latrobe and Thomson-Macalister Rivers (runoff reductions of 20% and 25% by 2030).

EXISTING AND EMERGING CHALLENGES / RISKS

- More frequent hot days, fewer cold days, an increasing frequency and intensity of fire, drought, flood and heavy precipitation events and risks to regional industry and communities.
- Climate impacts on flora and fauna, productivity of alpine tourism zones with shorter snow seasons.
- Natural resources industries (forestry, agriculture, tourism, fishing, water, mining) exposed to climate impacts.

EMERGING OPPORTUNITIES

- Forestry/carbon sink opportunities.
- Relative water availability may support additional agriculture/horticulture industry growth.
- Water, land management and remediation opportunities may work alongside forestry/carbon sink opportunities.



Latrobe Valley continued

INDICATOR: Emerging Industry & Support Structures

PRESENT SITUATION

- Existing strengths in diverse industry and business in addition to good access to markets and education facilities could underpin a number of new opportunities and, in parallel, addressing a number underlying challenges.

EXISTING AND EMERGING CHALLENGES / RISKS

- Emerging technology and industry risk across many 'potentially commercial' opportunities for coal and low-carbon industries.
- Finance risk and financial industry familiarity with emerging technologies especially in coal and low-carbon industries.
- Funding program continuity risks from changing Government policy approaches.

EMERGING OPPORTUNITIES

- Local skills and business services capacity and capability expansion to meet requirements of new and emerging commercial industry opportunities.
- Potential agriculture expansion opportunities - may require additional skills transition support.



Latrobe Valley Stakeholder Comments

- *“Some SMEs are recognising and embracing opportunities and others really have a low level of understanding and awareness. That said, there are still many people in the Latrobe Valley know that energy generation industry is here to stay and they aren’t paying attention to the associated risks”.*
[not attributed]
- *“Part of being ready for change is to build awareness and understanding of what a ‘transformation of the energy sector’ actually means and to help people become more empowered to drive these changes themselves. Steps need to be taken...to diversify the economic base but also to explore potential energy generation opportunities such as clean coal and carbon capture and storage, as well as alternative uses for coal”.*
Paul Flowerdew, DPI

Latrobe Valley Opportunities

Multiple opportunities for Latrobe Valley Coal

Many of the technologies surrounding brown coal are in the pre-commercialisation and commercialisation phases of development, having been proven viable at small scale demonstration plants. Many of these are the subject of existing relationships between educational institutes (such as Melbourne University), existing energy companies and small start-up ventures. The future applications of brown coal, should the technologies be commercially viable, now include:

- coal briquettes - coal which has been dried and compacted to form high energy briquettes
- syngas-based products - created through the gasification of brown coal, these products include methanol, urea, ammonia, propylene and transport fuels (as described below)
- coal-to-liquids - involves hydrogenation of coal to make fuels suitable for transport. There is also the potential to convert brown coal combined with plant matter to oil and coal products in the Latrobe Valley
- minerals processing - as a reductant in minerals processing due to its high reactivity
- steel - new technologies are enabling the blending of brown coal with other metals to produce low carbon steel (carbon fibre)
- “export-quality” brown coal - efficient water removal technologies allow for the safe and potentially commercial export of brown coal.



Latrobe Valley continued

The last of these applications, export-quality brown coal (also known as dried brown coal) is likely to offer the greatest opportunity for export. Should the technologies prove to be commercially viable, there is the potential to produce very high volumes of brown coal for export. However, there are some logistical limitations to this option: current port facilities and other supporting infrastructure are insufficient to support high export volumes, and would require significant capital investment

Creating value out of low grade feedstock

Ignite Energy Resources' (IER) have developed a Super Critical Water (SCW) reactor technology for converting modern biomass (plant matter) and ancient biomass (coal) into highly valuable oil and cleaner coal products. By converting abundant, low-cost, high-moisture lignite (brown coal) into cleaner and higher value products, IER hopes to provide a cleaner, secure energy source, while significantly reducing carbon emissions. IER have partnered with TRUenergy to develop a commercial demonstration plant capable of processing up to 60,000 tonnes of brown coal per annum to produce up to 60,000 barrels of high grade oils, 18,000 tonnes of high-grade dry coal.

Lifestyle farming in the Latrobe Valley

Ian and Marion Hill of Buln Buln in the Latrobe Valley have turned the aptly named 'Redundancy Farm' into an award winning beef farm accredited to an international standard.

Reducing their on-farm greenhouse gas emissions and adapting to a changing climate is a part of Ian and Marion's adaptive approach to farm management. They operate the farm under an Environmental Management System (EMS 14001) and sell premium beef under the niche brand, Environment. New to farming, they sought advice and information from local groups, training courses, field days, farming events and conferences. They also joined local Landcare and Beefcheque groups, which have been invaluable for sharing knowledge, gaining peer support and being exposed to the latest research and thinking. According to Ian, climate change predictions for the area are very positive for winter pasture growth, "projected heavier rainfall events can also be exploited by deep-rooted, quicker responding pastures. These make for good opportunities for increasing beef production."

Conclusions

Climate change is just one of many challenges facing small and medium business, and its effects are likely to be felt among a range of other forces. Victorian SMEs will continue to adjust to rising energy and operating costs, changes in legislation and shifting community, shareholder, client, customer and stakeholder expectations.

Changing physical and regulatory environments, shifting community and consumer expectations will also continue to affect regional SMEs due to capacity limitations (time, resources and finance). SME adjustment will also be shaped by the strong reliance on, and interaction with the community in which they operate. Understanding how to implement sustainable business practices is also clearly important in this context. Expanding that understanding to as many businesses as possible is a key objective for Carbon Down.

The most critical success factor for Victoria's regions, and vibrant SME sector, is increased resilience to enable businesses to find opportunities and mitigate negative aspects and risks from climate change and carbon price impacts. Resilience and the ability to adapt are important goals for regional communities because under conditions of uncertainty and ignorance about major future change there are no optimal solutions.

Building this resilience at the regional or local level requires action and strategies for practical implementation based on successful community engagement and support from Government. Necessarily, local SMEs will play a key role in engagement and in providing capacity to facilitate the development of 'transition' opportunities while maintaining regional viability. It is through forging links and alliances that the transition opportunities can be realised and risks minimised.





Turning challenge to opportunity

The research and the stakeholder comments show that the most critical success factor for Victoria's regions, and vibrant SME sector, is increased resilience to enable businesses to find opportunities and mitigate negative aspects and risks from climate change and carbon price impacts.

Resilience and the ability to adapt are important goals for regional communities because under conditions of uncertainty and ignorance about major future change there are no optimal solutions. Optimised planning requires a level of knowledge about future states that is unobtainable. In line with this resilience approach⁶, there is a need to focus on strategies that are less reliant on 'full and complete knowledge' such as:

- maintaining the flexibility and diversity of regional economies to prevent "lock-in" to unwanted or irreversible paths
- establishing institutions that are capable of applied industrial innovation and learning from results
- creating incentives for expansion of economic activity at a local and regional level that increases the variety of future economic choices
- Improving networks and coordination among communities, Governments, private sector actors, educational institutions and other non-state institutions.

Building this resilience at the regional or local level requires action and strategies for practical implementation based on successful community engagement and support from Government. Necessarily, local SMEs will play a key role in engagement and in providing capacity to facilitate the development of 'transition' opportunities while maintaining regional viability.

Providing appropriate financial and policy support is vital to ensure that the multiple risks are minimised and that a workforce with the skills to implement the transition is developed and/or available. While this will be an ongoing challenge for government at all levels, as well as other stakeholders, it is through forging links and alliances that the transition opportunities can be realised and risks minimised.

⁶ Measures and indicators of resilience will be important to monitoring, directing and assisting sustainable and lasting regional transitions. While it is not possible to measure resilience per se, indicators can be developed to measure adaptive capacities arising out of the quality and diversity of social and economic networks as well as the competence of community institutions.

What does it mean for regional small businesses?

Climate change is just one of many challenges facing small and medium business, and its effects are likely to be felt among a range of other forces. Victorian SMEs will continue to adjust to rising energy and operating costs, changes in legislation and shifting community, shareholder, client / customer and stakeholder expectations. Changing physical and regulatory environments, shifting community and consumer expectations will also continue to affect regional SMEs due to capacity limitations (time, resources and finance). SME adjustment will also be shaped by the strong reliance on, and interaction with the community in which they operate.

Seeking to address the challenges in relation to climate and carbon by focussing on expanding opportunities and reducing and or minimising the risks will help to build long-term resilience in SMEs and industries across these three regions. Stronger opportunities will flow through continued commercial viability in incumbent industries and from emerging industry opportunities. Understanding how to implement sustainable business practices is also clearly important in this context. Expanding that understanding to as many businesses as possible is a key objective for Carbon Down.

Sustainable business practices and internal capacity will help to build and drive more efficient, cost-effective and financially sound SMEs in the regions. Stakeholder comments, in particular, highlighted that the regional connection aspect necessitates a strong level of local engagement in the design and delivery of partnerships to attain these goals.

Stakeholders and research have also emphasised that governments have a core role to play in enabling businesses to seize these opportunities by providing access to and development of reliable, regionally relevant information, facilitating strategic regional planning, entering into partnerships for funding infrastructure and R&D, and promoting innovation in industry, education and workforce opportunities through financial support and community developed initiatives.





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