Regional Development

Regional Development Australia
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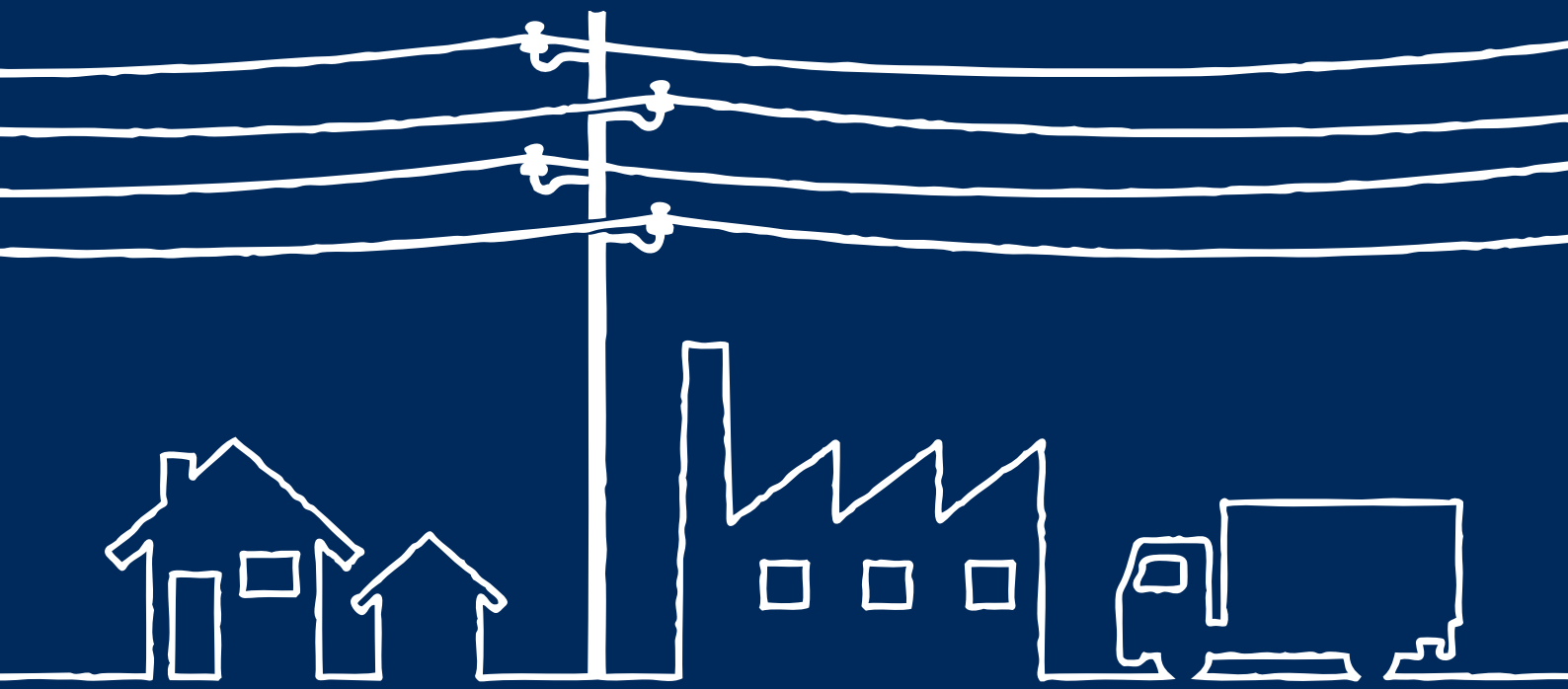
GRAMPIANS

Summary Report:

Energy Futures & Vulnerability in the Grampians



An Australian Government Initiative

State Government Victoria

Background Reports to this Summary

This Summary provides an overview for three technical reports commissioned by the RDA Grampians Committee to consider energy use in the Grampians region. Due to their length, the technical reports have been provided, along with any appendices, in a complementary CD to this Summary.

Please note that a GIS mapping tool has been provided alongside this report on the complementary CD to allow you to access the significant amounts of background data used to underpin this assessment in an easy to use, visual product.

Background Report Part 1: Grampians Energy Infrastructure

Paroissien Grant & Associates Pty Ltd

This report focuses on the mapping of energy infrastructure in the Grampians. In particular it considers:

- Liquid fuel held in the region, both at retail outlets and at bulk depots
- Biomass resources and case studies into utilization of biomass in generating heat or electricity
- Where locally generated electricity could be connected into the existing electrical network
- Mapping reticulated electricity, natural gas, water supply and sewerage in service centres.

Background Report Part 2: Economic Implications of Changes in Energy for the Grampians

Earth Systems

This report provides the policy settings as well as trends in energy demand and supply for Australia and Victoria. It then considers the possible economic implications of future changes in energy price or availability, particularly with respect to the residential sector, council functions, the health sector, agriculture and industry in the Grampians region, presented by Local Government Area.

The report also includes implications for land use and presents a broad framework for managing energy vulnerability in future.

Background Report Part 3: Social Implications of Changes in Energy for the Grampians

The Shaper Group and Dr Gill Owen

This report considers the relationship between affordable and available energy and socio-economic disadvantage, particularly with reference to residential energy needs and transport.

The assessment outlines the concepts of fuel and transport poverty, providing a break down of the risks of these issues for each of the Grampians' Local Government Areas. Furthermore, the report offers a broad outline of options that may be put in place to address such issues, specifying the State and Australian Government support existing in such areas.

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1. Introduction

This report brings together the high level findings of three background reports commissioned by the RDA Grampians Committee to explore the implications of energy prices and availability on the businesses and communities of the Grampians Region.

Traditionally, Australia has had relatively low-cost energy compared to other international benchmarks. Today, this trend is changing, with the country looking towards its next major energy transition. Australia has experienced energy transitions in the past, including a transition to coal in the late 1800s and then to oil in the early 1900s. The next energy transition is a shift from high carbon energy sources to low carbon energy sources.

The major reason for the recent increases in power prices is the rising cost of replacing the ageing poles and wires of Australia's electricity network.

Electricity prices across Australian cities have risen between June 2007 and June 2012 by the following percentage:

Melbourne	+ 84%
Sydney	+ 79%
Brisbane	+ 67%
Adelaide	+ 62%
Canberra	+ 45%
Darwin	+ 42%

ABS, Australian Social Trends (cat no. 4102.0), September 2012

Given the central importance of affordable and available energy to communities and business across the Grampians, this work was commissioned to assess the likely impacts of changes in energy over the coming decades for the people of this region.

The three background reports commissioned to inform this work include:

- Mapping of the Energy Infrastructure of the Grampians[i]
- Exploring the economic vulnerabilities and opportunities associated with changes in energy in the Grampians[ii]
- Exploring Fuel & Transport Poverty in the Grampians[iii]

The reports consider liquid fuels, gas and electricity. While forecasting energy prices is difficult, the reports has used trends analysis to determine the businesses and communities that may be at more risk to certain vulnerabilities arising from changes in energy prices or availability.

The background reports are available in full on the CD provided in the front cover slip of this report.

Table 1 provides an overview for local government areas (LGAs), with results expanded upon in the two-page summaries available for each LGA at the back of this summary report. It is recommended that the full information available around these results, as presented in the three background reports, is read in partnership with these summaries.

Victorian Farmers Federation president Peter Tuohey called for the Victorian Government to provide more investment into a long-term plan to deliver affordable energy for Victoria.

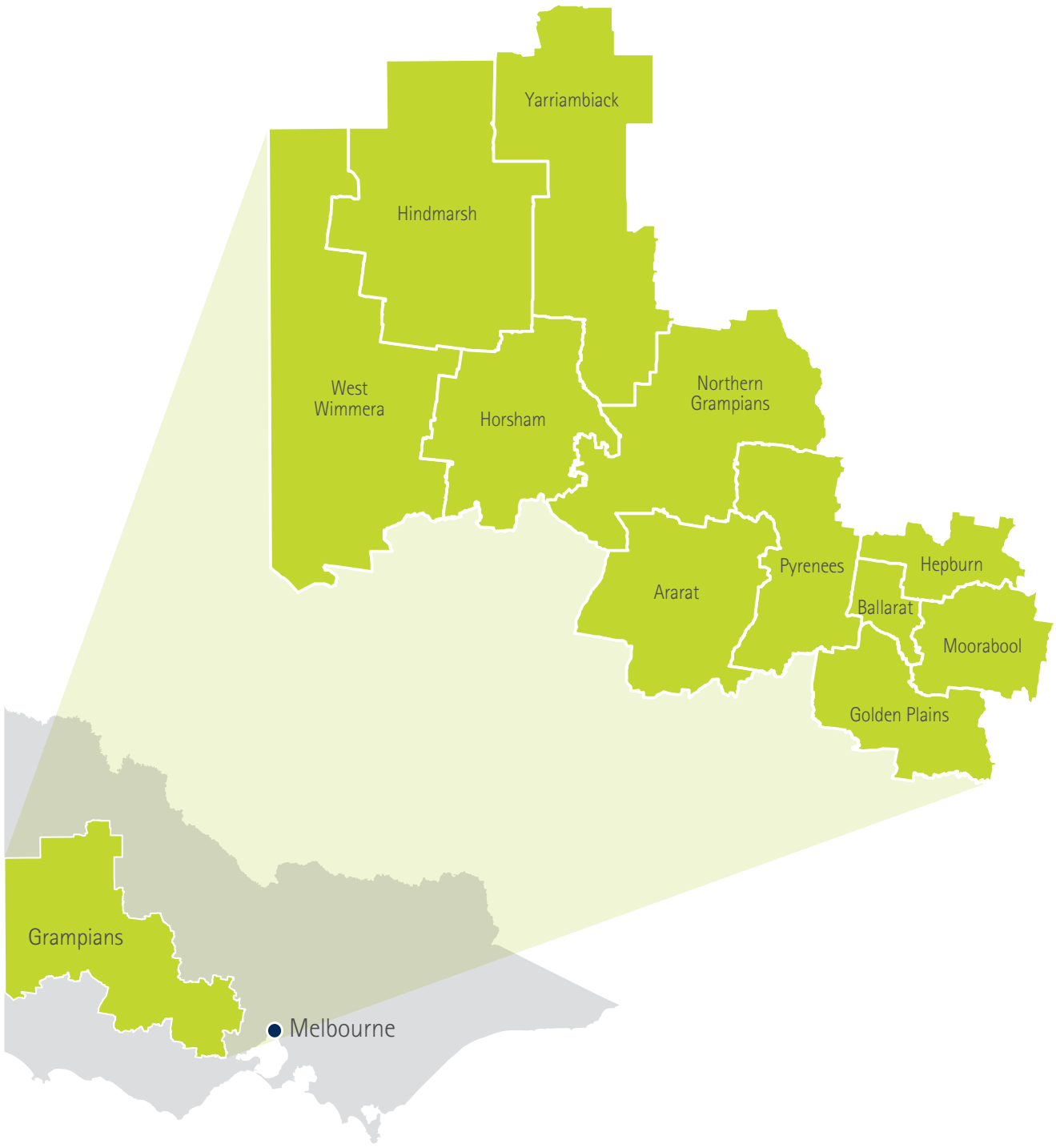
7 May 2013, Farming Ahead Online

Table 1: Vulnerability to Residential and Transport Energy Stress by Local Government Area[iv]

Key	
HIGH	Exposure to a large number of risk factors
MEDIUM	Exposure to an average number of risk factors
LOW	Exposure to a low number of risk factors

Local Government Areas	Risk of Residential Energy Stress	Risk of Transport Energy Stress
Ararat	High	Medium
Ballarat	Medium (to High)	Medium
Golden Plains	Low (to Medium)	Medium
Hepburn	High	High
Hindmarsh	High	High
Horsham	Medium	Medium
Moorabool	Low	Medium
Northern Grampians	High	Medium
Pyrenees	High	High
West Wimmera	High	High
Yarriambiack	High	High

The report also considers the energy use and vulnerability to changes in energy prices of some of the Grampians key employers: these include agriculture, health care, education and industry.


Yarriambiack
Hindmarsh
West
Wimmera
Horsham
Northern
Grampians
Pyrenees
Hepburn
Ararat
Ballarat
Moorabool
Golden Plains
Grampians
Melbourne

2. Energy Markets are Changing in Australia

Traditionally, Australia has had relatively low cost energy compared to other international benchmarks. Today, with higher prices and new technologies, the challenge is to transition our energy use in the least disruptive manner.

Australia, including the Grampians region, is experiencing a period of significant change in the generation and consumption of energy as the transition to reduced use and lower emissions technology occurs.

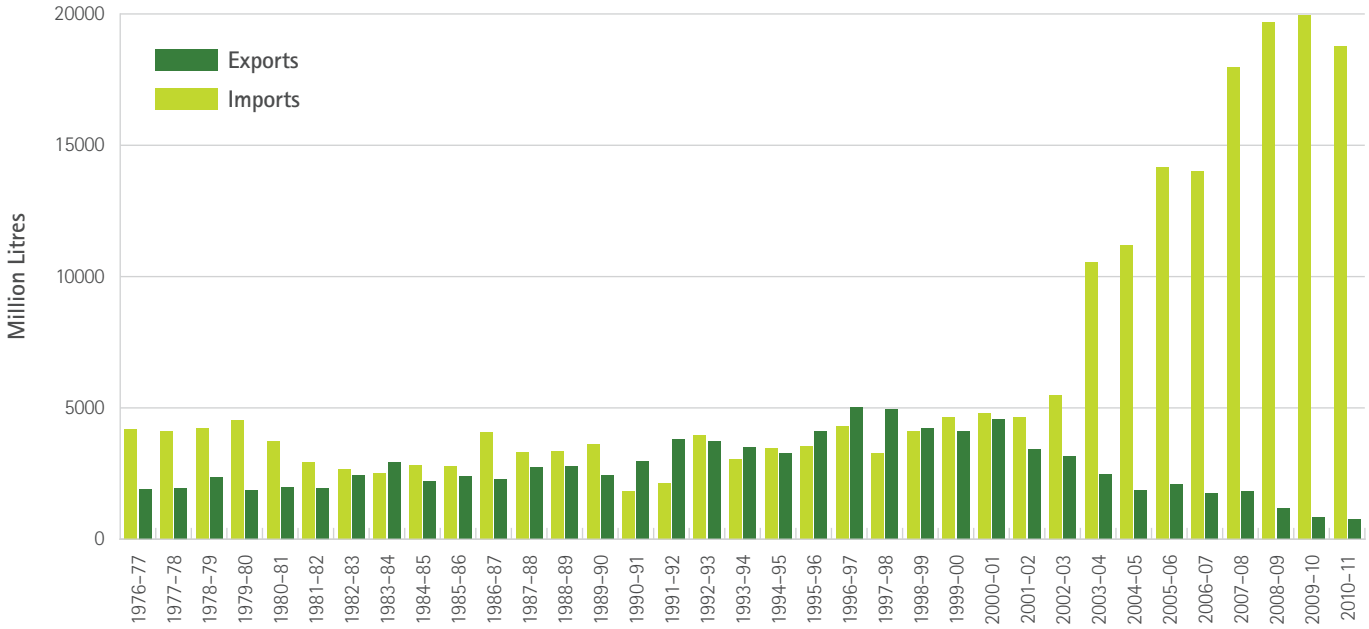
Liquid fuel

Liquid fuels are a major energy basis for transport, agriculture and some residential uses in the Grampians region.

Australia's liquid fuel prices compared to other OECD countries have historically been low, both in terms of base price and total price including tax. This has afforded Australia a competitive energy advantage.

However, Australia's liquid fuel prices have grown steadily over the last decade, with a price spike in 2005 coinciding with a reduced production caused by Hurricane Katrina in the United States. Australia's reliance on imports has also increased over the past decade, making the country a net importer of crude oil and petroleum products. The cost of importing oil is now over $20 billion per annum, with the net costs of oil imports being greater than exports by $5 billion in 2005. The probability of new Australian discoveries meeting the earlier peak production rate is very low, suggesting this trend will continue[v].

Figure 1: Australian trade in refined petroleum products, 1986–87 to 2010–11 (ML)[vi]



Despite continuing debate about when peak oil will occur, there is a consensus amongst oil industry analysts that oil prices will rise and increase in volatility over the decade between 2010 and 2020[vii].

The impacts for the Grampians would be significant under a rapid peak oil scenario where there is a drastic reduction in oil availability and subsequent increase in cost.

Peak oil is the hypothetical point in time when the global production of oil reaches its maximum rate, after which production will gradually decline.[viii]

Electricity

Historically, Australia has enjoyed one of the lowest electricity prices in the world. However, Victoria now rates in the top 6 jurisdictions in the world in terms of electricity prices. This is due to the average 40% increase in real household electricity prices in recent years, with some regions experiencing an increase of well over 50%.

Australian electricity prices are expected to continue to rise. The Australian Energy Market Commission forecasts an increase in residential electricity prices of around 22% in real terms (37% in nominal terms) nationally in the period from 2010/11 to 2013/14[ix].

As the older technology of brown coal fired electricity is relied upon in Victoria – producing one of the highest emissions per unit energy in the world – a carbon price may also contribute to higher electricity prices in future. As environmental policies are applied to emissions from electricity generation, these facilities will become less economic. However, the contribution of a carbon price to electricity prices will be minor in comparison with other factors such as the costs of maintaining the grid network.

Gas

In the Grampians the natural gas network is extensive, covering the major town centres of:

- Ararat
- Bacchus Marsh
- Ballan
- Ballarat
- Buninyong
- Carisbrook
- Creswick
- Daylesford
- Hepburn Springs
- Horsham
- Stawell
- Wallace[x]

Industrial and residential networks along the supply route have developed to rely on natural gas as a primary energy source.

Significant challenges are forecast for natural gas. Recent analysis of the gas network shows that Australia has the capacity to meet domestic demand for the foreseeable future, however it relies on significant development of the gas reserves to avoid supply issues.

In addition, in 2014 Australia will commence exporting liquid natural gas, linking domestic prices with the international market. Gas prices have already risen by 22% over the past five years. The influence of a global market may lead to further significant price rises, and a domestic gas supply shortage by 2016[xi].

3. Implications for Grampians Economic Sectors

Across the Grampians, job losses may be experienced in industries particularly exposed to energy costs and within small to medium sized businesses that find it difficult to absorb rising energy prices.

As major employers in the Grampians, the following sectors were chosen for the purposes of exploring the implications of changes in energy price or availability on the regional economy:

- Agriculture
- Healthcare
- Education
- Industry

Agriculture

Rising fuel prices and the possibility of supply shortages have significant implications for the rural and regional sector given the extent of use of these inputs in farm production.

Broad acre cropping, and to a lesser extent the sheep and beef industries, have high direct consumption of petroleum products. The dairy industry depends more on the electricity grid for fuel production.

Broad acre cropping expends approximately 12% of farm income on all energy related costs.[xii]

The cost of energy for farmers can be both direct (such as electricity for lighting) and indirect (for example, as an upstream input to the production of fertiliser). Modelling of the direct and indirect energy costs for the agricultural sector in the Grampians suggests the cost of both will increase in future.

Given the complexities of forecasting energy prices – reliant on many unknown supply and demand factors – it can be helpful to consider scenarios assuming a low, medium and high energy cost future.

Assuming a future of high energy costs, as a proportion of total farm cash receipts:

- direct energy costs (such as electricity fuel, oil and grease) could rise to 11.1% by 2020 and 13.3% by 2030 of total receipts
- Indirect energy costs could rise to 16.2% by 2020 and 25.1% by 2030 of total receipts

Under the CSIRO's Peak Oil scenario, total energy costs (direct and indirect) increase to 39% of total farm cash receipts.[xiii]

When oil prices spiked in 2008 to $147 per barrel, the cost of key farm inputs such as fuel, fertiliser, chemicals, seeds and fodder nearly doubled.[xiv]

Given the importance of the agricultural sector for the economy of the Grampians, this is a key area of vulnerability in the region.

Healthcare

Australia's healthcare system is critically dependent on oil and its products. Almost every aspect of healthcare delivery uses oil in one form or another. Should energy, including fossil fuels, increase in cost this would potentially adversely affect the healthcare system in the areas of:

- Transport sensitive services (pathology work, home visits, waste disposal etc) and patient travel to healthcare facilities
- Dependence on imported drugs and technology
- International logistics chain which supplies all the physical inputs to the healthcare system
- Medicine supples and other consumables, which are often made from petrochemicals
- Food security and public health issues through oil vulnerability in the agricultural sector

In the Grampians, energy demand in the health care sector is likely to rise over the coming decades, due both to an increasing and aging population.

Electricity and natural gas dominate energy consumption in the health care sector, comprising just over 50% and 40% of total consumption respectively by 2030. This would suggest that the health care sector is potentially more vulnerable to rising electricity and gas prices than rising liquid fuel prices. However, it should be noted that increased liquid fuel prices may be felt as upstream impacts of oil in products such as plastics, medicines, transport etc.

Direct energy related costs associated with hospital operations have been modelled for the Grampians region and under the scenario assuming a future of high energy costs and medium increases in demand, health care energy costs are anticipated to almost double by 2030.[xv]

Education

Data was only available for government schools in the region, and therefore this report does not represent the private schools operating across the Grampians. However, an assumption can be made that the trends found in government schools could be extended to private schools.

There are 143 government schools operating across the Grampians with more than 27 thousand students enrolled in 2012.

Forecast energy demand within government schools in the Grampians is expected to increase over the coming decades, attributed to an expected population increase and rise in student numbers.

Electricity currently meets approximately 78% of energy needs for the government schools, and it is expected that a similar energy mix will continue out to 2030.

Meanwhile, the forecast demand for natural gas use is expected to decrease slightly, from just over 20% currently to around 18% of the total mix by 2030.

As a whole, the region currently spends just over $1.2 million per year on energy within government schools. Under a scenario assuming a future of high energy costs and medium increases in demand, government schools' energy costs are anticipated to more than double by 2030 to $2.8 million per year.[xvi]

Industry

The transport industry accounts for 72% of Australia's total oil consumption and of that amount, 76% is for road transport. Industry that relies on road transport for the movement of goods and services in and out of the Grampians is likely to face significant cost pressures over the coming decades as liquid fuel prices increase over time.[xvii]

The rail network through the Grampians is well established compared to other regions of Australia. This offers a low-energy transport option for industry, providing both a competitive advantage and resilience to liquid fuel prices for those town centres that are within close proximity. Town centres such as Ararat, Ballarat, Beaufort, Dimboola, Horsham, Nhill and Stawell have existing rail infrastructure services.[xviii]

Industry that relies on natural gas or liquid petroleum gas (LPG) inputs to their energy consumption may be vulnerable to prices changes and supply constraints in coming years, as the potential LPG export is established. As noted previously, various factors are currently impacting on natural gas cost and supply.

Electricity price rises over the past few years have seen large increases at the domestic and large industrial level. While electricity is a domestic only market, and is not subject to international competition (such as forecast for natural gas), price increases are forecast. The impact of environmental policies is also likely to have a minor effect in increasing costs to end users.

Energy Costs at Mars and McCain Foods

Analysis conducted for this report shows that energy demand in both Mars and McCain Foods is expected to increase by just over 9% by 2030. Depending on the energy-cost scenario selected (low or high cost energy), this higher demand for energy will lead to a corresponding rise in spending of between 61% - 224% by 2030.[xix]

Case Study: Using Waste-Biomass to Fuel Business in the Grampians

Biomass refers to organic matter from plants and waste streams, including agricultural residue, forestry residue, organic wastes from industry, purpose grown energy crops, woody weed waste, algae and biodegradable municipal waste.

Businesses using biomass or whose processes result in excess biomass material for waste can utilise this fuel to:

- Generate heat from combustion for use in other processes
- Convert the biomass into synthetic fuels or fuel products
- Convert the biomass to electrical energy in a generating plant

Bioenergy Facility in the Ballarat West Employment Zone

The Ballarat West Employment Zone (BWEZ) is a 623 hectare industrial precinct immediately to the north west of the Ballarat town centre and adjacent to the Ballarat Airport. It is envisaged that the BWEZ will include high profile innovative businesses in the following sectors: industrial; manufacturing; freight and logistics; and aviation.

The City of Ballarat identified an opportunity to consider alternative energy options for future businesses within the BWEZ, with the intention of providing energy at reduced costs as well as leading to better overall environmental outcomes. It critically reviewed alternative energy options and energy demand profiles for the precinct, concluding that there was sufficient demand for heating to make an integrated co-generation solution to be feasible.

During the City of Ballarat's assessment it was increasingly apparent that an energy solution would benefit from the involvement of an established industry partner, such as Mars Chocolate, to take the waste-heat from a cogeneration system, providing reduced energy costs for all parties. It is also apparent that a significant opportunity exists to utilise existing waste feedstock in the Ballarat region to produce parts of the biogas (methane) used in this cogeneration process.

The BWEZ project proposes a natural-gas fired cogeneration system, supplemented by methane gas produced from a reduced amount of waste as feedstock for anaerobic digestion.

Beaufort Hospital Bioenergy Unit Project

This project is a major regional study that involves the showcasing of a commercial bioenergy demonstration plant at the Beaufort Hospital. The project places a focus on regional economic development opportunities with two major outcomes:

- Locally produced bioenergy that stimulates regional economic activity and increases energy security
- Bioenergy is understood and accepted across the region.

This project will undertake a feasibility study for a bioenergy unit as well as developing a model for the necessary biomass supply chain. This information will form the basis of a business case, used to raise awareness of bioenergy economic development opportunities across local government and business sectors. The business case is expected to be finalised by mid 2014.

4. Implications for People Living in the Grampians Region

Rising energy prices are already impacting the living costs of many households in the Grampians.

In the Grampians, average annual expenditure on electricity, natural gas and petrol combined is currently estimated to be approximately $7,227 per household or around 15.1% of total household income.[xx] Individual households may of course be significantly above or below this average percentage[xxi].

This amount can be broken down to approximately:

- 10% on electricity
- 21% on natural gas
- 66% on petrol

For the purposes of understanding the implications of energy for the residential sector of the Grampians, energy needs for housing and transport have been considered separately.

Housing energy costs

Households are considered to be under significant financial stress when they are required to spend more than 10% of their household income on energy to maintain a comfortable housing environment (temperature, light etc). Those experiencing such financial stress are sometimes referred to as being in fuel poverty.

When households are struggling to afford energy bills, they will often opt to manage by not adequately heating or cooling their house. In addition to the ill-health this creates, the experience of fuel poverty can negatively impact quality of life through the experience of financial hardship, disconnection from utilities, reduced food intake and loss of income.

Counsellors with Wimmera Uniting Care estimate 90% of their clients request assistance with energy related hardship and there is an increasing number presenting with energy disconnections.[xxii]

A recently released report by the Essential Services Commission in Victoria revealed a rise in the number of customers disconnected from electricity (rise of 33%) and gas services (rise of 50%) in Financial Year 2011/12. The average debt of new customers on hardship programs increased from $630 to $920.[xxiii]

Fuel poverty can arise from the combination of multiple factors including:

- Inadequate income (including those dependent on government assistance)
- Poor thermal efficiency of homes necessitating higher energy use to heat/cool the home
- Inefficient appliances including inefficient or expensive forms of heating
- Needs driven by life-cycle and personal circumstances (e.g. aging, and/or greater medical-related demand for energy)
- Inefficient and regressive tariff structures
- Rising energy costs

Furthermore, the Brotherhood of St Laurence identifies areas with no access to mains gas as at risk of higher energy costs.

Those in rental accommodation may face additional challenges as incentives to address household energy efficiency is split between landlords and tenants which lead to lower up-front investment in building and equipment and higher operating costs.

Transport energy costs

The average Victorian household spends approximately $138.53 on transport per week. By comparison, in regional Victoria the average weekly expenditure on transport ranges from approximately $122.58 (for urban residents) and $150.46 (for rural residents)[xxiv].

With a composition of major service centres, remote towns and farming communities, transport in the Grampians is vital. A lack of accessible transport, whether private or public, can lead to:

- reduced access to employment and education opportunities
- reduced access to social, cultural and leisure activities
- increased negative health outcomes and rates of morbidity
- greater reliance on council services for social and financial support

Within the Grampians, analysis has clearly shown that liquid fuel (petrol) vulnerability is the most significant of the analysed energy sources for those living in the region.

Low income households often do not have the income to purchase vehicles and the upkeep costs can lead to other household payments being missed or credit being sought from payday lenders and pawn brokers, causing further financial issues. Anecdotal evidence from Wimmera Uniting Care suggests that limited public transport timetables in rural areas often force people to purchase vehicles that are substandard or pay extravagant costs for taxi services or to hire cars to undertake shopping and run errands.

Case Study

Wimmera Uniting Care describes an elderly lady living 55 kms from the regional centre where the bus service is limited. She receives the aged pension and a pension from the United Kingdom. She catches a bus or taxi to the regional centre, hires a car for two days to undertake shopping and errands and then returns home. She has a son with a disability living with her at home.

Socio-economic analysis was conducted for the Grampians region to identify areas with either significant risk of fuel shortages in households or transport limitations. LGAs considered to have high risk include:

- Ararat
- Hepburn
- Hindmarsh
- Northern Grampians
- Pyrenees
- West Wimmera
- Yarriambiack

The risk was considered medium in Ballarat, Golden Plains, Horsham and Moorabool.[xxv]

5. Implications for Council Functions and Budgets

Council services within the Grampians are likely to be impacted by increasing energy prices unless necessary action is taken to build resilience and mitigate the risk.

Local Council operations are currently expending approximately 4.8% on energy related costs. Forecasts for 2020 and 2030 show this increasing to 10% and 12% respectively under high cost scenario.[xxvi] It is important to note that these estimates only include direct energy costs to Councils, however increased costs are also likely to be passed on to Councils from those services they contract or outsource.

Councils are particularly vulnerable in the areas of:

- Current energy expenditure costs for liquid fossil fuels, electricity and natural gas. Councils will be required to find additional funds to support the increased consumption and costs per unit of energy, assuming current consumption rates do not decrease (e.g. from energy efficiency measures).
- Road transport – council fleet of vehicles use petrol, LPG or diesel. Most Councillors and staff travel to work by car. Increasing liquid fuel costs could impact on staff transportation option for work and home travel.
- Contractor operations are significant areas of supply chain energy consumption. Essential council activities such as road construction and maintenance, and waste management collection costs will increase in future. It would be expected that councils will be required to expend more on energy intensive services in future.
- Financial management – councils will need to account for energy vulnerability (price shocks and carbon prices impacts) in their financial management.

It is also anticipated that the impact of energy price rises on households and businesses will lead to a knock on effect where by they seek greater support from council in addressing the vulnerability, be it through demand for welfare support or guidance on building long term resilience.

6. Transitioning Well Under New Energy Constraints

Energy transitions have occurred in the past. The challenge is to manage any such transitions in the least disruptive manner.

Australia has experienced energy transitions in the past, including a transition to coal in the late 1800s and then to oil in the early 1900s. The next energy transition is a shift from high carbon energy sources to low carbon energy sources.

It is the role of Federal and State Governments to set energy efficiency standards and regulate the provision of electricity and fuel.

However, local governments and regional leaders have an important role to contribute to the management of energy vulnerability in the Grampians. Example actions for councils include:

- Land use and transport planning
- Community education and awareness on energy
- Facilitating and assisting energy conservation and clean energy generation providers to operate in the area
- Implementing energy generation
- Conservation and efficiency policies within local government operations
- Providing advocacy, leadership, partnership and facilitation with all levels of government, the private sector and the wider community to address the challenges and opportunities presented by energy transition.

Table 2 presents an overview of activities local government or communities could take to develop a plan for energy resilience.[xxvii]

A list of Australian and Victorian Governments' financial support and related support initiatives to assist with residential or transport energy costs are provided in Background Report Part 3 (pages 18 to 31).

The role of local government in responding to energy vulnerability is both beneficial and necessary.

It is in every council's best economic interest to plan for energy vulnerability, as actions to respond to energy uncertainty are likely to save money in the long term. Local government is also uniquely placed to be effective on issues such as these as more removed levels of government cannot see the details that local governments can, often causing a time lag for responses.

Renewable Energy Opportunities: Wimmera Southern Mallee examples

- Natural gas is available from Horsham and Stawell. Horsham could support a limited gas fired power station and there may be some potential in Stawell as well.
- Adequate biomass resources are available to allow energy generation in the Nhill-Kaniva area, the Charlton – Donald – Wycheproof area, the St Arnaud area; the Horsham area and around Hopetoun.
- For solar power, each town may be able to support a solar energy facility, depending on the available capacity of its HV feeder lines.
- Wind is restricted to sites outside of a township location along HV feeder lines.

See Background Report Part 1 for further detail on these network opportunities and detailed maps of the Grampians region with regards to town-level energy infrastructure.

Table 2: Activities to Develop Energy Resilience

TIMEFRAME & ESTIMATE COSTS LEGEND	
Time	
Immediate	= Actions to be undertaken within the first year
Medium term	= Actions to be undertaken within the first three years
Long term	= Actions to be undertaken within 10 years
Ongoing	= Continued action

Estimate cost	
Low	= Less than $100,000
Medium	= $100,000 to $900,000
High	= Greater than $900,000

ACTIONS	TIMEFRAME	ESTIMATE COST
Manage the Energy Demands of an Expanding Population		
Baseline Assessment: Collect baseline data on energy consumption at the household, council and industrial scale. Review energy flows, and forecast energy costs and demand in future scenarios. Identify data gaps and conduct research to fill data gaps.	Ongoing	Low
Review current main energy infrastructure against current and forecast energy demand. Highlight potential weaknesses.	Immediate	Low
Maintain detailed knowledge regarding national and international energy supply and cost risks. For example, maintain watching brief on natural gas reserve development and potential impacts of export liquid natural gas markets on domestic cost.	Immediate	Low
Conduct research to identify initial opportunities for changes in energy infrastructure, renewable energy generation or reduced consumption (including energy efficiency).	Immediate	Medium
Assess opportunities in region for embedded generation, located close to existing infrastructure. Also assess embedded generation opportunities with large energy users (e.g. hospitals, industrial sites, dairies, food manufacturers).	Ongoing	Low
Build strategic, multi-disciplinary partnerships to develop promote and fund energy reduction, energy efficiency, demand management and clean energy generation with: • Other levels of Government (including the Federal Government through Regional Development Australia and the Victorian Government Programs) • Research, education and community programs (such as through the University of Ballarat's National Centre for Sustainability or Ballarat Renewable Energy and Zero Emissions Group) • Private sector (for example, Solar Cities in Ballarat)	Ongoing	Low
Identify spearhead projects, for example the Hepburn Bathhouse TriGenBioMass Plant (see Holgrems & Lillington 2011).	Ongoing	

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment		
Green Procurement Undertake feasibility assessment of a mandated sustainable procurement approach across all local councils in the Grampians region.	Immediate	Low
Capacity Building Support and build 'energy management capacity' within local councils to facilitate future energy efficiency and clean energy investment in the Grampians region.	Ongoing	Medium
Identify spearhead projects, for example, the establishment of wind/bioenergy implementation programs across local government areas.	Ongoing	
Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels		
Advocate to State and Federal Government for co-location of infrastructure corridors for road, rail and utilities.	Immediate	Low
Advocate to Federal Government to examine the fringe benefit tax incentives that encourage company or council cars to travel more kilometres than may be necessary to achieve the benefit.	Immediate	Low
Investigate targeted support to local councils and large organisations in the implementation of sustainable transport plans for staff: • carpooling • Building end of cycle trip facilities at key buildings • Telecommuting and teleconferencing • Flexible work arrangements, i.e. working from home opportunities	Medium	Low
Support local councils to investigate options to reduce waste contractor fuel consumption, i.e. requiring: • More fuel efficient waste collection trucks • Maximised efficient collection of household green waste and recycling	Medium	Low to High
Identify spearhead projects within the transport sector.	Medium	High
Maximise Regional 'Low-Oil' Food Production		
Work with local councils to assess and where appropriate, incentivise community-supported agricultural schemes in the region and facilitate staff 'food box' purchases.		Low
Work with local councils to assess and expand community gardening schemes, integrating establishment with green waste management and collection services (for example, City to Soil Programs).	Immediate	Medium
Work with local councils to identify and protect 'strategic cropping land' and quality agricultural land in any proposed amendments to planning scheme.	Ongoing	
Investigate options to reduce waste contractor fuel consumption.	Medium	
Identify spearhead projects.		High

Energy Vulnerability: Ararat

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 15.8% of the total employment in the Ararat LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 14.2 % of the workforce in the Ararat LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 10 government schools operating across the Ararat LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Ararat LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Average household energy costs across the Ararat LGA are equal to the average for the Grampians region.
- Energy costs are forecast to rise in the future.
- Average income in the Ararat LGA is less than the regional average.
- A greater proportion of the population in Ararat LGA is considered to be disadvantaged than for the Grampians region as a whole, as defined by the SEIFA Index.
- Most disadvantaged localities, as defined by the SEIFA Index, are considered to be Willaura and parts of Ararat.

There is a high risk of households in the Ararat LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- Ararat residents are generally considered to have good access to recreation and leisure, community and support groups and facilities and services.
- Average transport costs reported in the Ararat LGA are less than those for the broader Grampians region.
- Transport fuel costs are forecast to rise.
- The average income in Ararat LGA is less than the average for the Grampians region.

There is a medium risk of households across the Ararat LGA experiencing transport poverty.

Worksheet

Building a Resilient Ararat: Planning for Changes in Energy

Following further analysis specifically for the Ararat LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Ballarat

Economy

What the analysis tells us:

- Agriculture, forestry and fishing only represents 386 jobs within the Ballarat LGA economy. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 17.7 % of the workforce in the Ballarat LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 40 government schools operating across the Ballarat LGA. Assuming a future of high energy costs and a medium increase in demand for energy, energy costs for schools are forecast to double by 2030.
- Industry across the Ballarat LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Energy costs are forecast to rise in future.
- Households in Ballarat Central, Ballarat Inner North and Ballarat South spend on average the same as for the Grampians region on energy.
- Households in Ballarat North are spending more than the Grampians average energy expenditure.
- Households in Ballarat Central are considered most at risk (within the Ballarat LGA) of having difficulty paying their energy bills, given the rate of energy use and their lower than average income (compared to the Grampians region).

There is a medium (to high) risk of households in the Ballarat LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- Transport fuel costs are forecast to rise.
- Ballarat residents are generally considered to have good access to recreation and leisure, community and support groups and facilities and services.
- Car dependence to access employment in Ballarat LGA is greater than the average for the Grampians region.
- Households in Ballarat North and Ballarat South spend on average the same amount on transport fuel as the Grampians average.
- On average, households in Ballarat Inner North spend less than the regional average on transport fuel and those in Ballarat Central spend less again.

There is a medium risk of households across the Ballarat LGA experiencing transport poverty.

Worksheet

Building a Resilient Ballarat: Planning for Changes in Energy

Following further analysis specifically for the Ballarat LGA, strategies to manage future changes in energy may include the following.
[See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Golden Plains

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 25.6% of employment within the Golden Plains LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs less than 5 % of the workforce in the Golden Plains LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 15 government schools operating across the Golden Plains LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Golden Plains LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast.

Residential

What the analysis tells us:

- Energy costs are forecast to rise in the future.
- Average household energy costs in the Golden Plains LGA are equal to or marginally higher than average across the Grampians region.
- However, the average income in the Golden Plains LGA is also higher than the Grampians average.
- Levels of disadvantage (as measured by the SEIFA Index) are low on the whole in the Golden Plains LGA, though there are a few small towns considered disadvantaged where the risk of experiencing residential energy poverty is higher: Smythesdale, Linton, Meredith, Letherbridge and Enfield.

There is a low risk of households in the Golden Plains LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- Transport fuel costs are forecast to rise.
- Golden Plains LGA residents are reported to have less access to services, recreation facilities etc as a whole than the Grampians average.
- A greater proportion of the population in the Golden Plains LGA report experiencing transport limitations than is average for the Grampians.
- Car dependence is greater for the Golden Plains LGA than the Grampians average, making its residents more vulnerable to fuel price increases.
- Golden Plains' households report spending less than the Grampians average on transport fuel.

There is a medium risk of households across the Golden Plains LGA experiencing transport poverty.

Worksheet

Building a Resilient Golden Plains: Planning for Changes in Energy

Following further analysis specifically for the Golden Plains LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Hepburn

Economy

What the analysis tells us:

- Agriculture represents 10.5% of the Hepburn LGA economy. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 14 % of the workforce in the Hepburn LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 12 government schools operating across the Hepburn LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Hepburn LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Energy costs are forecast to rise in the future.
- Average household energy costs are higher in the Hepburn LGA than the Grampians average.
- Average income in the Hepburn LGA is lower than the Grampians average.
- The level of disadvantage across the Hepburn LGA is equal to the Grampians average. However, some small towns are considered to have higher disadvantage than the average for the LGA, indicating a higher risk of residents experiencing residential energy poverty: Clunes and its rural catchment, parts of Daylesford, parts of Creswick and Trentham.

There is a high risk of households in the Hepburn LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- Transport fuel costs are forecast to rise.
- Household spending on fuel for transport is significantly higher in the Hepburn LGA than the Grampians average.
- A greater proportion of the population in Hepburn LGA report experiencing transport limitation.
- The average income in Hepburn LGA is less than the average for the Grampians region.

There is a high risk of households across the Hepburn LGA experiencing transport poverty.

Worksheet

Building a Resilient Hepburn: Planning for Changes in Energy

Following further analysis specifically for the Hepburn LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Hindmarsh

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represents 28% of employment in the Hindmarsh LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 19.6 % of the workforce in the Hindmarsh LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 6 government schools operating across the Hindmarsh LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Hindmarsh LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Average household energy costs across the Hindmarsh LGA are greater than the average for the Grampians region.
- Energy costs are forecast to rise in the future.
- Average income in the Hindmarsh LGA is less than the regional average.
- A significantly greater proportion of the population in Horsham LGA is considered to be disadvantaged than the rate for the Grampians region as a whole, as defined by the SEIFA Index.
- Households in Dimboola (including its regional catchment area), Nhill, Jeparit, Rainbow are the most at risk of residential fuel poverty as these areas were identified as most disadvantaged by the SEIFA Index.

There is a high risk of households in the Hindmarsh LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- A greater proportion of the population in Hindmarsh LGA experience transport limitations than the average for the Grampians region.
- Household petrol costs for Hindmarsh LGA are significantly greater than the average for the Grampians.
- Transport fuel costs are forecast to rise.
- The average income in Hindmarsh LGA is less than the regional average.
- Dependence on cars to travel to work in Hindmarsh SLA is less than the Grampians average.

There is a high risk of households across the Hindmarsh LGA experiencing transport poverty.

Worksheet

Building a Resilient Hindmarsh: Planning for Changes in Energy

Following further analysis specifically for the Hindmarsh LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Horsham

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 8.8% of total employment in the Horsham LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 17 % of the workforce in the Horsham LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 7 government schools operating across the Horsham LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Horsham LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Average household energy costs (as a proportion of income) across the Horsham LGA are significantly less than the Grampians regional average.
- Energy costs are forecast to rise in the future.
- A significantly smaller proportion of the population in Horsham LGA is considered to be disadvantaged than for the Grampians regional average, as defined by the SEIFA Index.
- There are groupings in Horsham and Natimuk considered more vulnerable than average for the Grampians.

There is a medium risk of households in the Horsham LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- A smaller proportion of the population in Horsham LGA experience transport limitations than the regional average.
- A greater proportion of the Horsham LGA population report good access to recreation and leisure, community/ support groups and facilities and services than the regional average.
- Petrol costs as a percentage of household income is significantly less in the Horsham Central SLA than the regional average.
- Transport fuel costs are forecast to rise.

There is a medium risk of households across the Horsham LGA experiencing transport poverty.

Worksheet

Building a Resilient Horsham: Planning for Changes in Energy

Following further analysis specifically for the Horsham LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Moorabool

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent just over 10% of total employment in Moorabool LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 12.1 % of the workforce in the Moorabool LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 12 government schools operating across the Moorabool LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Moorabool LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- The average income in Moorabool LGA is greater than the regional average.
- Energy costs as a percentage of income vary across Moorabool LGA, with slightly less to slightly more than the Grampians average.
- Energy costs are forecast to rise.
- A significantly smaller proportion of the population in Moorabool LGA is considered to be disadvantaged than for the Grampians average, as defined by the SEIFA Index. However, households in Ballan, Gordon and Blackwood are identified as disadvantaged on this index.

There is a low risk of households in the Moorabool LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- A greater proportion of the population of Moorabool LGA experience transport limitations and a smaller proportion of the population report good access to recreation, services etc than the Grampians regional average.
- Dependence on cars to travel to work in Moorabool LGA is greater than the average for the region. Fortunately however, petrol costs as a percentage of household income is less than the average for the region.
- Transport fuel costs are forecast to rise.

There is a medium risk of households across the Moorabool LGA experiencing transport poverty.

Worksheet

Building a Resilient Moorabool: Planning for Changes in Energy

Following further analysis specifically for the Moorabool LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Northern Grampians

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 13.6% of total employment in the Northern Grampians LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 15.2 % of the workforce in the Northern Grampians LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 14 government schools operating across the Northern Grampians LGA. Assuming a future of high energy costs and a medium increase in demand for energy, energy costs for schools are forecast to double by 2030.
- Industry across the Northern Grampians LGA that either relies on road transport (liquid fuels), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Household energy costs across the Northern Grampians LGA are close to average for the Grampians region.
- Energy costs are forecast to rise in the future.
- Average income in the Northern Grampians LGA is less than the average for the Grampians region.
- A significantly greater proportion of the population of Northern Grampians LGA are living in districts considered disadvantaged under the SEIFA Index than is average for the Grampians. Stawell, St Arnaud and Greater Western were identified as areas of concern.

There is a high risk of households in the Northern Grampians LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- A smaller proportion of the population in Northern Grampian LGA experience transport limitations than the regional average.
- In the Northern Grampians – St Arnaud SLA, dependence on cars to get to work and household petrol costs as a percentage of household income is greater than the regional average.
- In the Northern Grampians – Stawell SLA, dependence on cars to get to work and household petrol costs as a percentage of income is less than the regional average.
- Transport fuel costs are forecast to rise.

There is a medium risk of households across the Northern Grampians LGA experiencing transport poverty.

Worksheet

Building a Resilient Northern Grampians: Planning for Changes in Energy

Following further analysis specifically for the Northern Grampians LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Pyrenees

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 32.5% of total employment in the Pyrenees LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 7.6 % of the workforce in the Pyrenees LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 12 government schools operating across the Pyrenees LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the Pyrenees LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Energy costs as a percentage of household income are very high in the Pyrenees North SLA and significantly greater than the regional average.
- There is no data on Pyrenees South SLA energy use beyond electricity (including bottled gas or renewable sources).
- Energy costs are forecast to rise in the future.
- A significantly greater proportion of the population in the Pyrenees LGA is living in a district considered to be disadvantaged under the SEIFA Index than the regional average.
- Beaufort and its rural catchment, Avoca and its rural catchment and Snake Valley were identified as most disadvantaged, and therefore are most at risk of residential energy poverty.

There is a high risk of households in the Pyrenees LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- A smaller proportion of the population in the Pyrenees LGA experience transport limitations than the regional average, however a smaller proportion also report good access to services, recreation facilities etc.
- Petrol costs as a percentage of household income are very high in the Pyrenees North and South SLAs and significantly higher than the regional average.
- Transport fuel costs are forecast to rise.

There is a high risk of households across the Pyrenees LGA experiencing transport poverty.

Worksheet

Building a Resilient Pyrenees: Planning for Changes in Energy

Following further analysis specifically for the Pyrenees LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: West Wimmera

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 50.8% of employment in the West Wimmera LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 10.9 % of the workforce in the West Wimmera LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 4 government schools operating across the West Wimmera LGA. Assuming a future of high energy costs and a medium increase in demand for energy, costs for schools are forecast to double by 2030.
- Industry across the West Wimmera LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Total energy cost for West Wimmera LGA is unknown as costs associated with energy other than electricity is not available. Electricity costs as a percentage of household income in the West Wimmera LGA is about average with the Grampians region.
- Energy costs are forecast to rise in the future.
- The proportion of West Wimmera LGA living in districts considered disadvantaged by the SEIFA Index is equal to the regional average.
- Apsley, Goroke, Edenhope, Harrow and Kaniva were identified as the most disadvantaged locations.
- The average income in West Wimmera LGA is less than the average for the Grampians region.

There is a high risk of households in the West Wimmera LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- The proportion of the population in West Wimmera LGA who experienced transport limitations is approximately equal to the Grampians regional average. A smaller proportion report good access to services, recreation facilities etc. than the regional average.
- Petrol costs as a percentage of household income in West Wimmera LGA is approximately average for the Grampians.
- Transport fuel costs are forecast to rise.

There is a high risk of households across the West Wimmera LGA experiencing transport poverty.

Worksheet

Building a Resilient West Wimmera: Planning for Changes in Energy

Following further analysis specifically for the West Wimmera LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

Energy Vulnerability: Yarriambiack

Economy

What the analysis tells us:

- Agriculture, forestry and fishing represent 30.1% of employment in the Yarriambiack LGA. Under the CSIRO's peak oil scenario, total energy costs could increase to 39% of total farm cash receipts, presenting a steep increase in costs.
- The healthcare sector employs 18.3% of the workforce in the Yarriambiack LGA. This sector is extremely reliant on primarily electricity and gas for operations, but also on petroleum-based products and supply of goods. Future energy price rises are likely to affect this sector.
- There are 11 government schools operating across the Yarriambiack LGA. Assuming a future of high energy costs and a medium increase in demand for energy, energy costs for schools are forecast to double by 2030.
- Industry across the Yarriambiack LGA that either relies on road transport (requiring liquid fuel), natural gas or electricity for production is likely to be vulnerable to the price increases forecast for these energy sources.

Residential

What the analysis tells us:

- Total energy cost for Yarriambiack LGA is unknown as costs associated with energy other than electricity (ie. bottled gas or renewable sources) is not available.
- Electricity costs as a percentage of household income in Yarriambiack South SLA are higher than the regional average and lower than average for Yarriambiack North SLA.
- Energy costs are forecast to rise in the future.
- A significantly greater proportion of the population in Yarriambiack LGA is living in districts considered disadvantaged under the SEIFA Index. The most disadvantaged locations were identified to be Warracknabeal, Beulah, Woomelang, Minyip, Murtoa, Rapanyup and Hopetoun.

There is a high risk of households in the Yarriambiack LGA experiencing residential energy poverty.

Transport

What the analysis tells us:

- The proportion of the population in Yarriambiack LGA who experience transport limitations is greater than the average for the Grampians and a smaller proportion report good access to services, recreational facilities etc.
- Petrol costs as a percentage of household income in Yarriambiack LGA are significantly greater than the regional average.
- Transport fuel costs are forecast to rise.
- Dependence on cars to get to work in Yarriambiack LGA is less than the average for the Grampians.

There is a high risk of households across the Yarriambiack LGA experiencing transport poverty.

Worksheet

Building a Resilient Yarriambiack: Planning for Changes in Energy

Following further analysis specifically for the Yarriambiack LGA, strategies to manage future changes in energy may include the following. [See page 17 of this Summary Report for guidance.]

Manage the Energy Demands of an Expanding Population

Chosen strategies to be determined.

Encourage Economic Diversity in the Region and Maximise Energy Efficiency Investment

Chosen strategies to be determined.

Encourage Sustainable Transport Systems to Reduce Consumption of Liquid Fuels

Chosen strategies to be determined.

Maximise Regional 'Low-Oil' Food Production

Chosen strategies to be determined.

End notes

[i] Paroissien Grant & Associates Pty Ltd (2012). *Energy Futures & Vulnerability in the Grampians Sub Project 1 – Map Energy Infrastructure.* Melbourne

[ii] Earth Systems (2013) *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne

[iii] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne

[iv] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne

[v] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 3

[vi] BREE (2011) in Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne

[vii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 54

[viii] Oxford Dictionary (2013). Retrieved from http://oxforddictionaries.com/

[ix] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne. Page 6

[x] Paroissien Grant & Associates Pty Ltd (2012). *Energy Futures & Vulnerability in the Grampians Sub Project 1 – Map Energy Infrastructure.* Melbourne. Page 15

[xi] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 69

[xii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 5

[xiii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 27

[xiv] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 26

[xv] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 171

[xvi] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 169

[xvii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 28

[xviii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 28

[xix] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 179

[xx] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne. Page 34

[xxi] Note: There is no data available to illustrate the cost of alternative fuels used in towns not connected to the mains gas supply (including bottled gas, wood pellets and diesel). Therefore, total energy costs may differ in the households of these towns.

[xxii] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne. Page 11

[xxiii] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne. Page 11

[xxiv] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 24

[xxv] The Shaper Group & Dr Gill Owen (2013). *Exploring Fuel & Transport Poverty in the Grampians: Energy Futures & Vulnerability in the Grampians (Sub-Project 3).* Melbourne. Page 37

[xxvi] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 5

[xxvii] Earth Systems (2013). *Energy Futures & Vulnerability in the Grampians Sub-Project 2.* Melbourne. Page 33

Want to know more?

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