



171 Piccadilly Street
PO Box 10331
KALGOORLIE, WA, 6433
Phone: 08 9091 6051
E-Mail: eo@rdage.com.au

April 2012

Submission

Draft Energy White Paper

Executive Summary

The Goldfields Esperance Region, comprising nine local government areas, has a landmass of 771,276 square kilometres making it over three times that of the State of Victoria. It has a population of 59,000 residents. Over half of the population resides in the City of Kalgoorlie Boulder and a further quarter is located in the Shire of Esperance.

The Region's low population density, coupled with its large landmass, represents a significant challenge to delivering any network infrastructure and associated services.

One of the issues facing the Region is the impact of the FIFO workforce. Whilst there is no comprehensive data collected on the numbers associated with FIFO, it is estimated that in the Shire of Leonora this may equate to an additional 6,000 residents at any one time and in the Shire of Laverton there may be up to 4,000 additional residents. These additional workers are located in stand-alone accommodation close to mine sites. Not all FIFO workers are housed in stand-alone accommodation. The demand for services can be cyclical and unpredictable making planning for infrastructure more complicated.

There is a significant variation in the demographic and family structure of households in the Region. This leads to different demands for, and capacity to pay for, energy at a domestic level.

The industry composition of the Region makes it heavily reliant on energy to maintain productivity. Industries such as mining, agriculture/forestry/fishing and transport are heavily reliant on diesel for transport and energy generation.

The need to transport goods to the Region, as well as the distances within

the Region, exacerbates the transport effort.

Continued growth in the region, particularly growth associated with mining activity will place further pressure on the demand for energy. The need for a coordinated approach to the provision of new sources of energy and the maintenance and upgrading of existing infrastructure cannot be over estimated.

The delivery of energy to the Region relies on a complex system of network grids, island grids and stand-alone systems. Energy is delivered to customers through the SWIS network, Horizon Energy and private sector providers. Diesel, wind and gas power these systems.

There is significant potential for the use of renewables (solar, biomass, wind etc) in the Region, particularly in relation to stand-alone and island networks.

A number of energy related challenges face the Region. These include:

- Delivering to a disperse population;
- Making sense of complex networks;
- Establishing renewable energy models; and
- Regional development vs energy policy.

There is an appetite for alternative energy sources in the Region as demonstrated by the early adoption of wind-powered energy in the region. In more recent times, consideration has been given to solar, biomass and geothermal energy sources, along with the expansion of wind generation. However, there are a number of barriers to the uptake of clean energy technology. These include:

- High capital costs. The savings associated with renewable energy are associated with longer-term running costs. This makes the

technology difficult to justify for some mining projects that have short life spans;

- The technology is perceived to be more complex to operate and maintain than traditional diesel technology that tends to be robust and easier to fix;
- There is a lack of expertise to support renewable technologies;
- Renewable technologies lack storage capacity (or require expensive batteries to store energy as it is generated). This is a problem with solar and wind driven systems.

The Government needs to look at ways of addressing these concerns, whether through direct subsidies, loan guarantees, accelerated depreciation, and/or investment tax credits for companies willing to utilise clean energy technology.

Table of Contents

| | |
|-------------------------------------|-----|
| Executive Summary | i |
| Table of Contents | iii |
| Purpose | 1 |
| Background | 2 |
| Role | 2 |
| Committee Membership..... | 2 |
| Vision | 2 |
| About the Region..... | 3 |
| Characteristics..... | 3 |
| Statistics..... | 4 |
| Population..... | 4 |
| Economy | 6 |
| Future Development..... | 8 |
| Projected Growth..... | 8 |
| Planning Framework..... | 8 |
| Regional Energy | 10 |
| Opportunities..... | 12 |
| Wind | 12 |
| Biomass | 12 |
| Geothermal | 12 |
| Solar..... | 12 |
| Off the Grid Mining Operations ... | 13 |
| Challenges..... | 14 |
| Delivering to a disperse population | 14 |
| Establishing renewable energy | |
| models | 14 |
| Making sense of complex networks | 15 |
| Regional development vs energy | |
| policy..... | 15 |
| Comments on the Draft Energy White | |
| Paper | 16 |
| General Comments | 16 |
| Priority Action Areas..... | 16 |
| Strengthening the resilience of | |
| Australia’s energy policy | |
| framework..... | 16 |
| Reinvigorating the energy market | |
| reform agenda | 16 |
| Developing Australia’s critical | |
| resources | 16 |
| Accelerating clean energy | |
| outcomes..... | 17 |
| Conclusion | 18 |

Purpose

Regional Development Australia Goldfields Esperance (RDAGE) has developed this submission to the Draft Energy White Paper. The submission is aimed at providing the Commonwealth with an understanding of the complexity of energy production and distribution in regional and remote areas.

The Goldfields Esperance Region is an extensive area with a mix of urban, rural and remote communities. Delivering reliable and secure energy to the Region is challenging. It is recognised that many of these challenges are the responsibility of the State Government. However RDAGE believes that if the Commonwealth Government is to develop an Energy Policy for the Nation as a whole, it is important to understand the regional variations that exist throughout Australia.



Background

Regional Development Australia (RDA) is an initiative of the Australian Government that aims to enhance the growth and development of regional areas by bringing together the three levels of government (Federal, State and Local) to provide a strategic and targeted response to issues in regional areas.

RDA Goldfields Esperance is one of 55 committees representing regional areas across Australia.

Role

The core role of RDA Goldfields Esperance is to build strong and effective partnerships with key stakeholders and work with them to provide a coordinated approach to address economic, environmental and social issues impacting on the region. To achieve this RDA Goldfields Esperance:

- Consults and engages with local communities and other stakeholders to identify, prioritise and find solutions to issues impacting on the region.
- Contributes to informed regional planning.
- Contributes to Government activities by providing information on regional issues and supporting the implementation of regional programs and initiatives.
- Promotes Government programs by creating awareness of services, grants and initiatives for regional development, and supporting stakeholders to gain access to these.
- Supports community and economic development through the identification of opportunities to diversify and expand industry and employment opportunities in the region.

Committee Membership

Chairperson: Mr Malcolm Osborne
CEO, Shire of Esperance

Deputy Chairperson: Mr Robert Hicks
CEO, Goldfields-Esperance Development Commission

Treasurer: Mr Keith Adams
Operations Manager, TransAlta Energy Australia

Cr Ian Goldfinch
President, Shire of Ravensthorpe

Mr Scott Manners
Director, WG Manners & Co. Pty Ltd

Mr Edward (Ted) English
Quality Systems Coordinator, Co-Operative Bulk Handling Group

Ms Dale Piercey
Trainer, Smyl Community Services

Julia Shadlow-Bath
CEO, Goldfields Indigenous Housing Organisation (GIHO)

Patrick Hill
Chairman, Outback Highway Development Council

Jeff Carter
President, Shire of Leonora

Vision

RDA Goldfields Esperance has the following Vision for the Region:

A sustainable region of flourishing and resilient communities enjoying an improving quality of life founded on:

- *A diverse and robust economy that fosters enduring business development and personal prosperity (economic);*
- *Equitable, regionally focused social conditions, services and amenities (social);*
- *A natural environment protected and preserved for its intrinsic value and for its foundation role in economic*

- and social advancement (environment); and
- Contemporary governance conditions that promote regional

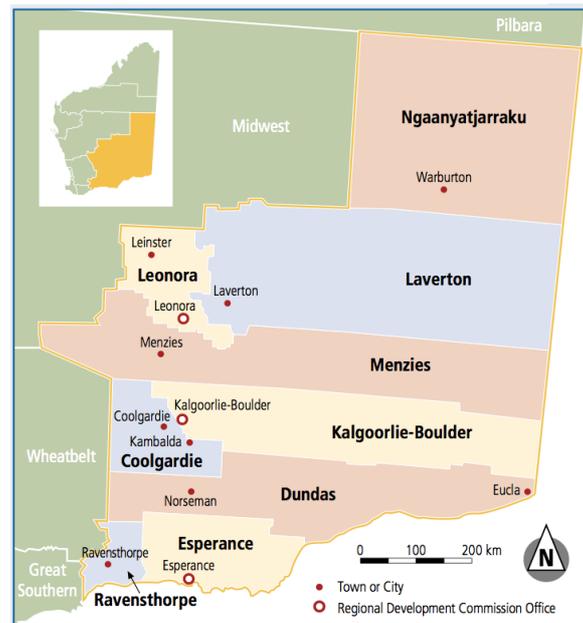
development opportunities and accommodate regional circumstances (governance).

About the Region

Characteristics

The Goldfields Esperance region is situated in the south-eastern corner of Western Australia and incorporates nine local government areas - the City of Kalgoorlie-Boulder and the shires of Coolgardie, Dundas, Esperance, Laverton, Leonora, Menzies, Ngaanyatjarraku and Ravensthorpe. The region has a landmass of 771,276 square kilometres making it just under a third of the total landmass of Western Australia and over three times that of the State of Victoria.

Figure 1 RDA Goldfields Esperance Region



The Region’s low population density, coupled with its large landmass, represents a significant challenge to delivering any network infrastructure and associated services.

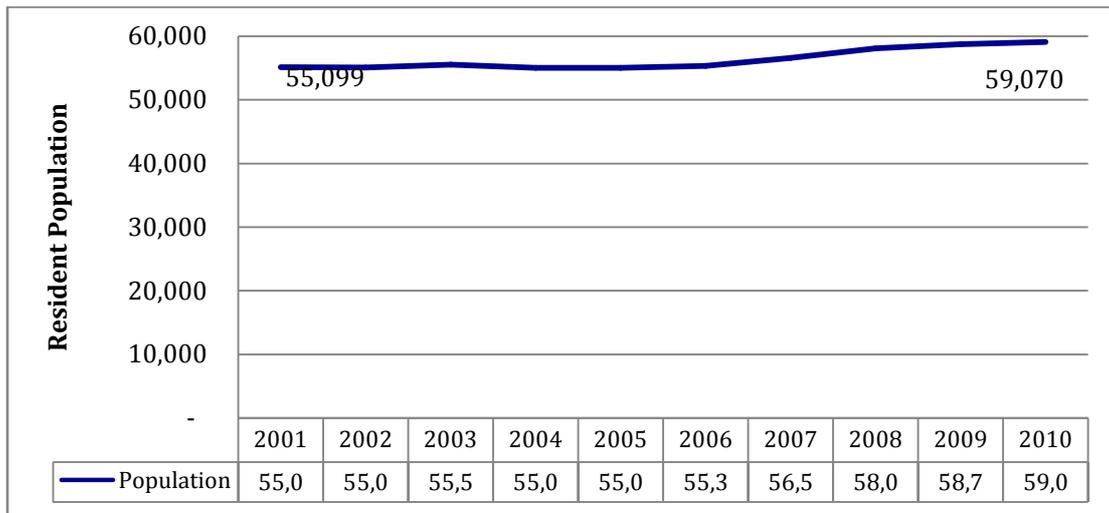


Statistics

Population

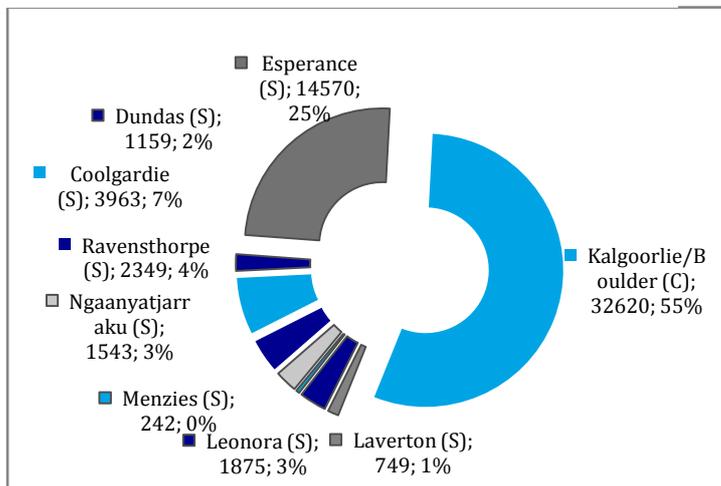
Based on the latest ABS Estimated Residential Population, the Region has a population of around 59,000 people. The population has grown by some 4,000 residents since 2001. This represents an average annual growth rate of 5.1% per annum. This growth is not evenly spread throughout the Region with the greatest growth being concentrated in the Kalgoorlie Boulder area.

Figure 2 Population Growth for the Region 2001 - 2010



Source: ABS Catalogue 3218.0

Figure 3 Distribution of population in the Region



Over half of the Region's population resides in the City of Kalgoorlie Boulder and a further quarter is located in the Esperance Shire. The Shire of Menzies has the smallest population with only 242 residents.

Source ABS Estimated Residential Population

One of the issues facing the Region is the impact of the fly in fly out (FIFO) workforce. Whilst there is no comprehensive data collected on the numbers associated with FIFO, it is estimated that in the Shire of Leonora this may equate to an additional 6,000 residents at any one time and in the Shire of Laverton there may be up to 4,000 additional residents. These additional workers are located in stand-alone accommodation close to mine sites. However, not all FIFO workers are housed in stand-

alone accommodation. The demand for services to support FIFO can be cyclical and unpredictable making planning for infrastructure more complicated.

The characteristics of the population in each of the local government areas differ considerably (Table 1). The median age of four of the local government areas is significantly below that of the State as a whole. In the case of Ngaanyatjarraku, this is associated with a high indigenous population (87% of the population is indigenous). The Shires of Coolgardie and Leonora and the City of Kalgoorlie –Boulder have a younger population based in part on the dominance of mining and associated industries.

The dominance of the mining industry is also reflected in median individual and household incomes that are significantly above that of the State.

All local government areas in the Region have median home loan and rental costs that are lower than the State as a whole. However there are some significant differences between local government areas within the Region. The Shires of Esperance and Ravensthorpe and the City of Kalgoorlie Boulder have higher median housing loan repayments than those in the Shires of Dundas, Laverton and Leonora. A similar pattern can be observed when considering median rental payments.

Whilst average household size is close to the overall State average, household size in the Shire of Ngaanyatjarraku is significantly higher than any other local government areas in the Region and the State as a whole.

Table 1 Characteristics of Local Government Areas in the Region

| | Coolgardie | Dundas | Esperance | Kalgoorlie-Boulder | Laverton | Leonora | Menzies | Ngaanyatjarraku | Ravensthorpe | Western Australia |
|---|------------|--------|-----------|--------------------|----------|---------|---------|-----------------|--------------|-------------------|
| Median age of persons | 30 | 36 | 36 | 30 | 36 | 31 | 40 | 27 | 38 | 36 |
| Median individual income (\$ per week) | 669 | 530 | 458 | 680 | 810 | 992 | 245 | 196 | 695 | 500 |
| Median household income (\$/weekly) | 1535 | 844 | 918 | 1513 | 846 | 1470 | 580 | 844 | 1068 | 1066 |
| Median housing loan repayment (\$/monthly) | 700 | 438 | 1018 | 1200 | 650 | 695 | 800 | 0 | 977 | 1213 |
| Median rent (\$/weekly) | 130 | 60 | 128 | 165 | 59 | 0 | 25 | 10 | 100 | 170 |
| Average number of persons per bedroom | 1.1 | 1.1 | 1.1 | 1.1 | 1.2 | 1.1 | 1.4 | 1.6 | 1.1 | 1.1 |
| Average household size | 2.7 | 2.2 | 2.6 | 2.7 | 2.5 | 2.7 | 2.6 | 4.1 | 2.5 | 2.5 |

Source ABS 2006 Quick Stats

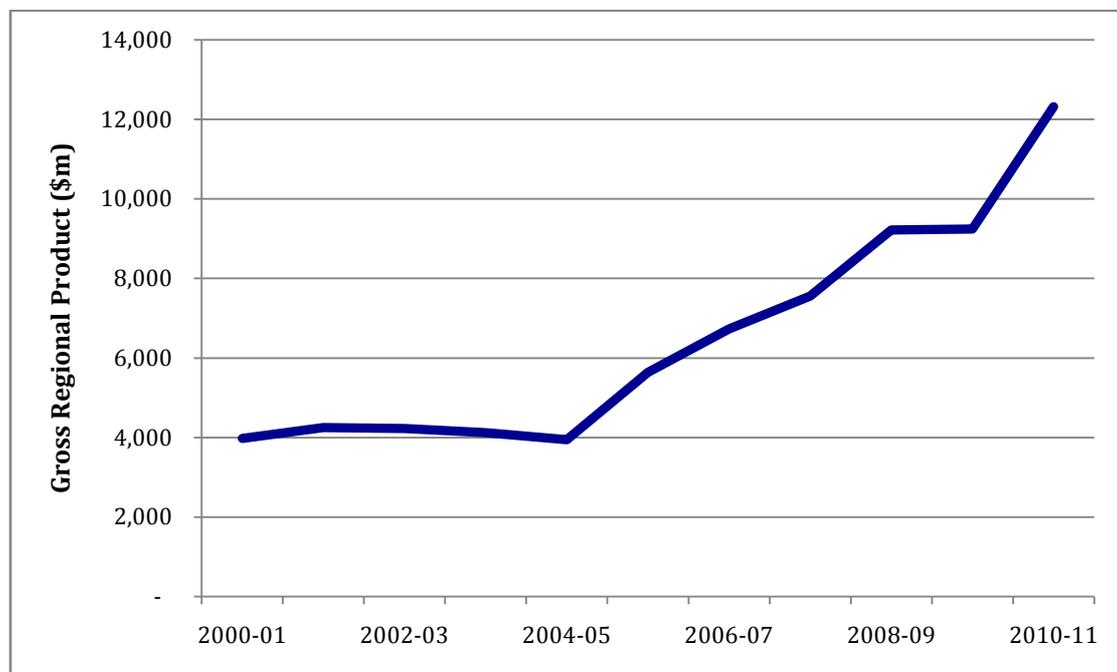
There is a significant variation in the demographic and family structure of households in the Region. This leads to different demands for, and capacity to pay for, energy at a domestic level.

Economy

The Goldfields Esperance Region had a gross regional product (GRP) of \$12.3 billion in 2010-2011 and is one of the strongest regional economies in Western Australia contributing 5.7% of the Gross State Product for 2010-11. Over the past ten years GRP has grown at an average annual rate of 12% per annum (Figure 4). Mining accounts for some 72% of the GRP, followed by construction (5%) and transport and storage (3.7%).¹



Figure 4 Gross Regional Product 2000-01 to 2010-11



Source: Department of Regional Development and Lands (estimated from ABS catalogue 5220.0)

¹ Department of Regional Development and Lands (estimated from ABS catalogue 5220.0)

The region's industrial concentration is more apparent using location quotient analysis. This indicates which sectors contribute the most to the economic base across the Goldfields-Esperance region.²

As shown in Table 2, mining was an economically important sector in all areas of the region in 2006, with location quotients ranging from 1.1 in Ngaanyatjarraku to 56.5 in Laverton. The agriculture, forestry and fishing sector is important to the local economies of Esperance and Ravensthorpe, while public administration and safety contributes significantly to the local economies of Ngaanyatjarraku and Menzies.

Table 2 Industry Quotients

| | Kalgoorlie- Boulder Coolgardie | Dundas | Esperance | Ravensthorpe | Leonora | Laverton | Menzies | Ngaanyatjarraku | |
|---|--------------------------------------|--------|-----------|--------------|---------|----------|---------|-----------------|-----|
| Agriculture, forestry & fishing | 0.1 | 0.2 | 1.2 | 6.1 | 3.8 | 0.4 | 0.2 | 2.1 | 0.0 |
| Mining | 18.5 | 36.2 | 32.2 | 1.3 | 8.4 | 43.5 | 56.5 | 17.6 | 1.1 |
| Electricity, gas, water & waste services | 1.0 | 0.8 | 0.0 | 0.8 | 0.7 | 1.0 | 0.2 | 2.5 | 0.7 |
| Construction | 0.9 | 0.7 | 1.2 | 0.9 | 5.2 | 1.2 | 0.4 | 0.3 | 0.2 |
| Accommodation & food services | 0.9 | 0.6 | 1.3 | 1.0 | 0.5 | 0.6 | 0.5 | 0.8 | 0.2 |
| Transport, postal & warehousing | 1.1 | 0.6 | 0.6 | 1.6 | 0.4 | 0.6 | 0.3 | 0.0 | 0.1 |
| Rental, hiring & real estate services | 1.3 | 0.7 | 0.2 | 1.0 | 0.6 | 0.3 | 0.2 | 0.0 | 0.0 |
| Public administration & safety | 0.7 | 0.6 | 1.1 | 0.7 | 0.4 | 0.3 | 0.7 | 3.2 | 6.6 |
| Education & training | 0.8 | 0.8 | 0.6 | 1.1 | 0.3 | 0.3 | 0.3 | 1.5 | 1.1 |
| Health care & social assistance | 0.7 | 0.7 | 0.6 | 0.8 | 0.2 | 0.2 | 0.4 | 1.0 | 2.0 |
| Arts & recreation services | 0.7 | 0.2 | 0.0 | 0.4 | 0.1 | 0.2 | 0.0 | 1.8 | 0.4 |

Source: 2011-2021 Strategic Development Plan

The industry composition of the Region makes it heavily reliant on energy to maintain productivity. Industries such as mining, agriculture/forestry/fishing and transport are heavily reliant on diesel for transport and energy generation.

The need to transport goods to and from the Region, as well as the distances within the Region, exacerbates the transport effort.

² Location quotients (LQ) give insights into the structure of local economies and the relative importance of different sectors. A location quotient greater than 1.0 suggests a local or regional advantage (or concentration of employment) in that sector. A location quotient less than 1.0 suggests that the sector is not a propulsive industry within the economy (Tonts et al., 2008: 35-36).

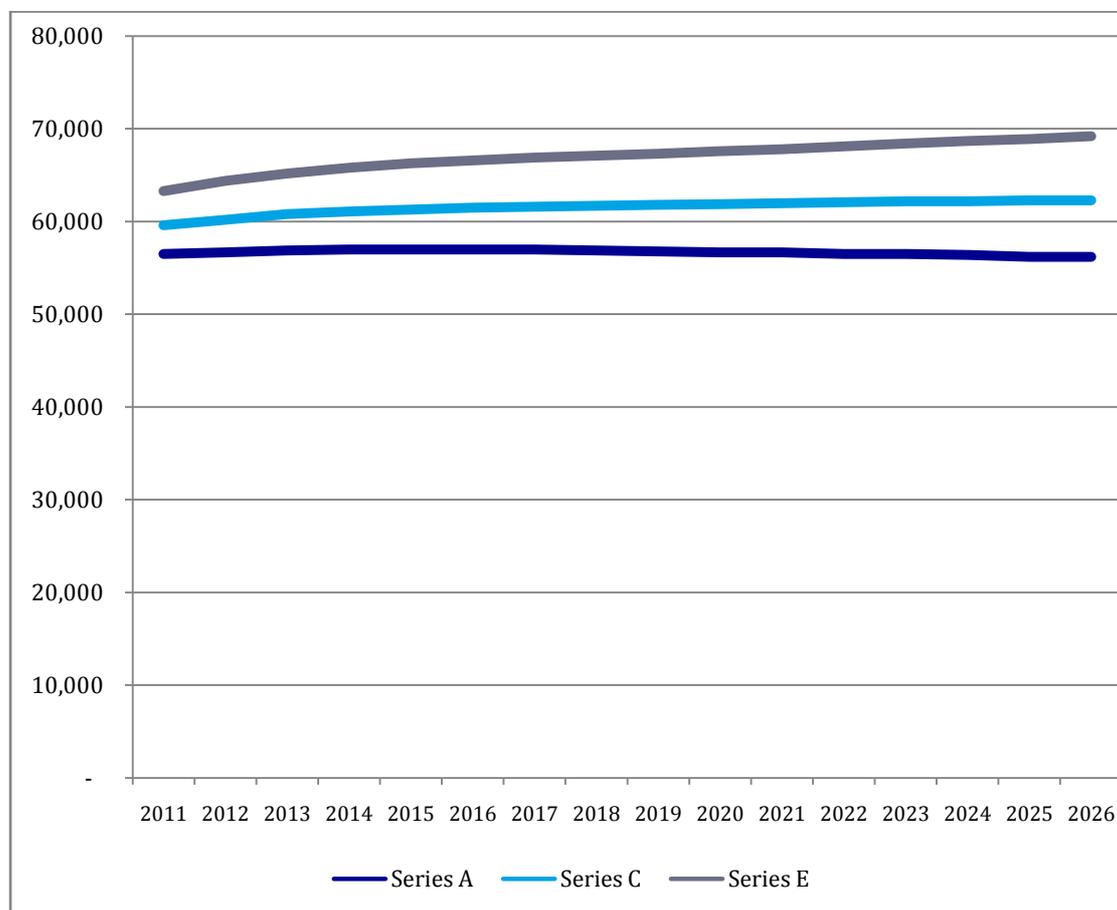
Future Development

Projected Growth

Recently released Department of Planning WA Tomorrow population forecasts provide a range of population growth forecasts for the Goldfields Esperance Region. These range from a low series that sees the Region declining in population from its current level of 59,000 residents to 56,000 residents. The high series would see the Region grow to 70,000 residents (Figure 5). The most likely outcome is Series C. This forecasts a population of 62,300 residents by 2026.

As is mentioned above, these projections do not forecast the impact of FIFO on the actual population of the Region and therefore make it difficult to plan for real demand.

Figure 5 WA Tomorrow Population Forecasts 2011 - 2026



Source: WA Tomorrow (2012)

Planning Framework

The current State Planning Strategy was adopted in 1997 and will be shortly replaced with a new long-term planning vision for Western Australia. The 1997 Strategy was aimed at an expected total population of 2.7 million by 2029. The

latest WA Tomorrow forecasts released in February 2012 indicate that WA's population of 2.3 million will rise to over 3 million by 2026 (an increase of 700,000 people). It is evident that the

new strategy is needed to guide the growth of the States regions.

The new Strategy has been drafted by the Western Australian Planning Commission to be released for public comment within the next few months. It is intended to assist State and local government in long-term land use planning and infrastructure co-ordination by managing growth in a sustainable way. It is expected to ensure that growth is less metropolitan focussed and more regionally balanced recognising that resource management and sustainable development are vital to the State.

The 1997 State Planning Strategy recommended a regional strategy be prepared to identify future land use needs and address the current demand and growth requirements of Kalgoorlie-Boulder and Esperance. The Goldfields-Esperance Regional Planning Strategy was completed in 2000 and last audited in 2003. In terms of energy the strategy contained the following implementation actions:

- Investigate alternative energy options for potential future use in remote areas and review feasibility figures to determine more cost-effective ways to introduce alternative energy sources. (Office of Energy (OE))
- Investigate the co-location of a gas pipeline if and when a water pipeline is constructed between Kalgoorlie-Boulder and Esperance, to minimise the cost of and disruption associated with construction. (OE, Private sector)
- Investigate power supply options for strategic locations within the region. (OE)
- Provide opportunities for private producers to compete as suppliers of power. (OE)
- Prepare a 10-year strategy to:
 - Determine how electricity and gas infrastructure can be

upgraded to meet future demands.

- Consider all feasible options for energy supply to regional centres and options for a more equitable energy supply. (OE, Western power)

The WAPC established the Goldfields-Esperance Regional Planning and Infrastructure Coordination Committee (GERPICC) to progress implementation of the Goldfields-Esperance Regional Planning Strategy. It was intended that this committee:

- Prioritise recommendations for implementation. (GERPICC)
- Review the Goldfields-Esperance Regional Planning Strategy every five years. (WAPC/MfP)
- Publish annual updates on the status of recommendations from the Goldfields-Esperance Regional Planning Strategy.
- GERPICC was disbanded due to its inability to deliver desired outcomes. Notwithstanding, many of the outcomes from the strategy were substantially achieved without the formal GERPICC structure.

Recent regional planning for Goldfields-Esperance has been conducted jointly by Regional Development Australia Goldfields-Esperance and the Goldfields-Esperance Development Commission in 2010 and 2011. The Strategic Development Plan 2011-2021 has been developed in consultation with a diverse range of regional stakeholders and has been endorsed by all Local Government Authorities in the Region. The Goldfields-Esperance Strategic Development Plan 2011-2021 focuses on long-term perspectives in addressing the opportunities and challenges that will or have the potential to significantly influence both the immediate and long-term development of the Region. This Plan is currently under review.

Continued growth in the region, particularly growth associated with mining activity will place further pressure on the demand for energy. The need for a coordinated approach to the provision of new sources of energy and the maintenance and upgrading of existing infrastructure cannot be over estimated.

Regional Energy

The Goldfields Esperance Region electricity supply is sourced and delivered to commercial, industrial, and residential consumers through a variety of arrangements. These arrangements are relatively complex with a mix of grid and off grid power generation and distribution networks supported by a number of different players.

The South West Interconnected System (SWIS) network provides electricity to Coolgardie, Kalgoorlie –Boulder, Kambalda, and Ravensthorpe. This supply is supplemented by a privately owned power station near Kalgoorlie–Boulder that also supplies several major mining operations as well as other customers. The extent of the SWIS network is shown in Figure 6.

Horizon Energy is responsible for providing energy to those areas not supported by SWIS infrastructure (Figure 6).

Esperance and surrounding areas are supplied electricity from a combination

of gas-fired and wind powered generators. There are two wind farms in the Esperance area. The newest, built by Verve Energy in 2004 at Nine Mile Beach, has six 600kW turbines and powers the equivalent of 2500 homes. This wind farm operates with the Ten Mile Lagoon wind farm (the first commercial wind farm in Australia) that was commissioned in 1993 and has nine 225kW wind turbines. These wind farms supply 20% of Esperance’s power needs and work in parallel with a gas turbine power station, which is privately owned and operated. The power station has high-efficiency, low-emission gas turbine generators.

Natural gas for the power station is supplied via a gas pipeline from Kambalda (Figure 7). The Kambalda Esperance gas pipeline and the gas turbine generator – the Esperance Energy Project- is owned by ANZ Infrastructure Services and managed by WorleyParsons. It provides electricity to Horizon for distribution to its clients and to the Esperance Port Authority.

Figure 6 SWIS Network and Horizon Infrastructure



Figure 7 Goldfield Esperance Pipe Line



Hopetoun is an island grid serviced by a wind-diesel system comprising of two wind turbines and a low-load diesel power station. The wind turbines supply up to 40% of the town's annual electricity requirement. This saves approximately 700,000 litres of diesel fuel.

Other towns such as Leonora, Laverton, Menzies and Norseman are supplied with electricity from stand-alone power stations fuelled by either diesel or natural gas.

The Goldfield Gas Pipeline (Figure 7) supplies North West shelf natural gas to the Goldfields towns of Mt Keith, Leinster, Murrin Murrin, Leonora, Cawse, Kalgoorlie-Boulder and Esperance. Reticulated gas is supplied to customers in Kalgoorlie-Boulder, Esperance and Nulsen.

The Goldfield Gas Pipeline to Kambalda is owned by the APA Group that also owns the Kalgoorlie Power Station

There are more than 15 remote indigenous communities in the Goldfields Esperance Region that rely on stand alone diesel generators for their power supply. Horizon Power provides support for these generators.

EDGE OF GRID - RAVENSTHORPE

The Town of Ravensthorpe represents a useful example of the problems with being at the edge of a grid system. It is at the edge of the grid, connected back to the grid by some 300km of power line stretching back to Katanning. The area was subject to many brown outs and black outs. On the 4 May 2009 the Minister for Regional Development requested Western Power and Horizon Power resolve the power quality and reliability issues affecting Ravensthorpe.

Western Power and Horizon Power have jointly developed a two-stage approach to resolving the current power supply issues:

- Stage 1 was the establishment of a temporary power station at Ravensthorpe to supply the town, which was commissioned in December 2009. The diesel power station was supplied by Horizon Power and saw Ravensthorpe being disconnected from the South West Interconnected System (the Grid).
- Stage 2 involves Western Power continuing to develop a permanent, sustainable solution for the town. This includes examining UPS systems and protection upgrades along with the development of a proactive Community and Stakeholder Engagement Plan. Until Stage 2 is finalised, Western Power has implemented a bridging solution.

Facts at a glance

- Stage 1 of the solution concluded on 2 February 2011. During this stage, energy consumption was 2.5 times of that estimated. The single biggest cost of this initiative was fuel and the amount budgeted for wasn't sufficient to run the generators through to December 2011.
- No other funding was provided enabling Western Power to continue running the generators through December 2011.
- Ravensthorpe is currently connected to the diesel generators for the winter peak months between June and August 2011.
- After the peak months have ceased, Ravensthorpe will be re-connected to the SWIS and the generators will remain on stand-by in case of an outage.

- Western Power will continue to develop a permanent, more sustainable solution for Ravensthorpe along with implementing a Community and Stakeholder Engagement Plan.

Project outline

2 February 2011 saw the completion of Stage 1 and the disconnection of Ravensthorpe from the diesel generators. The town was reconnected to the SWIS via the Gnowangerup feeder and will be able to utilise the generators during outages of over 30 minutes, improving power reliability and capacity to the area. The peak months of June, July and August will see Ravensthorpe supplied entirely from the generators in order to cope with increased demand.

Stage 2 of the project, which endeavors to find a longer term, sustainable solution to the reliability issues Ravensthorpe experiences, will continue to be developed. Western Power will work closely with the Shire and community ahead of implementing a permanent Stage 2 solution.

Opportunities

Wind

The southern coast of Western Australia has already demonstrated its capacity to generate energy from wind power with successful projects operating at Esperance and Hopetoun.

A plan released by not-for-profit organisation Beyond Zero Emissions (BZE) - looking at renewable energy in the Goldfields Esperance area – has identified a significant wind farm project for the Esperance area.

The BZE plan would see the installation of 300 new wind turbines in the Esperance Region, each of which will be 12 times as powerful as the largest turbines currently installed there.

Biomass

There has been a history of investigating opportunities for developing biomass technology in the Region. In 1996, the State Government provided a grant to investigate the generation of biomass fuel.

The energy farming scheme proposed would involve the planting of mallee gum plantations which would be harvested each year for biomass fuel, that biomass would then be gasified by the Syn Fuels process and used to run a gas turbine generator.

More recently, BioTek Resources Pty Ltd sought funding to develop the Ravensthorpe Biomass Energy Project –

a 12MW power station fuelled by grain stubble and oil mallee.

Geothermal

Greenpower Energy Ltd secured two geothermal exploration permits in the Esperance area of Western Australia. The permits, with a combined area of 10,732 sq km, have been awarded for six years, are renewable, and enable the holder to proceed to commercial development.

The company plans to map the extent of heat-emitting granites in the Esperance district during the first year. During the second year the company will examine the granite heat source in detail and begin shallow drilling. Deeper drilling is planned for 2012.

Solar

Zero Carbon Australia has identified Kalgoorlie-Boulder as one of its network of sites across Australia that could provide renewable energy for Australia into the future. The Kalgoorlie-Boulder solar energy plant would generate power using mirrors to transmit solar energy onto a receiver, which produces heat that can then be used to drive a turbine and generate electricity. The solar energy could then be stored in liquid molten salt tanks to continue generating power overnight.

Kalgoorlie-Boulder was chosen as one of the sites because of its local economy, infrastructure and weather patterns.

Off the Grid Mining Operations

Mt Cattlin

Galaxy resources is planning to establish the first mine in Australia to be completely powered by renewable energy. Its Mount Cattlin mine site operation located near to the Ravensthorpe townships will use real-time solar tracking panels to power its site. A dedicated diesel generator supported by state-of-the-art solar tracking technology provides power on site at Mt Cattlin. Galaxy has 14 giant solar trackers and 2 wind turbines in operation at Mt Cattlin, which together generate 226 MW per year of renewable energy.

Mt Cattlin was the first mine site in Australia to have real-time solar tracking panels as part of its power generating requirements. The solar tracking feature means the solar panels are able to follow the sun in all directions to maximise the power generated and provide 15% more power than a single axis system.

The wind and solar hybrid system supplements power from Galaxy's 5MW diesel generator, which accounts for, on average about a sixth of the mine site's daily power. This system also promotes savings in CO₂ emissions amounting to 200 tonnes every year.³

Figure 8 Mt Cattlin Solar Tracking Panels



Source:http://www.galaxyresources.com.au/pro_raven_mt_cattlin.shtml

The delivery of energy to the Region relies on a complex system of network grids, island grids and stand-alone systems. Energy is delivered to customers through the SWIS network, Horizon Energy and private sector providers. Diesel, wind and gas power these systems.

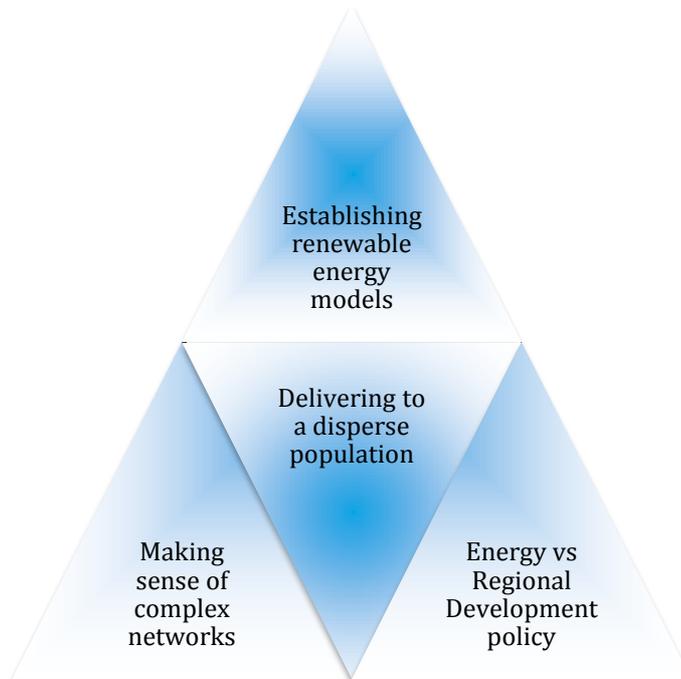
There is significant potential for the use of renewables (solar, biomass, wind etc) in the Region, particularly in relation to stand alone and island networks.

³http://www.galaxyresources.com.au/pro_raven_mt_cattlin.shtml

Challenges

There are a number of challenges to the provision of access to secure, reliable and affordable energy in the Goldfields Esperance Region. These are shown in Figure 9 and underpin the concept of energy security.

Figure 9 Challenges facing the Goldfields Esperance Region



Delivering to a disperse population

The Region has a disperse population. This means that it is impractical and inefficient to consider a fully networked model for delivery of energy to the Region. However, it is important to consider at what point the benefits of a network system outweigh those of network islands and stand alone systems. For example, the Esperance area comprises three island networks, Hopetoun, Esperance and Norseman. The question is whether there is a point at which, particularly if the proposed major wind farm becomes a real opportunity, the Esperance network is linked back through Norseman to the SWIS Network.

There needs to be a greater understanding of the benefits and costs of each of the delivery models.

Establishing renewable energy models

There is tremendous potential to deliver cleaner energy outcomes through the use of renewable resources. The south coast has already demonstrated its capacity to generate energy through wind power. Investigations are currently being carried out to determine the potential of geothermal power generation and opportunities for the development of mallee or other forms of biofuels. Some mining companies are beginning to use renewables to augment the production of energy through diesel generators and investigating opportunities to become completely reliant on renewables.

The use of renewables has the potential to add to the energy capacity of the region and may assist with providing back up for traditional energy sources.

As the technology matures, it has the potential to become the predominant source of energy.

There are a number of funding programs that are available for the investigation of clean energy through the Government's Clean Energy Futures Initiative. However, these programs are quite disparate and it is difficult to see how companies can secure start up funding or even investigative funding for innovative projects.

There needs to be a regional perspective on funding for clean energy. Regions such as the Goldfields Esperance could be a microcosm for innovate energy projects. There are small scale and large scale networks and opportunities for the development of stand alone technology or mobile technology that can be moved to where it is needed. Mining companies and indigenous communities could be beneficiaries of innovative approaches to energy delivery. The technology could also drive a lucrative export market.

Making sense of complex networks

The Region is characterised by a number of producers and energy retailers and a variety of delivery methods. It can be difficult to determine who is responsible for energy generation, who owns the networks and who is the responsible retailer. There are advantages to having a number of providers in the market particularly if this improves competitiveness and responsiveness to consumer needs. Large network providers operate well in bigger, established markets whilst smaller providers are often more nimble and can respond more quickly to

the unique needs of individual businesses.

Information must be transparent and comparable if markets are to operate competitively. Energy is an essential commodity. It is important that a diverse system is supported by clear standards which ensure that consumers are treated equitably. The market also needs to be supported by good quality information so that consumers are aware of who the service providers are and what the costs of connection and supply are.

Regional development vs energy policy

Energy is essential for regional development. It is recognised that the White Paper promotes the idea that Energy Policy should be divorced from any social policy agendas. This is a reasonable approach to take if all other things are equal. However, it is almost impossible to completely disregard economic and social policy outcomes when considering energy policy.

There is an expectation that the energy market is a robust competitive market place where there are numerous potential producers and providers. This is not the case in the delivery of energy to some regional and remote communities, particularly in the case of indigenous communities.

There will be incidents when social and economic policy outcomes will outweigh those of energy policy. It is recognised that any subsidisation of the cost of energy aimed at facilitating development or supporting communities should be transparent and fully funded by the government as a community service obligation, not as a cross subsidy within the energy system.

Comments on the Draft Energy White Paper

General Comments

The Commonwealth is to be commended on its Draft Energy White Paper. It provides a comprehensive assessment of our energy future and the challenges facing Australia as a whole. Whilst it is recognised that responsibility for delivering energy at a local level is the responsibility of the State, RDAGE believes that it is important to understand the way energy is delivered in a region that is characterised by limited network integration, island grids, stand alone infrastructure for specific purposes and the provision of services for remote indigenous communities. This presents a unique series of challenges.

Priority Action Areas

RDAGE offers the following comments on the Draft EWP priority action areas.

Strengthening the resilience of Australia's energy policy framework

RDAGE supports the notion of a regular four-yearly review of national energy policy strategy beginning in 2016. Consideration should be given to drilling down to focus on particular regions as part of this review process. This could act as a case study for assessing how the national goals translate to what is happening in different energy markets. The regional focus could be varied with every cycle and act as a practical assessment of policy implementation in different market environments.

RDAGE believes it is critical that a methodology is developed to provide for a more systematic and integrated understanding of key relationships between the energy sector and other areas of the economy. Of particular interest is the extent to which the policy initiatives act to promote or stifle

regional development in areas such as the Goldfield Esperance Region.

The provision of good quality, transparent information on the energy markets is very important. The same principal of transparency of information needs to apply to all tiers of the market, whether this information is to be used at a strategic Australia-wide level for Commonwealth and State planning purposes or by producers and consumers at a local level to inform their energy choices.

Reinvigorating the energy market reform agenda

Whilst the reform agenda which focuses on retail price deregulation, competition, improved network productivity, and the promotion of truly national energy markets is an appropriate one, some aspects of regional markets, particularly those represented by the Goldfields Esperance Region, do not lend themselves entirely to the reform agenda.

It needs to be recognised that there are areas where the only way that energy will be provided is through government involvement. This is the case with remote communities that are not likely to represent profitable markets for private sector investments. A blanket expectation of private sector involvement in all aspects of generation, distribution, retailing and maintenance is not a realistic one.

Developing Australia's critical resources

An important aspect of supporting the development of Australia's critical resources is ensuring that appropriate infrastructure is available to support the extraction, processing and transportation of resources. The

Portlink Project provides an integrated approach to linking the Pilbara to the Goldfields Esperance Region and the deep water port at Esperance.

Portlink envisages a new paradigm of moving freight to the Pilbara from the eastern seaboard, as well as allowing a self-healing network of the supply chain of resource exports. The proposed Intermodal Transport Hub could eventuate into a larger storage and logistics centre that may consume significant power usage.

Infrastructure such as the Esperance Port and the proposed Intermodal Transport Hub at Kalgoorlie will allow further development of the resource sector and will enable exporters and logistics companies to move product in a more efficient manner.

The development of the Yilgarn Mineral Province, the Tropicana Gold discovery and the potential of the Scaddan Lignite deposit all require careful consideration of future infrastructure needs and of course, the need for secure energy supplies in order to promote development.

Downstream processing of minerals, cereal crops and other food products (Shark Lake Abattoir) would significantly increase the region's economic development capacity. Anecdotal evidence suggests that energy costs are one of the major determinants as to whether such initiatives are viable.

Accelerating clean energy outcomes

The Goldfields Esperance Region has great potential for utilising clean energy technology. The success of wind power has been demonstrated in Esperance and Hopetoun. A hybrid solar/wind/diesel system has been utilised at the Mt Cattlin mine. Investigations are being carried out into large-scale wind farming, the use of geothermal power and opportunities

for the production of biofuels. Kalgoorlie has also been identified as a potential site for Concentrated Solar Thermal (CST) energy production. However, mining companies have investigated the integration of renewable energy into projects and found that it is not feasible.

The Tropicana Joint Venture investigated the use of solar power and concluded:

Power will be supplied by an on-site power station, operated by a third party under a Power Purchase Agreement. The power plant will have the capacity to operate on diesel or gas. Initial generation will utilise diesel, but if cost competitive, reliable gas supply opportunities arise, the power plant could be switched to gas. The JV considered diesel, gas, grid and solar thermal power options. Given the distances from the nearest power source, grid power is not economically viable. Solar power was found to be too capital intensive and fell outside of the scope of the Australian Government's solar flagship program.⁴

4

<http://www.tropicana-jv.com.au/irm/content/newsFAQ.html>

Conclusion

The Goldfields Esperance Region represents a complex microcosm of energy delivery models and methods. This, along with the large area and sparse population makes ensuring the delivery of secure energy to the region a particularly challenging task.

There is an appetite for alternative energy sources in the Region as demonstrated by the early adoption of wind-powered energy in the region. In more recent times, consideration has been given to solar, biomass and geothermal energy sources, along with the expansion of wind generation. However, there are a number of barriers to the uptake of clean energy technology. These include:

- High capital costs. The savings associated with renewable energy are associated with longer-term running costs. This makes the technology difficult to justify for some mining projects that have short life spans;
- The technology is perceived to be more complex to operate and maintain than traditional diesel technology that tends to be robust and easier to fix;
- There is a lack of expertise to support renewable technologies;
- Renewable technologies lack storage capacity (or require expensive batteries to store energy as it is generated). This is a problem with solar and wind driven systems.

The Government needs to look at ways of addressing these concerns, whether through direct subsidies, loan guarantees, accelerated depreciation and/or investment tax credits for companies willing to utilise clean energy technology.

The Draft EWP notes that Australia should leverage its research and development dollars in the most efficient manner and focus on augmenting international research and development efforts in this area. RDAGE believes that research and development that focuses on clean energy technology for remote communities and stand alone systems is an area that the Government could drive ensuring that Australia becomes a world leader in this area.