

Managing mining communities and sustainable development: a central Queensland case study

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Abstract

Coal mining is growing rapidly to meet global demand within the Bowen and Surat Basins of Queensland. The mining sector, while recognised as a major contributor to both Queensland and Australia's economy, exerts significant and diverse social impacts on the regions that host the mines. However, mines have a typically limited life and it is necessary to manage mining and the impact of mining on communities from a whole-of-mine-life perspective. This paper identifies the strategic issues facing the ongoing development and socio-economic sustainability of the Bowen Basin region during the characteristic "boom and bust" cycles of mining. The paper firstly provides a brief socio-economic characterisation of the region and its mining sector, and follows with a discussion on topics including social wellbeing, hard and soft infrastructure, housing, health, education, attraction/retention, families and women, Indigenous peoples and community development. Issues are then raised on the adequacy and currency of data for policy development and planning. Finally, recommendations are then presented for addressing each of the issues raised.

The work highlighted two difficulties when working with sustainable development data in the region. Firstly, the rapidly-changing nature of the mining sector leads to rapid fluctuations in regional statistics, making it very difficult to obtain, collate and report these accurately before the status quo has changed. Secondly, gross inconsistencies between the approach, coverage and style of figures used by different reporting bodies makes comparative studies difficult. This work was conducted in the closing stages of 2008 – the juncture at which a relatively long-lived mining 'boom' began to face a substantial decline in the global economy. Nevertheless, by highlighting the vulnerabilities featured in regions hosting mining activities (e.g., a lack of appropriate health and housing infrastructure and services), the data in this paper are critical to informing regional development and community wellbeing, regardless of the current 'boom' or 'bust' cycle being experienced.

Partnerships and regional coordination between industry, government and the community are important, especially those that take a regional and multidisciplinary approach. Positive outcomes can be achieved from community-driven initiatives in particular – and ultimately, the desired outcome of these is where townships can develop in a complementary and coordinated way that benefits industry together with the region and the individual communities that host industrial activity.

INTRODUCTION

Developing Sustainable Regional Resource Communities

Sustainable regional development has traditionally featured heavily in contemporary research. Some of the key messages from this research have now begun to be incorporated into the policy and practices aimed at improving the fortunes of Australia's regional communities – particularly those that host mining activities. For example, ongoing concerns about the pressures from the mining industry boom in Queensland led the Queensland Government to announce their Sustainable Resources Communities Policy in September 2008. The Queensland government is also the throes of developing better policy tools for regulating social impacts on Queensland resource communities, through social impact mitigation plans. In 2008, the State joined with the Local Government Association of Queensland and the Queensland Resources Council to implement the Resource Communities Partnership Agreement (RCPA) in four mining basins of Queensland (QRC, 2009). The objective of the RCPA was to 'develop prosperous regions and liveable communities'. However, given the complexity of challenges facing resource communities, this goal is not necessarily an easily tangible one. It remains difficult to measure progress in achieving sustainable development in Queensland's resource communities. Thus, this paper, which focuses on identifying – and in some cases, quantifying – the key issues facing one of Australia's the most important and productive mining regions, will be useful in informing and benchmarking initiatives such as the RCPA, as well as those undertaken in 'regional resource communities' across Australia.

The Bowen Basin

The Bowen Basin extends from Collinsville in the north to Moura in the south; it occupies approximately 160,000 km². Coal is the dominant extractive resource in the Basin: more than 25 billion tonnes of measured and indicated coal resources have been located in the Bowen Basin and these typically provide over 85% of Queensland's annual coal product (DME, 2008). Driven by the global demand for coal and other mineral resources, the Bowen Basin is one of Australia's fastest growing industrial and mining regions. The region is now recognised as a major source of wealth for the economies of both Queensland and Australia.

The economic growth of this region has brought substantial opportunities, but it has also triggered concerns on a range of issues regarding liveability, community health and wellbeing. For example, some of the key challenges stem from increases in incomes and employment, the stimulus to contractors and sub-contractors, the tightening of the labour market and shortages in the housing and rental market. These overlay a variety of interdependent social and economic trends, including demographic shifts to regional hubs and coastal areas, changes in the way people interact with communities, and changing attitudes to mining and work-life balances. All these pressures are impacting at both the regional and the community level. Recent, rapid growth of the Bowen Basin region is no exception. This project was designed to research and summarise, at a high-level, the key challenges confronting the region. It also included developing recommendations for how each key

issue might be addressed, to ensure that future development and planning in the Bowen Basin is truly 'sustainable'.

METHODOLOGY

This paper draws extensively on the material presented in the strategic issues paper compiled by Miles & Kinnear (2008). That report was based on a desktop review conducted at the end of 2008, which comprised four key areas:

- a contextualization of the challenges of the Bowen Basin with respect to the sustainable development theory;
- a profile of Bowen Basin's contribution to the state (Queensland) and national mining sector;
- a high-level socioeconomic characterization of the Bowen Basin, together with an analysis of the most critical trends and issues expected to impact future planning and sustainability in the region; and
- a list of management recommendations and (to a lesser extent) future research and development priorities useful for achieving sustainable development in the Bowen Basin.

The desktop exercise involved a search of the literature, company and government reports, online information, together with a survey of mines in the region and contacting key regional organisations for comments and data. The lack of 'hard' data (e.g., academic journal articles) was a particular point of note in gathering information for this report. In addition, it should be noted that the project research, and its accompanying report, was completed in the second half of 2008. At this time, the global economic downturn of late 2008 and early 2009 had been foreshadowed, but effects had not yet to been fully realised in Australia, nor by the heavy industries operating in the Bowen Basin.

PROJECT OUTCOMES

Study limitations

During the course of this study, two key limitations to effective decision making and planning were apparent: (a) the rapidly changing nature of the region's statistics, and (b) inconsistencies between the approach, coverage and style of figures used by different reporting bodies. Rapid industrial development often accompanies resource boom periods, and the pace of development can place pressure on many aspects of regional communities, particularly labour supply and service provision (both public and private). The rapid population growth and dynamic nature of conditions in the Bowen Basin (including infrastructure development and economic growth) create inherent problems because many metrics used in reporting are lagging statistics. This limits the capacity of planners to keep abreast of current regional trends; it is also a considerable impediment for government and industry when planning for future needs.

Disparities between data sources and reporting boundaries – particularly amongst different government departments – are also an impediment to planning as, in some cases, ‘conventional’ data sources are so different that only a gross overview of regional trends can be obtained with any certainty. For example, coal statistical regions do not align with the newly amalgamated local government boundaries, regional planning areas or Census and OESR statistical divisions.

The Bowen Basin – mining profile

The Bowen Basin is a world-class mining region with extensive coal deposits, an emerging coal seam gas industry and considerable reserves of high-quality magnesite, oil shale and limestone. Proximity to deepwater ports, the presence of a competitive rail system, bulk water and low-cost, reliable electricity supply have helped to establish Central Queensland as a major hub for energy-intensive mineral processing industries (e.g., alumina, aluminium and magnesia) (DME and ACIL Tasman, 2007).

During 2007, 47 coal mines operated in the Bowen Basin. At time of writing, approximately 55 new mines were also proposed due to the high demand for quality coking coal throughout the world, though the pace of expansion and new mine development plans is likely to have since been tempered by the recent economic climate. Nevertheless, existing mines have life expectancies generally exceeding 20 years, and the measured and indicated resources in the area are extensive: this indicates that coal mining will continue to play a critical role in the social and economic functioning of the Bowen Basin into the future.

The importance of the mining industry to the Bowen Basin, and the reciprocal contribution of the Bowen Basin region to the mining sector, is clear: in 2007, the Queensland Resources Council estimated that \$1.01 billion was contributed to the Queensland economy through coal royalties alone (Devine, 2007). Meanwhile, a survey of selected mines in 2007 reported that funding for community programs exceeded some \$25 million in the Bowen Basin region alone (Miles & Kinnear, 2008). Moreover, the outlook for the industry remains strong despite recent global economic concerns, as global drivers for increased coal consumption still remain, particularly for electricity generation in the developing Asian regions.

The Bowen Basin – Socioeconomic profile

The socio-economic profile of the Bowen Basin region is broadly summarised in figure 1. This indicates that the region is strongly shaped by the mining sector via its influences on demographic, economic and health statistics.

Figure 1 A socio-economic snapshot of the Bowen Basin (summarised from Miles & Kinnear 2008 and based on 2006 Census data).

Population	Workforce
<ul style="list-style-type: none"> resident population of 360,815 (9% of State total) 200,000 people reside in key regional centres (Rockhampton, Mackay, Emerald and Gladstone) significant loss of youth and young adults strong growth in the aged population gender imbalance (high male population) 40% of families represented by childless couples; nevertheless, many areas have a higher proportion of families with children than the state average population estimates place the Bowen Basin exceeding 450,000 persons by 2026 – the regional leader for population growth in Queensland 	<ul style="list-style-type: none"> 40% of the male workforce (38,000 people) employed in the mining, construction and/or manufacturing industries 45% of the female workforce employed in trade, health care/social assistance and education/training low unemployment rates across the region (average 3.15%) non-resident workforce of 12,000 represents a quarter of all jobs workforce predicted to increase by 22% over the 2007-2016 period, in response to ongoing expansion and new project commissioning plans.
Income	Health
<ul style="list-style-type: none"> pockets of wealth contrasted with poverty disproportionately high number of individuals receive incomes exceeding \$2,000/week; 37% of people gross less than \$399/week. 	<ul style="list-style-type: none"> large numbers of young families pockets of disadvantaged residents ageing population seasonal tourist influxes high number of Indigenous residents GPs often the only point of contact for medical care in small communities.

Key trends and issues

Data availability, accessibility and transparency

Some 27% of jobs in the Bowen Basin are taken up by non-residents who commute on shift rosters. These typically FIFO (fly-in, fly-out) and DIDO (drive-in, drive-out) employees are estimated to number more approximately 12% of the regional population. However, there are large differences in the population numbers arrived at by the Census data and Queensland Population and Information Forecasting Unit (PIFU): in some cases, the ABS data returns population estimates some 55% lower (PIFU 2007). Quantifying the non-resident population is a serious issue for the region, since demand for services and planning/supply of community services and soft infrastructure is set by estimated resident population (ERP) statistics. As a consequence of this gap in reliable data, many services in the Bowen Basin are now grossly inadequate to meet demand, leaving local Government, not-for-profit welfare service providers and NGO's attempting to bridge the gap. This is one example that shows the clear need for regular monitoring of key statistics in the area, using a tailored approach that accounts for the large non-resident population, and for that information to be made readily available to regional planning groups and government.

Policy and assessment tools for regional development

A critique of current impact assessment procedures (particularly EIA processes) in the Bowen Basin has suggested that there is strong support to look toward an integrated holistic approach to regional development (Miles & Kinnear 2008). For example, Ivanova *et al.* (2009) commented that both social and economic assessment methods have their own strengths and weaknesses, so a holistic approach is necessary to ensure a rich and accurate dataset. Furthermore, recent research work conducted by Ivanova *et al.* 2009 in the Bowen Basin has suggested that choice modelling and stakeholder workshops could be used as additional tools to inform social impact assessment. This could be one way by which deficiencies in the current impact assessment processes could be addressed.

A second issue revolving around assessment practices is that, to date, the potentially negative effects of resource development in Queensland (as well as other states) are examined through a variety of impact assessment tools; management actions in environmental management plans; or licences for environmentally relevant activities. Unfortunately, the use of such tools is generally restricted to project development (identification) stages: no social management plans or mitigation strategies are used to review, benchmark or improve social outcomes once projects move through the approvals phase and into construction, commissioning and operations. Solomon *et al.* (2008) have already noted that there is a need for independent monitoring of actual performance and/or impacts relative to initial impact assessments, once projects move into commissioning and operation. Furthermore, as many assessments are generally constrained to the project level, there is a tendency to focus on the impacts of a particular project, with the result that the potential cumulative impacts from multiple projects within a region do not appear to be adequately considered (although this appears to be changing).

Funding and resource allocation

The economic contribution of the mining industry to regional communities, the state and the nation is coming into sharper focus. This particularly relates to issues of returns to the Crown and how central government funds are allocated back to the regions; it also includes wider 'social investment' initiatives undertaken by mining companies. Coal is expected to remain one of Queensland's most important export commodities, and the State receives strong benefits from the coal sector through financial returns, increased employment opportunities and regional development. Thus, in purely economic terms, the overall benefits that are reaped from the resources sector are not in question; however, these benefits have not always reflected in the fortunes of the community that host resource sector activity. Thus, there is a mounting pressure for the benefits generated by mining to be focussed more clearly on compensating regional communities for the negative social impacts they may experience (Esteves & Vanclay, 2009). The perceived inequities in the return of royalties is now a well-documented concern within the Bowen Basin, with an imbalance apparent between the

value taken out of the region and what is paid to government, compared with the compensating value being put back into the social, economic and environmental infrastructure for the region. The public expectation is now that mining operations will contribute to the overall sustainability of the regions within which they are active. Indeed, the issue of royalty distribution and social investment may have indirect impacts on social licences to operate (despite companies not being directly responsible for the destination and nature of royalty expenditure). There is scope in the Bowen Basin to improve transparency on this issue, and consider more closely the re-allocation of central funds. For example, this could include adopting elements of Western Australia's 'Royalties for Regions' program – a state government initiative designed to foster a long-term focus on regional development in WA by investing the equivalent of 25% of mining and onshore petroleum royalties back into regional projects, infrastructure and community services (DRDL, 2009). Particular thought also needs to be given to the post-industry economies in regional centres hosting mining activities in the Bowen Basin.

Climate change

Climate change represents a significant threat to the ongoing viability of the resource industry and the communities that underpin it in the Bowen Basin. At the time of writing, Bureau of Metrology records had shown an increase of 25% in climate variability (longer and more protracted dry periods interspersed with high intensity localised storm events) coupled with up to 35% reduction in the long term average rainfall in the region. Up to a 50% reduction in stream discharge on the coastal rivers is evident in the stream discharge records from the (former) Queensland Department of Natural Resources. These figures reflect the expected and predicted changes identified by the IPCC in its 2007 4th Assessment Report. The changes in climate represent a major risk to the region in terms of the reliability of water supply and the risk of extreme events to infrastructure and production continuity (as seen in the recent 2008 flood events on the Ensham Mine). It is clear that climate change must now be a fundamental consideration in any planning and development of the Bowen Basin.

Furthermore, given the global concern about CO₂ emissions from fossil fuel usage, mining companies will be heavily involved and impacted on by carbon accounting and emissions trading schemes. Opportunities accordingly exist for offsets and environmental credits by partnering with the adjoining agricultural sector in the region.

Hard infrastructure

The capacity and appropriateness of hard infrastructure (road, rail/port, air, water, power and gas) is of the utmost importance to the development of the Bowen Basin, as the mining industry relies on modern and efficient transport infrastructure in order to move its product from mine to market. Furthermore, this must be done in a timely manner if export competitiveness is to be maintained (DIP, 2008). A dedicated coal transport network has been developed in Queensland to meet this

need; current capacity is 188 and 213 mtpa for the rail and port systems, respectively, however, both figures could exceed 400 mtpa capacity following around \$12 billion in planned and anticipated expansion projects. This should easily match projected needs under a high coal export growth scenario. The Bowen Basin is a major power exporter to Queensland with four generation plants, and competitively priced energy is available across the region (CQANM, 2002). However, unacceptable levels of delay are being experienced by both residential and industrial customers for connection to the state energy grid (Bowen Basin Mayors Group, 2006).

The road network servicing the Bowen Basin comprises sections of State highway and key regional highways (the Capricorn, Dawson, Peak Downs and Gregory), with inland townships linked by the Fitzroy, Gregory, Bowen and Suttor Developmental Roads. High rates of serious accidents accompanied by fatalities and/or hospitalisations are recorded on road sections that are frequented by the mining workforce whilst commuting between the coastal centres and the inland mining sites (Main Roads, 2008). There are also disproportionately large numbers of heavy commercial vehicles travelling these routes, and the volume of traffic of this nature is steadily increasing. Common themes for future planning across all three roads divisions in the Bowen Basin include road safety, community support (through economic development and employment opportunities) and improved access, particularly for outlying and/or isolated communities (Main Roads, 2008).

The Bowen Basin is serviced by seven major water supply schemes, with an additional 16 schemes specifically dedicated to mining industry needs. The availability and cost of water infrastructure has been identified as a key priority issue facing ongoing development in the Basin. Competing demands amongst the mining, urban, agricultural and industrial sectors in central Queensland are of particular concern. With climate change projections, a critical issue is the long term supply of water to the resources sector (CQRWSS, 2006).

Soft infrastructure

Availability of, and accessibility to, social services and soft infrastructure varies considerably across the Bowen Basin: regional coastal hubs house a large proportion of facilities and services, with regional areas serviced through outreach programs. It has been recognised throughout the region that adequate planning for, and provision of, soft infrastructure can only occur if reliable predictions can be made regarding the types of impacts and pressures that are likely to occur.

Housing

Housing is an issue of critical importance across the Bowen Basin: it is a basic need, and lack of appropriate housing can cause blockages elsewhere through its influence on economic status, attraction/retention and hence skills shortages. Whole-of-region housing tenure patterns in the Basin are broadly similar to elsewhere in the state, though some areas have abnormally high rental rates. In the Isaac, Central Highlands and Whitsundays areas, over half the coal-mining workforce is

housed in accommodation provided by mining companies (e.g., single persons quarters, camps or houses), but demand for more beds continues to grow strongly as the FIFO/DIDO employee base increases and companies outsource accommodation (MAC Services Group Limited, 2008). Short-term accommodation options are also under extreme pressure with 'hot-bedding' between day/night shift workers used to relieve the strain. Despite strong demand for accommodation, residential dwelling activity is not particularly high across the Bowen Basin (excepting Emerald). In some areas, this is a by-product of several consecutive years of high growth in median house prices, which has made new housing simply unaffordable, particularly in Mackay, a key regional hub (MWREDC, 2008).

Lacking information on housing demand is also barrier to approving new housing developments in the Bowen Basin. A number of other issues are also evident: contractors are reluctant to invest; short-term residents are reluctant to purchase homes where they do not expect to live permanently; demand for rental premises is high; accommodation villages in the Bowen Basin are operating at close to capacity and land availability for residential development is at a premium across many parts of the Bowen Basin. Whilst an obvious solution would be construct further single-persons quarters to relieve pressure on existing facilities, this is not being strongly pursued due to the social concerns surrounding such villages (e.g., the lack of contribution of FIFO/DIDO workers to the social and economic fabric of the community, amongst others).

Education

An adequate range of primary, secondary and tertiary educational facilities are available in the Bowen Basin, though most are concentrated in the coastal hubs of Rockhampton and Mackay, and private school attendance rates are reasonably high. Teacher shortages, particularly in specialist and support areas, appear to be the education issue of greatest concern.

Health

By and large, the regional coastal hubs are the only centres in Bowen Basin where residents can access healthcare facilities and services beyond basic level care. All private hospital beds are restricted to the coastal centres. In 2008, over 2,000 patients waiting elective surgery in Queensland were residents of the Bowen Basin, with a further 6,881 residents awaiting outpatient surgery. However, based on Queensland Health data for 2006/07, the hospitals are performing well. Even so, this cannot negate the lack of infrastructure availability: there are currently 1,132 available hospital beds in the Bowen Basin, equivalent to 3.14 beds per 1,000 head of population: this represents just 78.5% of the State average and 80% of the national average (AIWH 2008b). When only the regional areas of the Basin are considered, the statistic drops to just 1.61 beds per 1,000 persons.

The Bowen Basin has a high number of solo general practitioners (GPs) and reasonably low rates of female practicing GPs. Workloads for GPs are high, with an average of 1,351 people sharing a full-time equivalent GP, compared with rates of around 1,170 people per FTE-GP for both Queensland and Australia (PHCRIS, 2008). In addition to catering for a large number of patients (often with little or no relief staff), GPs in the Bowen Basin are isolated and often expected to manage their own practices with little business support. Many specialist services are simply unavailable. For example, paediatric, gynaecology and obstetric services are extremely limited in smaller centres, which places strain on the family unit.

Medical practitioners are in short supply in the region. Preliminary estimates in Miles & Kinnear (2008) suggested that nearly 310 new GPs would be necessary in the Basin if the current population levels are to be as well serviced as the rest of Australia (e.g., to achieve comparable full-time equivalent practitioners per 100,000 head of population).

Assessing and improving community wellbeing

The liveability of resource communities is a priority issue in the Bowen Basin. For example, according to the Queensland Resources Council: “social services and infrastructure such as health, education, emergency services, and housing are crucial to enhancing the sector’s capacity to attract and retain a skilled resources sector workforce, as well as maintaining the sector’s social licence to operate” (QRC, 2009). Solomon *et al.* (2008) have also agreed that the social dimensions of resource communities are ‘critical to business success, yet remain the least understood aspect’. Key issues for community wellbeing in the Bowen Basin include domestic violence, child care, family breakdown, drug and alcohol abuse and suicide (Bowen Basin Mayors Group, 2006). There are also increasing concerns about the nature of the community dynamic as predominantly single men move into the region in pursuit of work. Fatigue continues to be a key issue across the Basin: long hours are worked by males who dominate the mining, construction, manufacturing and agricultural industries, with additional time often spent on drive in/drive out access to worksites. This contributes not only fatigue, but also social and family breakdowns and other problems such as traffic safety. Mental health and domestic violence issues in the Bowen Basin revolve largely around the mining and associated heavy industries, with women living in Mackay and partnered by a mining employee reportedly being three and half times more likely to experience abuse than their State counterparts (Nancarrow *et al.* in prep). However, contrary to widespread belief, mining cultures appear to have little demonstrable association with women’s abuse.

The sense of community wellbeing in centres that host mining operations could be improved through better planning and greater resourcing of targeted services to these communities. There is a need for everything from childcare places to a greater emphasis on community and family, including the provision of aged care, affordable housing, better management and use of contractors

and single person camps and the need to secure the right balance and model to accommodate fly in-fly out staffing.

Attraction/retention

Shortages of skilled workers and professionals in the area and the shrinking pool of part-time workers, coupled with the looming impact of retiring baby-boomers, will significantly influence the future workforce of the Bowen Basin. These issues are compounded by the pre-existing difficulties in attracting and retaining professionals and their families. Increases in skilled migration may offer one solution to this problem, however recent research by the Local Government Association of Queensland (LGAQ) reported that the Bowen Basin was not equipped to provide the resources to support skilled migrants and their families. This indicates a need for careful planning and adequate resourcing to be applied to support any strategy that centres on recruiting skilled workers from overseas, and on removing constraints to (skilled) migratory growth.

Families and women

Many local government areas in the Bowen Basin that host or service the mining industry have higher proportions of families comprising of a couples with children (ABS, Census 2006 data). This is significant, since those communities will require proportionally more services to support families, including soft infrastructure such as education, child care and health services. The Bowen Basin already experiences a lack of (long-day) childcare options for infants and toddlers (DoC, 2008), and this is of concern given that there are some regional areas (e.g., Emerald) where over 50% of families have a female parent in the labour force, along with children aged 0-4 years. Mining townships also have high rates of unpaid (voluntary) childcare approaching 40%: this indicates that women may be experiencing difficulties re-entering the workforce due to a lack of available care options. The roles of women in mining communities are important, and development of the Bowen Basin should consider issues including women in the workforce (e.g., recruitment, co-worker attitudes, career paths and work-life balance) (Stutsel, 2006 in Solomon *et al.* 2008).

Indigenous population

In 2006, approximately 14,400 people resident in the Bowen Basin (4.25% of the total population) identified themselves as being of Indigenous heritage. Many reside in Rockhampton and/or the Woorabinda Aboriginal Council area, where drug and alcohol abuse represent major problems (Bowen Basin Mayors Group, 2006). Over 15% of employed Indigenous males in the Bowen Basin work in the construction sector, with females often employed in health care and social assistance roles. The mining industry accounts for the employment of just 318 (7.4%) indigenous people. Based on the 2006 census data, it is evident that most of the Indigenous workforce of the Bowen Basin receive lower weekly gross incomes than do the remainder of the population. For example, nearly

one-fifth of the young adult workforce (those aged 15-24 years) earn \$399/week or less: this represents over a third of all working Indigenous persons. Most of the Indigenous workforce of the Bowen Basin receives lower weekly gross incomes than do the remainder of the population, particularly young adults (15-24 years). Schooling completion rates for the Indigenous population are lower than for the general Bowen Basin population. In addition to low socio-economic standing and concerns with participation levels, other Indigenous issues are likely to revolve around conflicts with overlapping interests (e.g., cultural and ecological values competing against resource development)(Solomon *et al.*, 2008). However, these have not necessarily been reported specifically for the Bowen Basin.

Community sustainable development

Economic leakage is a key issue in the Bowen Basin. Very little published data exist on the location of operating expenditure by mine or company. Exceptions are a detailed study by SGS (2007), which showed that one Bowen Basin mine undertook 95% of total output and 99% of total mine operating expenditure outside of the local community economy, with 89% occurring outside of the Bowen Basin region. Similarly, scoping work undertaken by Miles & Kinnear (2008) provided evidence that leakage of mine operating expenditure from the region does exist, though there is considerable mine-to-mine variation. This has the potential to have a significant effect on local communities and long term economic prosperity.

The loss of youth from the community also represents a major challenge for many rural communities of the Bowen Basin (Bowen Basin Mayors Group). There is a need to evaluate the needs of youth and the level of services, employment prospects, housing, entertainment and recreation. Many social issues relating to youth stem from a lack of organised activity and events, which leads to boredom, and in turn, drug and alcohol abuse, damage to property, theft and promiscuity.

Public transport is another important issue in the Bowen Basin: the tyranny of distance, combined with an ageing population and the need to visit the provincial service hubs for many basic and specialist health services means that an accessible public transport system is critical. Transport services are viewed as a major limiting factor in the Basin in general. The lack of integration of the transport services between existing providers is a commonly expressed concern and limits the potential accessibility of the region.

Key recommendations

Recommendations have been developed for each of the strategic issues described above, and these are summarised in Table 1.

Table 1. Some key recommendations for achieving sustainable regional development in the Bowen Basin (adapted from Miles & Kinnear, 2008)

Key issue	Recommendation	Responsibility
Data availability, accessibility & transparency	<ul style="list-style-type: none"> • Develop strategies and actions to ensure currency and adequacy of statistics for planning purposes • Develop strategies and actions to ensure consistency in the use of data and in reporting boundaries, preferably via standardized reporting regimes. • Develop mechanisms to better measure the non-resident (FIFO/DIDO) population 	<ul style="list-style-type: none"> • Government (all tiers) • Regional planning groups • Industry (for annual reporting) • Australian Bureau of Statistics
Policy & assessment tools	<ul style="list-style-type: none"> • asses gaps in current assessment tools • identify mechanisms to better address socio-economic consequences, e.g.: <ul style="list-style-type: none"> ▪ alter the current assessment process to ensure whole-of-mine life, post-mine and cumulative effects of development ▪ integrate Environmental Impact Statements and Social Impact Analysis into regional planning mechanisms 	<ul style="list-style-type: none"> • Government (all tiers) • Industry and their representative bodies • Research providers
Funding & resource allocations	<ul style="list-style-type: none"> • Ensure collection and redistribution of revenue from mining is undertaken in a transparent, accountable and equitable manner • Ensure funding/ resource allocation accounts for the non-resident population 	<ul style="list-style-type: none"> • State and Local Government
Climate Change	<ul style="list-style-type: none"> • ensure climate change risk and exposure is factored into all future mining developments for the region, including the cumulative effect of mining • explore partnerships with the agricultural sector to develop carbon offsets and environmental services to address CO2 emissions from fossil fuel usage 	<ul style="list-style-type: none"> • Government (all tiers) • Industry • Research providers • Regional planning groups
Hard infrastructure provision (generally)	<ul style="list-style-type: none"> • address long-term issues of water demand, supply and reliability – particularly given the emergence of climate change as a key factor affecting supplies 	<ul style="list-style-type: none"> • Government (all tiers) • Industry • Research providers
Soft infrastructure provision (generally)	<ul style="list-style-type: none"> • focus on gender imbalances (e.g., needs of mining communities with a disproportionately higher number of males) • focus on the needs of youth • develop integrated and viable transport services for the region 	<ul style="list-style-type: none"> • Government (all tiers) • Industry & representative bodies • Research and transport

		<ul style="list-style-type: none"> providers • Regional planning groups
Housing	<ul style="list-style-type: none"> • consider new ways to address the housing issues in the Bowen Basin including gathering sound data on housing demand, housing affordability, rental cost and availability, choice in housing style and type as well as land availability. 	<ul style="list-style-type: none"> • Government (all tiers) • Industry and their representative bodies
Education	<ul style="list-style-type: none"> • consider ways to address the paraprofessional/ specialist teacher shortages 	<ul style="list-style-type: none"> • Government (all tiers)
Health	<ul style="list-style-type: none"> • consider new ways to address the shortages of hospital beds and the acute shortages in medical practitioners and allied health professionals in the region. 	<ul style="list-style-type: none"> • Government (all tiers)
Assessing & improving social wellbeing	<ul style="list-style-type: none"> • develop and use effective indices to monitor community health and wellbeing • use wellbeing data for delivery of targeted support and services to regional communities to address declining liveability • address the shortfall in community and personal services in the Bowen Basin • address issues of shift and drive in-drive out fatigue in the region 	<ul style="list-style-type: none"> • Government (all tiers) • Community • Industry and their representative bodies • Research providers
Attraction/retention and skills shortages	<ul style="list-style-type: none"> • support skilled migrants and their families to assist in addressing skills shortages 	<ul style="list-style-type: none"> • Government (all tiers) • Industry and their representative bodies
Families	<ul style="list-style-type: none"> • focus on the needs of mining communities with a disproportionately higher number of families 	<ul style="list-style-type: none"> • Government (all tiers) • Industry • Indigenous leaders / groups • Research providers • Regional planning groups
Indigenous population	<ul style="list-style-type: none"> • work together to more effectively engage indigenous people in the mainstream economy and the resource sector 	<ul style="list-style-type: none"> • Government (all tiers) • Industry • Indigenous leaders / groups
Community development	<ul style="list-style-type: none"> • examine ways to stem economic leakage • target programs to engage SME's and to improve local supply capacity, business acumen, quality assurance, access to venture capital • develop business networks, clusters and alliances • clarify the roles and responsibilities of each stakeholder and collaborate 	<ul style="list-style-type: none"> • Government (all tiers) • Industry • Research providers • Local businesses • Regional planning groups

CONCLUSIONS

The rapid growth that is currently being experienced in the Bowen Basin has significant implications for regional sustainability and development. Much of the growth hinges upon the mining industry, a sector often characterised by boom-and-bust cycles. The growth pressures that accompany rapid resource development in regional communities can be difficult to manage; this is particularly so because the responsibility for social and economic infrastructure and services is rarely attributed solely to project proponents. More often, responsibilities are often shared across different levels of government and private industry, and this makes it difficult to respond to changed community needs in a timely manner. The ability of the Bowen Basin's coal producers to help maintain Australia's position as a leading coal exporter, and to respond to growth in global coal consumption, depends on the timely and responsive development of new mines, together with supporting rail and port infrastructure, access to water resources and the availability of skilled human resources. Thus, if regional development and governance needs are not successfully addressed, they will not be able to underpin the rapid growth in the resource sector and the future competitiveness of Australia's coal exports may be compromised.

Addressing regional development in 'resource regions' will require an integrated and collaborative partnership approach between industry, government and the community. In 2006, a survey of sustainable development initiatives in the Australian mining and minerals industry noted that the sector can use a range of options to improve local communities, including environmental, social, community and business elements (Guerin, 2006). Embedding sustainable development principles into site operations, and working closely with local suppliers are two important success factors in this process. However, the complexity and interdependency of the challenges confronting the Bowen Basin region indicate that much wider engagement is necessary: the Government and the resource industry need to work in partnership, and with the community, to assess their options and develop pathways forward, all whilst taking into consideration multiple impacts and the cyclical nature of the resource industry. Partnerships and regional coordination between industry, government and the community are important, especially those that take a regional and multidisciplinary approach. Positive outcomes can be achieved from community-driven initiatives in particular – and ultimately, the desired outcome of these is where townships can develop in a complementary and coordinated way that benefits industry together with the region and the individual communities that host industrial activity.

The developmental pressures facing the Bowen Basin, including impacts on hard and soft infrastructure provision and other social consequences, are likely to be similar to those experienced by other regional resources industries in Australia. Thus, learnings from the Bowen Basin can, in many respects, be translocated to other regions. Moving forward, comparative analyses between the Bowen Basin and other growth regions, and particularly the development of benchmarking data,

will assist in improving sustainable regional development outcomes at a national (and potentially international) scale.

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