

Rolfe (CQU) Submission to House S.C. FIFO inquiry

Submission to the House Standing Committee on Regional Australia of Fly-In and Fly-Out (FIFO) workforce practices in regional Australia

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1. Overview

The focus of this submission is on the economic justification for fly-in and fly-out (FIFO) or drive-in and drive-out (DIDO) workforce operations in mining and other sectors in Australia and the regional economic impacts that are likely to be generated. This submission is organised into comments on several key themes:

1. The changing nature of workforce operations and estimates about the extent of FIFO and DIDO patterns
2. Reasons for using FIFO and DIDO operations
3. Economic effects of FIFO and DIDO operations
4. Community attitudes to FIFO and DIDO operations
5. Why mandated FIFO and DIDO operations should be avoided
6. Recommendations

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2. Background and experience

This submission has been developed by Professor John Rolfe, with additional input from Mr Lindsay Greer and Dr Delwar Akbar in the Centre for Environmental Management at CQUniversity.

John Rolfe is a Professor of Regional Economic Development at CQUniversity. He has international standing as a research leader in environmental and regional development research with over 90 refereed publications, most of which are in international journals. He leads the Centre for Environmental Management at CQUniversity, based in Gladstone and Rockhampton in central Queensland, comprising around 25 research staff (funded almost entirely from external grants) and a further 25 post-graduate students.

Professor John Rolfe and his research group and collaborating researchers have extensive current experience in assessing the impacts of resources development in the Central Queensland region. The team has more than \$1.5 million in research and contract research funding awarded in this field since 2003 from industry, government and nationally competitive grants. Across more than 20 different projects, the research has been focused on assessing the social and economic impacts of resource developments, particularly mining, with key analysis on assessing workforce location, housing and labour force issues. The group are currently part of the Minerals Future project, funded through the CSIRO Minerals Down Under National Research Flagship. A number of research reports generated with Professor Rolfe are available through the following website: www.bowenbasin.cqu.edu.au. The material provided in this submission is drawn from across the projects that Professor Rolfe and his research team at CQUniversity have been involved with.

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3. The changing nature of workforce arrangements

The use of a non-resident workforce is now an integral part of many mining operations in Australia.

There has been increased usage of FIFO and DIDO operations in mining activities in Australia since the 1970s. While the use of FIFO was initially focused on remote locations where it was difficult to provide appropriate infrastructure and services, there is now increasing application of FIFO and DIDO in more accessible areas. The use of FIFO is particularly evident in resource operations in Western Australia, while the use of DIDO is particularly evident in the Bowen Basin region in Queensland. While remote locations may be only serviced by FIFO, many resource operations are serviced by a mixture of FIFO, DIDO and local workforce when the range of direct employees, contractors and indirect employees are considered.

The extent of the issue can be shown in the material provided in Rolfe et al. (2010), where there were estimated to be 38,029 employees in the mining and resources sectors in Queensland. More than 40% of these employees are located in Brisbane and communities along the Queensland coast (excluding Gladstone) (Table 1). While many employees in Brisbane are based in head offices, and some employees in Rockhampton and Townsville are working in the local minerals processing plants, the evidence suggests that a large proportion of mining and resource sector employees are choosing to live in a different area to their workplace.

Table 1. Qld mining and resource sector employees in Brisbane and coastal communities in 2010

Local Government Area in Queensland	Residing mining and resource industry employees	
	Number	% of sector
Brisbane	5,819	15.3
Mackay	3,065	8.1
Townsville	2,132	5.6
Rockhampton	1,465	3.9
Toowoomba	451	1.2
Moreton Bay	413	1.1
Sunshine Coast	377	1.0
Redland	368	1.0
Cairns	298	0.8
South Burnett	231	0.6
Gold Coast	218	0.6
Bundaberg	159	0.4
Gympie	138	0.4
Logan	128	0.3
Fraser Coast	107	0.3
Somerset	102	0.3
Cassowary Coast	88	0.2
Burdekin	73	0.2
Hinchinbrook	43	0.1
North Burnett	41	0.1

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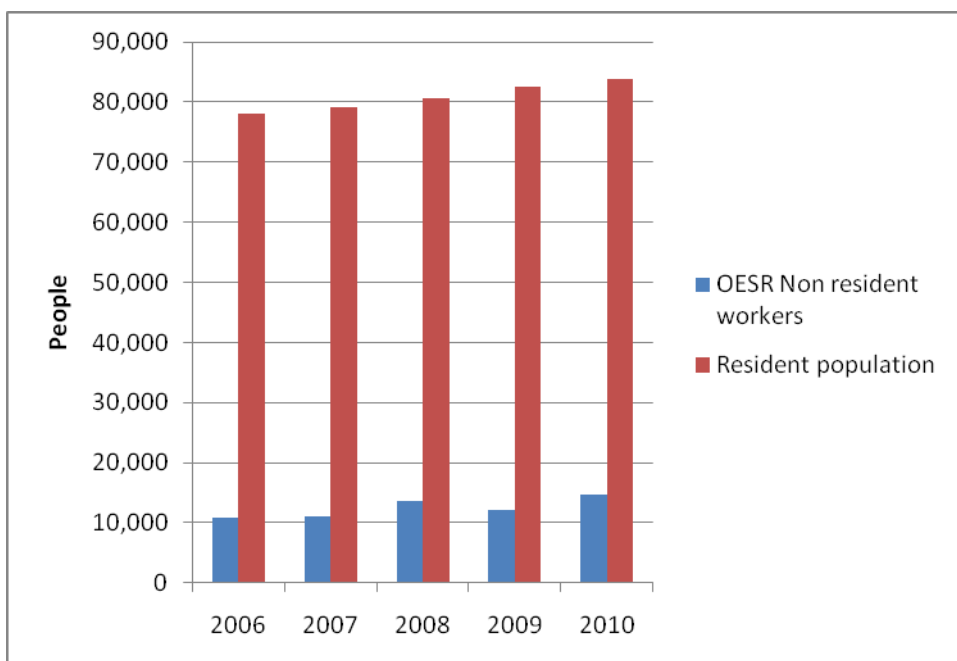
The use of FIFO and DIDO arrangements is not restricted to the mining industry. Australian workforces have become much more mobile in recent decades, in part because the costs and time involved in long distance travel have improved. There are many cases of workers and professionals commuting between cities and to other locations for block shifts or a working week on a temporary or a full-time basis. FIFO and DIDO arrangements are much more common in resource areas and communities because of (a) use by the mining industry, (b) housing shortages and (c) workforce demands. The small size of many communities in regional areas makes it difficult to provide workforce and/or housing during growth times. While mining industries often provide the core of FIFO and DIDO workforces, the need for the mining services sector, the business supply chain and the wider community and government services sectors mean that the non-resident workforce commuting into an area may be very diverse. Greer et al. (2009) report from one study of workcamps in the northern Bowen Basin that employees from more than 40 different companies from the mining and mining service sectors were identified staying in the camps.

In Queensland, the estimates of the number of workers commuting to mining regions by FIFO or DIDO for block shift periods are often under-estimated. The Office of Economic and Statistical Research (OESR) has been conducting annual surveys to estimate the size of the non-resident workforce in the Bowen Basin. The workforce estimates summarise the number of non-resident workforce in the region at any point of time, but the results are often mis-interpreted as the total amount of the non-resident workforce. For example, OESR (2010:v) reports that

Non-resident workers made up around 14,600 or 15 per cent of the 2010 FTE population, a slightly higher representation than in 2006 (12 per cent).

The data reported in OESR (2010) is summarised in Figure 1, which shows the estimated resident population in the region by year, plus the size of the 'medium term' non-resident workforce in the area (estimated in June each year). 'Medium term' means that only non-resident workers who are in the area for block shift periods of several days have been counted; contractors and other workers who are only in the area for day visits or single nights have not been counted.

Figure 1. OESR estimates of Bowen Basin population and non-resident workers



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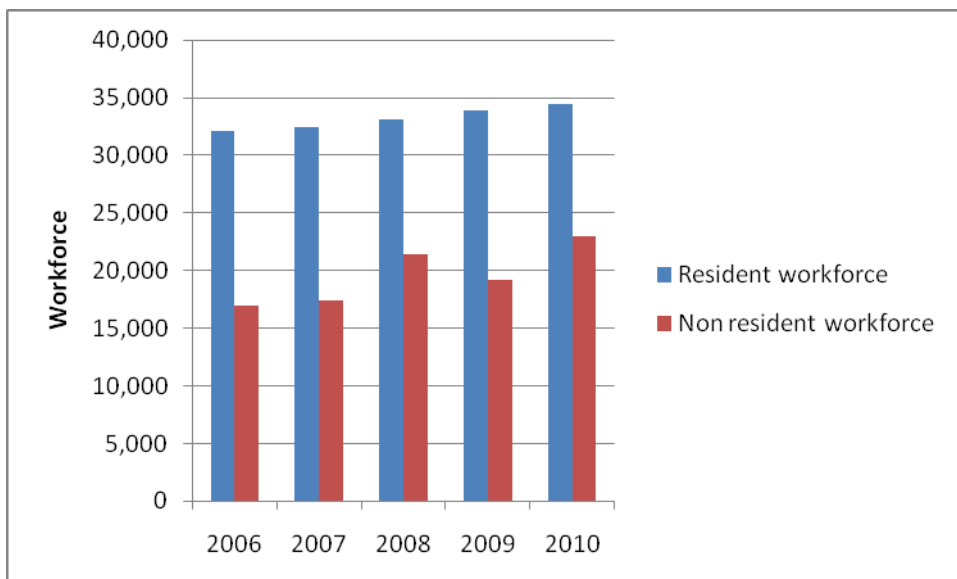
However the total number of non-resident workers in the Bowen Basin is much higher when the pattern of block shifts is considered. Most mines work in a 24 hour cycle with three rotating shift blocks and additional maintenance contractors. Typically two shifts are rostered on for 12 hour blocks with one shift away on 'days off'. Typical rosters are reported by OESR (2010) to be 7 days on and 4 days off, although some operations in the Bowen Basin work with 7 days on and 7 days off.

The workforce in the Bowen Basin can be usefully summarised into three groups:

- Workforce in local resident population (participation rate of 48.9% at 2006 Census)
- Non-resident workforce commuting to the area on block shifts
- Contractors and other providers making short trips

The size of the first two groups, assuming an overall workforce participation rate in the resident population of 48.9%, and a 7-on, 4-off work roster for non-resident employees is shown in Figure 2. This shows that non-resident workers accessing the Bowen Basin by FIFO and DIDO are a larger group and have a greater share of employment in the region than is commonly believed. At June 2010, it is estimated that there are at least 22,963 non-resident workers employed in the Bowen Basin, compared to an estimated local workforce of approximately 34,438. (Total resident workforce is estimated at 40,997 people, but based on the 2006 Census data, 16% are assumed to be resident in the area and working elsewhere).

Figure 2. CQU estimates of Bowen Basin local and non-resident workforce



Although the Bowen Basin region is one of the more closely settled regions of Australia, containing 20 small to medium townships, including regional centres such as Emerald, Biloela and Moranbah, at least 40% of all jobs in the area are serviced by DIDO and FIFO operations. It is worth noting that this is likely to be an underestimate of total work activity supported by DIDO and FIFO operations because the analysis provided here:

- does not account for differences in work intensity (many local residents may only have part-time employment whereas almost all non-resident employees work 12 hour shifts),
- may underestimate non-resident workforce where there are longer rotations between shifts
- does not account for some contractors and other workers who only access the region on day trips or short trips.

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4. Reasons why resource companies use FIFO and DIDO operations

FIFO and DIDO arrangements are likely to be the only practical arrangement for very remote sites, and for operations with only short to medium term time horizons. There are a number of different reasons why **resource companies** might choose to use a FIFO or DIDO operation. Practical reasons include:

- limited or no labour and housing stocks in local areas,
- the difficulties of providing housing or developing housing in short time frames,
- the difficulties of providing services and social infrastructure in short time frames
- the need to provide labour force in very short time frames (particularly for construction)
- the short term nature of construction periods and the short to medium term nature of mining operations.

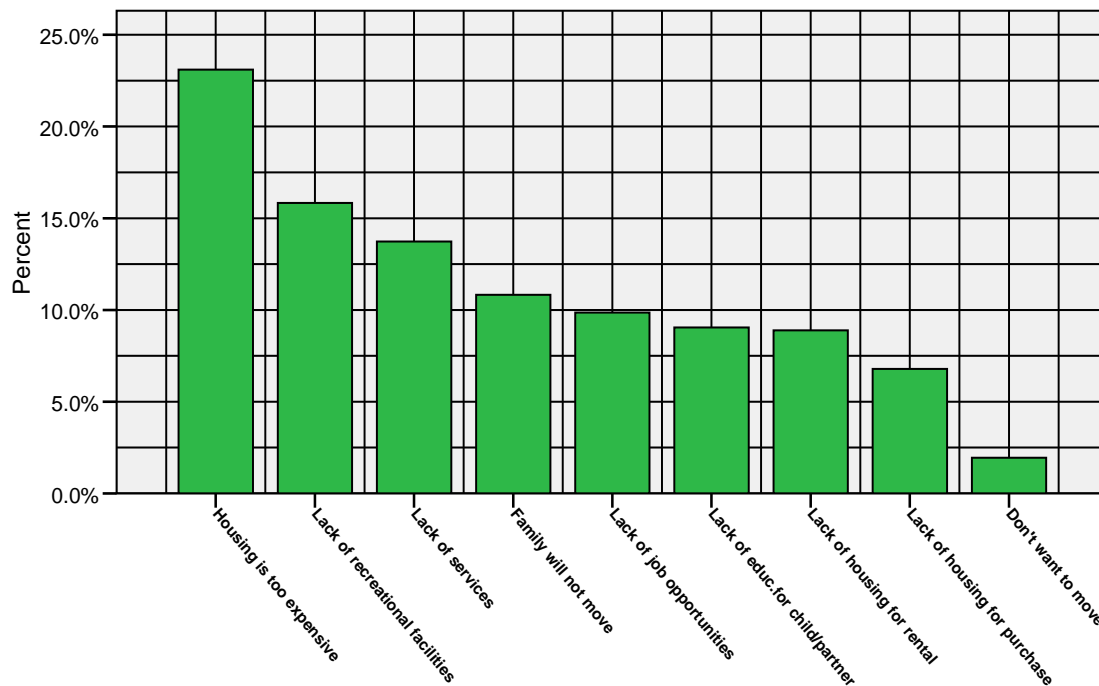
FIFO and DIDO arrangements are particularly relevant for construction stages, and may be useful in minimising impacts on local communities.

There are a range of other factors that may increase incentives for DIDO and FIFO operations, even in areas where labour and housing stocks are available. Structural reasons include the effects of fringe benefits tax when companies provide infrastructure and services for a local workforce, and the increasing use of development conditions which make resource companies more responsible for housing, service, infrastructure and road safety issues in local regions. Companies may prefer a FIFO or DIDO workforce because it avoids issues with local housing and service requirements, allows more flexibility in workforce sourcing and employment, and minimises the concentration of union power in local workforces. Even where there may be opportunities to locate workforce in local communities, **there may be perverse incentives for some companies to have DIDO and FIFO arrangements as a consequence of development conditions, fringe benefit taxes and industrial relations issues.**

5. Reasons why many employees prefer FIFO and DIDO operations

There are a number of different reasons why **resource employees** might choose to use a FIFO or DIDO operation. There are changing social trends, with some families reluctant to base in remote communities where jobs for partners, and education, health, recreation and other services are more limited (Rolfe et al. 2007a). The results of one survey conducted with the section of a workforce commuting to a coal mine in the southern Bowen Basin (Rolfe et al. 2008) is shown in Figure 3. This demonstrates that housing issues are the largest barrier to employees living locally (about 39% of the commuting workforce), but that lifestyle, lack of services and family issues were also very important.

Figure 3. Reasons why non-resident workforce at one Bowen Basin mine did not live locally.



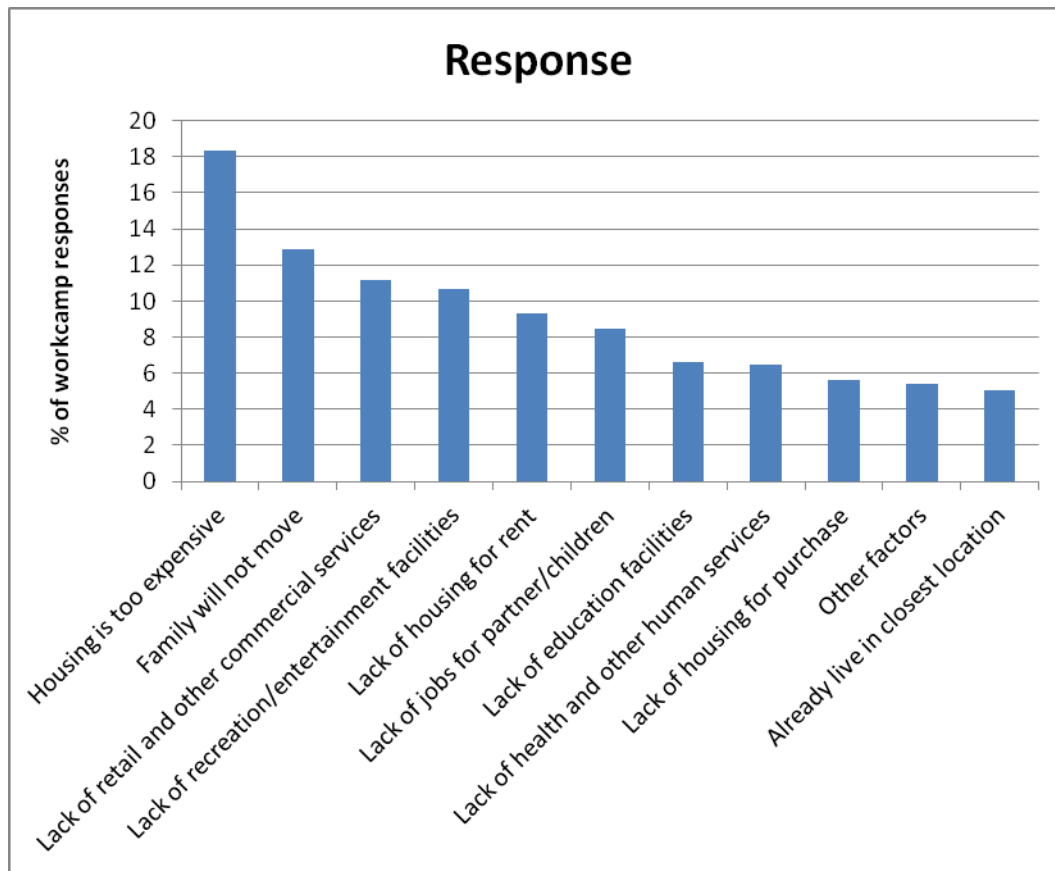
Source: Rolfe et al. 2008

Similar studies have been conducted in the commercial workcamps in the northern Bowen Basin, where many residents are more recent entrants to the mining sector and employed by sub-contractors (Rolfe et al. 2007b, Greer et al. 2009). The results of these studies (Figure 4) confirm that the lack of available housing accounted for one-third of responses about why people did not live locally. Similar to the study on a permanent mining workforce, lifestyle, family issues and the lack of services were other key reasons why people did not want to live locally.

It is expected that location choices will be driven by combinations of factors. Rolfe et al. (2009) report that between 11% and 20% of mining camp residents in the Nebo area of the northern Bowen Basin would prefer to live locally rather than commute. The comparison between the different study results suggests that it may be important to address packages of issues to make large changes in the proportion of workforce prepared to live locally.

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Figure 4. Reasons why Workcamp residents did not live locally.



Source: Greer et al. (2009)

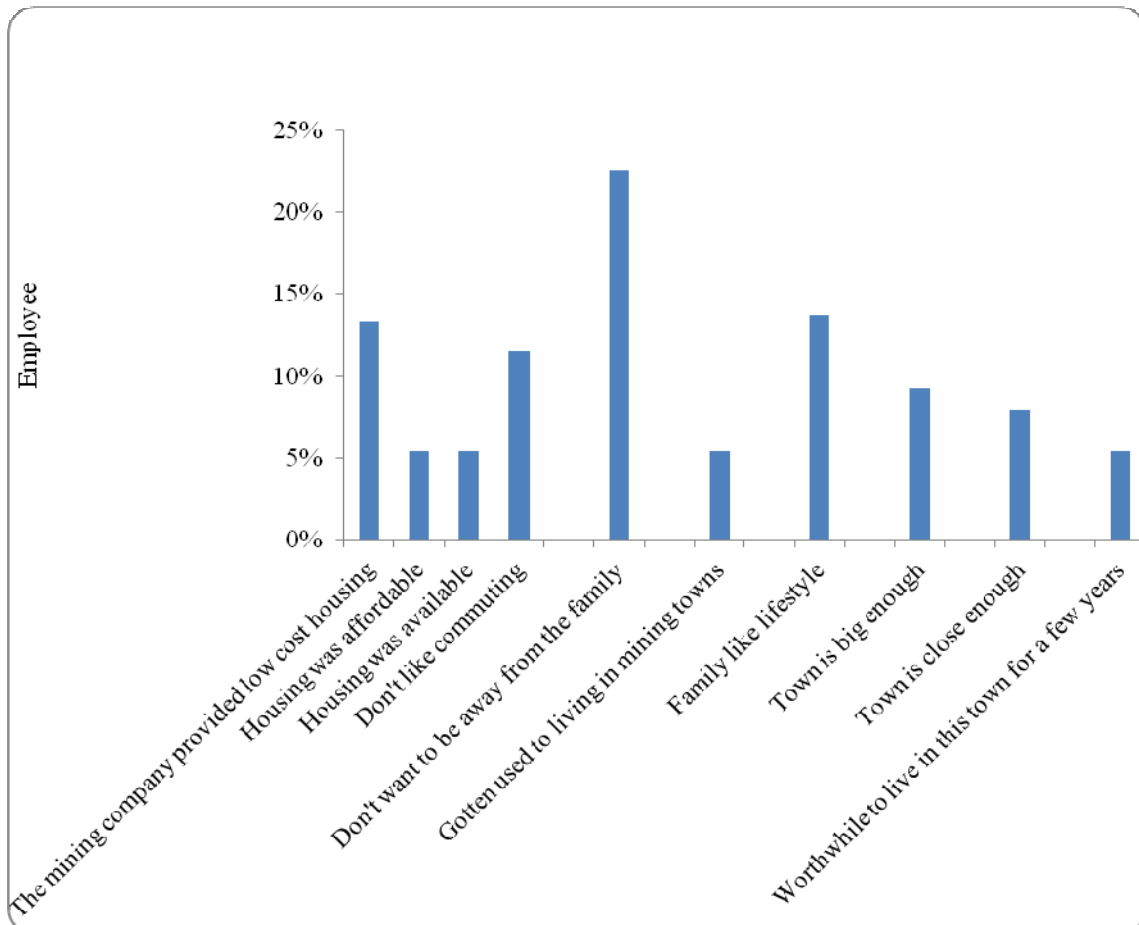
Unaffordable or unavailable housing is one of the major reasons why employees choose FIFO and DIDO arrangements. Studies conducted on commuting workforces in permanent mining operations (Rolfe et al. 2007b) and workcamps (Greer et al. 2009) indicate that for 39% and 33% of respondents respectively the lack of affordable or suitable housing was the major reason why they were commuting to their workplace. High housing costs are typically associated with resource communities (Rolfe et al. 2007), and provide a transmission link between economic pressures and social pressures, as well as providing a strong disincentive to more workforce being based locally. High housing costs in mining and resource communities are a form of localised ‘Dutch Disease’, where pressures from rapid development transfer costs to other economic sectors and restrict further economic development (Rolfe et al. 2007a). Addressing housing supply issues is a key factor in limiting FIFO and DIDO patterns and providing choice for workforce location.

Some employees prefer to live close to their workplace. Many older mining operations (e.g. at Mt Isa and Moranbah) still have a large proportion of their workforce living in the local community. The results of one survey at a coal mine in the Bowen Basin identified reasons why a large proportion of workers chose to live locally (the mine was within commuting distance of Moranbah, a larger centre in the northern Bowen Basin) (Akbar et al. 2009). The study showed that preferences to live close to their family and/or to avoid commuting was the dominant reason for about one-third of the local

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workforce, while access to appropriate housing was a dominant reason for another quarter of the workforce. Satisfaction with the lifestyle in the town accounted for a further 15%.

Figure 5. Reasons why resident workforce at one Bowen Basin mine did live locally.



Source: Akbar et al. (2009)

While the majority of new workforce may prefer to commute to mines for block shift periods, a substantial core of workforce may prefer to live locally. The effects of the changes in social trends can be seen from residential patterns for Bowen Basin mine employees over the past 20 years where at many sites there may be options to live locally or to commute. Older mines such as the Riverside-Goonyella mine near Moranbah still have up to two-thirds of the workforce living in the local town (Moranbah), where the provision of housing in the past and adaption to the community means that employees prefer to live locally. More recent mines (such as the Xstrata mine near Rolleston) where there is some local workforce available and opportunities for local housing have a local resident population of about one-third of their workforce. Surveys conducted in the workcamps in the northern Bowen Basin indicate that 11-20% of workers who are already commuting for block shifts would prefer to live locally if housing and services were available (Rolfe et al. 2007b).

Workforce location patterns may be 'path dependent'. The choices that employees make about whether to commute are likely to be influenced by the residential patterns at the beginning of their employment. Where housing is available and workers can live close to employment, there is greater

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likelihood that more employees will live locally. When workers begin their employment with commuting arrangements, then it is likely that workers and their families get used to the arrangements, perpetuating the pattern over the longer term.

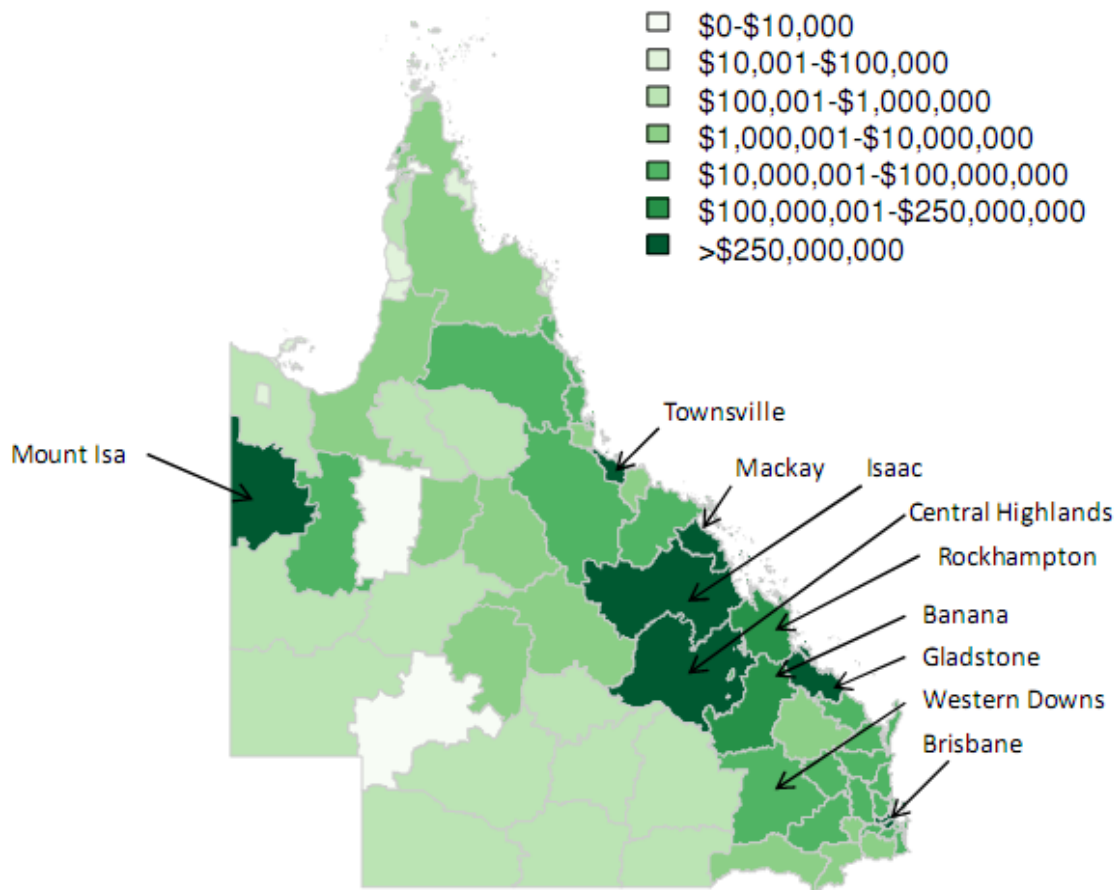
While a proportion of workforce can be expected to want to live in local communities, some workforce can be expected to prefer FIFO and DIDO arrangements, particularly at different stages through their working career. A 'life cycle' hypothesis suggests that preferences to live locally may vary through a working career (Rolfe et al. 2008). Employees who are young and single often prefer to live in larger centres and commute to work locations, whereas employees with young families often prefer to live locally (within 30 minutes travel time). As families get older, and education, lifestyle and partner employment needs increase, families are more likely to relocate to larger centres, with the mining employee moving to a commute pattern. Older workers are even more likely to commute, with lifestyle factors becoming more important.

Shift length is an important determinant of incentives for FIFO and DIDO. Rolfe et al. (2007) identify how the changes in shift length (to 12 hours) and moves to block shift rosters changed incentives from the 1990s to live in local mining towns. Longer block shift rosters make it more viable for employees to commute to the workplace from further away (even interstate and internationally). This is because the travel time between the workplace and home is a smaller proportion of 'days off' when rosters are longer (e.g. 2 weeks on and 2 weeks off). Maintaining shorter roster periods (e.g. less than 4 days off in a break) will help to provide incentives to live in local and regional communities.

6. Economic effects of FIFO and DIDO operations

The economic effects of FIFO and DIDO operations are that they spread economic impacts over a wider geographic area. Salary income tends to be spent in the towns where people live rather than where people work, so the effect is that direct income from mining employment tends to spread more widely than it would be if employees only lived in specific mining or industry communities. This pattern can be shown by the analysis of salary payments from the resources sector in Queensland reported by Rolfe et al. (2010, 2011). Results show that only 12 of 73 Local Government Authorities (mostly small remote LGAs) did not have any residents employed in the mining sector, while 65 LGAs did receive some salary income (Figure 6).

Figure 6. Salary payments in Queensland LGAs from resources sector



Source: Rolfe et al (2010).

FIFO operations can have a negative economic effect on specific local and regional communities by essentially transferring population and economic development to other centres. The mining boom that Australia has experienced since 2003 is notable in that much of the development stimulus is already flowing through to capital cities rather than local and regional centres. Instead, many local and regional communities are experiencing a fly-over effect, with limited population, economic or service growth. Limited growth in local and regional areas is self-perpetuating, as their attractiveness relative to larger centres continues to decline as growth bypasses them.

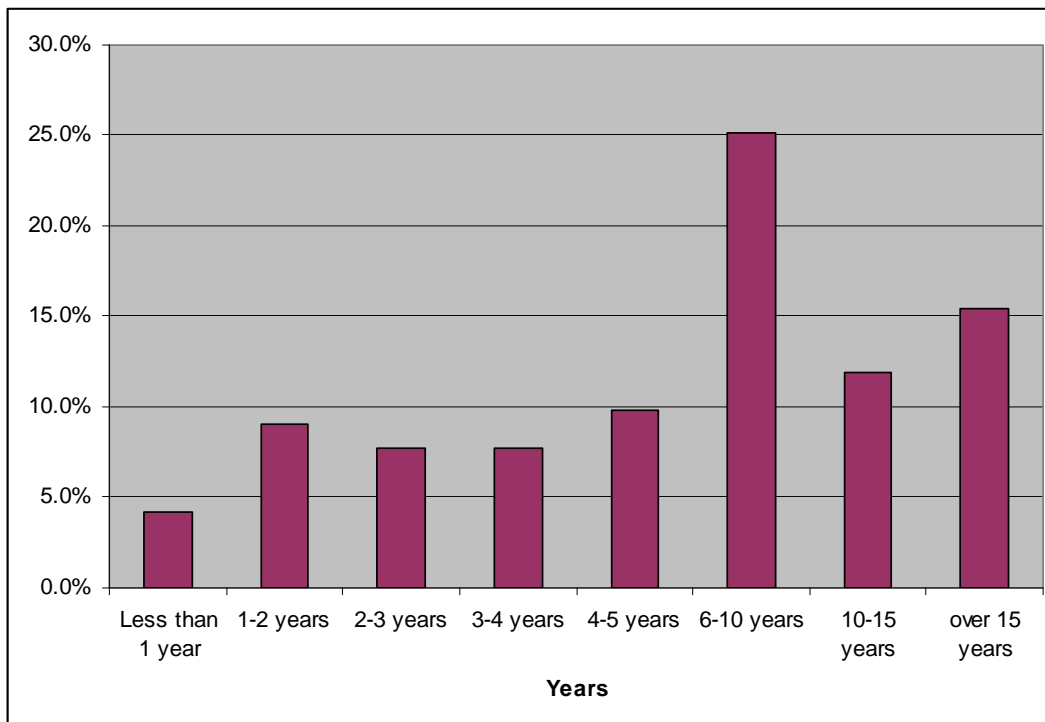
7. Community attitudes to FIFO and DIDO operations

Interviews and surveys conducted in Bowen Basin communities over several years have identified widespread concerns about FIFO and DIDO arrangements (Rolfe 2007, Rolfe et al. 2008, Rolfe et al. 2009, Lockie et al. 2009, Petkova et al. 2009). Possible reasons for a significant negative sentiment about FIFO and DIDO by some residents of Bowen Basin communities adjacent to mining operations include:

- Concerns about community image
- Concerns about impacts on families and workers
- Concerns about loss of engagement and participation in local communities
- Lack of clear economic benefit from the workcamp residents for local community businesses
- A perception of difference with workcamp residents receiving higher than average incomes and benefits
- The association (mostly unsubstantiated) of various social ills (crime, violence etc) with workcamp residents
- Increased dependency with community expectation that mining companies will fulfil an economic and social development function

In Moranbah in the Bowen Basin, Ivanova and Rolfe (2011) report the results of a community survey where they asked a random sample of households in the town to indicate the planned length of residence in Moranbah. The results, summarised in Figure 6, show an average of 8.4 years for expected residency. When residents were asked about different development options, an increase in workcamps was identified as the major concern, with planned residency falling by an average of 1.3 years (16%) if major workcamps were developed.

Figure 6. Planned length of residence of householders in Moranbah (in 2009)



Source: Rolfe and Ivanova (2011)

8. Why mandated FIFO and DIDO should not occur

While there are important reasons why some level of FIFO and DIDO operations will continue, there are three important reasons why it should not become ubiquitous. The first is that evidence from current mining operations in Queensland shows that a substantial proportion of the workforce is often prepared to live locally. Over the past twenty years many resource companies have moved to freeing up employee choice about where they would like to live, essentially providing a field test of location preferences. The longer established mines around communities such as Mt Isa and Moranbah still have approximately 60 – 80% of their workforce living locally, while newer mines such as Xstrata's mine near Rolleston has around one-third of their workforce living in the Central Highlands area. Surveys of workcamps in mining communities reveal that up to 20% of this very mobile workforce would prefer to live locally.

The second reason is that a standard FIFO approach would remove opportunities for local and regional workforce participation. Mining ventures are typically located in regional areas of Queensland with limited economic bases and high levels of social disadvantage. Currently, incomes and expenditure from many resource companies are an important stimulus to local and regional economies. Future resource developments in Queensland can potentially generate employment and business expenditure benefits in areas such as the Darling Downs, South West and Central West that to date have had limited involvement with mining. DIDO arrangements are preferable to FIFO arrangements because the workforce tends to be retained in regional areas.

The third important reason is that distant FIFO operations cripple opportunities for regional development and set a precedent for future workforce location patterns. If it is appropriate to FIFO from towns like Moranbah (which is a regional centre that already has 10,000 people), why not have FIFO operations to industrial cities like Gladstone, which only has three times the population and has larger prospects for resource development. Accepting the proposition that FIFO operations can occur into major centres sets a precedent for every large resource development in Australia to be serviced out of capital cities.

Given these three arguments, that FIFO operations do not suit all potential employees, do not spread wealth to local and regional areas, and sets a poor precedent for regional development, what should the Australian and state governments do? The answer lies in freeing up employee choices about location, addressing barriers to local workforce participation, and removing artificial incentives that favour FIFO operations.

Australia has an open diversified economy that generates growth and resilience by maximising choices that people and enterprises have about where they will supply factor inputs and allocate outputs. In keeping with the principles of an open, competitive economy, resource operators should accept the best skilled workforce that is available for the block shift periods, allowing employees to make their own choices about location. This should stimulate markets for housing and transport to provide the options that people may employ to live and commute to the workforce from different locations.

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9. Recommendations

There are a number of recommendations that flow from the material presented in this submission.

1. Policy settings should be framed around giving people freedom of choice about where to live and work, and transport options between locations where appropriate.
2. There needs to be better recognition that FIFO and DIDO work patterns are commonplace and will continue.
3. Planning and approval processes for major projects should have better recognition and planning for the needs and impacts on 'home' communities that provide FIFO and DIDO workforces.
4. Address regulatory and planning issues that provide major resource companies and other employers with perverse incentives to favour FIFO and DIDO arrangements over a locally based workforce.
 - a. Current taxation systems, particularly the fringe benefits tax, limit the incentives of resource companies to provide local housing and services.
 - b. Increasing development conditions on new projects around housing, transport safety and community infrastructure is creating perverse incentives for mining companies to limit use of local communities.
 - c. Issues about workforce flexibility and unionisation should be addressed through industrial relations reform.
5. Develop appropriate housing stocks in local communities that match the potential inflow of new employees, and avoid high housing costs that can generate perverse impacts on local town development
 - a. Provide development proponents with better guidelines for accommodation options that include diversity and avoid large impacts on social and affordable housing
 - b.
6. Address issues that make local towns less attractive as residences for workers over FIFO or DIDO options
 - a. Address barriers to relocation of workforce, such as stamp duties on housing.
 - b. Provide public infrastructure and services in a timely manner in rapidly growing communities
 - c. Pay attention to lifestyle and other factors that would help to encourage future workers to relocate to regional and local towns.
7. Develop more consistent planning for FIFO accommodation that maximises community benefits
 - a. Integrate FIFO services and facilities into local communities to maximise economic development
 - b. Develop better integration policies to overcome perceived social differences between FIFO workers and local communities
 - c. Provide better guidelines and standards for workforce accommodation camps that encourage a higher level of liveability, encourage family friendly practices, and provide different accommodation choices.

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Addressing these strategies would allow local and regional communities in resource areas of Australia to attract new workforce to their towns, thus increasing opportunities for economic growth and regional development. Company mandated FIFO operations should be avoided so that employees can choose where they want to live, while government should remove the barriers and perverse incentives that act against having a local workforce base.

References

- Akbar, D., Rolfe, J., Ivanova, G. and Pudasaini, K. (2009) *Analysis of Housing Demand and Housing Choices for Miners in the Bowen Basin Region: A Case Study of Moranbah*, Research Report No 6&7, Assessing Housing and Labour Market Impacts of Mining Developments in the Bowen Basin Communities – ACARP C16027, Australian Coal Association Research Program, Brisbane.
- Greer, L., Akbar, D. and Rolfe, J. (2009) Sustainable mining futures and the livability of mining villages, paper presented at the SEGRA conference in Kalgoorlie, WA, 27-29th of October.
- Lockie, S., Franettovich, M., Petkova-Timmer, V., Rolfe, J. and Ivanova, G. (2009) “Coal mining and the resource community cycle: A longitudinal assessment of the social impacts of the Coppabella coal mine”, *Environmental Impact Assessment Review*, 29: 330 – 339.
- Office of Economic and Statistical Research (OESR) (2010) *Bowen Basin Population Report 2010*, Office of Economic and Statistical Research, Queensland Treasury, Brisbane.
- Petkova-Timmer, V., Lockie, S., Rolfe, J. and Ivanova, G. (2009) “Mining developments and social impacts on communities: Bowen Basin case studies” *Rural Society* 19(3):211-228.
- Rolfe, J., R. Miles, S. Lockie and G. Ivanova (2007a) Lessons from the social and economic impacts of the mining boom in the Bowen Basin 2004 – 2006, *Australasian Journal of Regional Studies*, 13(2): 134-153.
- Rolfe, J., Petkova, V., Lockie, S. and Ivanova, G. (2007b) *Mining Impacts and the Development of the Nebo Township and Community*, Report 5, Economic and Social Impacts of the Coppabella and Moorvale Mines Research Reports, Central Queensland University, Rockhampton.
- Rolfe, J., Yabsley, E., Greer, L., Akbar, D., Ivanova, G. and Yabsley B. (2008) *Ensuring Sustainable Benefits from Boom Periods: A Case Study for Long Term Housing Policy in the Bowen Basin*, Final Report Prepared for the Queensland Department of Tourism, Regional Development and Industry, Central Queensland University, Rockhampton.
- Rolfe, J., Ivanova, G. and Yabsley, B. (2009) *Housing and Labour Market Issues: Survey of Moranbah Households*, Research Report No 8, Assessing Housing and Labour Market Impacts of Mining Developments in the Bowen Basin Communities – ACARP C16027, Australian Coal Association Research Program, Brisbane.
- Rolfe, J., R. Lawrence, D. Gregg, F. Morrish and G. Ivanova (2010) *Minerals and Energy Resources Sector in Queensland Economic Impact Study*, report prepared for the Queensland Resources Council, The Eidos Institute, Brisbane.
- Rolfe, J., Lawrence, R., Rynne, D., Gregg, D. and Ivanova, G. (2011) The Economic Contribution of the Resources Sector by Regional Areas in Queensland, *Economic Analysis and Policy*, 41(1), 15-36.