

**INQUIRY INTO BENEFICIAL AND PRODUCTIVE POST-  
MINING LAND USE**

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Standing Committee of State Development

## Summary

This submission provides a summary of relevant research findings of a study which explored community preferences and attitudes toward mine rehabilitation and post-mining land use (PMLU) options of coalmines in New South Wales (NSW). Focus groups, on-line survey, in addition to a choice experiment (CE) was used to estimate the non-market values held for mine rehabilitation outcomes using a case study of a coal mine in the Central Tablelands of NSW.

In principle, from an overall social welfare perspective, the value(s) that the land provides to the community, including the market and non-market values, should be accounted for when deciding upon the PMLU, but evidence that this is done in practice is lacking (Kazmierczak et al., 2017; Everingham et al., 2018). Mine rehabilitation (and subsequent PMLU) delivers tangible and intangible environmental, cultural, and social values to society; however, these are rarely considered in mine rehabilitation decisions (Damigos & Kaliampakos, 2003). This is partly because social and environmental values are difficult to estimate, particularly when those values are not traded in markets (i.e. non-market values).

Little attention is also afforded to mine rehabilitation alternatives during the assessment process; instead, regulatory policies and assessments typically focus on the impacts caused by mining (Menegaki & Damigos, 2020; Kung et al., 2020). Failure to account for informed mine rehabilitation and PMLU decisions may result in rehabilitation commitments that lead to sub-optimal societal outcomes. Assessment of the social and environmental impacts and benefits of mine rehabilitation outcomes is needed to inform evidence-based decision-making, which will add to the community and regulatory trust and transparency of mining companies.

## 1. Recommendations

- From an overarching social welfare perspective, consider the benefits and value of mine rehabilitation outcomes which incorporate social and environmental values.

- Consider community expectations surrounding PMLU decisions given they are not aligned with current mine rehabilitation and PMLU policy, especially around:
  - o evidence based decision-making processes for PMLU.
  - o incorporation and mechanisms of community preferences in PMLU decision making.
- Make mine features, rehabilitation and PMLU information publicly available to enable informed decision making and help identify beneficial PMLU.
- Consider a PMLU classification system that provides a consistent description of land use and land-use change that is an explicit statement that is aligned with the utility of the rehabilitation (Fogarty et al., 2019).

## 2. Findings

### 2.1. PMLU trends

- The most common pre-mining land use in NSW is agriculture, and the most frequently nominated PMLU was agriculture and biodiversity (Fogarty et al., 2019).
- It is common for mine sites to nominate a combination of PMLUs.
- Evidence was found to show that operations are unlikely to remain consistent with the land-use present at pre-disturbance.
- Given the rural setting of open-cut coal mines in NSW, more novel PMLUs such as tourism, commercial or industrial ventures may be adopted in higher populated areas that are able to support these land-uses.
- A change of a PMLU is uncommon; a mine will typically not alter from the initially approved PMLU. Wilpinjong Coal Mine is one known example where a change of PMLU was approved<sup>1</sup>.

### 2.2. Rehabilitation and PMLU values and preferences (CE model)

- Consider the benefits and value created through the current mine rehabilitation areas within the industry which may include productive agricultural land, native wildlife habitats, or creation of a rehabilitation industry.
- Results show that the NSW community holds a range of values across the offered mine rehabilitation attributes and preferences were influenced by the level of information presented in the CE survey. Results found that knowing the proportions of a PMLU is provided and where this sits in the landscape is equally as important as knowing what the PMLU will be.
- Preferences for mine rehabilitation consisted of PMLU combinations, especially solar and conservation (in combination).

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<sup>1</sup> From a PMLU of grazing and biodiversity, to conservation only.

- The community hold diminishing PMLU preferences for the amount of area mine rehabilitated land is used for including 60% and 80% for native vegetation, 60% for conservation, 80% grazing and between 20-40% solar.
- Respondents further preferred having access to rehabilitated land for recreation, less time needed to establish a PMLU, and creating more local jobs through the established PMLU.

## 2.3. Community preferences and attitudes

### 2.3.1. Mine Rehabilitation and PMLU

- Creation of *beneficial* land-use was identified as the ultimate goal of mine rehabilitation, where beneficial was articulated as someone being able to *use* mine rehabilitated land, creates employment or, at the very least, generate an income to pay for ongoing land management.
- Sustainability of the PMLU was deemed a success indicator of mine rehabilitation especially if it can be used for future generations, alleviates disturbance of other areas for land demands, or has a PMLU centred on alternative energy such as solar or wind farms.

### 2.3.2. Informational needs on PMLU

- More transparent public information on proposed PMLUs can assist in identifying future beneficial land-uses, support decision-making, and policymaking.
- In our research, NSW community members expressed concerns that mine rehabilitation/PMLU decisions by the mining companies and the NSW Government are not sufficiently transparent. While mine rehabilitation and PMLU information are publicly available in NSW; however, it is typically buried in compliance reports or large environmental impact statements documents, often with conflicting statements making it difficult to comprehend.
- No published information exists on either the collective plans for proposed PMLUs such as spatial information relating to approved PMLUs and how they sit in the surrounding land-use. This finding is not unique and has been reflected in most Government inquiries and audits in Australia to date (Commonwealth Government, 2019; Commonwealth Government, 2020; QLD Government, 2013; NSW Government, 2017).
- The level of detail provided to community members on a site's PMLU is important, and thus it is recommended that the PMLU be made available visually as well ensure that the PMLU reflect a description of the land-use categories but also the amount of each land-use.
- It is suggested both Government and mining companies need to be responsible for making this information available.

### 2.3.3. Communities' role in PMLU decision-making

- Community members in NSW have questioned the effectiveness and value of community input during this process, having lost faith in the NSW planning process with some feeling their concerns remain unresolved, while others believe there is a lack of transparency in the decision-making process (Fogarty et al., 2023).
- Community members recognise that they should have input in developing mine rehabilitation outcomes but feel their opinions do not carry much weight in Government decision-making.
- Notably, there are few examples in NSW where mine rehabilitation outcomes proposed by a mining company have been altered due to community input during a mining approval process.
- There was an expectation that mining companies undertake an analysis when considering different PMLUs.
- There were contradictory discussions when talking about PMLU changes, with some believing that the proposed land-use needs to be flexible, allowing the PMLU to be revisited during operations. In contrast, others advised that the PMLU needs to remain as initially decided because that is what the community expects to see after mining.
- Findings also concluded that the community believe they should have the greatest say in mine rehabilitation outcomes. It was suggested an advisory group be created with the people representing the community's interests and ultimately decide on mine rehabilitation outcomes. The use of a citizen jury (NSW Government, 2016) or stakeholder panel (Everingham et al., 2018) has been raised previously as an alternative to the current process.

## 2.4. Utility values of mine rehabilitation

- The PMLU for a site should account for the social utility value provided after the mining (Kazmierczak et al., 2017; Everingham et al., 2018). The utility value is based on how land will be used and the profit from land-use (Everingham et al., 2018; Rodrigue, 1994).
- Our research (Fogarty et al., 2019) found that when describing a PMLU, it was also common for mining companies to use non-descriptive language that failed to account for the potential use of the rehabilitation or mine site as a whole. For example, having a PMLU of 'bushland' does not describe potential use.
- We proposed that the description of a PMLU should be an explicit statement that is aligned with the utility of the rehabilitation (Fogarty et al., 2019, Kazmierczak et al., 2017; Everingham et al., 2018).
- Given communities' strong desire to understand how the mine rehabilitation will be used after mining it is suggested that Governments consider policy improvement such as a PMLU classification system that provides a consistent description of land-use and land-use change. A common PMLU classification could meet community preferences for transparency, provide guidance to assist in setting rehabilitation objectives for the

mine site, allow regulators to apply a consistent way to measure rehabilitation performance of mining companies, and so inform future land-use decision-making.

## 2.5. PMLU decision-making process

- As the industry has grown and evolved, so has the expectation for resource companies to make decisions based on science, community inputs, and responsible risk management (Queensland Government, 2017, Queensland Government, 2017a). The community expects that mining companies analyse options of alternative PMLUs when making mine rehabilitation decisions and is a requirement of NSW policy (NSW Government, 2015; NSW Government, 2015a). However, little evidence could be found of publicly available PMLU analyses.
- There are three main approaches to evaluating mine rehabilitation impacts: non-market valuations, market valuations, and other decision-making techniques such as multi-criteria analysis or ecosystem services assessments.
- While some decision-making tools such as multi-criteria analyses include social, economic, and technical factors, they typically evaluate one PMLU.
- Many studies only focused on the biophysical aspects of the mine or surrounding area and are not inclusive of social or economic factors.
- Better transparency of decisions will give the community confidence that the full range of potential impacts (positive and negative) have been considered (NSW Government, 2016)
- A choice experiment (CE) is an effective tool that can be used to account for the benefits of mine rehabilitation as well as incorporate stakeholder preferences in an evidence-based decision-making process (Mendes, 2013), although there is little evidence of their use when making mine rehabilitation and PMLU decisions.
- The use of a CE also addresses the community expectation that mining companies use evidence based decision-making to determine an optimal PMLU for site. The benefit of a CE is the estimation of WTP values that can be considered in a cost-benefit analysis of mining proposals. Furthermore, quantifying social environmental and social values of mine rehabilitation contributes to refocus the conversation of mine rehabilitation as a compliance obligation to instead the societal contribution generated from mine rehabilitation.
- Fogarty, K 2022, *Eliciting post-mining land-use preferences and values: an open cut coal mines in New South Wales, Australia*, is the first non-market research in Australia and second international example, which considers PMLU options.

### 3. Background

- I completed a PhD in 2022 titled '*Eliciting post-mining land-use preferences and values: an open cut coal mine in New South Wales, Australia*'. The study explores community preferences and attitudes toward mine rehabilitation and post-mining land use options of coalmines in New South Wales (NSW).
- With over 15 years' operational experience in the coal mining industry within Queensland, New South Wales and Victoria, I have worked on a diverse range of technical issues and projects which covers complex post-mine transition challenges and opportunities such as: active and future economic transitions in mining regions, social dimensions of mine closure, First Nations inclusion, re-commercialisation and beneficial post-mining land use opportunities. My passion is aligned with integrated mine planning leading to successful mine rehabilitation and closure.
- I have lived in rural mining communities in QLD and NSW for most of my life.

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