

**Submission
No 15**

INQUIRY INTO BENEFICIAL AND PRODUCTIVE POST- MINING LAND USE

Organisation: Green Gravity

Date Received: 25 June 2024

NSW Parliament Legislative Council
Standing Committee on State Development

24 June 2024

Dear Chair Hon Emily Suvaal MLC,

Thank you for the opportunity to contribute to the public consultation for the NSW Parliament Inquiry into beneficial and productive post-mining land use. Green Gravity welcomes the broad economic, environmental, and social criteria set out by the Terms of Reference. I would be **pleased to appear at the Inquiry to expand on our perspective in person.**

We are an innovative renewable energy storage provider working to repurpose mining assets, infrastructure and skills for NSW's energy transition. The Inquiry is ideally suited to examine the potential impact of Green Gravity's unique technology. By providing an entirely new post-mining land use for legacy mines, the application of our technology can drive increased value, investment, and employment in regional NSW.

About Green Gravity

[Green Gravity](#) is an NSW based energy storage developer. Our Gravitational Energy Storage System (**GESS**) technology has been developed utilising heavy objects moving vertically through legacy mineshafts to exchange electrical and gravitational potential energy. As heavy weighted objects are raised through the mineshaft, energy is consumed by running motors, converting electrical energy into gravitational potential energy. When electrical energy is required, heavy weighted objects are lowered through the mineshaft, generating energy as the descending weight spins the winch and causes the regenerative motor to generate electricity.

The GESS is a mechanical technology with no capacity degradation, long asset life (30+ years), no waste or chemical handling, and repurposes mining assets for a productive future. The technology offers cost-competitive long duration energy storage and will play a critical role in the NSW energy transition, while simultaneously adding domestic manufacturing capacity to underpin scaling up.

Post Mining Context

Green Gravity has engaged across multiple Australian states and international jurisdictions to calibrate our technical and commercial offering. The significant scale of post-mining assets is noteworthy, with estimates provided to the 2019 Senate Inquiry¹ into mine rehabilitation identifying more than 50,000 abandoned sites in Australia. While NSW has a disproportionately small number of these sites, other research² cited by the Productivity Commission has identified NSW as the most exposed state to inactive mining assets, with

¹ [Senate Inquiry Report – Parliament of Australia \(aph.gov.au\)](#)

² [Submission DR71 - Attachment: A Geospatial Database for Effective Mine Rehabilitation in Australia - Corrine Unger - Resources Sector Regulation - Commissioned study \(pc.gov.au\)](#)

19,728 identified terminated or ceased mining activities. This scale underscores the genuine opportunity for NSW to actively incentivise and facilitate the productive reuse of this surplus disturbed land.

The repurposing and rehabilitation of post-mining land has not yet proven to be a successful exercise for NSW, with very few examples of successful transition. The 2019 Senate Inquiry¹ found almost no examples (see paragraph 2.42) of mines in final closure and relinquishment. While there is no centralised data on mines in “care and maintenance,” estimates from the Australia Institute range from 200 to 970 nationally. The [Australian Mine Atlas](#) identifies 18 sites in “care and maintenance” in NSW, however there are clearly many more portions of operating mine leases in extended “care and maintenance”.

The absence of relinquished sites and the considerable number of inactive sites is evidence of inadequate public policy enabling post-mining land use. Minesite holders, including the NSW Government Crown Land, have no clear incentive mechanism to actively drive higher value uses for the post-mining land. Furthermore, there is no clear accountability mechanism for post-mining land holders for inaction. It is clearly in the community interest for rehabilitation of this land to proceed, and the opportunity cost is being borne by the community for the inaction of the leaseholders.

The Inquiry is an opportunity for the NSW Parliament to simultaneously address discharging of mining rehabilitation obligations and the State’s energy transition. By establishing a clear framework for post-mining land use assessment and a re-purpose tender process, it could stimulate investment into mining rehabilitation. This would provide greater certainty on rehabilitation liabilities for the State and mining lease holders, and secure land tenure for energy generation and storage.

Key Themes

1. Encouraging the transition to post-mining land use

Incentive to transition sites

The quantity of post-mining or “care and maintenance” land in NSW is large and the opportunity cost of inaction is significant. Critical investments in the energy transition, industrial capacity, housing opportunities and jobs could be accelerated with enhanced incentives to liberate this land.

Public policy should be developed to hold mining lease holders accountable (and penalised) where post-mining land rehabilitation and repurposing is inactive. The NSW Government should consider systematic and mandatory transition of key assets for repurposing. Where suitable infrastructure projects can be proposed, and where there is clear public interest, portions of mining leases should be transferred to the State for the advancement of those infrastructure projects.

Mining assets remaining in “care and maintenance” for prolonged periods should be discouraged. Public policy should be developed to cap the time assets can remain in “care and maintenance” and to require post-mining projects to be implemented at these sites.

Prioritising the clean energy transition

The challenge for NSW to achieve an effective transition to a low-carbon, low-cost electricity grid is well documented in [The Climate Change \(Net Zero Future\) Act 2023](#). It is critical that all sectors are aligned to implementing measures that enable the State to successfully navigate the transition and meet our ambitious emissions reduction targets.

Mining lease holders should be required to assess clean energy transition opportunities associated with their land and assets. Legislation already enables multiple interests to be accommodated with a single allotment of land, whether that be pastoral, minerals, gas, or traditional owner uses. Public policy should be developed to enable access rights to develop post-mining land use for energy projects while overlapping with other rights. This should be developed with particular focus on the development of clean energy infrastructure or assets for the State.

Crown land transitional use

Several NSW mining leases are on, or partially on, NSW Crown Land³. In many cases post-mining Crown land remains idle and not rehabilitated. Post-mining Crown land has the potential to generate greater income for the State if repurposed to support energy transition projects. When the post-mining land already belongs to the Crown or one of its entities (e.g., Sydney Water) it should present an even greater opportunity to assess and repurpose the land for critical state development in energy generation and storage.

2. Regulatory Framework and Approvals

Mining Act reforms

Mine authorisations in NSW are granted under the [Mining Act 1992](#). Authorisations include Assessment Leases, Exploration Leases and Mining Leases. Recent reforms to the Mining Act emphasise rehabilitation over traditional mining operations. These reforms have shifted the focus from mining operation plans to rehabilitation strategies, mine closure plans, and landscape management plans.

In terms of closure / transition requirements or obligations, post approval mine management plans must be consistent with the original approval documents. A key challenge is the lack of detail in approvals documentation for older projects, where the focus has traditionally been to return mined land to bushland or agricultural (pre-existing condition).

A shift that allows for partial rehabilitation to be recognised and potentially introduce a phased release of bonds associated with the original mining activity would encourage alternate economic use cases for mining land. By integrating these reforms, the regulatory framework can support innovative land uses while maintaining environmental integrity and community benefits.

³ Department of Resources and Energy: MinView/NSW Geodata Warehouse. Available online: <https://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/geosci-ence-information/services/online-services/minview>

Clear definition of land use changes

One challenge is defining the change in land use from mining to an energy storage hub. It must be clear whether this change constitutes a modification or a completely new development application.

The 2022 Mine Rehabilitation Reforms ([Mining Act 1992](#)) facilitated expanded implementation of mine domain closure objectives and criteria. This provided potential renewed reuse opportunities for alternate land uses for areas nominated as infrastructure domains (includes pit top, laydowns, roads, and rail). A clear definition can help avoid reopening entire mining approvals for review, thus reducing regulatory hurdles. This clarity is crucial for encouraging innovative post-mining land uses and supporting clean energy industries.

Increasing requirements for new investment to account for post-mining use

We have observed and assessed a considerable number of closed and legacy mining assets for the potential to accommodate GESS. With appropriate installation of certain infrastructure into mineshafts, many sites have the potential to deploy much needed energy storage to firm the State's transition to renewables. It is likely that if mineshafts were required to account for future GESS deployment at the time of initial design, the cost and ease of future GESS installation would be enhanced. NSW should enhance regulations for the installation of mineshafts to accommodate future gravitational energy storage infrastructure.

3. Systematic coordination

Coordination between agencies

Projects repurposing mine shafts must navigate approvals from multiple agencies, including those overseeing mining, environmental protection, and planning. Coordination between these agencies is vital to streamline the approval process. The recent separation of planning and environmental responsibilities within the NSW Government could impact how these projects are managed, necessitating proactive engagement with all relevant agencies. This coordination is essential for developing a robust regulatory framework to maintain best practices in post-mining land use.

Addressing inconsistencies across jurisdictions

There are inconsistencies in how different States manage post-mining land use and residual risks. A unified approach or at least synthesised guidelines could reduce the burden on companies operating across multiple states. This would provide clearer pathways, encouraging more companies to invest in repurposing disused mines. By addressing these inconsistencies, NSW can position itself as a leader in innovative post-mining land uses.

Increasing the pace of post-mining transition

The significant time that many legacy mining land holdings have remained unrehabilitated indicates more attention is required on the speed of planning and execution of post-mining land use opportunities. Public policy should be developed to identify critical projects on post-mining land and provide planning instruments to accelerate their development.

4. Environmental and Safety Considerations

Residual risk and bond liabilities

One of the critical aspects of transitioning from mining operations to energy storage hubs involves managing residual risks and bond liabilities. The residual risk, typically associated with the potential environmental impact post-closure, needs careful consideration. The transitioning of bond liabilities from the Mining Act to the Planning Act could be beneficial, as it would align the financial assurances with the new land use. This approach ensures that financial mechanisms are tailored to support innovative post-mining uses without compromising environmental and safety standards.

Rehabilitation obligations

Partial rehabilitation could be a viable approach, wherein specific parts of the mine, like shafts used for energy storage, are rehabilitated to the required standards. This approach can facilitate the return of bonds to the original mining operators while ensuring that the new use meets environmental safety standards. Clear guidelines and frameworks to support partial rehabilitation and transition of responsibilities from miners to new operators will be required to ensure that post-mining land uses contribute positively to local communities and the economy.

5. Social Obligations and Community Engagement

Enhancing closure plans with social considerations

Integrating social obligations into mine closure plans is crucial. It is critical to consider regional and community impacts when planning post-mining land uses. By incorporating social obligations into closure plans, projects can gain community support and address potential social impacts, making the transition smoother and more sustainable. This aligns with the Inquiry's focus on ensuring equitable sharing of benefits between communities and mine operators.

Role of independent bodies and community engagement

The role of an independent authority, with a profile modelled from EnergyCo⁴, to facilitate communication and engagement with local communities on post-mining land use to repurpose for state energy infrastructure within NSW declared REZ's would be of benefit. It would help address community concerns regarding greenfield land use for energy infrastructure and ensure that the transition of mining lands to energy aligns with regional development plans.

The requirements for rehabilitation planning and execution are failing to sufficiently liberate sites for post-mining land use. The requirements for progressive rehabilitation should be increased to enable more sites to achieve sufficient risk profile to enable accelerated post-mining land use projects. The NSW Government is a holder of multiple post-mining sites. Like policy employed in Queensland, the NSW Government could systematically assess the portfolio of legacy sites and take measures to release the sites for assessment and repurposing. Particularly for energy generation and storage in NSW declared REZs.

⁴ The Energy Corporation of NSW (EnergyCo) is a statutory authority established under the *Energy and Utilities Administration Act 1987*

Green Gravity Terms of Reference alignment

a. Benefits of Multiple Successive Land Uses

Repurposing disused mineshafts for energy storage offers benefits by providing new uses for existing infrastructure. This can create jobs, stimulate the economy, and support industry growth. Multiple successive land uses ensure that land continues to provide value long after mining operations cease, contributing to sustainable regional development.

b. Changes in Land Use Potential and Demand

Shifts in the economy, renewable technology, and skills training drive changes in land use potential and demand. By embracing these changes, NSW can foster innovative post-mining land uses that align with contemporary economic and technological trends. This includes the development of clean energy industries and advanced manufacturing, which can provide long-term economic benefits and enhance regional resilience.

c. Opportunities for Investment and Growth

There are opportunities to invest in skills development for mining communities. By focusing on skills relevant to renewable energy and advanced manufacturing, NSW can ensure that local workers are equipped to participate in new industries. This supports economic diversification and enhances the long-term viability of regional communities.

d. Encouraging Innovative Post-Mining Land Uses

Encouraging innovative post-mining land uses, such as energy storage hubs, requires a supportive regulatory framework and proactive government policies. By fostering innovation, NSW can attract investment, create high-value jobs, and position itself as a leader in sustainable development. This includes exploring partnerships with industry and research institutions to develop innovative technologies.

e. Equitable Sharing of Benefits

Ensuring the equitable sharing of benefits between communities and mine operators is essential for sustainable development. This involves transparent decision-making, community engagement, and fair distribution of economic gains. By prioritising equity, the NSW government can build trust and support for innovative post-mining projects.

f. Community Expectations and Innovative Reuse

Balancing community expectations with innovative reuse of existing infrastructure is critical. Mining communities often have specific expectations regarding post-mine land use, including environmental rehabilitation and economic opportunities. By engaging with communities and addressing their concerns, innovative projects like energy storage hubs can gain broader acceptance and support.

g. Developing a Robust Regulatory Framework

A robust regulatory framework is necessary to maintain best practices in post-mining land use. This includes clear guidelines, streamlined approval processes, and coordination between agencies. By developing such a framework, NSW can ensure that post-mining projects are implemented efficiently and sustainably, providing long-term benefits to communities and the economy.

Conclusion

Repurposing disused mine shafts into energy storage hubs presents a unique opportunity for NSW to leverage existing infrastructure for renewable energy solutions. Navigating the current regulatory framework in NSW requires an understanding of multiple planning pathways, disincentivised management of residual risks and bond liabilities, and navigating multi-level approvals. By addressing these areas and aligning with the terms of reference, the NSW Government can facilitate innovative projects that contribute to the State's renewable energy goals and provide sustainable and economic post-mining land uses for its mining regions.

Green Gravity recommend the NSW Parliament Inquiry consider reforms to:

- (i) **Enhance Incentives for Post-Mining Land Use Transition:** Develop policies that incentivise (or penalise) mining lease holders to actively rehabilitate and repurpose post-mining lands. Consider mandatory transition of key assets for repurposing and transfer portions of mining leases to the State for state significant energy infrastructure projects.
- (ii) **Prioritise Clean Energy Transition on Mining Lands:** Require mining lease holders to assess and integrate clean energy opportunities into their post-mining land use plans. Develop public policies to facilitate access rights for developing clean energy infrastructure on post-mining lands.
- (iii) **Accelerate Post-Mining Transition:** Implement policies to expedite planning and execution of post-mining land use projects. Increase requirements for progressive rehabilitation to enable faster repurposing of mining sites and systematically assess legacy sites for energy transition repurposing opportunities.
- (iv) **Systematically Coordinate Regional Efforts:** Develop regional post-mining land use strategies to unite stakeholders and streamline rehabilitation efforts. Enhance coordination between mining, environmental, and planning agencies to simplify approval processes and ensure best practices.
- (v) **Manage Environmental and Safety Considerations:** Transition bond liabilities from the Mining Act to the Planning Act to align financial assurances with new land uses. Establish clear guidelines for partial rehabilitation to meet environmental standards for energy land use and facilitate responsible transition of responsibilities.
- (vi) **Integrate Social Obligations and Community Engagement:** Include social obligations in mine closure plans to ensure a just transition for mining communities and address regional impacts. Use independent bodies to facilitate engagement with local communities on repurposing mining lands for energy infrastructure.
- (vii) **Reform Regulatory Frameworks and Approvals:** Provide clear definition and planning pathways for land use changes to encourage phased mine rehabilitation and release of bond liabilities, accelerating the managed liberation of critical land for energy generation and storage.

By implementing these recommendations, the NSW government can create a supportive regulatory environment that encourages the innovative use of disused mine shafts for energy storage and generation, contributing to the state's sustainable energy future and aligning with the broader goals outlined in the Inquiry's Terms of Reference.

Our commitment

Green Gravity is committed to playing its role in NSW's Energy Transition and we understand that this is going to be achieved region by region, community by community. Green Gravity's technology provides an alternative economic use for mining lands and helps deliver enhanced sovereign capacity and capability in energy storage, at a regional level.

By using proven mechanical parts that can be manufactured in NSW, and disused mines, Green Gravity's energy storage technology is low-cost, long-life, and environmentally compelling. Storing energy in this way uses no processed chemicals. Green Gravity's energy storage technology improves the economics of wind and solar power, leading to a faster and lower cost transition away from fossil fuels for NSW.

Green Gravity has genuine transformational value, providing highly efficient storage and dispatchable power to meet demand, deliver grid stability, and support emissions reduction from mining and industrial activity. We can also support local community energy schemes through firming distributed energy resources.

We applaud the NSW Parliament Legislative Council's inquiry into post-mining land use and look forward to attending the Standing Committee hearings in August. Further to this, **I am available to appear at the Standing Committee to further elaborate on our perspectives.**

Yours sincerely,

Mark Swinnerton
Founder & CEO