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NSW NET ZERO COMMISSION RESPONSE TO CONSULTATION PAPER

We appreciate the opportunity to respond to the NSW Net Zero Commission's Consultation Paper on behalf of the Net Zero Institute and The Warren Centre Energy Hub at The University of Sydney. In this submission, we have focused our responses on those questions where we believe our collective expertise can provide additional value to the Commission's deliberations.

We look forward to further opportunities to contribute to the important work of the Commission in the future.

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Q1/ What can you tell us about your experience of the impacts of climate change and how can the commission seek to reflect and respond to this in its work?

Communities in NSW are already seeing the effects of climate change through more frequent extreme weather events, stressed ecosystems, and disruptions to agriculture. These impacts are especially challenging for vulnerable groups, including First Nations and low-income communities.

To respond, the Commission should coordinate climate action across government sectors, engage affected communities in planning and decision-making, and build local capacity for participation. Focusing on resilience (as an outcome of both effective mitigation and adaptation), tracking real outcomes (e.g. rather than numbers of activities alone), and ensuring transparent reporting (including independent scientific verification and community feedback) will help create a fair and effective response to climate change.

Q2/ What actions can the commission take to engage across the community to help drive the shifts needed for the net zero transition and for effective climate change mitigation and adaptation?

- Coordinate engagement across all relevant government sectors (health, education, energy, economic development) for a whole-of-government approach.
- Streamline approval processes and create cross-disciplinary teams to address delays while maintaining strong community engagement.
- Prioritise inclusive and early engagement, involving diverse groups (First Nations, regional, vulnerable communities) in planning and decision-making, Moving beyond traditional consultation to genuine co-design. This will require investing in building community capacity so all groups can participate meaningfully, not just well-resourced ones.
- Use a mix of engagement methods (local panels, online town halls, interactive mapping) to broaden and streamline participation.
- Ensure transparency and accountability by clearly reporting how community input shapes decisions and tracking progress through outcome-based measures.
- Support local participation in energy projects and ensure direct community benefits to build trust and secure social licence for the net zero transition.

Q3/ How should the commission best engage with First Nations people to learn about cultural knowledge and practices to support adaptation, and what information and evidence should it draw on to inform its understanding of these practices?

The NSW Government's Department of Aboriginal Affairs provides guidance for best-practice co-design and collaborative engagement strategies that are instructive for how to best engage Indigenous communities when it comes to renewables infrastructure and Net Zero economic and energy transformation more broadly. To achieve effective community-led involvement in Net Zero planning and project execution requires a re-examination of how policy development and infrastructure planning is done, but it also requires overcoming a series of institutional, methodological and capacity based obstacles that currently make this work difficult.

Institutionally, substantive engagement with Indigenous communities requires government to change how it understands community benefit in relation to renewable infrastructure. The challenge is not simply to say that projects "should" benefit community, but to work "with" communities for them to define the kinds of benefits they seek and to negotiate with them on if and how those goals can be realised. Typically, when building renewables infrastructure, the idea of community benefits are construed narrowly – such as the project might unilaterally offer a "benefit" for community in the form of discounted energy for Aboriginal Land holders. Yet when benefits are determined by government and not with

communities there is evidence that they are more likely to be seen as coercive rather than a strategy for community consent (Jørgensen ML (2020) Low-carbon but corrupt? Bribery, inappropriateness and unfairness concerns in Danish energy policy. Energy Research & Social Science 70: 101663). However, enabling a community to identify the benefits they want means that the process of community consultation has to be broader than just under the climate or energy portfolio. It requires a 'whole-of-government' approach to consultation, for instance a community might identify benefits such as health or education outcomes in addition to issues related to energy. This would require cross-portfolio coordination. This kind of whole of government approach has precedence in other portfolios with NSW Premiers Department having previously played a coordinating role when it comes to Aboriginal Affairs, and it should be considered here too.

When it comes to capacity and methodology, a major challenge is that the communities that are asked to be involved in the consultation process are not resourced, trained or well supported to participate. In all forms of consultation, engagement strategies are only as strong as pre-existing community capacity. When done well, co-design is a policy or research practice that seeks to involve affected communities in the entire policy or development process. This kind of engagement requires what Aboriginal Education scholar Lyn Riley has called 'pre-research', an investment in capacity building and a serious understanding of co-created decision-making (Riley, L. (2021) Community-led Research through an Aboriginal Lens. In: Community-Led Research: Walking new pathways together., edited by V. Rawlings, J. Flexner and L. Riley. Sydney: Sydney University Press). There is precedent for this in government, with the Department of Planning's work on Caring for Country projects in Western Sydney (that emerged out of bio-diversity work in relation to housing) that have sought to deploy these strategies. But it is worth noting that this work has only been possible because of the role played by internal departmental leadership that recognises that there is a need to build pre-existing relationships with community before any consultation begins, that Indigenous staff were hired as part of the consultation team, that individual staff had a particular set of relationship-based skills, and that timelines were changed so they were open and flexible to allow for genuine community participation.

Q4/ What additional mechanisms, support, or incentives can meaningfully empower and enhance First Nations people's involvement in climate mitigation, adaptation, and environmental stewardship?

It is important to draw on best-practice guidance from the NSW Department of Aboriginal Affairs and successful models like Caring for Country, which emphasise community-led research. The Commission should implement a whole-of-government approach to consultation-coordinating across health, education, and economic development, not just energy-to address broader community priorities. Investing in capacity building, including training, resources, and funding, will ensure First Nations communities are well-equipped to participate meaningfully. Hiring Indigenous staff for consultation teams and building long-term, trust-based relationships before formal consultation begins are also essential. Finally, genuine co-design and collaborative engagement should be adopted.

Q5/ What additional information and evidence should the commission consider when assessing progress towards NSW's targets for reducing net greenhouse gas emissions?

The Commission's 2024 Report included an assessment of how NSW compares to other jurisdictions from a regulatory perspective, however there was no comparison of the emissions reductions versus other emitters. One approach may be to find countries, states, regions, and metropolitan areas that had similar emissions to NSW in 2005 and compare net carbon emission reductions over the last 20 years.

Q6/ The speed of deployment of electricity generation and infrastructure is a key risk to emissions reduction targets. What more could be done to fast-track deployment?

This question has been considered by many industry experts, and in general the key barriers and risks are well understood. They include a lack of coordinated planning, lengthy permitting delays (including issues with methods for consulting communities which can lead to legal challenges), a lack of technical experience running a power system with this mix of generation, and general inertia of many of the industry and regulatory stakeholders. Neither the NSW Road Map nor the AEMO Integrated System Plan are a *comprehensive plan for the energy transition in NSW*. Here we suggest how to fast-track deployment by developing Core Principles for the energy transition in the state upon which the actions can be implemented.

Principles for a comprehensive plan for the Energy Transition in NSW:

Urgency and Timing

- Accelerate deployment where emissions reduction is most urgent, such as large-scale grid infrastructure and high-emitting sectors.
- Allow time for inclusive community conversations where local impacts are significant, ensuring social license and long-term support.

Urgency and inclusive consultation need not be in conflict if engagement is built into, rather than added onto, the project schedule. Begin local dialogue at the concept stage, while engineers, planners, and financiers are still shaping routes and designs, so community issues surface before plans harden and attitudes polarise. Use standing reference panels in regions that host repeated projects, rely on pre-identified corridors and Renewable Energy Zones to confine debate to routing details, actively engage a broad-base of communities so consultation activities go beyond the usual suspects, and run streamlined online town-halls and interactive mapping to gather broad feedback quickly. Pair this with a transparent, consistent method-based approach that includes a community-input scheme so discussion focuses on 'what' and 'how,' not 'if,' benefits flow.

Meanwhile, create one-stop 'strike-force' permitting teams that house planning, environmental, heritage, and First Nations specialists together, cutting sequential referral delays. Grant conditional approvals that let early works start while secondary design elements are refined in response to feedback, and keep a live commitments register to show how community input changes the project -- preventing issues from being re-litigated. Managed as a parallel workstream with clear milestones, consultation secures durable social licence without extending, and often shortening, the overall timeline.

Adopt a multiscale approach

- Support, decentralised and local developments (e.g., batteries, rooftop solar) alongside large-scale industry projects (e.g., solar farms).
- Move beyond the traditional hub-and-spoke model; encourage distributed and flexible grid architectures.
- Ensure industrial land and grid access are available where needed, recognising that not every community has the same capacity or resources.

Investment and Economic Models

- Electricity generation capacity in NSW is built by commercial entities, governments, and private citizens. Commercial entities build plants when they believe they will earn a positive return on investment. However, increasing costs, longer lead times, and uncertainty about future electricity

prices have reduced the likelihood of positive returns, causing a slowdown in new builds. Certainty about the selling price for carbon-free power may be the most powerful lever to reverse this trend.
- The state and federal governments are increasingly investing in infrastructure, and greater willingness to invest could accelerate buildout.

Interconnection and Digital Solutions

- Prioritise interconnection upgrades and leverage digital technologies to enhance grid flexibility and resilience.
- Accelerate deployment of Virtual Power Plants (VPPs), community batteries, and Vehicle-to-Grid (V2G) solutions to maximize use of existing assets.

Planning and Policy

- Develop a coherent, long-term energy vision and policy for NSW, aligning local, state, and national initiatives.
- Integrate multidisciplinary expertise -- *engineering, economics, electronic technologies, and , and community engagement* -- into planning and delivery.
- Shift from piecemeal technical fixes to integrated engineering solutions, addressing the lack of coordination driven by fragmented financing and policy incentives.

Grid Pricing and Market Design

- Reform grid pricing to better reflect the value of distributed generation and storage, and to incentivise flexible demand.
- Recognise and support the emergence of two distinct and complementary markets: one for large-scale, centralized generation and another for local, decentralised solutions.

Project Delivery and Market Gaps

- Address the stalling of projects by streamlining approvals, reducing regulatory uncertainty, and ensuring timely grid connections.
- Focus on enabling large energy consumers to self-supply and innovate, supporting business models threatened by current market structures.

Supply Chain and Workforce Risks

- A critical, less-discussed barrier is the lack of detailed understanding and planning for the supply chain required for this transition. There are significant risks around the availability of key infrastructure (from transmission towers to transformers), skilled workers, and logistics (moving infrastructure from port to project).
- The cumulative effect of these risks on the viability of Renewable Energy Zone (REZ) plans is not well understood.
- Potential solutions that need investigation include:
    - Enforced local content requirements to ease supply chain risks.
    - Coordination mechanisms to reduce congestion on key ports and roads.
    - Up-front requirements for recyclability, work camp design, and control algorithms in equipment to remove deployment barriers.
- These questions require a major investigation to inform effective, rapid rollout.

Key actions to fast-track deployment include:

Repurpose Existing Infrastructure: Leverage and upgrade the current grid to accommodate both centralized and decentralized generation, minimising the need for new builds.

Enhance Financing Effectiveness: Prioritise proven, scalable solutions -- especially local solar, batteries, and digital integration -- in the funding mix rather than relying solely on large-scale grid rewiring.

Support Local Participation: Foster strong local engagement and participation in energy projects, ensuring communities benefit directly and can contribute to solutions.

Monitor and Iterate: Implement robust measurement and monitoring frameworks for all initiatives, enabling rapid iteration and scaling of successful approaches.

Whole-of-Sector Collaboration: Encourage collaboration across government, industry, finance, and communities to break down silos and drive integrated, system-wide progress.

The following table summarises the most promising electricity and energy strategies, assessed for their expected effectiveness, implementation speed, and NSW-specific readiness:

Approach	Effectiveness	Speed	NSW Readiness
Repurpose grid	High	Fast	High
Redirect finance	High	Medium	High
Local participation	Medium	Medium	High
Monitor & iterate	Medium	Medium	High
Sector collaboration	High	Medium	Moderate

Q7/ Are the measures now in place sufficient to ensure community engagement and benefit sharing from the build out of infrastructure for the energy transition?

No. The social licence issue around the location of large-scale generation and transmission infrastructure has not been solved. One of the largest risks to the pace of the energy transition remains community acceptance of such assets. Given this lack of acceptance, delays in licensing, permitting, and approvals are hindering large projects from going ahead.

When it comes to building a sufficient community engagement processes there are institutional, methodological and capacity based obstacles that need to be addressed. Institutional obstacles lie in government approach to development, where planning processes and timelines are initiated before the community landscape is understood, and in themselves frequently create polarisation in the process. The question of “engagement” cannot be separated from “benefit” and too often a portfolio response to community benefit means that consultation and listening processes are not able to then respond to the concerns that people have raised in the engagement process (e.g. if people identify their biggest issue is the local hospital – it can only be solved through coordination between portfolios). Methodological challenges are about the skills and capacity used to involve communities, that include balancing working “with” communities rather than “for” them. Capacity based challenges come from the fact that communities themselves are often poorly resourced, which means that certain – often wealthier organisations and groups – become the loudest voices in consultation and a broad-based community engagement process does not eventuate. Pre-existing support for diverse community participation in areas where renewable infrastructure is going to be concentrated would be advisable.

We should face past lessons. Some earlier policies, seen with hindsight, let developers earn solid returns and bring a few new power plants online. Others were poorly designed: they encouraged generation to cluster on weak grid links without matching transmission, drove down Marginal Loss Factors, created stop–start policy shifts, sparked local backlash through poor siting, and left an energy-only market that undervalues firm capacity. These legacies lengthen connection queues, erode revenue certainty, and push up financing costs, so fresh projects now stall. If the energy transition falls short, everyone will pay, but people already disadvantaged will carry the heaviest load.

Q8/ Are First Nations communities adequately engaged and included in sharing the benefits of the transition? What more could be done, and by whom?

To improve engagement and benefit sharing, governments and developers could work more closely with First Nations communities, allowing them to define and negotiate the benefits that matter most to them. Adopting a whole-of-government approach-coordinating across sectors such as health, education, and economic development-would help address a wider range of community priorities. Additional investment in capacity building, pre-engagement support, and including Indigenous staff in consultation teams would also support more meaningful involvement. These steps require commitment from both government and project developers to genuine co-design and long-term relationship building.

Q9/ What are likely to prove the most effective approaches to accelerate rapid decarbonisation across freight and passenger transport?

Accelerating the decarbonisation of the transport sector in NSW requires a dual approach: *Making the most popular modes greener and making the greenest modes more popular*. Both the freight and passenger sectors present unique challenges and opportunities, but several strategies stand out as especially effective in the NSW context—based on the state's infrastructure, economic structure, and urbanisation patterns.

For passenger transport, shifting people away from private car use is both urgent and impactful. This involves redesigning the urban mobility system to support public and active transport. Investment in high-frequency bus services and infrastructure — especially using zero-emission electric buses on existing roads with exclusive space for bus to ensure the best use of those resources — and improving active transport infrastructure (such as safe cycling and walking paths) are foundational.

Regulating and enabling e-bikes and e-scooters is a critical component of decarbonising urban transport. These modes must be made safe, convenient, and accessible while minimising disruption to non-users. This includes providing designated parking areas or corrals for shared micromobility to prevent footpath clutter, as well as introducing appropriate road rules that clearly define where these devices can be used, at what speeds, and with what safety requirements. Standardising battery sizes will also facilitate easier recharging and encourage more widespread and sustainable adoption.

These must be supported by regulatory and pricing reforms that appropriately price solo car travel. Road pricing reforms that assign costs for externalities likes pollution, congestion, and noise impacts, if introduced with equity safeguards, could strongly encourage this modal shift. Road pricing should complement existing mechanisms, like parking pricing and availability, for communicating the full cost of car use to users.

Moreover, land-use reforms — particularly zoning changes to facilitate dense, mixed-use development near transit hubs — can lock in long-term mode shift and emissions savings. Fortunately, these policies are being implemented. While land use may change slowly, we can expect at least 20% of the built environment in a decade to be new, and ensuring those residences, workplaces, schools, and shops support active and public transport first is essential to locking in the transition.

Simultaneously, NSW needs to electrify the light vehicle fleet (cars and small trucks). The state can accelerate this transition through policy levers such as EV purchase subsidies, expanding charging infrastructure (especially in apartment complexes and regional towns), and setting a phase-out date of 2030 for new fossil-fuel burning vehicles in urban areas, and slightly later regionally. Governments can lead by example through converting public fleets and mandating zero-emission vehicles for buses, taxis, and rideshare operators.

In the freight sector, emissions reductions are more complex due to heavier loads, longer travel distances, and slower vehicle turnover. However, near-term action is possible in urban freight. Establishing freight consolidation hubs and incentivising low-emission last-mile delivery such as electric vans and electric cargo bikes can yield rapid benefits. These changes also reduce congestion and noise in dense urban centres.

Long-haul freight presents greater technological challenges for decarbonisation. Battery electric trucks are already viable for short- to medium-haul operations, especially where depot-based charging can be reliably provided. NSW can accelerate adoption by co-investing in charging infrastructure along key freight corridors and within industrial precincts. For longer distances and heavier loads, green hydrogen may have a role—particularly if supported by renewable hydrogen production in regions like the Hunter Valley—but its economic and technological feasibility remains uncertain. Battery swapping or the development of rapid charging hubs along major freight routes may offer a more promising and scalable solution. In the longer term, dynamic charging, where vehicles can charge while in motion, should also be explored as the technology matures.

Mode shift is also relevant for freight. Expanding intermodal rail infrastructure—especially for access to Port Botany, Port Newcastle, and Port Kembla can reduce the share of long-distance road freight. NSW can use planning, pricing, and investment tools to favour rail over truck for bulk and container freight where viable.

Several cross-cutting enablers will determine the success of these strategies. Road pricing reform — transitioning from fuel excise to distance and emissions-based road user charges—can align incentives with emissions goals. This is especially salient since Sydney is among the most tolled cities in the world, and the tolls are notably uneven, begging for reform, while the adoption of EVs will shrink the revenue from motor fuel taxes.

Grid planning must anticipate new loads from EVs and hydrogen production, including investment in depot solar and battery storage. Regulations, such as aligning vehicle emissions standards with international best practice (e.g., Euro 6 or equivalent), are also essential.

The following table summarises the most promising transport strategies, assessed for their effectiveness, implementation speed, and NSW-specific readiness:

Approach	Sector	Effectiveness	Speed	NSW Readiness
Urban mode shift	Passenger	High	Medium	Moderate–High
Light vehicle electrification	Passenger	High	Medium	Moderate
Bus fleet electrification	Passenger	Medium–High	Fast	High
Last-mile freight reform	Freight	High (urban)	Fast	Moderate
Truck electrification	Freight	High	Medium	Low–Moderate
Hydrogen for long-haul	Freight	Medium–High	Medium	Emerging
Rail freight shift	Freight	Medium	Medium	Moderate
Road pricing reform	Both	High	Fast	High
EV infrastructure rollout	Both	Enabler	Medium	Moderate

With the right mix of regulatory, fiscal, and planning measures, NSW has the potential to become a global leader in zero-emission transport, delivering climate, health, and productivity benefits in tandem.

Q10/ What specific actions or policies could increase uptake of emissions reduction strategies in agriculture, both in the short and long term?

Achieving net zero in agriculture requires a comprehensive transition to clean energy and the adoption of advanced, sustainable practices. Implementing energy sources that do not rely on fossil fuels, combined with energy-efficient machinery and systems to lower operational emissions, is a key long-term strategy. Precision agriculture, including technologies like variable rate application, GPS guidance, and soil sensors, optimises resource use, reduces waste, and cuts emissions. Emissions from nitrogenous fertilisers can be reduced by optimising the rate and timing of application to curb nitrous oxide release. In addition, carbon sequestration through soil carbon management and the restoration of degraded lands offers significant potential to store carbon in soils and biomass. Feed additives, selective breeding, anaerobic digesters, and improved grazing management all mitigate livestock emissions.

However, reaching emissions reduction goals is not solely about technological innovation; it also involves a collective shift in behaviour. Economic tools like carbon pricing, ecosystem service payments, and reformed subsidies can drive emissions reductions and carbon sequestration. (At present, the carbon price is too low for soil carbon initiatives to be attractive, especially given the stringent permanence requirements.) Regulatory measures, including emission standards, climate-aligned land-use planning, and carbon product labelling, create additional incentives. Any carbon sequestration actions must also account for biodiversity enhancement and protection so as not to cause perverse outcomes for biodiversity in the pursuit of net zero.

There is an opportunity here to take an integrative approach that recognises the need to reduce emissions while also addressing the growing interest in sustaining and improving biodiversity in agriculture (supporting a 'nature positive' approach). This integration explicitly recognises the interconnections between these two dimensions of agricultural sustainability and seeks to identify and leverage synergies. It also adheres to the second principle of achieving balance between the two goals and challenges us to move beyond incremental improvements to reimagine how food is produced, distributed, and consumed.

Actions that need to be considered to increase uptake include;

Short-Term Measures:

- Provide direct financial incentives (e.g. grants or payments) and supportive policies to promote on-farm clean energy generation beyond agriculture's traditional role. Support landholders in integrating renewable energy installations into farm infrastructure and plans.
- Help optimise on-farm energy infrastructure by aligning generation sources with less productive (marginal) land or existing water bodies (such as farm dams). The objectives are to **maximise energy production** while **minimising impact on food production**, **minimising installation and maintenance costs**, and **maximising biodiversity co-benefits or credits**.
- Develop strategies for efficient use of on-farm produced energy within the business model. For example, convert farm-generated energy into renewable fuels or fertilisers, **maximise efficiency in energy conversion**, **maximise profit from energy returned to the grid**, and **minimise environmental impact of energy use**.
- Establish demonstration sites or 'satellite farms' to highlight the benefits of these new practices in targeted regional areas and provide direct support to individual landholders.

Long-Term Measures:

- Adopt an integrative policy approach that reduces on-farm emissions while enhancing biodiversity (aim for nature-positive farming). Policies and incentives should be developed cohesively to embed both emissions reduction and biodiversity conservation goals in agricultural practices, and to avoid fragmented or conflicting efforts.
- Create or improve value streams for landholders to realise economic returns from sustainable practices. This includes implementing or expanding payment schemes that support emissions reduction (e.g. carbon credit programs) and biodiversity conservation. (While penalties for high emissions could be considered; positive incentives are more effective and better received.)
- Expand accessible education and information for landholders about biodiversity values, the importance of carbon stocks, and how to participate in carbon and biodiversity markets. Through the supply chain, improve transparency of net zero or green credentials so that informed consumers can drive demand for sustainable products.
- Address technical and practical barriers by simplifying and subsidising the assessment of on-farm carbon stocks and biodiversity, which is currently perceived as costly and complex. Promote the adoption of reliable data and metrics for long-term tracking of carbon and biodiversity assets to build landholder confidence in reported outcomes.
- Ensure a coordinated approach in policy development to eliminate fragmentation. Align initiatives across government departments and programs so that they reinforce each other, and avoid any perverse incentives (for example, avoid only rewarding restoration of degraded land while providing no benefit to those who have maintained land in good condition).
- Improve communication and trust-building by delivering consistent messaging across government, industry, and landholders. Address knowledge gaps and provide clear, practical guidance, as inconsistent messages, and varying levels of expertise currently limit trust and slow the adoption of sustainable practices.
- Integrate local communities and Indigenous land managers into program design and implementation, leveraging their valuable knowledge and perspectives on sustainable land use. As in the short term, the development of demonstration farms in partnership with these groups can display the benefits of inclusive, sustainable land management practices.

Q11/ Given the uncertainties in land-sector net emissions, how should NSW incorporate this sector into the state's climate policy and emissions profile?

The uncertainty in the land sector stems from a lack of transparency in the data and concerns about overestimating sequestration. NSW should regularly track and monitor land use, land cover, and land-use change using modern remote sensing and AI technologies, which are now readily available. This will allow a clearer understanding of the state of land use and ensure transparency regarding emissions from land-clearing activities. Any areas cleared by land conversion should be well documented and reported annually.

Once land-use and land-cover changes are being accurately monitored (incorporating the effects of drought and bushfires), we can estimate the land sector's emissions (or sequestration) with greater confidence. Independent scientific verification should be employed to review the models, emission factors, and assumptions used in land-sector accounting.

Land-based carbon management under the federal carbon credit system (administered by the Clean Energy Regulator) should be linked with NSW's own data and monitoring efforts to enable greater transparency. The state's emissions profile should have a clear accounting and reporting system that includes all relevant factors on both managed and unmanaged lands. As mentioned in our response to Q10, land-sector activities (e.g. reforestation, improved grazing, soil carbon enhancement) should be pursued in tandem with biodiversity objectives.

NSW climate policy should integrate land-based mitigation with adaptation and co-benefits, aligning initiatives with agriculture net-zero plans, biodiversity (nature-positive) goals, and Indigenous land management programs.

Finally, to enhance the effectiveness of NSW's net zero implementation in the land sector, emissions policies must provide clarity, stability, and predictability. Standardised reporting frameworks should be supported by state-endorsed tools and set over fixed five-year commitment periods (as per NSW Climate Change Policy's sector adaptation plans), with a clear implementation cycle that accounts for natural variability (like rainfall, drought, or pasture recovery) in emissions trends. This approach is important to avoid penalisation due to short-term anomalies. Policy adjustments can then be made through structured consultation at the end of each cycle, allowing time for natural fluctuations and investment responses, while avoiding reactive short-term shifts that undermine long-term confidence.

The following table summarises the most promising agricultural and land strategies, assessed for their effectiveness, implementation speed, and NSW-specific readiness:

Approach	Effectiveness	Speed	NSW Readiness
On-farm renewables	Medium	Medium	Moderate
Precision agriculture	Medium	Fast	High
Optimised fertiliser	Medium-High	Fast	High
Soil carbon	High	Medium	Moderate
Livestock mitigation	High	Medium	Moderate
Economic incentives	High	Medium	Moderate
Regulatory measures	Medium	Medium	High
Land-use monitoring	Medium	Medium	High

Q12/ - Q13/ *Not answered*.

Q14/ What measures could accelerate industrial heat electrification in NSW, where technology is viable?

Two of the key barriers to industrial heat electrification are a general lack of awareness of what technology is available and its suitability to various processes, and a lack of capital and finance expertise to become confident in the financial case around the technology.

Industrial heat electrification is not as simple as swapping one capital asset to another: often, the underlying process needs to be changed, and operational practices varied. Many end users of heat find it a significant challenge to understand what technology is available to replace heat sources such as gas fired furnaces, and what the operational implications of switching to such technology would be. The complexity of the technology and uncertainty regarding its application are significant barriers. One solution to such barriers would be greater knowledge, more widespread case studies, and government 'help desks' to encourage and facilitate the switch (similar mechanisms have previously existed, for example, to promote the uptake of variable speed drives).

Another key barrier to the uptake of electrical industrial heat technologies is finance. Securing sufficient capital to make the shift to new heat sources is a well-understood challenge, with measures such as CEFC help and others suggested. Another major financial challenge that is less well understood is the additional financial complexity associated with a shift to electrical energy.

Electricity tariffs are incredibly complex for most industrial users, and there is a general lack of knowledge around how to best design processes and operations to respond to the growing complexity of electricity tariffs. Adding significant new energy load (and cost) from industrial electrification only exacerbates this risk. Energy users need assistance navigating the complexity of the electricity market.

While coal-fired generation remains in NSW's mix, any extra demand for electricity, such as from industrial electrification, battery charging, or other new loads, will usually be met by burning more coal, so emissions rise. Until coal retires (or a carbon price shifts the economics), coal is the cheapest dispatchable source and ramps first, with gas responding only after coal plants reach their limits. Fixing the power sector is therefore the priority; once the grid is near-zero, electrifying other sectors will deliver genuine emissions cuts. Nevertheless, long term capital investments in other sectors should recognise this switch.

Q15/ *Not answered.*

Q16/ How could transparency of how coal mines meet their Safeguard Mechanism obligations be improved?

Overall, daily monitoring of fugitive methane emissions from coal mines reported to public websites and charted against historical performance, reduction targets and each other (league tables) would provide incentives for companies to improve their performance. Currently, there are several challenges with the transparency of how coal mines meet their Safeguard Mechanism obligations.

- Mine-level emissions data are often not fully disclosed, making it difficult for stakeholders to assess how individual mines are complying and whether they are reducing emissions effectively.
- There is limited transparency around the use of carbon credits, with no clear distinction between on-site abatement and offset purchases, raising concerns about the integrity of the offset market.
- Reporting is typically delayed and infrequent, which diminishes its usefulness for public scrutiny.
- Baseline adjustments are also not always clearly explained, creating doubts about potential manipulation.
- Independent verification is inconsistent, and penalties for non-compliance are not widely publicised, weakening accountability.
- There is insufficient engagement with local communities, who often lack access to detailed compliance information and opportunities to provide feedback. These gaps hinder effective oversight and trust in the mechanism.

To improve transparency regarding how coal mines meet their Safeguard Mechanism obligations, several measures could be taken:

- **Public Mine-Level Emissions Reporting:** Require mines to publish detailed, **annual emissions data** at the facility level, including baseline emissions, actual emissions, reduction targets, and how obligations were met (e.g., abatement, use of carbon credits). This would provide clearer insights into how individual mines are performing.
- **Clear Reporting on Carbon Credit Usage:** Mandate detailed disclosure on the **use of carbon credits** (ACCUs), including the quantity, type, and source of credits. This would help ensure that offsets are legitimate and that reductions are not solely reliant on purchasing credits rather than actual emissions reductions.
- **Distinguish Between On-site Abatement and Offsets:** Improve transparency by clearly separating **on-site emissions reductions** (such as process improvements or technology upgrades) from the purchase of carbon credits. This distinction would provide a better understanding of how much actual progress is being made on-site.

- **Timely and Frequent Reporting:** Accelerate the reporting process, ensuring that emissions data is made available **in real-time or shortly after each compliance period**. This would make the data more relevant and useful for stakeholders to monitor performance and act when needed.
- **Clearer Baseline Adjustment Criteria:** Establish transparent criteria for **baseline adjustments** and make the justification for any changes publicly available. This would reduce uncertainty around potential manipulation of baseline emissions levels.
- **Independent Verification:** Require **consistent third-party verification** of emissions data for all facilities, not just a select few. This would ensure that self-reported data is accurate and reliable, strengthening confidence in the system.
- **Public Disclosure of Non-Compliance and Penalties:** Increase visibility of **penalties** for non-compliance, including specific details on which mines have failed to meet their obligations and the actions taken to rectify the situation. Publicising non-compliance will create stronger accountability.
- **Enhanced Community and Stakeholder Engagement:** Facilitate **greater community involvement** by making compliance information easily accessible and holding regular consultations with local communities and stakeholders. This would ensure that affected communities are informed and can provide valuable input. This could include programs supporting citizen science that empower local communities to be part of the process of infrastructure accountability

Approach	Effectiveness	Speed	NSW Readiness
Facility-level reporting	High	Medium	High
Credit disclosure	Medium	Medium	High
On-site vs offsets	Medium	Medium	High
Timely reporting	Medium	Medium	High
Baseline transparency	Medium	Medium	High
Third-party audits	High	Medium	High
Publish penalties	High	Fast	High
Community engagement	Medium	Medium	High

Q17/ - Q21/ *Not answered.*

Q22/ What should be included in a monitoring framework for NSW in the context of the transition to net zero, including any specific metrics and indicators?

Emissions are currently categorised in terms of sectors. The reporting should be broken down by the responsible party as well, and all parties who contribute more than, say 0.1% of the state's emissions. For example, instead of the emissions from Electricity and Energy being given as 44.0Mt, reporting would instead indicate the share from each generator.

Q23/ The adaptation objective is for NSW to be more resilient to a changing climate. The Act allows for regulations to further define the adaptation objective. What does a more resilient NSW look like to you?

A more resilient NSW in the context of a changing climate would be a state that effectively anticipates, prepares for, responds to, and recovers from climate-related challenges while maintaining or improving quality of life, justice outcomes, economic stability, and environmental health. In practical terms, this vision of resilience has several key facets:

A Foundation of Functional Ecosystems
The natural environment is recognised as the primary line of defence and a crucial enabler of resilience. This entails forests, wetlands, rivers, and coastal areas not only thriving with rich biodiversity but also being actively managed to maximise their innate adaptive capacity. Such ecosystems provide essential services like clean water, flood mitigation, and carbon sequestration, while effective biodiversity conservation strategies ensure native flora and fauna can adapt to changing conditions, thereby maintaining overall ecological integrity.

Robust and Adaptive Infrastructure
NSW's critical infrastructure is designed, constructed, and maintained to withstand current and anticipated climate extremes, ensuring the continuity of essential services. Key assets, such as roads, bridges, public transport networks, and energy grids, are either newly built with resilience in mind or retrofitted to cope with increased heat, intense rainfall, floods, bushfires, and coastal hazards like erosion and inundation. Buildings incorporate climate-resilient designs (for example, using heat-resistant materials and elevating structures in flood-prone zones), and energy systems are diversified and distributed to reduce vulnerability to single points of failure.

Prepared and Empowered Communities
Communities across NSW are well-informed, engaged, and equipped to manage climate risks, with a strong emphasis on equity and social cohesion. Communities are internally organised and resourced as sources of community leadership in partnership with government, learning lessons from the Northern Rivers and the work of Resilient Lismore post the 2022 floods. Residents have access to clear information about local climate threats, supported by effective early warning systems for extreme weather and well-communicated evacuation plans. Grassroots efforts (such as community fire units and flood response teams) are well-resourced, and targeted assistance ensures vulnerable populations like the elderly, low-income households, remote Indigenous communities, and people with disabilities or health conditions, receive the support they need. Public health systems are prepared for climate-related health impacts (e.g., heat stress and vector-borne diseases), with robust mental health support readily available for those affected by climate disasters. Social cohesion is actively fostered through inclusive planning processes that amplify local voices.

Adaptive Governance and Strategic Foresight
Governance structures at state and local levels are agile and forward-thinking, integrating climate considerations into all facets of decision-making. Policies, regulations, and planning frameworks are continually updated with the latest climate science, projections (such as NARCliM), and risk assessments. Land-use planning and development controls actively discourage new development in high-risk areas (e.g., floodplains or extreme bushfire-prone zones). Incentives are in place to encourage sustainable practices and climate-resilient design across industries and communities. These efforts are supported by strong partnerships and coordinated strategies between government agencies, local councils, industry, research institutions, and community groups to ensure cohesive and effective adaptation initiatives.

A more resilient NSW is a dynamic system where the infrastructure, communities, and governance collaborate to build a safer, more sustainable, and prosperous future despite the uncertainties of a changing climate.

Q24/ What additional information and evidence should the commission consider when assessing progress towards the adaptation objective?

When evaluating progress toward the adaptation objective, the Commission should prioritize evidence of actual resilience outcomes, not just completed activities:

Outcome-Based Metrics vs. Activity Metrics
While it is useful to track completed actions (activities), the focus should be on metrics that indicate real improvements in resilience and community capacity. For example, rather than only noting how many adaptation projects have been executed, measure whether there are reduced damages from extreme weather events, faster recovery times, maintained economic activity during disruptions, and reduced vulnerability of communities over time. These outcome-oriented metrics more directly reflect progress toward climate resilience. Measuring resilience also requires a focus on "how" projects are done – which could be undertaken by developing a dashboard of capacity-based indicators that show how a community is able to build its social capital through the process of becoming more resilient. Identifying the most suitable measurements for a capacity-dashboard should be done through evidence-based research, but it could include information such as the numbers of people participating, growth of organisations, the level of diversity between organisations, and self-reported indicators about confidence in making decisions and participation. These capacity-based social capital indicators such as these were critical in the 2022 Northern Rivers floods, and had been built through the preceding decade that included community-led mutual aid around the COVID pandemic, the 2017 floods and community activism around gas extraction.

Forward-Looking Preparedness Indicators
Beyond current resilience levels, the Commission should gather evidence of NSW's preparedness for future climate scenarios. This includes updated building codes and infrastructure standards, the extent of scenario planning across agencies, built-in redundancies in critical systems like energy, water, communications, and transport, and adaptive capacity of key sectors.

Q25/ How can adaptation planning better use the NSW Government's climate change projections (NARCliM)?

Effective use of climate projections like NARCliM can be achieved through several strategies:

Embedding NARCliM into Decision-Making Processes
To make the most of NARCliM's detailed climate projections, NSW adaptation planning should integrate this data into the core of government and private sector decision-making. By embedding NARCliM into regulatory frameworks, NSW ensures that decisions about infrastructure, land use, and resource allocation are forward-looking and climate-informed.

Tailoring Local and Regional Adaptation Plans
NARCliM's strength lies in its granularity, offering tailored projections across NSW. Adaptation planning should capitalise on this by supporting local councils and regional bodies to develop bespoke adaptation strategies. For example, the NSW Climate Change Adaptation Strategy's upcoming state-wide risk and opportunity assessment, due to inform the 2026 Adaptation Action Plan, should use NARCliM data to prioritise actions for high-risk areas, such as flood-prone regions in the Northern Rivers or bushfire-prone zones in the Blue Mountains.

Enhancing Stakeholder Collaboration and Accessibility
Effective use of NARCliM requires making its data accessible and understandable to diverse stakeholders, including communities, businesses, and non-experts. For example, businesses in renewable energy zones could use NARCliM data to design infrastructure resilient to extreme weather, ensuring economic stability.

Q26/ What other information or tools are needed to support decision-makers in NSW?

Best Practice Case Studies and Solutions Library
NSW-specific examples: A comprehensive and easily searchable database of successful adaptation projects and initiatives within NSW, highlighting the challenges faced, processes and methods used, solutions implemented, and lessons learned.
Transferable solutions: Examples from other jurisdictions (interstate and international) that are relevant to NSW's context, with analysis of their applicability and scalability.

Cross-Sector Dependency Mapping
Climate impacts cascade across interconnected systems. NSW needs tools that map critical dependencies between sectors - how transport disruptions affect supply chains, how energy outages impact water systems, or how agricultural impacts affect food security. This 'systems thinking' approach is essential for effective adaptation planning.

Community Engagement, Social Data and Capacity Building
Effective adaptation requires community buy-in and understanding of social dynamics. NSW needs better tools for community consultation, social vulnerability assessments, and tracking of community resilience indicators. This includes understanding how different communities perceive and respond to climate risks. It also includes funding for communities to increase their capacity and connectedness, including support for leadership training, networking and project work. This could be supported by the case study strategy, where case studies are identified that document how communities are working to strengthen their capacity and engage proactively in Net Zero planning and development, so lessons can be shared.