Response to the COP30 Presidency Roadmap

Transitioning Away from Fossil Fuels

March 2026

Executive Summary

UNSW submits this collation of contributions from UNSW experts across engineering, social sciences, environmental science, and Indigenous knowledge. Please note this is not intended as an official institutional response. The analysis highlights that the central constraint on transitioning away from fossil fuels is not technological capability, but the absence of credible pathways to replace the economic functions currently served by fossil fuel industries - particularly export revenues, regional employment, and public finance.

Australia provides a critical case study: a country with world-leading renewable energy resources and technological capabilities, yet deeply dependent on fossil fuel exports. This duality reflects a broader global challenge shared by major exporting nations and many developing economies.

There are four overarching insights:

1. **The transition challenge is fundamentally economic and political**, not technological.
2. **Export-dependent economies require growth-oriented transition pathways**, not simple substitution.
3. **Justice and equity - particularly Indigenous rights and global inequality - are central, not peripheral, to transition success.**
4. **Differentiated pathways are essential**, reflecting varied national circumstances and dependencies.

This submission features targeted inputs aligned with the COP30 Presidency questions, offering practical levers and policy-relevant recommendations.

(a) Critical Barriers

1. Economic and structural barriers

- Fossil fuel exports generate revenues at a scale not yet matched by clean alternatives, underpinning national budgets, regional economies, and employment.
- In export-oriented economies, transitioning domestic electricity systems does not address the majority of fossil fuel production.
- Regional economies are often structurally dependent on fossil industries, with high wages and long-term employment not easily replicated.

2. Political and institutional barriers

- Lack of political leadership and difficulty building durable social consensus.
- Policy capture by incumbent industries and insufficient fossil fuel taxation mechanisms.
- Planning system constraints and community opposition to infrastructure development.

3. Social and labour barriers

- Mismatch between fossil fuel employment (stable, high-wage, place-based) and renewable energy employment (short-term construction, smaller operational workforce).
- Community resistance where transitions are perceived as economic loss rather than opportunity.

4. Global and geopolitical barriers

- Ongoing conflicts and energy security concerns can reinforce fossil fuel demand in the short-term, but also create opportunities to improve energy security by accelerating the switch to renewables and electrifying key parts of the economy.
- Unequal access to technology and finance risks reproducing global inequalities.
- Exporters face incentives to maintain or expand production in response to global demand and price volatility.

5. Justice and equity barriers

- Intersections between climate transition and Indigenous rights, land ownership, and historical dispossession.
- In the Australian context, two of the most pressing challenges - the urgent need to stabilise the environment and the advancement of First Peoples' social, cultural, economic, and political rights - are deeply interconnected.

- Failure to align climate action with existing frameworks[1] risks reinforcing historical inequities and undermining the legitimacy of transition policies.
- Uneven distribution of transition costs and benefits across countries and communities.

(b) Potential Levers

1. Economic transformation and industrial strategy

- Value-adding to resource exports (e.g. green steel, green aluminium) to increase economic returns while reducing emissions.
- Development of new clean industrial sectors powered by renewable energy.
- Government-backed offtake mechanisms can help de-risk first-of-a-kind clean industrial projects by providing demand certainty.
- Initiatives such as the Clean Commodities Trading Initiative and the Scheme Finance Vehicle provide practical examples of how these mechanisms can be scaled to accelerate industrial decarbonisation, particularly in export-oriented economies.

2. Financial and policy mechanisms

- Polluter-pays principles and reform of fossil fuel subsidies.
- Scaling international climate finance aligned with capacity to pay and historical emissions.
- Integration of non-climate social justice goals—such as addressing health inequalities and skills gaps—into just transition planning.

3. Technology and infrastructure

- Investment in grid infrastructure and planning reform to enable rapid deployment.
- International technology transfer and multilateral funding mechanisms.

4. Indigenous leadership and land stewardship

- A significant share of renewable energy potential—potentially up to half of projects—may be located on Indigenous land, underscoring the central role of Indigenous peoples in the energy transition.
- Indigenous estates often have high biodiversity value, and Indigenous-led land management practices and knowledge systems are already critical to ecosystem restoration and emissions reduction.

[1] National frameworks include the Net Zero Plan, the Closing the Gap Agreement (2025), the National Indigenous Economic Framework (2025), and the First Nations Clean Energy Strategy (2024).

- Historical and ongoing experiences of dispossession and disadvantage place First Peoples on the frontline of climate change impacts, requiring urgent and inclusive adaptation responses.
- Transition pathways must therefore embed Indigenous rights, leadership, and equitable participation in energy development, including benefit-sharing and long-term economic opportunities.

5. International coordination

- Including targets, timelines and trajectories for a transition away from fossil fuels in Nationally Determined Contributions (under the Paris Agreement).
- Exploration of coordinated supply-side approaches among fossil fuel exporters, including through a global Roadmap Away from Fossil Fuels and potentially through a Fossil Fuel Treaty.
- Developing coordinated policy to decarbonise industrial supply chains - eg. green iron; green steel; green metals; green fertilisers.
- Development of aligned carbon border adjustment mechanisms.
- Increased openness to international investment and technology partnerships.

(c) Experiences, Best Practices, and Lessons

- Domestic electricity decarbonisation can proceed rapidly where technologies are mature and cost-competitive; however, this progress does not automatically translate into reduced fossil fuel extraction in export-oriented economies.
- Community opposition to energy infrastructure often reflects broader economic insecurity rather than project-specific concerns.
- Case studies developed in Australia for the Clean Commodities Trading Initiative and the Scheme Finance Vehicle demonstrate how government-backed offtake mechanisms can be operationalised and scaled in practice.
- International examples highlight diverse approaches, including:
    - Biofuels in Brazil
    - Electrified public transport in East Asia
    - Climate-resilient building standards in Asia-Pacific
    - Indigenous participation in energy systems in Canada

(d) Just, Orderly and Equitable Transition

1. Differentiated national pathways

- Wealthy exporters: focus on economic diversification, industrial transformation, and revenue replacement.
- Developing producers: balance transition with development needs and employment realities.
- Vulnerable nations: prioritise finance, capacity building, and energy access.
- National plans and policy for a just transition away from fossil fuels should be included in Paris Agreement Nationally Determined Contributions.

2. Justice and inclusion

- Embed Indigenous rights, land ownership, and knowledge systems in transition planning.
- Ensure transitions address broader inequalities, including health, education, and economic opportunity.

3. Growth-oriented framing

- Transitions must be framed as economic growth and opportunity creation, not simply replacement of existing industries.
- Without credible pathways to improved economic outcomes, transitions will lack political and social support.

Role of Universities and UNSW Engagement

Universities can play a critical role as partners in the transition, supporting governments, industry, and communities to co-design comprehensive, evidence-based pathways that are economically viable, socially just, and technically feasible. UNSW would welcome the opportunity to work closely with the COP30 Presidency in the further development of the Roadmap, contributing interdisciplinary expertise and applied research to support implementation.

In this context, attached is a detailed contribution by Prof. Ned Ekins-Daukes and colleagues (UNSW School of Photovoltaic and Renewable Energy Engineering - SPREE), which provides an in-depth analysis of the economic and structural challenges facing fossil fuel-exporting economies, with a particular focus on export revenues, industrial transformation, and pathways for scaling clean commodity markets. This submission is further informed by collaborative work across UNSW, including insights from a recent interdisciplinary workshop on Transitioning away from fossil fuels.

Contribution to the COP30 Presidency Roadmap on Transitioning Away from Fossil Fuels in a Just, Orderly and Equitable Manner

Submission by the School of Photovoltaic and Renewable Energy Engineering (SPREE), UNSW Sydney

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Preamble

This contribution responds to Part I of the COP30 Presidency invitation, addressing the transition away from fossil fuels in a just, orderly, and equitable manner. It draws on the experience of Australia, one of the world's largest fossil fuel exporters and simultaneously one of the countries best endowed with renewable energy resources. We present the Australian case as representative of the challenges that are broadly applicable to other fossil-fuel-exporting nations, including Canada, Indonesia, and the Gulf States, as well as to developing economies that depend on fossil-fuel revenues for poverty alleviation and industrialisation.

Our central argument is that the discourse on transitioning away from fossil fuels has focused overwhelmingly on the supply side of clean energy—the cost reductions in solar photovoltaics, wind turbines, and battery storage—while giving insufficient attention to the equally critical challenge of replacing the export revenues, government receipts, and regional livelihoods that fossil fuels currently sustain. A transition that addresses only the domestic electricity system while leaving the export economy untouched is not, in any meaningful sense, a transition away from fossil fuels. And a transition that destroys export revenue without a credible replacement is not just, orderly, or equitable.

[1] Carbon Bridge https://www.carbonbridge.co

(a) Critical Barriers to Transitioning Away from Fossil Fuels

The export revenue problem

The most critical barrier to a fossil fuel transition in resource-exporting nations is not technological but economic: fossil fuel exports generate revenues on a scale that no currently demonstrated clean alternative can replace. Australia's coal exports were valued at approximately A$91 billion in the 2024 financial year, while LNG exports contributed a further A$69 billion. Even in the current softer price environment, coal and LNG together generate A$100–150 billion annually in export earnings.

These revenues fund state government services through royalties (projected at over A$38 billion across Australian states and territories over a 4-year period from 2024-2028 [2]), sustain the highest average wages of any industry (approximately A$158,000 per year in mining), and underpin the viability of entire regional economies, transport infrastructure, and housing markets. In Queensland's Mackay region, the resources sector contributes A$18.4 billion per year—representing 91% of gross regional product[3]. In New South Wales, coal royalties account for over 95% of the state's A$3.6 billion annual mining royalty revenue.

This barrier applies with equal or greater force to other major exporters. Canada's Prime Minister, despite his personal history in climate finance leadership, has explicitly excluded fossil fuel export limitations from consideration. Indonesia is expanding coal production to meet both domestic and export demand. India is tripling coal production. The Gulf States' entire economic modernisation programmes—tourism, real estate, financial services—are funded by and contingent upon continued fossil fuel revenues. No major fossil fuel exporter has yet demonstrated a credible pathway to replacing this revenue at scale.

Grid infrastructure and planning system paralysis

While the generation technologies for renewable energy have achieved dramatic cost reductions—driven overwhelmingly by Chinese manufacturing scale—the complementary infrastructure of grid transmission has not experienced equivalent progress. In Australia, transmission projects have suffered severe cost overruns and delays, with limited competition among providers and no access to the cost reductions that international competition might bring. The connector between Victoria and New South Wales (EnergyConnect) has blown out significantly in both time and budget.

Planning systems in democratic societies have proven poorly equipped to manage the scale of infrastructure deployment required. In Queensland, a 200 MW battery project near Mackay attracted more than 700 objections and only three letters of support before the developer withdrew[4]. This is not an isolated incident: similar opposition has emerged for battery projects

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[2] Gene Tunny, "Riches from Royalties: How Australia's States and Territories Depend on Mining," Policy Paper 61, Centre for Independent Studies (CIS), May 2025. ISBN: 978-1-923462-02-1 *https://www.cis.org.au/publication/riches-from-royalties-how-australias-states-and-territories-depend-on-mining/*

[3] https://www.australianmining.com.au/mackay-crowned-queenslands-top-resources-pillar/

[4] "Trina withdraws battery application following state government intervention", *https://www.pv-magazine-australia.com/2026/03/17/trina-withdraws-battery-application-following-state-government-intervention/*

near Rockhampton and Bundaberg, and comparable patterns are evident in the United Kingdom, and across the United States, where 97 moratoriums on battery storage have been enacted in New York State alone. Community resistance to transmission lines, driven by aesthetic, land-use, and property-value concerns, has further compounded planning delays.

The replacement-versus-additionality framing

A subtle but powerful barrier lies in how the transition is perceived by affected communities. Where renewable energy projects are framed as replacements for existing fossil fuel industries, community resistance is intense and often politically decisive. Where they are framed as additional economic activity alongside existing industries, engagement is more constructive. However, this underscores the tension faced when transitioning away from fossil fuels, since the economically acceptable message of additionality implicitly accepts that fossil fuel production continues indefinitely.

This is compounded by the employment characteristics of the respective industries. A coal mine or LNG facility provides high-wage, long-term employment in a fixed location, sustaining multi-generational community investment in housing, schools, transport infrastructure and local businesses. A renewable energy project provides significant construction employment for two to five years, followed by a much smaller ongoing maintenance workforce that may or may not reside locally. Unless the employment gap is explicitly addressed, communities will rationally resist a transition that trades certainty for uncertainty, even if the aggregate economic case is favourable at the national level.

Geopolitical and fiscal distractions

The transition does not occur in a geopolitical vacuum. Energy security crises, such as the current disruption associated with tensions in the Strait of Hormuz, immediately redirect government attention and fiscal resources toward securing fossil fuel supply rather than accelerating the transition away from it. For fossil fuel exporters, such crises simultaneously increase the short-term value of their exports and create pressure for long-term supply contracts that lock in production for 10–20 years. This dynamic is structurally incompatible with a rapid transition and is not adequately recognised in transition planning.

Potential Levers for Accelerating the Transition

Value upgrading of existing resource exports

The most promising near-term lever for fossil fuel exporting nations is not the elimination of resource exports but their transformation into higher-value, lower-emission products. Australia exports approximately A$138 billion per year in iron ore, which is then smelted into steel in other countries using coal. If even a fraction of this were upgraded domestically to green iron or green steel using abundant renewable electricity, the export value per tonne would increase significantly while the volume of raw material and associated emissions would decrease. The same logic applies to aluminium, silicon, and other energy-intensive processed materials.

This “increase value, decrease volume” approach offers a politically viable pathway because it does not require the elimination of the extractive sector but rather its evolution. It also creates the manufacturing employment and industrial ecosystems that resource-exporting regions currently lack. However, it requires substantial capital investment, reliable and low-cost renewable electricity supply at industrial scale, and market demand for premium low-emission products—none of which are yet assured and whose competitiveness is unknown.

1. Openness to international investment and technology partnerships

Australia's experience with large-scale clean energy export projects offers a cautionary lesson. The Sun Cable project proposed to export solar electricity from the Northern Territory to Singapore via a 4,500 km, 1.75 GW subsea high-voltage DC (HVDC) cable. While subsea HVDC is a proven technology, the longest operational link to date is the 765 km Viking Link between Denmark and the UK, making the Sun Cable proposal roughly six times longer than anything yet demonstrated. The project was backed by two of Australia's wealthiest individuals, both of whom ultimately withdrew, illustrating that the technical and commercial risks of such a leap remain prohibitive even for the most ambitious private investors. Green hydrogen export projects have faced similar commercial challenges. These outcomes are significant data points: if the most risk-tolerant domestic investors cannot make these projects viable, the models underpinning them require revision.

A critical lever is therefore greater openness to foreign investment, including from countries that possess relevant technological capabilities and cost advantages in infrastructure delivery. Chinese companies are deploying terrestrial HVDC transmission at a scale unmatched elsewhere, the 3,300 km, 12 GW Changji–Guquan link[5] being one of over 20 HVDC lines now operational and hold a dominant position in renewable energy component and electric vehicle manufacturing. Yet security-driven foreign investment review mechanisms in countries like Australia have effectively closed the door to Chinese participation in energy infrastructure, while Chinese investment flows freely into comparable projects in Southeast Asia, the Middle East, and Africa.[6] A pragmatic reassessment of which international partners can deliver the infrastructure the transition requires—irrespective of geopolitical preferences—would materially accelerate progress.

2. Coordinated supply management among fossil fuel exporters

A novel but potentially powerful lever would be the formation of coordinated supply management arrangements among fossil fuel exporting nations—analogous in structure, if not in intent, to OPEC. If major coal exporters (eg. Australia, Indonesia) and LNG exporters (eg. Australia, the United States, Qatar) were to agree on graduated volume caps that taper production over time, the resulting supply constraint would support prices, thereby maintaining export revenues even as volumes decline. This would address the central political obstacle: no government will voluntarily destroy a profitable export sector without an economic safety net.

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[5] https://www.hitachienergy.com/news-and-events/customer-stories/changji-guquan-uhvdc-link

[6] Caroline Wang, Rising Tide: China’s Outbound Cleantech Capital Surge Drives Global Collaboration Toward Net Zero, Climate Energy Finance (December 2025).

Such arrangements could be paired with commitments to reduce scope 1 emissions intensity in production processes and with buyer-side commitments from importing nations not to source from non-participating producers. While the political conditions for such arrangements do not currently exist, a change of administration in any of the key producing countries could create an opening. The Roadmap should explicitly explore this mechanism as a means of reconciling climate objectives with the economic realities of exporting nations.

3. Carbon border adjustment mechanisms

Carbon border adjustment mechanisms (CBAMs), as implemented in the EU, represent a potentially significant lever but face three fundamental tests: whether the implementing bloc represents sufficient market share to change producer behaviour; whether domestic consumers can absorb the resulting price increases; and whether the political coalition supporting the mechanism can withstand sustained pressure from producer nations and internal dissent.

The EU CBAM is currently the only operational mechanism of scale, but its effectiveness is being tested by weakening economic growth, pushback from gas importers (the United States and Qatar), and the risk that individual member states break ranks. For smaller economies like Australia, unilateral CBAM adoption is impractical given limited market share. However, a coordinated network of CBAMs among like-minded importing nations could create sufficient market pressure to shift producer incentives. The Roadmap should examine the conditions under which such coordination becomes feasible, and what interim measures can be taken to build toward it.

(c) Experiences, Best Practices, and Lessons Learned

Australia: domestic decarbonisation is the easy part

Australia's experience demonstrates that the domestic electricity transition is technically straightforward and increasingly market-driven. Rooftop solar PV penetration is the highest in the world, household battery deployment is accelerating rapidly (the federal Cheaper Home Batteries program has funded over 12 GWh of residential storage), and utility-scale renewable generation is cost-competitive with new fossil fuel capacity. The domestic electricity system is, in a meaningful sense, on autopilot toward decarbonisation, albeit with the infrastructure bottlenecks described above.

However, the domestic electricity system represents only approximately 15% of the fossil fuels that Australia extracts. Even achieving 100% renewable electricity domestically would leave the vast majority of Australia's fossil fuel production—and its associated export revenues, employment, and government receipts—entirely untouched. This asymmetry between domestic decarbonisation progress and the scale of the export challenge is insufficiently recognised in national and international policy discourse.

Queensland: what happens when transition meets a coal economy

The recent withdrawal of Trina Solar's 200 MW battery project near Mackay, Queensland, following more than 700 community objections, illustrates the political dynamics of transition in a fossil fuel dependent region. Mackay is the gateway to the Bowen Basin, the largest coal reserve in Australia. The Port of Hay Point, 40 km south of Mackay, exports approximately 100 million tonnes of predominantly metallurgical coal annually through two terminals with a combined capacity exceeding 139 million tonnes per year[7]. The resources sector contributes 91% of the region's gross product and directly or indirectly supports three-quarters of employment.

In this context, community opposition to a battery project is not primarily about the battery. It is a proxy for anxiety about the direction of the economic transition and the absence of a credible plan to replace the revenue and employment that coal provides. The new Queensland state government has effectively shelved the previous government's 85% renewable energy target and is actively courting new investment in coal from Japan, Korea, Indonesia, and India. This is the response of a government whose current economic base depends on fossil revenue and an electorate who hold mortgages and businesses also sustained from this revenue.

4. Canada and the Gulf States: parallels

Canada's experience reinforces the Australian pattern. Despite prime minister Carney's deep personal credentials in climate finance, fossil fuel export expansion remains explicitly off limits for policy intervention. The Gulf States present the same dynamic in a more concentrated form: their entire economic diversification agenda—into tourism, financial services, technology, and real estate—is funded by and contingent upon continued fossil fuel revenues. There is no example, anywhere in the world, of a major fossil fuel exporter that has voluntarily and significantly curtailed production in the absence of either geological depletion or political destruction of the sector (as in the United Kingdom under Thatcher, which was driven by anti-union politics rather than climate policy).

(d) Reflecting Diverse National Realities

The exporter–importer asymmetry

The transition-away commitment must grapple with a fundamental asymmetry: the countries best placed to transition domestically (wealthy, energy-importing nations with strong institutions and diversified economies) are not the countries whose fossil fuel production drives global emissions. The countries whose production matters most (major exporters) face the steepest economic costs from curtailment and have the weakest incentives to act unilaterally. A roadmap that does not explicitly address this asymmetry will produce a transition that is neither just nor effective.

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[7] https://www.bhp.com/what-we-do/global-locations/australia/queensland/hay-point
https://dbinfrastructure.com.au/dalrymple-bay-terminal/terminal-overview/
https://nqbp.com.au/our-ports/hay-point

Differentiated pathways for different dependencies

We suggest the Roadmap consider at least three distinct categories of nationally determined pathways:

Wealthy fossil fuel exporters (Australia, Canada, Norway, Gulf States): These countries have the fiscal and institutional capacity to manage a transition but face the largest absolute revenue replacement challenge. The pathway here centres on value upgrading of resource exports, coordinated supply management, and diversification into energy-intensive manufacturing powered by clean energy. The timeline for these countries should be ambitious but must be paired with concrete replacement revenue strategies, not aspirational targets alone.

Developing fossil fuel producers (Indonesia, India, Mozambique, Colombia): These countries face the dual challenge of fossil fuel dependence and development needs. Indonesia's large population provides a domestic market that can absorb clean energy manufacturing investment (Chinese PV companies are already building factories there), but its coal export economy employs millions in regions with few alternatives. India is tripling coal production with at least 120 years of reserves at current rates. For these countries, the pathway must focus on ensuring that the pace of transition does not outrun the pace of alternative economic development. International financial support is essential, but so is realism about the timelines involved.

Fossil fuel dependent developing nations (Pakistan, Bangladesh, many African nations): These countries often lack both the fossil fuel production base and the fiscal capacity to finance a transition. They are simultaneously most vulnerable to climate impacts and most dependent on affordable energy for development. The Roadmap should acknowledge that for these countries, the just transition is fundamentally a question of international finance, technology transfer, and capacity building—and that the credibility of the entire transition framework depends on wealthy nations delivering on these commitments rather than merely exhorting developing nations to decarbonise.

Growth, not replacement

A final, critical insight from our consultations: any transition framed as replacement of existing revenue with equivalent new revenue is, in real terms, a plan for economic decline, because it does not account for inflation and the growth expectations embedded in every government budget, every mortgage, and every business plan. The transition must be framed as growth—as the creation of new industries and revenues that exceed what fossil fuels currently provide—or it will fail politically. This is not a rhetorical point; it is a structural requirement for the just transition to gain and sustain democratic support.

The word "transition" in paragraph 28(d) of the Global Stocktake is doing a great deal of heavy lifting. Whether that transition occurs over a decade or a century remains nationally determined. The word "away" does not mean "out." The Roadmap should honour this deliberate flexibility while articulating concrete, differentiated pathways that give fossil fuel exporting nations a credible economic rationale for engaging with the process, rather than treating them as problems to be solved by the countries that do not share their dependencies.