

PATHWAYS TO A FAST AND JUST ENERGY TRANSITION

INSIGHTS FROM CLEAN ENERGY CASE STUDIES

Case Studies

Abstract

The rapidly intensifying climate crisis is devastating people's lives and the natural world. The case studies documented in this short report illustrate potential just clean energy transition pathways that simultaneously help mitigate the climate crisis and reduce inequality, generate shared prosperity, and garner public support for the transition. An accompanying Overview Report, which synthesises the insights and draws out recommendations from the cases, is available at this [link](#). The cases provide examples of (a) policies and projects relating to the switch to renewable energy, the exit from fossil fuels, and the extraction of transition minerals and (b) different community, public, private and co-equity ownership and business models. While none of the cases fully meet all the identified just energy transition principles, they offer a positive vision and compelling reasons why governments, donors, multilateral agencies, business and civil society should put justice and rights at the heart of their energy transition policies and projects. The research also reveals some of the structural inequalities and constraints that inhibit both the delivery and scaling of just energy solutions and, hence, the need for increased and better-quality public climate finance and transformative policy and legal reform at the national and international levels.

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Māori co-owned, geothermal plant New Zealand (Nga Awa Purua)

1. Project summary

The 140MW Nga Awa Purua Geothermal Plant in New Zealand represents a collaborative approach to large-scale renewable energy projects that incorporates Māori landowners as key stakeholders. The project is co-owned by Mercury Energy (a publicly listed company with majority state ownership)¹ and the Tauhara North No. 2 Trust, which holds the land on behalf of its Māori beneficiaries in the North Island. The joint co-ownership model has been cited as a notable example of developer and Māori landowner collaboration (Mizuno, 2013), though its long-term impact on equity and sustainability continues to be evaluated. The model provides the Māori community with a governance role in the geothermal plant, as well as access to financial benefits, local employment, and educational opportunities. Additionally, it contributes to New Zealand's renewable energy targets, supporting the country's transition toward carbon neutrality by 2050.

2. Country background

New Zealand, a high-income country with a population of over five million people, has long been recognized as a leader in renewable energy development. The country's energy matrix includes significant hydroelectric, geothermal, and wind energy contributions, making up around 85.2% of its electricity generation (International Energy Agency, 2023). Geothermal energy plays a key role, particularly in areas like Rotokawa, which has a rich geothermal resource owned by Māori communities. New Zealand's 2005 NDC commits it to a 51-55% reduction in net greenhouse gas emissions below gross 2025 levels by 2035. These targets are economy-wide and encompass all sectors and greenhouse gases. While previous administrations had set aspirational goals for 100% renewable electricity by 2030, the current government's target is to double renewable energy generation by 2050. New Zealand faces challenges in balancing the energy transition with social justice, particularly in ensuring that Māori communities, who are stewards of

¹ Mercury is a publicly listed company with the NZ Government owning 51% of the shares although it does not take an active role in governance or management. It is listed on both the New Zealand and Australian Stock Exchanges.

natural resources but have suffered historical discrimination, racism and marginalization by European colonists, benefit equitably from developing these resources.

Indigenous Māori communities have been in New Zealand for over a millennium and are integral to the nation's cultural and socioeconomic landscape including through their preservation of indigenous culture, which emphasises the interconnection of people and nature, and their significant contributions to the economy. Their traditional livelihoods are deeply connected to the land, sea, and natural resources, including fishing, agriculture, and forestry (Te Puni Kōkiri, 2023). They own large land areas, including geothermal steam fields and areas suitable for wind farms and the Māori economy has experienced substantial growth, with assets increasing from \$68 billion in 2018 to \$118 billion in 2023, reflecting a shift from traditional sectors like agriculture, forestry, and fishing to areas such as property and professional service (Ministry of Business, Innovation and Employment 2024).

However, as a result of the country's colonial legacy, many Māori communities today face challenges related to unemployment, access to education, and health disparities (Ministry of Health, 2024; Ministry of Business, Innovation and Employment, 2021). Māori communities are also disproportionately affected by climate challenges such as rising sea levels, increased frequency of extreme weather events, and impacts on biodiversity and agriculture (Ministry for the Environment, 2023), especially those in coastal areas or dependent on traditional resource-based livelihoods. The government seeks to address these impacts through adaptive strategies and integrating Māori knowledge into climate action plans to ensure effective climate resilience for both Māori and non-Māori communities (Ministry for the Environment, 2023). The Māori worldview emphasizes the interconnection of people and nature and influences energy projects and policies via their regional trusts. New Zealand's nationally determined contributions (NDCs) incorporate considerations for Māori participation and benefits in climate and energy strategies, recognizing their unique contributions and positions (Ministry for the Environment, 2023).

3. Effectiveness and speed

3.1. Emission reduction

Geothermal plants are an important source of clean energy emitting around one-eighth of the carbon dioxide compared to coal-fired power plants (McLean et al, 2023). The Awa Purua geothermal power station produces about 3% of New Zealand's total electricity needs (Energy Monitor, 2014), illustrating how Indigenous or community co-ownership models can help contribute to renewable energy targets and greenhouse gas reduction targets.

3.2. Co-benefits

The Nga Awa Purua Geothermal Plant provides various co-benefits, including:

- **Energy access:** The plant generates reliable, renewable energy that feeds into the national grid, improving energy security and contributing to a stable electricity supply for the country. The power is sold on the open market. The plant generates 1,100GWh of electricity and supplies enough clean energy to power 140,000 households annually. The Māori Land Trust is currently in the process of including a 15% discount to their community (900 owners plus 9,000 descendants) if they sign up as retail partners (i.e., electricity providers).
- **Economic:** Initially, the project established that the Trust would receive royalties based on project revenue, with the option to buy into the project. Currently, the holdings are 35% owned by the Trust and 65% owned by Mercury Energy. The economic benefits are substantial, with the plant contributing to the local economy through dividends paid to the Māori trusts, employment opportunities created during the construction and operational phases, the utilization of local services and products, and discounted power rates for the Māori community (BHRRRC, 2024). The Trust's funds are distributed as follows: 33% to debt repayment, 33% to reinvestment, and 33% to providing support to families (Personal Communication with Chairman of Nga Awa Purua Trust, Chairman 2025).
- **Social:** The Trust Board maintains that the owners and descendants are the true wealth of the Trust. It fosters a sense of pride, community, and ownership among its people by ensuring that their financial, social, cultural, and environmental aspirations remain central to the strategic and operational decision-making of its governance board. This Board mindset is reflected in the many social programmes that the Trust has developed to enhance and improve the social and financial outcomes of owners and descendants. The Trust has enhanced community well-being, provided educational opportunities related to renewable energy, and increased economic activity in the regions where these projects are located. Māori have a duty of care to *Te Taiao* (the environment), *whenua* (land), and *tāngata* (people). Social projects set up by the Trust include *tangi* (funeral) grants, health grants (GP surgeries, dental and vision expenses), palliative care, education, scholarships, internships, rental and home ownership, financial literacy, afterschool tuition, *kaumatua* (elderly) support and youth development camps (BHRRRC. 2024).
- **Environmental:** Environmental co-benefits include the conservation of natural resources and biodiversity. By reducing reliance on fossil fuels, the project contributes to lower air pollution levels and helps protect New Zealand's rich biodiversity. Additionally, it incorporates Māori environmental stewardship principles, ensuring that the land and resources are managed sustainably. A core principle of the Tauhara North No.2 Trust is *kaitiakitanga*, or guardianship of the environment. As *kaitiaki* (stewards) of their *whenua* (land) and *taiao* (natural world), the Māori owners ensured that environmental

considerations were built into the project from the start. For example, the Trust worked closely with Mercury during planning and consenting to safeguard geothermal taonga (treasures) and cultural sites. Development on Māori land required approval of the Māori Land Court which the project achieved by emphasizing respect for the land and sustainable resource use (BHRRRC,2024). As a result, environmental management plans for Nga Awa Purua reflect Māori values including that geothermal energy development should not degrade the whenua (land) or wai (water) and should instead support ecological regeneration and long-term economic sustainability for Māori landowners. The project involves continuous monitoring of the geothermal field, protection of native flora/fauna where possible, and acknowledgement of sacred landscapes. Mercury notes that all its joint venture geothermal stations are sustainably managed, and their field integrity is closely monitored to ensure long-term viability (Mercury, undated.), which aligns with Māori stewardship principles, ensuring that the geothermal resource is used responsibly and preserved for future generations. Additionally, conservation initiatives have been undertaken in the Rotokawa area (e.g., weed control and native tree planting on iwi lands in partnership with NZ's Department of Conservation) to help protect biodiversity around the geothermal site. (Mercury, undated; New Zealand Ministry of the Environment, 2023).

3.3. Costs

The plant's US\$227 million cost was funded by Mercury Energy in partnership with the Tauhara North No.2 Trust, using a joint venture structure. Mercury covered the initial development expenditure, and the Trust later co-invested (initially 25% then rising to 35% ownership in 2011 (NZ Herald, n.d.)) using bank-funded capital (Japan Renewable Energy Foundation, 2013). The New Zealand government's role was indirect – no direct subsidies or government loans were provided - but Mercury had majority government ownership, and the project earned valuable Joint Implementation carbon credits under the Kyoto Protocol. (UNFCCC, n.d.)

3.4. Timescale

The development of Nga Awa Purua took several years from initial planning to full operation in 2010. This achievement demonstrates the effectiveness of well-planned renewable energy projects in avoiding delays, especially when inclusive governance and decision-making are prioritized from the outset, in this case due in large part to the initiative taken by the Māori Trust. The full climate benefits of the geothermal plant will continue to accrue over decades, supporting New Zealand's long-term emissions reduction goals and contributing to a steady decline in the country's reliance on fossil fuels.

4. Adherence to justice principles

4.1. Recognition of inequalities, knowledge, and rights (Recognition justice)

The Nga Awa Purua Geothermal Plant represents a positive shift toward a more equitable approach to renewable energy development that recognises past injustices, indigenous rights and knowledge and shares project benefits. Historically, government-led geothermal projects were developed on Māori land via a peppercorn lease, which generated \$1 per annum for the landowners while depriving them of access to their lands. The Rotokawa A project was the first developed on Tauhara North No. 2 land by a government-owned generation company (Mighty River Power), where the Trust retained ownership of the land and held a 50% stake in the steam field system and wells. By involving Māori stakeholders in co-ownership and decision-making processes, these projects acknowledge the Māori people's longstanding connection to the land and their rights to self-determination. After 10 years of monitoring the performance of Rotokawa A, the Trust and Mighty River agreed to develop the Nga Awa Purua project (BHRRC, 2024). The inclusion of Māori knowledge, particularly the concept of *kaitiakitanga* (guardianship), helps ensure that the project incorporates and align with Māori cultural values such as environmental stewardship, sustainable land management, and international responsibility in decision-making processes (see Environmental Co-Benefits above).

4.2. People-centred and inclusive (Procedural justice)

The plant exemplifies procedural justice through its inclusive governance structures. Māori stakeholders are actively engaged in the governance and planning stages, ensuring their voices are heard and respected in all major decisions. The Trust's complex form of ownership, involving many individuals, meant that approval from the Māori Land Court was required for the long-term lease arrangement for a development of this size. The court required evidence of support for the project from over 50% of the owners before it could proceed. The co-ownership model implemented goes beyond mere consultation; it ensures that Māori perspectives are integral to the operations and future direction of the projects. This participatory approach has enhanced transparency, building trust between Māori communities and other stakeholders, and increased accountability. Moreover, this model empowers Māori communities by giving them a stake in the renewable energy sector, a critical area for New Zealand's future economic development and climate action (Eastland Group, 2023).

4.3. Shared prosperity (Distributional justice)

Nga Awa Purua is an example of how renewable energy projects can be designed to share prosperity with marginalized communities. Mercury

Energy primarily owns and operates the plant. However, Tauhara North No. 2 Trust plays a significant role as the landowner of the 326 hectares above the geothermal reservoir. The partnership between Mercury Energy and the Trust was established through negotiated agreements ensuring that the local Māori community benefits from the project. The 35% equity stake held by the Trust, along with royalty payments, provide the local Māori community with ongoing dividends from the plant's profits, which are reinvested into local development initiatives. In addition to financial benefits, the project supports educational programmes and local employment, ensuring that the social and economic benefits of the project are widely distributed within the community.

4.4. Remedy and restoration (*Restorative justice*)

Nga Awa Purua helps address historical grievances related to the disenfranchisement of Māori communities from their ancestral lands under colonisations, allowing the community to reclaim control over their resources and benefit from their sustainable use. As an example of self-determined development based on an Indigenous People's control over and benefits from their land and resources, the Nga Awa Purua project represents a form of restorative justice. Grievance mechanisms are embedded in Māori governance structures rather than from independent third parties. They provide a structured platform for Māori landowners to raise concerns, negotiate fair resolutions, and monitor and oversee compliance with land use, royalties, and environmental impacts.

5. Transformative approach and potential

The co-ownership approach, which incorporates recognition of and respect for Māori land rights, knowledge and worldview, offers a potentially transformative way forward for future renewable energy projects. The project's success demonstrates the importance of co-ownership and community engagement, equitable financing structures, and a commitment to responsible environmental stewardship in achieving climate and social justice goals.

6. Contextual conditions, finance, and policy framework

6.1. Funding and finance

The development of the Nga Awa Purua Geothermal Plant, with an estimated cost of approximately US\$229 million, exemplifies a collaborative financing model that balances economic efficiency with

social equity. A key challenge in structuring the financing was ensuring that the Māori Trust, as a landowner, could participate in the investment without risking land forfeiture due to commercial default. Unlike conventional project financing models that require land as collateral, the Trust negotiated alternative security arrangements with lending institutions, offering security over its royalty stream and joint venture interest rather than over its land title. This approach aligned with the Trust's commitment to protecting Māori land tenure while enabling financial participation in the project (BHRRC, 2024). Despite initial concerns, securing financing for the Trust's equity share proved more straightforward than anticipated. Banks viewed the project as relatively low risk due to several factors, namely: the Trust's partnership with Mercury Energy, an experienced state-owned generator with a proven track record; the strong financial fundamentals of the project, ensuring the Trust could repay its debt in a relatively short timeframe; and protective financial covenants requiring reserves for capital expenditure and debt servicing, ensuring financial sustainability.

6.2. National-level policy framework

The Treaty of Waitangi (Te Tiriti o Waitangi) is considered a foundational legal document that recognizes Māori rights and interests. The Climate Change Response Act 2002, which provides the legal foundation for New Zealand's emissions reduction commitments, also acknowledges the need for incorporating mātauranga Māori (Māori knowledge) into climate strategies. Both these laws have some influence over how energy projects are developed and managed but treaty obligations in the energy sector are inconsistently applied and not necessarily translated into meaningful practice. For example, other energy projects have faced criticism for failing to deliver substantial benefits to Māori communities beyond one-off consultation or royalties, meaning that the distribution of costs and benefits largely dependent on project-specific negotiations rather than systemic inclusion highlighting the need for further reform (Ministry of the Environment, 2020; New Zealand Government, 2023; Ministry for the Environment (2020); Deep South National Science Challenge, 2023).

Government-supported Energy Communities, Colombia

1. Project summary

The Colombian Energy Communities (ECs) policy is a joint initiative between the Colombia's Ministry of Mines and Energy (MME) and local communities to advance a just energy transition. Its objectives are to reduce carbon emissions, promote the use of renewable energy, improve energy efficiency, and simultaneously expand energy access and create economic and social co-benefits for neglected and marginalized communities. Decree 2236, issued by the government in 2023, institutionalized energy communities by defining their objectives and implementation. (Decree 2236, 2023) A government call for interested communities, unions, companies and associations, among others, has since received more than 17,000 applications,² enabling it to map community energy needs and mitigation potential nationwide. (MinEnergía, n.d.) While still in its early stages, 820 energy communities have subsequently been constituted and are operational, so far receiving approximately COP 260bn (over US\$61m) in investment, reducing emissions and simultaneously benefiting at least 200,000 people. The MME aims to implement 3,000 energy communities by August 2026, when the current administration's term ends, with a projected investment of COP 3bn (over US\$700m) from various sources, mostly public finance. The strategy aims to prioritize communities which address multidimensional poverty, gender inequality and the impacts of armed conflict, focusing on marginalized groups such as Indigenous Peoples, Afro-descendants and farmers. Supported energy communities include state schools and hospitals, as well as geographical communities and associations of conflict victims and ex-combatants reintegrating into society, highlighting the initiative's transformative potential. The programme aligns with Colombia's broader transition efforts, including economic decarbonization and reducing reliance on fossil fuel exports, including halting new fossil fuel and gas exploration licences. Nonetheless, some CSOs participating in the energy communities strategies have questioned the representativeness of participating communities and the influence of private sector interests given the history of extractive coal and petroleum operations (personal communications with local CSOs, 31 March, 2025).

² According to the government the actual number of applications is approximately 17,800, rather than the reported 18,466 on the energy community website, following database cleaning and cross-referencing to eliminate duplicates.

2. Country background

Colombia, is an upper-middle-income country at the juncture of South America, Central America and the Caribbean with a population of 52 million but which remains highly unequal, and is marked by one of the world's longest armed conflicts. The country's energy mix relies heavily on fossil fuels, with oil, gas and coal comprising 75%. However, renewables account for 25% of its total energy supply – above the 14% global average – including 75% of electricity (far exceeding the 30% global average), primarily from hydropower (IEA, 2023). Despite its wealth of natural resources, 16.1% of the population lives below the energy multidimensional poverty line (Proamigas, 2024). Since 2016, Colombia has emerged as a regional leader in clean energy transition (IEA, 2023; WEF, 2024), with the incumbent government implementing an ambitious decarbonization strategy outlined in the National Development Plan 2022–2026. This policy aims to help achieve a just transition that shifts from an extractive economy to a sustainable and productive one. With abundant renewable energy sources like wind, solar, water, biomass, geothermal heat and ocean energy, Colombia has the potential, as well as the ambition, to play a vital role in national and global climate solutions (DNP, 2023).

3. Effectiveness and speed

3.1. Emission reductions

Colombia accounts for 0.57% of global emissions and is not a historical contributor to greenhouse gas emissions (UNDP, 2023). Electricity production is predominantly hydroelectric, resulting in a renewable-based grid that surpasses global averages (IEA, 2023). The government's just energy transition strategy focuses on breaking away from reliance on fossil fuels while also expanding clean energy access in peripheral regions, diversifying non-conventional renewable energy sources and fostering societal engagement in the transition (DNP, 2023).

The Energy Communities initiative seeks to contribute to emissions reduction, although mitigation is not its sole focus. There are no available statistics on their current impact on greenhouse gas reduction due to the short implementation period. However, by 2026 the MME aims to provide 400MW of clean energy: 300MW will be connected to the national grid or National Interconnected System (SIN), and 100MW in standalone systems and microgrids in Non-Interconnected Zones (ZNI) or not connected to the national grid. This would result in an annual reduction of 1.6 MtCO₂eq in ZNI and 2.1 MtCO₂eq in SIN, totalling 3.7 MtCO₂eq. This could contribute significantly to Colombia's revised NDC target of 169.4 MtCO₂eq reduction by 2030 (51%) and support the goal of net-zero emissions by 2050 (UNDP, 2023).

3.2. Co-benefits

As well as reducing emissions the Energy Communities initiative provides multiple economic and social co-benefits:

- **Energy access:** It aims to expand clean energy access to historically neglected areas and marginalised communities, addressing long-standing energy gaps as well as prevalent issues of illegal grid connections and payment evasion (EIA and TECI, 2023). It seeks to deliver clean energy solutions, either by connecting communities to the national grid or through microgrids and diesel reliant standalone systems (IPSE, 2023). The Energy Communities initiative is Colombia's most ambitious rural electrification effort and supports urban decarbonization. Priority is given to ZNI, which include historically marginalized territories and populations such as peasants, rural residents, Indigenous Peoples, Afro-descendant communities and those most affected by the armed conflict.
- **Economic:** The initiative aims to help strengthen local communities and their practices of solidarity, cooperation and self-governance – popular economies – for example, in managing natural resources and sharing their benefits (MME, 2024a). While promoting energy self-sufficiency, such practices also help reduce communities' fuel and energy costs. Communities can also sell surplus energy produced on a small scale for self-consumption or generate energy directly for commercialization (UPME, 2024; EIA & TECI, 2023). This frees up resources and generates new income streams for community members. Nevertheless,
- **Social:** Additionally, the initiative supports public schools and hospitals which means the savings and income generated from the sale of surplus energy can be used to purchase education and medical equipment. Additionally, the strategy supports associations of ex-combatants and communities who have been deeply affected by the civil war, fostering social cohesion and contributing to lasting peace. Another key co-benefit includes the just energy transition (JET) schools, organized by the MME in collaboration with local partners. These schools aim to provide community members with fundamental concepts and practical knowledge on the operation and maintenance of deployed clean energy solutions. Resolution 40509 establishes certification by a JET school as a prerequisite for registration in the Energy Community Register (RCE) (MME, 2024a). This is one of the final steps in institutionalizing energy communities.
- **Environmental:** A further key objective of the Energy Communities initiative is to promote environmentally responsible local development models through collective action, fostering the sustainable use and management of natural resources and common goods. Moreover, the strategy aims to incentivize the use of clean energy to address water scarcity and contamination, food insecurity, deforestation, soil degradation and other common environmental challenges in areas where fossil fuels are prevalent. It also seeks to enhance climate adaptation capacities and strengthen community resilience (MME, 2024a). The initiative is integrated into the broader just transition governmental policy, which prioritizes biodiversity

conservation and includes an ambitious program that has reduced deforestation to its lowest level in 23 years (El Espectador, 2024b). It also builds upon the country's national knowledge base and expertise in science, technology and research in the energy sector, advancing projects in solar, wind, geothermal, small hydroelectric plants, biomass, biofuels and green hydrogen.

3.3. Three examples of energy communities

Health energy community in San Andrés: Departmental Hospital Clarence Lynd Newball Memorial

This Community Energy project involved the installation of solar panels with a total capacity of 300kWp, providing 40% of the hospital's energy consumption. It required an investment of nearly COP 10,000m (approximately US\$2.3m). In some Caribbean communities, high electricity prices have forced hospitals to limit their services to remain financially viable. With access to renewable energy sources, these hospitals can now operate at full capacity, providing comprehensive services to the community. Beyond economic and energy savings, the project enables the region's largest hospital to allocate more resources to medical supplies and equipment. It therefore contributes to ensuring energy security and advancing health rights for the predominantly Black and Raizal population of the San Andrés and Providencia Archipelago, historically one of Colombia's most neglected territories. This initiative was further enhanced by the launch of an electric mobility programme and a renewable energy project for public lighting (Cuarto de Hora, 2024).

Education energy community in Bojayá, Choco: Public School IE Agropecuaria La Loma

This Community Energy project, implemented in one of 23 public schools in Chocó, installed solar panels benefiting 1,400 children and adolescents by providing lighting, internet access, audiovisual equipment, and printers. With an investment of COP 5,000m (US\$1.15m), the project is intended to cover the school's energy needs, previously met by costly diesel generators that the school sometimes could not afford, which meant that it only had energy for a few hours a day (El Tiempo, 2024). The region, historically affected by armed conflict, faces significant energy gaps. It is part of the Pacific Rainforest, is one of the rainiest in the world. In other regions, similar energy communities have benefited from replacing wood stoves with biogas stoves, as well as from productive community projects such as crop cultivation and fish farming.

Peace energy community in Tumaco, Nariño: Training and Reincorporation Space (AETCR) La Variante

This project constructed a photovoltaic solar system for the fish farming project of 53 peace signatories and former FARC-EP combatants (33 men and 20 women), benefiting 324 AETCR residents and their families.

The emerging energy community builds on the former association established by the ex-combatants, the Multiactive Cooperative for Memory, Life, and Hope (Coommave). (Multiactive Cooperative, Memory, Life and Hope (Coommave)). A circular economy project focuses on red tilapia farming while also incorporating vegetable production and water purification. The project was funded by Centrales Eléctricas de Nariño (Cedenaar) and involved an investment of COP 746m (approximately US\$0.2m). Although more modest in scale, the project has a symbolic impact as it supports the communities' commitment to reintegration, reconciliation and sustainable development. It also links climate action and just transitions with peacebuilding (El Espectador, 2024a).

3.4. Costs

The purchase and installation of all key technological components of the clean energy project (e.g. for photovoltaic systems: solar panels, inverter, mounting structure, battery storage, charge controller, wiring and connectors, and metering system), as well as equipment maintenance, have in most cases been covered by the government. In such cases ownership of the assets is transferred to the community, subject to the fulfilment of certain requirements, including financial sustainability, capacity to maintain the equipment and RCE registration (MME, 2023). However, energy communities follow different financial models. Some are financed through capital provided by private sector entities or publicly owned companies which also become members of the energy community. The role of the private sector and its relationship with communities has been questioned, as these partnerships often lack a foundation of trust. Many communities have experienced abuse at the hands of fossil fuel companies and now see similar patterns emerging in mega-renewable projects for example in La Guajira, home to El Cerrejón – the largest coal mine in the country – which is now also the focus of extensive wind farm developments (personal communication with local CSOs, 31 March, 2025).

The cost of each energy community varies widely depending on its scale, ranging from a few hundred dollars to multimillion-dollar projects. The government estimates that implementing the initial 400 energy communities entailed an investment of approximately US\$29m, with an average cost of US\$72,500. The most ambitious projects are yet to be implemented, including diversification of clean energy solutions, with photovoltaic technology the most common so far. According to the MME, the total investment by 2026 will be over US\$700m, with a goal of 3,000 energy communities. One limitation of the initiative is its cost-effectiveness when evaluated solely based on emissions reduction. However, evidence suggests that when the multiple social and economic co-benefits of these projects are considered, the overall benefits likely outweigh the investment costs. Community organization and participation also play a key role in ensuring the system's long-term sustainability (TECI, 2023).

3.5. Speed and timescale

The initiative combines individual energy community projects, which take a few months to a couple of years to establish, and a long-term strategy aimed at creating lasting public policies that future administrations can continue. Implementation is likely to be gradual due to limited resources and the new iterative collaboration and ways of working with communities. But the government intends to provide ongoing support throughout the lifespan of the Energy Communities, including efforts to strengthen community organisation and provide training centres to strengthen technical skills and future energy production. These features of the initiative, combined with the integration of just energy principles, are expected to help ensure the sustainability of the projects.

4. Alignment with just transition principles

The main objectives of the Energy Communities initiative are to deliver a just clean energy transition that reduces carbon emissions, promotes the use of renewable energy, improves energy efficiency, and simultaneously expands energy access and creates co-benefits for previously neglected and marginalized communities. The initiative also seeks to empower local populations by supporting decentralized community energy generation and management, fostering green economic development, and involving communities in energy transition initiatives.

4.1. Recognition of inequalities, knowledge and rights (*Recognition justice*)

The initiative's design is based on a recognition of the historical and structural inequalities within Colombia (TECI, 2023). It aims to democratize and decentralize energy services to reach, and benefit marginalized communities that are either unconnected to the grid or reliant on an unreliable and costly fossil-fuel energy supply. It also recognizes the unique jurisdiction of ethnic (Indigenous and Black) communities and their collective and sovereign land governance rights, enabling them to manage and own energy generated within their jurisdictions according to their laws and customs. The initiative further respects the diverse needs and preferences of different communities by enabling them to tailor just transition solutions to their contexts. Inclusivity and diversity criteria, such as energy poverty, multidimensional poverty, gender inequality, and conflict-affected areas, are used to select and prioritise energy communities. Special attention is given to Black, Afro-descendant, Raizal and Palenquera communities, Indigenous Peoples and peasant populations, as well as territories historically neglected by the state (MME, 2024a).

4.2. People-centred and inclusive (*Procedural justice*)

The initiative champions the principle of energy for the people, focusing on strengthening community economies and improving access to social services rather than solely relying on technological advancements. In the initial phase, over 17,000 communities applied to join the initiative highlighting its inclusivity and commitment to grassroots engagement. The prior broader participatory process involved an open call to all sectors of society to collaboratively shape the roadmap for a just energy transition through 27 nationwide government consultations (MME, 2024b). Nevertheless, some CSOs have been critical, questioning the representativeness of participating communities in the process and alleging that some were excluded (personal communication with CSOs, March 31, 2025). JET schools also facilitate access to training and skills development, increasing social capital within communities. This participatory process aims to ensure that the energy communities address systemic inequalities while empowering them to take ownership of their energy future. The intention is to engage and support local communities with strong organizational capacity and prior involvement in energy and resource management. However, one limitation of the strategy is its top-down design as it was government-driven rather than emerging organically as a community-led initiative (TECI, 2023). On the other hand, having a government community energy strategy can also be considered a considerable strength that many countries lack.

4.3. Shared prosperity (*Distributional justice*)

The Energy Communities initiative embodies distributive justice by promoting equitable access to clean energy as a common good for all and including marginalized and underserved populations. By enabling marginalised communities to actively participate in the energy value chain - whether ownership, generation, management and/or distribution - the initiative helps ensure that the economic and social benefits of clean energy are fairly, and widely shared helping foster shared prosperity.³ The initiative also strengthens national energy sovereignty by supporting a gradual transition to a diversified energy matrix that prioritizes self-sufficiency and resilience. Additionally, by linking access to basic services with the realization of fundamental human rights, energy communities offer an innovative framework for energy justice. The government predominantly funds these initiatives without burdening communities with loans, which contributes to a redistribution of resources that aligns with its broader agenda of progressive taxation and social security provision.

³ The ownership model depends on the composition of the energy community. If it consists solely of community members, the national government will transfer ownership to the community. If it includes public institutions such as schools or hospitals, the assets will be owned by local governments. If the private sector is involved, ownership is shared between private entities and the community.

4.4. Remedy and restoration (*Restorative justice*)

No specific conflict resolution mechanisms or grievance mechanisms have yet been established, as the initiative is still in its early stages. However, the energy communities strategy incorporates elements of reparative justice by prioritizing victims of armed conflict and historically neglected populations, addressing past injustices while building a more equitable future. Additionally, by empowering communities to tackle the climate crisis and protect biodiversity, the initiative fosters climate resilience in vulnerable regions. This approach not only restores opportunities for marginalized groups but also ensures that they play a central role in advancing environmental sustainability and adapting to climate challenges.

5. Transformative elements

The initiative has a number of transformative features. It integrates government policies aimed at decarbonizing the economy and reducing dependence on fossil fuels and mineral extraction, with strong community-level engagement. It also reshapes and democratizes the energy system by empowering users to become generators and managers of non-conventional renewable energy sources (NCRES), renewable fuels and distributed energy resources. By decentralizing energy generation, ownership, storage and consumption, it integrates communities in the energy value chain and by prioritizing marginalised communities it simultaneously reduces inequalities and addresses both social and environmental challenges. Furthermore, by integrating critical areas such as education, health and peace, the initiative fosters a holistic approach to energy justice. It links access to clean energy with the provision of essential public services and promotion of fundamental human rights – including a healthy environment, peaceful communities, and quality education. The initiative also emphasizes the need to address the climate–conflict nexus and creates opportunities to trigger a domino effect of benefits, multiplying positive outcomes across various levels. However, as this is a recent initiative, its longer-term impacts remain to be fully realized.

6. Financing and policy framework

6.1. Financing structure

The Energy Communities initiative has a complex and diversified financing structure. However, it is estimated that two-thirds of the total budget will be provided by the Ministry of Mines and Energy from the general government budget. Additional sources of financing include:

- Government funded
 - The Non-Conventional Energies and Energy Efficiency Fund (FENOGE)

- The general system of royalties
- The public works tax
- The Financial Support Fund for the Electrification of Interconnected Rural Areas (FAER)
- The Financial Support Fund for the Energization of Non-Interconnected Zones (FAZNI)
- The Programme for the Normalisation of the Electric Grid (PRONE)
- International cooperation
- The private sector (MME, 2024c)

6.2. Regulatory and policy framework

The energy communities initiative was formally established under National Decree 2236 on 22 December 2023. It is a cornerstone of the government's vision for a just energy transition, as outlined in its ambitious National Development Plan 2022–2026 (DNP, 2023). This aims to address energy inequality and ensure a transition rooted in respect for nature, social justice, sovereignty, security, reliability and efficiency. The plan includes three main strategies: fostering energy generation from NCRES, enhancing energy security and reliability, and closing the energy gaps that leave many communities underserved. Energy communities are central to the latter strategy, which prioritizes expanding electricity coverage to marginalized areas. This is achieved by connecting previously unlinked regions to the National Interconnected System (ZIN) – the government-run national energy grid – and implementing cleaner energy solutions tailored to the unique conditions of each territory. Other objectives include improving service quality and fostering distributed energy generation to democratize energy access.

The implementation of energy communities is further guided by national resolutions. Resolution 501 of 28 June 2024 regulates the maximum power limits and distribution for collective generators. Resolution 40509 of 21 November 2024 establishes the procedures for registering energy communities (RCE) and sets the criteria for their prioritization and focus.

Concerns remain over policy gaps for long-term implementation, such as safeguarding measures for these community initiatives regarding fee collection, or regulations on the lifespan of panel batteries and waste management to prevent contamination. There is also a need for more specific frameworks to clearly define the rules of engagement between the private sector and energy communities, ensuring that community interests are prioritized and protected.

Micro-hydro schemes, Pakistan

1. Project summary

The Sarhad Rural Support Programme (SRSP) is an NGO that is part of the Rural Support Programmes Network (RSPN) in Pakistan, which works on various community-driven development initiatives. One of its projects consists of micro-hydro schemes, with 355 installations which have provided electricity to approximately one million people, 90% of whom are receiving uninterrupted electricity supply for the first time. The project presents a positive model of how a development-orientated community and social enterprise can provide a clean energy alternative to biomass and fossil fuels in marginalized and remote rural areas. Unusually, the government has also purchased electricity from SRSP for a fixed period or for emergencies. As well as improving energy access, the project reduces deforestation and emissions, enhances livelihoods, reduces women's workloads and encourages local economic growth by enabling home-based businesses, often run by women, boosts tourism and improves educational and health opportunities. The participatory community approach also strengthens local capacity and fosters problem-solving, ownership, and sustainability in managing energy resources. SRSP collaborates with government bodies, international donors, and local communities to implement its projects, but it operates independently of the government.

2. Country background

Located in South Asia, Pakistan is a lower-middle-income country with high levels of inequality and a population exceeding 240 million as of 2022. Its economy is diverse, with agriculture, industry, and services playing significant roles, though agriculture remains a major livelihood source for many. The country's energy mix relies heavily on fossil fuels, including natural gas, oil and coal, but there is increasing exploration of renewable energy sources like hydropower, wind and solar (IEA, 2023). Access to electricity is uneven, with rural areas facing frequent outages and limited access. Pakistan aims to reduce its greenhouse gas emissions by 20% by 2030 compared to a business-as-usual scenario through various measures, including expanding renewable energy (World Bank, 2023). The country is highly vulnerable to climate change impacts, including extreme weather and shifting precipitation patterns, exacerbating existing social and economic challenges (IEA, 2023). Pakistan's energy sector is a major contributor to the country's greenhouse gas emissions. The sector, including electricity generation, accounts for approximately 46% of Pakistan's total emissions. The primary sources of emissions within the energy sector are fossil fuels, particularly coal, oil and natural gas, which are used for electricity

generation, transportation and industrial processes (Ministry of Climate Change, 2021). Pakistan's electricity generation relies heavily on fossil fuels, with natural gas and oil being the primary sources, followed by coal. In 2020, the total CO₂ emissions from Pakistan's energy sector were estimated at around 178 million tons, with electricity generation being a significant contributor (IEA, 2023).

3. Effectiveness and speed

3.1. Emission reduction

The micro-hydro schemes contribute to the country's emission reduction targets by providing a renewable energy alternative to traditional biomass and fossil fuels. Biomass, often in the form of wood and animal dung, is widely used in rural areas for heating and cooking, leading to deforestation and indoor air pollution. By replacing biomass with hydropower, these schemes help reduce emissions and mitigate the environmental impacts of deforestation. CO₂ emissions are reduced by 71,000 tons annually (SRSP, 2023). The reduction in deforestation also helps sequester carbon, further contributing to emission reductions (Hussain, 2018).

3.2. Co-benefits

The micro-hydro schemes have reportedly generated significant co-benefits, including:

- **Energy access:** The schemes have significantly improved energy access in marginalized, remote rural areas of Pakistan, providing electricity to approximately one million people.
- **Economic:** Access to electricity has also transformed lives by enabling new economic activities, such as small-scale industries, agricultural processing (like fruit drying) and home-based businesses, helping increase household income. Although no intersectional breakdown is available, many of these activities are led by women. The more reliable energy supply has also reduced the time and labour women often spend on gathering traditional biomass fuels, allowing more time for productive activities and education (UNDP Pakistan, 2019). The provision of cheap electricity has been a major boost for tourism in mountain regions, with over 300 hotels benefiting from the electricity (SRSP, 2023)
- **Social:** Access to electricity has also brought about social improvements, such as better educational outcomes, as schools and homes now have lighting during evening hours. This has allowed children to study after dark. The project's economic benefits have also allowed families to invest more in their children's education and wellbeing (Umar & Hussain, 2015). Basic health units can now provide laboratory and x-ray services to patients because of the electricity (SRSP, 2023). Mobile services have improved as mobile towers have regular electricity, boosting communication and the use

of social media. An independent evaluation of the project (Mathia, 2018) highlights its significant impact on women's empowerment, social relationships, economic growth and community mobilization (Mathia, 2018). In Serai, UC Balakot, Swat, where electrification had been needed for decades, the community's collective efforts led to the successful establishment of a micro-hydro plant, drastically improving daily life by providing reliable, clean energy. The electrification of rural households through 165 micro-hydro schemes under the EU-PEACE programme benefited over 624,000 off-grid people, significantly reducing dependency on fossil fuels and kerosene while enhancing women and students' quality of life. The project's sustainability was ensured through professional service delivery models, earning it prestigious awards such as the Ashden UK Award 2015, Energy Globe Award 2017 and UN Energy Initiative Award 2017, reinforcing its replicability and contribution to global clean energy efforts (Mathia, 2018).

- **Environmental:** In addition to reducing deforestation, the micro-hydro schemes have promoted biodiversity conservation by decreasing the pressure on forest resources. With the additional power, electricity has been used to pump water up the barren mountains to plant thousands of trees. By providing sustainable energy sources, these schemes contribute to the conservation of local ecosystems and biodiversity and the sustainable management of natural resources (WWF-Pakistan, 2018; SRSP, 2023).

3.3. Investment costs

The total cost of implementing SRSP's micro-hydro schemes is about Rs 4.5bn (US\$16,166,655), involving a combination of funding sources. These typically include government grants, international development aid, private sector investment and community contributions. The collaborative financing model and involvement of local communities helps ensure the viability of the projects by sharing risk between diverse funding streams and fostering local ownership and long-term commitment to the projects (GIZ, 2017). SRSP has been highly efficient in building its projects, which cost on average Rs 156,000 per kv, while government project costs per kv have varied between Rs 262,000 and Rs 320,000 (SRSP, 2023).

3.4. Speed and timescale

The implementation of the micro-hydro schemes spans several years, typically involving multiple phases. The timeframe for realizing the full benefits of emission reductions depends on the scale and scope of each project. Many of the schemes have been operational for several years, contributing to ongoing emission reductions and sustainable development. For instance, the Khyber Pakhtunkhwa government's initiative to install 350 micro-hydropower plants has been progressing with three plants inaugurated in Battagram District: the 200kW Bela Bala, 75kW Shagai, and 30kW Beesa Khait (Harris 2015). In the years following, SRSP has continued its efforts to expand access to renewable

energy in remote areas. The long-term impact of the micro-hydro projects is expected to grow as more rural communities gain access to clean energy, leading to cumulative environmental and social benefits over time (WWF-Pakistan, 2018).

4. Adherence to justice principles

4.1. Recognition of inequalities, knowledge and rights (Recognition justice)

SRSP's project targeted marginalized rural communities that had been historically underserved by national energy infrastructure. These communities, primarily located in remote areas of Khyber Pakhtunkhwa, often lacked basic services, including access to electricity. By focusing on these areas, the project aimed to reduce inequalities in energy access and improve the livelihoods of some of the most vulnerable populations in Pakistan. The project operates in highly conservative areas dominated by Pakhtun tribal culture and has creatively sought to address issues of governance, sustainability, power and vulnerability within communities to ensure inclusiveness and equality.

4.2. People-centred and inclusive (*Procedural justice*)

SRSP's micro-hydro project emphasized community participation and engagement in the management and operation of its schemes. In the smaller schemes, local communities were involved in every stage of the project, from planning to implementation and management. In larger schemes, because of coordination challenges across different villages in a tribal culture, a social enterprise model has been adopted, ensuring that the projects are run on a financially sustainable basis with prices that do not exploit the communities and communities are consulted on the use of any project surpluses. The governance of larger projects combines bottom-up and top-down approaches undertaken by highly qualified volunteers (SRSP, 2020). These participatory approaches have not only ensured that projects are aligned with the needs and preferences of the local population, but also that they foster a sense of ownership and accountability among community members. The projects also provide training and capacity-building opportunities, enabling local individuals to take on roles in the operation and maintenance of the micro-hydro plants. The approach helps the sustainability of the projects by supporting communities in managing their energy resources. Nevertheless, while the project is generally inclusive, the extent of involvement of marginalized groups, such as women and ethnic minorities, in decision-making processes has not been extensively documented (Ashden, n.d.; GIZ, 2017).

4.3. Shared prosperity (Distributional justice)

Shared benefits: The micro-hydro schemes are designed to ensure that the benefits of electricity generation are equitably distributed among previously underserved rural communities, including women. By focusing on remote and marginalized areas, the project seeks to address historical energy inequalities and provide substantial socioeconomic benefits. Roughly 94% of the project's electricity consumers belong to the poorest households and get electricity at lower rates than commercial users and higher-income groups. The communal and interconnected nature of these communities means the benefits of electrification are shared collectively. The introduction of hydropower has helped transform the lives of women in rural communities by reducing their workloads, creating income-earning opportunities and alleviating stress caused by prolonged hours spent on household chores without electricity (SRSP, 2023). Women have expressed strong support for these projects, often being the most vocal advocates for electricity restoration when power systems are damaged. Surpluses generated from the projects can only be utilized for the benefit of the communities in consultation with them. The revenues and expenditures for the social enterprise projects are audited annually, and the audited statements are public documents

Fair financing: The financing model involved a mix of international/national, public/private and local resources. The role of external actors in providing funding, technical assistance and policy advocacy has enhanced the effectiveness and reach of the schemes (GIZ, 2017; UNDP Pakistan, 2019).

Protection of rights and the environment: Unlike large-scale hydro projects, micro-hydro schemes do not cause flooding and hence avoid displacing people from their land. Before a project starts, land and water rights are settled with all owners and stakeholders; where needed, compensation is paid. However, the issue of remedy is not comprehensively covered in the available literature (Ashden, n.d.; WWF Pakistan, 2018).

4.4. Remedy and restoration (*Restorative justice*)

The environmental impact of the SRSP's micro-hydro schemes was carefully considered during the design and implementation phases. The projects aimed to reduce deforestation and reliance on biomass for energy, which are significant contributors to environmental degradation in rural Pakistan. By providing a renewable energy alternative, the project improved local environmental conditions and contributed to broader ecological restoration efforts. The sustainable use of water resources and the promotion of biodiversity conservation were key components of the project, ensuring long-term environmental health. Additionally, staff working on the projects who come from poorer households are all insured against hazards in their work and a system of protecting against this was also initiated (SRSP, 2023). But SRSP still needs to put in place more robust monitoring systems to ensure that

those who are negatively affected by the projects are adequately compensated and the interests of minority and vulnerable groups are protected (Ashden, n.d.; UNDP Pakistan, 2019; SRSP, 2023).

Transformative elements

5. Transformative Elements

The micro-hydro initiatives represent a promising community-driven, not-for-profit and participatory development approach that significantly improves energy access in rural areas through renewable energy alternatives to biomass and fossil fuels, thereby reducing deforestation and greenhouse gas emissions. These projects bring substantial benefits to communities, including reliable electricity, which supports small businesses, home-based enterprises, and educational activities, catalysing local economic growth and enhancing quality of life. The participatory approach employed in these projects strengthens local capacity and fosters community ownership, which is critical for operational success and resource management. However, the social tariffs offered by the project, and other community contributions, sometimes fall short of covering maintenance and operational costs so the project still relies to some extent on external grants. However, this is a common financial challenge, like those experienced by public utilities and private delivery in low-income areas.

6. Further details of the Financing structure and policy framework

6.1. Financing structure

The SRSP's micro-hydro schemes are financed through a blend of public, private, and community resources. The EU has been the main donor, providing Rs 2.5bn (US\$8,981,475) out of the Rs 4.5bn (US\$16,166,655) invested in total. The Khyber Pakhtunkhwa has provided Rs 1.6bn (US\$5,748,144) from a loan provided by the Asian Development Bank. The remaining contributions have come from Kreditanstalt für Wiederaufbau (KfW), a German state-owned development bank through the Pakistan Poverty Alleviation Fund, and various international development agencies. The EU has also provided considerable technical assistance. SRSP has also indirectly benefited from the investments made by Swiss Agency for Development and Cooperation (SDC) and the German development agency in the micro-hydro sector in manufacturing turbines and so on (UNDP Pakistan, 2019; SRSP, 2023). Local community contributions to the project, often in the form of labour or small monetary donations, and the provision of land have enhanced local ownership and sustainability.

6.2. Regulatory and policy framework

Elements of Pakistan's legal and policy frameworks provide a conducive environment for the implementation and scaling of renewable energy projects such as SRSP's micro-hydro schemes (WWF-Pakistan, 2018) as well as helping ensure that they are aligned with national development goals and international commitments. The National Energy Policy encourages the diversification of Pakistan's energy mix, emphasizing the expansion of renewable energy sources to meet the growing demand and reduce the country's carbon footprint. For example, the Environmental Protection Act (1997) requires that the environmental impacts of such projects are carefully assessed and managed. It mandates that all energy projects, including micro-hydro schemes, undergo rigorous environmental impact assessments to promote sustainable practices. Furthermore, the National Climate Change Policy, which aligns with international climate agreements like the Paris Agreement, underscores Pakistan's commitment to building resilience against climate change through renewable energy projects.

6.3 Institutional support

The project's multistakeholder approach has been essential in overcoming project implementation challenges and achieving long-term sustainability. The presence of an experienced and strong local not-for-profit organization like SRSP, with credible financial, management and governance systems and deep knowledge of the context, has contributed to the success of the project, as well as the collaborative efforts of various stakeholders, including government bodies, local communities and international development organizations. The Pakistani government, through its rural development and energy ministries, has provided important support in the form of policy guidance and facilitation. International organizations, such as the United Nations Development Programme and the German Agency for International Cooperation GIZ, have been pivotal in providing technical expertise, financial support, and capacity building. These organizations have not only helped in the design and implementation of the micro-hydro schemes but also in monitoring and evaluating their impact. Additionally, partnerships with local NGOs have been instrumental in mobilizing community participation and ensuring that the projects are tailored to local needs.

Kipeto Community Benefit Wind Farm, Kenya

1. Project summary

Kipeto Wind Farm (Kipeto Ltd., n.d.), located in Kajiado County, Kenya, is the second-largest wind power project in the country and provides clean energy to over 40,000 households (300,000 people). Some of the key positive elements that could be replicated by other renewable energy projects include supporting local landowners to formalise their land titles by leasing the land rather than buying it from them, and by establishing a Community Trust whereby the community receives a share of the profits. This is intended to be 5% of the profits in the Kipeto case but has allegedly not yet been operationalised. The windfarm is privately owned, managed and operated by Kipeto Energy Limited. Primary stakeholders include Meridiam, a France-based Benefit Corporation (B Corp) and an asset manager (88% share) and Craftskills Wind Energy International (12% share), a Kenyan company that specializes in developing and promoting renewable energy solutions, particularly wind energy, within the country and across Africa. Funding for the Kipeto Wind Farm includes a combination of equity and debt financing.

2. Country background

Kenya is a lower middle-income country located in East Africa, with high levels of inequality and a population of about 55 million as of 2024. Agriculture forms the backbone of its economy, alongside manufacturing and services. Its energy mix features hydroelectric, geothermal, wind and solar sources, contributing to about 80% of the country's electricity. Despite this progress, energy access remains a challenge, especially in rural areas. Kenya's electricity access is currently 84%, the result of an aggressive electrification programme that saw growth from 32% a decade ago (ITU, 2024). It aims for universal access by 2030 (World Bank, 2023; IEA, 2024). The country's nationally determined contributions (NDCs) target a 32% reduction in greenhouse gas emissions by 2030, with 15% unconditional and 17% conditional on international support (UNFCCC, 2024).

The Maasai people who live in the vicinity of the wind farm are indigenous to Kenya and are known for their pastoralist lifestyle. The Maasai face challenges, including low incomes and limited access to essential services. Historically, they have experienced marginalization and discrimination related to land evictions and access to education and healthcare (Brockington, 2023; Muthuri, 2023). Their traditional land use and pastoralist practices can sometimes conflict with development projects, posing challenges for the community and developers in

ensuring that projects respect Maasai land rights and offer tangible benefits.

3. Effectiveness and speed

3.1. Emission reduction

Kipeto Wind Farm⁴, with 60 wind turbines connected to the national grid and a capacity of 100MW, contributes significantly to reducing Kenya's greenhouse gas emissions. It is expected to reduce CO₂ emissions by approximately 450,000 tons annually (IEA, 2024). According to the latest NDC submission, Kenya aims to reduce emissions by approximately 101 million tons of CO₂ equivalent by 2030 (World Bank, 2023). Kipeto Wind Farm's annual CO₂ reduction represents approximately 0.45% of this target. While this is a small proportion of national emissions, wind farms prevent 166,500 tons of CO₂ emissions annually compared to generating the same amount of electricity using coal power.

3.2. Co-benefits

Kipeto Wind Farm has generated several important co-benefits:

- **Energy access:** The company claims according to Kipeto Energy Ltd. the wind farm has helped to expand affordable and reliable electricity access to an estimated 300,000 people in Kajiado County and surrounding areas, including providing power to local communities with previously limited or no access to reliable electricity (Kipeto Energy Ltd, 2023; Power Africa, 2024). However, direct engagement with community members, including landowners, living near the farm in January 2024 revealed that some did not agree with this assessment, who stated that 'the real people who are living within the community, affected peoples, are [still] living in darkness' and 'we are selling power, but we don't have power in our homes'. They stated that while some relocated households got access to solar lanterns, most did not and their electricity access had not improved since the project started (Community engagement exercise, January 2025).
- **Economic:** According to the company the project has created over 400 jobs during construction and about 50 permanent jobs. These include civil engineers, construction labourers, project managers and safety officers during construction, and operations and maintenance technicians, site managers, administrative staff, environmental officers and community relations officers for ongoing operations. However, community members estimate that 70% of the permanent jobs are not held by local people. Kipeto Energy Ltd has employed Maasai people in various roles, including as construction labourers,

⁴ See Kipeto Ltd's response to the Kenya case study and overview report <https://www.business-humanrights.org/en/latest-news/kipeto-energy-response-to-six-possible-pathways-to-a-fast-just-and-transformative-clean-energy-transition-report>

administrative staff, community relations officers and environmental and compliance officers (Kipeto Energy Ltd, 2023) although no intersectional distributional data is available, so it is not known how many are women, and community members clarified that local Maasai are not represented in top management.

- **Social:** The project claims to have supported local infrastructure, including roads and schools, and improved community health through investments in medical facilities (Actis, 2024). However, community members stated that most of the promised projects have not yet been delivered, but they believe and hope the Community Development Fund will implement these projects over time.
- **Environmental:** Beyond emission reductions, the project has contributed to local biodiversity conservation efforts through various initiatives, including implementing a biodiversity management plan that includes monitoring and protecting bird and bat species in the area. This plan was put in place in response to concerns about the potential impact of wind turbines on local wildlife, particularly avian species (The Nature Conservancy, 2023). Community members confirmed that the biodiversity management plan and efforts have been successful so far.

3.3. Costs

The total cost of setting up Kipeto Wind Farm was approximately US\$365m, including equity and debt financing (Kipeto Energy Ltd, 2023). This covered construction, infrastructure and initial operational expenses.

3.4. Speed and timescale

From the initial studies to full operation, Kipeto windfarm took around nine years to complete, including feasibility studies, consultations, construction and commissioning (IEA, 2024; Kipeto Energy Ltd, 2023) and began operations in 2021. The full impact on emission reductions is expected to be realized over the project's lifetime (exact date unknown), with the initial cuts becoming apparent within the first year of operation (IEA, 2024).

4. Adherence to just transition principles

4.1. Recognition of inequalities, knowledge and rights (*Recognition justice*)

The project reports that it has incorporated an analysis of the Maasai community's land rights and socio-economic conditions. It also claims to have helped address historical land injustices and consulted local leaders to meet the community's needs. These consultations identified

concerns related to land use and access, particularly affecting pastoral livelihoods, and informed the project's design and implementation (Kipeto Energy Ltd, 2023; IFC, 2024). However, comprehensive intersectional analysis relating to gender, income and ethnicity was less emphasized. As a result, the project might not have fully tailored its approach to meet the specific needs and challenges faced by different subgroups within the Maasai community (IPRI, 2024). Community members stated that one of the most significant positive aspects was that some households have been able to acquire land titles with the help of the project and the company. Some thought that the company has probably done this out of its own self-interest but recognised that the end result was positive because otherwise money would go to the county, not directly to the landowners. (Community engagement exercise, January 2025).

4.2. People-centred and inclusive (*Procedural justice*)

The project claims to have adhered to free, prior, and informed consent (FPIC) principles. Extensive consultations were reportedly held between the project proponent and the community, and a Maasai lawyer was involved to ensure legal and cultural sensitivities were addressed.

4.3. Shared prosperity (*Distributional justice*)

Shared benefit: The community trust was established to manage a share of the revenue from the wind farm. Community members were supportive of the concept of the trust but stated that, while they are meant to be receiving 5% of the company's profits through it, the community is not aware of the actual profit, so they do not know how much they are meant to be receiving (Community engagement exercise, January 2025). This trust is intended to support community development projects and enhance local livelihoods, helping ensure that the community benefits from the project (BHRRC, 2023; Actis, 2024; Kipeto Energy Ltd, 2023). However, community members stated that the trust is not yet operational, that the process so far has been 'micromanaged' by the company, and that no money has yet come into it. There is a perception that the community trust will eventually be of value– but there have been no real changes for now (Community Engagement Exercise, 2025). Additional design features contributing to the project's just aspects include the establishment of a local development fund and partnerships with NGOs to provide financial support to the community. The project respects Maasai land rights by leasing land rather than purchasing it. The project owners state that they followed Kenyan regulations and international standards for environmental and social governance. However, detailed due diligence processes regarding ongoing community rights and social protection are not extensively covered (Power Africa, 2024; Kipeto Energy Ltd, 2023).

Fair financing: Kipeto Wind Farm is funded through a combination of public and private finance, with significant contributions from international sources. The Overseas Private Investment Corporation (OPIC), the US government's development finance institution, provided the primary loan to the project. Additional equity financing came from Actis, a global investor in sustainable infrastructure, which holds an 88% stake, and Craftskills Wind Energy International, a Kenyan company, which holds a 12% stake. The project also received technical and environmental support through USAID's Power Africa initiative, which helped develop a biodiversity action plan in line with international best practices. This mix of private and public finance helped the project to raise the necessary funds to start implementation and meet the community's needs, including those of job creation and environmental sustainability.

Protection of rights and the environment: The rights to freedom of association and collective bargaining have reportedly been upheld, with the project adapting its plans based on community feedback (Power Africa, 2024). Environmental and human rights defenders were reportedly protected through transparent and responsive engagement practices (Kipeto Energy Ltd, 2023). However, given the inequality of power between large, international company and Indigenous communities, and the weakness or lack of enforcement of human rights and environmental safeguards in some countries, it is important going forward that governments condition the provision of public or concessional finance on adherence to such standards.

4.4. Remedy and restoration (*Restorative justice*)

The project has included measures to address potential harms, such as compensating landowners and supporting community development projects (Kipeto Energy Ltd, 2023). A company-run grievance mechanism was established as part of the project's commitment to transparency and community engagement, allowing community members to raise concerns or complaints about the project. One resolved complaint involved concerns about the potential displacement of Maasai pastoralists due to the wind farm's construction. Actis and Craftskills worked with community leaders to adjust the project's footprint and implement compensation measures, including the leasing of land rather than purchasing it, thus respecting Maasai land rights (Kipeto Energy Ltd, 2023). However, community members expressed that the grievance mechanism is not working well: for example, the landowners where Kipeto's turbines sit have sent three letters to the company in the past three months that have not been answered in writing and the grievance has not been resolved. One community member said that they will likely 'have to go to the street again', suggesting this is the only way to get a resolution.

5. Transformative elements

While some human rights concerns remain and will need to be resolved, the Kipeto Wind Farm does include some transformative elements that are important for all large-scale clean energy projects undertaken by private companies to consider. By working closely with local leaders to formalise their land-titles, and by leasing rather than buying land, the project has set a positive precedent for how large-scale energy initiatives can be harmonized with traditional land-use practices and ensure that local Maasai households, rather than the county government, are the direct beneficiaries of the rental income. The project provides some tangible benefits to the local community, including some employment opportunities and infrastructure development, and the community representatives are hopeful that if the Community Trust is operationalised and is fully and transparently co-managed with the community, that the Kipeto project may contribute to long term socio-economic improvements in the region that help reduce historical inequalities. Kipeto's commitment to environmental stewardship, including measures to minimize the impact on local wildlife, demonstrates a holistic approach to sustainability that balances energy generation with preserving biodiversity.

6. Further details of the financing and policy framework

6.1. Financing structure

The project was financed through a combination of equity investments, loans and grants from international financial institutions, demonstrating a blended finance approach. The project received approximately US\$233m in debt financing from OPIC. Additionally, equity investments come from Actis and Craftskills, which provide the capital needed to develop and operate the wind farm (Kipeto Energy Ltd, 2023; OPIC, 2023). However, there is a dearth of detailed information about the proportion of grants, interest rates on debt financing or loans, or conditionalities, which inhibits learning from the project.

6.2. Regulatory and policy framework

Kenya's legal framework, while not always fully implemented or enforced in practice, is important in promoting a just energy transition, helping ensure that energy projects like Kipeto Wind Farm adhere to principles of equity, transparency and sustainability. Kenya's Constitution (2010) mandates public participation in decision-making processes for development projects, including energy projects. This provision requires that communities affected by such projects, like the Maasai in Kajiado County, have a say in decisions that have an impact on their land and livelihoods (Government of Kenya, 2024).

Kenya's Land Act (2012) is instrumental in regulating land use and ownership, providing guidelines for equitable land transactions, and intended to protect community land rights. It requires that land acquisition for projects be conducted transparently and with fair compensation, reflecting the principle of distributive justice by ensuring that affected communities are not marginalized (Government of Kenya, 2024). The Environmental Management and Coordination Act (EMCA) (1999, amended 2015) enforces rigorous environmental impact assessments for projects, ensuring that potential environmental and social impacts are evaluated and mitigated. This law promotes procedural justice by involving stakeholders in environmental decision-making processes and addressing community concerns (Government of Kenya, 2024).

The Energy Act (2019) supports Kenya's transition to renewable energy by providing a legal framework for energy efficiency and renewable energy projects. It includes provisions for the integration of renewable energy sources into the national grid and promotes the participation of local communities in the benefits of renewable projects (Government of Kenya, 2024). Kenya's climate policies, including the National Climate Change Action Plan (2018–2022), align with international climate agreements and support the transition to a low-carbon economy. These policies reflect Kenya's commitment to integrating climate justice into national development strategies (Government of Kenya, 2024).

Kenya's ratification of international standards, such as the International Financial Corporation Performance Standards and the OPIC Environmental and Social Policy Statement, are useful and necessary first steps towards ensuring that projects like Kipeto are aligned with global social and environmental sustainability benchmarks. These standards emphasize stakeholder engagement and the protection of human rights, further reinforcing Kenya's commitment to a just energy transition (IFC, 2024; OPIC, 2023).

Coal decommissioning: Mpumalanga, South Africa

1. Project summary

South Africa's planned coal decommissioning project in Mpumalanga province, and the national clean energy transition plan of which it is a part, contain many of the key justice elements that trade unions have campaigned for. These include consultation and engagement with workers and communities, social protection measures like reskilling programmes and early retirement packages for affected workers, site remediation to address environmental degradation, new investment, economic diversification and job creation in the expanding renewable energy sector. It is hoped the transition plans can be funded through a mix of Eskom's budget, international development assistance and loans, and carbon tax revenues. If the justice elements are fully funded and translated into practice the project will offer a model for other coal-dependent countries and regions about how to transition in a just and equitable way that protects workers and community rights, addresses social and economic costs, and creates shared prosperity. However, there are many challenges to translate the vision and plan into practice.

2. Country background

South Africa is an upper-middle income country but with the highest levels of unemployment and inequality globally, meaning many people live below the poverty line. It relies heavily on coal for its energy needs, with coal-fired power plants accounting for around 80% of the country's electricity generation (Department of Mineral Resources and Energy, 2023). This makes South Africa one of the continent's largest greenhouse gas emitters (World Bank, 2023). The country has set ambitious targets to reduce its carbon emissions by 42% by 2025, relative to a 2010 baseline, as part of its nationally determined contributions (NDCs) under the Paris Agreement (National Treasury, 2023). It established a Presidential Climate Commission in 2020 and a Just Transition Framework (JTF) (Republic of South Africa, 2020), which helped forge greater community engagement and consensus about the need for a just and green transition, and is one of the first countries to incorporate the concept of a 'just transition' in its NDCs (Republic of South Africa, 2020).

However, translating the commitment to a just transition into practice is extremely challenging. The coal industry is a cornerstone of South Africa's economy, accounting for 72% of the country's energy needs, and is a significant employer, with approximately 200,000 workers employed

in the coal industry's value chain in 2019 (IASS/IET/CSIR, 2022), Mpumalanga province is the epicentre of this industry, hosting 83% of the country's coal mines and 87% of coal mining employment. Five municipalities – Emalahleni, Govan Mbeki, Msukaligwa, Steve Tshwete and Victor Khanye – account for 70% of national coal production within Mpumalanga. The coal sector's dominance in Mpumalanga has led to significant economic dependence, with coal mining constituting 19% of employment in Emalahleni, 15% in Msukaligwa and 14% in Steve Tshwete (Bhorat, et al., 2022). Additionally, the country's energy transition is unfolding against the backdrop of severe energy poverty and chronic power shortages. ESKOM, the state-owned utility, has faced persistent operational and financial challenges, leading to prolonged load shedding that disproportionately impacts poor and marginalized communities. The Just Transition must, therefore, address not only decarbonization but also the urgent need for reliable and affordable electricity, ensuring that energy security and social equity are central to the transition process. Without structural reforms in the energy sector, including a transformation of ESKOM and targeted investments in energy infrastructure, the transition risks deepening inequalities rather than alleviating them (COSATU, 2022). Political will, adequate funding, consultation and strategies closely tailored to the needs of affected workers and communities will be essential to mitigate adverse effects on livelihoods and ensure an equitable transition to sustainable energy sources (Cocks, 2024).

3. Ambition, effectiveness and speed

3.1. Carbon reduction

The coal decommissioning initiative in Mpumalanga aims to significantly reduce emissions by closing several coal-fired power plants and transitioning to renewable energy sources. Under South Africa's Integrated Resource Plan (Department of Energy, 2019), approximately 11.3GW of coal-fired capacity is scheduled for retirement by 2030 (CREA, 2023). This is expected to decrease South Africa's overall carbon footprint, contributing to the country's national emission reduction targets. The shift to renewables will play a critical role in lowering greenhouse gas emissions, though the speed and effectiveness of these reductions will depend on the pace of plant closures and the successful implementation of renewable energy projects. However, President Cyril Ramaphosa has confirmed that the government will be slowing down its planned decommissioning of coal-fired power plants as part of the country's Just Energy Transition Programme (JETP) to prioritize energy security (Dludla, 2023). This decision has implications for South Africa's ability to meet both its emission reduction and justice commitments and underscores the complex balance between transitioning to sustainable energy sources and maintaining energy reliability.

3.2. Transition co-benefits

Coal decommissioning will entail significant job losses for coal workers in Mpumalanga and across South Africa, but the clean energy transition is also expected to generate new green jobs as well as other important co-benefits:

- **Energy access:** The transition has the potential to improve energy access for previously underserved rural communities by distributing energy and reducing their dependence on the centralized coal-fired power grid that has historically been prone to outages and inefficiencies. For instance, metropolitan municipalities in Gauteng have provided free solar home systems to almost 57,200 households, aiming to increase clean energy's contribution to 30% by 2025 (Presidency of South Africa, 2022).
- **Economic:** It is expected that the closure of coal plants will lead to between 3,000 to 9,000 jobs being lost by 2030, predominantly in regions like Mpumalanga, with the most severe impacts expected after 2025 (Presidency of South Africa, 2022). However, the transition is also expected to potentially create up to 79,000 clean energy jobs in renewable energy and economic diversification by 2030 (Eskom, 2023), although it is not certain to what extent workers and communities in Mpumalanga itself will benefit.
- **Social:** Coal decommissioning is also expected to improve people's health. Coal mining creates significant environmental and health problems for workers and local communities (WHO, 2023). Mpumalanga is infamous for its extreme air pollution, with 2018 marking it as one of the worst places globally to live due to coal-related environmental degradation. A 2017 study estimated that emissions from coal-fired power plants in South Africa contribute to approximately 2,239 deaths per year, with specific causes including lung cancer, ischaemic heart disease, chronic obstructive pulmonary disease, strokes and lower respiratory infections (CER, 2017). Additionally, research in 2014 estimated up to 2,700 premature deaths annually due to air pollution from the country's coal-fired plants (The New Humanitarian, 2014). Nationally, coal decommissioning is expected to reduce the 2,200 annual excess deaths, 94,000 cases of asthma, more than 9,500 cases of bronchitis in children, almost 2,800 cases of chronic bronchitis in adults, 2,400 hospital admissions, and one million lost working days a year related to air pollution from Eskom (CREA, 2023).
- **Environmental:** South Africa's national transition plan (Presidential Climate Commission, (2022) and the planned Mpumalanga decommissioning project both include site remediation intended to address soil and water contamination resulting from coal power plants, improving local environmental quality and health outcomes for affected communities (Department of Environment, Forestry and Fisheries, 2023).

3.3. Transition costs

The total investment cost of South Africa's transition over the next five years, beginning in 2023, is estimated at US\$82bn, which will finance the updated NDC targets and broader climate response. The decommissioning of coal plants involves additional substantial costs, including those associated with job losses, plant closures, site remediation and investments in renewable energy infrastructure. The investment required to decommission coal-fired power plants in Mpumalanga is substantial. Eskom, South Africa's state-owned electricity utility, has outlined plans to decommission and repurpose several coal-fired power stations in the province. By way of a yardstick, the decommissioning and repurposing of the Komati Power Station were supported by a concessional loan of US\$497m (approximately R9bn) from the World Bank. Plans for the Camden, Hendrina and Grootvlei power stations are estimated to cost around US\$2.6bn (R44bn) in total (Business Tech, 2022).

3.4. Speed and timescale

The Komati Power Station has already been decommissioned. According to the Integrated Resource Plan, the decommissioning of coal plants in Mpumalanga is expected to take around seven years. Key milestones will include:

- 2023–2025: Gradual closure of older coal plants and initiation of renewable energy projects to begin replacing coal capacity.
- 2025–2030: More significant closures as demand for coal declines, with coal generation dropping to between 55 to 60 million tons by 2030. This phase involves the largest reductions in coal power generation and demand.

However, unions and local communities are concerned over job losses and economic instability in Mpumalanga, while political leaders remain divided on the transition's pace. In May 2023, President Ramaphosa confirmed that the government would slow down the planned decommissioning of coal-fired power plants to prioritize energy security amid ongoing power shortages (Dludla, 2023). This may hinder progress towards South Africa's NDCs, potentially affecting international climate finance agreements, such as the US\$8.5bn JETP pledged by several developed nations to support South Africa's transition to a low-carbon economy (Cocks, 2024). But the delay may give some relief to communities and workers who are worried about job losses and economic decline in their regions and have cautioned government over both the JET-P and pace of decommissioning (Industrial Union, 2021).

4. Adherence to justice principles

4.1. Recognition of inequalities, knowledge and rights (*Recognition justice*)

The government's inclusion of justice elements in its NDCs, national transition plans and Mpumalanga coal decommissioning project demonstrate its recognition of trade unions' demands for a just transition, the inequalities experienced by workers and communities, and the importance of protecting their rights. However, there are fears that in practice the Mpumalanga plan might repeat the closure of the Komati Power Station in 2022, intended as a model for transitioning to renewable energy, but that resulted in widespread unemployment, social discord and resistance (Malayu, 2022). Despite Eskom's assurances that no permanent employees would lose their jobs, approximately 360 contractors were terminated, and many community members who depended on the power station for employment were left without livelihoods. This led to increased unemployment and economic hardship in the region (Ngcuka, 2024).

Trade unions like the National Union of Mineworkers (NUM) and the National Union of Metalworkers of South Africa (NUMSA) emphasize the critical need for adequate funding and detailed plans to ensure proper implementation of justice elements. (Cocks, 2024). The Trade Union Federation COSATU has highlighted concerns about what an unjust transition would mean for workers, the prospect of insufficient renewable energy infrastructure and a lack of clarity regarding the allocation of transition funds, stressing that a participatory approach is vital to ensuring equity and stability during South Africa's shift to renewables (COSATU 2011; COSATU 2022; COSATU 2023).

4.2. People-centred and inclusive (*Procedural justice*)

South Africa's Just Transition Framework outlines a shared vision, guiding principles, and governance arrangements to effectuate the transition. It emphasizes the importance of stakeholder engagement and has been shaped by extensive consultations, including those facilitated by the National Planning Commission and the National Economic Development and Labour Council (South Africa Climate Commission, 2022). Africa's Just Energy Transition Investment Plan (JET IP for 2023–2027) also emphasizes the importance of inclusive, people-centred approaches. The government also sought to establish transparent decision-making processes and consultations with affected communities in Mpumalanga (Department of Environment, Forestry and Fisheries, 2023). However, opinions are divided on how inclusive or effective these efforts have been. For instance, labor unions and community leaders have expressed scepticism regarding the transition plans, emphasizing the need for tangible commitments to ensure that workers and local communities are not left behind. They advocate for

practical measures that safeguard livelihoods and provide clear economic opportunities in the emerging green economy. (Cocks, 2024)

South Africa's Just Energy Transition Investment Plan (JET IP for 2023–2027) emphasizes the importance of inclusive, people-centred approaches. The government established transparent decision-making processes and consultations with affected communities in Mpumalanga (Department of Environment, Forestry and Fisheries, 2023). However, opinions are divided on how inclusive or effective this has been (COSATU 2023).

4.3. Shared prosperity (*Distributional justice*)

Shared benefits: As noted above the expansion of renewable energy is expected to generate various economic and environmental co-benefits. For example, the government's national JET IP for 2023–2027 aims to decarbonize the electricity sector, enhance energy security and diversify the economy via investments in green hydrogen and new energy vehicle sectors, and to enhance skills development and the municipal capacity of marginalized sectors, particularly coal. However, it is not clear yet to what extent affected workers and communities will be able to benefit from the new green jobs, as much of the renewable energy investment will be in Cape Town rather than Mpumalanga (IRENA, 2021). Additionally, their demographic profile and existing skill levels makes them difficult to redeploy (Lobna, 2024). Workers and communities are concerned that without adequate funding and detailed strategies to provide fair compensation, retraining and local economic diversification, decommissioning will exacerbate unemployment and inequality in Mpumalanga and other coal-dependent provinces (Cocks, 2024).

Fair financing: The coal decommissioning process is expected to be financed through diverse sources, such as Eskom's budget, carbon tax revenues and international development assistance, including three international initiatives, one of which is the JETP. The JETP has pledged US\$8.5bn over the next three to five years to help South Africa transition from coal to renewable energy (Just Energy Transition Partnership, 2023). However, JETP funding represents a small proportion of the country's transition needs, and the large majority of its promised funding is in the form of loans, which has raised concerns about the initiative exacerbating the country's national debt. The withdrawal of the US from the South Africa JET-P will likely further reduce the grant element. There are also concerns that loan guarantees, public–private partnerships and other forms of blended finance may limit South Africa's government's policy space to ensure just outcomes (Bretton Woods Project, 2024; IMF, 2023). Additionally, there are concerns that the country's carbon tax, which helps fund the transition, will have regressive impacts on employment and low-income households. The tax is levied on fossil fuels, methane emissions from mining and cement, iron, steel, glass, and ceramics, and critics argue that they may respond to the tax by passing increased operational costs onto consumers, leading to higher electricity, public transport, and motor fuel prices and job losses in carbon-intensive sectors. One report suggests

that, by 2034, carbon taxes could constitute over 35% of electricity generation costs, significantly affecting businesses and consumers alike (Cocks, 2024). Such concerns point to the need for accompanying mechanisms to prevent companies from passing on the costs to consumers and for carbon taxes targeted at polluting consumption and the investments of wealthy individuals.

Protection of rights and the environment: While South Africa's plan includes provisions such as early retirement packages, reskilling programmes and job placement assistance for workers and communities affected by plant closures, concerns persist regarding the adequacy of funding and implementation to effectively protect their rights. Environmental groups have also raised concerns about the adequacy of measures to address environmental degradation resulting from coal mining. They emphasize the need for comprehensive land rehabilitation and pollution mitigation strategies to prevent long-term ecological damage (Natural Justice, 2023).

4.4. Remedy and restoration (*Restorative justice*)

The Just Energy Transition Investment Plan (JET IP) for 2023–2027 outlines the country's strategy to transition to a low-carbon economy while addressing social and economic impacts. A key component of this plan is the decommissioning and repurposing of coal-fired power stations, particularly in the Mpumalanga province, which is heavily reliant on coal mining and coal-fired power generation. The plan emphasizes the need for site remediation to mitigate environmental impacts and repurposing initiatives to support economic diversification and job creation in affected communities (The Presidency of South Africa, 2022). The Eskom Just Energy Transition Project, supported by international partners, focuses on the decommissioning and repurposing of specific coal power stations, includes comprehensive plans for site remediation, community development, and worker support to ensure a just transition for affected stakeholders (JET PMU, 2024). The JETP allocates funds for site remediation and decommissioning activities in coal-dependent regions. Reports indicate that the Department of Mineral Resources and Energy has rehabilitated only about 55 derelict and ownerless mines across South Africa, focusing on asbestos mines due to their detrimental effects on local communities (Molelekwa, 2024).

5. Transformative elements

How transformative and just the clean energy transition in South Africa turns out to be will depend on a range of political and economic factors, some discussed above. One additional aspect concerns energy ownership. Proponents of liberalization argue that unbundling vertical state monopolies such as Eskom can help address dysfunctionality, corruption and poor performance and attract private investment needed to expand the supply of clean energy (Rongé et al, 2024; Eberhard et al, 2014). With the involvement of private independent power producers

(IPPs) and associated public–private partnerships (PPPs), investment in distributed renewables has increased in South Africa. Trade unions caution against overreliance on privatization and advocate for retaining a significant element of Eskom because of its potential for democratic accountability, affordability and job creation. They also advocate for a greater role for workers and community-owned energy (Cocks, 2022).

6. Financing and policy framework

6.1. Further details of financing sources and structure

Eskom allocates part of its budget towards decommissioning activities and supporting workers affected by plant closures. Carbon tax revenues contribute to environmental remediation efforts and help fund community development projects in affected areas. The carbon tax is levied on fossil-fuel generation, methane emissions from mining and cement, iron steel, glass and ceramics that meet or exceed a particular threshold. It was first implemented in 2019 and is set at approximately R144 per ton of CO₂ emitted, with plans for gradual increases over time (World Bank, 2023). Additionally, international development assistance provides vital external funding, helping to bridge gaps and support large-scale initiatives. Three major international initiatives complement the coal decommissioning project in Mpumalanga. The Climate Investment Funds (CIF) Accelerating Coal Transition (ACT) Investment Plan, approved in October 2022, will provide US\$500m in concessional funds, which will be blended with approximately US\$1bn from multilaterals such as the World Bank, International Finance Corporation and African Development Bank. This funding will be supplemented by around US\$1bn of private-sector financing. The ACT Investment Plan focuses on coal power plant decommissioning and repurposing, capacity replacement and community-driven development in Mpumalanga, which aligns closely with the goals of the local decommissioning project. The JETP established at COP26 represents a significant commitment from France, Germany, the UK, US and EU. This partnership aims to mobilize US\$8.5bn over the next three to five years to support South Africa's broader energy transition objectives, just over 3% of the total required investment for the transition (Swilling, 2024).

6.2. Policy framework

South Africa established a Presidential Climate Commission in 2020 to advise on and promote a common understanding of the just transition, and developed the JTF, a policy framework that integrates energy and climate policy. Once approved by Cabinet, the JTF became the basis for the JET IP, which in turn was developed during 2022 through a country-led and engagement-focused process and presented at COP27 (Presidential Climate Commission, 2022). The national policy framework supporting the decommissioning initiative includes legislation and policies related to coal plant closures, site remediation and renewable

energy development. These provide a foundation for implementing the transition plan and achieving South Africa's climate and development goals (Department of Environment, Forestry and Fisheries, 2023).

Mexico's mining law reforms: minimizing social and environmental harms from transition minerals

1. Project summary

In 2023, the Mexican Congress passed a set of landmark and transformative legislative reforms aimed at preventing harmful human and environmental practices by the mining industry and improving protections for Indigenous Peoples (Radwin, 2023). The reforms include revisions to the Mining Law, National Waters Law, General Law of Ecological Equilibrium and Environmental Protection (LGEEPA) and General Law for the Prevention and Integral Handling of Wastes (LPGIR) (IEA, 2023). They do not include all the provisions reformers sought, due to resistance from business interests (Radwin, 2023). However, *Cambiémosla Ya*, an alliance of Indigenous Peoples, communities, civil society organizations and academics, claim this is a significant achievement for local and Indigenous communities as it gives them the tools to defend their territory and prevent despoilation of the environment and natural resources (Engenera, 2024). Nevertheless, challenges remain. The government has not yet passed the corresponding laws to regulate these rights, there is opposition from business interests who claim that some of the changes could violate international law and suggest that they may seek remedy via international investment treaties (Jones Day, 2023) or judicial cases, and there is growing pressure globally to loosen, rather than tighten, concessions due to the burgeoning global demand for transition minerals. If regulated, the reforms will provide a vitally needed model for other governments to help minimize social and environmental harms from mining, including for transition minerals.

2. Country background

Mexico, located in North America, is the 13th largest country by area and has a population exceeding 130 million as of 2023. An estimated 25.7 million Mexicans identify as Indigenous (21.5% of the population), while 1.3 million people (1.2%) consider themselves Afro-Mexican (BN Americas, 2024). Although the energy matrix in the country is heavily reliant on fossil fuels, its economy is diverse, with significant contributions from agriculture, industry, and services, and many rural areas rely heavily

on agriculture and small-scale mining. Mexico also plays a critical role in the global energy transition, particularly through its extraction and export of transition minerals like lithium, copper, and zinc, which are essential for renewable energy technologies. The country is also a leading global producer of gold, silver, copper and zinc (Crux Investor, 2023). Mexico's mining industry has expanded significantly since the introduction of the 1992 mining law and further legislative reforms in 2013–14, which allowed the participation of private corporations in the energy sector. Mining concessions now cover over 8% of the country's territory, according to some sources (Crux Investor, 2023; Radwin, 2023) and 11% according to others (Camimex, 2020), compared to less than 1% in the 1980s. Yet despite its size, the mining and metallurgical sector contributes only a small fraction to the country's economy, accounting for about 2.5% of GDP and exports, and generating fewer than 250,000 jobs, most of which are outsourced and 15% rate of informal work (Gobierno de Mexico, 2024). Mexico's tax revenue from mining is also limited, representing just 0.1% of GDP, partly due to the fragmented and relatively low taxation system in place for the sector (IMF, 2021). Mining operations have also raised significant environmental and human rights concerns, including about land degradation, water contamination and conflicts with local communities over land rights and resource use (Amnesty International, 2023).

3. Effectiveness and speed

3.1. Emission reductions

The mining reforms are not directly aimed at reducing emissions, but the mining and processing industry requires the use of large amounts of energy. So by promoting more sustainable mining practices and encouraging the adoption of cleaner technologies, these reforms could reduce the carbon footprint of the sector. Additionally, the reforms include provisions related to environmental protection, such as water conservation and the prevention of pollution, which may also help mitigate emissions in related industries.

3.2. Co-benefits

If implemented, the mining reforms should lead to wider and fairer sharing of the economic benefits from mining and reduce future environmental and social harms.

- **Energy access:** the reforms will help ensure that transition minerals extracted for the clean energy transition are not extracted at the expense of local communities or the environment.
- **Economic:** the Mining Reform requires that if land being bid on is inhabited by an Indigenous or Afro-Mexican community, the successful bidder must negotiate an agreement with the community for land use. The agreement mandates compensation of at least 5%

of profits from mining activities (Gobierno de Mexico, 2023). This approach promotes transparency and accountability, fostering trust between communities and businesses. Over time, it can enable communities to reinvest in their local economies, ensuring long-term sustainability beyond mining operations. Additionally, the compensation model can help reduce economic disparities between Indigenous or Afro-Mexican communities and wealthier urban centers, contributing to more equitable development.

- **Social:** The Mining Reform also brings potential significant social co-benefits by promoting inclusive decision-making and strengthening community resilience. By incorporating mandatory consultation with Indigenous and Afro-Mexican communities before mining activities, the reform helps ensure that these communities have a say in projects affecting their lands and livelihoods (Jones Day, 2023). This inclusive approach can help foster social cohesion and protect cultural heritage, offering a platform for marginalized groups to assert their rights. Additionally, the requirement for mining companies to share a minimum of 5% of net profits as compensation can support social development projects such as education, health, and infrastructure, improving overall quality of life in local communities.
- **Environmental:** The mining reform strengthens environmental protections by requiring mining companies to obtain environmental impact assessments and adhere to restoration and post-mining closure plans. This includes a ban on mining in protected natural areas and in regions with limited water availability, helping safeguard essential water resources. It also prohibits mining in marine areas, thus protecting vital marine ecosystems. Furthermore, the law mandates the recycling of at least 60% of water used in mining operations and prioritizes water for human consumption (Gobierno de Mexico, 2023). These provisions, alongside measures for sustainable land use and the prevention of irreversible ecological damage, align with the just energy transition by ensuring that environmental safeguards are prioritized in mining activities.

3.3. Costs

Mining in Mexico has entailed various environmental and social costs, which have been pushed onto workers and communities through poor working conditions, environmental degradation and pollution. The mining reforms, if implemented, will help ensure that the companies pay these costs themselves. However, some mining companies have expressed concern that the reforms may create legal uncertainty, be used to halt projects, and hinder investment (Radwin, 2023). Additionally, concerns have been expressed about the potential for 'expropriation' of company assets under the guise of public interest, and several companies have already filed legal challenges to the reforms. Some elements of the industry argue that the new policies could deter foreign investment and reduce Mexico's competitiveness in the global mining sector (Arbisman and Fortuño, 2023). On the other hand, if implemented the reforms may help reduce community resistance to mining and thereby contribute to financial viability. The Global Atlas of

Environmental Justice outlined 206 cases of environmental conflict, including conflicts over water management, extraction of minerals and construction materials, gas pipelines and fossil fuels, in 2023 (Global Atlas of Environmental Justice, n.d.). Additionally, mining giant Grupo México has stated that the government's reforms do not represent a risk to its portfolio (Cortes, 2023).

3.4. Speed and timescale

The reforms were introduced by President Lopez Obrado in May 2023, responding to deep concerns and campaigns about the environmental and social impacts, particularly in Indigenous and rural communities. The campaigns were supported by environmental advocates and Indigenous groups, who argued that mining operations had caused significant harm to local ecosystems and violated the rights of Indigenous populations. The Cambiemosla Ya collective presented proposals for legislative initiatives, discussion forums, dialogue with legislators and a strong communication campaign to pressure decision-makers to change the 1992 mining law.

The reforms faced significant resistance from the start, particularly from private sector lobbies, which diluted some of the favourable outcomes. For example, the proposed 10% compensation to Indigenous and Afro-Mexican communities was reduced to 5%, and the initial 30-year limit on mining concessions to prevent long-term corporate control was increased to 80 years, after extensive debate (Radwin, 2023). The Supreme Court of Justice of the Nation (SCJN) issued the first setback against the mining reform in October 2024, declaring the Fifth Transitory Article unconstitutional, as it retroactively ordered the dismissal of pending mining concession applications and limited the validity to concessions granted after the reform (Morales, 2024). Recent developments, such as the presentation of the 'Plan México', have raised concerns. The plan proposes promoting mining projects and returning exploration rights to the private sector, potentially reversing progress made in regulating the mining industry. But as Cambiemoslaya says on its website, *'It is not all that is needed to put a stop to mining abuses in Mexico, but it is a first step in the right direction – and we are going for more'* (Cambiemoslaya.org.uk, n.d.).

4. Adherence to justice principles

Mexico's previous mining law was introduced in 1992 during the ascendancy of neoliberalism and introduced strong protections for private and foreign mining companies, as outlined in Table 1 (Azamar et al., 2021), with insufficient social and environmental protections. The 2023 mining reform seeks to rebalance this law, including by:

- reducing the duration of concession terms from effectively 100 to 30 years, with a possible one-time extension of 25 years if the owner has not infringed any cancellation causes.
- mandating that new concessions cannot be granted without first

having obtained the consent of Indigenous and Afro-Mexican communities by conducting free, prior, culturally appropriate and good faith consultation and social impact assessments (personal communication with Cambiésolaya, October 2024; Jones Day, 2023; Coles et al., 2023).

- requiring mining companies to disburse 5% of their net profits to any Indigenous, Afro-Mexican or other communities owning the land where the mining concession is located, a move designed to promote social equity (UNCTAD, 2023).
- introducing environmental protections, including stricter water conservation requirements and mine restoration and closure plans, reflecting a broader commitment to human rights and environmental sustainability (Garduño, 2023).

Table 1. Overview of mining reforms in Mexico

	Regulatory Law 27 1975 of the constitutional article on mining matters	Mineral Law 1992	2023 Mining reforms
Natural resources	Articles 8 and 12 refer to the scope of foreign private-sector participation, which cannot exceed 49%.	Articles 10 and 11 only require that companies are incorporated under Mexican law regardless of their origin.	Article 13: Concessions will only be granted through public bidding that guarantees the state the best economic conditions and benefits for the population.
Indigenous rights	Not mentioned	Not mentioned	Article 6: Establishes consultation to obtain prior, free and informed consent before granting a concession on the territories; removes the priority for mineral mining over other land uses; prohibits mining in protected natural areas or where there is limited water availability.
Validity	Article 33 states that exploration concessions will be valid for three years and can be extended for another three years. Article 34 states that concessions for exploitation will be valid for 25 years, and can be extended for another 25 years.	Concessions are valid for 50 years, extendable for another 50 years (so 100 years in practice).	Article 15: Concessions will last for 30 years and may be extended once for a term of 25 years if they have not incurred any reason for cancellation.

	Regulatory Law 27 1975 of the constitutional article on mining matters	Mineral Law 1992	2023 Mining reforms
Scope of concession	Article 34 states that the exploration concession only allows the exploration of the substances found in the title of the concession.	In Article 16, the concessions grant rights over all minerals or substances subject to the Law.	Article 6: Prohibits mining in protected natural areas or where there is limited water availability Article 20: Bans underwater mining operations.
Territorial surface	Article 33 determines that exploration has a maximum of 50,000 hectares that must not be exceeded after the permit expires and cannot exceed what is dictated in Article 35. Articles 34 and 35 indicate that each concession covers only one lot of 500 hectares and that together it cannot be used for more than 5,000 hectares.	Undefined	Article 13: In no case will the concession be granted to anyone who has two or more concessions adjacent to the lot being tendered, to avoid hoarding.

Source: Azamar, et al (2023); Personal communication with Beatriz Olivera (2025).

4.1. Recognition of inequalities, knowledge and rights (*Recognition justice*)

The mining reforms will create a legal framework to help identify and ensure recognition of Indigenous people and Afro-Mexican communities rights, including the requirement for successful tender winners to carry out social and environmental impact assessments and mitigation measures for each concession (Jones Day, 2023; Coles et al., 2023). By mandating these assessments, the reform ensures that the voices of these communities are considered in mining-related decision-making processes. This framework not only safeguards land and resource rights but also validates Indigenous ecological knowledge, recognizing it as essential for sustainable resource management and community-led development.

4.2. People-centred and inclusive (*Procedural justice*)

The reforms will establish free, prior and informed consent (FPIC) as a legal requirement for mining concessions involving consultation with Indigenous and Afro-Mexican people and communities. The consultation must be carried out by the Ministry of Economy, with the winning bidder covering the cost (Jones Day, 2023). By making FPIC a legal prerequisite, the reform helps prevent exploitative practices and reinforces the right of communities to determine how their lands and resources are used⁵. Additionally, requiring companies to finance consultations without compromising their integrity promotes transparency and accountability, ensuring that the process remains independent and community driven.

4.3. Shared prosperity (*Distributional justice*)

Shared benefit: To date, the economic benefits of the mining boom have been concentrated among a small number of companies.⁶ Communities continue to live in poverty despite being in areas rich in minerals. For example, at least 17 of the 20 most important mining communities in the country where gold and silver are extracted have poverty levels higher than the national average of 43.6%, and in at least 10 of these places extreme poverty is more than double the national average (7.6%). In most of these places, mining has been carried out for at least a decade, enough time for any positive effects to be evident (Azamar et al., 2021).

Under the previous mining law, companies could easily buy up land because extractives activities were listed as having a higher economic benefit than sectors like agriculture and tourism. Mining companies will no longer have preferential treatment and will have to compete with those industries through a public bidding process (Radwin, 2023). Additionally, the amendments to the mining law will mean that companies now have to pay 5% of their net mining profits via royalties to adjacent and affected communities (Radwin, 2023). The water reform requires that mining concession holders must provide water for tilling, and the use of water to transport mining materials will be prohibited (Jones Day, 2023).

⁵ There is a question about whether the Ministry of Economy is well suited to carry out this role but it is expected that legal requirements will ensure that it is conducted properly.

⁶ In 2018, four companies controlled 50% of gold production; two companies 48% of silver production; one company 77% of copper production; two companies 57% of zinc production; and three companies 58% of lead production. National capital companies control 30% of the production of gold, 44% silver, 87% copper and 62% of zinc and lead. Foreign capital has increased its control over the production of precious minerals, especially gold, where it surpasses national private capital. Grupo México, Peñoles and its subsidiary, Fresnillo Plc, and Minera Frisco control practically all the rest of mining production: 81% of copper production, 62% of zinc, 49% of lead and 43% of silver (Azamar et al., 2021).

Full and fair financing: The law will require mining companies to internalize social and environmental costs but does not reference taxation.

Protection of human rights and the environment: Mining exploration has previously been granted in protected natural areas, Indigenous territories, headwaters of hydrological basins and areas close to towns. Communities living in or near these areas often rely on the surrounding natural resources for their livelihoods, including agriculture and water sources (Francisco, 2023). The adoption of modern techniques for open pit mining, the use of highly toxic substances, such as cyanide and mercury, as well as the use and contamination of large volumes of water, have produced irreparable ecological losses. Due to the lack of institutional regulatory capacity, socio-environmental disasters have been frequent, as have work accidents with human losses and death (Azamar et al., 2021).

The reforms aim to limit such harmful practices and enhance environmental and Indigenous protections, including by:

- prohibiting the granting of mining concessions in natural protected areas.
- granting the federal government the power to regulate the management of mining and metallurgical waste and enter into agreements with the states.
- creating the concept of a guarantee of responsibility for mining and metallurgical waste, establishing that such responsibility is permanent and nontransferable from the concession holder, regardless of the management regime to which it is subject.
- establishing new grounds for the cancellation of concessions, including:
 - the existence of an imminent risk of ecological imbalance, irreversible damage to, or deterioration of, natural resources.
 - contamination with dangerous repercussions for the ecosystem or for public health.
 - failure to inform the Ministry of Economy of any accident that has caused damage or endangers the safety of people or the environment.
- banning exploration and extraction in areas with proven water shortages, underwater and in protected areas, and requiring that concession holders must achieve 60% recycling of treated wastewater at their facilities (Jones Day, 2023; Coles et al., 2023).

Remedy for harm: The reforms establish a new obligation for companies to implement a restoration, closure and post-closure programme for mining activities (Jones Day, 2023). This measure acknowledges the historical ecological and social debt owed to Indigenous and Afro-Mexican communities, who have disproportionately borne the environmental degradation, displacement, and social harm caused by extractive industries. By requiring restoration programs, the reforms mark a critical step toward ensuring that past injustices are not repeated.

To strengthen accountability, the reforms introduce new offences, including extracting minerals without a concession, trafficking minerals illegally, falsifying information to obtain or retain concessions, and endangering workers by neglecting mine safety regulations (Gobierno de Mexico, 2023). These provisions ensure legal consequences for harmful practices, reinforcing corporate responsibility and protecting affected communities.

5. Transformative elements

The Mexican mining law reforms represent an urgently needed and transformative rebalancing of the previous 1992 law, which granted increased rights and protections for private mining companies without adequate protections for workers, communities and the environment. The reforms provide a critically important opportunity for Mexico to create a fairer and environmentally sustainable legal framework that many other lower-income countries could adapt and adopt. However, there are pressures from companies and northern governments to loosen concession rights due to the burgeoning global demand for transition minerals. While speed is crucial for clean energy transition, and unnecessary bureaucracy should be streamlined, a fast transition will not be possible unless social and environmental protections are introduced and enforced.

6. Further details of the Financing and policy framework

6.1. Financing

By requiring mining adhering to stricter environmental standards and paying for the costs of consultation and clearing up after mining operations the reforms will effectively require them to internalize and bear more of the costs of their operations.

6.2. Regulatory and policy framework

In addition to the mining reforms, other elements of Mexico's legal and policy frameworks support environmental and social responsibility. The 1917 Constitution recognizes Indigenous land rights, establishing communal landholdings as 'social property', and offers protections through Article 2 for Indigenous peoples' self-determination, including preferential access to natural resources on their lands. Mexico is also a signatory of international agreements such as ILO Convention 169, which mandates consultation with Indigenous communities before the initiation of projects affecting their territories. Environmental regulations, such as the General Law of Ecological Balance and Environmental Protection, aim to promote sustainable practices across industries, including mining. In addition to these frameworks, Mexico

signed the Escazú Agreement in 2018, reinforcing its commitment to ensuring access to environmental information, public participation in environmental decision-making, and access to justice in environmental matters. This regional treaty also includes provisions to protect environmental defenders, aiming to create a safe and enabling environment for those advocating for environmental and land rights (Global Witness, 2023). However, implementation challenges persist, with gaps in regulatory enforcement and transparency, especially regarding mining concessions and environmental protections, which can undermine these legal provisions (Calleros, 2021). While these laws are progressive on paper, the real challenge often lies in their enforcement. Despite the strong constitutional guarantees and international commitments, Indigenous communities and environmental advocates have continued to face issues such as land grabs and insufficient consultation due to inadequate oversight and the influence of powerful economic interests.

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