



Research Article

Securing South Africa's Just Energy future: Governing the water-energy-food nexus in environmental law

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Abstract

The Just Energy Transition (JET) framework places justice, equity, and systemic inclusion at the centre of South Africa's shift toward a low-carbon economy, grounded in distributive, restorative, and procedural justice. However, an implementation gap persists due to fragmented governance and inadequate understanding of interdependencies between water, energy, and food systems, collectively recognised as the water-energy-food (WEF) nexus. Although the Environmental Impact Assessment (EIA) process under the National Environmental Management Act 107 of 1998 is constitutionally mandated by Section 24, it remains project-specific and reactive. The paper assesses the suitability of project-level EIA for governing the WEF impacts of the JET and proposes a proportionate framework comprising WEF nexus screening within the existing environmental screening process, risk-based escalation to further assessment, selective use of Strategic Environmental Assessment (SEA), structured cooperative governance and improved access to information.

Keywords: *Just Energy Transition; water-energy-food nexus; environmental impact assessment; strategic environmental assessment; South African environmental law*

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1 Introduction

The global energy transition is fundamentally a question of justice, particularly where decarbonisation intersects with existing inequalities, resource dependencies and power asymmetries (Kalt et al., 2023; Abram et al., 2022). South Africa's JET is currently facing a range of complex challenges across geopolitical, social, political, demographic, and economic spheres, marking a pivotal moment in the country's history (International Federation of Red Cross and Red Crescent Societies, 2024). As the continent's highest emitter of greenhouse gases and one of the most unequal countries in the world (Murcott, 2022), South Africa faces a dual and daunting imperative: to rapidly decarbonise its coal-dependent economy and simultaneously address profound, entrenched socioeconomic challenges, including poverty, unemployment, and inequality (Phiri, 2024).

At the forefront of South Africa's response is the JET, spearheaded by the Presidential Climate Commission (PCC) and funded primarily by the European Union (EU), Germany, France, the United States (US), the United Kingdom (UK), the Netherlands and Denmark, through the Just Energy Transition Implementation Plan (JETIP) (Presidential Climate Commission, 2022). The JET framework is rooted in distributive, restorative, and procedural justice, and aims to facilitate a transformative shift toward a low-emissions and climate-resilient economy, creating decent work and addressing the nation's pressing challenges (University of the Witwatersrand, 2024). This vision extends far beyond a technical or environmental initiative; it embodies a socioeconomic compact linked to the constitutional obligation to "improve the quality of life for all citizens" (Constitution of the Republic of South Africa, 1996). It further aligns with the constitutional rights to an ecologically sustainable environment, sufficient food and water, and cooperative governance.

However, a gap exists between this progressive vision and on-the-ground practice, highlighted by the government's controversial support for Shell's seismic surveys off the Wild Coast (Murcott, 2022). The litigation concerned the validity of the exploration right and its subsequent renewals. In *Minister of Mineral Resources and Energy and Others v Sustaining the Wild Coast NPC and Others* [2024] ZASCA 84, the Supreme Court of Appeal found that the consultation process was manifestly inadequate and that relevant considerations had not been taken into account. The Court dismissed the appeal, but suspended the orders setting aside the exploration right and its renewals pending determination of a subsequent renewal application. As Murcott (2022) argues, the government's position demonstrated an intent to "cement South Africa's reliance on fossil fuel-driven energy without due regard to the social, environmental, and climate injustices caused thereby" (Murcott, 2022).

This contradiction highlights a broader governance challenge: how to govern the mutual connections among energy, water and food systems, the WEF nexus in an integrated manner.* Water, energy and food are essential resources for human survival, socioeconomic development, and environmental sustainability (Vilakazi et al., 2019).

At the heart of South Africa's environmental law lies a constitutionally tasked Environ-

*The WEF nexus provides a framework for understanding the interdependencies among water, energy and food systems and for identifying trade-offs and opportunities for more integrated resource governance. The Bonn 2011 Conference, The Water, Energy and Food Security Nexus - Solutions for a Green Economy, addressed the interconnections among these systems. Hoff's 2011 background paper for the conference examined how a nexus approach could enhance water, energy and food security by increasing resource-use efficiency, reducing trade-offs, building synergies and improving governance across sectors (Hoff, 2011).

mental Impact Assessment (EIA) process, established under NEMA (National Environmental Management Act, 1998) to evaluate developmental impacts through procedural safeguards. These safeguards involve screening to determine if an assessment is required, scoping to identify key issues and alternatives, and impact assessment to predict environmental, social, and economic effects. They also encompass public participation to ensure inclusive decision-making and a final authorisation granted with conditions. Despite this structured process, the EIA system remains largely project-specific and reactive.

This creates risks whereby JET initiatives, like renewable energy projects in water-stressed regions, may shift vulnerabilities onto marginalised communities dependent on these interconnected resources for their livelihoods.

This paper employs critical doctrinal analysis of constitutional, environmental, and administrative law to unpack this gap, drawing on key judgments, NEMA provisions, and international norms. It further elaborates on JET's constitutional foundations and WEF interlinks. Additionally, the paper situates the South African EIA framework within the broader development of EIA in international environmental law and examines whether the domestic framework is capable of addressing the interconnected WEF impacts of the JET.

2 The constitutional imperative: a whole-systems approach to the JET

2.1 Constitutional foundations of the JET

Although the JET is articulated primarily through policy, its implementation is situated within a broader constitutional framework of rights, duties and principles to “respect, protect, promote, and fulfil the rights in the Bill of Rights” (Constitution of the Republic of South Africa, 1996). To achieve a JET, a purposive interpretation under section 39(2) of the Constitution demands a whole-systems approach, a conceptualisation that involves a range of justice issues, particularly those related to the wider context of socially inclusive efforts for decarbonisation (Abram et al., 2022).

The PCC's vision of a JET, underpinned by distributive, restorative, and procedural justice, finds its legal basis in the Constitution (Presidential Climate Commission, 2022). Reductionist approaches that focus solely on carbon mitigation without considering implications for water and food security risk overlooking the interdependence of constitutional rights and the need for integrated governance.

South Africa faces multiple complexities related to the scarcity and uneven allocation of water, energy, and food resources (Viljoen et al., 2024). The Constitution itself underscores the importance of social justice and requires cooperation among all tiers of government and state organisations (Viljoen et al., 2024). This duty of cooperative governance is enshrined in section 41 of the Constitution*, and operationalised by the Intergovernmental Relations Framework Act 13 of 2005 (IGRFA). Given the interrelated nature of water, energy, and food,

*Section 41 (1) of the Constitution provides that “All spheres of government and all organs of state within each sphere must... co-operate with one another in mutual trust and good faith by (i) fostering friendly relations; (ii) assisting and supporting one another; (iii) informing one another of, and consulting one another on, matters of common interest; (iv) coordinating their actions and legislation with one another; (v) adhering to agreed procedures; and (vi) avoiding legal proceedings against one another.

effective management and decision-making require cooperation across sectoral mandates rather than governance through separate silos (Viljoen et al., 2024).

2.2 The WEF nexus and constitutional interdependence

The WEF nexus describes the interdependence of water, energy and food systems. Within that nexus, WEF interactions refer to the relationships between these systems; WEF impacts refer to the effects of particular developments on those systems; and WEF nexus risks refer to risks arising from those interdependencies. The WEF nexus is the practical manifestation of the constitutional and justice-based interdependence discussed above. For instance:

2.2.1 Energy-water: a nexus of scarcity and systemic failure

Energy production can require significant quantities of water, although the scale and nature of that requirement vary considerably between technologies, and climate change is likely to exacerbate water scarcity and competition throughout South Africa (Presidential Climate Commission, 2022). While a transition to large-scale solar or green hydrogen may be low-carbon, it can also be highly water-intensive, creating potential conflict in a province like Mpumalanga, which is already a pollution hotspot (Nel et al., 2023). This is a critical nexus point: due to the limited availability of water in South Africa, freshwater resources are subject to competing demands from agriculture, hydropower generation, industrial processes and other essential activities (Viljoen et al., 2024).

The National Water Resource Strategy III reports that average physical losses in municipal water systems are around 35%, although the extent of losses varies considerably between municipalities and service providers (Department of Water and Sanitation, 2023). These losses place additional pressure on the availability and reliability of water resources for different users.

These demands intersect with the country's ongoing energy crisis, where load shedding routinely leaves communities without electricity for extended periods, disrupting economic productivity and essential public services (Viljoen et al., 2024). Climate change compounds these challenges: many communities experience declining water availability, while episodes of intense rainfall frequently result in destructive flooding that damages property, crop systems, and sanitation infrastructure (Viljoen et al., 2024). Despite a progressive constitutional framework, the implementation of water policies has not succeeded in creating a water-aware nation, leaving it critically vulnerable to these climate shocks (Adom & Simatele, 2021).

The combined effect is heightened vulnerability across the food-energy-water nexus, contributing to widespread insecurity in many parts of the country (Viljoen et al., 2024). Although Section 27 of the Constitution guarantees the right of "access to sufficient water and food", these rights remain only partially realised in practice (Constitution of the Republic of South Africa, 1996).

2.2.2 Agriculture-food: a nexus of historical inequity and livelihoods

Agriculture represents more than 60% of total water consumption in South Africa (Presidential Climate Commission, 2022). Climate-induced changes in water availability directly

threaten food security, agricultural livelihoods and communities dependent on climate-sensitive economic activities (Presidential Climate Commission, 2022), and the many more in agriculture, particularly farmworkers who typically have less education, lower pay, and fewer assets (Presidential Climate Commission, 2022).

This is compounded by the historically unequal distribution of access to agricultural water resources, which remains a significant feature of South Africa's water-governance landscape (Department of Water and Sanitation, 2018). The National Water Act 36 of 1998 (NWA) (National Water Act, 1998) is founded on two main principles: sustainability and equity (Soyapi, 2017), but the continued challenges surrounding equitable access to water demonstrate that the legal recognition of these principles has not, by itself, resolved historical inequalities in water allocation. The relationship between agriculture, water and food security therefore illustrates the broader WEF interdependence. Changes in water availability can affect agricultural production and livelihoods, while competing demands for water from energy and other economic activities may place additional pressure on agricultural users. These interactions demonstrate why the implications of energy development cannot always be considered independently of the water and food systems on which communities depend.

2.3 Governing implications for JET implementation

Governing these interconnections is not a matter of policy preference but an important condition for a JET, particularly where energy developments may affect water availability, food production and community livelihoods (Nel et al., 2023). The interdependence of these systems means that decisions concerning one resource can generate consequences for the others, particularly in regions already experiencing resource constraints (Viljoen et al., 2024).

An integrated approach is therefore necessary to ensure that JET initiatives do not achieve carbon-reduction objectives while creating or intensifying pressures on water security, food production or community livelihoods. The challenge is not to replace sector-specific regulation, but to ensure that material interactions between these systems are identified and considered when decisions concerning energy development are made.

3 EIA as an environmental management tool: history and contemporary developments

Environmental impact assessment (EIA) developed as a means of bringing environmental considerations into decisions concerning activities that may have significant environmental consequences. Its development is important to this article not because international law itself establishes a general domestic WEF assessment obligation, but because the evolution of EIA demonstrates the preventive and information-based character of environmental decision-making. This provides an important context for assessing whether South Africa's existing EIA framework is capable of responding to the interconnected consequences of the Just Energy Transition (JET).

3.1 The origins of EIA, from Stockholm to customary law

The formal emergence of EIAs is widely credited to the enactment of the United States' National Environmental Policy Act (NEPA) of 1969, which pioneered a legally binding process to assess the environmental impacts of federal actions (NEPA, 1969). Internationally, EIAs gained traction after the 1972 Stockholm Conference (*Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration)*, 1972). Although the conference did not explicitly adopt EIAs, its call for "rational planning" for environmental protection in Principle 14 laid essential normative foundations for the practice (Stockholm Declaration, 1972). Notably, a draft Principle 20 of the Stockholm Declaration advocated for EIAs, though this proposal was rejected following opposition from several developing countries, which argued that developed states could abuse such an obligation to obstruct projects in the developing world (Stockholm Declaration, 1972). This resistance highlighted the perceived tension between environmental protection and development, a tension that the subsequent refinement of EIA procedures sought to balance by providing a structured, evidence-based decision-making tool (Stockholm Declaration, 1972).

The normative foundation laid at Stockholm was gradually fortified. The 1978 UNEP Draft Principles of Conduct proposed that states should conduct an EIA for activities risking significant transboundary impact (Principle 5 of the 1978 UNEP draft Principles of Conduct). A significant multilateral milestone came with the 1991 Espoo Convention on EIA in a Transboundary Context, which established binding obligations for states to conduct EIAs for activities likely to cause significant cross-border harm (Espoo Convention on Environmental Impact Assessment in a Transboundary Context, 1991). This was followed by the Rio Declaration on Environment and Development (1992), whose Principle 17 provides that environmental impact assessment, as a national instrument, shall be undertaken for proposed activities likely to have a significant adverse impact on the environment and subject to a decision of a competent national authority (Rio Declaration, 1992). This has since been interpreted to reflect a general principle of international environmental law (Craik, 2015). EIAs have become a recognised legal method, both internationally and domestically, for incorporating environmental factors into socioeconomic development and decision-making procedures (Sands et al., 2018). The principle of preventive action, a core foundation of international environmental law, underlies the requirement for EIAs.* As the Iron Rhine tribunal held, a growing emphasis is being put on the duty of prevention, which includes the procedural obligation of conducting EIAs.†

This evolution culminated in the recognition of EIA as a requirement under customary international law. The International Court of Justice (ICJ) in *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* (2010) declared that "the obligation to conduct an EIA where there is a risk that the proposed industrial activity may have a significant adverse impact in a transboundary context now forms part of customary international law" (ICJ Reports 14). The Court also observed that an EIA is required to be conducted before a project commences. It

*These include: (1) the obligations outlined in Principle 21 of the 1972 Stockholm Declaration and Principle 2 of the 1992 Rio Declaration, which provides that states have sovereignty over their natural resources and the responsibility not to cause transboundary environmental damage; (2) the principle of preventive action; (3) the principle of cooperation; (4) the principle of sustainable development; (5) the precautionary principle; (6) the polluter pays principle; and (7) the principle of common but differentiated responsibilities. See also, Sands et al Principles of Environmental Law 4th ed 211.

†Iron Rhine (Belgium v. Netherlands) (2005), paras. 59 and 222;

emphasised that this duty involves establishing suitable regulations, applying administrative oversight, and conducting monitoring to avert any potential damage (ICJ Reports 14). These views confirm that, in circumstances involving a risk of significant transboundary harm, EIA has acquired recognition as a requirement of customary international law. In the South African context, this customary international law norm provides interpretive context, but the domestic legal basis for the EIA duty considered in this article rests principally on sections 24 and 27 of the Constitution. (Constitution of the Republic of South Africa, 1996).

3.2 The core procedural components of EIA

Anchored in the principle of preventive action, the EIA matured into a comprehensive legal technique with a common global structure aimed at informing decision-making, enhancing transparency, and ensuring public participation (Sands et al., 2018). While specific procedures vary, the typical EIA process includes:

- Screening, to assess if a project necessitates an EIA based on its scale and potential impacts (Environmental Law Alliance Worldwide, 2010).
- Scoping, to identify key environmental issues and impacts, and alternatives to be considered (Environmental Law Alliance Worldwide, 2010).
- Impact assessment, to analyse and predict environmental, social, and economic impacts through expert studies and data modelling (Environmental Law Alliance Worldwide, 2010).
- Mitigation and management, to propose measures to avoid or reduce adverse impacts, often through Environmental Management Plans (EMPs) (Environmental Law Alliance Worldwide, 2010).
- Reporting and preparing terms of reference to document the assessment in an Environmental Impact Statement (EIS) (Environmental Law Alliance Worldwide, 2010).
- Review and public participation, to enable competent authorities and the public to review the EIS, as required; for example, by the Espoo Convention, which mandates equivalent public participation rights for affected countries (Environmental Law Alliance Worldwide, 2010).
- Decision-making, to evaluate whether the proposed activity should be approved, modified, or rejected (Environmental Law Alliance Worldwide, 2010).
- Monitoring and follow-up to guarantee adherence and evaluate the efficacy of mitigation strategies, including post-project analysis (Environmental Law Alliance Worldwide, 2010).

3.3 Contemporary developments: technology, SEA and risk governance

Technological and scientific advancements increasingly shape modern EIAs. As the Seabed Disputes Chamber of International Tribunal for the Law of the Sea (ITLOS) explained, due

diligence obligations “may change over time” depending on “new scientific or technological knowledge,” meaning that “measures considered sufficiently diligent at a certain moment may become not diligent enough” (Seabed Disputes Chamber of the International Tribunal for the Law of the Sea, ITLOS Case No. 17, 1 February 2011). In this evolving landscape, EIAs are becoming more dynamic, data-intensive, and predictive.

Key contemporary innovations include:

- Geographic information systems (GIS) facilitating advanced spatial evaluation and impact mapping.*
- Artificial intelligence and machine learning, enhancing prediction accuracy, identifying patterns in large datasets, and supporting automated analysis.
- Digital participation platforms, facilitating more inclusive and transparent public consultations.†

Concurrently, SEA has emerged as an important complementary tool, evaluating the environmental implications of policies, plans, and programmes at an earlier decision-making stage (Sands et al., 2018). The 2003 Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Kiev, 2003) to the Espoo Convention illustrates this shift toward proactive and integrated environmental planning (SEA Protocol, 2003). Furthermore, risk assessment procedures, particularly for genetically modified organisms and hazardous chemicals, have been formalised in instruments such as the 2000 Cartagena Protocol, which requires “scientifically sound” (Cartagena Protocol, 2000) risk assessments prior to making import decisions on living modified organisms (Sands et al., 2018). These assessments focus on both the likelihood and consequences of adverse effects, including impacts on human health.

This international evolution presents EIA as a dynamic, preventive, and proactive tool for integrated environmental governance and systemic risk management. The following analysis of South Africa’s EIA process will critically assess the extent to which this domestic system reflects these advanced international norms or remains constrained by a reactive, project-specific focus that is ill-suited to the systemic, cross-sectoral challenges of the WEF nexus.

*GIS have become integral to Environmental Impact Assessments (EIAs), enhancing spatial and temporal analysis, increasing transparency and objectivity in decision-making, and enabling systematic, rapid, and visual interpretation of environmental impacts. Despite no legal obligation to incorporate spatial data in EIAs or SEAs, GIS offer distinct advantages over traditional methods like matrices, particularly in addressing seasonal variability and cumulative effects. The EU’s INSPIRE Directive has further promoted the standardisation and accessibility of spatial datasets, reinforcing GIS’s central role in future environmental governance. See A Gonzalez “GIS in Environmental Assessment: A Review of Current Issues and Future Needs” (2012) 14 *Journal of Environmental Assessment Policy and Management* 2-4.)

†Digital platforms, such as web portals and interactive tools, are increasingly utilised in Environmental Impact Assessments (EIAs) to improve the communication of project information to the public. While these tools can enhance accessibility and transparency by broadening access and improving comprehension, their effectiveness in fostering inclusive participation remains uneven due to persistent digital access gaps and usability barriers (Northmore & Hudson, 2022).

4 The South African EIA law process

EIAs in South Africa are primarily governed by the NEMA (National Environmental Management Act, 1998) and its accompanying EIA Regulations, published periodically in terms of section 24(5) of NEMA (National Environmental Management Act, 1998). NEMA gives legislative effect to section 24 of the Constitution, which guarantees everyone the right to an environment that is not harmful to health or wellbeing, and to have the environment protected for the benefit of present and future generations (Constitution of the Republic of South Africa, 1996).

4.1 Evolution and institutional framework

The EIA process has evolved from an informal practice in the 1970s (Boden, 1980) to formalisation under the Environment Conservation Act (ECA) in 1989 (Environment Conservation Act, 1989), transitioning to the NEMA's structured approach in 1998 (National Environmental Management Act, 1998). As the overarching environmental framework, NEMA incorporates international environmental principles, promotes cooperative governance, and enables integrated environmental management (IEM) (Oosthuizen et al., 2018).

The ECA-based EIA regime was subsequently replaced by the NEMA framework, with the 2006 EIA Regulations introducing a more detailed and time-bound assessment process (EIA Regulations No 385 of 21 April 2006). * Key changes included refined screening mechanisms to reduce unnecessary EIAs and the introduction of “norms and standards for self-regulation” in certain sectors (Retief et al., 2011). However, these refinements also introduced complexity, with overly prescriptive activity lists creating uncertainty (Alberts et al., 2020). The removal of discretionary exemptions further reduced flexibility, leading to inefficiencies, particularly for small and medium enterprises (Alberts et al., 2020). Subsequent amendments in 2010 (Environmental Impact Assessment Regulations, 2010), 2014 (Environmental Impact Assessment Regulations, 2014), and 2017 (Environmental Impact Assessment Regulations, 2017) sought to address these issues by introducing strategic instruments such as SEA and Environmental Management Frameworks (EMF), as well as a web-based screening tool (Alberts et al., 2020). Despite these efforts, overlapping mandates and poor conceptualisation of strategic tools led to confusion rather than streamlined decision-making (Cilliers & Retief, 2017).

Institutionally, NEMA imposes a legal obligation on the competent authority to consider EIA applications, and it establishes institutional mechanisms to encourage collaborative governance and the alignment of environmental responsibilities among different state entities, typically involving provincial Departments of Environmental Affairs or the national Department of Forestry, Fisheries and the Environment (DFFE) (Oosthuizen et al., 2018). Section 24H of NEMA provides for a self-regulatory model whereby an association proposing to register its members as Environmental Assessment Practitioners (EAPs) may apply to the Minister to be appointed as a registration authority, recognising the critical function of EAPs in facilitating informed and objective assessments (NEMA; Kidd, Retief & Alberts,

*These regulations were issued by the Minister of Environmental Affairs and Tourism in terms of s 24(5) read with s 44 of NEMA and formally replaced the ECA framework, introducing a more comprehensive and time-bound EIA process.

2018). Civil society, including NGOs and local communities, participates through mandated public consultation processes, which are integral to promoting transparency, accountability, and environmental justice (Mavee, 2022). The EIA process includes screening, scoping, impact assessment, public participation and decision-making, informed by the principles in section 2 of NEMA and the requirements of the Environmental Impact Assessment Regulations, 2014 (GN R982), as amended.

4.2 Judicial interpretation and administrative law relevance

South African courts have played a key role in reinforcing the procedural obligations inherent in the EIA process. In *Director: Mineral Development, Gauteng Region v Save the Vaal Environment* 1999 (2) SA 709 (SCA), the Supreme Court of Appeal considered whether interested parties were entitled to raise environmental objections and be heard before the granting of a mining licence. The Court held that the *audi alteram partem* “the right to be heard” rule applied and that interested parties should at least be notified of the application and given an opportunity to raise their objections. The Court emphasised that environmental considerations must receive appropriate recognition in administrative processes, particularly given the potential for development activities to cause significant environmental harm (*Save the Vaal Environment*, 1999).

The jurisprudence subsequently developed beyond participation to the substance of environmental decision-making. In *Earthlife Africa Johannesburg v Minister of Environmental Affairs* (2017), the High Court held that climate change impacts were relevant considerations in the environmental authorisation of a proposed coal-fired power station. The Court emphasised the need to consider both the contribution of the proposed development to climate change and its vulnerability to climate-related impacts over its operational life (*Earthlife Africa*, 2017). The decision is significant because it demonstrates that the environmental assessment process is not confined to readily observable or immediate impacts. Where information before the decision-maker establishes that longer-term environmental consequences are relevant to the proposed activity, those consequences must be properly considered before authorisation is granted.

The importance of access to environmental information is highlighted in *Company Secretary of ArcelorMittal South Africa Ltd v. Vaal Environmental Justice Alliance* (2015). The Supreme Court of Appeal (SCA) considered requests for environmental information held by a private corporation under the Promotion of Access to Information Act 2 of 2000 (PAIA). The SCA held that civil society organisations have the right to obtain environmental compliance records under PAIA (VEJA, 2015). The Court acknowledged that “the nature and effect of ArcelorMittal’s activities are crucially important” and found that access to such information was necessary to enable communities to exercise environmental oversight (VEJA, 2015). Access to information is therefore not merely an administrative convenience; it can enable affected communities and civil society organisations to scrutinise activities that may affect environmental rights.

These developments are operationalised through procedural rights embedded in the Constitution, particularly section 32, which guarantees the right to access information, and section 33, which provides for administrative action that is lawful, reasonable, and procedurally fair (Constitution of the Republic of South Africa, 1996). These rights are operationalised through the Promotion of Access to Information Act of 2000 (PAIA) and the

Promotion of Administrative Justice Act of 2000 (PAJA), forming the legal backbone for EIAs. These procedural rights can enable participatory, representative, and transparent governance in environmental matters, especially when used to advance the transformative vision of section 24 of the Constitution (Murcott, 2018).

The principle of legality provides a further basis for reviewing the exercise of public power, including exercises of power that fall outside the definition of administrative action under PAJA. It requires public power to be exercised within the authority conferred by law and in a manner that is rationally related to the purpose for which the power was conferred. In *Pharmaceutical Manufacturers Association of South Africa and Another: In re Ex Parte President of the Republic of South Africa and Others* 2000 (2) SA 674 (CC), the Constitutional Court confirmed that the exercise of public power is subject to constitutional review and that rationality is a minimum requirement for the lawful exercise of public power. Rationality is therefore relevant to the exercise of public power generally. Where an environmental authorisation constitutes administrative action, however, this article treats PAJA as the principal analytical framework because PAJA gives effect to section 33 of the Constitution and provides specific statutory grounds for reviewing administrative action. This approach is consistent with the Constitutional Court's reasoning in *National Energy Regulator of South Africa and Another v PG Group (Pty) Ltd and Others* 2020 (1) SA 450 (CC), where the Court distinguished between administrative action reviewable under PAJA and exercises of public power reviewable under the principle of legality. Accordingly, the omission of a material WEF consideration in an environmental authorisation is analysed principally through PAJA, particularly section 6(2)(e)(iii), rather than treated automatically as an independent legality or rationality defect. The proposed WEF screening mechanism does not create a new ground of review; it is intended to assist decision-makers in identifying material considerations that may already be legally relevant to the exercise of their existing powers.

This principle has particular relevance to the WEF nexus. A project-level EIA does not need to assess every possible interaction between water, energy and food systems. However, where the characteristics of a proposed development and the available evidence indicate that the project may have material cumulative or cross-sectoral consequences for water availability, energy systems or food production, those consequences may become relevant considerations in the environmental authorisation process. The question is therefore not whether every project must produce a comprehensive assessment of the national WEF system, but whether material WEF impacts that are reasonably connected to the proposed activity have been identified and considered.

Where such considerations are materially relevant to the decision and are supported by available evidence, their omission may engage the ordinary grounds of administrative review. The failure to consider a material WEF impact would not automatically invalidate an environmental authorisation. Its legal significance would depend on the circumstances of the case, including the statutory framework applicable to the decision, the nature and scale of the proposed activity, the information available to the decision-maker and the materiality of the omitted consideration.

This approach also clarifies the relationship between procedural compliance and substantive environmental governance. The purpose of the proposed WEF nexus approach is not to create an additional, free-standing ground of judicial review. Rather, it is to improve the information available to competent authorities so that existing constitutional, statutory and administrative-law obligations can be properly discharged. A nexus screening process

can assist in identifying circumstances in which further assessment of cumulative or cross-sectoral WEF impacts is warranted. Where those impacts are material to the decision, they can then be incorporated into the existing EIA and authorisation process.

The procedural rights protected by the Constitution, PAIA, PAJA and NEMA therefore provide an important foundation for more integrated environmental governance. They support participation, access to timely information and accountable decision-making, while the developing environmental jurisprudence demonstrates that decision-makers must engage with material environmental considerations rather than treating EIA as a purely procedural exercise. This provides the administrative-law basis for examining, in the following section, whether the existing project-level EIA framework is sufficiently equipped to identify cumulative and interconnected WEF impacts associated with the JET.

4.3 Key strengths and limitations

South Africa's EIA process, as framed by NEMA, is constitutionally anchored in section 24 (Constitution of the Republic of South Africa, 1996), with clear procedural frameworks, recognition of participatory rights through PAIA and PAJA, and its capacity to integrate environmental considerations into development planning (NEMA, 1998). Judicial reinforcement* and instruments like SEAs demonstrate commitment to modernisation.[†]

However, despite these foundational strengths, the current EIA process presents significant limitations.

First, the process lacks explicit WEF nexus incorporation, failing to anticipate cross-sectoral or cumulative impacts undermining resource security in vulnerable communities (Khofi et al., 2025). Sectoral silos persist with limited integration across water, energy, and agricultural frameworks (Gulati et al., 2013).

Second, rigid regulatory requirements - including inflexible prescriptive activity listings and the absence of discretionary screening - and complexity create procedural and administrative inefficiencies (Alberts et al., 2020).

Third, uneven provincial implementation due to limited institutional capacity, overlapping mandates, and weak coordination hinders the consistent application and integration of governance outcomes (Cilliers & Retief, 2017).

Last, vulnerable communities struggle with limited information access, technical resources, and decision-making platforms, constraining meaningful participation despite constitutional guarantees (Ndlovu & Masuku, 2021).

*See *Director: Mineral Development, Gauteng Region v. Save the Vaal Environment* (1999), where the court affirmed that meaningful public participation is a constitutional imperative in environmental decision-making. See also, *Earthlife Africa* (2017), which confirmed the duty to assess climate impacts as part of EIA.

[†]The inclusion of Strategic Environmental Assessments (SEAs), Environmental Management Frameworks (EMFs), and the development of a web-based screening tool under the EIA Regulations (as amended in 2014 and 2017) reflect ongoing efforts by the DFFE to modernise and streamline EIA processes in accordance with section 24 of NEMA.

5 The governance gap: the inadequacy of project-level EIA

5.1 Systemic constitutional blindness

The project-specific focus of EIA creates a limitation in connecting the assessment of individual developments with the wider interdependence of water, energy and food systems. Although project-level EIA can identify and assess impacts associated with a particular activity, it may not fully capture how those impacts interact with regional water stress, agricultural production or food insecurity. This limitation is significant for the JET because the constitutional protection of environmental, water and socio-economic interests requires consideration of their practical interdependence rather than treating the environmental rights in section 24 in isolation from section 27 and related socio-economic rights (Constitution of the Republic of South Africa, 1996, ss 24, 27, 39(2)).

This limitation may manifest in approval processes that assess whether a project meets applicable environmental requirements without necessarily providing a basis for assessing its interaction with existing regional vulnerabilities (Viljoen et al., 2024). For instance, renewable energy projects in water-scarce regions may receive authorisation based on their environmental merits while placing additional pressure on water resources (Nel et al., 2023), creating a risk that the pursuit of one constitutional objective may adversely affect other constitutionally protected interests under section 7(2) (Constitution of the Republic of South Africa, 1996, s 7(2)).

5.2 The project-level limitation in addressing cumulative WEF impacts

Project-level EIA under NEMA expressly provides for the assessment of cumulative impacts. The Environmental Impact Assessment Regulations, 2014 (as amended) define “cumulative impact” and require the assessment of cumulative impacts as part of the assessment of potentially significant impacts in the environmental impact report. NEMA itself requires the investigation of “the potential impact, including cumulative effects, of the activity and its alternatives on the environment, socio-economic conditions and cultural heritage”. The limitation therefore does not lie in a legal inability to consider cumulative effects, but in the capacity of an assessment centred on a particular proposed activity and project to provide a broader strategic picture of WEF interactions that may emerge across multiple developments, geographical areas or planning decisions (National Environmental Management Act 107 of 1998, ss 24(4)(b) and 24(7)(b); Environmental Impact Assessment Regulations, 2014, GN R982).

This distinction is important for the JET. Cumulative WEF risks may arise not only from the impacts of an individual energy development, but from the interaction between developments and existing resource pressures within a wider area. Where such interactions extend beyond the circumstances of an individual application, project-level EIA may need to be informed by broader strategic or spatial information to place those impacts in context (Cilliers & Retief, 2017; Nel et al., 2023). The limitation is therefore one of scale and strategic context rather than an absence of legal provision for cumulative-impact assessment.

5.3 Procedural justice as constitutional compliance

Procedural participation forms an important component of South Africa's constitutional and statutory environmental governance framework. The *Wild Coast* litigation provides a particularly instructive example of the relationship between procedural participation and the quality of environmental decision-making. In *Minister of Mineral Resources and Energy and Others v Sustaining the Wild Coast NPC and Others* [2024] ZASCA 84, the Supreme Court of Appeal found that the consultation process concerning seismic surveys off the Wild Coast was manifestly inadequate. Among other deficiencies, the notices published in four newspapers were inaccessible to many members of the affected communities: three newspapers were in English and one in Afrikaans, while the majority of residents along the Wild Coast spoke isiXhosa or isiMpondo. The Court held that, if meaningful engagement with those communities was intended, notices should have been prepared in languages accessible to them. It further noted that newspapers were not circulated in some of the affected communities and that many residents primarily received information through radio. The inadequacy of the consultation process meant that affected communities were not placed in a meaningful position to assess the proposed activities and make informed representations (*Minister of Mineral Resources and Energy and Others v Sustaining the Wild Coast NPC and Others* [2024] ZASCA 84). The case illustrates that effective procedural participation depends not merely on providing formal opportunities to participate, but on whether those opportunities enable affected communities to access, understand and respond to information relevant to decisions affecting their livelihoods and interests.

This illustrates the practical importance of the PCC's principle of procedural justice, which seeks to empower and support workers, communities and small businesses during the transition and enable them to determine their own development and means of livelihood (Presidential Climate Commission, 2022). Yet EIA processes may reproduce top-down approaches that limit the effective participation of affected communities (Murcott, 2022).

5.4 The project-level EIA and the JET implementation gap

Consequently, the project-level EIA framework may identify and regulate significant impacts associated with individual developments without necessarily providing the strategic context required to understand how those developments interact with wider WEF pressures. This creates an implementation gap for the JET where individual projects may comply with applicable environmental requirements while their combined effects place additional pressure on water resources, agricultural production or community livelihoods (Nel et al., 2023; Viljoen et al., 2024). A framework for reform: integrating the WEF nexus into environmental governance.

6 Foundational principles for reform

The governance gap identified above does not require the replacement of South Africa's existing EIA regime with a separate WEF authorisation system. Rather, the existing environmental governance framework should be strengthened so that it can identify and respond to material interactions between water, energy and food systems when these arise in the assessment of JET-related developments. This approach is consistent with NEMA's emphasis

on integrated environmental management and cooperative governance (National Environmental Management Act, 1998).

Four principles guide the proposed reforms. First, **integration over isolation** requires water, energy and food considerations to be examined where they are materially connected to a proposed activity (Viljoen et al., 2024). Second, **proactive over reactive governance** requires relevant WEF nexus risks to be identified early enough to influence project design and assessment rather than only being addressed after authorisation (Abram et al., 2022). Third, **collaborative over sectoral governance** requires the relevant authorities to share information and coordinate their respective mandates where a project creates material cross-sectoral implications (Constitution of the Republic of South Africa, 1996). Fourth, **inclusive over exclusive governance** requires affected communities to have timely access to information concerning material WEF impacts so that participation can be meaningful (Presidential Climate Commission, 2022).

These principles are intended to guide the operation of existing environmental-management instruments rather than create a parallel regulatory regime. The objective is therefore not to subject every energy project to an additional WEF assessment, but to establish a proportionate mechanism for identifying when WEF interactions are sufficiently material to require further consideration.

The proposed approach is also intended to avoid reproducing the rigidity identified in section 4.3. The existing EIA regime has been criticised for prescriptive activity listings and limited flexibility in determining when further assessment is warranted. The proposed WEF nexus screening would instead operate as a risk-based threshold within the existing screening process. It would not automatically impose additional assessment requirements on every energy project, but would identify whether the characteristics of a proposed activity and its receiving environment indicate a material WEF nexus risk. Only where such a risk is identified would the process escalate to further WEF-related assessment or coordination. In this way, the proposed screening layer seeks to improve early identification of material WEF nexus risks without creating a new universal procedural requirement

6.1 Proposed interventions

Building on these principles, the following interventions address specific governance gaps:

6.1.1 Mandatory nexus screening within the existing environmental screening process

The first reform should be to incorporate a WEF nexus component into the existing environmental screening process. The purpose would be to identify, at an early stage, whether a proposed energy development presents material interactions with water resources, agricultural production or other components of the water, energy and food systems that warrant further consideration.

This approach builds on an existing administrative mechanism rather than creating a new screening system. The National Web-Based Environmental Screening Tool already generates a screening report that must accompany applications for environmental authorisation under Regulation 16(1)(v) of the Environmental Impact Assessment Regulations, 2014, as amended (Environmental Impact Assessment Regulations, 2014, GN R982). The Department of Forestry, Fisheries and the Environment (DFFE) describes the National Web-Based

Environmental Screening Tool as a mechanism for assessing the environmental sensitivity of proposed development sites and identifying potential risks at an early stage of project planning (DFFE, 2025). The Department's Environmental Geographic Information System (EGIS) also provides access to downloadable geospatial data, interactive map viewers and the national web-based environmental screening tool (DFFE, 2026).

The proposed WEF component should therefore operate as an additional analytical layer within this existing screening architecture. It should not require applicants to commission a basin-wide hydrological, agricultural or economic model merely because an energy project triggers environmental authorisation. Its initial function should be to determine whether the characteristics of the proposed activity and the receiving environment indicate a material WEF interaction.

The screening criteria should be sufficiently clear to promote consistency while remaining sensitive to local conditions. Relevant indicators could include the location of a proposed activity within a water-stressed or water-constrained area; significant water abstraction or consumption associated with the proposed technology; overlap with important agricultural production areas; substantial land-use requirements; concentration of existing or proposed energy developments within the same catchment or agricultural region; or other circumstances in which the proposed activity may place material cumulative pressure on shared water, land or food-production resources. These indicators are proposed screening criteria and should therefore be subject to technical development and stakeholder consultation before being incorporated into the regulatory framework.

The outcome should be proportionate to the level of risk identified. Where the screening indicates low WEF nexus risk, the ordinary EIA process should proceed without additional nexus requirements. Where the screening identifies moderate risk, the scoping process should specify the WEF interactions requiring further investigation and identify the specialist information necessary to assess them. Where the screening identifies high risk, the competent authority should require a more detailed assessment of the relevant WEF interactions and obtain information from the authorities responsible for the affected water, agricultural or energy interests.

This tiered approach is important because a mandatory screening requirement should not become another universal procedural burden. Section 4.3 identifies inflexible activity listings and the absence of meaningful discretionary screening as weaknesses of the existing regime. The proposed WEF nexus layer is intended to avoid reproducing those weaknesses: it would not automatically impose additional assessment requirements on every energy project, but would use defined indicators to identify projects and receiving environments in which material WEF interactions are reasonably foreseeable. The purpose of screening is precisely to distinguish circumstances requiring additional assessment from those that can proceed through the ordinary EIA process. South Africa's existing environmental screening system already uses spatial information to differentiate levels of environmental sensitivity, demonstrating the feasibility of a risk-based approach within the existing administrative architecture (DFFE, 2025).

The proposed WEF screening should also remain distinct from the subsequent stages of environmental assessment. Screening would identify whether a material WEF interaction is present; scoping would determine the nature and extent of the information required; and the environmental assessment would then consider the significance of the identified interaction, reasonable alternatives and appropriate mitigation measures. This preserves

the existing sequence of environmental decision-making while improving the ability of the process to recognise cross-sectoral WEF impacts at an earlier stage.

The reform would consequently shift the role of screening from identifying environmental sensitivity alone towards identifying material WEF sensitivity where the proposed activity creates a plausible interaction between energy development and water or food systems. It would also allow the existing EIA process to remain proportionate: projects with no material WEF nexus risks would not acquire additional assessment requirements, while projects presenting significant WEF nexus risks would be identified before detailed assessment is completed.

6.1.2 Strategic environmental assessment and the wider planning context

Project-level EIA cannot resolve every cumulative or system-wide WEF interaction associated with the JET. Where the implications of energy development extend across multiple projects, geographical areas or planning decisions, SEA can provide a broader basis for identifying environmental and resource constraints before individual projects are authorised (Sands et al., 2018).

South Africa already has experience using SEA in strategic energy planning, including the designation of Renewable Energy Development Zones (REDZ), where strategic assessment was used to identify environmental sensitivities before individual projects proceeded through environmental authorisation (DFFE, 2021). These assessments demonstrate the complementary relationship between strategic and project-level assessment: SEA can identify areas of environmental sensitivity and development potential, while project-level EIA remains necessary to assess the site-specific consequences of individual developments (DFFE, 2021).

The proposal is therefore not that every JET-related project should undergo SEA in addition to EIA. Rather, SEA should be used where the scale, concentration or spatial distribution of proposed energy development creates cumulative WEF questions that cannot reasonably be resolved through individual project applications (Cilliers & Retief, 2017). This may include strategic plans or programmes that materially influence the location, scale or sequencing of energy infrastructure and that may place significant pressure on water resources, agricultural land or related systems (Nel et al., 2023).

SEA should also not be treated as a guaranteed solution to cumulative impacts. Its effectiveness depends on the quality of available information, the scope of the assessment and whether its findings are incorporated into subsequent planning and authorisation decisions (Cilliers & Retief, 2017). Where an adequate SEA or Environmental Management Framework already provides relevant strategic information, that information should inform WEF nexus screening rather than be reproduced at project level.

The purpose is therefore to create a complementary relationship between SEA and EIA: SEA should address strategic and cumulative questions where they arise at planning level, while project-level EIA should assess the site-specific consequences of individual developments. Used selectively in this manner, SEA can strengthen the strategic context of WEF-sensitive projects without creating an additional assessment requirement for every JET development.

6.1.3 Institutionalisation of cooperative governance

The principles of the Intergovernmental Relations Framework Act 13 of 2005 (IGRFA) should be operationalised through structured coordination between the authorities responsible for environmental, water, energy and agricultural matters. For projects identified through WEF screening as presenting moderate or high WEF nexus risks, the competent authority should obtain structured written input from the relevant sectoral authorities. This would operationalise the constitutional principle of cooperative governance while retaining the separate statutory mandates of the participating authorities (Constitution of the Republic of South Africa, 1996).

The responses should be consolidated into a Nexus Opinion forming part of the environmental decision-making record. The Nexus Opinion should identify areas of agreement, disagreement and any material information gaps. It should not confer a veto on any participating department. The competent authority responsible for the environmental authorisation should retain its statutory decision-making power, but should be required to address material points raised by the participating authorities in its reasons for decision.

Cooperative governance should not, however, be understood as occurring between institutionally neutral actors. The authorities responsible for environmental management, water, energy and mineral resources operate under distinct statutory mandates and may attach different institutional priorities to development, resource security and environmental protection. These differences can produce disagreement about the significance of particular WEF impacts and the appropriate balance between development objectives and environmental protection. The proposed Nexus Opinion is not intended to eliminate such disagreement. By recording the respective assessments without requiring agreement as a condition of decision-making, it would preserve the competent authority's existing statutory responsibility while ensuring that material institutional disagreements form part of the decision-making record and are addressed in the reasons for decision. The competent authority would remain responsible for the final decision within its existing statutory powers, but would be required to engage with material differences identified in the Nexus Opinion when giving reasons for that decision.

Where the competent authority fails to address a material point raised through the Nexus Opinion, that omission may be relevant to the review of the environmental authorisation under the principles discussed in section 4.2, particularly where the point constituted a material consideration that the decision-maker was required to consider.

This approach builds on existing NEMA mechanisms rather than creating a new interdepartmental approval system. Section 24K provides for consultation and coordination between competent authorities and organs of state responsible for other aspects of an activity, while section 24O requires relevant information and comments from organs of state to be considered in the environmental authorisation process (National Environmental Management Act, 1998). Section 24O also provides a 30-day period for an organ of state to submit comments following a written request, providing an existing statutory timeframe that can help prevent coordination from becoming an open-ended source of delay (National Environmental Management Act, 1998).

The proposed mechanism would therefore strengthen cooperative governance by connecting existing sectoral mandates to the environmental decision-making record without transferring environmental decision-making to a multi-departmental body or creating a parallel

authorisation process.

6.1.4 Advancement of procedural justice through accessible information

EIA reports for projects identified as presenting moderate or high WEF nexus risks should include a dedicated, plain-language section explaining the material WEF impacts of the proposed development. This should identify the relevant water, energy and food interactions, affected resource users, alternatives considered and measures proposed to avoid or mitigate material impacts.

Accessible information is important to meaningful participation because affected communities cannot effectively engage with technical environmental information that they cannot reasonably understand (Presidential Climate Commission, 2022). The approach would also support the participatory and transparency requirements already embedded in South Africa's environmental governance framework (Constitution of the Republic of South Africa, 1996).

The proposed requirement should complement, rather than replace, existing public-participation processes. Its purpose is to ensure that where WEF impacts are material, the information necessary to understand those impacts is presented in a form that enables affected communities to participate meaningfully in the decision-making process.

6.2 Implementation framework

The proposed reforms can be implemented through the existing environmental governance framework rather than through a separate WEF authorisation regime. Their purpose is to identify material WEF interactions early, escalate assessment where the level of risk warrants it, coordinate relevant sectoral information, and improve the accessibility of that information to affected communities. The following framework summarises the proposed interventions and their relationship with the existing legal architecture.

Table 1: *WEF-Nexus integration framework for South Africa's JET*

Reform	Trigger	Existing legal basis	Proposed mechanism	Consequence
WEF nexus screening	Material WEF indicators identified during environmental screening	NEMA s 24; EIA Regulations	Add a WEF component to the existing screening process and classify risk as low, moderate or high	Low-risk projects proceed ordinarily; higher-risk projects receive proportionate additional assessment
Nexus-sensitive scoping	Moderate or high WEF nexus risk	NEMA s 24; EIA Regulations	Identify material WEF interactions, information requirements and reasonable alternatives in scoping	Relevant WEF impacts become part of the assessment record

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Reform	Trigger	Existing legal basis	Proposed mechanism	Consequence
Strategic assessment	Cumulative WEF questions cannot reasonably be addressed at project level	NEMA; existing SEA framework	Use SEA selectively for strategic plans, programmes or areas where system-level assessment is required	Provides strategic information for subsequent project-level decisions
Cooperative governance	Moderate or high WEF nexus risk	Constitution s 41; NEMA ss 24K and 24O; IGRFA	Obtain sectoral input and consolidate it into a Nexus Opinion	Material interdepartmental positions inform the environmental decision without creating a departmental veto
Accessible information	Moderate or high WEF nexus risk	Constitution ss 32–33; PAIA; PAJA; NEMA	Include a plain-language explanation of material WEF impacts in EIA documentation	Strengthens meaningful participation and transparency
Administrative accountability	Material WEF consideration identified	PAJA s 6(2)(e)(iii); NEMA; principle of legality	Require material nexus considerations to be addressed in the decision-making record and reasons	Provides a basis for reviewing the omission of a material consideration under the applicable administrative-law framework

The framework is deliberately proportionate. It does not require every JET-related project to undertake a comprehensive WEF assessment. Instead, screening determines whether additional assessment or coordination is justified by the characteristics of the proposed activity and its receiving environment. This approach seeks to improve the substantive quality of environmental decisions without reproducing the administrative burden associated with unnecessary or duplicative assessment processes.

7 Conclusion

South Africa's JET is not merely a technical decarbonisation exercise; it constitutes a constitutional test of the state's ability to govern interconnected socioecological systems while fulfilling multiple, simultaneous rights obligations (Constitution of the Republic of South Africa, 1996). This paper has demonstrated that the persistent gap between JET aspirations and implementation arises not primarily from policy insufficiency, but from a structural misalignment between environmental governance mechanisms and the interconnected logic of the Bill of Rights.

At the centre of this misalignment lies the WEF nexus. Far from being a peripheral policy concern, the WEF nexus provides a useful systems-based framework through which the constitutional interdependence of water, energy and food interests can be understood in the context of the JET. South Africa's environmental constitutionalism, anchored in explicit

rights to an environment that is not harmful to health or well-being, access to sufficient water and food, and cooperative governance (Constitution of the Republic of South Africa, 1996), provides both the mandate and the normative architecture for integrated governance. Yet the EIA process under NEMA remains predominantly project-specific. Although the framework permits cumulative impacts to be considered, project-level assessment may not always provide the broader strategic context needed to understand how multiple developments interact with regional water stress, agricultural production and other WEF pressures.

The analysis has shown that, while South Africa's EIA framework is procedurally robust and constitutionally grounded, project-level assessment has limitations in addressing cumulative and cross-sectoral risks associated with the JET. Although NEMA and the EIA Regulations permit cumulative impacts to be considered, project-level assessments may not always provide the broader strategic context necessary to understand how multiple developments interact with regional water security, food production and community livelihoods. The challenge is therefore not an absence of legal provision for cumulative-impact assessment, but the need to connect project-level assessment with broader WEF interactions relevant to the constitutional interests protected by section 24 and section 27 of the Constitution, together with the cooperative-governance principles in section 41.

In response, this article has argued that reform must move beyond incremental procedural adjustments toward a transformation in environmental governance logic. The proposed interventions include:

- WEF nexus screening within the existing environmental screening process, with risk-based escalation to nexus-sensitive scoping and assessment;
- selective use of strategic environmental assessment where cumulative or system-level WEF questions cannot reasonably be addressed at project level, together with structured cooperative governance among relevant authorities; and
- improved procedural justice through accessible information concerning material WEF impacts.

Collectively, these signal a shift from environmental management to constitutional systems governance. By embedding WEF nexus considerations into screening, scoping, strategic planning, and decision-making processes, these reforms operationalise the whole-systems approach (Abram et al., 2022) demanded by the Constitution (according to a purposive interpretation under Section 39(2)) and echoed in the Presidential Climate Commission's justice-based JET framework (Presidential Climate Commission, 2022).

The significance of this reform agenda extends beyond South Africa. As jurisdictions worldwide pursue rapid energy transitions under conditions of climate stress and inequality, many confront similar tensions between decarbonisation imperatives and resource security. South Africa's constitutional framework, distinctive in its explicit recognition of environmental, water, and food rights, offers a compelling template for rights-based governance of complex systemic transitions. Integrating WEF nexus thinking into environmental law demonstrates how constitutional rights can evolve from isolated guarantees into organising principles for integrated, anticipatory, and just governance.

Implementing these reforms, however, will require confronting substantial challenges, including uneven institutional capacity at the provincial and local levels, resistance from en-

trenched sectoral interests, and the technical complexity of nexus-based assessment methodologies. Future research should therefore focus on: (1) developing monitoring and evaluation frameworks for WEF-integrated governance; (2) assessing the distributive and administrative costs and benefits of proposed reforms; (3) undertaking comparative analyses of jurisdictions experimenting with nexus- or systems-based governance; and (4) designing standardised, context-sensitive nexus assessment tools to support environmental assessment practitioners and affected communities alike.

Ultimately, embedding the WEF Nexus into environmental governance enables the JET to move beyond narrow carbon reduction toward its intended constitutional purpose: a socioecological compact in which the pursuit of a low-carbon future strengthens, rather than compromises, water security, food systems, and human dignity. Such an approach ensures that South Africa's energy transition is not only rapid but genuinely just, resilient, and faithful to the transformative promise of the Constitution.

Conflict of interest

The authors declare that they have no conflict of interest.

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Author contributions

Camagu Luvo Ngubevana conceptualised the study, conducted the legal and literature research, and prepared the initial manuscript. Lwazi Ngubevana contributed to the conceptual development of the article and critically reviewed and revised the manuscript. Both authors approved the final version for submission and agree to be accountable for the work.

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