

Policy Briefing

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Geopolitical Energy Futures in South Africa: Strategic Policy Pathways to 2035

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Recommendations

SADC member states should:

- Champion cross-border collaboration that fosters sustainable energy democracies.
- Practice active non-alignment in international renewable energy diplomacy to promote a diversified domestic energy ecosystem.
- Build awareness of used energy futures, identify divergent framings of futures of energy and foster transnational long-term intergenerational fairness.
- Reevaluate growth-centric economies, discover energy blindness and build anticipatory energy governance.

Executive summary

The future of energy and geopolitics is undergoing significant transformations in the post-COVID-19 era. To navigate these changes and shape a stable, prosperous and equitable world, policymakers need anticipatory systems for nations and the world economy. This includes prioritising inclusive and responsive energy policies to understand geopolitical trends, issues and disruptions within the South African contextual environment, to mitigate the systemic risks of uncertain energy futures.

This policy briefing provides a high-level overview of a series of four reports on the Geopolitical Energy Futures: Implications for South Africa. The series of special reports include:

- **Special Report 1:** Global Markers in South Africa's Just Energy Transition
- **Special Report 2:** The Geopolitics of Energy in the Post-COVID-19 Era
- **Special Report 3:** Navigating South Africa's Geopolitical Energy Transition
- **Special Report 4:** Systemic Innovations for South Africa's Geopolitical Energy Futures Including the Strategic Framework

The COVID-19 pandemic, Russia-Ukraine and Israel-Palestine conflicts and BRICS expansion have marked a turning point in energy geopolitics. This change emphasises the need for a multipolar approach. Africa must proactively address these shifts to shape its economic and geopolitical destiny.

South Africa can navigate the complexities of the evolving geopolitical energy landscape, ensuring a sustainable, inclusive and resilient energy future for the nation, by embracing the following four strategic priorities:

- **Strategic Priority 1** focuses on fostering cross-border collaboration to create sustainable energy democracies.
- **Strategic Priority 2** advocates for active non-alignment in international renewable energy diplomacy.
- **Strategic Priority 3** highlights the importance of challenging used futures in energy policy.
- **Strategic Priority 4** urges a re-evaluation of growth-centric economies and the adoption of anticipatory energy governance.

The policy recommendations highlight integrated strategic activities and more importantly empowers stakeholders to create the future(s) they desire. African countries must navigate key trends such as shifts in power dynamics, adapting to evolving standards in energy geopolitics and pursuing regional integration and cooperation. Therefore, policies that promote resilience, agility and responsiveness must complement traditional planning to use the future by creating a better tomorrow, today.

Introduction

The post-COVID-19 era, marked by global and intertwined crises, represents a turning point of epochal change. The ongoing conflict in Ukraine is a stark reminder of the resurgence of great power politics and the end of European security arrangements, ushering in a new post-Cold War era. The world has become increasingly volatile, uncertain, complex and ambiguous. The existing international order is facing growing contestation, with a fraying multilateralism as witnessed in the rise of China and the Global South, and the BRICS expansion. As power dynamics shift, there are calls for the reform of institutions and the rules that govern them to ensure they adequately respond to the needs of the developing world. These changes also bring a diversification of global value systems, where heterogeneity will define future global perspectives and priorities.

Within this evolving geopolitical environment, energy plays a pivotal role. As nations strive for energy security, they are increasingly aware of the interplay between energy resources, politics and global power dynamics. The future of energy will shape the possibilities and limitations of humans in social-ecological systems that depend on ecosystem services and contribute to distinct new global alliances and non-alignment strategies.¹

The transition towards sustainable energy systems – aiming to furnish dependable, cost-effective and low carbon energy services – demands approaches that acknowledge its complex nature. Energy and economic systems involve multiple participants that act in novel and radically open ways and engage via nested networks. This results in emergent properties characterised by adaptive and dynamic processes. Economists,² energy experts³ and scientists⁴ have since the early 2000's called for a shift from simplistic, heterodox thinking about economic and energy systems to complex systems perspectives.

To effectively address the challenges and opportunities presented by the future of energy and geopolitics, a shift towards complex adaptive systems thinking⁵ is essential. This approach recognises the intricate interdependencies and feedback loops between various factors, such as energy production, economic consumption patterns, environmental sustainability and socioeconomic development. Policymakers can better anticipate and respond to the complexities of the energy transition within the broader geopolitical context. This shift from analysis of the individual parts of the energy system represents an

1 Jürgen Scheffran, 'Limits to the Anthropocene: Geopolitical Conflict or Cooperative Governance?', *Frontiers in Political Science* 5 (2023), <https://www.frontiersin.org/articles/10.3389/fpos.2023.1190610/full>.

2 John Foster, 'From Simplistic to Complex Systems in Economics', *Cambridge Journal of Economics* 29, no. 6 (2005): 873–92, <https://www.jstor.org/stable/23601603>.

3 Catherine SE Bale, Liz Varga and Timothy J. Foxon, 'Energy and Complexity: New Ways Forward', *Applied Energy* 138 (15 January 2015): 150–59, <https://doi.org/10.1016/j.apenergy.2014.10.057>.

4 W Brian Arthur, *Complexity and the Economy* (Oxford: Oxford University Press, 2015).

5 Complex adaptive systems thinking offers a way of 'interconnected' thinking about the world that allows us to see the dynamic behaviour and patterns of change that such systems display. R Preiser, 'Key Features of Complex Adaptive Systems and Practical Implications for Guiding Action', CST Policy Briefing (Stellenbosch: Centre for Sustainability Transitions, 2018), <http://www0.sun.ac.za/cst/publication/key-features-of-complex-adaptive-systems-and-practical-implications-for-guiding-action/>.

alternative metaphor – viewing the energy systems as living ecosystems, not machine-like systems.⁶ It opens awareness of the intricate relationships and patterns of interaction and the underlying organisational processes that emerge.

Considering the changing global dynamics, energy policies must be inclusive and responsive to the diverse needs of all nations and living systems that humans depend upon. The voices of countries like South Africa must be heard. They call for equitable representation, fair access to energy resources and the alignment of energy policies. Engaging in dialogue and collaboration with developing countries will be crucial to shape intergenerational fairness for human and planetary well-being.

As the world undergoes significant changes over the next ten to thirty years, policymakers should, promote inclusive energy policies and consider strategies like active non-alignment which will be pivotal in shaping a future where energy resources are harnessed sustainably, geopolitical dynamics are navigated despite acute risks and the aspirations of all nations are considered. By proactively addressing these geopolitical risks, policymakers can lay the foundation for a more stable, prosperous and equitable world.

The aim of this policy brief is to explore the global markers in South Africa's just energy transition in the context of the geopolitics of energy in the post-COVID-19 era. The research highlights the key geopolitical trends shaping the energy landscape. It then proceeds to describe how South Africa can navigate the geopolitical energy transition, by 2050 by applying strategic foresight and futures thinking. Four futures-informed strategic priorities are offered that culminated from the participatory research with key stakeholders in South Africa's energy ecosystem. The policy briefing concludes with a call to action towards collective leadership from all levels of society towards sustainable, inclusive and resilient energy futures in an era of geopolitical turmoil.

Key geopolitical trends and the shift to a multipolar world

The COVID-19 pandemic brought a sudden end to a neoliberal era, characterised by weak fiscal policies, tight monetary policies, limited state intervention, free markets, geopolitical stability, long supply chains and cheap Chinese production.⁷ The pandemic, followed by the commencement of the Russia-Ukraine war, has changed everything. In particular, the template was set for legitimising unconventional interventions as responses to crises, such as adopting futures thinking and systems thinking approaches to long-term energy

6 Rika Preiser et al., 'Social-Ecological Systems as Complex Adaptive Systems: Organizing Principles for Advancing Research Methods and Approaches', *Ecology and Society* 23, no. 4 (2018), <https://www.jstor.org/stable/26796889>.

7 Clinton Free and Angela Hecimovic, 'Global Supply Chains after COVID-19: The End of the Road for Neoliberal Globalisation?', *Accounting, Auditing & Accountability Journal* 34, no. 1 (1 January 2021): 58-84, <https://doi.org/10.1108/AAAJ-06-2020-4634>.

planning. The pandemic was a crisis that has come and gone, but the Russia-Ukraine war and the climate crisis are now central concerns of the global policymaking community.

Additionally, Africa is adapting to evolving standards and norms in energy geopolitics, including prioritising renewable energy sources and environmentally friendly practices.⁸ African countries are navigating shifts in power dynamics, addressing climate change and the energy transition and advocating for a just transition and improved food systems. They also demand a more prominent role in global financial institutions and strengthening health infrastructure and pandemic preparedness. By strategically addressing these trends, Africa can shape its economic and geopolitical future in the post-COVID-19 era.

African countries, including South Africa, can navigate the complexities of global geopolitics by adopting active non-alignment. This approach allows them to safeguard their sovereignty, avoid conflicts and pursue their own interests independently. To ensure long-term energy security, African nations should prioritise self-reliance by developing domestic energy sources, investing in renewable energy and improving energy efficiency. Diversifying partnerships with various countries and organisations will provide access to resources, expertise and investments, reducing reliance on a single ally. Seeking greater symmetry in engagements will also foster equitable and mutually beneficial relationships. Continual reflection and adaptation are crucial to effectively navigate the changing geopolitical landscape, while ensuring a stable and sustainable energy and geopolitical environment for Africa.

The following section provides strategic priorities for energy stakeholders to address the geopolitical energy landscape of South Africa over the next ten to thirty years.

Navigating South Africa's geopolitical energy transition

Strategic Priority 1: Champion cross-border collaboration that foster sustainable energy democracies

Collaborations are needed to navigate the interconnected global and local issues that impact sustainable energy ecosystems. Understanding the interplay between global renewable energy ambitions and socio-economic challenges in South Africa is crucial to navigate the complexities of a just energy transition. This balance is necessary to ensure that the transition not only benefits the environment but also uplifts marginalised communities. It is imperative that South Africa aligns its climate goals with South Africa's development aspirations through the implementation of the just transition framework. This framework

⁸ Daniel D Bradlow and Elizabeth Sidiropoulos, ed., *Values, Interests and Power: South African Foreign Policy in Uncertain Times* (Pretoria: Pretoria University Law Press 2020).

is central to managing the tensions between decarbonisation, job creation and socio-economic inclusivity – all vital components in forging a sustainable energy future for the country.

Exploring the diverse narratives driving the just transition in South Africa sheds light on underlying assumptions regarding the relationships between economic development, decarbonisation and broader societal progress. Recognising and addressing these assumptions is crucial to ensure the equitable distribution of benefits throughout society. In South Africa, a just energy transition will only be achieved if there is a radical socio-economic transformation of society in ways that will result in authentic or ‘deep’ decarbonisation, social mitigation and inclusive upstream industrialisation. This perspective – which is widely held by labour unions and NGOs – is that relying on the private sector to facilitate a just transition may not lead to a green economy that is accessible to all. Instead, the focus is on promoting ‘energy democracy’, which involves restructuring the ownership of the emerging sustainable energy system. This entails a significant involvement of publicly owned utilities and community-owned entities, such as energy cooperatives.

Energy democracy is a key pillar of this strategic priority.⁹ The Department of Mineral Resources and Energy (DMRE) and the Presidential Climate Commission (PCC) can empower communities and individuals to participate in the renewable energy transition and to have greater influence over their energy sources and the broader energy sector. Promoting energy democracy ensures that the benefits of sustainable energy transitions are shared equitably and marginalised communities can better incorporate their local knowledge about environmental stewardship to support a just energy transition.

Energy democracy demands a socially just energy system, favoured towards the public interest, where the sole profit motive is substituted for social and environmental goals and objectives. These goals will help to achieve SDG7 and ensure access to affordable, reliable and clean energy for all. The PCC can foster cooperation, knowledge exchange and joint initiatives for sustainable energy democracy development by identifying region-specific renewable energy resources and creating integrated approaches. By promoting energy generation and distribution cooperatives, cooperative banks and collaborative initiatives, the DMRE and Department of Science and Innovation (DSI) can empower communities and enhance local participation towards a more equitable distribution of resources and benefits.

Additionally, it is essential to acknowledge South Africa’s energy history and understanding the transformative force of the Renewable Energy Independent Power Producer Procurement Program (REIPPPP). This context provides insights into current priorities and challenges posed by the REIPPPP, as well as its potential to drive renewable energy-led industrialisation and avenues for economic progress.

9 Sharné Bloem, Mark Swilling and Kweku Koranteng, ‘Taking Energy Democracy to the Streets: Socio-Technical Learning, Institutional Dynamism and Integration in South African Community Energy Projects,’ *Energy Research & Social Science* 72 (February 2021), <https://doi.org/10.1016/j.erss.2020.101906>.

To promote economic democracy and equitable wealth distribution, the DMRE and DSI should promote and encourage energy cooperatives where employees and members are active stakeholders in the energy ecosystem. Recognising ownership through finance as a catalyst for change is of paramount importance. By probing just transition finance, South Africa can assess its potential to either drive genuine transformation or inadvertently sustain carbon-intensive industries. This assessment extends to various financing mechanisms, including domestic, international and regional avenues. Alternative financing models highlight the inclusion of technology and innovation, creating the mechanisms to improve accessibility and inclusion in energy ecosystems, further emphasising the anticipated demand for decentralised energy policies coupled with more appropriate governance.

This strategic priority creates an environment for innovation, increased participation in energy transitions and inclusivity to reshape global energy supply chains. It is expected that technological advancements will contribute to the modernisation of the energy grid, which may include the expansion of renewable energy sources further contributing towards decarbonisation. The internet of things enables the network effect, which can be used to integrate renewable energy and digitisation to boost renewable energy production and regional energy efficiency. Developing a new SADC-focused energy infrastructure, encompassing both the centralised SADC Power Pool and decentralised community-owned mini-grids, will enable equitable and sustainable energy access across the region.

The post-globalisation era is expected to produce shocks in the traditional economic and energy models, creating the space for new alliances to emerge. As economies and nations usher into this post-globalisation era, the DMRE and Department of International Relations and Cooperation (DIRCO) should promote local renewable energy development and narrow the energy development gap to promote regional development efforts. The modernised grid will provide deeper insights into regional and global value chains and participation of renewable energy industries to further enhance and expedite sustainable energy ecosystems.

Over time, cross-border collaborative processes will need to be embedded in governance structures to support energy provisions equitably and fairly while serving a wide range of stakeholders and shareholders. The transition must be supported by adaptive capacities and multi-level leadership competencies to sustain collaborative arrangements, while pursuing divergent interests

Advocating for South Africa to take a leadership role in regional partnerships is a strategic move. It empowers the nation to shape the energy landscape in ways that align with equitable and sustainable developmental goals. Through regional collaboration and decisive leadership, South Africa can influence the broader region positively and drive collective progress toward more sustainable energy futures. By considering these elements collectively, the DSI and South African National Energy Development Institute (SANEDI) energy secretariat can construct a comprehensive policy framework that paves the way for sustainable energy democracies.

Strategic Priority 2: Practice active non-alignment in international renewable energy diplomacy to promote a diversified domestic energy ecosystem

In the complex arena of global geopolitics, the adoption of an active non-alignment strategy emerges as a strategic imperative. By deliberately avoiding entanglement in external conflicts, African nations can assert their sovereignty and independence. This approach allows them to chart a unique path that aligns with their own national, regional and continental interests and values.

Amidst the tectonic shifts in energy dynamics, the paramount importance of prioritising self-reliance cannot be overstated. South Africa's deliberate pursuit of domestic energy sources, coupled with substantial investments in renewables and energy efficiency, serves as a bedrock for enhancing its resilience against potential external disruptions. This proactive stance not only fortifies energy security but also underscores a commitment to sustainable, domestically or regionally sourced energy solutions.

In the evolving landscape, diverse energy and geopolitical partnerships emerge as a critical necessity. South Africa's strategic engagement must extend across a wide spectrum of countries, regions and organisations. This inclusive approach ensures security and access to vital resources and a wealth of expertise, which can be harnessed for mutual benefit. The DMRE should establish partnerships and cooperation among countries and organisations within and across geopolitical blocs, with the aim to leverage collective strengths, expertise and resources to increase the resilience of energy supply chains.

As energy dynamics and geopolitical relationships continue to evolve, adaptability stands as a cornerstone of South Africa's strategic approach. Regular assessments and proactive responses are key in enabling South Africa to effectively navigate the complexities of this ever-changing landscape. This flexibility allows for the alignment of strategies with the dynamic circumstances of the global stage.

The benefit of framing the domestic energy economy within the larger global context is that it allows for critical reflection on systemic and strategic long-term actions to capitalise on emerging multipolar shifts. Repositioning will give African nations symmetry, resilience and agility in partnerships, to advance the reordering of the intricate multipolar equitable geopolitical networks.

The narrative of seeking favour with one large geopolitical bloc through increased trade (in mostly lopsided agreements) is declining. South Africa should adopt critical measures such as diversifying critical mineral supply chains, fostering domestic and regional production and innovation and forging equitable international cooperation.

The strategic options for Africa in seeking positive futures of energy in the current geopolitical context include cultivation of diverse partnerships, prioritising symmetric

engagements, promoting peaceful resolutions and regional cooperation and deepening BRICS plus cooperation and trade. Furthermore, South Africa should advocate for the strategic navigation of EU relations, enhancing US–South Africa diplomacy and leveraging digital and green synergies. These actions collectively form a robust strategy to empower South Africa in the dynamic intersection of energy and geopolitics.

Strategic Priority 3: Build awareness of used energy futures, identify divergent framings of futures of energy and foster transnational long term intergenerational fairness.

Used energy futures¹⁰ refers to a preconceived image of the future that is unconsciously borrowed or adopted from external sources, often mirroring what is commonly accepted or practiced by others. This borrowed vision of the future may have originated in a different context and may subtly influence perceptions, potentially overshadowing more authentic and empowering visions of what lies ahead. Critically examining these images of the futures of energy and challenging these borrowed future scenarios – especially as they pertain to geopolitical energy futures – is crucial to navigate to a more desired future of energy. Relying on familiar patterns of thought and preconceived notions in the face of complex and intersecting energy challenges will not lead to alternative outcomes in the geopolitical energy landscape. Simpler approaches will be insufficient to tackle the scale and intricacy of these complex energy issues.

Used futures are prevalent in current energy policy in four key ways.

- **Unfulfilled social contract:** the government’s inability to provide stable power supply and operate transparently has eroded the promise of a prosperous future for South African citizens.
- **Lack of youth targeted skills development:** the inadequate focus on skills development tailored to the youth population, amidst high unemployment rates.
- **Dependence on coal:** coal as a primary energy resource yet environmentally unsustainable approach.
- **Corruption and instability:** the presence of corruption, political instability and vested interests in governance and investment decisions reflects a continuation of conventional practices that prioritise short-term gains over long-term sustainability.

To enable just energy transitions, the DSI, DMRE and PCC should advocate for a new global finance pact recognising the urgency of climate change. This pact should provide alternative financial solutions to emerging economies where the energy transition is prioritised, particularly those most vulnerable to climate impacts. Additionally, increased

¹⁰ Sohail Inayatullah, ‘Six Pillars: Futures Thinking for Transforming’, *Foresight* 10, no. 1 (1 January 2008): 4–21, <https://doi.org/10.1108/14636680810855991>.

climate finance reparations are needed to address historical imbalances and promote sustainable development. Multilateral institutions and donor countries should fulfil their commitments and provide funding for energy transition projects. Moving towards full-cost pricing involves accounting for energy production and the associated environmental and social costs of consumption. Therefore, by internalising these costs, South Africa can expedite the adoption of energy awareness and promote alternative energy models to ensure participation and relevance in global markets.

SANEDI's energy secretariat and PCC have an added duty to align policies with futures-informed paradigms and invest in capacity building to overcome used futures, which is blemished with greenwashing and politically connected elite. They can enable conditions for economies to flourish; and in so doing ease international trade relations with multi-lateral partners.

The identification of different narratives and framings of energy futures is crucial for informing geopolitical energy policies.¹¹ These alternative perspectives – such as eco-modernism, planetary stewardship, pathways to sustainability, critical post-humanist, post-growth and great simplification¹² paradigms – offer diverse insights into how energy development, sustainability and global interactions can shape the future. By exploring and interacting with these framings, policymakers can gain valuable insights into the range of perspectives that can guide South Africa's energy policies. These perspectives challenge conventional assumptions, emphasising the ethical choices at hand and highlighting the importance of futures thinking and complex adaptive systems in decision making, where long-term policy implications are influenced and shaped in the present.

Energy policy should embrace an integrative approach that harmonises elements from multiple framings – including eco-modernist pathways, the great simplification and planetary stewardship – to ensure proactive responsible resource management and intergenerational equity. Such an approach bridges economic imperatives with environmental responsibilities.

Blended finance mechanisms and a task force dedicated to inclusive energy ownership, moving from private and public funds to community-led initiatives, will empower local communities and ensure justice beyond environmental sustainability within South Africa and SADC. This will allow for more regional integration, cooperation, self-reliance, energy diversity and security. An immediate priority is transitioning towards energy localisation by establishing waste-to-energy models, prioritising shorter supply chains and encouraging low carbon energy consumption patterns.

11 'Navigating Alternative Framings of Human-Environment Interactions: Variations on the Theme of "Finding Nemo" – ScienceDirect', 6 November 2022, <https://www.sciencedirect.com/science/article/abs/pii/S2213305417300474>.

12 N.J. Hagens, 'Economics for the Future – Beyond the Superorganism', *Ecological Economics* 169 (1 March 2020): 106520, <https://doi.org/10.1016/j.ecolecon.2019.106520>.

It is also essential to consider the principles outlined in the UN's Our Common Agenda.¹³ This approach requires recognising the interconnectedness of social, economic and environmental factors and prioritising long-term sustainability, social equity and environmental stewardship. By incorporating these principles, policymakers can create more just and equitable energy futures, reevaluating growth-centric economic models and embracing inclusive governance, environmental sustainability and social equity. Informed by these framings, policymakers can shape energy policies that align with the promotion of effective long-term multilateralism.

Strategic Priority 4: Reevaluate growth-centric economies, discover energy blindness and build anticipatory energy governance

South African and SADC policymakers should develop policies and practices that prioritise relational approaches of the inseparability of human nature, considering the needs and aspirations of humans and non-humans beyond solely profit-seeking measures. This includes addressing energy poverty, promoting inclusive access to clean, affordable energy, fostering equitable distribution of benefits and living in a mutually beneficial relationship with nature.

The DMRE is encouraged to invest in research and development to promote systemic innovations in the energy sector, especially for bottom-up actors. This includes supporting initiatives that promote renewable energy sources, energy efficiency and clean technologies. In addition, the DMRE and DSI can partner with the private sector to create innovation hubs to accelerate the discovery and implementation of sustainable energy technologies and solutions. The private sector should be spurred and incentivised to build new alliances with similar interests to strengthen its regional supply chains for energy resilience.

The PCC working with DSI international and DIRCO should develop a post carbon futures strategy for South Africa that develops regenerative economic and alternative energy models responsive to the changing geopolitical landscape by 2050. In a world where global connections are changing, new ways of doing business and using energy sources must be considered that support both the environment and the economy. Post-growth¹⁴ and the Great Simplification¹⁵ should inform transitions towards post carbon energy futures. This involves reevaluating consumption patterns and prioritising regenerative practices¹⁶ that value interdependent relationships with humans and nature.

13 UN, 'Our Common Agenda', accessed 7 June 2023, <https://www.un.org/en/common-agenda>.

14 Julien-François Cerber and Rajeswari S. Raina, 'Post-Growth in the Global South? Some Reflections from India and Bhutan', *Ecological Economics* 150 (1 August 2018): 353–58, <https://doi.org/10.1016/j.ecolecon.2018.02.020>.

15 NJ Hagens, 'Economics for the Future'.

16 Bill Reed, 'Shifting from "Sustainability" to Regeneration,' *Building Research & Information* 35, no. 6 (1 November 2007): 674–80, <https://doi.org/10.1080/09613210701475753>.

PCC is encouraged to continue embracing these concepts to foster a more harmonious post-globalisation era and coexistence within the bioregion

through promoting systemic energy consciousness and human interconnectedness with the natural world. By adopting a bioregional perspective, South Africa will acknowledge its interconnectedness with neighbouring countries and ecosystems.

By reevaluating the narrow growth-centric economies to rather embrace wellbeing economies, governments may shift their energy transition from competition among geopolitical powers to collaboration. This relational approach to global energy supply chains should be informed by mutual values, norms and principles of a multipolar non-binary world.

Moving away from a singular focus on individual ownership towards sharing economic models is crucial in the post-globalisation era. This includes fostering partnerships between businesses and governments to address complex challenges and transition from solely profit-focused to shared value that overcomes energy blindness.

Energy blindness¹⁷ refers to a widespread lack of awareness regarding the crucial role energy plays in our lives, economies and ecosystems. This oversight arose from a historical shift where the significance of energy in driving economic progress was gradually overshadowed by a focus on other economic factors such as capital and labour. This transition occurred as societies moved from primarily relying on natural resources and human/animal muscle power to harnessing stored energy sources like coal, oil and natural gas. Consequently, this shift led to an underestimation of energy's impact on our well-being and overall quality of life.

Currently, we are experiencing a rapid depletion of these stored energy reserves, often referred to as the 'carbon pulse'.¹⁸ This has significantly boosted productivity and economic development. However, it also means that we are consuming these resources at an unsustainable pace. Energy blindness is further evident in how society tends to treat energy as a commodity without recognising its distinct and vital role.

Addressing energy challenges requires a multi-faceted approach, including conservation and more efficient energy use. It is also crucial to protect ecosystems and adopt a more comprehensive way of living. While technological and governance innovations are important, they must be combined with a shift towards new economic models that prioritise sustainability and fair resource distribution.

While enhancing energy efficiency is important, they will not entirely solve the challenges posed by dwindling resources. Therefore, alongside efficiency improvements, a broader

¹⁷ NJ Hagens, 'Economics for the Future'.

¹⁸ NJ Hagens and DJ White, *Reality Blind: Integrating the Systems Science Underpinning Our Collective Futures*, vol. 1 (Red Wing, Minnesota: Amazon, 2021), <https://read.realityblind.world/view/975731937/ii/>.

transition towards renewable and sustainable energy sources – along with changes in governance, pricing and cultural values – will be crucial in navigating the complexities of a post-carbon future.

Anticipatory energy governance systems are needed to balance energy demand and supply within the environmental parameters while enabling more just socio-economic outcomes. This will require active citizen participation, collective imagination and a revived social contract to support the energy transition. Anticipation embeds alternative futures and highlights pathways of how to act in the present, thereby creating the link between long-term objectives and present action. It is further expected that private power supplies will exceed traditional energy generation, highlighting the need for anticipatory governance frameworks in energy systems.

Renewable energy industrialisation models are expected to improve the efficiency of energy resource production. It could however lead to increased resource consumption, commonly referred to as Jevon's paradox. This is evident in new energy demands, such as electric vehicles and the application of technology. This highlights the perpetual need for increased energy sources, which gives rise to energy blindness. Africa's unprecedented urbanisation levels provide an opportunity for more responsible energy consumption patterns and promote more equitable social energy systems. By leveraging urbanisation trends, Africa can implement sustainable and efficient energy solutions. This includes integrating renewable energy sources, promoting energy-efficient technologies and fostering community-led initiatives to enhance energy resilience and economic and social well-being.

In the evolving landscape of geopolitics, Africa should pursue digital sovereignty¹⁹ and redefine traditional diplomatic approaches to address energy poverty and scarcity. Digital diplomacy,²⁰ inclusive energy practices and redefining the role of energy as a basic need are crucial to South Africa's future. There is a need for closer diplomatic cooperation, civic technologies and proactive measures and frameworks to address energy poverty, promote sustainability and embrace Africa's demographic dynamics.

An increase in geopolitical tensions should be anticipated and the subsequent impacts on capital flows will be more pronounced for emerging and developing economies and could give rise to economic and financial fragmentation. Civic technology and digital sovereignty can support new infrastructures to bypass these tensions, while enabling sustainable energy demands.

Breaking the carbon lock-in in South Africa will require significant investments and reversal of the carbon trap. The DMRE should take the lead in promoting innovation in

19 Jan Hofmeyr, Ndeapo Wolf and Deon Cloete, 'SADC Futures of Digital Geopolitics: Towards African Digital Sovereignty,' *SAIIA Occasional Paper* (Johannesburg: SAIIA, October 2022), <https://saiia.org.za/research/sadc-futures-of-digital-geopolitics-towards-african-digital-sovereignty/>.

20 Ilan Manor and James Pamment, 'Towards Prestige Mobility? Diplomatic Prestige and Digital Diplomacy,' *Cambridge Review of International Affairs* 32, no. 2 (4 March 2019): 93-131, <https://doi.org/10.1080/09557571.2019.1577801>.

financial products to increase the diversity of available finance to stimulate investment in post-carbon energy. Financial frameworks are also needed to accelerate the shift towards renewable energy sources. As the energy ecosystem becomes more variable, distributed and digitised, new risks will emerge that will undoubtedly impact the resilience and affordability of energy security in South Africa.

Conclusion

This policy briefing underscores the critical importance of proactive, multidimensional strategies in navigating South Africa's geopolitical energy transition. It highlights four strategic priorities that collectively form a comprehensive framework for a just and sustainable energy future: championing sustainable energy democracies; practising active non-alignment in international renewable energy diplomacy; fostering transnational long-term intergenerational fairness; and building anticipatory energy governance and breaking carbon lock-in.

By adopting these strategic priorities and next steps, South Africa can proactively steer its energy transition towards a more sustainable, inclusive and resilient future. The resounding call is evident: South Africa's energy future demands a strategic foresight approach and systemic innovations that surpasses boundaries, ideologies and established norms. The suggested measures are not just choices but vital necessities supported by extensive research. The moment to act is upon us – to come together, pioneer new solutions and collectively guide South Africa towards energy prospects that are fair, rejuvenating and robust. In striving for this aspiration, South Africa stands poised to take the lead in the worldwide energy shift, offering a groundbreaking model for not only the region and the continent, but for the entire global community.

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CST is a flagship research and teaching hub at Stellenbosch University. It brings together complexity thinking, sustainability science and transdisciplinary research across five themes: knowledge co-production, social-ecological resilience, transformative futures thinking, finance and resource flows, and political economy and development. The CST offers a Postgraduate Diploma, MPhil, and PhD in Sustainable Development. Both teaching and research activities are theoretically grounded in Complex Adaptive Systems, Human-Nature Interconnectedness, Socio-Technical Transitions and Social Ecological Transformations.

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