POLICY BRIEF

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OJTA
Operationalising a Just Transition in Africa

HARNESSING ARTIFICIAL INTELLIGENCE (AI) TO PROPEL A JUST ENERGY TRANSITION IN AFRICA

The implementation of Artificial Intelligence (AI) offers a transformative opportunity for advancing a just energy transition (JET) in Africa. While AI offers promising advantages for a cleaner and more resilient energy system, if not managed strategically, unintended consequences such as the environmental impact of AI hardware production, increased energy consumption, and heightened risks to national sovereignty may be overlooked. To ensure that the benefits of AI are not overshadowed by these unintended consequences, policymakers must develop frameworks that ensure the responsible deployment of AI while addressing potential socioeconomic disparities. This policy brief advocates for the development of strategic interventions to harness AI's potential for a JET, emphasising the need for AI solutions to be tailored to local contexts, ensuring they are affordable, accessible, and culturally appropriate.

Authors: Dr Tamuka Chekero (University of Pretoria) & Phatsimo Rahman (SouthSouthNorth)

KEY MESSAGES

1 AI AS A CATALYST FOR A JUST TRANSITION

AI has the potential to transform Africa's energy systems by enhancing the integration of renewable energy, improving energy forecasting, and promoting equitable energy distribution. These capabilities are essential for driving a socially and environmentally just energy transition, ensuring that energy access is not only expanded but also equitably distributed, while simultaneously reducing reliance on fossil fuels. AI can optimise energy systems and enable decentralised solutions, offering new opportunities to accelerate the transition to cleaner, more resilient energy systems across the continent.

2 ADVANCING EQUITY AND INCLUSION THROUGH AI

AI can be instrumental in advancing equity and inclusion in the energy sector by identifying vulnerable and underserved communities. AI-driven insights and data patterns can enable targeted interventions and innovations, such as microgrids, which ensure that clean energy solutions reach those who have historically been excluded from energy access. By focusing on marginalised communities, AI can help address energy inequities, fostering inclusive growth and ensuring that no one is left behind in the energy transition.

3 AI-DRIVEN CAPACITY BUILDING FOR THE ENERGY TRANSITION

To ensure that AI contributes to a just energy transition, it is essential to invest in education, training, and skills development in both AI and renewable energy technologies. By equipping local workforces, particularly in rural and underserved areas, with the expertise to implement and manage AI-driven energy solutions, Africa can build a versatile and skilled workforce.

4 INNOVATIVE FINANCING FOR RENEWABLE ENERGY ACCESS

AI could potentially unlock new opportunities for financing renewable energy projects, particularly in low-income and underserved communities. By leveraging AI-driven financial models, such as pay-as-you-go systems or blockchain-based investments, tailored financing solutions can be created to increase capital access for renewable energy initiatives. These innovative financing approaches empower local populations, facilitating clean energy adoption and contributing to inclusive growth in the energy sector.

5 OVERCOMING CHALLENGES FOR EFFECTIVE AI DEPLOYMENT

While AI presents significant opportunities for advancing the energy transition, its effective deployment requires overcoming barriers such as data gaps, regulatory constraints, and limited local expertise. Addressing these challenges through collaborative, culturally appropriate, and community-driven approaches will ensure that AI solutions are trusted, sustainable, and capable of delivering meaningful impacts. By prioritising these efforts, Africa can harness AI's full potential while mitigating the risks and unintended consequences of its deployment in the energy sector.

LEVERAGING ARTIFICIAL INTELLIGENCE FOR A JUST TRANSITION: EXAMPLES FROM AFRICA

Africa's energy landscape faces significant challenges, including limited access to electricity, reliance on expensive and polluting energy sources, and a lack of sufficient financing for renewable energy projects, especially in rural and underserved areas. Despite Africa's substantial renewable energy potential, over 640 million people remain without reliable electricity access, and the average per capita energy consumption is as low as 180 kWh — significantly below the 13,000 kWh in the United States and 6,500 kWh in Europe.[1] This is largely because fossil fuels still make up 77% of Africa's energy mix and the slow and costly expansion these traditional grids require – especially in remote areas. This has left a large portion of sub-Saharan Africa with limited electricity access, impeding economic and social development, and hindering progress towards the achievement of the African Union's Agenda 2063 goal of universal access to affordable, reliable and sustainable electricity for all Africans. The attainment of this goal is set within the broader context of advancing a just and equitable energy transition, while balancing the pressures of increasing urbanisation, economic development, and the developmental challenges associated with poverty, climate change, and limited infrastructure. This calls for the exploration of innovative, decentralised, scalable and effective energy solutions that leverage renewable energy resources to drive an equitable energy transition.

Emerging research shows that the use of AI systems presents considerable opportunity to tackle Africa's energy challenges while promoting a sustainable and equitable future.

> **Artificial Intelligence (AI),** is the simulation of human intelligence in machines that are programmed to think, learn and reason like humans by using algorithms and vast amounts of data to recognise patterns, make decisions, and improve their own performance over time. [2] [3]

The Africa Continental Artificial Intelligence Strategy, launched by the African Union (AU), has begun outlining the continent's approach to adopting AI for development, including the development of energy sectors.[4] In highlighting AI's role in addressing climate change and accelerating the adoption of clean energy solutions aligned with the Sustainable Development Goals (SDGs) and the African Union's Agenda 2063,[5] the strategy emphasises the importance of conducting African-led research to assess the potential risks of AI to African societies, economies, and value systems. [6]

Many African countries still rely on conventional energy generation methods that use fossil fuels like coal, which come with significant disadvantages, including high costs, inefficiencies, and environmental harm due to carbon emissions and pollution.

However, AI optimisation offers a promising solution to reduce these challenges by enhancing the efficiency of energy systems, improving resource management, and minimising energy losses. This can not only make conventional energy generation more sustainable, but also create opportunities for greater adoption of renewable energy sources, driving a cleaner, more cost-effective energy future for the continent.

In South Africa, Eskom, the state-owned power utility entity, is integrating AI-powered smart grid technologies to tackle inefficiencies and enhance energy reliability, reducing energy losses by optimising grid management and electricity distribution. By incorporating AI-based monitoring and predictive analytics, Eskom has been able to more accurately predict energy demand, promptly detect faults, and optimise grid responses to dynamic conditions.[7] Similarly, in Kenya, the Kenya Power and Lighting Company (KPLC) has made significant strides in adopting AI-powered solutions within its smart grid infrastructure. The application of AI machine learning has enabled KPLC to detect power theft, optimise load distribution, and manage power outages more efficiently, resulting in a reduction of energy losses by up to 30%.[8]

Through real-time analysis of energy consumption, weather conditions, and grid performance, AI enables optimised energy distribution[9] and facilitates the integration of renewable sources. Furthermore, AI can drive inclusive growth by identifying vulnerable communities through socio-economic data analysis, thereby enabling targeted interventions. AI-powered microgrids, like those used in the Powerhive project in Kenya, manage solar energy in rural areas, optimising energy storage and distribution, demonstrating how AI can support community-driven energy systems, giving local stakeholders the autonomy to manage their energy needs and reduce reliance on centralised grids, thereby enhancing energy resilience in off-grid regions. The Solar for All initiative in Tanzania on the other hand demonstrates how AI can distribute solar energy based on real-time demand data, reducing energy inequity by 40%.[10] By forecasting energy demand, AI enhances power allocation in off-grid communities, providing more reliable and affordable energy to underserved areas. US-based AI company, Husk Power Systems, has reported on how AI has facilitated the use of solar mini-grids to provide renewable energy to off-grid communities in rural East and West Africa. These AI technologies improve the performance of renewable energy systems while reducing operational costs, ultimately fostering sustainable development in areas with inadequate energy infrastructure.[11]

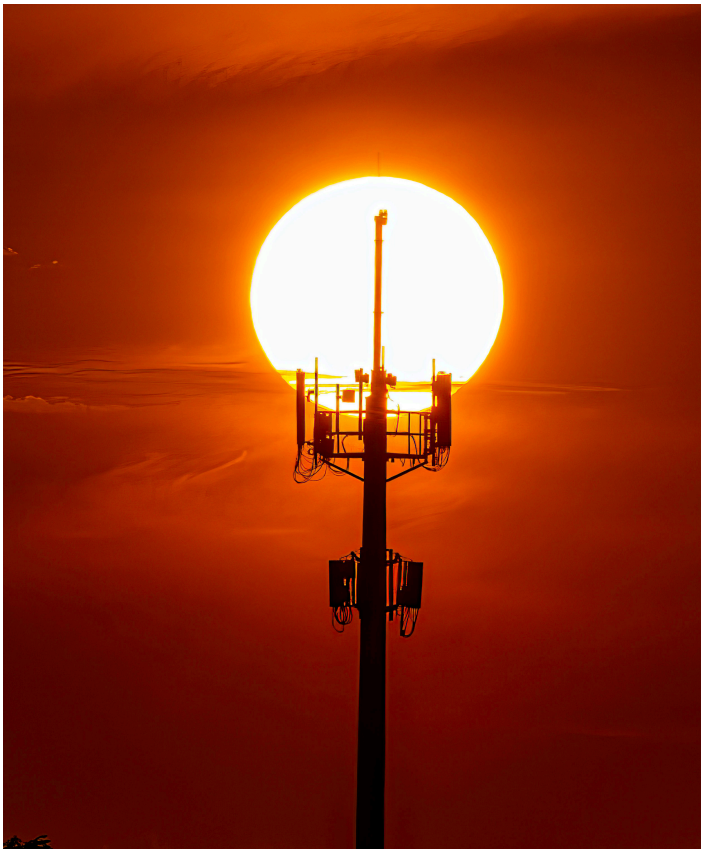
AI is also being leveraged to prioritise the broader equity goals of a JET by identifying targeted interventions and ensuring that financial resources are allocated where they are most needed.[12] A compelling example of this is the transformation of Gwakwani, South Africa's first smart rural village, which has benefited from AI-driven technologies to address basic infrastructure gaps.[13] In collaboration with the University of Johannesburg's School of Electrical Engineering,

Gwakwani has introduced solar-powered water pumps, lighting, cold storage units, and a bakery, monitored by remote AI-driven technology, which collects and analyses real-time data, to ensure operational efficiency. Through the introduction of these technologies, local stakeholders have been empowered, to autonomously manage and maintain these systems in addition to fostering economic growth through a solar-powered bakery. By prioritising AI investments in underserved areas like Gwakwani, the integration of AI into energy systems can be used to accelerate progress toward equitable and sustainable development.

LEVERAGING AI FOR A JUST ENERGY TRANSITION & ENHANCED CLIMATE RESILIENCE

The urgent need for climate resilience in Africa is driven by the continent's vulnerability to extreme weather events, rising temperatures, and shifting agricultural patterns, which threaten its people, economies, and ecosystems. To effectively tackle these challenges, a just energy transition must be central to Africa's strategy, ensuring that vulnerable populations are not left behind as the continent adapts to climate change. A Just Energy Transition goes beyond simply shifting from fossil fuels to renewable sources; it focuses on inclusivity, equity, and social justice. This approach, focussed on justice, not only prioritises technological innovation in transitioning to clean energy but also emphasises engaging communities in decision-making processes, ensuring that vulnerable groups benefit from the transition. For this reason, just transition principles are intrinsically linked to enhancing climate resilience because they ensure that the shift to a sustainable, low-carbon economy is inclusive, equitable, and supportive of vulnerable communities, enabling them to adapt to and thrive in the face of climate change impacts. Therefore, by supporting the just transition, AI can enhance climate resilience. Tailoring these solutions to local contexts enables communities to leverage technology that directly addresses their unique challenges, equipping them with the tools and knowledge to adapt to changing environmental conditions. For example, AI can play a practical role in enhancing climate resilience, by identifying climate risks, such as extreme weather events, forecasting their impacts[12] on communities, infrastructure, and ecosystems, enhancing the accuracy of climate models and early warning systems and enabling better preparation and adaptive strategies.

AI can also play a transformative role in fostering green entrepreneurship by enabling innovative, sustainable, and scalable solutions to environmental challenges, thereby promoting economic growth. Given Africa's diverse resources, ecosystems, and developmental needs, AI has the potential to empower local entrepreneurs to tackle environmental issues while advancing green business models. AI-enhanced systems' unique ability to analyse real-time data and predict environmental changes helping communities anticipate and respond to the impacts of climate change.



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For example, AI-enabled systems can dynamically adjust to changing weather patterns, helping to anticipate and therefore mitigate the impacts of extreme weather events on energy infrastructure, especially in vulnerable regions. Furthermore, by empowering local communities to monitor and manage these enhanced energy systems, AI has the potential to foster greater adaptability and resilience, enabling communities to better cope with the increasing frequency and intensity of climate-related disruptions.

AI can also significantly contribute to the principles of a JET, particularly by fostering fair energy distribution and inclusive decision-making. The JET framework emphasises equity, inclusivity, and sustainability, aiming to ensure that the shift from fossil fuels to renewable energy benefits all members of society, particularly marginalised communities. AI facilitates more equitable energy access by utilising data-driven insights to optimise energy distribution based on real-time demand rather than traditional infrastructure. For example, in decentralised energy systems like solar microgrids, AI can adjust power distribution dynamically, ensuring that underserved communities, often the most affected by energy poverty, receive their fair share of resources. Additionally, AI empowers local communities to participate actively in energy governance by providing them with the data needed to monitor and manage their energy systems, ultimately promoting greater autonomy and inclusivity in decision-making processes.

THE ROLE OF AI IN PLANNING & FINANCING A JUST ENERGY TRANSITION

Artificial Intelligence (AI) has the potential to significantly enhance the capacity of financial institutions and policymakers to support the JET through improved decision-making, risk assessment, and capital allocation for sustainable energy initiatives. Financial institutions play a pivotal role in driving the transition to a low-carbon economy, and AI provides powerful tools to increase their effectiveness. For example, AI is reshaping how green finance is managed, providing unprecedented opportunities to accelerate the transition to a more sustainable and resilient global economy. Because green finance focuses on outcomes beyond financial returns, it requires making timely and verifiable information on sustainability parameters. AI could therefore serve as a key enabler in this process, analysing large datasets to identify trends, optimising portfolios, and assessing risks with greater accuracy.[14] These capabilities can help identify promising low-carbon investments, streamline portfolio management, and evaluate environmental, social, and governance (ESG) risks—leading to more informed financial decisions while also unlocking greater potential for investment in low-carbon investment opportunities that align with social equity goals.

In Africa, AI-driven financing tools have the potential to address energy access challenges, through microfinance platforms for renewable energy projects. By refining risk assessments and financing models, AI enhances the scalability of these platforms, facilitating renewable energy adoption in regions with limited access to traditional financial services. In this way, AI can be leveraged to prioritise investment in underserved communities, supporting the equity goals of a JET by ensuring that resources are allocated where they are most needed.[15] Additionally, AI automates the analysis of large datasets—such as climate risk projections, carbon footprints, and energy market trends—making due diligence processes more efficient and precise, further supporting the growth of sustainable energy solutions across Africa.

For example, AI can improve credit scoring and loan disbursement processes by analysing socio-economic data and energy usage patterns, thereby enabling underserved populations to access financing for renewable energy solutions. Platforms like PayGo Energy in Kenya use AI to assess customer creditworthiness, allowing low-income households to access solar energy through pay-as-you-go schemes.[16] Similarly, AI-powered platforms like M-KOPA in East Africa leverage machine learning algorithms to track payment behaviour and predict repayment likelihood, which supports the expansion of solar power in off-grid areas.[17]

Partnerships, particularly public-private collaborations, play a crucial role in supporting the integration of AI into energy planning and financing in Africa. As an information tool, AI can potentially inform and facilitate public-private partnerships by providing data-driven insights and helping align the goals of both sectors thus enabling collaborations that support a Just Energy Transition—partnerships that might not be possible without such technological support. These partnerships can drive the development of AI-powered platforms, enhance financing access for renewable energy projects, and ensure the deployment of AI technologies in underserved regions.

While AI presents opportunities for the energy transition, it is essential to develop policies that ensure AI-driven solutions are equitable and responsive to the specific needs of African countries. A balanced approach is necessary to ensure that AI's integration does not exacerbate existing inequalities or environmental challenges, such as rising energy demand. The integration of AI into national energy policies should therefore be carefully planned to ensure that it contributes positively to a JET, addressing both long-term developmental priorities and immediate energy access needs.

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EMPOWERING KENYA'S ENERGY FUTURE: THE ROLE OF AI IN ACHIEVING A JUST ENERGY TRANSITION

Kenya's journey to a Just Energy Transition (JET) showcases how Artificial Intelligence (AI) can transform energy management. AI tools that improve demand forecasting and grid management contribute to the sustainability of the energy system. The Kenya Power and Lighting Company (KPLC)[18] has embraced AI-powered tools like predictive analytics to improve electricity distribution and reduce outages. By analysing real-time data from smart meters and sensors, KPLC can better forecast demand and detect potential grid issues early, ensuring a more reliable power supply. To make electricity more affordable and accessible, KPLC also introduced mobile payment options for bills, a practical solution for many Kenyans who rely on informal payment methods. To build a skilled workforce for this AI-driven approach, KPLC works with universities and technical schools to provide training in AI and data analytics, equipping people with valuable expertise. This initiative is supported by partnerships among government agencies, private companies, and community organisations, incorporating local perspectives into the project's design and implementation. However, challenges remain, such as limited internet access in rural areas and the need for robust regulations to support AI use. Addressing these obstacles is crucial to maximising AI's impact in Kenya's energy sector and ensuring equitable access to power for all.

Kenya's adoption of AI in the energy sector provides a practical example of how AI can support key JET principles such as affordability, accessibility, and inclusivity while addressing the challenges and social impacts of energy access. AI-powered tools, such as predictive analytics implemented by the KPLC, help improve demand forecasting and grid management, ensuring a more reliable energy supply and reducing power outages. This directly impacts marginalised communities, particularly in rural areas, where energy access has traditionally been limited. The introduction of mobile payment options for electricity bills addresses affordability concerns by offering flexible payment methods suited to informal economies, making energy more accessible to low-income households. Moreover, KPLC's collaboration with universities and technical schools to provide training in AI and data analytics ensures the development of local expertise, fostering inclusivity and equity by equipping individuals from underserved communities with the skills to participate in the evolving energy economy. However, challenges such as limited internet access in rural areas and the need for robust regulations to support AI integration remain, highlighting the importance of addressing infrastructural barriers to maximise AI's potential in promoting equitable energy access. Despite these hurdles, the case study exemplifies how AI can contribute to JET's goals by making energy systems more efficient, affordable, and inclusive for marginalised populations.

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CHALLENGES AND RISKS TO AI ADOPTION

Despite AI's potential to drive sustainable energy solutions in Africa, several significant challenges hinder its widespread adoption. These challenges include the reinforcement of existing inequalities by high upfront costs, limited reliable data infrastructure, increased dependency on foreign technology providers, environmental costs associated with AI processes and unclear regulatory and ethical guidelines. As such, to effectively leverage AI for the JET in Africa, it is vital to address these risks and challenges. Failing to do so, might undermine efforts to create a more inclusive, affordable, and sustainable energy future, limiting the full potential of AI to transform the region's energy sector.

Economic Cost of AI Adoption

The first major barrier Africa faces in its adoption of AI for a JET is the high upfront cost associated with deploying AI solutions.[19] The initial investment in AI infrastructure, such as hardware, software, and skilled personnel, can be prohibitively expensive, particularly for rural or underserved areas. For instance, deploying AI-powered solar microgrids in remote areas may surpass the financial capacity of local governments or private sector entities, making it a significant challenge for these communities to access advanced energy solutions. This challenge is exacerbated by limited access to affordable financing, which hampers smaller, community-based initiatives from accessing and implementing AI technologies.

Algorithmic Bias & Dependency on Foreign Technology Providers

AI systems may perpetuate existing biases or create new dependencies on foreign technology providers, undermining local autonomy and economic growth. Biases in algorithms, due to inadequate or non-representative datasets, can lead to skewed decision-making, disproportionately disadvantaging marginalised communities. This dependency on external technology providers may hinder the development of local AI ecosystems and limit the region's capacity for sustainable technological innovation. Additionally, the growing divide in AI development between Africa and the rest of the world further exacerbates these issues.

Data Access Gaps

Another critical limitation of AI in Africa's energy sector is the need for reliable data infrastructure. AI systems depend on vast amounts of high-quality, real-time data to function effectively, including data on energy consumption patterns, weather conditions, and grid performance. However, many African regions lack the necessary data infrastructure, including robust data collection and transmission networks.[20] This data gap undermines the potential effectiveness of AI systems, as they require accurate and consistent data inputs to make informed decisions. In rural areas, where internet connectivity and data collection tools are often limited or absent, the integration of AI solutions becomes even more challenging. AI models may produce inaccurate predictions without reliable data, leading to inefficiencies and system failures. Addressing this issue requires substantial investments in building data infrastructure to support AI-driven energy solutions. Many African countries face significant data infrastructure limitations, with gaps in energy use data, renewable resource availability, and socio-economic factors critical to AI training. These data gaps prevent the development of accurate AI models and hinder local capacity to leverage AI for energy management. Moreover, the lack of skilled AI professionals exacerbates reliance on foreign expertise, impeding knowledge transfer and sustainable capacity-building, and limiting data sovereignty.

Environmental Costs of AI Adoption

AI's energy-intensive processes, including data preprocessing, cleaning, and machine learning, contribute to significant environmental costs. As data volumes increase, so too does the demand for computational resources and storage, exacerbating energy consumption and environmental impacts. Without adopting energy-efficient data processing technologies, AI's role in energy management could become counterproductive, increasing energy demand rather than mitigating it.

Limitations to the Scalability of AI-driven Solutions

Scalability also presents a significant challenge to the widespread adoption of AI in Africa's energy sector. While AI-driven solutions have been successfully piloted in specific regions, scaling these systems across the continent poses logistical and operational difficulties. The diversity in energy needs, infrastructure quality, and regulatory environments across African countries means that effective AI solutions in one context may not easily transfer to others. Moreover, scaling AI systems requires ongoing maintenance, updates, and local expertise, which can be scarce in many African regions. The fragmented nature of Africa's energy market, with decentralised and non-standardised energy systems, further complicates the scalability of AI solutions. While AI holds great promise, the logistical and operational challenges to its scalability must be addressed to ensure that it can be effectively implemented across diverse and resource-constrained environments.

Regulatory Challenges & Ethical Guidelines

The lack of clear and comprehensive regulatory frameworks poses a significant barrier to AI adoption in energy systems. Outdated or ambiguous regulations may create uncertainty, deterring investment and facilitating the misuse of AI, such as biased decision-making or breaches in data privacy. The absence of ethical guidelines further complicates the responsible deployment of AI technologies.

To mitigate these risks and support a sustainable and inclusive JET, it is crucial to foster local AI innovation ecosystems by promoting investments in data infrastructure and capacity-building initiatives. Developing ethical guidelines and regulatory frameworks for AI deployment will ensure its responsible use, while bridging Africa's AI skills gap through targeted education and training will support workforce transition goals and foster local ownership of technological solutions.

POLICY RECOMMENDATIONS FOR THE USE OF AI TO ACHIEVE JUST ENERGY TRANSITIONS IN AFRICA

To effectively leverage AI as a catalyst for a JET in Africa, several critical considerations must be prioritised. AI solutions should focus on affordability and accessibility by integrating cost-effective methods for energy access, such as mobile payment platforms for microgrid systems. Concurrently, investing in training programs is essential to build local expertise and equip communities with the skills needed to effectively utilise AI technologies in energy, climate adaptation, and mitigation efforts. Fostering collaboration among governments, the private sector, non-governmental organisations (NGOs), and local communities is fundamental to ensuring the successful implementation of AI initiatives. These partnerships enhance the relevance and effectiveness of AI-driven solutions by aligning them with cultural and community-specific needs.[21] However, emerging challenges must be addressed to fully harness AI's potential for sustainable energy transitions. These include inequitable access to AI technologies, insufficient regulatory frameworks to support AI integration, and inadequate investment in capacity-building initiatives. Without thorough oversight and robust regulations, including consistent monitoring and evaluation, AI risks exacerbating rather than alleviating socioeconomic inequalities and could contribute to increasing emissions rather than mitigating them. The following section presents policy recommendations aimed at addressing these challenges, which are essential to ensuring that AI becomes an equitable and effective tool for driving sustainable energy transitions across Africa.

RECOMMENDATIONS

1. Ensure Equitable Access to AI-Driven Energy Solutions

Governments should prioritise bridging the digital divide by investing in internet access and digital infrastructure in underserved areas, particularly rural regions where AI-driven energy solutions can have the greatest impact. This includes increasing public funding for research and development focused on AI applications in the energy and climate transition sectors. Ensuring equitable access to AI technologies can support the integration of sustainable energy solutions across diverse communities, addressing both energy poverty and socio-economic disparities.

2. Establish Clear AI Regulatory Frameworks

To foster responsible AI deployment, governments must develop and implement clear, up-to-date regulations that address ethical concerns, such as AI transparency, accountability, and fairness in energy distribution. Regulatory frameworks should mitigate risks like job displacement and growing energy inequality, while creating an environment conducive to investment in AI technologies. These frameworks should be aligned with national climate and energy transition goals, ensuring AI's contribution to sustainable and equitable energy systems

3. Invest in Capacity Building & Local Ownership

Governments should invest in comprehensive training programs that build local AI and renewable energy expertise, promoting community ownership of AI technologies. By fostering local knowledge, communities can maintain and adapt AI systems for long-term sustainability. These initiatives should include designing culturally sensitive AI solutions that align with local traditions and involve stakeholders throughout the process, ensuring greater community acceptance and engagement. Additionally, investing in knowledge brokering capabilities will bridge the gap between complex AI outputs and actionable solutions, enhancing resilience and local adaptation.

4. Enhance Data Relevance & Transparency

AI models must be tailored to local energy infrastructure and needs, fostering trust through transparency and relevance. Governments should mandate the inclusion of local communities in the design, implementation, and monitoring of AI energy solutions. Establishing innovation hubs or AI labs to bring together researchers and local experts can promote the development of AI solutions suited to sustainable development. Furthermore, creating open-access climate data repositories and developing sustainable AI infrastructure will enable data-driven AI models to address real-world challenges effectively.

5. Mitigate Job Displacement & Support Green Entrepreneurship

To mitigate job losses from AI adoption in the energy sector, governments should invest in retraining and reskilling programs that help workers transition into green economy roles. AI can drive green entrepreneurship by enabling scalable, sustainable solutions to environmental challenges. By empowering local entrepreneurs, AI can stimulate economic growth, foster innovation, and promote business models that address Africa's environmental needs. Focus should be placed on integrating AI in sectors that complement Africa's diverse resources and ecosystems.

6. Integrate AI into National Energy Planning

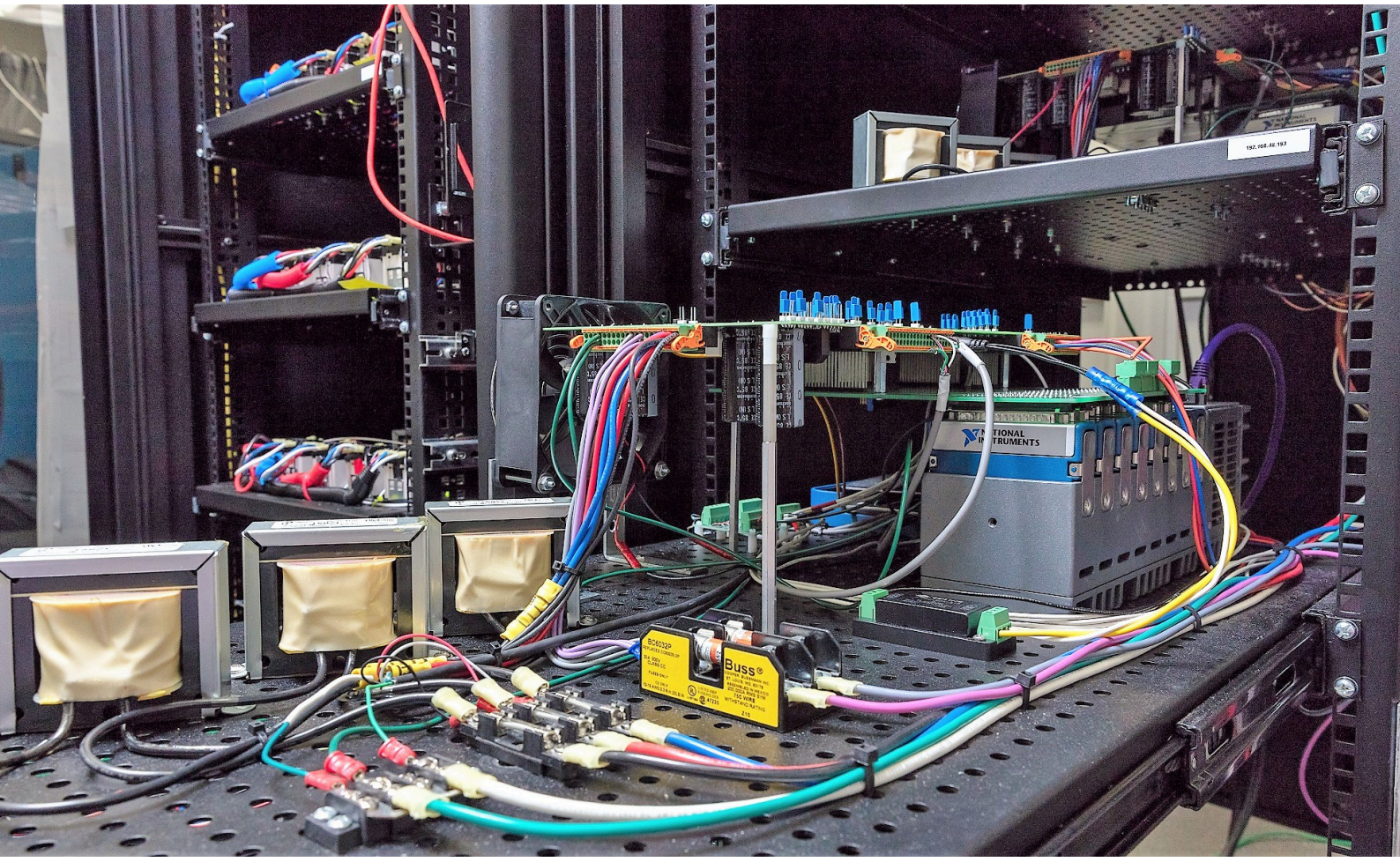
AI should be integrated into national energy planning to improve long-term forecasting, optimise energy storage, and enhance distribution systems. Governments must leverage AI tools, such as climate prediction models and early warning systems, to simulate various energy transition pathways and identify risks. By embedding AI into national energy frameworks, countries can ensure that AI contributes to achieving long-term sustainability, equitable energy access, and climate resilience goals. This will also help optimise decision-making in national energy policies.

CONCLUSION

Artificial Intelligence presents a transformative opportunity for driving a Just Energy Transition in Africa. By leveraging AI's capabilities to enhance energy efficiency, facilitate financing, and optimise planning, stakeholders can develop equitable and sustainable energy solutions that are tailored to local contexts. This approach not only empowers marginalised communities but also ensures that the transition is inclusive, leaving no one behind as Africa moves toward a more resilient and sustainable energy future. Continued dialogue and collaboration are essential to explore the full scope of AI's role in shaping Africa's energy future. Prioritising ethical, culturally sensitive, and accessible AI practices in energy management fosters trust, inclusivity, and sustainable development for all communities.

While AI can significantly advance climate action through optimised energy systems, improved resource management, and accelerated innovation, it is not a silver bullet for solving the climate crisis. The scale of this challenge demands immediate, concrete actions. What we urgently need is not just technological solutions, but a strong commitment from developed countries to provide financial resources, technical support, and capacity-building assistance to help developing countries implement a just energy transition.

Without such commitment, AI and other technologies may prove limited or ineffective, especially in regions facing significant financial and infrastructural barriers. A just energy transition requires a collective effort to ensure all countries, regardless of their development status, can access the tools and resources needed to mitigate climate impacts, adapt to changes, and transition to sustainable, low-carbon economies. The focus must therefore be on creating a framework that guarantees equitable access to both financial means and technological innovations essential for a sustainable and inclusive future.



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