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INTERSECTION OF APPRENTICESHIP CURRICULUM AND THE PRINCIPLES OF CLIMATE JUSTICE AND JUST ENERGY TRANSITION: A UNIQUE OPPORTUNITY TOWARDS A MORE SUSTAINABLE FUTURE IN NIGERIA

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Abstract: The intersection of apprenticeship curriculum and the principles of climate justice and just energy transition represent a unique opportunity to promote a more sustainable future in Nigeria. This paper explores how integrating these principles into apprenticeship programs can equip learners with the skills and knowledge necessary to drive sustainable development and address climate change challenges. By examining current literature and case studies, the paper highlights the benefits of such integration, including the promotion of social equity, environmental sustainability, and economic resilience. The integration of climate justice and just energy transition principles into apprenticeship curriculums represents a critical evolution in vocational training, aligning education with the urgent demands of sustainable development and social equity. This approach aims to blend technical training in renewable energy technologies with comprehensive education on environmental policies and social equity. By incorporating core technical skills, environmental education, and practical experience, apprenticeship programs can empower individuals to participate actively in the green economy, ensuring economic opportunities are accessible to all and promoting environmental stewardship. This article investigates how climate justice and just energy principles can be used to guide and shape the energy transition in Nigeria. The goal is to ensure that the transition is inclusive, sustainable and beneficial for all segments of society. It highlights the need for comprehensive policy frameworks that balance developmental concerns and market creation. The study recommended that Nigeria government should develop a national framework that integrates climate justice and just energy transition principles into apprenticeship curricula. Create a multi-stakeholder task force to oversee the integration process, including representatives from educational institutions, industry, government, and civil society and more.

Keywords: Apprenticeship, Climate Justice, Just Energy Transition

Introduction

As the global community grapples with the escalating challenges posed by climate change, the need for a just energy transition, one that moves from fossil fuels to renewable energy sources while ensuring fairness and equity has become increasingly urgent. The World Health Organization (WHO) in 2015 has referred to climate changes as posited by Saliu (2024) the biggest threat to global public health in the 21st Century having

significant impacts on fundamental aspects of life: i.e. access to clean water, air, food and shelter. This transition necessitates not only technological advancements but also a skilled workforce capable of implementing and maintaining these new systems. In recent years, the global focus on climate change and the urgent need for sustainable development have highlighted the importance of a just energy transition one that not only mitigates environmental impact but also ensures social equity. At the heart of this transition lies the concept of climate justice, which advocates for fair treatment of all people and equitable distribution of the benefits and burdens associated with climate policies and practices (Roberts & Parks, 2007). Now more than ever, the world seems to be coming to a consensus that large-scale and coordinated climate action is the only path to a sustainable future (Onuigbo, 2024). In this context, the development of an apprenticeship curriculum tailored to the principles of climate justice and just energy transition becomes crucial. Climate justice emphasizes addressing the disproportionate impacts of climate change on marginalized communities. The Intergovernmental Panel on Climate Change (IPCC), WHO, and World Meteorological Organization (WMO) having examined the health impact of climate change, came out with a consensus that these effects will intensify with increasing climate change, having disproportionate impacts on vulnerable population groups within and between countries while exacerbating health inequality (Saliu, 2024). Therefore, climate justice focuses on the ethical dimensions of climate change, advocating for policies that address the disproportionate impacts on vulnerable communities. It stresses the need for inclusive and participatory approaches in climate action planning and implementation. By integrating climate justice into apprenticeship programs, trainees can learn not only technical skills but also the importance of social equity and environmental stewardship. University of California Center for Climate Justice maintains that the holistic approach ensures that the transition to a green economy is inclusive and equitable, providing opportunities for all, particularly those from disadvantaged backgrounds (UC Center for Climate Justice). Saliu (2024) points out that although there is a world-wide climate change impact, the degree to which it is experienced differs, with the most vulnerable population groups within the poorer and developing nations expected to feel the most impact.

As nations worldwide embark on ambitious plans to reduce greenhouse gas emissions and transition to renewable energy sources, the role of education and training in this endeavor cannot be overstated. A well-structured apprenticeship curriculum that aligns with the goals of climate justice and just energy transition can play a pivotal role in building a workforce capable of driving sustainable development while ensuring that the benefits of this transition are shared equitably across all segments of society. In recent years, the convergence of apprenticeship curricula and the imperatives of climate justice and just energy transition have emerged as a critical area of study and practice, and the urgent need to address climate change, the demand for a workforce skilled in sustainable practices and green technologies has surged. Several successful models highlight the intersection of apprenticeship curricula with climate justice and just energy transition. For instance, Germany's Dual Education System: Germany’s apprenticeship system includes programs in renewable energy and environmental technology, emphasizing sustainability and ecological responsibility (BIBB, 2023). The UK’s Green Apprenticeships: The UK has introduced green apprenticeships focused on sustainable construction practices and renewable energy installations, aligning training programs with the country’s net-zero goals (National Apprenticeship Service, 2022). The United States of America is not left behind on this. California’s Climate Action Corps: This initiative integrates climate action into vocational training programs, preparing apprentices for careers in sustainability and climate resilience (California Volunteers, 2021). Similarly, South Africa's Renewable Energy Training Program focuses on preparing apprentices for careers in the renewable

energy sector, contributing to both economic growth and environmental protection (Baker, 2016). Thus, apprenticeship curriculum for a sustainable future becomes inevitable in the developing countries like Nigeria. Apprenticeship programs traditionally focus on hands-on training and skill development. Incorporating principles of climate justice and just energy transition principles into Core Curriculums Minimum Academic Standard (CCMAS) can prepare workers for roles in renewable energy, energy efficiency, and other green industries. The Nigerian University Commission (NUC) has the obligation to introduce intersection of apprenticeship curriculum and principles of climate justice and just energy transition into tertiary institutions. In line with World Economic Forum, apprenticeships in renewable energy sectors such as solar and wind power are expanding rapidly, driven by the need for a skilled workforce to support the global shift away from fossil fuels (WEF, 2023). These programs are designed to provide learners with direct experience and practical skills in their chosen fields. International Renewable Energy Agency (IRENA) (2020) posits that by incorporating climate justice and just energy transition principles, these programs can prepare apprentices to address and mitigate the impacts of climate change while promoting fairness and equity. This approach can be particularly effective in sectors such as renewable energy, construction, agriculture, and manufacturing, where sustainable practices are crucial.

Apprenticeship programs, traditionally designed to meet the needs of specific industries, must now adapt to the evolving demands of the green economy. This adaptation involves not only updating technical skills but also fostering a commitment to sustainability and equity. Integrating climate justice principles into apprenticeship curricula ensures that future workers are not only proficient in their trades but also advocates for fair and inclusive energy policies (Sovacool, Martiskainen, Hook & Baker,. 2021). Smith (2020) opine that apprenticeship curricula focused on imparting specific vocational skills, must evolve to meet this demand by integrating principles of climate justice and sustainability. An apprenticeship curriculum designed for a just energy transition must encompass the skills and knowledge required to support sustainable energy solutions while also addressing the socio-economic dimensions of this transition. It should integrate technical training in renewable energy technologies, energy efficiency, and sustainable practices with an understanding of the broader societal impacts, including job creation, community resilience, and economic justice (ILO, 2020). By equipping apprentices with both technical competencies and an awareness of climate justice, such a curriculum can contribute to a more inclusive and equitable energy transition. Furthermore, the transition to a low-carbon economy presents an unprecedented opportunity to remagine workforce development and education systems (European Commission, 2020). The integration of climate justice and just energy transition into apprenticeship curricula represents a significant shift in how vocational training is designed and delivered. It calls for a holistic approach that combines technical training with education on social and environmental issues, thereby preparing apprentices to contribute to a sustainable and equitable future. This approach is not only essential for addressing the global climate crisis but also for ensuring that the transition to a green economy is inclusive and just for all stakeholders involved. Apprenticeship programs, which were centered on trade skills and vocational training, should be reconceptualized to include competencies that support environmental sustainability and equitable energy transitions.

The need for a climate justice and just energy transition, one that moves from fossil fuels to renewable energy sources which ensures fairness and equity has become increasingly urgent in our society. Consequently, so many countries have achieved tremendous successes in intersection of apprenticeship curriculum and principles of climate justice and just energy transition as recorded above. This has been the motivation and

ambition of this research to expose to the government, NUC, leaders and administrators of tertiary institutions and stakeholders the need to quickly introduce apprenticeship curriculum and principles of climate justice and just energy transition into the CCMAS as plans to train skilled workforce that will help to reduce greenhouse gas emissions and transition to renewable energy sources. This is the role of education and training in this endeavor cannot be overstated. Therefore, it is the objective of this study to investigate and develop a comprehensive framework for integrating climate justice and just energy transition principles into apprenticeship curricula in Nigeria, with the aim of creating a skilled workforce that supports sustainable development and equitable energy practices. The research will focus on identifying the key components and practical strategies required to align apprenticeship programs with climate and energy transition goals, ultimately contributing to a more sustainable and just future for Nigeria.

Climate Justice: Climate Justice emphasizes the fair treatment of all people and communities in the development and implementation of climate policies. It transcends mere reductions in greenhouse gas emissions and decarbonization. Instead, it underscores the importance of addressing the root cause and disproportionate impacts faced by vulnerable frontline communities due to climate change and fossil fuel pollution (Saliu, 2024). According to Kinol, Miller, Axtell, Hirschfeld, Leggett, Yutong, and Stephens (2023) the inadequacy of climate action over the past decade underscores the need for a more comprehensive approach to transformation. It reiterates that climate justice encompasses not only the origins and consequences of climate change but also the preservation of infringement of human rights and justice. It seeks to ensure that marginalized and vulnerable groups, often disproportionately affected by environmental degradation and climate change, have equitable access to the benefits of clean energy and resilient infrastructure (Newell and Mulvaney 2013, Swilling, Musango and Wakeford, 2015). When the climate action plans and policies of universities focus on technology-based mitigation which, like the climate action plans of so many other organizations and jurisdictions, fail to consider equity and systemic change, climate injustices are exacerbated (Kinol et. al., 2023). Integrating climate justice principles ensures that these programs also address the disproportionate impact of climate change on marginalized communities (Schlosberg & Collins, 2014). Furthermore, climate justice emphasizes the ethical and political aspects of climate change, advocating for the fair treatment of all people and ensuring that marginalized and vulnerable communities do not bear the brunt of environmental degradation. Kinol, et. al. (2023) further states that climate justice provides a framework for understanding the distribution of benefits and burdens associated with greenhouse gas mitigation, the allocation of responsibility and capacity to address climate change, and strategies to alleviate the disproportionate burden on the most vulnerable populations globally. Therefore, integrating climate justice into apprenticeship curricula involves embedding principles of equity, social responsibility, and environmental stewardship into training programs. This approach not only prepares apprentices for the technical demands of green jobs but also fosters a deeper understanding of the socio-environmental dimensions of their work (Bulkeley et al., 2023). Climate justice, on the other hand, highlights the need to balance the mitigation of climate impacts with the imperative of social equity. This social equity cannot be achieved without a just energy transition.

Just Energy Transition: Just energy transition refers to the shift from fossil fuel-based energy systems to renewable energy sources in a way that ensures social justice, fairness and inclusive, ensuring that the benefits and burdens of this transition are distributed equitably (Schlosberg, 2013). The concept of a just energy transition emphasizes the equitable distribution of the benefits and burdens associated with energy shifts. It

seeks to address historical injustices and ensure that marginalized communities are not disproportionately affected by the changes. Just energy transition involves creating new opportunities for workers in the renewable energy sector while addressing the potential socioeconomic impacts on communities dependent on traditional energy industries. It emphasizes the creation of green jobs, the protection of workers' rights, and the provision of training and reskilling opportunities for those affected by the transition. Furthermore, the just energy transition emphasizes the shift towards renewable energy sources and the creation of green jobs, which can be facilitated through targeted apprenticeship training (Healy & Barry, 2017).

Apprenticeship programs are pivotal in this transition, as they equip individuals with the necessary skills to thrive in a rapidly evolving energy landscape. Research indicates that apprenticeships are vital for equipping individuals with practical skills and competencies that align with industry demands (Ryan, 2020). By incorporating renewable energy technologies, sustainable practices, and community engagement into their curricula, apprenticeship programs can contribute to a workforce that is not only technically proficient but also aligned with the principles of just energy transition (Heffron & McCauley, 2022). A just energy transition as maintained by World Economic Forum, aims to move from fossil fuels to renewable energy sources in a way that is fair to workers and communities affected by this shift. Apprenticeship programs can play a critical role in this by offering reskilling and up skilling opportunities for workers transitioning from traditional energy sectors to new sustainable industries. This ensures that the transition does not lead to job losses but rather to the creation of new, sustainable employment opportunities (WEF, 2023). A just energy transition focuses on shifting from fossil fuels to renewable energy sources in a way that is fair and inclusive, providing opportunities for all workers and communities. Together, these concepts advocate for an inclusive approach to sustainability that accounts for social, economic, and environmental dimensions. Recent studies underscore the importance of integrating these principles into educational frameworks. According to the International Labour Organization (ILO), the transition to a greener economy could create 24 million new jobs globally by 2030, provided that the right policies are in place, including those focused on education and training (ILO, 2018). Similarly, research by the International Renewable Energy Agency (IRENA) highlights the critical role of education in equipping the workforce with the necessary skills for renewable energy sectors (IRENA, 2020). This paper argues that apprenticeship programs are uniquely positioned to bridge the gap between the current workforce's capabilities and the skills required for a sustainable future. By embedding climate justice and just energy transition principles into their curricula, these programs can produce a generation of workers who are not only technically proficient but also environmentally conscious and socially responsible. Such an approach not only addresses the immediate technical needs of the green economy but also fosters a culture of sustainability and equity, essential for long-term global resilience.

Integrating Climate Justice and Just Energy Transition Principles into Apprenticeship Curriculum

Apprenticeship programs are vital for workforce development, providing hands-on training and skills acquisition in various trades and professions. Globally, the higher education sector is being challenged to respond and innovate to contribute more to climate justice and global sustainability (Steele and Rickards 2022; UNESCO 2022), yet as the climate crisis intensifies, it is increasingly clear that higher education's commitment to climate justice is insufficient (UNESCO 2022). Through a commitment to advancing transformative climate justice, colleges and universities around the world could realign and redefine their priorities in teaching, research, and community engagement to shape a more just, stable, and healthy future (Kinol et. al, 2023). With growing recognition that the climate crisis is a symptom of larger socioeconomic and

political dysfunction, a climate justice approach embraces a transformative lens focused on social and financial innovation, which is a paradigm shift from the more mainstream technocratic way of conceptualizing climate "solutions" (Sultana, 2022).

Be that as it may, United Nations Environment Programme maintains that these programs are particularly effective in bridging the gap between education and employment, offering practical experience alongside theoretical learning (UNEP, 2021). For a better integration of Climate Justice and Just Energy Transition into apprenticeship curriculum, Nigerian University Commission (NUC) in the new Core Curriculum and Minimum Academic Standard (CCMAS) develop or design transformative curricula that accommodate climate justice and just energy transition for all the disciplines offered in the universities all over the country. This is to remedy the inequitable climate vulnerabilities increase, which higher education has multiple emerging opportunities to resist, reverse, and repair climate injustices and related socioeconomic and health disparities (Kinol et. al.,2023). The NUC should develop curriculum that support this transition through:

1 Curriculum Design: An apprenticeship curriculum that integrates climate justice and just energy transition should include:

- **Assess Current Apprenticeship Curricula:** Evaluate existing apprenticeship programs in Nigeria to identify gaps and opportunities for incorporating climate justice and just energy transition principles and analyze how current curricula address or neglect sustainability and equity issues related to climate and energy.
- **Core Technical Skills:** Training in renewable energy technologies, such as solar, wind, and hydroelectric power, as well as energy efficiency and sustainable building practices.
- **Environmental Education:** Courses on climate science, environmental policy, and the social impacts of climate change to provide a comprehensive understanding of the issues at hand.
- **Equity and Inclusion:** Modules that address the social dimensions of the energy transition, including the impacts on marginalized communities and strategies for ensuring that the benefits of the green economy are widely shared.
- **Practical Experience:** Hands-on training and real-world projects that allow apprentices to apply their skills in sustainable practices and technologies.
- **Identify Key Principles and Competencies:** Define the core principles of climate justice and just energy transition relevant to Nigeria's context. And determine the competencies and skills needed to effectively address these principles within apprenticeship training.

2 Develop Curriculum Framework and modules:

Create a detailed framework for integrating climate justice and energy transition principles into apprenticeship curricula, including curriculum modules, teaching materials, and assessment methods. Ensure that the framework includes practical, hands-on training components and aligns with national sustainability and energy policies. Integrating principles of climate justice and just energy transition into apprenticeship curriculums involves developing modules that focus on sustainable practices, renewable energy technologies and the social impacts of climate change (Carley and Konisky, 2020),. These modules should cover topics such as energy efficiency, sustainable construction, and the socio-economic implications of energy transitions. Embedding ethical considerations which including modules on the ethical implications of environmental decisions and the importance of equitable resource distribution.

3 Skills Training: Apprentices should be trained in green skills, including the installation and maintenance of renewable energy systems, energy auditing, and sustainable agriculture (ILO, 2019). This training will prepare

them for the emerging green economy and ensure they can contribute to sustainable development. The transition to a sustainable energy system requires a specialized training in solar, wind, and other renewable energy technologies, workforce equipped with specialized skills in renewable energy, energy efficiency, and sustainable practices. Apprenticeship programs should include training on these technologies and practices, preparing workers for the emerging green jobs market.

4 Community Engagement: Hall and Weiss (2012) maintain that apprenticeship programs should include components that involve community engagement and outreach. This approach will help apprentices understand the local impacts of climate change and energy transitions and involve them in community-driven sustainability projects. Furthermore, community engagement projects will encourage apprentices to work on projects that directly benefit disadvantaged communities, thus promoting social equity. Community engagement will also foster diverse representation, ensuring that apprenticeship programs are accessible to individuals from diverse backgrounds, particularly those from communities disproportionately affected by climate change

5 Pilot and Evaluation: Implement pilot programs based on the developed framework in selected regions or sectors to test its effectiveness and relevance. Collect data on the outcomes of the pilot programs, including apprentices' knowledge, skills, and attitudes towards climate justice and energy transition.

6 Policy Advocacy and Support: This is developing strategies to advocate for policy changes and institutional support to sustain and expand the integration of these principles into apprenticeship training. Highlight successful case studies and best practices to encourage broader adoption and support from government bodies, educational institutions, and industry stakeholders. Incorporating apprenticeship curriculums into education policy can empower apprentices to advocate for climate justice and just energy transition policies. Governments can incentivize the integration of climate justice and just energy transition principles through funding and regulatory frameworks. In line with Mark, Musango and Wakeford (2015) understanding the policy landscape will enable them to participate in decision-making processes and champion sustainable practices within their industries. Effective policies and collaborative efforts between governments, educational institutions, and industries are essential to support the integration of these principles into apprenticeship curriculums. Initiatives like the European Union's Green Deal, which includes mechanisms to ensure a just transition, highlight the importance of policy support in driving these changes (WEF, 2023).

Practical Steps for integrating climate justice and just energy transition principles into apprenticeship programs.

The intersection of apprenticeship curriculum and the principles of climate justice and just energy transition offer a unique opportunity to shape a workforce that is both skilled and socially responsible. As we move towards a more sustainable future, integrating climate justice and just energy transition principles into apprenticeship programs is essential. Here are the practical steps:

Identify Key Principles and Competencies: Define the core principles of climate justice and just energy transition relevant to Nigeria's context. Determine the competencies and skills needed to effectively address these principles within apprenticeship training.

Curriculum Development: Collaborate with industry leaders, educational institutions, and community organizations to develop a curriculum that incorporates climate justice and just energy transition principles and ensure the curriculum is dynamic, reflecting the latest advancements in technology and sustainability practices.

Engage Stakeholders: Conduct interviews, surveys, and focus groups with key stakeholders, including educators, industry professionals, community leaders, and policy makers, to gather insights on integrating climate justice and energy transition into apprenticeships. Assess the perspectives and recommendations of these stakeholders on curriculum development and implementation.

Partnerships and Funding: Establish partnerships with governments, NGOs, and private sector entities to secure funding and resources for apprenticeship programs. Leverage these partnerships to provide apprentices with hands-on experience in real-world projects that promote sustainability and equity. Partnering with companies in the renewable energy sector will ensure that apprentices have access to employment opportunities.

Mentorship and Support: Provide apprentices with mentors who are experienced in sustainability and climate justice to guide their development and career progression. Offer support services, such as career counseling and job placement assistance, to help apprentices navigate the green job market. These processes have been tried by some other countries who are proponents of climate justice and just energy transition. For instance according to Hippach-Schneider and Huismann (2020) Germany's dual education system is a model for integrating sustainability into vocational training. The system combines classroom instruction with on-the-job training in green technologies and sustainable practices, preparing apprentices for careers in the renewable energy sector. In the same way South Africa's Green Economy Accord highlights the importance of skills development in achieving a just energy transition. The accord includes commitments to train workers in renewable energy and energy efficiency, ensuring that the benefits of the green economy are broadly shared (South African Government, 2011).

Benefits of Integrating Principles of Climate Justice and Just Energy Transition into Apprenticeship Curriculum

Promoting Equity and Inclusion: Climate justice emphasizes the fair distribution of environmental benefits and burdens, ensuring that marginalized communities are not disproportionately affected by climate change. By incorporating these principles into apprenticeship programs, we can ensure that all communities have access to new job opportunities in the green economy, helping to alleviate historical inequalities.

Preparing a Diverse Workforce and Industry Collaboration: An apprenticeship curriculum focused on climate justice can attract a diverse group of apprentices, including those from underrepresented communities. This diversity can foster a more inclusive and innovative workforce, capable of addressing the complex challenges of climate change. Partnering with industries committed to sustainability can provide apprentices with real-world experience and job opportunities.

Raising Awareness and Responsibility: Embedding climate justice into training can instill a sense of responsibility and awareness in apprentices about the social and environmental impacts of their work. This awareness can lead to more conscientious decision-making and practices that prioritize sustainability and equity.

Supporting Economic Resilience: A just energy transition seeks to ensure that workers in traditional energy sectors are not left behind and as the green economy grows, it creates new job opportunities. Apprenticeship programs can play a critical role in reskilling and up skilling (providing current workers, especially those from the fossil fuel industry, with the skills needed to transition to new roles in the green economy), these workers.

By providing pathways for existing workers to transition into new roles within the green economy, this can support economic resilience and stability, promoting economic inclusion and social equity.

Fostering Innovation: Apprenticeships that emphasize sustainable practices and technologies can encourage innovation and the development of new solutions to energy and environmental challenges. This focus can drive advancements in renewable energy, energy storage, and other key areas, contributing to a more sustainable and just future.

Conclusion

Integrating climate justice and just energy transition into apprenticeship curriculums is not just a forward-thinking approach or just a moral imperative; it is a necessary step toward a sustainable future and a strategic approach to building a resilient and equitable workforce for the future. By aligning vocational training with the urgent demands of climate action and social justice, we can create a workforce capable of driving the green economy and ensuring that the benefits of this transition are shared by all. This also entails equipping apprentices with the skills and awareness needed to contribute to a sustainable economy; we can ensure that the transition to a greener world is just an inclusive for all. This approach not only addresses the technical and economic aspects of sustainability but also champions the ethical and social dimensions, fostering a holistic and inclusive path to a better future through education. Integrating the principles of climate justice and just energy transition into apprenticeship curricula presents a unique and timely opportunity to develop a workforce that is equipped to tackle the environmental challenges of the 21st century. By fostering ethical, equitable, and sustainable practices our tertiary institutions, these programs can play a critical role in advancing a more sustainable future. In conclusion, aligning apprenticeship curricula with the principles of climate justice and just energy transition offers a pathway to sustainable development in Nigeria. By equipping learners with relevant skills and knowledge, these programs can contribute to a more equitable, resilient, and environmentally sustainable future.

Recommendations

1) **Develop a national framework:** Nigeria University Commission (NUC) should develop a framework that integrates climate justice and just energy transition principles into apprenticeship curricula. This involves collaborating with industry stakeholders, educational institutions, and policymakers to ensure that training programs are relevant and forward-looking. Additionally, investing in infrastructure and resources to support green apprenticeships can enhance their effectiveness and reach. Promoting public awareness and support for these initiatives is also crucial for their success.
2) **Form a Task Force:** Create a multi-stakeholder task force to oversee the integration process, including representatives from educational institutions, industry, government, and civil society.
3) **Secure Funding:** Explore funding opportunities from government grants, international organizations, and private sector partnerships to support curriculum development and implementation.
4) **Launch Pilot Programs:** Begin with a phased approach, starting with pilot programs to demonstrate success and refine the approach before broader rollout.

References

Baker, L. (2016). The evolving role of finance in South Africa's renewable energy sector. Energy Research Centre, University of Cape Town.

BIBB (2023). The role of Germany's dual education system in promoting sustainable development. https://www.researchgate.net/publication/333519110

Bulkeley, H., Edwards, G. A. S., & Fuller, S. (2023). Climate justice and energy transitions: Understanding the challenge of inclusive decarbonization. Earthscan.

California Volunteers (2021). Climate action corps: Integrating climate action into vocational training. https://www.californiavolunteers.ca.gov

Carley, S., & Konisky, D. M. (2020). The Justice and Equity Implications of the Clean Energy Transition. Nature Energy, 5(8), 569-577.

European Commission (2020). European Skills Agenda for Sustainable Competitiveness, Social Fairness, and Resilience.

Hall, D., & Weiss, T. (2012). Community-Based Sustainability Initiatives: What it takes to Succeed. Sustainability, 4(4), 572-589.

Healy, N., & Barry, J. (2017). Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition". Energy Policy, 108, 451-459.

Heffron, R. J., & McCauley, D. (2022). Just transitions and the future of energy: A critical justice perspective. Palgrave Macmillan.

Heffron, R. J., & McCauley, D. (2018). What is the 'Just Transition'? Geoforum, 88, 74-77.

Hippach-Schneider, U., & Huismann, A. (2020). Vocational Education and Training in Germany: Short Description. Cedefop.

ILO (2018). World Employment and Social Outlook 2018: Greening with Jobs. Retrieved from https://www.ilo.org/wesogreening

ILO (2019). Skills for a Greener Future: A Global View. International Labour Organization.

ILO (2020). Skills for a greener future: A global view. Retrieved from https://www.ilo.org/skills/WCMS_723593/lang--en/index.htm

International Renewable Energy Agency (IRENA). (2020). Renewable Energy and Jobs – Annual Review 2020. Retrieved from https://www.irena.org/jobs

Kinol, A. Miller, E., Axtell, H., Hirschfeld, I., Leggett, S. Yutong, S. & Stephens, J.C.(2023).Climate justice in higher education: a proposed paradigm shift towards a transformative role for colleges and universities. Springer Link Journal https://link.springer.com/article/10.1007/s10584-023-03486-4

Mark S., Musango, J. & Wakeford J. (2015). Developmental states and sustainability transitions: prospects of a just transition in South Africa" Journal of Environmental Policy & Planning, Volume 17, Issue 5, on pages 650-672.

National Apprenticeship Service (2022). Green apprenticeships in the UK: Aligning training with Net-Zero Goals. https://researchbriefings.files.parliament.uk

Newell, P., & Mulvaney, D. (2013). The political economy of the 'Just Transition'. The Geographical Journal, 179(2), 132-140.

Onuigbo, S. (2024). Climate Act: Implication for climate action in Nigeria. Key address delivered at maiden climate justice and just energy transition conference in honour of Prof. Chinedu Nwajiuba @60 on 16-17 July, 2024.

Roberts, J. T., & Parks, B. C. (2007). A climate of injustice: Global inequality, North-South politics, and climate policy. MIT Press.

Ryan, P. (2020). Apprenticeship: The Economics of an Institution. IZA World of Labor.

Saliu, N. B. (2024). The core curriculum and minimum academic standard: The role of NUC in mainstreaming climate change mitigation and justice in university education in Nigeria. Key address delivered at maiden climate justice and just energy transition conference in honour of Prof. Chinedu Nwajiuba @60 on 16-17 July, 2024.

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: Climate change and the discourse of environmental justice. Wiley Interdisciplinary Reviews: Climate Change, 5(3), 359-374.

Schlosberg, D. (2013). Theorizing environmental justice: The expanding sphere of a discourse. Environmental politics, 22(1), 37-55.

Smith, E. (2020). Apprenticeship and vocational education and training in the context of the Coronavirus (COVID-19) Pandemic. International Journal of Training Research, 18(3), 208-221.

South African Government (2011). Green Economy Accord.

Sovacool, B. K., Martiskainen, M., Hook, A., & Baker, L. (2021). Decarbonization and its discontents: A critical energy justice perspective on four low-carbon transitions. Climatic Change, 155(2), 391-412.

Steele W, Rickards L (2022). The sustainable development goals in higher education: A transformative agenda? Cham, Switzerland: Palgrave Macmillan. https://link.springer.com/book/10.1007/978-3-030-73575-3

Sultana F (2022) Critical climate justice. Geogr J 188(1):118–124 .https://doi.org/10.1111/geoj.12417

Swilling, M., Musango, J., & Wakeford, J. (2015). Developmental states and sustainability transitions: Prospects of a just transition in South Africa. Journal of environmental policy & planning, 17(5), 650-672.

UNESCO (2022) Knowledge-driven actions: transforming higher education for global sustainability. https://unesdoc.unesco.org/ark:/48223/pf0000380519. Accessed 8 Jul 2022

UNEP (2021). Emissions Gap Report 2021. United Nations Environment Programme.

University of California Center for Climate Justice (UC Center for Climate Justice): What is climate justice? https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/#just- transition

World Economic Forum (2023). How to ensure a just transition to a green economy Sep 6, 2023