

Mitigating the Impacts of the Energy Transition on Vulnerable Communities

1. Introduction

The need to minimise carbon emissions has become exigent as human-induced climate change continues to wreak havoc on ecosystems, biodiversity, habitats, and humans. The dependence of the global energy system on fossil fuels remains a major contributor to carbon emissions and climate change; hence, the need to transition to low/ zero carbon energy sources such as renewable energy. However, the transition to renewable energy sources has its adverse impacts, particularly as it relates to vulnerable groups such as workers, host communities, and indigenous groups. To mitigate the adverse impacts of the transition to renewable energy sources, the transition should be undertaken within the confines and principles of energy justice and just transition.

The first section of this paper evaluates the need for energy transition. The second section highlights the adverse impacts of the energy transition on vulnerable groups. The third section analyses how the principles of energy justice and just transition can be implemented to mitigate the impacts of the transition on vulnerable groups.

2. Imperatives of the Energy Transition

The devastating impacts of climate change are no longer a future prediction but have become a daily reality for the planet. The Intergovernmental Panel on Climate Change (IPCC) has warned that the planet now faces severe adverse impacts from human-induced climate change, which has resulted in the degradation of the environment, loss of habitats, damage to ecosystems, frequent natural disasters such as hurricanes, wildfires, and flooding, rise in sea levels, melting of the Arctic, desertification, and famine.¹ An estimated one million plant and animal species are threatened with extinction due to climate change.² Also, at the current rate of carbon emissions, a third of plant and animal species are projected to become extinct by 2050.³

These occurrences are traceable to the unsustainable consumption of fossil fuels in the global energy systems. Fossil fuels still account for 82% of global energy consumption, including for electricity and heating as well as transportation – encompassing vehicles, shipping, aviation as well as space travel.⁴ Whilst most attention is paid to fossil fuel usage in energy consumption

¹ H.O. Pörtner et al (eds.), 'IPCC, 2022: Summary for Policymakers'. In: H.O. Pörtner et al (eds.), *Climate Change 2022: Impacts, Adaptation and Vulnerability (Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 2022) 9

² UN, UN Report: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating' available at: <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/> accessed 16 April 2024

³ Centre for Biological Diversity, 'Global Warming and Endangered Species Initiative' available at: https://www.biologicaldiversity.org/campaigns/global_warming_and_endangered_species/ accessed 16 April 2024

⁴ R Rapiet, 'Global Energy Trends: Insights From The 2023 Statistical Review Of World Energy' available at: <https://www.forbes.com/sites/rrapiet/2023/08/06/global-energy-trends-insights-from-the-2023-statistical-review-of-world-energy/> accessed 16 April 2024

and transportation, other sectors that contribute significantly to carbon emissions include construction, agriculture, manufacturing, technology, and international trade (e.g. fast fashion).⁵

Renewable energy development has been identified as being germane to reducing carbon emissions.⁶ This entails the development of energy from renewable sources such as solar, wind, hydro-energy, bioenergy, and geothermal.

Whilst renewable energy sources have low carbon emission potentials compared to fossil fuels, are generally better for the planet, they also adversely impact the environment, social structure, and economy. Similarly, the transition to renewable energy will impact various groups differently. Understanding the adverse impacts of the energy transition is essential to prevent or mitigate them. It is also necessary to influence the development of impact assessment regulations and standards as well as to prevent energy injustices occasioned by previous transitions.

3. Analysing the Environmental, Socio-cultural and Economic Impacts of the Energy Transition

3.1 Environmental Impacts

As mentioned earlier, the development of renewable energy is not environmentally benign. For instance, cultivating biofuel crops such as sugarcane to produce biofuel requires significant volumes of water.⁷ This significant water requirement can result in shortage of water supply for other users especially livestock and domestic users, thereby forcing women and girls in rural communities to travel long distances in search of water.⁸ In the US, for example, the production of less than 1 US gallon (3.8 litres) of bioethanol consumes between 3 – 7 US gallons (13 – 28 litres) of water, while an estimated 800 tonnes of water are required to grow a tonne of sugarcane.⁹ Emphasis on the production of biofuel crops will threaten food security and access to water.

⁵ Xavier Rixhon et al, 'Integration of Non-Energy Among the End-Use Demands of Bottom-Up Whole-Energy System Models' (2022) 10 *Frontiers in Energy Research* 1

⁶ A. Suman, 'Role of Renewable Energy Technologies in Climate Change Adaptation and Mitigation: A Brief Review from Nepal' (2021) 151 *Renewable and Sustainable Energy Reviews* 1

⁷ Asia Pacific Energy Research Centre, *A Quest for Energy Security in the 21st Century: Resources and Constraints* (APERC, 2007) 31

⁸ Danielle Gent and Julia Tomei, 'Responding to Global Energy Paradigms? Electricity Reforms in Central America' in Julia Tomei and Danielle Gent (eds.) *Equity and the Energy Trilemma: Delivering Sustainable Energy Access in Low-Income Communities* (International Institute for Environment and Development, 2015) 18

⁹ APERC (n 7) 32

Although it may be considerably low on GHG potential, renewable energy developments do not eliminate environmental pollution.¹⁰ The production and transportation of renewable energy technology equipment contribute to emissions.¹¹ The production of photovoltaic (PV) cells for solar panels generates harmful pollutants affecting water and air quality.¹² Some countries may incur the adverse effects of the production of renewable energy technology while another country benefits from its utilisation. This is underscored by the production of renewable energy facilities for developed countries by companies in developing countries in Asia.¹³ For instance, while wind energy may be beneficial for electricity production in countries such as the UK, the production of wind turbines has occasioned the outsourcing of significant amounts of emissions to China and South Korea.¹⁴

3.2 Social Impacts

The siting of large hydroelectricity projects in most rural indigenous communities with predominantly agrarian and fishing population, have dire consequences for their livelihoods.¹⁵ Apart from the risk of overflowing dams flooding their farmlands and homes, there is also the mass migration of fishes and loss of aquatic biodiversity.¹⁶ This was the situation in the United States when the reservoir of Dalles Dam on the River Columbia flooded the neighbouring Celilo village, a predominantly fishing settlement and cultural village, forcing residents to flee their ancestral homes and livelihood.¹⁷ It is suggested that while hydroelectricity comes with many benefits for the wider society and indeed the country, the cost to the indigenous community is unquantifiable.¹⁸ Entire communities may be displaced and ancient histories, cultures and traditions permanently distorted.¹⁹ Local populations are not consulted before or during construction and operation of dams; and are forcefully displaced without adequate resettlement plans.²⁰

3.3 Economic Impacts

As noted earlier, the large-scale deployment of hydroelectricity can result in dislodging aquatic habitats and human communities (through involuntary resettlement).²¹ This can tremendously affect the economies of riverine communities whose residents depend on fishing as their

¹⁰ National Academy of Engineering and Chinese Academy of Sciences, *The Power of Renewables: Opportunities and Challenges for China and the United States*, (National Academies Press, Washington 2010), 89

¹¹ *ibid*

¹² *ibid*

¹³ Benjamin K. Sovacool, et al, 'New Frontiers and Conceptual Frameworks for Energy Justice' (2017) 105 Energy Policy 677, 684

¹⁴ NAE (n 10)

¹⁵ *ibid*102

¹⁶ See William L Lang, 'The Meaning of Falling water: Celilo Falls and the Dalles in Historical Literature' (2007) 108 Oregon Historical Quarterly 577

¹⁷ *Ibid*

¹⁸ *Ibid*

¹⁹ *Ibid*

²⁰ Benjamin Sovacool, Matthew Burkec, Lucy Baker, Chaitany Kumar Kotikalapudi, Holle Wlokas, 'New Frontiers and Conceptual Frameworks for Energy Justice' (2017) 105 Energy Policy 677, 686

²¹ *ibid*

livelihood. The disruption in fishing will affect not only the fishermen and their households but also the operators of seafood shops, restaurants, and seafood transporters. This may force coastal residents to migrate to urban cities to seek employment.

The transition to renewable energy will lead to loss of jobs in the fossil fuel sector. Whilst the renewable energy sector contributes to the creation of new jobs, there is need to support those affected by the transition as this will promote a people-centred energy transition that is fair and just.

4. Towards a Just Energy Transition for Vulnerable Groups

The transition to low/zero carbon energy must be undertaken within the principles of energy justice to achieve a just energy transition. Drivers of the energy transition such as governments, policy makers and renewable energy developers need to implement people-centred just transition programmes. For renewable energy projects to gain acceptance from workers, host communities, and indigenous groups, there is a need for stakeholder engagement. This entails engaging with these vulnerable groups to understand how the project will affect them and designing the project to mitigate these adverse impacts. Moreover, the interests of older people, women, children, and people living with a disability should also be protected during these conversations to facilitate social inclusion. Vulnerable groups should be supported in the transition.

4.1 Workers

The transition to low/ zero carbon energy will undoubtedly lead to the loss of jobs for workers in the fossil fuel industry as well as other sectors of the economy that rely on the fossil fuel industry.²² This will affect direct jobs in the upstream, midstream, and downstream sectors such as rig engineers and technicians, forepersons, pipeline technicians, gas engineers, diesel and petrol vehicle mechanics, petroleum tanker drivers, operations, maintenance, and indirect jobs such as hotel and restaurants, fuel station attendants, schools, and other businesses in fossil fuel host communities. Nevertheless, the renewable energy sector has been shown to create more jobs.²³ Therefore, there is a need to provide retraining and upskilling to former fossil fuel sector workers to equip them with the requisite skill and training to secure employment in the renewable energy sector. Moreover, where there are transferable skills from fossil fuel jobs, such skills should be encouraged in the transition. A challenging aspect of the transition of jobs from the fossil fuel industry to renewable energy is how the years of experience gained in fossil fuel jobs will be quantified when transferred to renewable jobs. Most renewable jobs require the use of modern technology, automation, computer programmes and artificial intelligence (AI), whereas most fossil fuel jobs require a hands-on approach. Thus, there is a need to provide adequate on-the-job training to enable transitioned workers to adapt to the new technologies.

²² Martin Černý et al, *Employment Effects of the Renewable Energy Transition in the Electricity Sector: An Input-Output Approach* (ETUI aisbl, 2021) 4

²³ *ibid*

Labour laws should be strengthened to prevent discrimination against former fossil fuel workers.

4.2 Host communities

Communities where the fossil fuel industry operates enjoy various kinds of support from the sector.²⁴ Community benefits from fossil fuel companies include the construction and maintenance of community centres, road constructions, provision of potable drinking water, connection to electricity service, construction of educational infrastructures such as classroom blocks, libraries and computer centres, scholarships for students, financial grants for indigent households, jobs for local residents, royalty grants to traditional institutions, and primary health centres. Therefore, the transition to low/ zero carbon energy will lead to the discontinuation of these benefits that accrue to host communities from fossil fuel companies.

To promote a just energy transition, there is need to undertake an energy transition impact assessment on fossil fuel host communities. This will ensure that measures are introduced to mitigate the adverse impacts of the transition on host communities. Furthermore, this will enable governments to develop a robust transition programme that will assist in mitigating the effects of the transition on host communities.

It is important to note that not all fossil fuel host communities have benefitted from fossil fuel activities in their locale. For instance, petroleum production in Ogoni land, Nigeria has been characterised by monumental environmental pollution of farmlands and watercourses, resulting in the destruction of lives and property.²⁵ Therefore, where a fossil fuel host community has suffered environmental degradation from the activities of the company, there is need for environmental remediation and compensation for the victims as part of the transition. Thus, to promote just transition, there is need to embed restorative justice energy transition law and policy.

4.3 Indigenous peoples

The development of energy infrastructure in most indigenous communities has been characterised by non-recognition of the peculiar features of the indigenous groups such as traditional monuments, shrines, ancestral graveyards, scenic views, and cultural sites.²⁶ Ancestral lands have been compulsorily acquired for energy infrastructure without proper consultation and prior informed consent from the indigenous groups.²⁷ Communities have been displaced to make room for energy development. Thus, the transition to renewables will

²⁴ Punch Newspaper, 'How host communities can benefit from PIA – NUPRC' available at:

<https://punchng.com/how-host-communities-can-benefit-from-pia-nuprc/> accessed 16 April 2024

²⁵ Olof Lindén and Jonas Pålsson, 'Oil Contamination in Ogoniland, Niger Delta' (2013) 42 *AMBIO* Report 685–701; see also Enes Al Weswasi, 'Spending Blood for Oil in Nigeria: A Frame Analysis of Shell's Neutralisation of Acts that led to Corporate-Initiated State Crime' (2019) 3 *Nordisk Tidsskrift for Kriminalvidenskab* 280-296

²⁶ Christina E. Hoicka, Katarina Savic, and Alicia Campney, 'Reconciliation Through Renewable Energy? A Survey of Indigenous Communities, Involvement, and Peoples in Canada' (2021) 74 *Energy Research & Social Science* 1, 2

²⁷ *ibid*

continue to perpetuate these injustices unless adequate engagements with these communities are had to remedy historical injustices and forestall future injustices in energy development. Engaging with indigenous communities throughout the energy life cycle of renewable energy projects – from planning to decommissioning, will foster social inclusion, build trust, and minimise conflicts.

Furthermore, some indigenous communities are far from energy networks, thereby relying on fossil fuel to meet their energy needs.²⁸ Therefore, whilst off-grid and mini-grid renewable energy is essential to meet their energy needs, there is a need to ensure that adequate renewable energy services are available and accessible (both in terms of proximity and affordability) to these communities before the transition from fossil fuel energy is implemented.

5. Conclusion

The transition from fossil fuels to renewable energy is essential to prevent the devastating effects of climate change. However, the transition will result in adverse impacts on vulnerable communities. Therefore, there is a need to mitigate these impacts by implementing the energy transition that is in line with energy justice principles. An energy transition founded on the principles of energy justice and the just transition is central to mitigating the impacts of the energy transition on vulnerable groups.

²⁸ J. Hunt, B. Riley, L. O'Neill & G. Maynard, 'Transition to Renewable Energy and Indigenous People in Northern Australia: Enhancing or Inhibiting Capabilities?' (2021) 22 *Journal of Human Development and Capabilities* 360