



WECAN

Women's Earth & Climate Action Network, International

The Need for Real Zero Not Net Zero: Shifting from False Solutions to Real Solutions and a Just Transition

second edition

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Who We Are: The Women’s Earth and Climate Action Network (WECAN) is a solutions-based, multifaceted 501c3 non-profit organization that engages women worldwide in policy advocacy, on-the-ground projects, trainings, and movement building for global climate justice.

I. Introduction

With growing pressure to take action to address the climate crisis, governments, financial institutions, and corporations have made Net Zero commitments as a primary response to adhere to the goals outlined in the Paris Climate Agreement, which aims to limit global temperature rise to 1.5°C.¹ According to Net Zero Tracker, a research collaborative of scientists, academics, and data analysts, 93% of global GDP is committed to achieving Net Zero.² Given that Net Zero is enshrined in the Paris Agreement as the end-state at which global temperatures will stabilize, and has therefore informed the response to the climate crisis, it is essential to examine the concept in greater detail. In particular, it is critical to investigate both how the framework is being operationalized and whether Net Zero strategies are delivering the solutions that global governments and companies are professing. The objective of this policy analysis is to better define Net Zero and address concerns with its conceptualization and implementation. This report also begins to explore and provide several examples of alternatives to Net Zero that adhere to climate just principles, namely Real Zero initiatives. Guided by the principles of a Just Transition framework, this policy brief interrogates questions concerning the efficacy of Net Zero strategies and demonstrates alternative practices and pathways forward for a healthy and equitable approach to the climate crisis.

Escalating greenhouse gas (GHG) emissions by polluting activities are causing more frequent and severe climate change-induced disasters, such as wildfires, extreme heat, flooding events, hurricanes, droughts, and high sea surface temperatures.² According to climate scientists and human rights experts, in order to mitigate the worst impacts from anthropogenic climate change, the global community will need to significantly reduce GHG emissions.³ The United Nations states that countries “must collectively commit to cutting 42 per cent off annual greenhouse gas emissions by 2030 and 57 per cent by 2035 in the next round of NDCs [Nationally Determined Contributions].”⁴ The negative health and safety impacts from these extreme climate events disproportionately affect the Global South and Indigenous, Black, Brown, and low-income communities in the Global North.³ Due to unequal gender norms globally, climate impacts are also more detrimental to women.⁴ Because of these disproportionate impacts, addressing the climate crisis requires interdisciplinary and collaborative approaches that are based on scientific research, Traditional Ecological Knowledge, climate justice principles, and the lived experiences of vulnerable communities. In order to bolster real solutions and support efforts and frameworks that lead to equitable and effective outcomes, governments, financial institutions, and corporations need to engage in critical interrogation of policies

¹Levin, K., Fransen, T., Schumer, C., et al. (2023, March 20). What Does ‘Net-Zero Emissions’ Mean? 8 Common Questions, Answered. *World Resources Institute*. [\[LINK\]](#); Union of Concerned Scientists. (n.d.). *Climate Impacts: The consequences of climate change are already here*. [\[LINK\]](#)

²Net Zero Tracker. (n.d.). [\[LINK\]](#)

³United Nations Environment Programme. (2024, October 24). *Emissions Gap Report 2024: No more hot air - please!* [\[LINK\]](#)

⁴United Nations Environment Programme. (2024, October 24). *Emissions Gap Report 2024: No more hot air - please!* [\[LINK\]](#)

and activities while accepting genuine accountability for their role in perpetuating socio-environmental crises. Government and corporate actors have the responsibility and opportunity to transform existing exploitative socio-economic structures—which many Net Zero strategies perpetuate—and instead, support healthy and equitable paths forward. Such frameworks and mechanisms that address the climate crisis must account for a Just Transition that best serves people and the planet.⁵

Net Zero, an atmospheric end-state at which global temperatures stabilize, has been enshrined in the Paris Agreement based on experts’ understanding of climate science. However, due to a lack of early governance on Net Zero commitments, many low-integrity Net Zero pledges are actually moving the world further away from genuine climate action.⁶ Instead of individual governments, financial institutions, and corporations reducing their fair share of emissions at the source to reach global Net Zero, many actors have falsely interpreted their contribution to Net Zero as ‘netting’ or ‘balancing’ their own emissions portfolio. Unscientific and market-based Net Zero strategies have led to weak climate pledges and the proliferation of carbon markets, which undermine climate justice.⁷

As governments, financial institutions, and corporations widely promote and endorse Net Zero as the central solution to the climate crisis, a growing body of research shows that Net Zero, as it’s being currently applied, is a false solution. As this policy analysis will detail, Net Zero targets heavily rely on carbon offset projects, which often perpetuate the same socio-environmental exploitation as the current extractive economy.⁸ Such targets and offsets allow industries to continue polluting in the current moment by promising to remove released carbon at a later date.⁹ For example, Carbon Capture and Storage (CCS), a commonly employed strategy to offset emissions, has led to significant carbon dioxide leaks and explosions.¹⁰ In one instance, in April 2024, 2,548 barrels of carbon dioxide leaked from ExxonMobil’s pipeline in Sulphur, Louisiana¹¹—a predominantly Black community that already faces pollution levels far higher than the nation’s average due to the town’s proximity to petrochemical facilities.¹² By outlining how the Net Zero framework perpetuates environmental injustice and undermines a transition away from fossil fuels and an extractive economy, this report underscores the urgency required for

⁵ Cha, J. M. (2017). *Fordham Environmental Law Review*. Fordham University. [\[LINK\]](#)

⁶ Haya, B., Evans, S., Brown, L., et. al. (2023, March 20). Comprehensive review of carbon quantification by improved forest management offset protocols. *Frontiers*. [\[LINK\]](#); Fankhauser, S., Smith, M., Allen, M., et al. (2021, December 20). The Meaning of Net Zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁷ Americans for Financial Reform Education Fund., Public Citizen., Sierra Club. (2023, August 24). SBTi’s proposed standards represent important progress in tackling greenwashing and ensuring credible, science-based net-zero pledges from financial institutions. *PublicCitizen*. [\[LINK\]](#); Axelsson, K., Black, R., Chalkley, P., et. al. (2023). Net Zero Stocktake 2023. *Net Zero Tracker*. [\[LINK\]](#)

⁸ Haya, B., Evans, S., Brown, L., et. al. (2023, March 20). Comprehensive review of carbon quantification by improved forest management offset protocols. *Frontiers*. [\[LINK\]](#); Fankhauser, S., Smith, M., Allen, M., et al. (2021, December 20). The Meaning of Net Zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#); Pearce, F. (2024, January 9). Mind the Gaps: How the UN Climate Plan Fails to Follow the Science. *YaleEnvironment360*. [\[LINK\]](#)

⁹ Lindwall, C. (2022, February 3). The Promise and Pitfalls of Net-Zero Pledges. *National Resource Defense Council*. [\[LINK\]](#)

¹⁰ Simon, J. (2023, September 25). The U.S. Is Expanding CO2 Pipelines. One Poisoned Town Wants You to Know Its Story. *NPR*. [\[LINK\]](#)

¹¹ Lakhani, N. (2024, April 19). ‘Wake-up call’: pipeline leak exposes carbon capture safety gaps, advocates say. *The Guardian*. [\[LINK\]](#)

¹² Lapid, N. (2024, June 12). Toxic gas in Louisiana air far exceeds safe levels, EPA estimates, US study finds. *Reuters*. [\[LINK\]](#)

governments and corporations to move away from the current Net Zero framework. Instead, such actors need to adopt approaches and policies that genuinely and equitably address the climate emergency and socio-ecological injustice while deploying a Just Transition. Although reenvisioning the approach to Net Zero and global emissions reductions is a massive undertaking that will require reorienting the current economic system, it is essential to meeting the goals of the Paris Agreement and upholding human rights. Real Zero solutions are viable alternatives to extractive, harmful, and ineffective practices. While acknowledging the serious political constraints, this reimagining is what is needed and what ecological and social realities demand.

II. Definitions:

A. Net Zero:

While the science underpinning Net Zero is credible, governments' and corporations' interpretations and applications of Net Zero are flawed because they deviate from the framework's scientific foundation. Net Zero is a concept that emerged from climate science and refers to a state in which greenhouse gasses released into the atmosphere from human activities are counterbalanced with greenhouse gasses removed from the atmosphere.¹³ In order to curtail increasing global temperatures beyond a certain limit, physics necessitates that there is a bounded amount of GHGs that can be released into the atmosphere.¹⁴ Any additional release of greenhouse gasses must be balanced by removal into sinks, which remove carbon from the atmosphere.¹⁵ Therefore, to attain the goals set out in the Paris Agreement with 50% probability leaves a carbon budget of 400–800 GtCO₂; remaining within this budget would require CO₂ emissions to peak before 2030 and lower to Net Zero by 2050.¹⁶

In practice, governments' and corporations' Net Zero policies and actions have been implemented through current socio-political and economic structures and norms.¹⁷ In this way, Net Zero has been weakened through trends that reduce climate action to numerical target setting, a focus on mid-century timelines, reliance on harmful technologies, and solutions that are abstracted from local socio-ecological contexts.¹⁸ Net Zero goals are often predicated on market-based carbon offset schemes rather than limiting the release of greenhouse gasses at their source—the most essential part of the scientific concept. When employing the term Net Zero throughout this report, we are referring to how it is

¹³ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

¹⁴ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

¹⁵ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

¹⁶ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

¹⁷ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

¹⁸ Khosla, R., Lezaun, J., McGivern, A., et. al. (2023, May 12). Can 'Net Zero' still be an instrument of climate justice? *Environment Research Letters*. [\[LINK\]](#)

currently being applied (i.e., governments' and corporations' interpretation of the concept).

While governments' and corporations' application of Net Zero in practice is foundationally unsound, it is nevertheless essential to strengthen the framework as much as possible because the approach is widely in use. Although that is not the focus of this analysis, it is important to note that there are crucial efforts aiming to supplement current Net Zero interpretations with climate justice principles and a Just Transition framework to obtain genuine emission reductions. For example, the Sierra Club and Public Citizen have advocated to strengthen the Science-Based Targets Initiative's (SBTi) Financial Institutions Net-Zero Standard (FINZ) Consultation Draft as much as possible to prevent banks, asset managers, and insurance companies from using Net Zero to further greenwash.¹⁹ Ongoing updates to the GHG Protocol, SBTi's Corporate Net Zero Standard, and the conversion of the International Organization for Standardization's (ISO) Net Zero Guidelines into an independently verifiable international standard on Net Zero emissions for organizations (ISO Net Zero Standard), will all help to improve the Net Zero integrity landscape. Even still, the global community must move fast to reduce emissions at the scope and urgency required to make targets by 2030.

Net Zero could deliver on its fundamental scientific truths of temperature stabilization if governments and corporations fundamentally reoriented their application of the framework toward the original scientific conceptualization and incorporated both the scientific and ethical dimensions of the climate crisis.²⁰ As it is currently being operationalized, however, the Net Zero framework is perpetuating socio-environmental harms and moving the world away from a Just Transition.

B. Real Zero:

Real Zero entails removing all GHG emissions at their source so that the total sum of emissions released or created amount to zero. Efforts to move toward Real Zero will require phasing out fossil fuels and all other polluting activities based on timelines that drastically reduce emissions sources year-to-year. While the concept of Real Zero is still developing as a framework, there are many policy and economic models that epitomize Real Zero and could be immediately incorporated and applied by governments, corporations, and financial institutions.

¹⁹ Americans for Financial Reform Education Fund., Public Citizen., Sierra Club. (2023, August 24). SBTi's proposed standards represent important progress in tackling greenwashing and ensuring credible, science-based net-zero pledges from financial institutions. *PublicCitizen*. [\[LINK\]](#)

²⁰ Khosla, R., Lezaun, J., McGivern, A., et. al. (2023, May 12). Can 'Net Zero' still be an instrument of climate justice? *Environment Research Letters*. [\[LINK\]](#)

III. Background

Net Zero as a goal is central to the Paris Agreement. Article 4.1 underlines the goal to achieve a “balance between anthropogenic emissions by sources and removals by sinks into the second half of this century.”²¹ Despite an emergent governance landscape to manage and define what credible Net Zero looks like (e.g., through the International Standard Organisation’s Net Zero Guidelines²² or the UN High-Level Expert Group²³), many governments’ and corporations’ evaluations and implementations of Net Zero are not in alignment with environmental justice frameworks, nor are they on track to prevent even a 2°C increase in global temperatures.⁷ Furthermore, Net Zero pledges and targets are often ambiguous and lack specific plans for how emission reductions will be achieved. For example, according to Climate Action Tracker’s analysis of 34 countries whose governments have pledged Net Zero targets, only 15 of the pledges stipulate detailed information about their intended carbon offset strategies (i.e., Nature-based Solutions and carbon dioxide removal and storage) in their Net Zero target year.²⁴ The analysis also found that most of the governments’ Net Zero pledges heavily depend on unproven carbon dioxide removal (CDR) technologies to make their net zero target or fail to account for a significant portion of their emissions, which was conservatively estimated to be 20% of the countries’ current emissions.²⁵ In other words, many governments are failing to fully cover all their emissions in their targets and/or can only meet their Net Zero targets by heavily relying on CDR capacity they do not yet have.²⁶ As an example, Australia, Canada, Chile, New Zealand, Russia, Saudi Arabia, and Vietnam would still emit over 30% of their 2019 emissions after their planned Net Zero target dates.²⁷

Net Zero as a framework for climate action has been heavily criticized, particularly by the climate justice community, for being an instrument that allows companies and countries to greenwash their decarbonization efforts, creating the appearance of progress where there is little to none. This enables government, corporate, and financial actors to delay action with the promise of technological or land-based carbon removals, which remain speculative and unproven at scale.²⁸ There are serious concerns about whether Net Zero strategies, such as technological and nature-based carbon removal methods, can address

²¹ UNFCCC. (2015). *Paris Agreement*. [\[LINK\]](#)

²² ISO. (n.d.). *Net Zero Guidelines*. [\[LINK\]](#)

²³ Starbuck, A., Gosh, A., Hare, B., et. al. (n.d.). Integrity Matters: Net Zero Commitments by Businesses, Financial Institutions, Cities and Regions. *United Nations*. [\[LINK\]](#)

²⁴ Hans, F., Heck, S., Mooldijk, S. (2024, May 30). Net zero or real zero? Assessing the carbon dioxide removal in net zero pledges. *Climate Action Tracker*: [\[LINK\]](#); Khosla, R., Lezaun, J., McGivern, A., et. al. (2023, May 12). Can ‘Net Zero’ still be an instrument of climate justice? *Environment Research Letters*. [\[LINK\]](#)

²⁵ Hans, F., Heck, S., Mooldijk, S. (2024, May 30). Net zero or real zero? Assessing the carbon dioxide removal in net zero pledges. *Climate Action Tracker*: [\[LINK\]](#)

²⁶ Hans, F., Heck, S., Mooldijk, S. (2024, May 30). Net zero or real zero? Assessing the carbon dioxide removal in net zero pledges. *Climate Action Tracker*: [\[LINK\]](#)

²⁷ Hans, F., Heck, S., Mooldijk, S. (2024, May 30). Net zero or real zero? Assessing the carbon dioxide removal in net zero pledges. *Climate Action Tracker*: [\[LINK\]](#)

²⁸ Khosla, R., Lezaun, J., McGivern, A., et. al. (2023, May 12). Can ‘Net Zero’ still be an instrument of climate justice? *Environment Research Letters*. [\[LINK\]](#)

the crisis with the speed, scale, equity, safety, and effectiveness that is necessary to keep the global temperature rise below 1.5°C.²⁹

To mitigate the worst effects of the climate crisis, countries and communities across the world must contend with and address the root causes of historic and ongoing environmental and social exploitation. According to the Intergovernmental Panel on Climate Change (IPCC), ongoing oppressive societal patterns, such as colonialism, are driving forces that heighten communities' vulnerability to climate change.³⁰ The Net Zero solutions that dominate governments, corporations, and financial institutions' policies and statements, frequently do not address the root causes of emissions and instead sustain business as usual, thereby perpetuating interlocking socio-environmental crises.³¹ A 2024 report published by the research nonprofit—GRAIN—that analyzed 279 carbon projects found that the majority of the land acquired for carbon offsets was land traditionally used by local communities.³² In one instance, Suzano, the Brazilian paper giant, seized Indigenous and traditional peoples' land for the company's multiple large-scale carbon plantation projects.³³ The Quilombola people and other communities have been forced to fight Suzano in order to grow food on their traditional lands.³⁴ Examples such as this showcase how Net Zero strategies entrench colonialist practices and disenfranchise communities vulnerable to the climate crisis, thereby preserving the exploitative nature of the extractive industry.³⁵

Net Zero strategies also often lack grounding in science. For example, announced goals to offset carbon through tree-planting to date would likely exceed available land in the world.³⁶ Other studies have found that relying primarily on planting trees to offset carbon emissions would require more land than all of the world's existing farmland—to put this in perspective, this would mean reforesting land that equates to five times the size of India.³⁷ It is important to note that although tree-planting for the sake of continuing fossil fuels is harmful and ineffective. Instead, community-led land restoration and reforestation that is not part of carbon offset and market-based schemes is vital to resolving climate mitigation and biodiversity loss. Net Zero strategies are often false solutions, namely technological or market-based schemes that fail to address emissions at the source.³⁸ Examples of this include the use of hydrogen power, geoengineering, bioenergy, waste-to-energy,

²⁹ Lindwall, C. (2022, February 3). The Promise and Pitfalls of Net-Zero Pledges. *NRDC*. [\[LINK\]](#)

³⁰ Skea, J., Shukla, P., Reisinger, A., et al. (2022). Climate Change 2022: Mitigation of Climate Change. *IPCC Intergovernmental Panel on Climate Change*. [\[LINK\]](#)

³¹ Thériault, A., Grainger, M., et al. (2021, August 3). 'Net Zero' Carbon Targets Are Dangerous Distractions from the Priority of Cutting Emissions, Says New Oxfam Report. *Oxfam International*. [\[LINK\]](#)

³² Grain. (2024, September 17). From land grabbers to carbon cowboys: a new scramble for community lands takes off. *Grain*. [\[LINK\]](#)

³³ Grain. (2024, September 17). From land grabbers to carbon cowboys: a new scramble for community lands takes off. *Grain*. [\[LINK\]](#)

³⁴ NFUniversity. (2023, October 26). *Resisting land grabs for eucalyptus plantations in Brazil*. [\[LINK\]](#)

³⁵ Mardirossian, N., Arnold, J. (2023). Commentary: Nature-Based Insetting: A Harmful Distraction from Corporate Decarbonization. *Columbia Law School*. [\[LINK\]](#)

³⁶ Becker, W. (2023, January 26). As carbon offsets, tree planting can be shady. *The Hill*. [\[LINK\]](#)

³⁷ Thériault, A., Grainger, M., et al. (2021, August 3). 'Net Zero' Carbon Targets Are Dangerous Distractions from the Priority of Cutting Emissions, Says New Oxfam Report. *Oxfam International*. [\[LINK\]](#)

³⁸ Amorelli, L., Gibson, D., Gilbertson, T. (2021, April). Hoodwinked in the Hothouse. *Climate False Solutions*. [\[LINK\]](#)

large-scale high-impact hydroelectricity, and carbon capture. Not only do these approaches endanger the global community’s ability to prevent the global temperature from rising above 1.5°C, but they also contribute to human and Indigenous rights violations, land theft, adverse health implications, and food insecurity.³⁹

It is essential to emphasize that real solutions to the climate crisis—those that do not rely on the exploitation of people or the environment and avoid emissions at their source—presently exist. Alternative pathways which address the root causes of anthropogenic climate change have been outlined and implemented by Indigenous communities,⁴⁰ scientists,⁴¹ labor groups,⁴² women in all of their diversity and feminist movements,⁴³ climate and environmental justice organizations,⁴⁴ local land-based communities,⁴⁵ and many others. Climate justice solutions promulgated by these groups actualize a Just Transition away from fossil fuels and exploitative practices.⁴⁶ The Internal Labour Organization has defined a Just Transition as “greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.”⁴⁷

Furthermore, aligning with Just Transition principles will also mean prioritizing investments in a Care Economy, which refers to women’s paid and unpaid labor in the education, healthcare, and social and domestic industries.⁴⁸ Such solutions also uplift Indigenous knowledge systems and local communities’ and Indigenous Peoples’ rights and sovereignty. With a continuous focus on the principles of the Just Transition, this policy analysis aims to better define and interrogate Net Zero approaches, as well as begin to probe Real Zero as an alternative policy framework to the proliferation of false solutions. These contrasting strategies are juxtaposed through a presentation of Net Zero principles and examples followed by a discussion of Real Zero and current initiatives and models that exemplify climate justice principles.

IV. The Problem with Net Zero

For years, governments, corporations, and global financial institutions have permitted and financed high-emitting projects and activities.⁴⁹ For example, corporations have been allowed to rapidly expand fossil fuel infrastructure and extraction while ignoring the

³⁹ Amorelli, L., Gibson, D., Gilbertson, T. (2021, April). Hoodwinked in the Hothouse. *Climate False Solutions*. [\[LINK\]](#)

⁴⁰ Schertow, J. A. (2019, May 21). The Yurok Nation Just Established the Rights of the Klamath River. *Cultural Survival*. [\[LINK\]](#)

⁴¹ Union of Concerned Scientists. (n.d.). *Climate Solutions*. [\[LINK\]](#)

⁴² <https://www.swunion.org/>

⁴³ Feminist Green New Deal. (n.d.). *Feminist Agenda for a Green New Deal*. [\[LINK\]](#)

⁴⁴ Just Transition Alliance. [\[LINK\]](#)

⁴⁵ Cooperation Jackson. [\[LINK\]](#)

⁴⁶ ITUC. (2015, March). Climate Justice: There Are No Jobs on a Dead Planet. *International Trade Union Confederation*. [\[LINK\]](#)

⁴⁷ ILO. (2024, July 9). Climate change and financing a just transition. *International Labour Organization*. [\[LINK\]](#)

⁴⁸ Carpenter, C., Staab, S., Bidegain, N. (March 14). New Economics for Sustainable Development: Purple Economy (Care Economy+). *United Nations Economist Network*. [\[LINK\]](#)

⁴⁹ Merleaux, A. Et al. Banking on Climate Chaos: Fossil Fuel Finance Report. (2024, May 13). *Rainforest Action Network*. [\[LINK\]](#); EESI. (2019, July 29). Fact Sheet | Fossil Fuel Subsidies: A Closer Look at Tax Breaks and Societal Costs (2019). [\[LINK\]](#)

devastating impacts of increasing dirty fossil fuel-based energy.⁵⁰ These same actors are now enacting Net Zero approaches, which further endanger communities and the environment, as a way to sustain their polluting activities. Many actors pledging to Net Zero do not include any commitment to fossil fuel phase-out, the key cause of the climate crisis.⁵¹ Net Zero approaches, which have been promulgated by governments, financial institutions, and corporations as solutions to the climate crisis, generally entail a two-step approach:

1. reducing emissions (e.g., stop burning fossil fuels) and
2. removing greenhouse gasses from the atmosphere through carbon offsets, which include carbon removal via land and market-based methods (e.g., bioengineering, Carbon Capture and Storage (CCS), Nature-based Solutions (NbS), carbon pricing, among others).⁵²

The rise in Net Zero by 2050 pledges from financial institutions, major corporations, and governments has given the impression that a shift towards a greener future has occurred.⁵³ Governments' and companies' interpretations of Net Zero, however, vary widely and their policies and statements about Net Zero goals are often ambiguous and lack detailed schedules describing their path to Net Zero.⁵⁴ Because the current standardized method of calculating emissions leaves room for discretion with regards to "residual emissions", the rate of reduction in voluntary governance situations are left to the discretion of heads of state and company leaders.⁵⁵ Furthermore, many interpretations of Net Zero do not take into account scientifically informed standards and are therefore inconsistent with limiting the global temperature rise to 1.5°C.⁵⁶ For example, in tree-planting carbon offset schemes, the type and age of the trees cause the forest to uptake carbon at vastly different rates; the accounting in companies' Net Zero emissions promises often do not adjust for these types of biological nuances.⁵⁷ Net Zero pledges are also generally not legally binding, providing little accountability that these commitments will be upheld.⁵⁸

Importantly, Net Zero goals often allow industries to continue polluting in the current moment by promising to remove released carbon at a later date.⁵⁹ Both the continuation

⁵⁰ Hall, S. (2015, October 16). Exxon Knew about Climate Change almost 40 years ago. *Scientific American*. [\[LINK\]](#). Milman, O. (2024, January 30). 'Smoking gun proof': fossil fuel industry knew of climate danger as early as 1954, documents show. *The Guardian*. [\[LINK\]](#)

⁵¹ Net Zero Tracker. (2023, December 3). *Global net zero targets at risk due to scarcity of fossil fuel phase-out plans*. [\[LINK\]](#)

⁵² Fankhauser, S., Smith, M., Allen, M., et al. (2021, December 20). The Meaning of Net Zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁵³ "Net-Zero Pledges Grow; Ambition Falls Short." United Nations, 2023. [\[LINK\]](#)

⁵⁴ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁵⁵ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#); Lindwall, C. (2022, February 3). The Promise and Pitfalls of Net-Zero Pledges. *National Resource Defense Council*. [\[LINK\]](#)

⁵⁶ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁵⁷ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁵⁸ Lindwall, C. (2022, February 3). The Promise and Pitfalls of Net-Zero Pledges. *National Resource Defense Council*. [\[LINK\]](#)

⁵⁹ Lindwall, C. (2022, February 3). The Promise and Pitfalls of Net-Zero Pledges. *National Resource Defense Council*. [\[LINK\]](#); Axelsson, K., Black, R., Chalkley, P., et. al. (2023). Net Zero Stocktake 2023. *Net Zero Tracker*. [\[LINK\]](#)

of polluting activities (e.g., oil and gas drilling) and the strategies for capturing emissions at a later date (e.g., carbon capture) result in adverse health effects and safety threats. Due to colonial and racist social structures, land and market-based mechanisms that attempt to achieve Net Zero goals, similar to traditional extractive infrastructure, are disproportionately located in poor, low-emitting countries in the Global South and Indigenous, Black, and Brown communities in the Global North.⁶⁰ In addition to fossil fuel extraction that is being perpetuated by false solutions, these communities are further burdened with harmful CCS infrastructure, land theft, and the subsequent adverse health implications from all of these activities.⁶¹ In one tragic instance, in the predominantly Black community of Satartia, Mississippi, a CCS pipeline explosion caused many residents to lose consciousness, have convulsions, and suffer other serious health complications.⁶²

Studies have shown that corporate and government entities have used Net Zero targets to advance thinly veiled greenwashed marketing techniques to take the spotlight off any climate wrongdoings and to maintain unambitious timelines to reduce GHG emissions by 2050.⁶³ Carbon capture and storage (CCS) and Nature-based Solutions (NbS) are market-based carbon solutions widely used by financial, governmental, and corporate entities as carbon offsets to achieve misaligned Net Zero goals. These methods of balancing carbon emissions in the atmosphere fail to address ambient pollution from fossil fuels and other polluting industries.⁶⁴ Carbon offset techniques such as CCS and NbS are false solutions because all of these approaches fail to reduce emissions at the source, frequently lack scientific backing, and often harm Black, Brown, Indigenous, and low-income communities through land theft and environmental degradation.⁶⁵ Below is a description of carbon offsets and two examples of this scheme, explaining how these approaches fail to prevent the escalating climate crisis:

A. Carbon Offsets:

Carbon offsets allow polluters to “offset” their emissions by investing in projects that supposedly remove or avoid carbon emissions. Carbon offsets are units of measurement that represent investments in “green” projects and can in turn be bought and sold on public and private carbon markets. The types of projects that qualify as carbon reduction mechanisms are numerous. For example, biomass plants, mine methane capture, fuel switching or efficiency projects, “forest management,” and other nature-based schemes are all considered mechanisms to offset companies’ emissions.⁶⁶ Carbon offsets often lack

⁶⁰ Tongia, R. (2021, October 25). Net Zero Carbon Pledges Have Good Intentions, but They Are Not Enough. *Brookings*. [\[LINK\]](#)

⁶¹ Donaghy, T., Healy, N., Jiang, C., et. al. (2023, June). Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities. *Energy Research & Social Science*. [\[LINK\]](#)

⁶² Simon, J. (2023, September 25). The U.S. Is Expanding CO2 Pipelines. One Poisoned Town Wants You to Know Its Story. *NPR*. [\[LINK\]](#)

⁶³ Dyke, J., Watson, R., Knorr, W. (2021, April 22). Climate Scientists: Concept of Net Zero Is a Dangerous Trap. *The Conversation*. [\[LINK\]](#)

⁶⁴ Donaghy, T., Healy, N., Jiang, C., et. al. (2023, June). Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities. *Energy Research & Social Science*. [\[LINK\]](#)

⁶⁵ Donaghy, T., Healy, N., Jiang, C., et. al. (2023, June). Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities. *Energy Research & Social Science*. [\[LINK\]](#)

⁶⁶ Amorelli, L., Gibson, D., Gilbertson, T. (2021, April). Hoodwinked in the Hothouse. *Climate False Solutions*. [\[LINK\]](#)

credibility and do not deliver the climate-saving benefits that governments and industries claim.⁶⁷ A UC Berkeley study that included almost 300 carbon offset projects concluded that developers have been allowed to claim emissions reduction benefits far beyond what is justified.⁶⁸ Even when carbon offset projects do work in the short-term, very few result in long-term carbon removal, undercutting their utility to counterbalance carbon emissions.⁶⁹ Other problems include: the benefits of carbon offset projects are often exaggerated; many of the projects profess to avoid rather than remove carbon emissions from the atmosphere; almost all approved carbon storage is temporary while the effects of carbon emissions are much more permanent; and carbon offset trades between private international buyers often result in the benefits being double-counted because private sellers are not required to increase climate mitigation efforts to compensate for the transferred offset to another country.⁷⁰

For all of these reasons, companies and governments using carbon offsets to lower their emissions are often making unvalidated claims about their carbon emissions. In 2023, research revealed more than 90% of Verra's (the world's leading carbon standard) rainforest offset credits are "phantom credits," or carbon offsets that can be bought, but do not reflect genuine carbon reductions.⁷¹ Corporations have also been weaponizing carbon offsets to acquire land for tree-planting and forest management schemes, as well as developing carbon offset technologies in communities that oppose their construction. In one instance, the Indigenous Kichwa People in Peru were not only forcibly displaced from their land when Shell and TotalEnergies bought carbon credits from a national park, but were also denied the right to hunt on their ancestral territory.⁷² Biomass plants—facilities that produce energy from organic matter—are another ineffective carbon offset scheme. Biomass proponents claim to emit less pollution than coal or other fossil fuel sources.⁷³ However, a Southern Environmental Law Center (SELC) study found that Enviva—the company behind a major biomass plant project in North Carolina and Virginia—cut down 71,000 acres of forest for bioenergy, destroying a crucial carbon sink and causing long-term damage to the forest and wildlife.⁷⁴ According to SELC, “burning trees for power can emit more carbon pollution than burning coal.” Carbon offsets result in further socio-ecological harm in communities across the world while allowing corporations to continue to pollute at source and only further delay emission reductions.⁷⁵

⁶⁷ Fankhauser, S., Smith, S.M., Allen, M. (2021, December 20). The meaning of net zero and how to get it right. *Nature Climate Change*. [\[LINK\]](#)

⁶⁸ Haya, B., Evans, S., Brown, L., et. al. (2023, March 20). Comprehensive review of carbon quantification by improved forest management offset protocols. *Frontiers*. [\[LINK\]](#)

⁶⁹ Cullenward, D., Badgley, G., Chay, F. (2023, September 15). Carbon offsets are incompatible with the Paris Agreement. *One Earth*. [\[LINK\]](#)

⁷⁰ Cullenward, D., Badgley, G., Chay, F. (2023, September 15). Carbon offsets are incompatible with the Paris Agreement. *One Earth*. [\[LINK\]](#)

⁷¹ Greenfield, P. (2023, January 18). Revealed: More than 90% of Rainforest Carbon Offsets by Biggest Certifier Are Worthless, Analysis Shows. *The Guardian*. [\[LINK\]](#)

⁷² Davey, E. (2022, December 22). In Peru, Kichwa Tribe Wants Compensation for Carbon Credits. *AP News*. [\[LINK\]](#)

⁷³ Southern Environmental Law Center. (2022, March 28). *New Study Confirms Harmful Impacts of Biomass Industry*. [\[LINK\]](#)

⁷⁴ Southern Environmental Law Center. (2022, March 28). *New Study Confirms Harmful Impacts of Biomass Industry*. [\[LINK\]](#)

⁷⁵ Axelsson, K., Black, R., Chalkley, P., et. al. (2023). Net Zero Stocktake 2023. *Net Zero Tracker*. [\[LINK\]](#)

1. Nature-based Solutions (NbS):

Land-based offsets hinge on a false pretext that fossil fuel emissions can be balanced out with emission reductions from land use practices, ecosystem restoration, or forest management.⁷⁶ There is abundant scientific evidence that fossil fuel carbon and land-based carbon cannot be treated as the same.⁷⁷ NbS, as currently defined and implemented, often has detrimental impacts on local communities and ecological systems. For example, when vast amounts of water are used for NbS projects, such as large-scale tree-planting efforts, further loss of already strained water sources can result in famine for local populations and more deforestation.⁷⁸ Additionally, current examples of NbS do not align with many Indigenous Peoples' and local communities' forest management practices, and can also result in land grabs, in which Indigenous Peoples are forcibly removed from their territories⁷⁹ and subjected to harassment and sexual abuse.⁸⁰ In one example, members of the Ogiek community in Kenya were evicted from their ancestral territory in the Mau Forest by Kenya's government in order to secure carbon offsets and credits.⁸¹ In another case, the major oil company, ENI, was able to forcibly uproot several small fishing communities in Mozambique to extract gas by promising that it would offset the company's emissions with reforestation across Africa, which will require further land dispossession.⁸² Despite these socio-environmental threats, fossil fuel and other extractive corporations continue to include NbS as a central component of their Net Zero commitments.⁸³

2. Carbon Capture and Storage (CCS):

Carbon capture involves carbon dioxide being collected from industrial smokestacks, compressed into a liquid, and transported via pipeline to a site where it can be pumped underground into oil and gas reservoirs, saline aquifers, or into the ocean.⁸⁴ Carbon farming, carbon removal, and Direct Air Capture for Carbon Storage are other names for CCS. The goal of such a process is to remove and subsequently store emissions from the atmosphere. 95% of CCS capacity in the United States is actually used to bring *more* carbon out of the ground through a practice known as "enhanced oil recovery," which involves injecting carbon dioxide underground rather than for capturing carbon emissions

⁷⁶ Griffith University. (2013, May 30). Land-based carbon offsets: False hope? Forest and soil carbon is important, but does not offset fossil fuel emissions. *ScienceDaily*. [\[LINK\]](#)

⁷⁷ Alva, A. (2022, December). A Critical Perspective on the European Commission's Publications 'Evaluating the Impact of Nature-Based Solutions.' *Nature-Based Solutions*. [\[LINK\]](#)

⁷⁸ Sen, A., Dabi, N. (2021, August). Tightening the Net. *Oxfam International*. [\[LINK\]](#)

⁷⁹ Melanidis, M.S., Hagerman, S. (2022, June). Competing narratives of nature-based solutions: Leveraging the power of nature or dangerous distraction? *Environmental Science & Policy*. [\[LINK\]](#)

⁸⁰ Greenfield, P. (2023, November 7). Allegations of extensive sexual abuse at Kenyan offsetting project used by Shell and Netflix. *The Guardian*. [\[LINK\]](#)

⁸¹ Marshall, C. (2023, November 9). Kenya's Ogiek people being evicted for carbon credits - lawyers. *BBC*. [\[LINK\]](#)

⁸² Chandrasekaran, K. (2021, December 2). Bogus 'Nature Based Solutions' Won't Solve the Climate Crisis. It's Just Corporate Greenwashing. *Friends of the Earth International*. [\[LINK\]](#)

⁸³ Chandrasekaran, K. (2021, December 2). Bogus 'Nature Based Solutions' Won't Solve the Climate Crisis. It's Just Corporate Greenwashing. *Friends of the Earth International*. [\[LINK\]](#)

⁸⁴ International Energy Agency. (n.d.). *Carbon Capture, Utilisation and Storage*. [\[LINK\]](#)

to help reach global Net Zero.⁸⁵ In other words, polluting companies are able to count this harmful technology—which is most often facilitating fossil fuel extraction—as a carbon offset and even earn carbon capture and sequestration tax credits in the process.⁸⁶ Economic research also reveals that there "are no significant market ends" for CCS and that scaling CCS technology is not economically viable.⁸⁷ In a November 2023 report, the International Energy Agency described the carbon capture as an "illusion."⁸⁸

Another serious concern about CCS is the risk of carbon dioxide leaking from the injection wells or pipelines back into the atmosphere or into groundwater and soil.⁸⁹ Such leaks can result from improperly sealed wells, large blowouts during the injection process or from earthquakes⁹⁰—some of which may be triggered by the geologic disruption caused by CCS itself.⁹¹ The risks of CCS are exemplified in the disastrous event in late 2023 in Jal, New Mexico, where the Piñon Midstream's Dark Horse Treating Plant—a carbon capture and sequestration operation—emitted a poisonous mix of gasses and erupted into flames. After this event, the company, Piñon, was still able to claim carbon capture tax credits potentially worth over a quarter of a billion dollars.⁹² Ultimately, the same harmful patterns—driven by unfettered capitalism and ongoing settler-colonialism and racism—in the extractive industries will continue with CCS technology because it is based on furthering fossil fuel expansion.⁹³ Additionally, frontline, Indigenous, Black, Brown, and low-income communities will continue to experience the disproportionate burden of extraction in their communities.⁹⁴ Investing in CCS facilities allows industries to continue business as usual while profiting from both harmful extraction and false solutions.⁹⁵

V. Steps Toward Real Solutions, Real Zero, and a Just Transition

Due to the lack of genuine emission reductions and equitable outcomes from Net Zero, coupled with the urgent time frames of the escalating climate crisis, it is essential to discuss, advocate for, and work to implement Real Zero as a viable alternative and required approach. Real Zero frameworks are premised on a complete elimination of GHG emissions—a goal that can be achieved by phasing out fossil fuels and other polluting activities year-to-year on a finite timeline.⁹⁶ While achieving Real Zero within current

⁸⁵ Douglas, L. (2021, December 13). U.S. lawmaker Introduces Bill to Eliminate Carbon Credits for Oil Recovery. *Reuters*. [\[LINK\]](#)

⁸⁶ Douglas, L. (2021, December 13). U.S. lawmaker Introduces Bill to Eliminate Carbon Credits for Oil Recovery. *Reuters*. [\[LINK\]](#)

⁸⁷ Feir, S., Reisch, N., Bonacini, C., et. al. (2021, August 18). Too Many (Loop)Holes in the Net: 'Net-Zero' Promises Ring Hollow without 'Zero Fossil Fuel' Pledges. *Center for International Environmental Law*. [\[LINK\]](#)

⁸⁸ International Energy Agency. (2023, November 23). *Oil and gas industry faces moment of truth — and opportunity to adapt — as clean energy transitions advance*. [\[LINK\]](#)

⁸⁹ DiFelice, M., Shelton-Thomas, O. (2023, September 6). Why Carbon Storage Is a Bad Idea. *Food & Water Watch*. [\[LINK\]](#)

⁹⁰ DiFelice, M., Shelton-Thomas, O. (2023, September 6). Why Carbon Storage Is a Bad Idea. *Food & Water Watch*. [\[LINK\]](#)

⁹¹ Magill, B. (2013, November 4). Study Shows Carbon Sequestration Can Cause Quakes. *ClimateCentral*. [\[LINK\]](#)

⁹² Kelly, S. (2024, August 13). Piñon Dark Horse Fire Reveals How Oil Industry Environmental 'Solution' Spurs Climate Crisis. *DeSmog*. [\[LINK\]](#)

⁹³ Donaghy, T., Healy, N., Jiang, C., et. al. (2023, June). Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities. *Energy Research & Social Science*. [\[LINK\]](#)

⁹⁴ Donaghy, T., Healy, N., Jiang, C., et. al. (2023, June). Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities. *Energy Research & Social Science*. [\[LINK\]](#)

⁹⁵ Simon, J. (2023, September 25). The U.S. Is Expanding CO2 Pipelines. One Poisoned Town Wants You to Know Its Story. *NPR*. [\[LINK\]](#)

⁹⁶ Zahn, M. (2022, July 17). Fed up with Net-Zero Climate Goals, Activists Call for 'Real Zero.' *ABC News*. [\[LINK\]](#)

socio-economic and political structures will be difficult, it is essential to move toward solutions that prioritize rapid decarbonization across all sectors of the economy. Goals and targets that strive for Real Zero necessitate actions such as a moratorium on fossil fuel expansion, immediate divestment from fossil fuels, elimination of the reliance on market-based carbon offsets, stopping pollution at the source, and a Just Transition to renewable energy, amongst other measures and policies.⁹⁷ In other words, Real Zero provides a paradigm shift that advocates for bold and transformative approaches and policies that effectively address the climate crisis, as well as a phase-out of fossil fuels within a climate justice framework that is healthy for people and the planet.

Real Zero applications provide a framework to effectively reduce emissions and mitigate pollution at the source, while not relying on industrial-scale technology and CCS to prevent further global warming.⁹⁸ There has not been adequate research or reporting on Real Zero, which must be remedied. This policy analysis seeks to help fill this gap with an exploration of the kinds of practices, economic models, and principles that epitomize Real Zero. By exposing the inadequacies of Net Zero and discussing the potential of Real Zero, this analysis also highlights the need for further research on the capacity of Real Zero to be incorporated into policy and operationalized across all institutions and sectors.

In short, a Real Zero approach involves a just and rapid phase-out of fossil fuels, a fair and democratic renewable energy transition, a shift to both agroecology and small-scale farmers, Indigenous and community-led forest protection, an end to all fossil fuel subsidies, policies that halt fossil fuel expansion, and prioritization of women's leadership.⁹⁹

VI. The following are examples of Real Zero applications and practices:

- **Rapid and Just Transition Away from Fossil Fuels**

A just and prompt transition away from fossil fuels will be achieved by stopping all pollution at the source, discontinuing new fossil projects, rapidly phasing out existing fossil fuel projects, and avoiding false climate solutions and techno-fixes (including carbon capture, carbon removal, carbon farming, carbon offsets, geoengineering, and NbS), which enable further fossil fuel dependence.¹⁰⁰

⁹⁷ Real Zero Europe. (n.d.). *Net zero is not zero!* [\[LINK\]](#)

⁹⁸ Real Zero Europe. (n.d.). *Net zero is not zero!* [\[LINK\]](#)

⁹⁹ Real Zero Europe. (n.d.). *Net zero is not zero!* [\[LINK\]](#)

¹⁰⁰ Real Zero Europe. (n.d.). *Net zero is not zero!* [\[LINK\]](#)

- **End all Public Subsidies to Fossil Fuels**

There are a variety of mechanisms across different countries that could help halt fossil fuel extraction and expansion. For example, currently, there are publicly funded subsidies for fossil fuels to offset the real cost of petroleum and crude oil. Removing these subsidies will decrease the amount of fossil fuels consumed, thus lowering emissions. Fossil fuel subsidies were worth \$7 trillion globally in 2022.¹⁰¹ According to one study, eliminating fossil fuel subsidies globally would reduce the world's emissions by 37 Gigatons by 2050—approximately the same reduction if all the oil reserves in the US and Norway were left in the ground.¹⁰²

- **Implement Policies that Stop Fossil Fuel Expansion**

An important global initiative to phase out fossil fuels is the Fossil Fuel Non-Proliferation Treaty (FFNPT), which outlines three main principles: ending the expansion of fossil fuel production, phasing down existing production in line with 1.5°C, and enabling a global Just Transition for every worker, community, and country.¹⁰³ There has been a great deal of momentum for the FFNPT led by Pacific Island nations, and it can serve as a vital international mechanism to complement the Paris Climate Agreement. The Beyond Oil & Gas Alliance (BOGA) is another important international alliance aiming to phase-out oil and gas production and mobilize action and commitments around the phase-out.¹⁰⁴

- **A Just Transition to Renewables**

To facilitate a Just Transition towards renewable energy there must be a guarantee that everyone currently engaged in jobs in the fossil fuel energy sector has adequate job transfer training to the renewable energy sector.¹⁰⁵ The transition to renewable energy must provide safeguards to people for fair and democratic input, including adherence to Free, Prior, and Informed Consent (FPIC) and prohibition of land grabs and displacement.¹⁰⁶ For example, mining for transition minerals often results in the displacement of Indigenous Peoples, the destruction of their land, and does not comply with FPIC. These practices must be halted in the Just Transition.

- **An Ecologically Sound Transition to Renewables**

Any effort to shift to renewable energy must consider how and where the materials needed are sourced. Methods such as mineral mining, which is used to develop solar panels, must be continuously scrutinized, as these practices can lead to the same

¹⁰¹International Monetary Fund. (n.d.). *Fossil Fuel Subsidies*. [\[LINK\]](#)

¹⁰²Gerasimchuk, I., Eyob, Z., et. al. (2017, February 12). Ending Fossil Fuel Production Subsidies Cuts Greenhouse Gas Emissions by 37 GT over 2017-2050; study. International Institute for Sustainable Development. [\[LINK\]](#)

¹⁰³ Fossil Fuel Treaty. (2023, May). *Why We Need a Fossil Fuel Non-Proliferation Treaty*. [\[LINK\]](#)

¹⁰⁴ Beyond Oil & Gas Alliance. (n.d.). *Redefining Climate Leadership*. [\[LINK\]](#)

¹⁰⁵ Cha, M. (2017). A Just Transition: Why Transitioning Workers into a New Clean Energy Economy Should Be at the Center of Climate Change Policies. *Fordham Environmental Law Review*. [\[LINK\]](#)

¹⁰⁶ Knight, R., Angarova, G., Finn, K., et. al. (2023, September). Securing Indigenous Peoples' Right to Self-Determination: A Guide on Free, Prior, and Informed Consent. *Cultural Survival*. [\[LINK\]](#)

socio-environmental harm and economic problems associated with the fossil fuel industry.¹⁰⁷ In particular, all practices employed to move toward clean renewable energy must adhere to FPIC and prohibit land grabs and displacement.¹⁰⁸ Such a transition would also necessitate addressing overconsumption in the Global North (see discussion on degrowth as an economic model below).

- **Democratize, Decentralize, Diversify Energy**

A Just Transition supports democratic participation in decentralized energy grids and diversified economic systems.⁶⁴ Investments in local energy production as opposed to large renewable infrastructure will ensure local communities are involved in the planning and implementation process and job creation.⁶⁵

- **Energy Efficiency**

Governments must establish stringent energy efficiency standards and provide affordable and accessible methods to meet such standards. Lowering emissions through energy efficiency is highly effective and governments should use public funds to implement energy efficiency plans—e.g., providing resources to retrofit and weatherize inefficient buildings and homes.¹⁰⁹

- **Public and Active Transportation**

Transportation accounts for one-fifth of global carbon emissions.¹¹⁰ There must be investments in mass public transit with free or heavily subsidized fares. Cities need to transition away from car-centric infrastructure and move towards walkable and bikeable infrastructure with major investments in electric trains.¹¹¹

- **Supporting Small-Scale Farmers to promote Agroecology**

Promoting a more sustainable and equitable food system requires empowering small-scale farmers to implement a Just Transition away from large-scale monoculture and commercial food systems towards agroecological systems.¹¹² Agroecology is a farming approach which involves bottom-up processes to apply ecological and social principles that are based on contextualized solutions to fix local problems.¹¹³ For example, an agroecology approach would improve soil quality through increasing biodiversity and enriching the soil with compost rather than applying fossil fuel-derived pesticides and

¹⁰⁷ Alarcón, P., Diaz, N., Schwab, J., et. al. (2022, August). Rethinking ‘Just Transition’: Critical Reflections for the Global South. *TRAJECTS*. [\[LINK\]](#)

¹⁰⁸ Knight, R., Angarova, G., Finn, K., et. al. (2023, September). Securing Indigenous Peoples’ Right to Self-Determination: A Guide on Free, Prior, and Informed Consent. *Cultural Survival*. [\[LINK\]](#)

¹⁰⁹ ActionAid., Corporate Accountability., FOE., et. al. (2020, October). Not Zero: How ‘Net Zero’ Targets Disguise Climate Inaction. *Demand Climate Justice*. [\[LINK\]](#)

¹¹⁰ Ritchie, H. (2020, October 6). Cars, Planes, Trains: Where Do CO2 Emissions from Transport Come From? *Our World in Data*. [\[LINK\]](#)

¹¹¹ ActionAid., Corporate Accountability., FOE., et. al. (2020, October). Not Zero: How ‘Net Zero’ Targets Disguise Climate Inaction. *Demand Climate Justice*. [\[LINK\]](#)

¹¹² De Schutter, O. (2010, December 20). Report submitted by the Special Rapporteur on the right to food. *United Nations*. [\[LINK\]](#)

¹¹³ Agroecology Fund. (n.d.). *What is Agroecology?* [\[LINK\]](#)

fertilizers.¹¹⁴ Numerous studies have demonstrated that agroecology is both ecologically sound and an effective path forward in feeding the world.¹¹⁵ Small-scale organic farming can increase crop productivity, reduce rural poverty, boost nutrition, and mitigate climate change through carbon sequestration.¹¹⁶

- **Forest Protection/Reforestation led by Indigenous Peoples and Local Communities**

Numerous studies have found that the world's healthiest forests are located in protected Indigenous lands, which are also areas of highest biodiversity¹¹⁷—approximately 25% of the carbon stored in tropical and subtropical forests is stewarded by Indigenous Peoples.¹¹⁸ Given Indigenous Peoples' and local communities' ancestral knowledge and expertise in harmonious land management, as well as their stewardship of important biodiverse regions and carbon sinks, they are critical leaders in the protection of forests and reforestation.

- **Women's Leadership**

Numerous studies have demonstrated the crucial role of women's leadership in successfully addressing the climate crisis and specifically lowering carbon emissions.¹¹⁹ An in-depth study shows that a one-unit increase in a country's score on the Women's Political Empowerment Index demonstrates an 11.51% decrease in a country's carbon emissions.¹²⁰ Additionally, addressing and investing in women's unpaid and undervalued labor in the care sector will further efforts to transition the economy and help move society toward Real Zero.¹²¹ Investing in the care workforce, which is disproportionately female, will provide women in all of their diversity with more resources and capacity to take on leadership roles during both the planning and implementation process of the Just Transition.¹²² By enhancing participation and perspectives included throughout the transition to renewable energy, the outcomes will be more socio-ecologically sound and equitable. Studies have revealed that communities and ecological systems significantly improve when women hold leadership positions at all levels.¹²³

¹¹⁴ Sayner, A. (n.d.). What is Agroecology? An In-Depth Guide. *GroCycle*. [\[LINK\]](#)

¹¹⁵ De Schutter, O. (2010, December 20). Report submitted by the Special Rapporteur on the right to food. *United Nations*. [\[LINK\]](#); Kerr, R., Postigo, J., Smith, P., et. al. (2023, June). Agroecology as a transformative approach to tackle climate, food, and ecosystem crises. *Current Opinion in Environmental Sustainability*. [\[LINK\]](#)

¹¹⁶ De Schutter, O. (2010, December 20). Report submitted by the Special Rapporteur on the right to food. *United Nations*. [\[LINK\]](#); Kerr, R., Postigo, J., Smith, P., et. al. (2023, June). Agroecology as a transformative approach to tackle climate, food, and ecosystem crises. *Current Opinion in Environmental Sustainability*. [\[LINK\]](#); Lario, A. (2024, February 13). Why small-scale farmers can teach us a lot about climate change. *World Economic Forum*. [\[LINK\]](#)

¹¹⁷ Sze, J., Childs, D., Carasco, R., et. al. (2022, November 21). Indigenous Lands in Protected Areas Have High Forest Integrity across the Tropics. *Current Biology*. [\[LINK\]](#)

¹¹⁸ Beltran, L. (2024, January 30). Lessons from Indigenous leaders to protect the Amazon rainforest. *World Economic Forum*. [\[LINK\]](#)

¹¹⁹ WECAN International. (n.d.). *Why Women*. [\[LINK\]](#)

¹²⁰ Lv, Z., Deng, C. (2019, January 3). Does women's political empowerment matter for improving the environment? *Sustainable Development*. [\[LINK\]](#)

¹²¹ Lake, Osprey., Quaid, K. (2023). Prioritizing Care Work Can Unlock a Just Transition for All. *WECAN International*. [\[LINK\]](#)

¹²² Paul, S. (2024, August). Gender, Climate and Energy in the United States. *WEDO*. [\[LINK\]](#)

¹²³ WomenWatch. (n.d.). Women, Gender Equality and Climate Change. United Nations. [\[LINK\]](#)

- **Rights of Nature**

In the 2019 *Harmony with Nature, Report of the Secretary-General 16*, United Nations Secretary-General António Guterres stated, “Over the last decade, Earth jurisprudence can be seen as the fastest growing legal movement of the twenty-first century.”¹²⁴ Earth jurisprudence is the legal framework that humans are embedded within the natural world and that human governance should be ecocentric rather than anthropocentric; the Rights of Nature (RoN) movement is a form in which this framework is mobilized.¹²⁵ Many RoN concepts are rooted in numerous different Indigenous knowledge systems; the RoN movement is often led by Indigenous Peoples. RoN laws and policies recognize that ecosystems—including trees, oceans, animals, rivers, and mountains—have rights just as human beings have rights and that human communities are embedded within ecosystems.¹²⁶ It is the holistic recognition that all life is deeply intertwined. Rather than treating nature as property under the law, Rights of Nature acknowledges that nature in all its life forms has the right to exist, flourish, regenerate, and naturally evolve.¹²⁷ In legal cases alleging infringement on rights, an ecosystem itself can be named as the injured party, with its own standing and rights to payment for damages.¹²⁸ Rights of Nature is being implemented by communities in countries worldwide and is a legal framework that aligns human law with the laws of nature.

VII. Real Zero calls for a restructuring of extractive economies. Below are several economic models and principles that demonstrate pathways forward:

- **Degrowth**

Degrowth is an economic and social strategy to immediately and equitably downscale production and consumption to diminish the use of resources and energy.¹²⁹ The dominant global economic model is based on exponential growth with finite resources. Human and environmental impacts of current systems manifest through longer work hours, collapsing ecosystems, and low quality of life.¹³⁰ Instead, investments must center on the optimization of materials, renewable energy, climate mitigation and adaptation, and ecosystem regeneration.¹³¹ Other key components of degrowth are redistributing wealth through community currencies and fair distribution of funds and assets based on income.¹³² Degrowth economics has the potential to truly decarbonize supply chains that are a primary contributor to climate change.

¹²⁴ United Nations General Assembly. (2019, July 26). *Harmony with Nature: Report of the Secretary-General*. [\[LINK\]](#)

¹²⁵ United Nations General Assembly. (2019, July 26). *Harmony with Nature: Report of the Secretary-General*. [\[LINK\]](#)

¹²⁶ United Nations General Assembly. (2019, July 26). *Harmony with Nature: Report of the Secretary-General*. [\[LINK\]](#)

¹²⁷ United Nations General Assembly. (2019, July 26). *Harmony with Nature: Report of the Secretary-General*. [\[LINK\]](#)

¹²⁸ United Nations General Assembly. (2019, July 26). *Harmony with Nature: Report of the Secretary-General*. [\[LINK\]](#)

¹²⁹ Kallis, G. (2011, March 15). In Defence of Degrowth. *Ecological Economics*. [\[LINK\]](#)

¹³⁰ Kallis, G. (2011, March 15). In Defence of Degrowth. *Ecological Economics*. [\[LINK\]](#)

¹³¹ Kallis, G. (2011, February 15). In Defence of Degrowth. *Ecological Economics*. [\[LINK\]](#)

¹³² Kallis, G. (2011, February 15). In Defence of Degrowth. *Ecological Economics*. [\[LINK\]](#)

- **Reciprocal Economies drawing upon Indigenous knowledge systems**

Knowledge from different Indigenous cultures holds wisdom to guide in many arenas, including economies and values that preserve biodiversity and restore key habitats that sustain life.¹³³ Many historic and current Indigenous economies incorporate reciprocity, redistribution of resources, harmony with nature, and communal sufficiency, as opposed to over-consumption, hyper-individualism, and boundless material economic growth.¹³⁴ This can be seen in the prioritization of local markets over global trade markets and their accompanying socio-environmentally harmful global supply chains. The Biocultural Heritage Territory, in the Potato Park in Peru, for instance, is led by six Quechua communities that have built collective micro-enterprises relating to traditional food, agro-ecotourism, handcrafted art, herbal teas, and others, through the application of Andean principles of holism and wellbeing.¹³⁵ Approximately 10% of revenues from the micro-enterprises are reinvested into a community fund which is distributed to biocultural heritage stewards and assists local residents in need.¹³⁶

- **Buen Vivir**

Buen Vivir or *Sumak Kawsay*, which roughly translates to “good living,” comes from the Quechua Peoples of the Andes.¹³⁷ Some principles of Buen Vivir include small-scale production, reduced consumption, a sharing economy, and symbiosis between people and the planet, all of which must be incorporated into a renewable energy transition.¹³⁸ While Buen Vivir is community-centric and honors traditional Indigenous knowledge, the principles of Buen Vivir do not aim to return to the “ancestral Indigenous past,” but rather seek to create a “common ancestral future.”¹³⁹

- **Care Economy**

As previously mentioned, care work is the paid and unpaid labor often performed by women that supports day-to-day societal welfare.¹⁴⁰ Jobs in the care sector typically include nurses, child caregivers, housekeepers, health care workers, cooks, eldercare workers, and other roles that support the well-being and functioning of society.¹⁴¹ Investing in the care economy, which is considered a low-carbon sector, is a necessary part of a Just Transition to a healthy and equitable future that keeps all genders on equal footing. A well-paid care workforce creates low-carbon jobs, which have traditionally

¹³³ Swiderska, K. (2021, April 12). Here’s Why Indigenous Economics Is the Key to Saving Nature. *International Institute for Environment and Development*. [\[LINK\]](#)

¹³⁴ Swiderska, K. (2021, April 12). Here’s Why Indigenous Economics Is the Key to Saving Nature. *International Institute for Environment and Development*. [\[LINK\]](#)

¹³⁵ Swiderska, K. (2021, April 12). Here’s Why Indigenous Economics Is the Key to Saving Nature. *International Institute for Environment and Development*. [\[LINK\]](#)

¹³⁶ Swiderska, K. (2021, April 12). Here’s Why Indigenous Economics Is the Key to Saving Nature. *International Institute for Environment and Development*. [\[LINK\]](#)

¹³⁷ Villalba, U. (2013, September). *Buen Vivir vs Development: A Paradigm Shift in the Andes?* Routledge Taylor and Francis Group. [\[LINK\]](#)

¹³⁸ Villalba, U. (2013, September). *Buen Vivir vs Development: A Paradigm Shift in the Andes?* Routledge Taylor and Francis Group. [\[LINK\]](#)

¹³⁹ Salazar, J. (2015, July 23). *Buen Vivir: South America’s Rethinking of the Future We Want*. *The Conversation*. [\[LINK\]](#)

¹⁴⁰ Carpenter, C., Staab, S., Bidegain, N. (March 14). *New Economics for Sustainable Development: Purple Economy (Care Economy+)*. *United Nations Economist Network*. [\[LINK\]](#)

¹⁴¹ Carpenter, C., Staab, S., Bidegain, N. (March 14). *New Economics for Sustainable Development: Purple Economy (Care Economy+)*. *United Nations Economist Network*. [\[LINK\]](#)

been undervalued, and also allows women, who may be otherwise burdened by unpaid care work, to participate in and lead energy transition solutions. This in turn bolsters the inclusivity of the Just Transition process, thereby creating more equitable and sustainable outcomes.¹⁴² Reduction and redistribution of care work has been shown to increase women's participation in renewable energy-related affairs.¹⁴³ Investments in care as a public good, as opposed to other high-emitting industries, can also contribute to a shift away from a production-based society reliant on resource extraction and over-consumption to locally-based circular economies that are reciprocal and sustainable with respect to planetary boundaries.¹⁴⁴

- **Gross National Happiness (GNH)**

Gross Domestic Product (GDP) is the current economic indicator of success for much of the Western world. In contrast, Gross National Happiness (GNH) recognizes numerous measurements to determine the well-being and happiness of a country.¹⁴⁵ GNH analyzes 33 indicators that are divided into various pillars, such as good governance, socio-economic development, health, education, cultural preservation, and environmental resilience, to measure and improve the well-being of all people.¹⁴⁶ Bhutan is currently the only country that calculates their GNH index and incorporates GNH principles into all of the country's new policies.¹⁴⁷ GNH provides a holistic perspective while also giving policymakers data from various indicators that can be studied and improved upon.¹⁴⁸

- **Circular Economy**

The purpose of a circular economy is to minimize material extraction, redesign products and services to be less resource intensive, and upcycle "waste" as a resource to create new materials and products.¹⁴⁹ The circular economy has the potential to create thousands of new and meaningful jobs, minimize overexploitation of resources, and reduce toxic waste in landfills.¹⁵⁰ While current business models rely on planned obsolescence for continued profit, a circular economy ensures that items are built to last and easy to repair.¹⁵¹ Examples of waste that can be upcycled include clothing, scrap metal, glass, and even food scraps.¹⁵² Historically and currently, underserved and low-income communities are often

¹⁴² Paul, S. (2024, August). Gender, Climate and Energy in the United States. *WEDO*. [\[LINK\]](#); Carpenter, C., Staab, S., Bidegain, N. (March 14).

New Economics for Sustainable Development: Purple Economy (Care Economy+). *United Nations Economist Network*. [\[LINK\]](#); Palladino, L., Gunn-Wright, R. (2021, April). Care & Climate: Understanding the Policy Intersections. *Feminist Green New Deal Coalition*. [\[LINK\]](#)

¹⁴³ Paul, S. (2024, August). Gender, Climate and Energy in the United States. *WEDO*. [\[LINK\]](#); Carpenter, C., Staab, S., Bidegain, N. (March 14).

New Economics for Sustainable Development: Purple Economy (Care Economy+). *United Nations Economist Network*. [\[LINK\]](#)

¹⁴⁴ Women's Budget Group. (2022, November). *A Green and Caring Economy: Key Messages*. [\[LINK\]](#)

¹⁴⁵ Oxford Poverty & Human Development Initiative. (n.d.). *Bhutan's Gross National Happiness Index*. [\[LINK\]](#)

¹⁴⁶ Oxford Poverty & Human Development Initiative. (n.d.). *Bhutan's Gross National Happiness Index*. [\[LINK\]](#)

¹⁴⁷ Sharma, L., Ratnakar, A. (2021, October 25). What Bhutan Got Right about Happiness - and What Other Countries Can Learn. *World Economic Forum*. [\[LINK\]](#)

¹⁴⁸ Sharma, L., Ratnakar, A. (2021, October 25). What Bhutan Got Right about Happiness - and What Other Countries Can Learn. *World Economic Forum*. [\[LINK\]](#)

¹⁴⁹ European Parliament. (2023, May 24). *Circular Economy: Definition, Importance and Benefits*. [\[LINK\]](#)

¹⁵⁰ European Parliament. (2023, May 24). *Circular Economy: Definition, Importance and Benefits*. [\[LINK\]](#)

¹⁵¹ European Parliament. (2023, May 24). *Circular Economy: Definition, Importance and Benefits*. [\[LINK\]](#)

¹⁵² European Parliament. (2023, May 24). *Circular Economy: Definition, Importance and Benefits*. [\[LINK\]](#)

burdened with the health and environmental implications that spawn from the landfills and toxic facilities necessary to dispose of materials.¹⁵³ These types of facilities would be significantly reduced in a circular economy. For example, Cooperation Jackson, located in Jackson, Mississippi, is a network of worker-owned co-ops that is implementing plans to use all waste generated by the co-op towards developing new materials and products that create high-quality, well-paying jobs.¹⁵⁴ This sector has the potential to improve health, create good-paying jobs, and minimize reliance on resource extraction.

- **Doughnut Economics**

Economist Kate Raworth coined the term “Doughnut Economics” to bring a new economic perspective that balances social and ecological well-being. The economic model ensures that everyone has their basic needs met while also avoiding exploitation of planetary boundaries to stay within ecological limits.¹⁵⁵ The Doughnut Economy has two rings: the inner ring symbolizes a social foundation ensuring food, shelter, water, and human rights are guaranteed, while the outer ring represents the water, air, biodiversity, and other ecological systems needed to sustain life.¹⁵⁶ Doughnut Economics seeks to evenly distribute wealth, restore resources, and provide conditions for living beings to thrive.¹⁵⁷ This model emphasizes that a flourishing economy should not rely on endless exponential growth and that overall consumption must be reduced.

VIII. Conclusion:

While Net Zero is a scientific concept centered on balancing out produced greenhouse gasses and keeping temperature rise to 1.5°C, the way governments, corporations, and financial institutions are interpreting and implementing the concept has led to a lack of integrity and accountability. This policy analysis begins a much needed critical assessment of Net Zero and its many limitations, contrasting Net Zero strategies with the potential and promise of Real Zero alternatives. Real Zero approaches shift from false solutions to solutions that center Just Transition principles, reliable interdisciplinary research, community-led solutions, and a climate justice framework. The Net Zero model has serious flaws. Most carbon offset projects overestimate their emissions reduction benefits,¹⁵⁸ while some do not result in any emissions reduction¹⁵⁹ or risk increasing carbon emissions.¹⁶⁰ This policy analysis demonstrates that Real Zero and a Just Transition

¹⁵³ Erickson, J. (2016, January 19). Targeting Minority, Low-Income Neighborhoods for Hazardous Waste Sites. *University of Michigan News*. [\[LINK\]](#)

¹⁵⁴ Cooperation Jackson. (n.d.). *Sustainable Communities Initiative*. [\[LINK\]](#)

¹⁵⁵ Raworth, K. (2017). Doughnut economics: Seven ways to think like a 21st-century economist. *Chelsea Green Publishing*. [\[LINK\]](#)

¹⁵⁶ Raworth, K. (2017). Doughnut economics: Seven ways to think like a 21st-century economist. *Chelsea Green Publishing*. [\[LINK\]](#)

¹⁵⁷ Raworth, K. (2017). Doughnut economics: Seven ways to think like a 21st-century economist. *Chelsea Green Publishing*. [\[LINK\]](#)

¹⁵⁸ Haya, B., Bukosi, J., Jacobson, R., et. al. (2023, March 20). Comprehensive review of carbon quantification by improved forest management offset protocols. *Front. For Glob. Change*. [\[LINK\]](#)

¹⁵⁹ Correa, A.D. (2023, November 20). Brazil: Three carbon offset project accused of being scams. *Le Monde*. [\[LINK\]](#)

¹⁶⁰ Rochon, E., Bjureby, E., Johnston, P., et. al. (2008, May). False Hope: Why carbon capture and storage won't save the climate. *Greenpeace International*. [\[LINK\]](#)

present best practices and pathways forward for a healthy and equitable approach to addressing the climate crisis.