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Climate Change and Net Zero Emission: A Global Imperative

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Global warming, an alarming consequence of escalating greenhouse gas emissions, presents unprecedented challenges to both our environment and humanity. The repercussions are manifest in rising sea levels, extreme weather events, and disruptions to ecosystems. In recent years, the critical focus has shifted to carbon emissions, prompting a unified global effort towards the ambitious goal of Net Zero Emission.

Simply, Net Zero Emission embodies the equilibrium between the quantity of greenhouse gases produced and those effectively removed from the atmosphere. This objective is pivotal in mitigating the adverse effects of climate change and safeguarding the planet for future generations. The urgency of the matter is glaring, emphasizing that a sustainable future hinges on our collective ability to achieve and sustain Net Zero Emission.

The urgency of achieving Net Zero Emission is underscored by the clear scientific evidence indicating that limiting global temperature increase to 1.5°C above pre-industrial levels is crucial. Currently, Earth is already 1.1°C warmer than the late 1800s, and emissions continue to rise. To avert the worst impacts of climate change and maintain a livable planet, global warming must be capped at 1.5°C. This necessitates a 45% reduction in emissions by 2030 and achieving net zero by 2050, as outlined in the Paris Agreement.

How Can Net Zero Be Achieved?

Transitioning to a net-zero world poses one of humanity's greatest challenges, requiring a fundamental transformation in how we produce, consume, and navigate our world. The energy sector, responsible for approximately three-quarters of

greenhouse gas emissions, holds the key to mitigating climate change. Increasing the share of renewable sources like wind and solar in power generation is pivotal for a significant reduction in carbon emissions. A global coalition comprising countries, cities, businesses, and other institutions is actively pledging to achieve net-zero emissions. Over 140 countries, including major polluters like China, the United States, India, and the European Union, have committed to net-zero targets, covering a substantial 88% of global emissions. More than 9,000 companies, 1,000 cities, over 1,000 educational institutions, and 600 financial institutions have joined the Race to Zero, committing to immediate and rigorous action to halve global emissions by 2030.

Are We on Track to Reach Net Zero by 2050?

National climate plans, collectively representing 195 Parties to the Paris Agreement, would result in an alarming almost 9% increase in global greenhouse gas emissions by 2030, compared to 2010 levels. Achieving the 1.5°C target demands a 45% reduction in emissions by 2030 and reaching net zero by 2050. Urgent and bold steps are imperative, especially from the largest emitters, to strengthen their Nationally Determined Contributions and take immediate actions to reduce emissions. The commitment to a sustainable future must translate into decisive, impactful measures to address the pressing climate crisis.

To actualize Net Zero, nations are implementing an array of initiatives and strategies. These encompass transitioning to renewable energy sources, enhancing energy efficiency, and investing in sustainable practices. Success stories from various regions underscore the feasibility and tangible benefits of these approaches, providing valuable lessons for others to emulate.

The energy sector emerges as a linchpin in the journey towards Net Zero. The adoption of high-tech and clean technologies is reshaping how we generate and consume energy. From the pervasive use of solar and wind power to the deployment of advanced energy storage solutions, innovation is propelling a green revolution in the energy landscape, steering it away from fossil fuel dependency.

Decarbonization and Carbon Footprint

Decarbonization, the process of systematically reducing carbon emissions, occupies a central position in achieving Net Zero. Both individuals and industries must actively contribute by minimizing their carbon footprint. This necessitates a paradigm shift towards sustainable practices, lifestyle alterations, and the enthusiastic embrace of eco-friendly technologies, ensuring a holistic approach to decarbonization.

At the forefront of the battle against carbon emissions are Carbon Capture and Storage (CCS) technologies. These innovative solutions effectively capture CO₂ emissions from various sources, preventing their release into the atmosphere. The captured carbon can then be stored underground or repurposed for other applications, offering a promising avenue for emission reduction on a significant scale.

Navigating the Net-Zero Transmission: Closer Look at capital Spending and Global Implications

According to McKinsey & Company, capital spending on physical assets for energy and land-use systems during the net-zero transition from 2021 to 2050 is projected to total approximately \$275 trillion, averaging \$9.2 trillion per year. This reflects an annual increase of up to \$3.5 trillion compared to current levels. An additional \$1

trillion of today's annual spend would also need to be redirected from high-emissions to low-emissions assets. Considering anticipated growth in spending due to income and population increases, along with existing legislated transition policies, the required spending increase would be somewhat lower but still around \$1 trillion. This expenditure is front-loaded, rising from 6.8 percent of GDP today to as much as 8.8 percent of GDP between 2026 and 2030 before gradually declining.

While the financial requirements are substantial and financing strategies are yet to be solidified, it's crucial to recognize that many of these investments offer positive returns, independent of their role in mitigating physical risks. Additionally, technological innovations could expedite the reduction of capital costs for net-zero technologies. As the power sector incorporates renewables and expands transmission and distribution capacity, the fully loaded unit cost of electricity production, factoring in operating costs, capital costs, and asset depreciation, could rise approximately 25 percent by 2040 and remain about 20 percent higher globally in 2050 compared to 2020 averages. However, near-term cost increases could surpass these estimates if challenges related to grid intermittency are not effectively managed.

The net-zero transition could have profound implications for employment, resulting in a net gain of about 200 million and a loss of about 185 million direct and indirect jobs globally by 2050. This includes demand for jobs in operations and the construction of physical assets. Employment demand in fossil fuel extraction, production, and fossil-based power sectors could decline by about nine million and four million direct jobs, respectively, while renewable power, hydrogen, and biofuels could generate around eight million direct jobs by 2050.

Crucially, achieving net-zero emissions and limiting global warming to 1.5°C would diminish the likelihood of catastrophic climate impacts, preserve our ability to halt additional warming, and usher in a more sustainable future. The road to net zero

necessitates coordinated and innovative actions from both governments and businesses. This includes defining, executing, and evolving decarbonization plans, integrating climate-related factors into decision-making processes, and fostering collective action. Financial institutions play a pivotal role in supporting large-scale capital reallocation, while governments and multilateral institutions can leverage policy tools to incentivize and support the transition. The pace and scale of the transition might require the creation of new institutions and the revamping of existing ones to disseminate best practices, establish standards, and manage uneven impacts.

Recommendations for a Sustainable Future:

1. **Individual Responsibility:** Encourage individuals to make environmentally conscious choices in their daily lives, from adopting energy-efficient practices to reducing waste and supporting sustainable products.
2. **Government Policies:** Advocate for comprehensive and forward-thinking government policies that incentivize and mandate the transition to sustainable practices across industries.
3. **Investment in Research and Development:** Support and prioritize research and development in clean technologies to foster innovation and create more efficient solutions for reducing carbon emissions.
4. **International Collaboration:** Strengthen international collaboration and cooperation to share knowledge, resources, and best practices in the pursuit of global Net Zero goals.

Conclusion

In confronting the reality of climate change, achieving Net Zero Emission is not merely a lofty goal; it is an essential global imperative. The collaborative efforts of nations, coupled with advancements in technology and sustainable practices, offer hope for a sustainable future. As we navigate this critical juncture, individual actions, industry innovations, and international cooperation will be the driving forces in securing a planet that thrives for generations to come. Let our collective commitment to Net Zero Emission serve as the guiding light toward a resilient and sustainable future.

While the net-zero transition poses substantial challenges, it also brings about transformative opportunities. It is a collective responsibility to act with unity, resolve, and ingenuity, extending planning and investment horizons while taking immediate actions to manage risks and seize opportunities.

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