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**Transitioning from
fossil fuels: prioritising
clean energy sources**

Environmental Commission

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INTRODUCTION

The transition away from fossil fuels is one of the most important and urgent topics of the modern world. Fossil fuels have been powering economies for many years, even centuries, helping in industrial growth and technological advancements. However, fossil fuels hold significant environmental impacts, particularly in greenhouse gas emissions. These environmental impacts have fueled climate change, and pose severe risks to ecosystems and even human livelihoods. As global energy demands are at an all-time high and continue to rise, prioritizing a source of clean energy is essential to sustainable development and the environment.

The Energy Transitions Commission (ETC) emphasizes the importance of a large reduction in the use of coal, oil, and gas by 2050 to meet the COP21 Paris Agreement targets, in their latest report; *"Fossil Fuels in Transition."* It is clear that immediate action is critical to limit global warming temperatures to 1.5°C by the end of this century. Crossing this 1.5°C threshold could have catastrophic risks and consequences, including more frequent and severe droughts, heatwaves, and heavy rainfall.

The world needs to significantly reduce its emissions of greenhouse gases such as carbon dioxide, achieving net-zero carbon emissions will require a significant shift away from fossil fuels. Since energy production remains one of the largest contributors to greenhouse gas emissions, the adoption of cleaner energy sources that produce little to no carbon dioxide is essential for a sustainable future.

KEY TERMS

Greenhouse gases - Greenhouse gases are gases in the earth's atmosphere that trap heat. During the day, the sun shines through the atmosphere, warming the earth's surface. At night the earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the greenhouse gases in the atmosphere, which causes global warming.

Fossil Fuels - Fossil fuels are natural non-renewable energy sources formed from the remains of ancient plants and animals buried underground for millions of years. These include coal, oil, and natural gas, which are burned to produce energy. While they have powered global economies for centuries, their combustion releases greenhouse gases, contributing to climate change and environmental degradation.

Renewable Energy Sources - Renewable energy sources are natural resources that are replenished continuously and cannot be depleted. Examples include sunlight, wind, water, and geothermal heat. Unlike fossil fuels, renewable energy produces little to no greenhouse gas

emissions, making it a cleaner and more sustainable option for generating electricity and powering industries.

Net Zero Emissions - This term refers to achieving a balance between the amount of greenhouse gases emitted into the atmosphere and the amount removed. This can be accomplished by reducing emissions through cleaner energy sources and technologies while offsetting any remaining emissions with practices like reforestation or carbon capture.

Carbon Pricing - This is an economic strategy used to reduce carbon emissions by assigning a cost to emitting carbon dioxide and other greenhouse gases. It incentivizes businesses and individuals to adopt cleaner technologies and practices.

The UNFCCC - The **United Nations Framework Convention on Climate Change** is an international environmental treaty established in 1992 to address climate change and its impacts. It provides a framework for global cooperation to limit greenhouse gas emissions and adapt to climate change.

The COP conferences- The Conference of the Parties conferences are annual international meetings where world leaders, negotiators, and experts gather to discuss and make decisions on global climate change policies. The conferences are part of the UNFCCC.

GENERAL OVERVIEW

The clean energy transition is the process in which we are aiming to shift energy production away from fossil fuels, such as coal, oils, and natural gas, and reduce our use of these energy sources, and increase production of renewable energy sources that emit little to no greenhouse gases. Historically, fossil fuels have been the main source of global energy production and consumption, powering industries, homes, and transportation. However, fossil fuels are a major contributor to global warming through greenhouse gas emissions, to limit the impacts of climate change there needs to be a clear reduction in fossil fuel consumption and a transition towards more clean and renewable energy, such as wind and solar powers, which are critical for reducing emissions and ensuring a sustainable energy future.

Renewable energy sources offer several strong advantages over fossil fuels. They are naturally replenishing and, unlike fossil fuels, are not finite resources. This makes them both environmentally sustainable and economically viable in the long term. Despite these benefits, the transition to clean energy is complex and full of multifaceted challenges, including **technological**, economic, societal, and **geopolitical** obstacles.

From a geopolitical standpoint, the topic of clean energy transitioning has brought up debates and worries, especially in the southern global regions. Many LEDC's and developing nations have argued that they are being pressured into adopting renewable energy technologies despite not being large contributors to greenhouse gas emissions. Many leaders believe that prioritizing clean energy could slow their economic development and stop them from getting their populations out of poverty. Especially in Africa, these opinions have been expressed by the former Nigerian Vice President Yemi Osinbajo and Ugandan President Yoweri Museveni have voiced concerns.

Technologically speaking, clean energy systems face many challenges in matching the same efficiency and reliability as fossil fuels. Solar power technology, for example, has made significant progress but continues to not sufficiently deliver on its own, silicon-based solar panels, the most established technology, have an efficiency of about 26% and a lifespan of 20-25 years. Emerging technologies, such as perovskite and organic solar cells, are still under development and not yet market-ready due to efficiency and stability issues. Additionally, solar energy requires complementary storage technologies, such as batteries, to provide reliable power around the clock. Mining materials for these technologies and managing their disposal further complicates and contradicts the sustainability of solar solutions.

Therefore, the clean energy transition involves not only reducing our dependence on fossil fuels but also addressing the economic disparities between nations, improving existing technologies, and finding ways to overcome the environmental impacts of renewable technologies too.

MAJOR PARTIES AND COUNTRIES INVOLVED

Sweden, Costa Rica, Iceland, Norway - These countries have shown themselves to be global leaders in the clean energy transition, acting as an example of sustainable development. **Sweden** achieved its target of 50% renewable energy in 2012, eight years ahead of schedule, and is on track to produce 100% fossil-free electricity by 2040. It utilizes a diverse mix of wind, bioenergy, solar, and even innovative methods like capturing body heat from commuters to warm buildings. **Costa Rica** has repeatedly broken records for consecutive days powered entirely by renewable energy, reaching 300 days in 2018. Its energy mix includes hydro, geothermal, wind, biomass, and solar power. **Iceland** relies almost entirely on hydropower and geothermal energy, with geothermal sources heating 90% of homes and ranking among the world's top producers of geothermal energy. Similarly, **Norway** generates 98% of its electricity from renewables, primarily hydropower, which it has utilized since the late 1800s. The UN has also recognized and suggested these nations' approaches as models for other nations.

The United States of America - The USA is the second largest emitter of carbon dioxide (CO₂) in the world, with 5,057 million metric tons of CO₂ emissions recorded in 2022. Its primary sources of emissions are transportation, electric power, and industry, considering the country is a large industrial producer, it faces challenges with ruling out fossil fuels. While the Biden Administration has made progress in addressing climate change, including rejoining the **Paris Agreement** and promoting clean energy initiatives, the country remains off track to meet its domestic climate targets or align with the 1.5°C global warming limit.

China - China is the world's largest emitter of carbon dioxide (CO₂), its emissions reached an all-time high in 2023, driven by a surge in economic activity and fossil fuel consumption following the end of zero-COVID policies. As one of the largest importers of oil, China's reliance on motor vehicles and transportation fuels significantly contribute to its emissions. Additionally, as the second-largest manufacturer globally, much of its industrial production is powered by coal, worsening their CO₂ outputs even further. Rapid urbanization has also intensified emissions, with infrastructure projects requiring large amounts of cement and steel, which are both industries that emit a lot of carbon dioxide. China's large population, fast urbanization, and overall reliance on fossil fuels create really extreme challenges for them to simply accept being forced into the clean energy transition.

The European Union - The EU leads in promoting green policies, and has set a legally binding target to achieve carbon neutrality by 2050 through the European Climate Law, aiming to be the first carbon neutral continent. This goal is central to the European Green Deal, which outlines strategies for reducing greenhouse gas emissions and transitioning to sustainable energy systems. In the first half of 2024, fossil fuels accounted for only 27% of the EU's total electricity generation, down from 33% during the same period in 2023, showing significant progress in their clean energy transition. The EU's commitment to becoming the world's first climate-neutral continent underscores its dedication to combating climate change and setting an example for other regions.

India - India is the third-largest emitter of carbon dioxide globally, releasing 2,830 million metric tons in 2022. Coal remains the primary energy source, supplying approximately 44% of the country's energy, while petroleum and other liquids account for about 24%. The country's dependence on fossil fuels has only grown following its modernization and fast urbanization. The country's rapid economic growth and urban expansion have driven a steady rise in energy demand, posing significant challenges for reducing emissions while maintaining development. Their key focus should be to balance economic progress with sustainable development.

Saudi Arabia - Saudi Arabia is the world's largest oil exporter and heavily reliant on oil revenues. However, the country is undergoing a major economic transformation through its Vision 2030

plan, which aims to reduce dependence on oil by diversifying the economy. The introduction of a value-added tax (VAT) and successful debt issuances have already helped lower oil's share of total revenue to below 70%, even during periods of high oil prices. Despite these efforts, Saudi Arabia remains sensitive to fluctuations in oil prices, so strong policies are necessary.

TIMELINE OF KEY EVENTS

1970's // Energy Crisis & Renewable Energy Movement - Political tensions and oil embargoes triggered a global energy crisis, prompting interest in renewable energy sources like solar and wind power. This period marked a shift towards diversifying energy sources.

1992 // UNFCCC Established- The United Nations Framework Convention on Climate Change (UNFCCC) was formed to address global climate challenges.

1995 // First COP Conference Meeting - The first Conference of the Parties (COP) was held in Berlin, Germany, initiating annual climate negotiations. The COP would be meeting every year from here on out, unless decided otherwise by the Parties.

1997 // Kyoto Protocol - The Kyoto Protocol set legally binding emission reduction targets for developed nations. However, limited participation and enforcement issues challenged its success. Though the treaty has been superseded by the Paris Agreement, the Kyoto Protocol remains an important part of environmental and conservation history.

2015 // Paris Agreement - Implemented at COP21 in Paris, this legally binding treaty aimed to limit global temperature rise to well below 2°C, with efforts to cap it at 1.5°C. The EU pledged a 55% emissions reduction by 2030 as a step toward neutrality by 2050.

2021 // COP26 (Glasgow Climate Pact) - At COP26, Nation adopted the Glasgow Climate Pact, which called for stronger resilience measures, curbing greenhouse gas emissions, phasing down coal, and increasing renewable energy investments.

2023 // COP28 (Global Stocktake) - Held in Dubai, COP28 was the biggest of its kind, with about 85,000 participants, it marked the first 'global stocktake' of climate action under the Paris

Agreement. Findings showed slow progress, leading to renewed calls to transition from fossil fuels to renewable energy by 2030.

UN INVOLVEMENT & RELEVANT RESOLUTIONS

THE UNFCCC - The United Nations Framework Convention on Climate Change is the primary international organization that is responsible for addressing climate change and global warming. It was established in 1992, and it provides a global platform for 198 nations to cooperate on strategies and resolutions to adapt to climate change, and minimize global warming risks. The ultimate goal of the UNFCCC and its agreements is to stabilize greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system.

The UNFCCC secretariat (a.k.a UN Climate Change) is the foundation for two major climate agreements, and is also responsible for monitoring their progress to ensure global cooperation;

- The 1997 Kyoto Protocol, which focused on legally binding emissions reductions for developed nations.
- 2015 Paris Agreement, which aimed at limiting global temperature rise to 1.5°C above pre-industrial levels, with commitments from all member nations to reduce greenhouse gas emissions.

THE CONFERENCE OF THE PARTIES (COP) - The COP is the primary decision-making body of the UNFCCC. It is an annual international and intergovernmental climate summit where world leaders and representatives gather to develop and implement strategies and resolutions to combat climate change. It serves as the central platform for all global climate negotiation, where all 198 parties to the UNFCCC are represented and participate to let their nation's voice be heard. Its agreements and decisions shape the global response to the climate crisis, ensuring continuous commitment to reducing emissions and promoting sustainability. The COP meets every year, unless the Parties decide otherwise. The first COP meeting was held in Berlin, Germany in March, 1995.

The main responsibilities of the COP are to review the implementation of previously made agreements and protocols, evaluate the effects of actions taken and track progress, making decisions to promote the implementation of climate policies.

RESOLUTION 70/1 (2015) - The United Nations General Assembly adopted 'Resolution 70/1' in 2015, which establishes the 17 Sustainable Development Goals (SDGs) as a global basis for addressing the world's most important and urgent challenges. These goals aim to end poverty and hunger, protect human rights and dignity, preserve the planet from degradation, and foster peace

and prosperity for all. The SDGs emphasize inclusivity, equity, and sustainability in addressing issues like education, health, economic growth, and environmental protection.

Among these goals, Goal 7; “Affordable and Clean Energy”, specifically focuses on ensuring access to affordable, reliable, sustainable, and modern energy for all. This goal shows the importance of clean energy solutions in advancing sustainable development and minimizing the risks of climate change. This resolution plays a vital role in the commitment to creating a safer and more green global environment.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Renewable Energy Policies - Many nations have implemented their own national policies to support their personal transition from fossil fuels. Countries like Germany and Denmark have for example implemented different renewable energy programs, increasing their reliance on wind and solar power. These two nations have together also agreed to landmark an energy project that could supply ip to 4.5 million European homes with green electricity.

International Agreements - The Paris Agreement and the Kyoto Protocol set clear emission reduction targets and describe frameworks for clean energy adoption, by creating more specific agreements between nations the UN can keep each other accountable and ensure proper progress.

Financial Mechanisms - Existing organizations like the Green Climate Fund support developing nations in adopting more sustainable technologies. The GCF is the world’s largest climate fund, and it accelerates transformative climate action through a country-owned partnership approach. By providing funds it comes up with financing solutions and can help invest into more renewable energy options for developing countries.

Carbon Pricing Initiatives - Many countries have implemented carbon taxes and cap-and-trade systems to incentivize emissions reductions. Putting higher prices on carbon pollution is a very effective way to reduce greenhouse gas emissions, creating a financial incentive for people and businesses to pollute less as it sends a clear signal that carbon-intensive products/activities are more costly than low-carbon alternatives.

POSSIBLE SOLUTIONS

Crucial factors to consider in the transition towards renewable energy;

- Investment in renewable energy infrastructures
- Technology innovation and research and development (R&D)
- Energy efficiency measures
- Policy support and regulatory frameworks
- Global cooperation and collective action

Global Energy Transition Framework: Establish international guidelines for phasing out fossil fuels and increasing renewable energy production.

Financial Support for Developing Nations: Provide funding and technology transfers to support sustainable energy adoption in low-income countries.

Public-Private Partnerships: Encourage collaboration between governments and industries to drive renewable energy investments and innovations.

Capacity Building and Education: Develop training programs and promote research in clean energy technologies to build expertise worldwide.

Increased International Cooperation: Establish global agreements to monitor progress and ensure accountability in meeting renewable energy targets.

Expansion of Renewable Infrastructure: Invest in modernized grids, energy storage systems, and offshore wind farms.

Further Technological Innovation: Encourage the further development and implementation of renewable technologies, shaping the future of green energy.

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