KINNAIRD COLLEGE FOR WOMEN, LAHORE

POLITICS OF GREEN GROWTH: CHALLENGES AND OPPORTUNITIES FOR USA (2009-2021)

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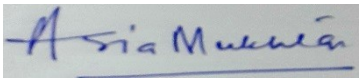

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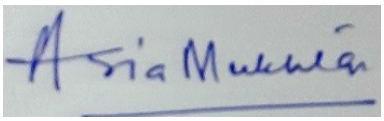

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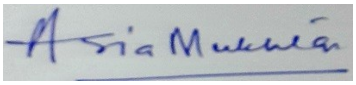

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ABSTRACT

The global community faces an urgent challenge to shift towards a sustainable, low-carbon economy to mitigate the impacts of climate change. The United States, as one of the largest economies in the world, has a critical role to play in this transition. The United States has a long history of industrialization, driven by a reliance on fossil fuels such as coal and oil. This industrial growth has come at a cost, including environmental degradation and a heavy reliance on non-renewable resources. The impact of climate change has forced the US to re-evaluate its industrial trajectory and shift towards a low-carbon economy. With climate change increasingly affecting the planet, the need for sustainable economic development has become more pressing. Green growth, which aims to achieve economic growth while reducing greenhouse gas emissions, has gained popularity as a strategy for addressing this need. This research analyzes the political and economic factors that have shaped the US industry, including the role of fossil fuels and the influence of corporate interests. The research then explores the transition towards green growth, including the growth of renewable energy and the development of green infrastructure. It also highlights the importance of addressing the politics of green growth and the need for a coordinated effort to achieve sustainable economic development in the US. The shift towards green growth presents both challenges and opportunities for the US. On the one hand, there are concerns about the impact on employment and economic growth, particularly in regions reliant on fossil fuels. On the other hand, green growth offers significant opportunities for job creation and economic development, as well as the potential to mitigate the impacts of climate change. Overall, the research highlights the importance of addressing the politics of green growth and the need for a coordinated and collaborative effort to achieve sustainable economic development in the United States.

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List of Abbreviations:

UNEP: United Nations Environmental Program

IPCC: Intergovernmental Panel on Climate Change

OECD: Organization for Economic Co-operation and Development

GDP: Gross Domestic Product

GG: Green Growth

GE: Green Economy

SDGs: Sustainable Development Goals

GNP: Gross National Product

GNH: Gross National Happiness

HDI: Human Development Index

EPA: Environmental Protection Agency

GG-GE-SD: Green Growth- Green Economy-Sustainable Development Model

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CHAPTER 1

1.1 Introduction:

Environmental politics is a diverse and multifold term that has different interpretations depending upon the context. Mostly, environmental politics refers to the relationship between global politics and environmental factors. It particularly focuses on environmental management and the need for global interaction for the purpose of preservation of the environment and its habitats. It covers an extensive range of issues including water management, waste disposal, and management, climate change, coral reef depletion, mangroves depletion, etc. It also includes the relationship between states and non-state actors related to the issues of trade, global finance, corporations, markets, etc. that have direct or indirect implications on the environment and its related issues.

The terminology of "green growth" is a relatively new concept that emerged at the international platform as one of the most significant theories of environmental politics by 2009. This idea encouraged nations to regulate their economic development and address their environmental issues at the same time. The term was used by South Korea for the very first time at an event of presidential speech in August 2008. Since then, it has gradually transformed into a completely new paradigm that aims to generate new sources of growth without destroying nature and its elements. Keeping in mind the contemporary environmental crisis, the theory immediately got recognition. This theory basically proposes an alternative to the traditional methods and tools of economic and industrial development. Moreover, the proposals of green theory, for instance, employment, technology, investments, etc. have attracted world leaders. In simple words, green growth theory aspires to be a political tool that emphasizes that developmental growth and environmental elements can go hand in hand, without one being damaging the other for its growth.

Green growth is a theory of environmental politics that seeks sustainable development while preventing environmental damage. It urges states to not only focus on hollow GDP growth but also on holistic sustainable development. It should be borne in mind that corporate capitalism, the most commonly used economic system, is an anti-green medium as the basic mechanism of capitalism is to generate capital at the cost of the environment. Hence, the growth in capitalism is strictly against the goals of green growth and environmental preservation. Therefore, this is the basic dilemma that

connects green growth with the “green economy”, an economic growth that urges the states to try to opt for the options which are more environmentally friendly in nature and in which the growth would be measured in terms of environmental stability and human equality. This concept also backs up the environmental ethics theoretical framework.

The term “Green Economy” was coined by a group of UK environmental economists in a report in 1989, named “Blueprint for a Green Economy”. According to the United Nations Environmental Program, Green Economy leads to social equity and equality along with mitigating environmental scarcities and ecological problems. It is a socially inclusive low carbon economy, which is focused on economic growth but by promoting environmental sustainability and security. Its purpose is to reduce environmental hazards. While the concept of green growth is comparatively new. Key areas of green growth include renewable energy, sustainable transportation, advanced forestry, agricultural management, and the promotion and upgrading of the waste management system. Both Green Growth and the Green Economy are related to the well-being of people and social equity by mitigating environmental problems and pollution, using natural resources more efficiently and preventing damage to the environment in any capacity.

Capitalism in the USA came somewhere between 1820 to 1870 on the eve of the industrial revolution. This industrial revolution has changed the course of the USA’s development and contributed in making America, the great America it is known as today. The industrial revolution started with the development of mechanical devices for farming techniques to make more products with less effort in less time. Gradually this led to the development of industries with the invention of new machines every day. The main aim of these machines was to make it more efficient and effective for the labor force to produce the desired results when it comes to production. The USA is considered one of the first industrialized states in the era, where states were still greatly dependent upon their agriculture.

Although this industrialization has contributed greatly to the development of the USA and its labor force, it is also an undeniable fact that the USA is one of the major contributors to pollution which eventually has become the source of contemporary environmental crisis and climate change. It is a well-known fact that greenhouse gases are the main cause of the pollution of air along with the depletion of the ozone, which in turn is the cause of many environmental and health issues. It is also

noteworthy that the effects of global warming and climate change are becoming more and more devastating and irreversible day by day as states fail to acknowledge their contributions to this phenomenon. The situation is so severe that the IEA has forecast that the emission of these harmful gasses and substances can increase up to 130% by 2050, even though many states are trying to adopt more environmentally friendly approaches. As it seems, their efforts are so little compared to the crisis faced by the world today.

Being the world's largest industrial and biggest commercial power, the contribution of the USA to Global pollution is as great as can be expected and reaches the extent of 15% of the total global pollution. 15% of global pollution by a state is a very large contribution whatsoever. Keeping in mind this, the US initiated its green growth projects. The US has introduced multiple clean energy and development plans in the past decade. The 2009 American Recovery and Reinvestment Act (ARRA) commonly referred to as the "stimulus bill", reflects the golden age of renewable energy policies and investment, resulting in rapid development in the area of clean energy and efficiency. After that, the US was ranked as the number one investor of global clean energy according to Pew Charitable Trust 2011 ranking. The use of the infrastructure investment, block contributions, and tax credits generated by the ARRA program, which has been built on a solid-state motivation for renewable energy and efficiency, has gradually grown over the decade resulting in the national stimulus bill. The United States eventually left China behind with $48.a 1 billion investment in clean energy in 2011, for the first time since the beginning of Pew reports.

1.2Significance of Study:

This study is significant because it highlights the new worldwide emerging concept of environmental politics, "green growth". The study will provide a unique perspective on green growth and its impact on the environment, as well as its link to the national economic policies of a state. The study highlights the major factors and threats which lead the major capitalist countries, like the United States of America, which became the global superpower by exploiting the natural environment for decades, to pursue green growth since 2009. It will focus on the challenges and opportunities faced by the US while adopting green growth. USA’s environmental degradation and economic transformation from 2009 to 2021 will be examined. Finally, the influence and effect of US green policies on the rest of the world will be discussed.

1.3 Aims and Objectives

- To investigate the evolution of green growth and its relationship with economic growth.
- To understand the diversity and complexity of the US economy and its implications on the global environment.
- To highlight the factors that lead global industrial powers like the USA to opt for green growth after 2009
- To highlight the challenges faced by the US economy in the context of green growth.
- To investigate prospects of development and green growth for the US after the implementation of eco-friendly policies and strategies.

1.4 Research Questions

1. How with the industrial revolution, the concept of green growth has evolved and what is the relationship between green growth and economic growth?
2. What is the status of the US industrial economy and how it is a threat to the global environment?
3. What are the factors that caused global industrial powers like the USA to focus on green growth after 2009?
4. What are the major challenges faced by the USA in its quest for green growth?
5. What are the prospects of green growth opportunities for the US after implementing the green economic policies?

1.5 Methodology

The type of research conducted is mix method research in which the application of green growth theory on US economy and development is undertaken and its consequences on the rest of the

world are highlighted. The methodology followed during the research will be qualitative research. Mix method research approaches shall be used towards different concepts, challenges, issues and policies. Both primary and secondary sources of data shall be collected and used during the research. Internet, books, articles, journals, documents from websites, press releases, and reports shall also be used for data collection and examination of US environmental policies and their future opportunities and challenges.

1.6 Literature Review:

The literature review in this qualitative research is written using Chronological method in which different developments in the area of green growth and smart cities have been highlighted in chronological manner.

Lucien Georgeson & Mark Maslin (2019), in their article "Estimating the scale of the US green economy within the context", explains it is estimated that the US green economy generates an annual sale revenue of approximately $1.3 trillion with estimated employment of around 9.5 million workers. The G20 states suggest that as compared to the world largest growing economy, China, the already world's largest economy USA, have a more diverse variety of age population employed. Moreover, they also claim that the USA has higher sales revenue per capita in the green economy as compared to other states. But it is also a well-established fact that USA should have to consider the inclusion of developing energy, environmental and educational policies regarding green economy like the other states in competition (Georgeson & Mark, 2019).

Patrick Soderholm (2020), in his article "The green economy transition: the challenges of technological change for sustainability" explains that the green theory is basically presented as the alternative for traditional growth and development. These states have been debating and adopted agendas for sustainable development and thus created a link between the ecological and economic systems of the world. For this purpose, along with technological advancements, economic and societal adjustments and changes are also very significant. The best case of this can be observed in American society, where despite electricity was discovered in 1870, it tools almost 50 years for productivity through mechanical devices to soar, as societal changes take time. These concerns again arose when it comes to the debate of potential changes sustainable technological change will

produce. Consequently, it raised several complex challenges for the states willing to pursue these sustainable changes (Söderholm, 2020).

According to Ashley Johnson and Thomas Lutken, (2021), the Biden government has made it clear that under his administration, climate and environment will be of top priority. Changing market conditions have led to a shift to low carbon energy resources and have opened new windows of opportunities for technological development, market growth, innovation, and collaboration. There have been prominent energy transitions taking place for instance in places like Appalachia, where the coal mining is reduced by 27% between 2005-2015 due to low gas rates and economic shifts. A large number of people across the country are currently working in the renewable energy production sector. The US economy is transitioning to lower carbon in the coming future from and California to Texas (Johnson & Lutken, 2021).

Pipppa Stevens (2019) in her report "US 'green economy' generates $1.3 trillion and employs millions, a new study finds" stated that green economy is the new player for the US to generate economic growth and is responsible for the mass job opportunities. While considering massive opportunities, there is also a perceived threat for the USA in this field as the rest of the world is catching up on the new phenomenon. It has been studied that only in the USA, the green economy is responsible for generating $1.3 trillion while creating 9.5 million opportunities for full-time employment. These projects are highly significant for the USA as they are employing a massive number of the working-age population. Moreover, it has produced higher sales revenue, even greater than China or any other G-20 state, for the USA. While these numbers look great, but it is also a fact that $1.3 trillion comprises even less than 7% of the total USA's GDP, while 9.5 million employment opportunities cover only 4% of the working-age population. Thus, analyzing the impact of the green economy in the USA is quite challenging, as the term "green" itself is extremely broad and conflicting, along with the lack of government data collection in this regard (Stevens, 2019).

Lucretia Dogaru (2021), in her article "Green Economy and Green Growth - Opportunities for Sustainable Development" explained that modern day economic opportunities are often linked with having a negative effect on the environment. These effects not only include the short term, but also long-term damages to the environment and thus has forced the states to focus their attention on the development of green economy and green growth. Many policies and measures have been

taken and implemented by different states in recent years. Increasing number of sustainable growth projects are being related to the green economy and green growth. Green growth is basically a contemporary and practical tool for obtaining the timeless objectives of these sustainable projects. It is concluded that the right estimation and investment can help green growth to provide the opportunities for sustainable development. But to get the practical benefit of these opportunities requires high level and right-angled public policies for the construction of a proper green economy (Lucret, 2021).

CHAPTER 2

POLITICS OF GREEN GROWTH: THEORY AND PRACTICE

2.1 Introduction

The most recent financial and economic crisis has temporarily reduced human impact on the environment globally. However, it is projected that returning to a pattern of rapid expansion will result in a greater rise in environmental burdens than what was seen before the recession. At the OECD Ministerial Council meeting, a new action plan was developed to address these issues. It is known as the "Green Growth Strategy," also known as the "Strategy of Ecological Development". The OECD's "green growth" strategy encourages development and economic growth alongside ensuring that the nation's natural resources continue to provide the environmental and resource services necessary for its prosperity. The major objective of green growth is to quicken investments in and technological advancements towards sustainable development and the creation of new business prospects. According to Reilly (2012), the quest for green economic growth shows the intention to guide the economy towards technologies and consumer habits that support economic growth, the creation of jobs, and environmental protection (Kasztelan, 2017).

Green Growth is a synthesis of economic development and environmental sustainability. The vision for green growth is based on the premise that economic growth may be pursued and elevated by working within the boundaries that assure sustainable development as well. Policymakers have drawn attention to the challenge of worsening environmental sustainability and the threats to the existence of future human generations via sustainable development. Growth is the result of governmental decisions rather than economic theoretical frameworks. Overall, Green Growth has been offered to the globe as "an ecologically sustainable economic growth." Various accounts have been given as to how and what different actors, both state and non-state actors, subjectively perceive and characterize green growth. Green Growth is defined by some governments and international organizations as "low carbon green growth," while others have dropped the phrase from their definitions. Green Growth as a concept, objective, and aim was generated from policy rather than an agreed-upon economic framework, which explains the disparity. (Hussain, Mehmood, & Khan, 2022).

Our existing linear economic system, in which we extract, produce, consume, and discard, is driving all these effects to a considerable extent. This has enabled some people to live lavish lives, but it also has a negative impact on the environment. Furthermore, common thinking of the 20th century is that our reliance on fossil fuels for energy will continue to dominate well into the 21st century and underpin development in the world's poorest nations. We have to transform, and the most effective way to do so is to shift to a green economy, which dramatically decreases environmental risks and environmental scarcity while simultaneously promoting social fairness and human wellbeing. A green economy is one that is low in carbon emissions, resource-efficient, and socially inclusive (Evolution and the Green Economy in the Age of the Anthropocene, 2014)

A green economy, practically speaking, is one in which increases in income and employment are fueled by public and private investments that lessen pollution and carbon emissions, improve resource and energy efficiency, and prevent the degradation of ecosystems and bio diversities like clean air, water, and healthy soils. The green economy cannot function without clean energy; it is a necessity. In the last decade, sustainable energy technologies have developed and been implemented at an incredible rate. For instance, no one anticipated that from 2004 to 2011, 70% of the new energy capacity in Europe would be the result of renewable energy sources (Evolution and the Green Economy in the Age of the Anthropocene, 2014).

2.2 Evolution of Green Growth

Climate change, which the Intergovernmental Panel on Climate Change (IPCC) has categorically connected to CO2 and greenhouse gas emissions from human activity, is the most spectacular and widespread indication of how we have dominated our planet. According to the IPCC's most recent report, failure to reduce emissions might worsen food insecurity and cause major cities and island nations to flood. This might result in additional refugee crises, the mass extinction of plants and animals, and a significantly altered environment that could transform life as we know it for hundreds of millions of people now. The term “green economy” was first coined by leading environmental economists in a pioneering 1989 report for the Government of the United Kingdom entitled Blueprint for a Green Economy. The purpose of the report was to advise the UK government about the implications of sustainable development for measuring economic development and evaluating projects and policies, and to discuss if there was a consensus

definition of the term "sustainable development". Although the term "green economy" was only used in the report's title with no further reference to it in the report, it seems that the term was used by several authors as an afterthought following the report (Kasztelan, 2017).

In 1991 and 1994, respectively, the authors released Blueprint 2: Greening the World Economy and Blueprint 3: Measuring Sustainable Development as a follow-up to the initial report. The primary takeaway of the first Blueprint report was that economics ought to endorse ecological regulations; however, the sequel reports expanded this message to include problems with the world's economy, including environmental issues. Every article drew from years of expertise and study in environmental economics. This was the formal start of a conversation that was gaining traction in intellectual circles. Pro-environmental political forces began to demand that public and economic policymaking be modeled on the basis of environmental sustainability. Large international governmental organizations such as the OECD, World Bank, UN (UNEP), IMF, and others gradually began to promote economic growth while keeping environmental sustainability in mind. Green Growth and its policies began to gain traction under the auspices of the OECD. Green (Loiseau, et al., 2016).

When decision-makers were discussing how to carry out environment friendly policies in the midst of several global crises in 2008, the term underwent yet another revision. UNEP championed the idea of "green stimulus packages" and identified areas where large public investment could kick-start a "green economy" in light of the global financial crisis and recession. In June 2009, the UN released an interagency statement in favour of the green economy as a change to solve various difficulties in the wake of the Copenhagen Climate Change Conference. The declaration's objective was to lay the groundwork for a comprehensive and effective global response to the many climate-related problems that face humanity today.

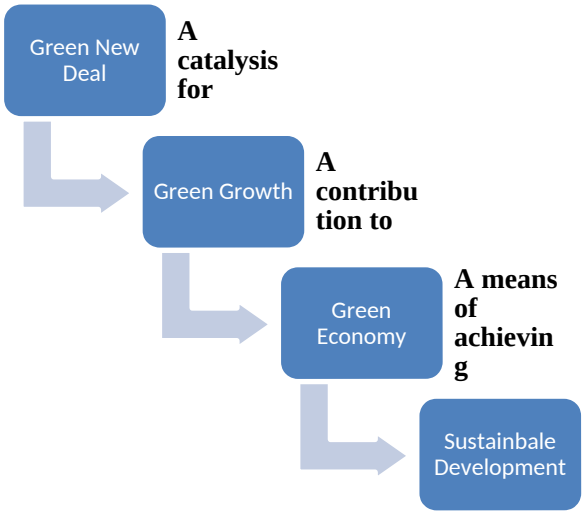
At the Global Ministerial Environment Forum in Nusa Dua in February 2010, the heads and ministers of the UNEP delegation stated that the green economy "can considerably resolve present issues while providing economic opportunities and numerous advantages for all nations." Additionally, it praised UNEP for taking the initiative to better define and advance the concept and urged UNEP to take part in this effort by assisting with the preparations for the 2012 (Rio+20) UN Convention on Sustainable Development. In March 2010 the UN General Assembly decided that one of Rio+20's two special themes would be the green economy in the framework of sustainable

development and poverty eradication (resolution 64/236). As a result of this, increased international attention on the green economy along with the publications of numerous reports seeking to further define and demystify the notion was seen (Kanianska, 201).

One of the crucial reports was the UNEP's Green Economy Initiative's flagship report, the Green Economy Report, which was published in November 2011. To give its economic evaluations credibility, UNEP worked with academic centres and corporate leaders like Deutsche Bank. The functional definition of "green economy" presented in the study, which has since been utilised in a number of other publications, is an important part of the work. Working Towards a Balanced and Inclusive Green Economy was also published in December 2011 by the UN Environment Management Group, an organisation that oversees more than 40 specialised organisations, programmes, and organs of the United Nations. It provides an overview of the green economy from a systemic perspective and defines and explains how the phrase "green economy" along with related terminology are used. The UNEP's 2011 Green Economy Report served as the source for the term employed in this study. A number of non-governmental organisations and partnerships have developed recently with the aim of advancing the concept of the "green economy" through research, analysis, and outreach.

Furthermore, several countries, such as South Korea, have included the key themes of the green growth model into their policymaking and economic programs. The three pillars of economic, social, and environmental growth were the underlying agendas of green growth, and South Korea addressed and met these three goals. With a victory story of a nation-state, other emerging economies in the Asia Pacific are also taking after the strides of South Korea by adjusting increasingly to green development. The stimulus plans put out by the United States, China, and South Korea were termed "Green New Deals" with the justification that they would help the economy while also laying the groundwork for future, more stable, and sustainable growth. Such initiatives acknowledge that addressing climate change and economic recovery are not mutually exclusive. Green growth was promoted as a more alluring alternative to "brown" growth, for economic recovery (Georgeson, 2017).

Figure 1: The Hierarchy of Green Economy



The hierarchy of green economy concepts. Source: ten Brink et al. (2012).

2.3 Comparison of Green Growth and Green Economy

Green growth and green economy are two concepts that have gained significant attention in recent years as we seek to promote sustainable development. While the two concepts share some similarities in their goals, they differ in their approach, scope, and focus. In this article, we will provide a detailed comparison of green growth and green economy.

Green Growth:

Green growth refers to an economic growth model that is environmentally sustainable and socially inclusive. The focus is on using natural resources efficiently, reducing pollution, and promoting the use of renewable energy sources. Green growth recognizes that economic growth is necessary to address poverty and create employment opportunities, but it must be sustainable and inclusive. Green growth is closely linked to the concept of a green economy, which aims to improve social justice and overall wellbeing while significantly decreasing ecological deficiencies and environmental risks (UNEP, 2011). Although the idea of "green growth" has only lately gained attention on a global scale, it has been the topic of discussions and analyses in scientific circles for decades, particularly in the field of "environmental and ecological economics." The paper entitled Blueprint for a Green Economy of 1989, issued for the United Kingdom's government by a team of renowned environmental economists, used the phrase "green economy" for the first time (Kasztelan, 2017).

However, aside from the title, there was no further reference of the green economy, suggesting that the word may have been used by the writers as an act of reflection. In 2008, the word "refreshed" was used in relation to responses to the global financial crisis. In order to provide research and political backing for investments in "green" economic sectors while also turning traditional, resource- and pollution-intensive sectors "green," UNEP introduced the so-called Green Economy Initiative in October 2008. In April 2009, the Global Green New Deal (GGND) report was made public. Ministers and delegation heads responded by praising UNEP's innovative efforts in further defining and pushing the notion of the "green economy" in February at the Global Environment Forum in Nusa Dua.

Green Growth is described as a system that fosters economic growth and development while also guaranteeing the health and availability of natural resources, according to a report published by the OECD (assets). It is also recommended that innovation be pursued, and investment opportunities be expanded to achieve true long-term development. Green Growth models offer a means to boost an economy's growth while also promoting sustainable development. The approach focuses on statecraft policymaking and institutional frameworks (Fernandes, Veiga, Ferreira, & Hughes, 2021).

Approach: The approach of green growth is broad-based, emphasizing economic growth and development while reducing negative environmental impacts. Green growth recognizes that economic growth is necessary to address poverty and create employment opportunities, but it must be sustainable and inclusive. It focuses on increasing resource productivity and energy efficiency, promoting innovation and technological advancements, and investing in clean energy technologies

Scope: The main scope of green growth is to promote economic development and development while minimising adverse environmental effects. It acknowledges that economic growth is vital to combat poverty and generate job opportunities, but that it must be inclusive and sustainable.

Focus: The focus of green growth is primarily on economic growth and development, with an emphasis on using natural resources efficiently, reducing pollution, and promoting the use of renewable energy sources. It seeks to promote economic growth while reducing negative environmental impacts.

Implementation: Green growth is implemented through policies and programs that promote green technologies and encourage sustainable practices in various sectors of the economy, such as energy, transportation, and agriculture. It requires significant investment in clean energy technologies, and a transition to a low-carbon economy.

Green Economy:

Green economy, on the other hand, is an economy that is low-carbon, resource-efficient, and socially inclusive. It is a system that aims to promote sustainable development by balancing economic growth with environmental and social sustainability. It emphasizes the importance of using resources efficiently, reducing waste and pollution, and promoting the use of renewable energy sources. A working definition of the term "green economy" was included in the UNEP's Green Economy Report, which was published in 2011. This definition was frequently quoted in subsequent publications. The green economy, according to the UNEP, is "one that considerably reduces environmental dangers and ecological scarcities, while improving human well-being and social fairness." It is socially inclusive, resource-efficient, and low carbon (UNEP, 2011).

A significant rise in investment in economic sectors that add to and protect the Earth's natural capital or work to lessen environmental dangers and ecological deficits is what is known as a "green economy." Renewable energy, low-emission transportation, energy-efficient construction, clean technologies, better waste management, sustainable agriculture, sustainable forestry, and sustainable fishing are just a few of these areas. With an emphasis on the need to continue promoting sustainable development by concentrating on key issues, such as eliminating poverty, ensuring intra- and intergenerational justice, improving economic effectiveness, and more equitable access to resources, potential directions for implementing the concept of the green economy were identified during the Rio + 20 Conference. Without a doubt, the trend towards a more comprehensive and integrated approach to including the environment in economic operations is what led to the formation and development of the concepts of green economy and green growth. With current climate issues and a growing lack of natural resources in mind, both approaches seek to discover potential options for enhancing economic activity, primarily through the development of resource- and energy-efficient technology advancements (Georgeson, 2017).

It may be confusing that both concepts aim in a somewhat different direction. The idea of a green economy is to transform the economy in order to promote greater social justice and wellbeing while also significantly decreasing environmental dangers. This transition will be primarily accomplished by "green" investments, "green" job creation, the development of new markets for goods and services (such as the market for ecosystem services), facilitation of global trade, and the so-called circular economy. Combating poverty and assisting developing nations are other definite objectives of the green economy. In contrast, maintaining economic growth while simultaneously acknowledging the importance of natural capital in planning and national accounts is the core goal of the Green Growth Strategy (Georgeson, 2017) .

Approach: The approach of green economy is holistic, integrating economic, social, and environmental considerations. It recognizes that economic growth and environmental sustainability are interdependent and must be addressed together. It seeks to balance economic growth with environmental and social sustainability.

Scope: The scope of green economy is broader than green growth, focusing not only on economic growth but also on social and environmental sustainability. It recognizes that sustainable development requires a balance between economic, social, and environmental considerations.

Focus: The focus of green economy is on creating green jobs, promoting sustainable consumption and production patterns, and developing eco-friendly infrastructure and products. It seeks to promote sustainable development by balancing economic growth with environmental and social sustainability.

Implementation: Green economy is implemented through policies and programs that promote sustainable development and address the social, economic, and environmental challenges facing the world. It involves the integration of sustainability considerations into decision-making processes at all levels of government and society. It requires significant investment in sustainable infrastructure and green technologies.

Table 1: Comparison between Green Growth and Green Economy

Dimension	**Green Economy**	**Green Growth**

Social	Human well-being; social equity; socially inclusive; reduced inequalities; better quality of life; social development; equitable access; addressing needs of women and youth.	Well-being, socially inclusive, access to basic commodities for the impoverished; meeting demands for food production, transport, construction, housing, and energy.
Economic	Growth in income and employment; public and private investments; resilient economy; economic growth; new economic activity.	Economic growth and development; technological innovation; environmentally sustainable economic progress; sustained economic growth; driver for economic growth; new growth engines; green technology: new job opportunities; qualitative growth
Environmental	Reducing environmental risks and ecological scarcities; low carbon; resource-efficient; reduce carbon emissions and pollution; enhance energy and resource efficiency: prevent loss of biodiversity and ecosystem services; within ecological limits of the planet; environmental responsibility; finite carrying capacity.	Protection and maintenance of natural assets and environmental services; provision of resources and services; low carbon; using fewer resources and generating fewer emissions; resource efficient; cleaner; climatic and environmental sustainability; energy and resource-efficient; harmony between the economy and the environment.

The main strategies for achieving this goal include maintaining pressure on innovation and fostering competition, as well as providing an adequate valuation of natural capital considering its role as a production factor (i.e., first and foremost, ensuring accurate measurement of pollution and resource utilization). As a result of its promotion as a solution to the financial and economic crisis, the ideas of green growth and green economy are intertwined. They seek to promote the recovery of a struggling global economy by concentrating on investments in the marketplace for environmental goods and services and establishing "natural" infrastructure, such as forests, water bodies, or biological variety. Although the terms "green economy" and "green growth" have different historical roots—that is, they are the results of the efforts of various organisations and target audiences—Allen and Clout (2012) assert that the differences between these concepts are no longer obvious and that they are now frequently used in the same context. Unfortunately, it's difficult to fully support such a course of action.

2.4 Connection of Green Growth and the Economy

Since the 1992 Rio convention the concept of economy as driver for development has been replaced with the new notion that to achieve sustainable development, it is important to divide the development across social, economic, and environmental pillars. Economic growth is considered to be the key factor in the reduction in poverty and improvements in social indicators. Despite ongoing population growth, it has led to an 80% increase in GDP per capita in developing nations over the past 20 years. With more than 500 million people escaping poverty and impressive advancements in life expectancy, literacy and education, child, and maternal mortality, many people's standards of living have improved. And while China has been mostly responsible for the reduction in global poverty, other nations that experienced growth also had a substantial decline in poverty. For instance, Ghana saw substantially faster growth than the rest of Africa and was able to reduce its poverty rate from 51% to 30% between 1990 and 2005 (Hallegatte, Heal, Fay, & Treguer, 2012) .

It also turns out that policies, not growth, are what lead to income inequality. Some nations work to eliminate inequality as they develop, others allow it to increase. For instance, inequality reduced in most of Latin America in recent decades, while it significantly increased in the United States and most of Europe. Hence, it implies that there is generally a positive relationship between the

economic and social pillars of sustainable development i.e., economic, and social developments always go hand in hand. Even though there are some similarities, the relationship is not as simple when it comes to the economic and environmental pillars. For instance, the environmental conditions do not get better or worse with income at such rapid rate. Of course, a number of environmental public goods improve with income such as the quality of the air and water. But this is not the case, however, for local pollutants that have long-term or invisible effects (such as pesticide accumulation), for global pollutants (such as greenhouse gases), or for the extinction of biological diversity. (Adamowicz, 2022).

Furthermore, ineffective policies and market failures are major contributors to environmental degradation. Therefore, correcting them can lead to an economy that is more effective and productive, with higher output and prosperity. Green development might be achieved without incurring too many expenses and might even offer some important advantages. It does take policy work to balance the three pillars of sustainable development, especially the environmental pillar. Green growth policies are a vital component of these initiatives and are required for carrying out sustainable development (Hallegatte, Heal, Fay, & Treguer, 2012).

Green Growth is comprised of two components as a conceptual paradigm and a framework. One is concerned with economic growth and prosperity, while the other is concerned with environmental sustainability. Since GDP (Gross Domestic Product) is considered as an indication of economic growth, the outcomes of pro-environmental policy execution are measured in terms of GDP.

It is important to remember that GDP is the outcome of interactions between components such as labor, physical and natural capital, and the technology utilized in the process. Natural capital, a significant contributing component, offers natural resources to a country's businesses and boosts its economy, such as trees that create wood (e.g., timber), land that generates agricultural commodities, oceans that enable trade and supply marine food, and so on. These natural resources and products are exchanged in order to strengthen the economy of a country. Seafood exports, for example, provide a significant contribution to the Sri Lankan economy, as do wood exports to Indonesia, India, and China. If natural capital gets tarnished because of an environmental event, GDP will suffer as well. While natural capital is concerned with the process, physical capital is concerned with the tangible resources that are used in the manufacturing process. Technology, which refers to both real and intangible scientific resources, knowledge, and organizational

structure that support and increase the other two pillars of physical and natural capital, is the third pillar of GDP contribution (Adamowicz, 2022).

It is worth noting that the development and execution of pro-environmental legislation has an influence on these GDP-supporting pillars. Simply put, if environmental regulations called for the preservation of natural capital and prohibited over-exploitation of natural resources, natural products would not flood the market as they have in the past, and the country's GDP would suffer as a result. Furthermore, how would the engines of industrial units and manufacturing facilities be stoked if non-renewable resources (or carbon-based fuels) were to be reduced in consumption? Because environmental policies challenge the capitalist system of mass production and hyper-consumerism, this has been the fundamental reason for the reluctance to enact them (Hallegatte, Heal, Fay, & Treguer, 2012).

Not only have the effects on natural and physical capitals been observed with the introduction of environmental policies, but they affect technology profoundly as well. For instance, technological advancements focusing on cleaner energy (through renewable resources) or efficient energy consumption would be encouraged and invested upon. This can spur investment in the green sector as well as research and development, allowing greater opportunity for eco-innovation. Better yet, if the government intervenes directly and allocates specific money and expenditures to research and development, the speed of sustainable growth may be accelerated significantly. This would happen because of conscientious production channels, or channels that ensure that natural resource exploitation does not disrupt the environment and that their businesses can assure ecological sustainability. For example, companies and businesses that make wood-based products, such as furniture, building materials, paper, tissues, and other items, plant an equivalent number, if not more, of trees that have been chopped down as raw material. Government subsidies for enterprises engaged in eco-friendly products and other eco-innovation projects can help to accelerate the implementation of environmental legislation. This phenomenon is known as the "innovation effect," and it has a favorable impact on environmental health (Adamowicz, 2022).

This direct participation by the government in subsidizing the green industry and investing in R&D has a stimulative impact and can therefore increase the efficiency of the industrial process and chain of production. The relationship between the Green Growth model and the economy, as well as the economic processes, is fundamental and interdependent. This may be seen in a variety of

areas, such as business. Because the breadth and extent of the global market influence economic growth, the speed of transaction efficiency is also examined. One of the indications of the degree of economic organizational setup is transactional efficiency. In layman's terms, transactional efficiency is concerned with the seamless movement of data, capital, and interactions between business partners. In the current environment, as a result of scientific and technical breakthroughs, the rate of data (information) flow, people mobility, and commodity transportation have expanded tremendously (Hallegatte, Heal, Fay, & Treguer, 2012) .

This transactional efficiency has spawned new business lines and prompted existing ones to innovate in order to stay up with the shifting worldwide landscape. Another benefit of transactional efficiency is that it can help to create a more efficient division of labor, which can lead to increased economic growth. According to some experts, as the business model has altered, consumption patterns of material and non-material products and services have changed. These new patterns, together with rising eco-awareness and environmentalism, have the potential to reduce the demand on natural resource extraction. Because significant changes in These new patterns, together with rising eco-awareness and environmentalism, have the potential to reduce the demand for natural resource exploitation. Because significant changes in manufacturing processes are expected, the concept of a "third industrial revolution" has been floated. This hypothetical industrial revolution would be more environmentally friendly since it would be focused on long-term growth (Zhang, 2014).

Since the environment is the natural capital, it is a contribution into the production function, and preservation of it can result in greater inputs of natural resources and thus a rise in income, therefore, protecting the environment can directly contribute to economic growth. The use of natural assets is usually characterized by market failures, with external costs and poorly defined property rights being common. Fixing failures in the market might boost the efficient supply of natural capital, which will increase output. It can also directly boost human well-being by improving air and water quality, which is something that may not always be reflected in conventional GDP statistics but is nonetheless the ultimate objective of economic policy. Because the world's economies are far from being "optimum," indirect contributions of the preservation of the environment to economic development are also possible. In fact, there are a lot of market failures that have no direct connection to environmental problems but nonetheless have an adverse

impact on both the environment and the economy at large. Thus, addressing these market failures has benefits in addition to those that are related to the environment. Urban congestion, which results in air pollution and lowers productivity and the economies of scale that cities are known for offering, is a clear example (Hallegatte, Heal, Fay, & Treguer, 2012).

2.5 Hollow Concept of Development

Financial development is frequently defined as a country's move from a low-income or existing income level to a higher-income one. For a long time, nation-states have been consumed by the need to get more and more. This ideology seized European nations following the Industrial Revolution, and the Global North has acted as a model for achieving economic glory throughout the globe to this day. The aspect of social development is one thing that distinguishes economic growth from economic development. Economic development is the state in which an economy's production increases while social development circumstances improve. As a result, it is possible that emerging or underdeveloped countries will enjoy economic development. Hence, it can be said that the under-developed or creating nations may involve financial development, but the proportion of financial advancement would be exceptionally somber there (Hickel, 2017)

This gets us to the heart of the subject's debate. The basic equipment used to measure economic advancement has flaws. There are a variety of measures, such as Gross National Income (GNI), Gross National Happiness (GNH), and Gross National Product (GNP), but one, Gross Domestic Product (GDP), is nearly universally utilized (GDP). Its very nature, the history associated with it, its restricted role, and its drawbacks are what make it an impediment to attaining economic progress, and economic development that would result in positive human welfare indices. Surprisingly, the idea of advancement, or financial improvement to be exact, has been entirely related to the development in GDP. Subsequently, when a nation looks for financial improvement, the objective to extend GDP stands fundamental and the destinations of social improvement are pushed aside. This creates a conundrum. In basic words, in the event that a low-income country is endeavoring to attain financial improvement, they would take the strides of a high-income nation (Hickel, 2017).

Presently, like high-income nations, the hidden thought process of financial advancement would be kept to the increase in GDP. And to realize that increase in GDP, mechanical forms would

increment at an exponential rate, which increment would utilize common capital and would result in natural disintegration. Degradation of living circumstances and a health crisis would emerge from environmental degradation, which would go against the spirit of social growth. And this vicious cycle would continue, with the only way out being the implementation of a new economic growth metric. In this manner, green development puts forward the thought that it is non-negotiable that financial development complements feasible improvement. In the event that financial development is coupled with maintainable improvement at that point, the conclusiveness of GDP as an as it was degree would be decreased and the much-needed significance of social advancement would take its merited platform. The arrangement of a cleaner environment would reduce wellbeing issues (particularly respiratory, recurrence of pandemics), and would reestablish environmental adjustment as much as possible (Hickel, 2017).

2.6 Niche of Environment in Development

The majority of literature on development, its doctrines, and forms of development does not include the environment as a constituting element or even a consideration to examine. This says a lot about the categorization and the amount of space given to the environment. When the term "development" occurs or is heard, the first thought that comes to mind is "economic development," which demonstrates human nature's ingrained anthropocentrism, which emphasizes power over environmental well-being. Nations that aim for financial improvement interface GDP development to their projections, and with that increment, they may channel their financial might into numerous shapes of control and impact. One of the foremost essential and utilized channels of control is to form a move from fringe, or semi-periphery to center nations. The enrollment of the center club gives its individuals uncountable benefits and advantages. One of the benefits is the impact that these center nations home in IGOs, like those of, UN, World Bank, IMF, WTO, and so forward. This impact permits the center countries to support the system of colonialism, in show disdain toward the reality that is secured in present-day covers, on the South (OECD, 2011).

As a result, the nations of the South rush to grow in order to overthrow the imperialist system and hegemony, even if it means paying a price in ecological bargains. Furthermore, it is the South that is dealing with the greatest effects of the environmental catastrophe, which has been created by environmental abuse perpetrated by European countries and North America for over two centuries.

Until recently, the concept of human happiness and well-being, as well as the function of a healthy environment in it, was not even recognized or explored. And paradigms and developmental models that prioritize human development above economic growth are not only desirable but essential (OECD, 2011).

2.7 Green Growth and Sustainable Development

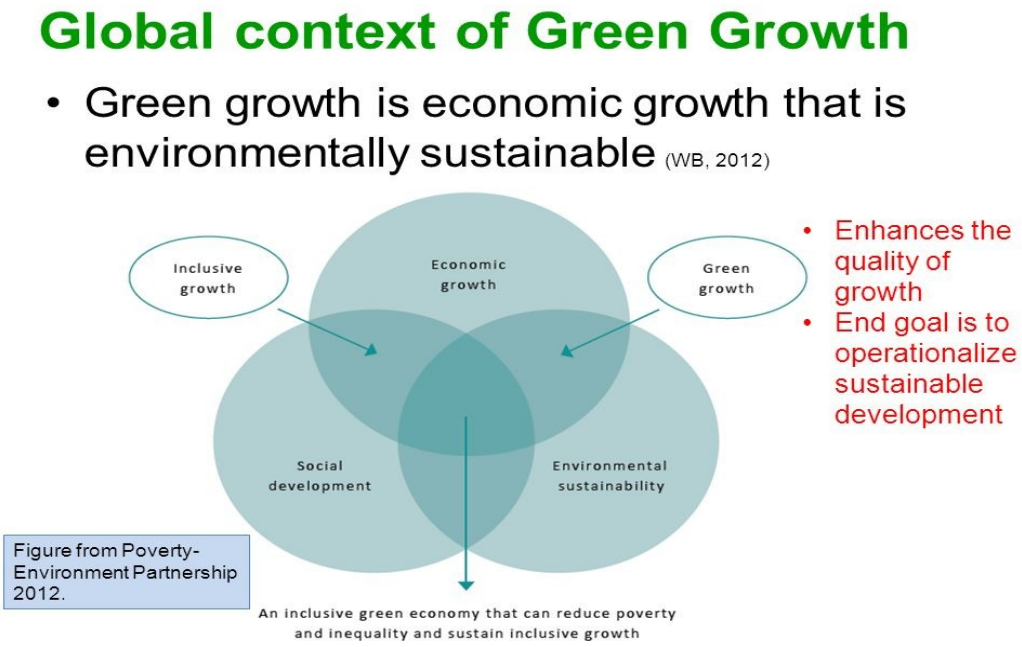
The necessity of changing current economic models in order to address important social and economic concerns has received a lot of attention in recent years. This discussion was sparked by the global financial crisis of 2008–2009, and as a result of these worries, the idea of a "green economy" emerged. Additionally, the 2030 Agenda for Sustainable Development, which comprises seventeen goals for sustainable development, was accepted by nations all over the world in 2015. These objectives take into account the fact that eliminating poverty necessitates policies that encourage economic growth while also addressing a variety of social demands, such as those pertaining to social protection, education, health, and environmental concerns. As a result, the environment and economic structures are strongly connected as a result of the sustainable development goals.They also emphasise the need for a transition to a "green economy," or an essential shift towards more sustainable forms of manufacturing and consumption. (Söderholm, 2020).

First off, the idea of sustainable development emerged in the late 1980s across a wide range of scientific disciplines as a result of the publishing of the report "Our Common Future" in 1987. In a summary of humankind's successes and failures in the 20th century, the report identified sustainable development as a potential means of enhancing the current situation. The Rio de Janeiro Earth Summit (1992), which established the "Agenda 21" model program for implementing sustainable development, marked a significant increase of interest in the area. The concept of sustainable development was widely embraced by governments soon after the Earth Summit, and in many nations, it had a big impact on how environmental goals were prioritized. Since the Brundtland Commission's initial definition of sustainable development, other efforts at alternative definitions of this idea have been made (Jacobs, 2012).

To achieve sustainable development, environmental preservation must be integrated and assured with economic growth. Green Growth is a developmental pattern that has broken the link between

economic growth and non-renewable resource usage. It has separated the reliance ties of financial advancement and furious utilization of fabric assets, most ideally vitality saddling non-renewable assets. Green Growth energizes the venture in R&D (Research and Development), gives a modern space for growth, and utilizes progressing innovations to deliver “green (ecologically neighborly) products”. Not as it were, but the designs of the worldwide commercial center are moreover challenged and the soul of advancement to realize sustainable development is proliferated. It is additionally energized that speculations must be made to empower naturally inviting endeavors. The intended impact of Green Development can moreover be recognized within the behavioral road. Green Development moreover targets utilization, conservation, and preservation demeanors of the common open (Jacobs, 2012).

Figure 2: Global Context of Green Growth



(Source: Britannica Encyclopedia 2019)

The worldwide trend towards sustainable development drastically slowed down at the start of the new millennium. The states took practical actions in this area, but they weren't enough to stop the environment from changing on a worldwide scale. Although it was still informally, there was a need for a "new approach" in this circumstance. In 2005, the idea of "green growth" was developed

and advocated as a potential strategy for bringing a revolutionary, low-emission model of sustainable development for Asia's rapidly developing nations, Institutions that support green growth highlight that it is a means of achieving sustainable development rather than a replacement for it. Like sustainable development, the idea of "green growth" tries to show that environmental conservation need not come at the expense of reduced welfare. Yet, green growth directly addresses the issue of economic growth, in contrast to sustainable development. Issues like general compatibility between growth and environmental protection and reevaluation of the main economic goal, development, were disregarded in the pursuit of sustainable development. In addition to emphasizing this compatibility, green growth asserts that environmental protection can help raise growth ratios (Jacobs, 2012) .

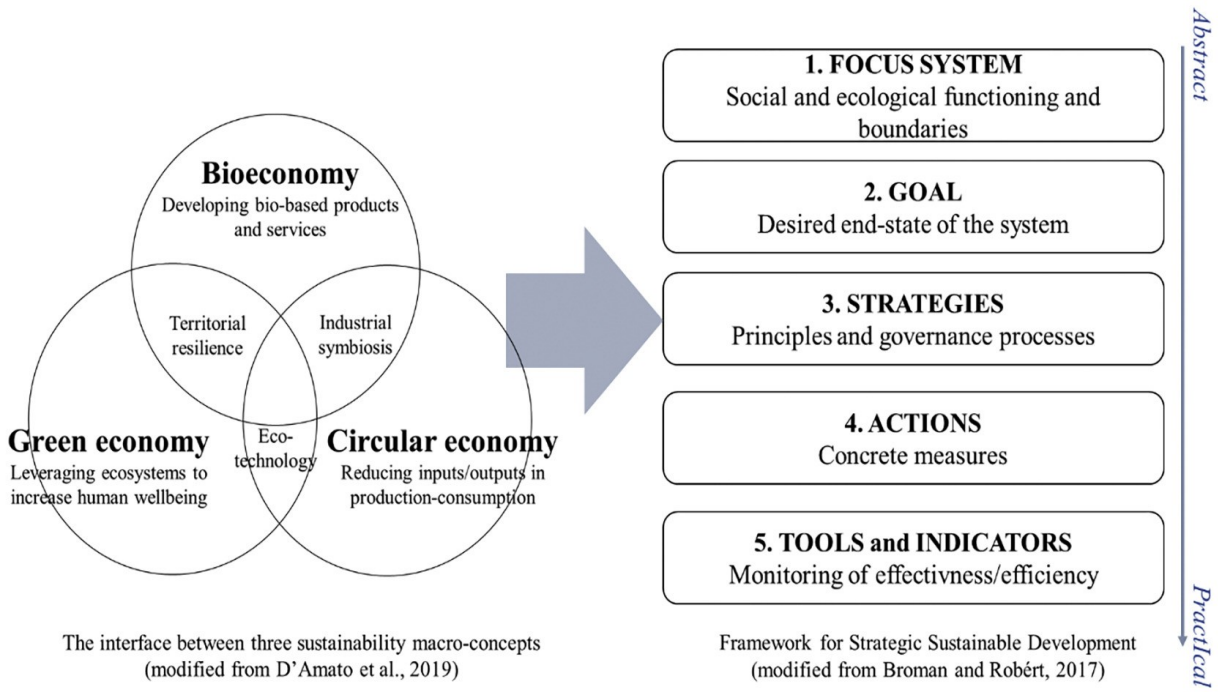
It's often said that sustainable development is a fairly wide phrase that encompasses a variety of usually ill-defined goals. Due to this, several interest groups have begun to question the term's definition or even adopt more conservative or radical interpretations of it. Green growth, on the other hand, appears to be a more highly focused concept. Undoubtedly, it should be viewed as a "child" of sustainable development, but in reality, it is a response to the shortcomings of sustainable development, focusing in particular on both climatic changes and economic growth that have increasingly emerged in the public discussion. The notions of sustainable development and green growth have a number of differences. First off, sustainable development encompasses a broader range of objectives. Green growth "loses" the social element in favor of a solely economic and environmental focus. Second, green growth emphasizes the category of growth rather than the growth itself, as the name suggests. Green growth can have a significant influence on the environment since it is only economic growth depending on utilization of the environment. Green growth is also one of the alternatives put up in response to the current economic crisis, hence it is usually coupled with other economic or social initiatives (Jacobs, 2012).

2.8 Green Growth- Green Economy-Sustainable Development Model

Even though sustainable development is often seen to include both green growth and the green economy as subcategories, indicators, or even direct outcomes, there are many situations where it is clear that these ideas need to be differentiated. Three "green" ideas can operate simultaneously without being in conflict. On the other hand, there are connections that may be made between them

that are both complementary and synergistic. We can look at the relationships between these three concepts if we assume that sustainability and consequently sustainable development is what we should finally aim for. There is clearly growing support for the notion that attaining a sustainable future should be founded on the core principles of the green economy or green growth, even though these concepts cannot substitute for the idea of sustainable development. The creation of an economy that is green based on the principles of the green growth strategy is a necessary component of economic policy on the road to sustainable development. Viewing the interrelationships between the green economy, sustainable development, and the idea of green growth from the viewpoint of reciprocal feedbacks is essential.

Figure 3: The interface between 3 sustainability macro-concepts



The interface between three sustainability macro-concepts (modified from D'Amato et al., 2019)

Framework for Strategic Sustainable Development (modified from Broman and Robért, 2017)

The ultimate goal and primary focus of activities carried out in accordance with this approach have consistently been sustainable development. Another equally good solution addressing the development of the current and future generations has not yet been suggested, therefore we should not concentrate on "why we cannot succeed," but instead focus on "what we can do to succeed," The notions of green growth and green economy offer potential solutions in that regard. The starting point of the proposed model for attaining sustainable development suggests a properly constructed green growth plan (GG). It should be highlighted once more that green growth does not

serve as a substitute for sustainable development. Instead, it should constitute a viable and adaptable strategy for attaining concrete, quantifiable improvements in two important areas: economic and environmental, while fully understanding the social repercussions of greening the development of respective economies (Inclusive Green Growth: For the Future We Want, 2014). Green growth may resolve problems with the economy and the environment and generate new sources of growth through:

- Encouraging a rise in the effective utilization of resources and natural resources, including improving efficiency, cutting back on waste and energy use, and making the best use of existing resources.
- Presenting ideas that could be encouraged by laws, rules, and other circumstances outlining how to apply fresh approaches to ecological issues.
- Opening up new markets and job opportunities by increasing demand for green products, services, and technologies.
- Increasing the predictability and consistency of the government's actions with regard to key environmental protection problems in order to increase investor trust
- More stable macroeconomic conditions, less fluctuation in resource prices, and budget consolidation support, such as by examining the composition and efficacy of public expenditures and boosting revenue as a result of an evaluation of the consequences of pollution (OECD, 2012)

Equity should be a major emphasis of green growth strategies because it can directly result from the implementation of solutions on a national and international scale. Comprehensive strategies must address the seven fundamental components of the paradigm (Figure 1), which are essential for achieving sustainable development. Green economy is the second component (GE). The evaluation of all areas to "go green" in this case is crucial. On the one hand, the green economy includes industries that depend on natural resources, such as agriculture, fishing, forestry, and water management. These industries have a tremendous impact on the economy not only because they serve as the foundation for production but also because the rural population's living conditions are directly influenced by these resources. However, the term "green economy" also applies to industries based on the so-called. Traditionally referred to as “brown” economic sectors, “human-made capital” (Inclusive Green Growth: For the Future We Want, 2014).

There is a lot of room for energy and resource savings in industries including transportation, energy, and industry. Savings like these can support job creation and economic expansion. Since it can apply to improved waste management as well as the efficient use of energy and materials, effective resource utilization is a multifaceted topic. The ten industries shown on Figure 1 need to be viewed as being crucial to the process of economic transformation. The "greening" of the economy can result in long-lasting, beneficial impacts including greater wealth, improved economic output, respectable employment, and decreased poverty (UNEP, 2011). In terms of the economic dimension, green economy and green growth are meant to facilitate an increase in overall welfare; in terms of the social dimension, they will translate into an improvement in life quality; and in terms of the environmental dimension, they will help relieve environmental pressure and increase the efficiency with which natural capital is utilized. It may permanently transition to sustainable development with the aid of a well-designed green growth strategy and complete economic "greening." (Inclusive Green Growth: For the Future We Want, 2014) .

2.9 Application of GG-GE-SD Model on US

The United States is the largest economy in the world, with significant industrialization and economic growth over the past century. However, this growth has come at a significant cost to the environment, leading to high levels of greenhouse gas emissions, resource depletion, and environmental degradation. To address these challenges, the GG-GE-SD model can be applied in the US to transition towards a more sustainable and inclusive economy. The GG-GE-SD model combines the principles of green growth, the green economy, and sustainable development into a single framework. It aims to create a more sustainable and inclusive economy that supports economic growth, social well-being, and environmental protection. In this article, we will explore the potential areas of application for the GG-GE-SD model in the US (Fraser & Bohlmann, 2013).

Renewable Energy:

The US is one of the largest emitters of greenhouse gases, and the energy sector is a significant contributor to these emissions. To address this challenge, the GG-GE-SD model advocates for the promotion of renewable energy sources. In the US, renewable energy sources such as wind, solar, and hydroelectricity have gained popularity in recent years. However, fossil fuels continue to dominate the US energy mix. By prioritizing renewable energy sources and phasing out fossil

fuels, the US can significantly reduce greenhouse gas emissions, promote energy security, and create new jobs. The US has made significant progress in renewable energy adoption in recent years. The US Energy Information Administration estimates that, up from 8% in 2010, renewable energy sources made up 12% of all US energy consumption in 2020. Wind and solar energy are the fastest-growing sources of renewable energy in the US, with wind energy accounting for 8% of total US electricity generation and solar energy accounting for 3% in 2020. The adoption of renewable energy sources in the US has also led to job creation. According to the National Renewable Energy Laboratory, the US renewable energy sector employed 442,000 workers in 2020 (Fraser & Bohlmann, 2013).

Resource Efficiency:

The US is a major consumer of natural resources, leading to significant resource depletion and waste. The GG-GE-SD model advocates for the adoption of resource-efficient practices, which minimize waste and encourage recycling. In the US, the adoption of energy-efficient buildings, sustainable manufacturing practices, and sustainable waste management can reduce resource depletion and promote a circular economy. These practices can also create new opportunities for businesses, create new jobs, and reduce costs for consumers. The US has made progress in improving resource efficiency in recent years, but there is still room for improvement. According to the US Environmental Protection Agency, the US recycling rate was 32.1% in 2018, up from 15% in 1980. However, the US still generates a significant amount of waste, with each person generating an average of 4.9 pounds of municipal solid waste per day in 2018. The US also consumes a significant amount of energy per capita, with each person consuming an average of 307 million BTUs in 2019, compared to a global average of 74 million BTUs (Feng & Sun, 2019).

Sustainable Transportation:

The US transportation sector is a significant contributor to greenhouse gas emissions, air pollution, and traffic congestion. The GG-GE-SD model advocates for sustainable transportation options such as electric vehicles, public transportation, and active transportation. In the US, the adoption of sustainable transportation options has been slow due to various challenges, including a lack of infrastructure, limited availability of sustainable transportation options, and a lack of incentives for consumers. According to the US Environmental Protection Agency, transportation accounted for

28% of US greenhouse gas emissions in 2020, down from 29% in 2010. The adoption of electric vehicles in the US has also been increasing, with electric vehicle sales growing by 81% from 2019 to 2020. However, the US still lags behind other countries in sustainable transportation adoption. According to the International Energy Agency, the US ranked 7th out of 13 countries in terms of electric vehicle adoption in 2020. However, by investing in sustainable transportation infrastructure, promoting public transportation, and incentivizing the adoption of electric vehicles, the US can significantly reduce carbon emissions, promote healthy communities, and create new jobs in the transportation sector (Feng & Sun, 2019).

Social Equity:

The US has significant social and economic inequalities, particularly among marginalized communities. The GG-GE-SD model advocates for the promotion of social equity by ensuring access to basic services such as education, healthcare, and affordable housing for all communities. In the US, various initiatives have been implemented to promote social equity, including the Affordable Care Act, the Fair Housing Act, and the Elementary and Secondary Education Act. The US has made some progress in promoting social equity, but significant disparities still exist. According to the US Census Bureau, the poverty rate in the US was 9.1% in 2019, down from 11.8% in 2010. The poverty rates vary significantly by race and ethnicity, with the poverty rate for Black and Hispanic populations more than double that of the White population. Access to healthcare also varies significantly by income and race, with lower-income and minority populations less likely to have health insurance. The COVID-19 pandemic has further highlighted disparities in the US, with lower-income and minority populations disproportionately affected. By prioritizing social equity, the US can promote social well-being, reduce disparities, and create a more inclusive economy (Feng & Sun, 2019) .

Sustainable Agriculture:

The US is a major agricultural producer, but current practices often prioritize productivity over sustainability, leading to soil degradation, biodiversity loss, and water pollution. The GG-GE-SD model promotes sustainable farming methods that put the condition of the soil, biodiversity, and water conservation first. Crop rotation, conservation cultivation, and integrated pest control are examples of sustainable agriculture techniques that can help the US economy and the environment

while minimising negative environmental effects. The US agricultural sector is a significant contributor to the economy, but current practices often prioritize productivity over sustainability. According to the US Department of Agriculture, the US agricultural sector contributed $136.1 billion to the US gross domestic product in 2019. Only a small percentage of US farms use sustainable agriculture practices, with only 7% of US farmland certified organic in 2019. By promoting sustainable agriculture practices, the US can create a more resilient and sustainable food system.

The GG-GE-SD model can be a useful framework for promoting sustainable and inclusive growth in the US. By focusing on renewable energy adoption, resource efficiency, sustainable transportation, social equity, and sustainable agriculture, the US can address some of the pressing challenges related to climate change, environmental degradation, and social inequality. The aforementioned data presented shows that the US has made some progress in these areas, but there is still significant room for improvement. For example, while the adoption of renewable energy sources has increased in recent years, the US still consumes a significant amount of energy per capita compared to global averages.

Furthermore, the US transportation sector is still a significant contributor to greenhouse gas emissions, and social equity remains a challenge, with poverty rates varying significantly by race and ethnicity. Finally, while the US agricultural sector is a significant contributor to the economy, current practices often prioritize productivity over sustainability, leading to environmental impacts such as soil degradation and water pollution. Overall, the GG-GE-SD model can help guide policymakers, businesses, and other stakeholders in addressing these challenges and promoting sustainable and inclusive growth in the US. By pursuing a holistic approach that balances economic, social, and environmental objectives, the US can create a more resilient, equitable, and sustainable future for all its citizens (Fraser & Bohlmann, 2013).

CHAPTER 3

ESTABLISHMENT OF THE INDUSTRIAL ECONOMY IN THE USA: IMPLICATIONS FOR THE GLOBAL ENVIRONMENT

3.1 Historical Growth of Us Economy

The movement of goods, the division of resources, and the establishment of prices in a market economy are all governed by the fundamental patterns of supply and demand. A planned economy, where the government decides what will be manufactured and how much it is going to cost, is the antithesis of a market economy. In a market economy, producers decide which goods to market, how to create them, and how much to charge for them based on what they believe the market will want and be willing to pay. Market economies encourage businesses competition, which normally results in reduced pricing and is widely regarded as advantageous for both employees and customers. In contrast, a planned economy is run by a central government that has much more control over prices and production in addition to stricter supervision of businesses and industrial processes. The "Mixed Economy" of the United States combines elements of both socialism and capitalism to produce a system having an elevated degree of market freedom, as well as regulatory institutions and social services that improve public welfare. Whenever it comes to the utilization of capital, such a mixed economy encourages the free market, but it also permits government involvement for the betterment of everyone. (Siegel & Barber, 2011).

Even economists find the workings of the American economy to be complicated and even enigmatic. The consumer, corporate, and government sectors make up the economy's core components. The vast bulk of consumer income goes towards paying companies for their products and services. These businesses use the money to raise the number of products and services that they produce and to pay the salaries of their staff. Both consumers and businesses fund the governmental sector, which generates purchases and transfers funds back into the economy. The banking system is essential to the economy because it allows every industry to save and borrow money. Then there are the stock markets, where people can invest their money in the businesses of the country, further promoting economic growth in all spheres. Because of this, the American economy is a cyclical system built on interdependent interactions where large sums of money are

traded. Understanding the historical circumstances that gave rise to this system is crucial because they provide essential details about what has made the American economy such a potent force in the global economy (Siegel & Barber, 2011).

3.2 The United States' Industrial Economy's History

In 1700, there were about 250,000 European colonists and enslaved Africans living in North America, mostly gathered along a slender stretch of land that bordered the Atlantic Ocean. The United States and Canada, two continental nations with a combined population of more than 40 million, were formed through the consolidation of these scattered colonial communities by the year 1870. Although agriculture was still the main source of employment in North America in 1870, these countries were becoming more urban and industrialized, which in turn was causing the rise in living standards to accelerate. The characteristics and key changes in the American economy from colonial times to the present are the focus of the economic history record of the country. The focus is on economic performance and productivity, as well as how new technology, alterations in the size of economic sectors, and the results of legislative and governmental initiatives have affected the economy. The 16th, 17th, and 18th-century European colonists' quest for profit can be linked to the development of the modern American economy. The New World's economy transitioned from a prosperous colonial economy to a small, independent agrarian economy, and then to a highly developed industrial economy. The United States created increasingly complex institutions to keep up with its development (Ross, Boyle, & Chatham, 2021).

3.2.1 The American Economy During Colonial Times: 1607-1763

When European colonists first arrived in the "New World," they discovered a wide area of territory populated by Native People. Many of the original colonies were "charter corporations," which were economic endeavors backed by wealthy English landowners and businessmen. The colonies received limited economic and political benefits from the English king. After income proved to be below expectations, several of the investors turned their businesses over to the colonists themselves. They eventually exploited the natural resources of their new homeland to conduct business with Europe. The principal crops grown in the colonies were rice, indigo plant, wheat, rye, and tobacco. Furs from animals, goods made from fish and whales, and timber were additional

significant exports. In New England, shipbuilding became a significant industry (The American Economy: Historical Overview, n.d.).

The utilization of charter corporations had a significant impact on how well England colonized what would ultimately become the United States of America. Charter companies were associations of interested parties that wished to advance their own financial interests as well as maybe those of England as a whole. These individuals were frequently wealthy landowners and merchants. Even though the King gave each business a charter or grant that gave it political, judicial, and economic privileges, the enterprises' funding came from the private market. The colonial charters were frequently given to the settlers by English bankers, but the colonies frequently failed to generate immediate wealth. Even if they weren't realised at the time, the political effects were significant.

Trapping and trading in furs led to early colonial prosperity there. Moreover, one of Massachusetts' main sources of income was fishing. Yet, individuals were self-sufficient and mostly lived on small farms throughout the colonies. With the expansion of the colonies, supporting industries emerged. A variety of specialised sawmills and gristmills started to emerge. In order to build fishing fleets and later commercial ships, colonists established shipyards. They also built tiny iron forges. Although plantations in Maryland, Virginia, and the Carolinas produced tobacco, rice, and indigo, while the central colonies of New York, Pennsylvania, New Jersey, and Delaware conveyed general crops and furs, the New England colonies relied on shipbuilding and sailing as a source of wealth. Regional patterns of development were evident by the 18th century. With the possible exception of slaves, the general standard of living was excellent, even greater than in England itself. Since English investors withdrew, colonial businesses had access to the field.

Researchers who have studied the economics of the British American mainland colonies have frequently concentrated on the staple crops grown in specific areas. Such a strategy exposes the extreme regional disparities that occurred. Planters imported tens of thousands of slaves to work in low-lying areas of the southern colonies, particularly South Carolina and Georgia, to produce rice, which they then shipped to English ports, where traders usually organized to ship it again to the Iberian Peninsula, where rice was constantly in high demand. Over time, southern colonists expanded their exports to include indigo and deerskins that they acquired from Choctaw, Cherokee, Chickasaw, and Creek people who had managed to escape the demographic collapse

brought on by the introduction of Old-World diseases. Farmers in the middle colonies transported a large portion of their harvest to the English settlements in the West Indies; landowners on the islands required this trade in order to focus their land and forced laborers on the manufacture of sugar. Although the traders of Boston, Newport, and Salem actively participated in planning the shipping of products across the Atlantic basin, New England trailed behind the other areas in terms of exports despite taking advantage of cities growing along its shoreline and fostering fishing endeavors. By the second half of the 18th century, English traders had developed trade ties that reached all the way to the Atlantic from the Ohio Valley (Mancall, 2021).

North America's economy stayed agrarian during the colonisation era. At the time of the first census of the United States in 1790, more than 90% of the people lived on farmland or in tiny rural towns. Even so, the cities that did appear became essential for managing economic activity despite the comparatively small proportion of the people that lived in urban areas. The goods that other colonies would discover in their local shops were largely determined by the merchants who gathered in Boston, Philadelphia, and New York City, as well as others in the shipping lanes of New England and Charleston, South Carolina. They also established the financial framework needed to sustain trade throughout English America. Some academics have recently questioned the English's economic success and demonstrated the value of looking at American economic history from a broad regional perspective. Without a question, the wealth colonizers experienced frequently resulted from the exploitation of the labor of Native Americans in addition to enslaved African and African American people, and from the acquisition and appropriation of territories previously cultivated by Indigenous peoples. A close look at metropolitan dwellers' daily lives reveals that many hard-working people never experienced the prosperity they had anticipated to find in North America. Additionally, the goal of financial gain frequently resulted in long-term environmental harm, sometimes to the extent of cutting out particular pursuits, like the trade of beaver in new England. It is challenging to provide measures for entities like output per capita because there is a lack of data available. However, regardless of the rate of economic development, the colonial era's history shows that success frequently came to those who immigrated from Europe and their descendants even though, as many scholars claimed, the material foundation of that prosperity developed from the workers and lands of others (Mancall, 2021).

3.2.2 The American Economy During Political Revolution: 1775–1783

The colonies united to establish the United States of America as a result of their dissatisfaction from Britain, which culminated in the Revolutionary War, was driven by economic and political considerations, including a desire for increased autonomy and tax relief. "Unalienable rights to life, liberty, and property", a phrase directly lifted from English philosopher John Locke's Second Treatise on Civil Government, served as the rallying cry for the American Revolution (1775–1783), which was both political and economic (1690). The war was started by an event in April 1775. While attempting to acquire a colonial arsenal stash, British forces engaged in combat with local militias in Concord, Massachusetts. Eight years of conflict began when someone fired a shot. Although the majority of colonists may not have initially desired political independence from England, in 1776 independence and the birth of a new nation led to the eventual formation of the United States. In the late 1700s, Britain and the newly formed United States witnessed a massive social and economic shift from agriculture to industry. During the Industrial Revolution, tools that boosted production while decreasing human labor were developed, like the steam locomotive and spinning jenny. For instance, farming required far less effort, allowing people to pursue other options. The United States changed from having an agrarian economy to one where the main sources of income were manufacturing, trade, and companies that offered consumer services throughout the next century (The U.S. Economy: Historical Overview).

Although the American Revolutionary War was regarded as a huge political victory, it had fewer favourable economic results. There were numerous financial issues in the Revolution's subsequent years. Throughout the American Revolutionary War, the colonial economies were in ruins. The War was expensive, notwithstanding the colonies' unexpected wealth in 1774. Because they could not pay soldiers in cash to encourage them, the fledgling United States used property aid to pay troops. In order to form reserve districts, there had to be adequate territory as the conflict dragged on and didn't end until 1781. The size of the parcels, sometimes known as prize land, was based on length of service and rank in the military. Over a million acres of this area were allotted for usage during the Revolutionary War. The American Revolutionary War put an end to the beneficial trade between America and Britain. Even though this trade was onerous due to import monopolies, particularly on tea, and tariffs without representation, colonial firms nevertheless made a lot of money from it. Credit markets crashed before and following the revolutionary war as a result of the

idea that investing in the nascent United States was dangerous. Foreign trade was made more challenging since the USA's two Revolutionary War allies, France and Spain, were more motivated by the chance to defeat Britain then by a desire to aid the new nation. People were already concerned about taxes, thus the newly formed United States was created with a modest tax allowance.

The 13 American states, formerly known as the Thirteen Colonies, came to an arrangement known as the Articles of Confederation and Perpetual Union in 1777, which acted as the country's first frame of government. This paper served as the first constitution of the United States. It lasted from March 1, 1781, until the current Constitution took effect in 1789. The federal government, as it is presently called, was not permitted to impose taxation directly on its citizens under the Articles of Confederation. It could only ask the states for tax money, which they refused to do. It should not be surprising that the federal government was unable to pay for to provide many services given that it was on the brink of bankruptcy at the time. Since the federal government was unable force states to engage in trade or adopt standardised units and measurements, the Articles restricted commerce. Additionally, each state had its own distinct currency, which complicated trading. Despite the fact that both the central government and the state governments owed money to businessmen and European powers, neither had the resources to demand payment from the other. Credit was destroyed since investors were not paid back and no additional loans were provided as a result, credit quickly disappeared (Rust, 2022).

3.2.3 The Us Constitution & Economic Reforms: 1787

One of the major causes of the Constitutional Convention of 1787 was the failure of the Articles of Confederation to keep a US economy stable. Fifty-five individuals participated in the Philadelphia Constitutional Convention that put together the United States' constitution in the summer of 1787. New Hampshire became the ninth state to ratify the Constitution on June 21, 1788, less than a year after the convention came to an end. Since only nine out of the thirteen states needed to ratify the Constitution in order for it to be deemed accepted by the ratifying states, Congress proclaimed the Constitution to be in effect as of March 4, 1789. The Articles of Confederation were thus replaced by the Constitution as the supreme law of the land. The American political structure was comprised of a loose confederation of mainly autonomous states with a weak central authority under the

Articles, which had only been in force since 1781. The Articles had been replaced by the Constitution with a political structure that featured a strong central authority and, eventually, little state autonomy (Lam, 2020) .

The following economic powers were granted to the central government under Article I Section 8 of the Constitution: take out loans for the government, control all intrastate and international trade, establish common bankruptcy laws, coin money, regulate its value, and battle piracy and counterfeiting on the high seas. Because the federal budget was incorporated into law in Section 9, people had more confidence that the government would not overspend and possibly damage its creditworthiness. The new Constitution's authors granted the central government the authority to impose its own taxation, involving on the states. However, the Constitution's Origination Clause mandated that any measure dealing with federal taxes (revenue bills) must begin in the House of Representatives because taxation was a sensitive subject given America's history of complaining about “taxation without representation” under British control (Rust, 2022) .

The Constitution's clearly established delegation of the ability to tax and the right to pay off earlier federal debts boosted the financial prospects of the central government and capital markets. Contrary to the Articles, the Constitution stated that both chambers of Congressress could adopt tax legislation with a simple majority vote of the delegates. However, there were and are still safeguards against a simple majority vote. The president has the power to veto a congressional veto, but Congress can override the president's veto with a two-thirds majority. None of these limitations on majority voting, however, significantly increases the expenses associated with decision-making, as did unanimous voting under the Articles. It was anticipated that the capital markets would be strengthened by the national government being granted the exclusive authority "To coin money, [and] regulate the value thereof," and by states being forbidden from issuing "bills of credit" (paper money). The Constitution established a national judiciary and strongly placed the central government in charge of signing treaties with other countries (McGuire, 2018) .

Regarding interstate trade, Gary M. Walton and James F. Shepherd proposed in 1979 that until the Constitution expressly gave the federal government authority to regulate interstate commerce, the possibility of such impedimentsloomed as a threat. The most important constitutional changes, in accordance with Walton and Shepherd's research, "were those that enhanced the legal framework

for the safeguarding of personal property and execution of contracts." These changes were essential because they increased the benefits of exchange (the cornerstone of a market economy) and provided people a reason to engage in economic operations in which they had a clear advantage and then trade goods and services with other people who were experts in other economic activities in a way that was advantageous to both parties. The Constitution's specific provisions that restricted both, the central as well as state government to enact the ex-post-facto laws (retroactive laws), and the provisions that restricted the state governments to pass any "law impairing the obligation of contracts" specifically contributed to the increase in the benefits of exchange. These restrictions prevented governments from interfering with economic trade, which increased the security of economic activity's returns and contributed to the growth of a market economy. The adoption of the Constitution had very little direct impact on the country, because the economics of all thirteen states were not closely intertwined in 1780s. But because the Constitution eventually became the cornerstone of the supremacy of the central government in the America, the alteration to the basic political structure would finally have a significant impact on the history of America (McGuire, 2018) .

Throughout the 1800s, the United States witnessed enormous growth in terms of its territory, population, and economic might. The Northeast had a massive influx of European immigrants that gave rise to prosperous enterprises and populated cities. Notwithstanding the South's continued dominance of rural and agricultural life, developments in technology like cotton gin changed the region's emphasis. Cotton developed and became a significant crop that was sent to textile industries in the US and other countries. The South's economic prosperity was based on the use of slave labor. The devastating American Civil War began in 1861 because of severe divisions between North and South factions about the morality of enslavement and other political and economic issues. The Northeast's industries had grown significantly by the time the war ended in 1865, therefore playing a crucial role in sustaining the American economy (The American Economy: Historical Overview, n.d.).

3.2.4 The American Economy During The 1800s

Due to industrialization, immigration, territorial growth, new technical advancements, and other trends, the United States experienced a volatile but significantly growing economy in the 19th

century. Volatility was caused by the government's laissez-faire attitude and badly controlled banking. The U.S. had one of the biggest industrial economies in the world by the end of the 19th century, whereas it had a modest and primarily agrarian economy in 1800. The United States had abundant natural resources, which were crucial to economic development as the nation extended its borders in the 19th century. As settlement led to the development of new fields, towns, and cities, new areas offered up new business possibilities. In addition to providing excellent arable territory for growing excess food, huge woods for timber and fuel, coal reserves for fuel and mineral resources for smelting iron and other metals, territorial growth also encouraged immigration (Peterson, 2018).

How the federal government would interfere in the economy in the 19th century was influenced by the argument between Thomas Jefferson and Alexander Hamilton in the 1790s. Jefferson supported a more limited role in which the market should be free of governmental interference, in contrast to Hamilton's firm belief that the government should heavily intervene in financial and economic matters. The concept of a central bank was bitterly contested in the country, and Jefferson rejected the notion of a national bank. Some believed that in order to control the economy and lessen the impacts of depressions, a national bank was required. For much of the 19th century, the United States lacked a national bank because of the views of others, especially those who were inspired by Jefferson and Jackson, who viewed one as an unneeded government intrusion. The worth of paper money and bills differed widely and was prone to corruption and speculation because banking was governed by the states. The nation didn't have a stable central bank until the Federal Reserve was established in 1913 (Peterson, 2018).

When the 19th century began, Jefferson thought of America as an agricultural nation, but over the course of the century, it grew more and more industrialized. Railroads began to traverse the nation in the second half of the 19th century, along with the invention of steam engines, power-driven manufacturing tools, and an inexpensive labor force populated by recently arrived immigrants. Urban areas started to be dominated by factories, and people moved there in droves to find employment in emerging sectors. The American manufacturing sector was revolutionized by advances in interchangeable components, mass production, and assembly lines. The U.S. economy was especially vulnerable to the business cycle in the 19th century. Economies go through peak and decline phases. Deep depressions and volatility were caused by the relative absence of legislative

impact and poorly controlled finance. Currency became constrictive and less resilient to economic downturns as a result of a monetary system that relied on gold and silver to support its worth. Because it was bound to the gold standard, the economy could not be injected with money during depressions. In 1933, during the 20th century's Great Depression, the gold standard came to an end. Economic disasters happened roughly every 20 years, and the 1840s and 1870s in particular saw deep depressions (Peterson, 2018).

3.2.5 The Economics of the Civil War: 1861-1865

In the midst of an impending civil war, the United States had two distinct economies. Although the majority of Americans in all parts of the country were employed or lived on farms, their economic situations were significantly dissimilar. Staple crops and forced labour dominated Southern culture. The North had a wider range of commerce, banking, and manufacturing, and it depended on the "free labour" of wage employees and small business owners.. Southern planters enjoyed opulent affluence in 1859 and 1860 as a result of their record-breaking cotton harvests—at the time, America's most valuable export. Cotton and other primary commodities were grown by more than 4 million African American slaves, who were essential to the economy of the South. Cotton was the main source of energy for the textile mills in both America and Europe, which also greatly increased local prosperity. In comparison with all other slave economies in the New World, the American South had the largest per capita wealth on the eve of war. The most valuable resource for their masters, worth roughly $3 billion, was their slaves.

Contrary to the slave South, the North was praised for having free labour provided by traders, farmers, and wage employees. Additionally, the market economy was prospering. By 1860, northerners could buy clothing made in New England or light their homes with paraffin imported from Pennsylvania. The Midwest produced enormous amounts of grain, enough to feed the country and export to Europe. Further west, mining and agriculture were the main economic activities. Along with the textile mills, shoe factories, and iron foundries, businesses like McCormick Harvesting Machines and the Colt Company showcased the technological advances of the northern industries. The North's developing railway network carried these items across the country. An extensive banking system and financial institutions supported manufacturing, helping to assemble capital that could be spent on further growth.

Like any other battle, the Civil War affected normal business operations by causing the loss of lives and property. This was true, especially in the Confederacy. Beginning in 1861, the Confederate government strained to get the supplies, food, and equipment needed to equip an army. The South did enjoy incredible advances in industrial productivity during this time, yet they were never enough. Confederate efforts to ship cotton to Europe to fund the war were unsuccessful because of the Union's naval occupation of the Atlantic. The Confederate Congress produced paper money that quickly lost value and increased inflation as a means to compensate their soldiers and preserve the economy. In many instances, Confederate rulers did not require tax payments to be made in cash and instead merely demanded food and supplies from the citizens. Most jarring of all, many Southerners struggled to obtain enough food despite the South's tremendous agricultural wealth (Arrington, 2017) .

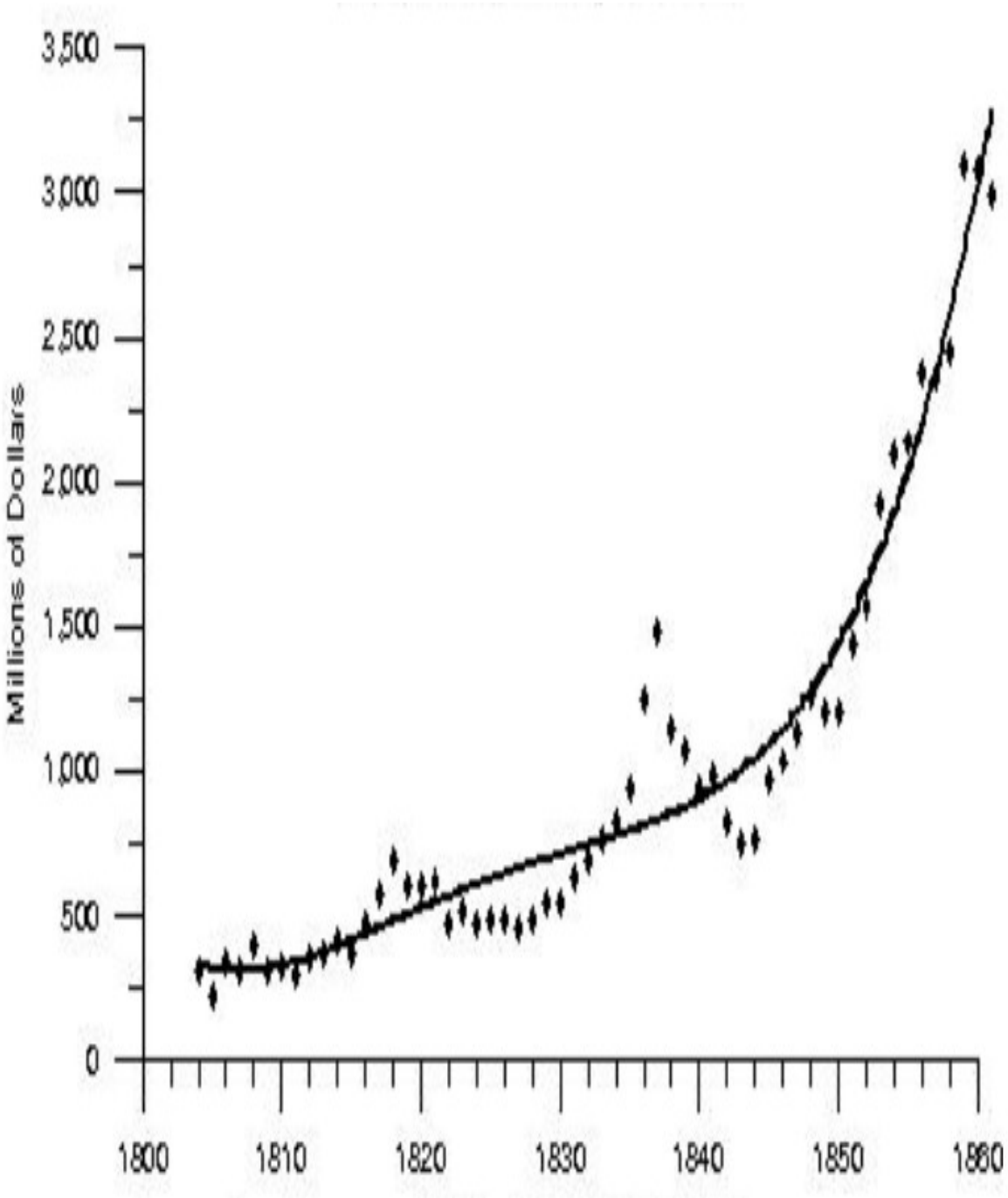
- ## Economic Causes of the American Civil War: Slavery

Southerners were the first to be subjected to slavery during British colonial rule. It became crucial for agricultural labor by the 1850s. Because the plantation system needed a lot of physical labor to produce cotton and tobacco in large quantities, replacing slave labor with paid labor would be financially disastrous for prosperous farmers. Rich farmers found slavery to be enormously profitable, and by 1860, the American South manufactured 75 percent of the world's cotton. Political backing for slavery in the southern region was unwavering because abolishing it would endanger the substantial profits earned by the owners of plantations. Nevertheless, since the "Second Great Awakening religious movement" emerged in the 1830s, adamant endorsement of slavery has been met with growing opposition. For religious reasons, many Americans, particularly in the North, started to oppose slavery. The Second Great Awakening sparked a burgeoning abolitionist movement that aimed to abolish slavery on a national scale. As a result, proponents of slavery intensified their own justifications, saying that slavery was vital for both economic survival and the welfare of the slaves. Racist justifications for slavery were frequently invoked, such as the notion that black people needed masters to look after them because they were incapable of managing their own affairs (Rust, The Economic Impact of the American Civil War, 2022).

The worth of all slaves in the US from 1805 to 1860 is depicted in Figure 5. Over a million slaves, worth roughly $300 million, were owned in 1805; four million slaves, worth nearly $3 billion, were

owned in 1965. Four out of ten residents in the 11 states that would later create the Confederacy were slaves in 1860, and they provided more than half of the agricultural labor in those areas.

Figure 4: The Value of Stock of Slaves in United States (1805-1860)



Source: Roger Ransom and Richard Sutch (1988)

- ## Economic Causes of the American Civil War: Tariffs and Trade

A second issue resulting from the South's lack of economic diversity was tariffs, which are charges on imports. Many finished goods were brought into the US from Europe in the early 1800s. But as time went on, the North produced an increasing amount of its very own finished products. As a result, import restrictions on European competitors were promoted by the central government to safeguard emerging Northern businesses. This outraged the South, which was more reliant on imports from Europe than the North. The tariffs increased the price of European goods, which disproportionately increased the cost of finished items for Southern buyers. Up until the outbreak of the Civil War, Southern hostility to tariffs was a political issue. The Republican Party advocated raising tariffs in the late 1850s to generate more income for the national government. Southerners were furious when the Republican nominee Abraham Lincoln secured the presidency in 1860 regardless of not appearing on the ballot in 10 Southern states. They no longer possessed sufficient political clout to hold both slavery as well as low tariffs over the long haul. (Rust, The Economic Impact of the American Civil War, 2022).

- ## Wartime Economy in The North

War broke out in April 1861, following the South's secession from the United States and the founding of the Confederate States of the United States as a separate state. The North gained economically from significant wartime spending due to its extensive industry. The United States government could invest billions in its armed forces, including on uniforms, salaries, and equipment. For northern manufactures, especially those that produced guns and other weapons, this resulted in enormous profits. Despite spending twice as much on the war as the South, the North had a population that was more than twice as compared to South. Due to reduced per capita spending on the war in the North, taxpayers were not as heavily burdened. The South lost land quickly and was compelled to call up some white farmers for military service, while the northern region was able to retain its own manufacturing and agricultural sectors throughout the Civil War. During the conflict, government expenditure greatly aided the North's economic growth. Along with spending less money during the war, the Confederacy's administration additionally required longer to mobilise in order to control output. The South's inclination for sovereign statehood, which was the same as the nation as a whole under the disastrous Articles of Confederation, had a

significant negative impact on the war effort (Rust, The Economic Impact of the American Civil War, 2022).

- **Economics During the American Civil War: The Homestead Act Of 1862**

The Homesteading Act of 1862 was enacted by Congress in May 1862 amid the ongoing Civil War in an effort to speed up the settlement of the West. The law promoted Union military enrollment by permitting veterans to subtract their period of duty from residency restrictions, in addition to assisting in the expansion of the US economy through increased agriculture and resource development. The Act also forbade Southerners from enlisting in the Confederate army since they would not be eligible for a land grant if they fought against the United States. Even throughout the War, the Union's westward growth was attributed to its economic benefits and wartime productivity. The Confederacy gave municipal and state independence a higher emphasis than the United States did, but the Union nationalized all railways and telephone lines. During the War, the economies of the Union and the Confederacy formed in opposition to one another: the Union's economy strengthened due to government investment, while the Confederacy went through a recession and experienced lack as a consequence of the loss of resources, problems in transport, and the diverting of essential agricultural labor to the battlefield (Ransom, n.d.).

- **The South’s Economy at the End of the War**

The South's economy had been destroyed by the conclusion of the United States Civil War. By the middle of the war, food shortages had sparked bread riots, and by 1865, they had spread to most of the Confederacy's remaining territories. And while the Union employed up to 200,000 Black soldiers as a part of the war effort, the Confederacy only permitted the use of a considerably less number of Black soldiers at the conclusion of the conflict. It is hardly unexpected that this is the case because supporting the Confederacy would not be very appealing to slaves. Their desire to perform effectively was diminished by the fact that the last-minute law legalizing the deployment of Black troops did not necessarily guarantee them liberation from slavery. The thirteenth and fourteenth Amendments of the United States Constitution, which made the forcible abolition of slavery legal nationwide, severely damaged the South's post-Civil War economy. The South also suffered from losing its monopoly on cotton exports. Egypt's cotton industry was created during the period of the Civil War to make up for the loss of "King Cotton" exports from the American South (Ransom, n.d.).

- ## The North’s Economy at the End of the War

Despite incurring significant costs in the war, it can be said that the North's economy grew stronger as a result of it. Government expenditures had created industries that now had strong ties to the Republican-controlled Congress. Despite the tragic assassination of Abraham Lincoln, Andrew Johnson, a Democrat from the South, finished Lincoln's second term as president; however, the Republican Party controlled the federal government during the post-war period. Due to favorable rules and government subsidies for wartime sectors, industrial capitalism grew in the North. In the decades following the Civil War, government loans and subsidies were employed to aid railroads in settling the West. The Transcontinental Railroad's completion in Utah in 1869 was a sign of the power of American industry and the determination of the federal government. Industrialists in the North experienced an increased need for their goods and services as the country moved westward during the end of the Civil War and 1890, thanks to the Homesteading Act and the growth of the railroads (Ransom, n.d.).

- ## The “Costs” of the War

The Civil War is frequently referred to as the first "modern" conflict. This is due in part to the great amount of effort put forth by both sides in order to carry out the battle. How much did this conflict cost? The research of Claudia Goldin and Frank Lewis (1978; 1975) is the most thorough attempt to provide an answer to this topic. Table 2 and Table 3 show the Goldin and Lewis estimations of the war's expenses. The costs are broken down into two categories: the direct costs, which include the costs incurred by state and local governments as well as losses due to property damage and the loss of human capital as a result of casualties; as well as what Goldin and Lewis refer to as the indirect costs of the war, which include the repercussions of war after 1865. In 1860 values, Goldin and Lewis calculate that the combined expenditures of the two governments came to $3.3 billion. The discounted economic worth of the war's casualties is added in at $1.8 billion, and the destruction caused by the war in the South is added in at $1.5 billion. This results in direct costs of $6.6 billion, with each region paying around half of the total. (Rust, The Economic Impact of the American Civil War, 2022).

Table 2: The Direct Costs of the Civil War (In Millions)

Direct Costs:	**South**	**North**	**Total**

Government Expenditures	1,032	2,302	3,334
Physical Destruction	1,487	N/A	1,487
Loss of Human Capital	767	1,064	1,831
Total Direct Costs of the War	3,286	3,366	6,652
Per capita	376	148	212

Table 3: The Direct Costs of the Civil War (In Millions)

Indirect Costs:	**South**	**North**	**Total**
Total Decline in Consumption	6,190	1,149	7,339
Effect of Emancipation	1,670	N/A	N/A
Effect of Cotton Prices	1,960	N/A	N/A
Total Indirect Costs of the War	2,560	1,149	118
Per capita	293	148	212

The US Civil War is frequently attributed to establishing the "modern economy" through industrialization, modernized taxation, banking, and the use of paper money. Consumers favored using gold dollars over paper money before to the Civil War, and there was limited utilization of deficit spending and no income tax. The tremendous price of the war caused everything to alter abruptly. Because of deficit spending (government spending that exceeds tax collection), which was intended to finance the war, both the North and the South both sold bonds. They also implemented a tax on income for the first time. The Union issued the initial demand notes, sometimes known as "greenbacks," in 1861. The government started issuing US currency the next year and legalized its use. The term "green" came to be associated with money because of the green ink that gave the term "greenbacks" its start. Even though paper money remained popular after the

Civil War, many criticized the replacement of gold coinage. In 1933, the US government completely supported the paper dollar and stopped minting gold coins as legal cash. (Ransom, n.d.).

3.2.6 The Gilded Age: 1865-1898

The United States saw the Gilded Age, a period of unparalleled industry and entrepreneurship, from 1865 through the 1890s, but at a terrible price to the working masses. The turbulent years following the end of the Civil War and before the start of the 20th century are referred to as "The Gilded Age." Due to investment during the US Civil War (1861–1865), the victorious North enjoyed a strong manufacturing sector. Government support for colonizing the West persisted, which sparked a boom in railway building. Immigrants from southern and eastern Europe supplied inexpensive labor to America's expanding factories during the late 1860s and the 1890s. Communities in the Northeast saw quick industrialization due to the influx of labor from Europe and Western natural resources. Great economic and technological advancements during the Gilded Age created enormous riches for an increasing number of capitalists, while the working class was adversely affected by urban slums, low wages, and unsafe working conditions. Take a look at the hectic time period that produced the first skyscrapers (Field, 2009) .

The American economy grew significantly after the Civil War, establishing the groundwork for the modern industrialized base. The upshot of a deluge of discoveries and innovations was a series of momentous developments some have labeled the "2nd industrial revolution." Oil was found in Western Pennsylvania. The typewriter was the one that made it. Refrigerated locomotive carriages started to be utilized. The telephone, phonograph, and electric light were all invented. At the turn of the century, vehicles had replaced the use of chariots, and humans were flying. Alongside these successes, the industrial country's infrastructure expanded. In the Appalachian Mountains, coal could be found in plenty from Pennsylvania to Kentucky. Large iron mines began to sprout in the upper Midwest's Lake Superior area. Wherever these two essential raw materials could be combined to produce steel, mills flourished. First, enormous copper and silver mines were opened, then lead mineral deposits and cement factories (Field, 2009) .

American author Mark Twain (1835–1910) and his neighbor Charles Dudley Warner (1829–1901) collaborated on the 1873 book The Gilded Age, which paints a portrait of an American society where shady politicians and greedy businessmen pursue quick money at the expense of the common people. Scandals involving high-ranking politicians making money from dubious business deals, in addition to an incredible boom in the sector, characterized the decades after the Civil War. As a result, there was social unrest and poverty among the lower and middle classes, whereas the upper classes wallowed in debauchery (The American Economy: Historical Overview, n.d.) .

The Gilded Age saw significant corporate growth. A corporation is a legally recognized entity that is allowed to receive funds from many sources while still being regarded as an entity by the law. A legislative charter grants a company-specific right, benefits, and obligations. This style of corporate organization gained favor in the late 1800s. It enabled people to make investments in their companies without having to deal with all the responsibilities and risks associated with being a business owner. Legislative charters protected individual capitalists who received dividends in proportion to their portion of the firm's investment. Several firms have expanded by consolidating with or buying contenders. Later they established a trust, a legal framework in which a select number of people identified as trustees were responsible for managing the constituent companies. When a company is monopolized, it means that it controls all the enterprises in its industry. People were worried that trusts would restrict competition, which would help keep expenses in line. Congress voted in favor of the Sherman Antitrust Act in 1890. The stated purpose of the group was to "fight trade and commerce opposing illegal barriers and cartels." The law was finally put into place, nevertheless, only in the early 1900s, when there was unlimited rivalry and a free enterprise emerged, because of court disputes (The American Economy: Historical Overview, n.d.).

3.2.7 Panics and Depressions

In the realm of economics, panic is a frequent occurrence of public fear over financial issues. Individuals are choosing to preserve their money instead of squandering it because they no longer have trust in banks and investments. A country's economy may undergo a significant global recession or depression because of this. Regardless of the booming prosperity of the 1800s and the early 1900s, fear and despondency ravaged the American economy. Although economists vary on

the exact definitions of panics and depressions, widespread consensus holds that the United States had panics or other recessions in 1819, 1837, 1893, and 1930s.

Panic of 1819:

The Panic of 1819 was the first major economic depression in the United States. It occurred after a period of rapid economic growth and expansion following the War of 1812. The causes of the panic can be traced back to several factors, including a speculative boom in land prices, overproduction of agricultural goods, and the collapse of European demand for American exports. During the War of 1812, the US government had borrowed heavily to finance the war effort. To pay off this debt, the government sold large amounts of land to private investors. This led to a speculative boom in land prices, as investors rushed to buy up land in the hope of making a profit (Campbell, 2021) .

At the same time, American farmers were producing more goods than they could sell, leading to a surplus of agricultural products. This droves down prices and hurt farmers' incomes. In addition, the collapse of the European economy after the Napoleonic Wars led to a decline in demand for American exports, particularly cotton. This hurt the southern economy and contributed to the overall economic downturn. As land prices and agricultural prices fell, many investors and farmers found themselves unable to repay their debts. Banks began to fail, leading to a widespread contraction of credit. This, in turn, led to a sharp decline in economic activity, with businesses closing and unemployment rising (Campbell, 2021) .

Here are some major events related to the Panic of 1819:

- Between 1817 and 1821, the value of American exports fell by over 50%, from $107 million to $53 million.
- Land prices in the western US, which had been booming during the preceding years, fell by as much as 75% in some areas.
- Between 1819 and 1821, the number of bankruptcies in the US rose from 98 to 523.
- Unemployment rose sharply during the panic, with estimates suggesting that up to 15% of the US workforce was unemployed at the height of the crisis.
- The US government responded to the crisis with several measures, including the Land Act of 1820, which reduced the price of public land in an effort to stimulate economic growth.

The Panic of 1873:

The Panic of 1873 was a severe economic depression that lasted from 1873 to 1879, primarily in Europe and North America. It was caused by a variety of factors, including the failure of several major banks and the collapse of the investment firm Jay Cooke & Company. This led to a widespread panic among investors and a sharp decline in stock prices. The panic quickly spread throughout the United States, causing widespread bankruptcies, bank failures, and high unemployment rates. Many businesses and individuals were unable to pay their debts, which led to a wave of foreclosures and a significant decrease in consumer spending. The panic also had international repercussions, as it led to the contraction of credit and the reduction of international trade. The economic downturn lasted for several years, and it was not until the mid-1870s that the global economy began to recover (Gibson, 2017) .

The Panic of 1873 was a significant economic depression that affected many countries, especially the United States. Here are some major events related to the panic:

- Stock prices: In September 1873, the New York Stock Exchange closed for ten days due to the panic. When it reopened, stock prices had fallen by 23 percent.
- Bank failures: Over 5,000 businesses and banks failed during the depression, including the investment firm Jay Cooke & Company, which went bankrupt in September 1873.
- Unemployment: The unemployment rate in the United States increased from 2.4 percent in 1873 to 14.8 percent in 1876.
- Production: Industrial production declined by 14 percent in 1874 and did not fully recover until 1878.
- Railroad construction: The panic led to a significant reduction in railroad construction, with the number of miles of track laid falling from 7,923 in 1872 to 1,462 in 1875.
- Gold production: The price of gold fell during the panic, leading to a decrease in gold production. In 1875, the United States produced only 1.5 million ounces of gold, compared to 3.9 million ounces in 1872.
- Trade: International trade declined sharply during the depression. For example, U.S. exports fell from $425 million in 1872 to $251 million in 1876.

The Panic of 1873 had long-term effects on the United States, as it led to a shift in political power and the rise of the Greenback Party, which advocated for the use of paper money instead of gold. The depression also contributed to the development of labor unions and the growth of the populist movement, which sought to address the economic inequalities that had been exposed by the panic (Gibson, 2017) .

The Panic of 1893:

The Panic of 1893 was a severe economic depression that primarily affected the United States. It was caused by a variety of factors, including overbuilding and speculation in the railroad industry, a decrease in silver prices, a decline in agricultural prices, and a drop in consumer confidence. The panic led to a significant reduction in economic activity, with many businesses and banks failing, and unemployment rates reaching record levels. It also had international repercussions, as it led to a contraction in credit and a decrease in international trade. The depression lasted for several years, and it was not until the turn of the century that the United States began to experience sustained economic growth. The panic had long-term effects on the country, including the rise of the Populist Party, which advocated for the interests of farmers and workers, and the creation of the Federal Reserve System, which was established to provide stability to the banking system and prevent future financial crises.

Here is some major events related to the panic:

- Stock prices: The panic led to a decline in stock prices, with the Dow Jones Industrial Average falling from 274 in January 1893 to a low of 41 in July 1896.
- Bank failures: Over 500 banks and 15,000 businesses failed during the depression.
- Unemployment: The unemployment rate in the United States increased from 3.2 percent in 1893 to a peak of 18.4 percent in 1894.
- Production: Industrial production declined by 26 percent between 1893 and 1895.
- Railroad construction: The panic led to a significant reduction in railroad construction, with the number of miles of track laid falling from 11,569 in 1892 to 3,247 in 1895.
- Gold reserves: The panic led to a run on gold reserves, and the United States Treasury was forced to borrow $65 million in gold from J.P. Morgan to shore up its reserves.

- Trade: International trade declined sharply during the depression. For example, U.S. exports fell from $1.6 billion in 1892 to $862 million in 1896.

Overall, the Panic of 1893 had a significant impact on the United States economy, leading to widespread bankruptcies, bank failures, and high unemployment rates. It took several years for the economy to recover from the depression, and it was not until the turn of the century that the country experienced sustained economic growth.

3.2.8 Industrialization of The U.S. Economy

The industrialization of the United States economy was a period of rapid growth and development in the 19th and early 20th centuries. It was a time of significant change as the country transitioned from an agrarian-based economy to an industrial one. The industrial revolution brought about technological advancements that revolutionized manufacturing, transportation, and communication. It had far-reaching implications that transformed the way Americans lived, worked, and interacted with each other and the world.

By 1878, the United States had returned to a time of prosperity after a lengthy period of recession in the middle of the 1870s. Over the following 20 years, the amount of industrial production, the number of people employed in the sector, and the quantity of manufacturing facilities all more than tripled. A more accurate indicator of the magnitude of this economic feat is the increase in the total annual value of all goods produced, which went from around $5,400,000,000 in 1879 to $13,000,000,000 in 1899. The iron and steel industry, which has always been a vital component of any industrialized base, expanded even more quickly: between 1880 and 1900, the United States' annual volume of distribution rose from around 1,400,000 to more than 11,000,000 tons. Before the end of the century, the United States produced more than one-fourth of the world's pig iron, surpassing Great Britain in both iron and steel output (Industrialization of the U.S. economy, n.d.) .

Several factors contributed to this surge in economic activity. While gold and silver mines generated new funding sources for East-coast investment, the utilization of Western commodities like mining and timber spurred a need for efficient transportation. Construction of railways, especially in the West and South, helped the steel industry grow by creating a market for rail tracks. In the US, locomotive tonnage increased from just under 93,262 miles (150,151 km) in 1880 to almost 190,000 miles (310,000 km) in 1900. Improved goods and cheaper manufacturing costs

arose from technological advancements, such as the use of the Bessemer and open-hearth processes in the fabrication of steel. The telephone, typewriter, linotype, phonograph, electric light, cash register, air brake, refrigerator car, and automobile were only a few of the significant technologies that helped to launch some new businesses and transform business practices (Industrialization of the U.S. economy, n.d.).

Technological innovations, namely the employment of the Bessemer and following a comprehensive in the creation of steel, led to better products and reduced production costs. Just a handful of the important technologies that contributed to the establishment of certain new companies and the transformation of business processes are the cellphone, typewriter, linotype, gramophone, electric light, cash register, air brake, refrigerator car, and automobile. The widespread adoption of the corporate form of business organization created new opportunities for the humongous financing of commercial firms and enticed additional capital, the majority of which came from European investors. Throughout, a vibrant and energetic group of businesspeople oversaw this industrialization. They attracted public attention, though not necessarily admiration, and gave the impression that they embodied the special generation of leadership in the United States of America. The best-known of these varied organizations were railroad builders and marketers like Cornelius Vanderbilt, Leland Stanford, Collis P. Huntington, Henry Villard, and James J. Hill, as well as John D. Rockefeller in the oil and steel industries (Industrialization of the U.S. economy, n.d.).

3.2.9 Great Depression of the 1930s

The Great Depression of the 1930s was one of the most severe economic downturns in the history of the United States. It began with the stock market crash of 1929 and lasted until the late 1930s, with the economy not returning to pre-crisis levels until the onset of World War II. There were numerous complex causes of the Great Depression. One major factor was the collapse of the US stock market, which had been driven up by speculative buying in the years preceding the crash. The crash led to a wave of panic selling, and by the end of 1929, the value of the stock market had fallen by more than 40%. The economic crisis spread quickly throughout the economy, with businesses closing, unemployment soaring, and credit becoming scarce. By 1933, the unemployment rate had reached 25%, and many Americans were forced to turn to soup kitchens and other forms of charity to survive (Caldbick, 2019) .

In response to the crisis, the US government took a number of steps to boost economic growth and rebuild public trust in the financial sector. These included the development of the New Deal, a collection of initiatives and regulations designed to promote relief, restoration, and reform. The National Preservation Corps, which hired hundreds of thousands of young men in infrastructure improvements, and the system of Social Security, which offered protection for the elderly and crippled, were two examples of policies included in the New Deal.

Here are major events related to the Great Depression:

- Between 1929 and 1933, the value of American exports fell by more than 50%, from $5.24 billion to $1.7 billion.
- The unemployment rate during the depression peaked at 25% in 1933.
- GDP fell by 30% between 1929 and 1933.
- Industrial production fell by 45% between 1929 and 1932.
- The Dow Jones Industrial Average, a measure of stock market performance, fell by more than 80% between 1929 and 1932.

The US economy and society were significantly impacted by the Great Depression. It highlighted the dangers of unchecked speculation and the need for responsible economic management. It also led to the creation of a more robust social safety net and helped to establish the role of the federal government in stabilizing the economy during times of crisis.

Several factors contributed to the catastrophe. Investor volatility and excessive indebtedness were frequent problems, as was the federal democratic control over the banks. The act of purchasing assets in the hope that their value would significantly rise in the future is referred to as speculation. In the 1800s, a lot of speculators borrowed money from the banks to buy land. High demand caused land prices to soar, usually well above what the land was worth in the market. Poorly regulated banks provided fraudsters and one another a significant amount of credit. Smaller banks and companies also fell because of the collapse of a major bank, which started a domino effect (The American Economy: Historical Overview, n.d.).

3.2.10 Post WW2 Economic History 1945 Onwards

In the years following World War II, the United States saw a dramatic economic transformation. The transition to a highly consumer-driven economy during this time, sometimes known as the "Golden Era of Capitalism," and the emergence of new sectors were key factors in the period's rapid economic expansion. People fondly recall the post-World War II era as a period of social stability and economic growth. After winning the war, America had defeated the powers of evil in the world. Rising living standards, more opportunities, and a newly established American culture, optimistic in its future and role in the world, replaced the sufferings of the fifteen years prior of war and depression.

The US GDP increased at an average yearly pace of 3.7% from 1946 to 1960, which was much higher than the 1.9% pre-war average. With an average yearly increase of 4.2%, the growth rate reached its high in the 1950s. Increased productivity and technology breakthroughs across a number of economic sectors were the main drivers of this expansion.

Factors contributing to economic growth:

- Government Policies: The US government played a significant role in promoting economic growth through policies such as the GI Bill, which provided education and training for veterans, and the Marshall Plan, which provided aid to rebuild Western Europe. The government also invested heavily in infrastructure, such as the construction of highways and airports, which helped to facilitate economic growth.
- Technological Innovation: The post-war period saw significant technological advancements, such as the development of computers, jet engines, and telecommunications. These advancements helped to increase productivity and efficiency in industries such as manufacturing and agriculture.
- Consumerism: The post-war period saw a rise in consumerism, as people had more disposable income and access to credit. This led to an increase in demand for goods and services, which in turn fueled economic growth (Bohanon, 2012).

3.3 Comparison of US Economic Development: Past and Present

The economic development of the United States has undergone significant changes over the years. From the agricultural economy of the colonial era to the industrialized powerhouse of the 20th

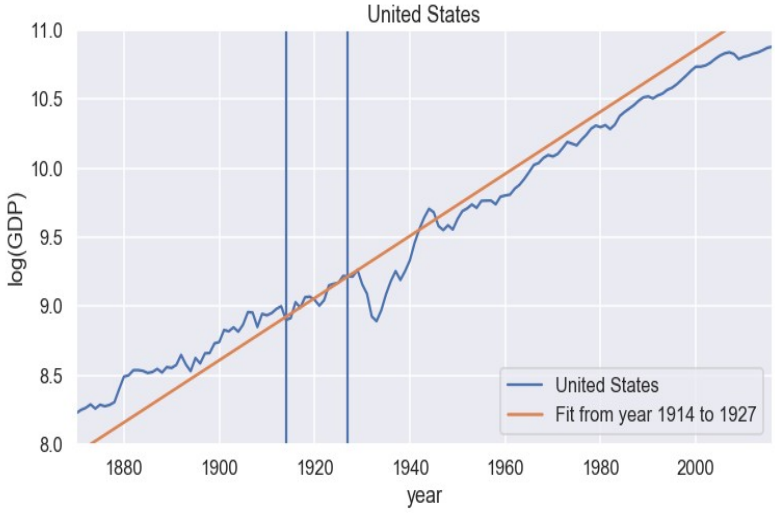
century, the US has experienced a series of transformations. In this article, we will compare the past and present economic development of the US, with a focus on key indicators and statistical data.

Gross Domestic Product (GDP)

GDP is the total value of goods and services produced in a country. It is often used as an indicator of economic growth. According to data from the Bureau of Economic Analysis, the US GDP in 1890 was $11.8 billion (in 2012 dollars), and it grew steadily over the next several decades. By 1929, just prior to the Great Depression, US GDP had grown to $1.1 trillion (in 2012 dollars). The economy contracted sharply during the Depression, with GDP falling to $0.8 trillion by 1933.

The US economy rebounded during World War II, with GDP reaching $1.5 trillion in 1944. GDP continued to grow during the post-war period, reaching $6.4 trillion in 1970. The economy experienced periods of both growth and recession in the following decades, with GDP reaching $18.9 trillion in 2016.

Figure 5: GDP Growth in US Over the Years (1880-2005)



(Source: American Association for the Advancement of Science)

Since 2000, the US economy has experienced both periods of growth and recession. According to data from the Bureau of Economic Analysis, the US GDP grew by an average of 2.2% annually from 2000 to 2019. According to the World Bank, the US had a GDP of $20.9 trillion in 2019,

making it the largest economy in the world. In comparison, the US had a GDP of $8.4 billion in 1790, which grew to $1.8 trillion in 1960. This growth in GDP is a clear indication of the significant economic development that has taken place in the US over the years (Gross Domestic Product, Fourth Quarter and Year 2019 (Advance Estimate), 2020) . However, the COVID-19 pandemic in 2020 caused a significant contraction in the US economy, with GDP falling from $21.5 trillion in 2019 to $20.9 trillion in 2020 (in current dollars). The US GDP is projected to grow to $22.9 trillion in 2022 (in current dollars), according to data from the Congressional Budget Office.

Income Inequality

Income inequality in the United States has fluctuated significantly over the past century, with periods of both increasing and decreasing inequality. One common measure of income inequality is the Gini coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality). According to data from the World Inequality Database, the Gini coefficient for the US in 1890 was 0.446, indicating a moderate level of inequality. Income inequality increased during the first half of the 20th century, peaking in the late 1920s and early 1930s, with a Gini coefficient of 0.482 in 1933. The introduction of social welfare programs and progressive taxation during the New Deal era helped to reduce inequality, with the Gini coefficient falling to 0.401 by 1944. Income inequality remained relatively stable during the post-war period, with the Gini coefficient fluctuating between 0.385 and 0.426 from 1947 to 1980. However, inequality began to rise again in the 1980s and 1990s, with the Gini coefficient reaching 0.482 in 2018, its highest level since the Great Depression.

The COVID-19 pandemic in 2020 had a significant impact on income inequality in the US, with the Gini coefficient rising to 0.488, according to data from the World Inequality Database. The pandemic disproportionately affected low-income workers, who were more likely to lose their jobs or have their hours reduced, while higher-income workers were more likely to be able to work remotely and maintain their income levels. Overall, income inequality in the US has fluctuated over the past century, with periods of both increasing and decreasing inequality. The current level of income inequality in the US is relatively high compared to other developed countries, highlighting the need for policies to address this issue (Income and Poverty in the United States, 2020).

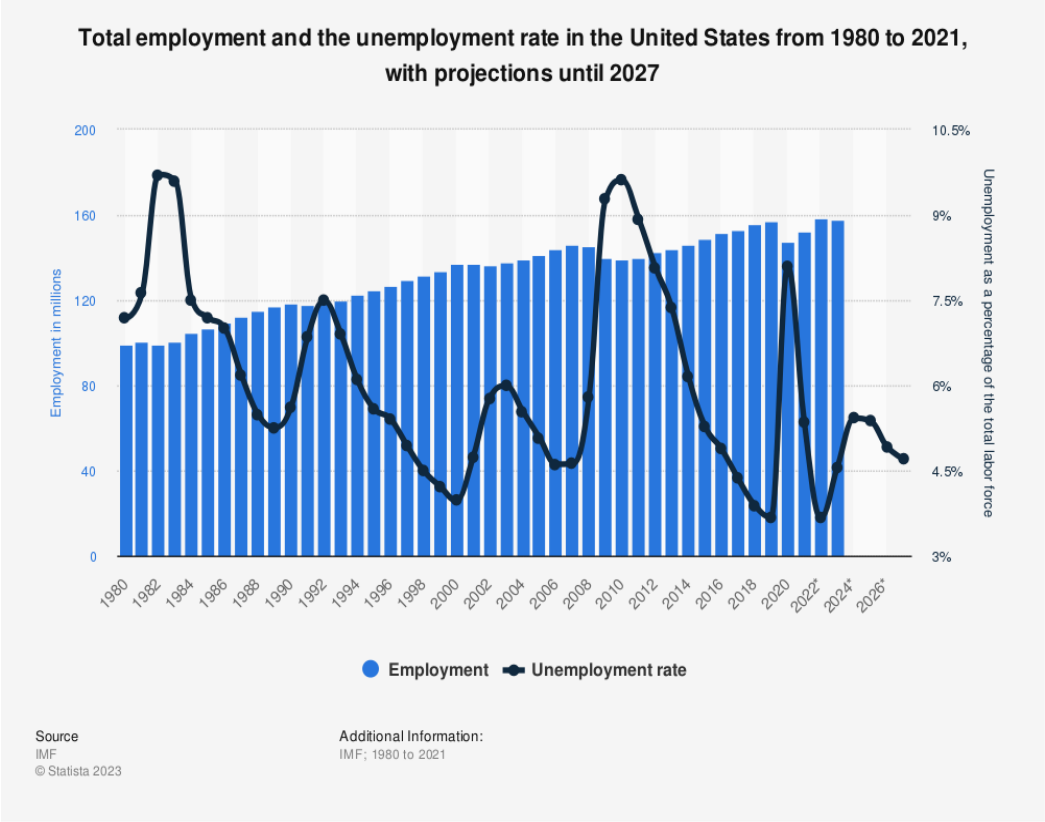
Employment

Employment in the United States has undergone significant changes over the past century, with shifts in the types of jobs available and the industries that dominate the economy. The following is a comparison of US employment from 1890 to 2022, based on data from the Bureau of Labor Statistics. In 1890, the US had a total civilian labor force of approximately 25 million, with the vast majority (over 80%) working in agriculture. Manufacturing was the next largest industry, employing just over 2 million workers. Over the next few decades, employment in manufacturing continued to grow, and by 1950, it had surpassed agriculture as the largest industry in terms of employment. In that year, there were approximately 16 million workers in manufacturing and 10 million in agriculture (Employment Situation Summary, 2021).

Since 1950, the US economy has undergone significant changes, with a shift away from manufacturing towards service-oriented industries. Today, the largest industries in terms of employment are healthcare and social assistance, retail trade, and professional and business services. As of January 2022, the total civilian labor force in the US was approximately 161 million, with approximately 125 million employed and 6 million unemployed. The unemployment rate in January 2022 was 3.9%.

It is worth noting that the COVID-19 pandemic had a significant impact on employment in the US, with millions of workers losing their jobs or having their hours reduced due to business closures and restrictions. However, employment has been steadily recovering since mid-2020, and the current employment situation in the US remains robust (Employment Situation Summary, 2021).

Figure 6: Total Employment and Unemployment Rate in US From 1980 To 2021



Source: Bureau of Labor Statistics (2021)

Trade

Trade has been a significant component of the US economy throughout its history, with the US being a major player in global trade. The following is a comparison of US trade from 1890 to 2022, based on data from the US Census Bureau. In 1890, the US exported approximately $840 million worth of goods and imported around $610 million. The leading exports were agricultural products, such as cotton and wheat, and the leading imports were manufactured goods, including textiles and steel.

Over the next few decades, US trade continued to grow, with both exports and imports increasing substantially. By 1950, the US was exporting around $16 billion worth of goods and importing around $18 billion. The leading exports were still agricultural products, but manufactured goods had become a more significant component of US exports, with machinery and transportation equipment leading the way. The leading imports were still manufactured goods, with machinery

and transportation equipment also leading the way (U.S. International Trade in Goods and Services, 2022).

Since 1950, US trade has continued to grow, with both exports and imports increasing dramatically. Today, the US is one of the world's leading trading nations, exporting around $2.5 trillion worth of goods and services and importing around $3.6 trillion. The leading US exports today include machinery, transportation equipment, and chemicals, while the leading imports are machinery, transportation equipment, and electronics.

However, trade has also been a contentious issue in US politics, with some arguing that it has resulted in job losses and economic imbalances. This has led to efforts to renegotiate trade agreements and impose tariffs on certain imports. Overall, trade has been a significant component of the US economy throughout its history, with both exports and imports growing substantially over time. While it remains a controversial issue, US trade continues to play a significant role in the global economy (U.S. International Trade in Goods and Services, 2022).

3.4 The Contribution of US to Global Environmental Damage 1990-2022

The United States challenged the United Kingdom as the leading economic power in the late nineteenth century, and it has held that position ever since. By the start of the twenty-first century, the United States produced about 30% of the world's gross domestic product (GDP). The United States, in addition to being the biggest economy in the world, is one of the biggest users of natural resources. The nation, which is home to around 5% of the world's population, consumes 15% of all extracted materials and about one-fifth of the world's primary energy supply alone in year 2005, resulting in the 21% of the world's carbon dioxide (CO2) emissions through burning fossil fuels and producing cement (Marland et al. 2007). A change from renewable biomass to mineral and fossil resources, as well as an 18-fold rise in material consumption per capita, are all characteristics of US economic history. Despite considerable improvements in the material intensity, there hasn't been any dematerialization to date; in contrast to other high-income nations, material consumption has increased rather than stabilized since the 1970s (Gierlinger & Krausmann, 2012).

Domestic Extraction of materials increased 17-fold between 1870 and 2005, from 0.4 gigatons (Gt)6 to 7.4 Gt. Almost the entire time, extraction increased; the only uncommon exception was a drop that occurred across several years. The greatest declines in DE happened in the early 1930s, during the Great Depression, and in the years after major increases in the price of oil between 1973 and 1979. Almost all recessionary periods (such as those in 1990 and 2000) were accompanied by decreased rates of resource extraction. DE was dominated by biomass at the start of the studied period. From 86% in 1870 to under 50% in 1911 to 25% in the early 1960s, where it has remained, the biomass fraction dropped quickly. The total mass flow increased while the proportional contribution of biomass to DE continued to decline: DE of biomass increased by five times from 0.39 gigatons per year (Gt/yr) in 1870 to 1.76 Gt/yr in 2005. Mineral and fossil resources now make up the majority of domestic extraction, accounting for around three-quarters of all domestic extraction since the turn of the 20th century.

Table 4: Average annual U.S. growth rates of population, gross domestic product (GDP), and resource use during different periods of the metabolic transition and factor growth between 1870 and 2005 levels

	1870–1929	*1932–1973*	*1984–2005*	*Factor 2005/1870*
Population	*1.9%*	*1.3%*	*1.0%*	*7.5*
GDP, in intl. $	*3.7%*	*4.4%*	*3.1%*	*91.6*
DMC, in kg	*2.8%*	*3.3%*	*1.5*	*19.0*
Income (GDP per capita), in intl. $/cap/yr	*1.7%*	*3.0%*	*2.0%*	*12.2*
DMC minerals and fossils, in t/cap/yr	*3.3%*	*3.2%*	*0.7%*	*12.2*
Total primary energy supply (TES), in GJ/cap/yr	*2.1%*	*2.0%*	*−0.3%*	*4.9*

(Sources: U.S. Bureau of the Census (1975), FAO (2009) (population); Maddison (2008) (GDP))

(1870–1929: coal phase of the metabolic transition; 1932–1973: oil-based growth; 1984–2005: consolidation of industrial metabolism. The table does not show average growth rates for the years after the Great Depression (1929–1932) or the years after the first two oil price shocks (1974–1983), which were characterized by strong fluctuations in material and energy use).

3.4.1 US Carbon consumption: 1750-2022

Carbon consumption in the US has undergone a significant transformation since the Industrial Revolution, which began in the mid-18th century. From 1750 to 1800, the carbon emissions in the US were just 0.1 metric tons per capita. However, as the economy began to expand rapidly, carbon

consumption also started to increase. By 1900, carbon emissions had risen to 5.5 metric tons per capita, which marked the beginning of a trend that would continue to this day.

Here is a detailed timeline of US carbon consumption since 1750:

1750-1800: During this period, the US emitted just 0.1 metric tons of carbon per capita. At that time, the main sources of carbon emissions were wood burning and agriculture.

1800-1900: In the 19th century, the US underwent a significant shift from an agrarian economy to an industrial one. This transformation led to a significant increase in carbon consumption. By 1900, carbon emissions had reached 5.5 metric tons per capita, with coal replacing wood as the primary source of energy.

1900-1920: The early 20th century was marked by the growth of the automobile industry and the discovery of oil in Pennsylvania in 1859. These developments led to a sharp increase in carbon consumption, with emissions reaching 12.8 metric tons per capita by 1920.

1920-1970: The period between the World Wars and the post-World War II boom saw a further increase in carbon emissions, driven by the growth of the petrochemical industry and the widespread use of fossil fuels in transportation and industry. By 1970, carbon emissions had risen to 21.1 metric tons per capita.

1970-2000: In the 1970s and 1980s, concerns about the environmental and health impacts of carbon emissions led to some efforts to reduce consumption. These efforts, combined with the effects of the 1973 oil crisis, led to a slight decline in carbon consumption. However, the trend reversed in the 1990s, with emissions rising again. By 2000, carbon emissions had reached 23.7 metric tons per capita.

2000-2022: In the early 21st century, there has been some progress in reducing carbon consumption in the US. In particular, the use of renewable energy sources like wind and solar power has grown significantly. However, overall carbon consumption has remained high, with emissions averaging around 20 metric tons per capita from 2000 to 2022. In 2022, carbon emissions in the US were 14.5 metric tons per capita, down slightly from the previous year due to the COVID-19 pandemic and related economic slowdown.

Despite some progress in reducing carbon consumption, the US remains one of the world's largest carbon emitters. According to the Global Carbon Project, the US was responsible for approximately 14% of global carbon emissions in 2020, behind only China. As such, there is still much work to be done to reduce carbon consumption and mitigate the negative effects of climate change (Shao, 2023).

3.4.2 US Coal consumption: 1750-2022

The United States has a long history of coal consumption, which dates back to the mid-18th century when the first commercial coal mine was opened in Virginia in 1748. Since then, coal has played a crucial role in the economic development of the country, powering industries and homes alike. Here is a detailed discussion on US coal consumption over the years since 1750-2022 along with statistical data (Shao, 2023).

1750-1850: During this period, coal consumption in the US was primarily limited to heating homes and small-scale manufacturing, such as blacksmithing. The total annual coal consumption during this period is estimated to be around 1 million short tons.

1850-1900: This period saw a massive increase in coal consumption due to the rapid expansion of the railway system, which relied heavily on coal for locomotives. Coal was also used extensively in the manufacturing of iron and steel, which played a vital role in the country's industrialization. By the end of the 19th century, the US was the world's largest coal producer and consumer. The annual coal consumption during this period increased to around 267 million short tons.

1900-1950: During this period, coal continued to be a vital source of energy for the US economy, accounting for over 90% of the country's electricity generation. The total annual coal consumption during this period increased to around 1 billion short tons.

1950-2000: In the second half of the 20th century, coal consumption in the US continued to increase, fueled by the growing demand for electricity and the expansion of heavy industries such as steel and cement. The annual coal consumption during this period increased to around 1.1 billion short tons.

2000-2022: In the early 21st century, the US coal industry faced significant challenges due to increased competition from natural gas and renewable energy sources. The annual coal consumption during this period has decreased to around 600 million short tons.

According to the US Energy Information Administration, the total coal consumption in the US in 2020 was 535.4 million short tons, which is the lowest level since 1965. The decline in coal consumption can be attributed to the growing awareness of the environmental impact of coal-fired power plants and the increasing use of natural gas and renewable energy sources for electricity generation. Hence, the US coal consumption has seen significant changes over the years since 1750-2022. While coal played a vital role in the country's economic development in the past, its usage has declined in recent years due to environmental concerns and the increasing adoption of cleaner energy sources (Shao, 2023).

3.4.3 US Mineral Consumption: 1750-2022

The consumption of minerals in the US has increased significantly since the 1750s due to industrialization and population growth. Minerals are essential for various industries such as construction, transportation, and manufacturing, making them crucial for economic growth.

One of the most widely used minerals in the US is iron, which has been used for centuries in construction and manufacturing. Iron consumption increased steadily from the 1750s until the mid-20th century, peaking in the 1970s, and has since declined due to the rise of alternative materials such as plastics and composites. In 1750, the US consumed approximately 1,500 metric tons of iron. By 1900, this had increased to over 14 million metric tons, and by 1970, it had peaked at over 114 million metric tons. As of 2022, the US consumed around 42 million metric tons of iron (Nunez, 2019)

Another essential mineral is copper, which is widely used in electrical wiring, plumbing, and electronics. Copper consumption in the US has also increased significantly since the 1750s, with consumption of around 1,000 metric tons in 1750 to over 2.4 million metric tons in 2022. Other minerals that have seen significant increases in consumption over the years include aluminum, which is used in various industries such as aerospace, construction, and packaging, and zinc, which is used in the production of steel and alloys.

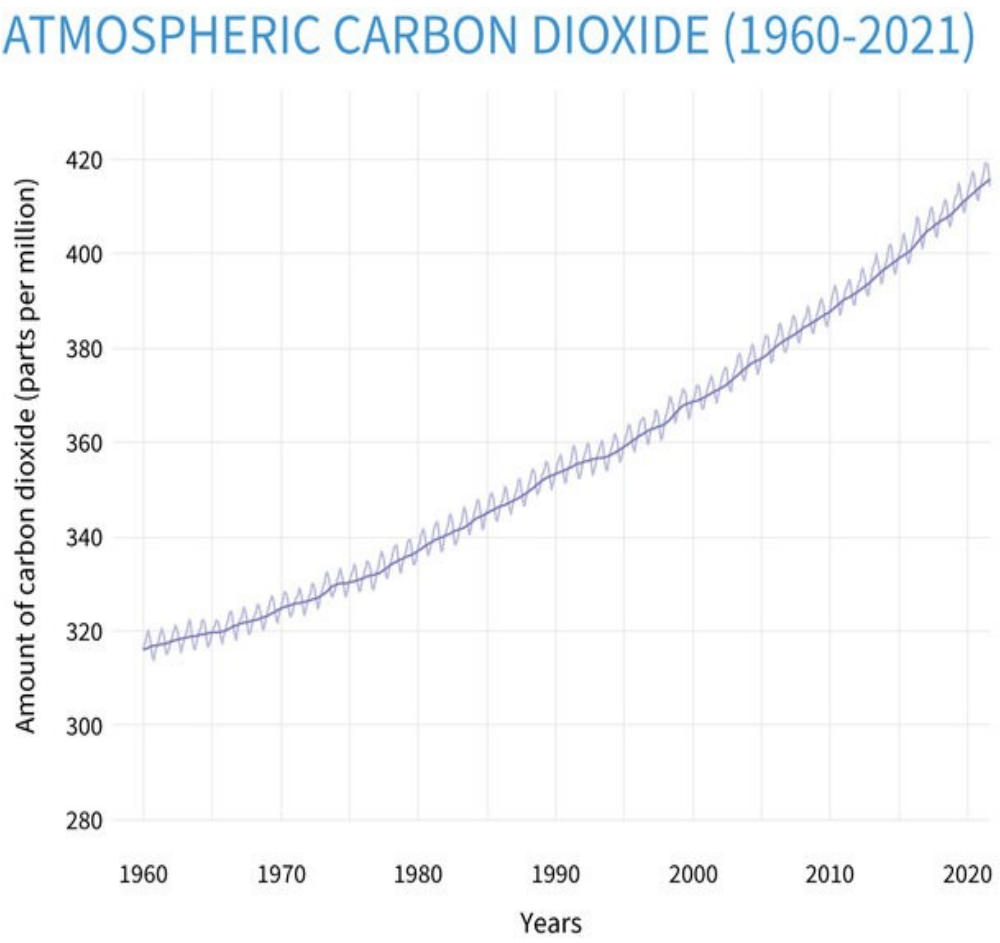
It is worth noting that mineral consumption has environmental impacts, including land use, water consumption, and greenhouse gas emissions from mining and processing. Efforts to reduce the environmental impact of mineral consumption have led to increased recycling and the development of alternative materials. In conclusion, the US.'s mineral consumption has increased significantly since the 1750s due to industrialization and population growth. While minerals such as iron, copper, aluminum, and zinc are essential for various industries' economic growth, their consumption has environmental impacts that must be addressed (Nunez, 2019)

3.4.4 Greenhouse Gas Emissions 1990-2022

Greenhouse gases have basically been responsible for making the life possible on Earth, for not only humans but also for millions and billions of other species and organisms as well, simply by entrapping the heat coming from the Sun in the Earth's atmosphere. But for some recent times the balance of these gases has been disturbed resulting in the "survival of the fittest" phenomenon for many of the species of plants and animals as well. Among these gases, one is Carbon dioxide, which can be considered as the most dangerous of them. Recently, the level of which has reached its highest in the course of history. These levels have reached their highest in the atmosphere, in history, mainly due to human activities like that of burning of fossil fuels. These gases perform their primary function that is to entrap the heat coming from the sun in the Earth's atmosphere, but due to their drastic increase in volume, the heat remains close to the Earth's surface, instead of escaping into space. Thus, increasing the heat level of Earth, due to high levels of Greenhouse gases, is known as the greenhouse effect (Nunez, 2019).

(Based on analysis from NOAA’s Global Monitoring Lab, global average atmospheric carbon dioxide was 414.72 parts per million (“ppm” for short) in 2021, setting a new record high despite the continued economic drag from the COVID-19 pandemic. In fact, the jump of 2.58 ppm over 2021 amounts tied for 5th-highest annual increase in NOAA's 63-year record).

Figure 7: Level of Atmospheric CO2 from 1960-2021



Source NOAA Climate.gov

Carbon dioxide that is related to global energy has increased by 6% in 2021, making it approximately upto 36.3 billion tons, which make it increased to the highest level ever as confirmed by new analysis performed by IEA. The world economy has suffered a great deal because of the COVID-19 and to rebound that loss, the world has heavily relied on coal to generate growth. This year, the rise of the emission level of CO2 which is around 2 billion tons, was the largest ever in history. The analysis performed by IEA shows that this increase has even again offset the balance which has somehow been restored due to the pandemic last year. In 2021, despite a price hike, the demand of these products increased due to multiple factors which included adverse weather conditions and conditions of energy markets. These conditions altogether have resulted in burning of more coal despite the fact that the non-renewable resources have also registered their largest ever growth around the globe (Global CO2 emissions rebounded to their highest level in history in 2021, 2022).

The pollution of the world has expanded extremely rapidly in the past 6 decades, which also has brought rapid economic growth. But all this growth has cost the earth greatly in the form of environment. The global GDP has tripled as a result of this process since 1960. But it is also noted that emission of CO2 has increased 4 times in the same time period. Moreover, two-thirds of the increase has happened in the last three decades only. China is a state which has emphasized its focus on the issues like that of poverty eradication and economic growth for its people. Moreover, China has extensively integrated itself into global value chains. But all this progress has been accompanied by an enormous increase in the emission of carbon dioxide by the state. The top three emitters of greenhouse gases are China, USA and India. These states emit about 50% of total CO2 that is emitted globally. Moreover, top 20 emitters of greenhouse gases comprise around 80% of the total gases emitted globally (Nunez, 2019).

3.4.5 US Greenhouse Gas Emissions: 1990-2022

Since the beginning of the Industrial Revolution, the United States of America has been one of the major producers of carbon emissions on a global scale. The Industrial Revolution, which began in the late 18th century and lasted until the middle of the 19th, revolutionized industry and paved the way for the widespread use of fossil fuels like coal and oil. Since then, the industrialization, urbanization, and technological development in the United States have grown exponentially, causing a constant rise in carbon emissions.

Although the nation was still largely an agrarian nation in the early 1800s, there were hardly any overall carbon emissions from the United States. The US has released large volumes of carbon dioxide into the atmosphere ever since the industrial revolution. The result has been an unnatural warming that has caused the Earth's temperature to rapidly increase. The impact that excessive industrialization had on the environment, such as the numerous natural disasters that happened as a result of the newly introduced, swift industrialization practices that had been put in place in rapid motion, was one of the main drawbacks of the industrial revolution (Nunez, 2019).

The first Industrial Revolution in Great Britain started a chain reaction that resulted in several additional industrial revolutions, notably the Industrial Revolution in the United States, which had an influence on the environment and increased emissions. During the US industrial revolution, carbon dioxide emissions started to rise steadily, and they have continued to rise ever since. The

tremendous rise in greenhouse gas emissions and carbon dioxide emissions is not expected to slow down any time soon. The United States was one of the world's leading industrial powers by the end of the 19th century, and its carbon emissions had already begun to have a considerable effect on the environment.

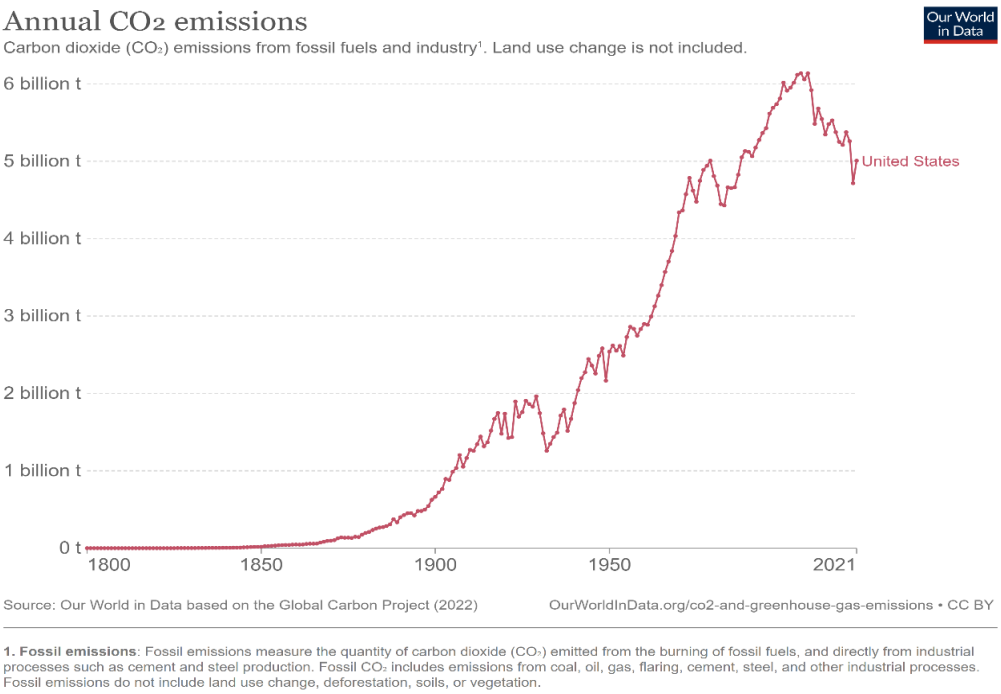
The United States continued to experience industrial and economic growth during the 20th century, which resulted in a significant rise in carbon emissions. The demand for energy and resources significantly increased as a result of the two world wars and the post-war economic boom, which exacerbated carbon emissions. The United States started switching from coal to oil and natural gas in the 1950s and 1960s because they were seen to be more efficient and clean energy sources. Yet, there was still a sizable rise in carbon emissions as a result of the increased usage of these fossil fuels (Global CO2 emissions rebounded to their highest level in history in 2021, 2022).

The contemporary environmental movement got its start in the 1970s, and the US government started implementing policies to cut carbon emissions. The Clean Air Act's adoption and the creation of the Environmental Protection Agency (EPA) in 1970 were important advances in the direction of lowering carbon emissions. The EPA enacted laws to limit pollution and set emissions guidelines for a number of businesses, including factories, power plants, and vehicles.

Notwithstanding these steps, the United States' carbon emissions increased throughout the 1980s and 1990s due to the nation's persistent economic expansion and rising energy demand. But the United States started to act more forcefully to cut carbon emissions in the early 2000s. After the Energy Policy Act was passed in 2005, the government started enforcing harsher emissions regulations for cars and power plants, providing incentives for the growth of renewable energy sources like wind and solar energy.

The United States has begun to reduce its carbon emissions in recent years. The Environmental Protection Agency reports that between 2005 and 2018, the overall carbon emissions in the US decreased by 12%. The transition to cleaner energy sources, such as natural gas and renewable energy sources, as well as advancements in energy efficiency, have contributed to this drop (Global CO2 emissions rebounded to their highest level in history in 2021, 2022).

Figure 8: US CO2 Emission Over the Years



3.4.6 Effects of Greenhouse Gases

The effects of greenhouse gases range from environmental issues to health issues. They are the main source of climate change due to entrapment of heat. Moreover, they formulate smog and air pollution which are causing respiratory diseases. The climate change caused by greenhouse gases itself has severe affects which include food supply disruption, increasing wildfires and extreme weather. Moreover, these conditions have severe future threats which include change in weather patterns, extinction of species due to unfavorable weather and conditions and for the same reason migration of many other species (Nunez, 2019).

Along with severe environmental hazards, carbon dioxide emission also possesses severe health hazards as well. These health hazards can range from headaches, low cognitive performance score, dizziness, decision making problems, tingling sensations, restlessness, sweating, difficulty in breathing, tiredness, blood pressure, increased heart rate, convulsions to asphyxiation and even coma. It is a fact that life would be impossible without CO2 as plants cannot photosynthesize without CO2 and without plants the basic food chain system of Earth's sustainability would be broken. But it is also a fact that increased levels of CO2 are causing climate change as it causes heat traps. It has been medically proven that elevated CO2 levels indoors have caused even brain

damage to human beings. There have been many cases where increased levels of CO2 in bedrooms and offices have caused cognition as well as kidney and even bone problems.

3.5 The Impact of US Committed Pollution on the World: 1900-2022

The US has been one of the world's largest polluters since the industrial revolution, with a significant impact on global pollution levels. The US has been responsible for a considerable amount of greenhouse gas emissions, which contribute to climate change, and other types of pollution that affect air, water, and soil quality. According to data from the World Bank, the US was responsible for approximately 13% of global CO2 emissions in 2019. The US has historically been the world's largest emitter of greenhouse gases, with emissions increasing significantly during the 20th century due to industrialization, transportation, and energy consumption. The US is also one of the largest consumers of energy, accounting for approximately 17% of global energy consumption. (Folk, 2021).

The US has also had a significant impact on global pollution levels due to its production and consumption of goods. The US is one of the world's largest consumers of resources, including minerals and fossil fuels, which are often extracted and produced in developing countries with less stringent environmental regulations. The extraction and production of these resources can have significant environmental impacts, including deforestation, water pollution, and soil degradation. Moreover, the US has also exported a considerable amount of pollution to other countries through international trade. Many of the products imported to the US are produced in countries with weaker environmental regulations, leading to pollution from the production process. For instance, China, which is one of the largest producers of goods exported to the US, has had severe air pollution problems due to its reliance on coal for energy production. (Folk, 2021).

3.5.1 Role of US in Global Warming

In 2019, carbon dioxide emissions reportedly reached a record high, the Global Carbon Project reported. The survey also discovered that some of the world's biggest emitters are slowing down the rate of emissions rise. According to reports, China has overtaken the United States as the top emitter of greenhouse gases. That is true, but it has only happened recently (within the last ten years). Looking back in history, the USA is by far the biggest emitter. (Mooney, 2015).

The US performs a behind-the-back, through-the-legs, backboard-breaking dunk over China as well as the Soviet Union in terms of overall greenhouse gas emissions. In other words, the US is responsible for the biggest proportion of greenhouse gases released into the atmosphere since the Industrial Revolution. According to the World Resources Institute's analysis, the United States alone was responsible for producing 27% of the world's total greenhouse gas emissions between 1850 and 2011. No other nation came close; in fact, the United States outperformed the whole European Union. Furthermore, carbon dioxide has an extremely long residence time in the atmosphere. A recent study by Raymond Pierre Humbert, a geoscientist at the University of Chicago, found that for an unexpected pulse of carbon dioxide in the atmosphere that raises its concentration to 1,250 parts per million over its pre-industrial levels, there will continue to be about 900 parts per million of carbon dioxide in the atmosphere after 100 years. It is correct that the concentrations won't fall to 675 parts per million for another 900 years. The carbon dioxide created during the last 150 or 160 years is therefore still very much prevalent in enormous amounts. It still affects our future now.

The US produced 15.53 metric tonnes of carbon dioxide per capita in 2015. China produced 6.59 tonnes of emissions. India only produced 1.58 tonnes of emissions. These nations' emissions per capita are expected to increase as they get wealthier. Because of this, transferring technology from industrialized nations to developing ones is expected to be a key strategy in the fight against climate change.

3.5.2 Role of US in Air Pollution

During the Industrial Revolution, coal became widely used in the late 18th and early 19th centuries, leading to the release of smog and soot that had detrimental effects on the health of urban residents. The Great Smog of 1952 was a significant event where pollutants from factories and home fireplaces mixed with condensation in the air, resulting in the deaths of at least 4,000 people in London over several days. Similarly, severe industrial air pollution caused a deadly smog in Donora, Pennsylvania, in 1948 that made 7,000 people sick and led to the asphyxiation of 20 individuals. In the 1850s, the discovery of acid rain highlighted another issue stemming from coal-powered plants. The emission of sulfur and nitrogen compounds by human activity into the atmosphere had harmful effects on plants, fish, soil, forests, and certain building materials. Nowadays, motor vehicles, first mass-produced by Henry Ford in the early 20th century, are the primary cause of air pollution in the United States.

Automobile emissions have a dual negative effect of increasing greenhouse gas levels in the atmosphere and contributing to global warming. The Keeling Curve, a scientific graph developed by geochemist Charles Keeling in the late 1950s, demonstrated a consistent increase in CO2 levels, which could result in climate change. In the 1980s, computer models began projecting that a doubling of CO2 levels could cause a temperature increase of 2.6 degrees Fahrenheit globally within the next century.

Despite significant improvements in air quality since the implementation of the Clean Air Act in 1970, air pollution remains a persistent problem in the United States, causing harm to both human health and the environment. In an effort to combat this issue, the Environmental Protection Agency (EPA) has been collaborating with state, local, and tribal governments, as well as other federal agencies and stakeholders, to reduce air pollution and its detrimental effects. Unfortunately, despite these efforts, a 2009 report indicated that roughly 60% of Americans reside in areas where air pollution has reached levels deemed unhealthy, posing a threat to public health. Moreover, recent data from the American Lung Association based on the years 2016 to 2018 revealed that air quality has continued to deteriorate, with significant increases in ground-level ozone concentrations. One of the primary contributors to air quality issues is the emission of air pollutants, which continues to be a significant problem in the United States. In 2020, approximately 68 million tons of pollutants were released into the atmosphere, exacerbating issues such as ozone deformation, acid deposition, and visibility impairment.

According to reports from the Environmental Protection Agency (EPA), air pollution presents significant health risks to individuals. Inflammation and respiratory issues like aggravated asthma, worsening chronic obstructive pulmonary disease (COPD), and worsened COPD are among the detrimental impacts of air pollution on human health. Both short- and long-term exposure to air pollution can both cause early death.

Furthermore, strokes, heart attacks, heart disease, and chronic heart failure are all associated with air pollution, as are other cardiovascular issues. Additionally, it is thought that air pollution may affect the central nervous system, which could have an impact on cognitive and behavioural health. Additionally, air pollution may contribute to reproductive and developmental harm.

3.5.3 Role of US in Land Pollution

Industrial activities such as mining and manufacturing have a long history of causing soil pollution. These areas often exhibit much higher levels of trace elements and organic contaminants due to both intentional and unintentional releases from industrial processes that directly impact the environment, including the soil, nearby water bodies, and the atmosphere. Accidents in industrial facilities can also be a significant source of soil pollution. In addition to current industrial activities, there are also legacy issues related to abandoned industrial sites, long-term historical pollution

caused by industries that are no longer operating, and poorly managed waste disposal sites. These sources of soil pollution continue to impact the environment long after the initial activities have ceased. The impacts of soil pollution can be far-reaching and long-lasting, affecting not only the immediate environment but also potentially causing harm to human health and the ecosystem. Soil pollution can lead to decreased soil fertility, reduced crop yields, and contamination of groundwater, which can have adverse effects on both human and animal populations. Furthermore, soil pollution can lead to the accumulation of toxins in food chains, resulting in potential harm to animals and humans at higher trophic levels.

The United States, as a nation with a significant industrial presence, has been identified as a major contributor to land pollution on a global scale. As of 2021, there were over 1,300 Superfund sites on the National Priorities List (NPL). Superfund sites refer to locations where hazardous waste, such as landfills and mines, has been dumped. The toxic waste present in these sites has the potential to leak into the groundwater, streams, and soil, leading to widespread pollution that poses significant threats to both human health and the environment. The existence of Superfund sites underscores the urgent need for effective waste management and remediation strategies. Addressing the legacy of hazardous waste left by past industrial activities requires a concerted effort from governments, industry leaders, and the public to ensure that these sites are identified, assessed, and cleaned up in an environmentally sound manner.

In 2018, the United States produced a staggering 292 million metric tons of municipal solid waste (MSW), with roughly half of this amount ending up in landfills. The country currently has 1,269 municipal waste landfills in operation, and food, yard trimming, and inorganic waste, followed by plastics, are the most frequently landfilled materials. Landfilling remains the most commonly used waste disposal method in the U.S., with hundreds of millions of metric tons of MSW sent to landfills every year. In 2018, approximately 146 million metric tons of MSW were landfilled, accounting for 50 percent of total waste disposal that year.

Recycling has emerged as a vital approach to managing waste and reducing the volume of material ending up in landfills. Over the past several decades, the volume of recycled materials in the U.S. has experienced a significant uptick, growing from 5.61 million metric tons in 1960 to 69 million

metric tons in 2018. Paper and paperboard are the most commonly recycled materials in the U.S., indicating that efforts to reduce paper waste and promote recycling are having a positive impact.

Despite the progress made in recycling, landfilling remains a significant challenge for waste management in the U.S. The large volume of MSW being sent to landfills every year underscores the need for continued efforts to promote waste reduction, recycling, and other sustainable waste management practices. Adopting a circular economy approach, in which waste is minimized and materials are kept in use for as long as possible, can help reduce the environmental impact of MSW and ensure the long-term sustainability of waste management practices in the U.S. (Tiseo, 2021).

3.5.4 US Military Pollution

The US military's pollution has a big impact on global warming. It would be the 47th greatest producer in the world if it were a country. Reform must be considered in order to safeguard our world because their carelessness, nuclear testing, and disdain for human life have had a significant negative impact on the ecosystem. The US military was identified as "one of the largest climate polluters in history, consuming more liquid fuels and emitting more CO2e (carbon-dioxide equivalent) than most countries" in a research published by Durham and Lancaster Universities in 2019. This news was not unexpected. The US military has a huge global network of vehicles, cargo planes, and container ships that it uses to supply its missions. These operations can involve anything from providing humanitarian relief to using explosives and fossil fuels. It might be challenging to compile information regarding the US armed forces. The US is excluded from disclosing its military emissions due to its decision to leave the 1997 Kyoto Protocol. However, neighborhood news outlets, NGOs, lobbyists, and FOIA requests can be used to gather statistics about their careless behavior. (Lewis, 2021).

- **US Military Air Pollution**

In 2017, the US Air Force bought USD $4.9 billion worth of fuels, the Navy bought USD $2.8 billion, the Army USD $947 million and the Marines USD $36 million. Additionally, it was discovered that the US military consumed over twenty-five thousand kilotons of carbon dioxide and bought 269,230 barrels of oil per day. These two instances are not outliers. According to the Cost of Wars Project, the US military was responsible for 1.2 billion metric tons of greenhouse gas

emissions annually, or 257 million passenger cars. The emissions from entire nations like Sweden, Morocco, and Switzerland were compared to this astounding amount (Lewis, 2021)

- **US Military Land Pollution**

The Marshall Islands nuclear weapons test and the Navajo Indian tribe nuclear weapons test were two of the most horrific examples of US military pollution operations.

In what is now known as the Republic of the Marshall Islands, 67 nuclear bombs were tested by the US between 1946 and 1958. The fallout from these nuclear tests, which were 1,000 times more powerful than the Hiroshima bomb, had the greatest effect on four northern atolls: Enewetak, Bikini, Rongelap, and Utrok, all of which required evacuation owing to radiation from these tests. More than 75 years later, the inhabitants of those islands are still suffering from harmful life-threatening effects, including radiation poisoning, birth abnormalities, leukemia, thyroid, and other cancers (Lewis, 2021).

Nuclear testing is just one example of US military land degradation; other forms include military real estate. According to reports, US military installations abroad and at home are among the most toxic in the world. This is a result of the startling quantity of harmful substances found to pollute drinking water, aquifers, and the earth's surface surrounding the bases, including perchlorate and other jet fuel additives. Additionally, the US military wastes a significant amount of the land. According to studies, about 900 of the 1,200 Superfund sites in the US alone are abandoned military facilities, making them a prevalent occurrence. (Lewis, 2021).

- **US Military Water Pollution**

84,000 gallons of jet fuel were found to have been spilled into a stream at the US Naval Air Station Oceana in Norfolk, Virginia, in 2017. Similar information surfaced in 2019 claiming that an Air Force contractor had been disposing of the industrial solvent trichloroethylene (TCE) for 29 years in the vicinity of the Tucson International Airport. It was determined that 1,350 residents suffered from cancer and other illnesses as a result of their negligent conduct. Allegations against the Air Force have been made by a large number of South Tucson citizens who insist they are still experiencing negative effects from drinking the contaminated water (Lewis, 2021).

The world has released more than 1.5 trillion tonnes of CO2 since 1751. The globe must drastically cut emissions if we are to meet our climate target of keeping the rise in average temperature to 2°C. One prevalent argument is that the countries that have contributed the most to the issue that exists today by increasing the amount of CO2 in the environment should bear most of the burden in finding solution. A mean storage potential of 3,000 metric gigatons of carbon dioxide is predicted by the USGS in its first-ever comprehensive, national evaluation of geologic carbon sequestration, which was published in 2013. The evaluation, which ranges from 2,400 to 3,700 metric gigatons of potential carbon dioxide storage, is the first probabilistic geological assessment. Additionally, the potential is evaluated for what is technically feasible, which means the carbon dioxide might be effectively injected using current engineering methods and practices. According to the U.S. Energy Information Administration, the United States released 5,130 million metric tonnes of carbon dioxide connected to energy in 2019, while 33,621.5 million metric tonnes were released globally. As pollution increases, so is the need to reduce climate change. The United States has already reduced its emissions of greenhouse gases more than any other nation in the world. US emissions decreased 11.5 percent between 2005 and 2015, partly as a result of the country's move to less carbon-intensive sources like natural gas.

The United States established itself as the world's preeminent economic power throughout this time. According to Madison (2008), the United States' GDP per capita11 surpassed that of the UK in 1901, and immigration fueled the country's rapid population expansion. Utilizing its abundant natural resource base, the United States became a significant net exporter of natural resources, supplying food and fuel (coal and petroleum) to Europe's industrializing economies. The metabolic transition's coal phase was characterized by a sharp fall in the proportion of renewable biomass in DMC. It had already dropped below 50% by 1911, and it kept decreasing despite a more than twofold increase in domestic biomass consumption.

CHAPTER 4

FACTORS SHIFTING ATTENTION OF US TO GREEN GROWTH

4.1 Introduction

In recent years, there has been a growing shift towards green growth, which aims to promote economic growth while simultaneously reducing environmental impact and promoting sustainability. This shift has been driven by several factors, including climate change, resource scarcity, public pressure, economic opportunities, and international agreements and goals. As a result, global powers are increasingly recognizing the need to adopt more sustainable and environmentally friendly policies to address these challenges and to promote a more sustainable future. Some of these factors include:

4.1.1 Global Warming

In 2019, carbon dioxide emissions reportedly reached a record high, the Global Carbon Project reported. The survey also discovered that some of the world's biggest emitters are slowing down the rate of emissions rise. Yet, as a result of the overall amount of greenhouse gases that have collected in the atmosphere, climate change is a chronic issue. Now in the atmosphere are several gases that trap heat that date back to the Industrial Revolution. Since then, some nations have produced significantly more carbon dioxide than others. The phenomenon of cumulative temperature increases in the atmosphere, soil, water, and vegetation cover on Earth's surface over time is known as global warming. The "greenhouse effect" is a result of the production of greenhouse gasses (GHG) such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (Mooney, 2015) .

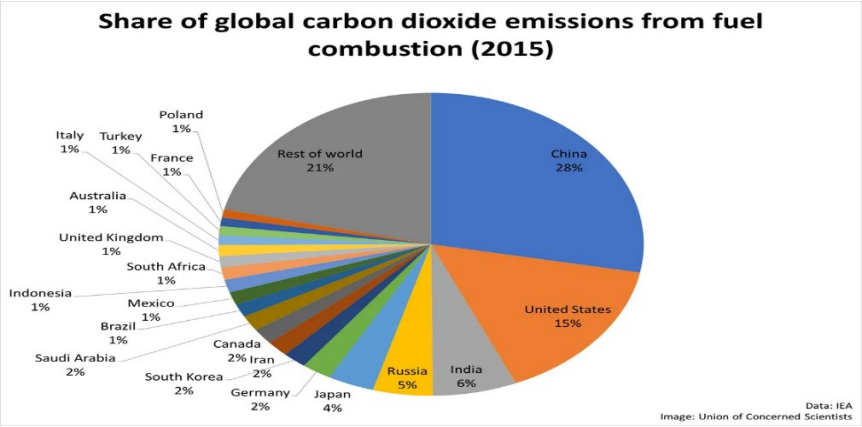
The short-wave radiation that the sun sends into space, which increases the temperature of the surface of the planet and its lower atmosphere and contributes to global warming, has no effect on GHGs but the long-wavelength radiation that the Earth emits into space does. Of all GHGs, carbon dioxide is responsible for over fifty percent of the global warming. The atmospheric carbon dioxide level stabilised at 270 and 290 ppm before the Industrial Revolution. Industrialization and urbanisation increased after the 18th century, hastening the rise in CO2 concentration. The IPCC

reported that the CO2 concentration in 2005 was 379 ppm, much higher above the range of endogenous transformation in the preceding 650,000 years, in the IPCC Fourth Annual Report (AR4), which was published in 2007. The annual Greenhouse Gas Bulletin of the World Meteorological Organization, which was released in 2011, states that the amount of greenhouse gases in the atmosphere globally in 2010 hit an all-time high for the industrial era.

Since the Industrial Revolution, the average worldwide air temperature has increased by about 0.7 °C and is currently increasing at an average of 0.2 °C per 10 years. The partial melting of polar icebergs, an increase in sea levels, the flooding of some foreland regions, and numerous other repercussions of climate change will be felt over the entire planet. In addition to altering precipitation patterns and creating an abnormal climate, climate change will also destroy the ecology, cause droughts and floods, put agricultural output and daily life at risk, and result in diseases linked to heat waves (Jianping, Minrong, Jinnan, Jianjian, Hongwen, & Maoxing, 2014).

The graph demonstrates that the populous nations aren't the worst producers of greenhouse gases ever. Instead, the largest economic nations tend to dominate the charts.

Figure 9: Share of Global Carbon Dioxide from Fuel Combustion



Source: International Environmental Association

While China and India certainly make up a sizable and increasing portion of the world's emissions, which must be stopped and reversed, richer nations like the United States are mostly responsible for the current warming. The US produced 15.53 metric tons of carbon dioxide per capita in 2015 alone. China produced 6.59 tons of emissions. India only produced 1.58 tons of emissions. These

nations' per capita emissions are expected to increase as they get wealthier. Because of this, transferring technology from industrialized nations to developing ones is expected to be a key strategy in the fight against climate change (Irfan, 2019) .

More than any other nation, the United States is responsible for global warming. According to the World Resources Institute's analysis, the **United States alone was responsible for 27%** of the world's total carbon dioxide emissions between 1850 and 2011. Neither nation came close; in fact, the United States even outpaced all of the European Union's member states taken together. Furthermore, carbon dioxide has a very, extremely long residence time in the environment. According to a recent study by University of Chicago geoscientist Raymond Pierrehumbert, for a spontaneous pulse of carbon dioxide in the atmosphere that elevates the concentration to 1,250 parts per million over pre-industrial levels (which were around 280 parts per million), there will continue to be approximately 900 parts per million of carbon dioxide in the atmosphere after 100 years. It will indeed take another 900 years for concentrations to drop to 675 parts per million.

As a result, a large portion of the carbon pollution produced over the past 150 or 160 years is still very much present. Even now, it still determines our future. This means that the United States is still more accountable than any other nation for the global warming that the globe is currently enduring and will undergo. But yes, the US has already reduced its emissions of greenhouse gases by some of the biggest amounts among other nations. American emissions decreased 11.5 percent between 2005 and 2015, partly as a result of the country's move to less carbon-intensive sources like natural gas. Nonetheless, despite years of declining emissions, the US set a record for energy consumption the very next year (Irfan, 2019) .

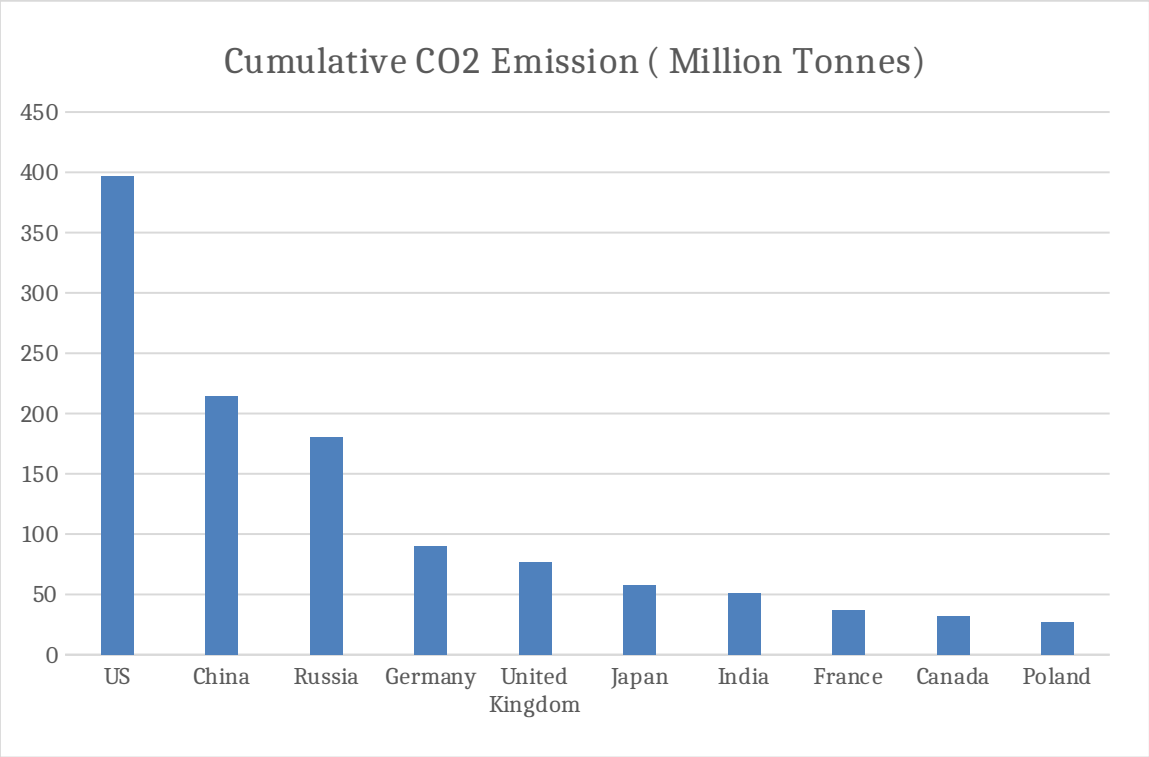
Following is the list of the countries with the largest cumulative CO2 emissions since 1750.

Ranking as of the start of 2019:

- US – 397GtCO2
- Canada – 214Gt
- Russia – 180
- Germany – 90
- United Kingdom – 77
- Japan – 58

- India – 51
- France – 37
- Canada – 32

Figure 10: Cumulative CO2 Emission as the Start of 2019



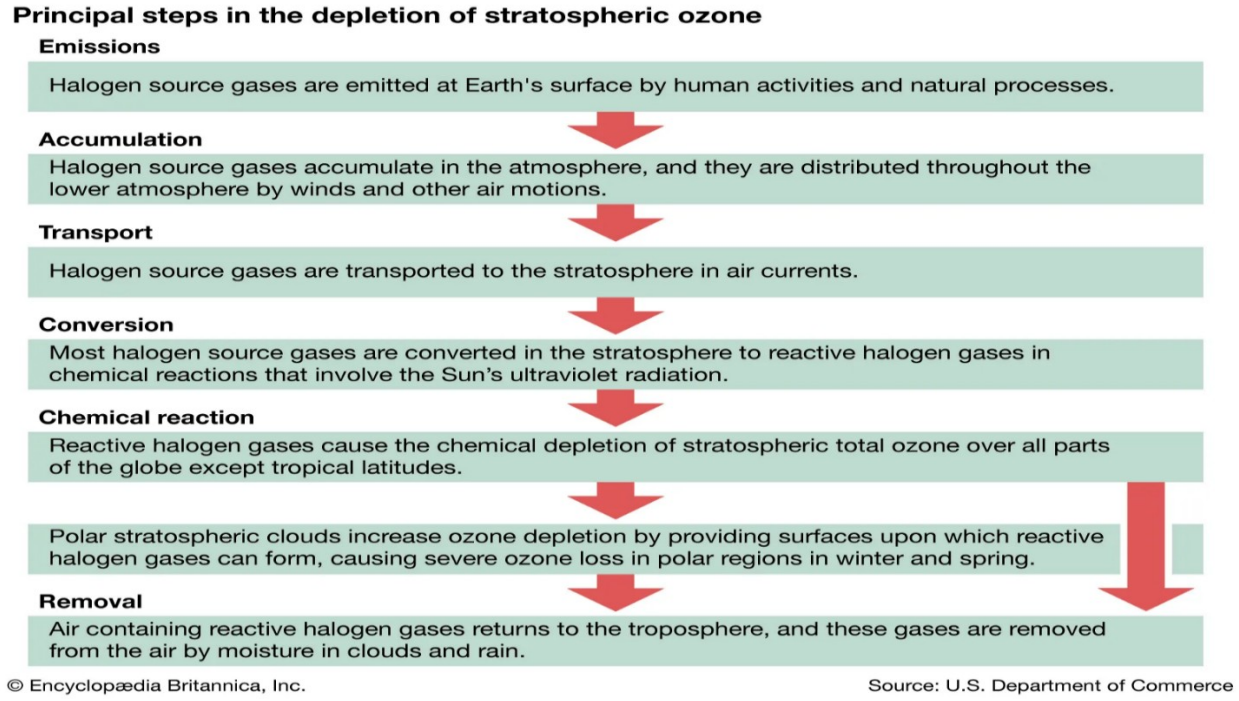
4.1.2 Ozone Depletion and Destruction

The ozone layer makes it less likely that harmful UV radiation will reach the Earth's surface. Ozone (O3) is typically found in large concentrations in the Ozone layer, which is located in the lower stratosphere (15–35 km above Earth). The gradual loss of ozone from the earth's upper atmosphere is known as ozone layer depletion. Another consequence of ozone depletion is the ozone hole, which results in a far more substantial springtime reduction in stratospheric ozone over Earth's poles. Ozone depletion and destruction (CFCs) are caused by ozone-depleting substances, usually chlorofluorocarbons. The ozone layer acts as a natural "Umbrella" for Earth, absorbing approximately 99% of the sun's UV radiation and shielding life on the planet from their harmful effects. Studies and research have shown that the ozone layer has been declining in concentration since the 1950s. The causal link between CFC emissions and ozone depletion was originally shown

by Professor Rowland and Dr. Molina in their research "Chlorofluorocarbons in Environment," which was published in 1974. The "ozone hole" over Antarctica was first identified by UK scientists in the 1980s, and data collected from the American satellite Nimbus-7 confirmed this finding (Wuebbles, 2023).

The identical ozone hole was then found above the Arctic by German scientists. Due to full ozone sounding and recent technological advancements, the protective ozone layer has been destroyed all over the planet. According to USEPA projections, stratospheric ozone will decline by 40% by 2075 compared to 1985 if CFC emission is not restricted. Under such circumstances, there may be more than 150 million cases of prostate-related cancer, 18 million cases of eye illnesses, a 7.5% fall in grain production, a 25% decline in aquatic products, a decline in human immune function, as well as other significant risks. Commercial manufacturing of chemicals, especially the manufacture of halocarbon propellants, chemical solvents, and foam-blowing agents, is the main cause of the loss of ozone and the ozone hole (Wuebbles, 2023).

Figure 11: Principal Steps in Depletion of Ozone Layer



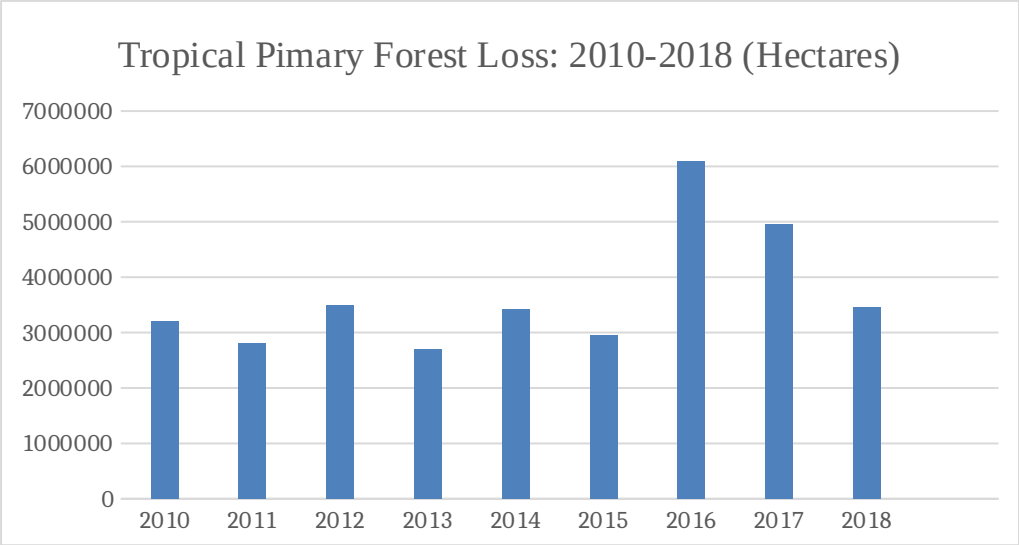
Source: US Department of Commerce)

ODS is incredibly stable and can endure for up to 50-100 years, therefore it would take a long time to witness any restorative actions within the ozone layer. Based to the UN's 2010 Scientific Assessment on Ozone Depletion, the Earth's atmospheric ozone layer has stopped deteriorating and will soon start to slowly rebuild. However, new empirical data showed that thec ozone depletion over Antarctica may still be severe as shown by actual indicators like the area, depth, and hyperlapse of ozone holes. For example, the ozone hole over Antarctica has maintained a high level of depletion of ozone across a significant region since 2000. 2009 saw no change in the size of the ozone hole over Antarctica compared to previous years. Therefore, it is clear that the depletion of ozone over Antarctica is still occurring, and it will take time for the ozone layer to regenerate (Jianping, Minrong, Jinnan, Jianjian, Hongwen, & Maoxing, 2014).

4.1.3 Radical Reduction in Forest Cover

As a vital natural resource, trees provide advantages such as air purification, climate control, water conservation, wind resistance, sand stabilization, biological diversity preservation, and ecological stability. At the dawn of human civilisation, there were 76 million km2 of virgin woods covering a third of the world's continent. This figure fell to 56 million km2 by the middle of the 20th century, 34.4 million km2 at the end of the century, and just roughly 28 million km2 remained covered in forests by 2003. According to the Food and Agriculture Organization of the United Nations (FAO), 130,000 km2 of woodland were lost or converted into land for other uses every year between 2000 and 2010, down from 160,000 km2 during the ten years prior. Water loss, deterioration of soil, and desertification are all direct effects of reduced forest cover on the global ecology. Additionally, it has reduced biological variety, exacerbated the climate change effect, and put human civilization's long-term viability in jeopardy. Water loss, deterioration of soil, and desertification are all direct effects of reduced forest cover on the global ecology. Additionally, it has reduced biological variety, exacerbated the climate change effect, and put human civilization's long-term viability in jeopardy (Janowiak, Swanston, & Ontl, 2017).

Figure 12: Tropical Primary Forest Loss: 2010-2018 (Hectares)



Over the past ten years, tropical primary forests have continued to deteriorate despite international efforts. Since the turn of the century, the three most recent years for which data are available (2016, 2017 and 2018) each saw one of the highest rates of primary forest loss. In 2016 and 2017, primary forest loss was observed to increase, primarily as a result of fires in the Brazilian Amazon, which again grabbed international headlines in 2019. Despite the fact that the loss of forest to non-forest utilisation is generally seen as a global issue, a considerable part of forest land is turned over to other uses each year in the United States. Each year between 1982 and 2012, more than a million acres of U.S. Forest land were used for construction, farming, or other activities. Although this loss is more than offset by an annual gain of more than 1.3 million acres of non-forest land that is converted to or returns to forest (resulting in a net gain of forest acres), the removal of carbon from the atmosphere occurs when land is changed to a non-forest use. sequestration. Recovery through afforestation takes a very long time because mature forest stands are more likely to be carbon rich due to the high volume of tree biomass. Much of that accumulated biomass carbon can be quickly removed through forest harvesting. Moreover, the faster breakdown of organic matter like trash and tree roots causes soil carbon to generally decrease following deforestation. By reducing emissions and increasing the potential for greater sequestration, the capacity of soil to store carbon helps to maintain that ability in the future. measures to preserve the forest's canopy and stop it from being converted to non-forest purposes (Janowiak, Swanston, & Ontl, 2017).

4.1.4 Declining of Biological Diversity

Nature is perishing just in front of our very eyes. Up to one million species of plants and animals are in danger of going extinct because of loss of habitat, agriculture, illegal hunting, contaminants, invasive species, and, increasingly, global warming. As a result of population growth that has expanded, unsustainable patterns of production and consumption, and rising demand for biological resources, the biological variety has drastically decreased during the past few centuries. Biodiversity, which includes chromosomal (biological genes), taxonomic, and environmental variables, is the fundamental component of the the planet's life-support system and the raw material for human survival and development. However, due to the harmful effects of human activity over the past 100 years, the rate of extinction of species has grown 1,000-fold. Currently, approximately twelve percent of birds, 23 percent of animals, and twenty-five percent of conifers are at risk of extinction. In the next two to three decades, a quarter of all biological species on Earth will be in danger of going extinct, and by 2050, over half of all animals and plants would have disappeared from the globe, according to UNEP's forecasts. In fact, since 2010, the world has been concentrating on creating a strategy for wildlife conservation, and the Strategic Plan for Biodiversity 2011-2020, which established a goal for the preservation of global biodiversity by 2020 and created the strategy and timetable for global biodiversity protection, was endorsed by the 10th Conference of the Parties to the Convention on Biological Diversity, held in Japan in October 2010 (Tsioumani & Tsioumanis, 2020).

4.1.5 Role of Global Environmental Protection Movements

Global environmental protection movements have emerged as a response to the growing threats posed by human activities to the environment. These movements have been instrumental in raising awareness about environmental issues, advocating for sustainable solutions, and shaping global environmental policies and practices. In this essay, we will discuss some of the leading global environmental protection movements and their contributions to the cause. Environmental protection movements have played a crucial role in global environmental protection. The environmental movement emerged in the 1960s as a response to the degradation of the environment caused by industrialization and human activities. The global environmental protection movements can trace their roots to the early 20th century when conservationists began

advocating for the preservation of natural resources. However, it was not until the 1960s and 1970s that the modern environmental movement emerged. The first Earth Day was celebrated in 1970, which helped to raise awareness of environmental issues and led to the creation of many environmental organizations. Since then, environmental protection movements have become increasingly globalized, with activists and organizations working together to address global environmental issues. These movements have also gained significant traction in recent years, with the rise of youth-led movements like Fridays for Future and Extinction Rebellion. Environmentalists aim to protect the natural world and its resources by promoting sustainable practices, reducing pollution, and preserving natural habitats (Rootes, 1999).

The role of global environmental protection movements has become increasingly critical in addressing the planet's environmental issues. These movements have played a crucial role in raising awareness, advocating for policy changes, and implementing sustainable practices.

- **Raising Awareness**

One of the primary roles of global environmental protection movements is raising awareness of environmental issues. These movements use a variety of tactics, including protests, marches, social media campaigns, and educational events, to inform people about the impacts of climate change, pollution, and other environmental issues. For instance, the youth-led organisation Fridays for Future got its start in 2018 when Greta Thunberg, then 15, started skipping class to demonstrate outside the Swedish Parliament and demanding action on global warming. The movement has since grown to include students from around the world, with regular school strikes and protests taking place in over 150 countries. Through their activism, the movement has raised awareness of the urgent need to address climate change and has put pressure on governments to take action (Rootes, 1999).

- **Advocating for Policy Changes**

Global environmental protection movements also play a critical role in advocating for policy changes at the national and international levels. These movements often work in partnership with policymakers and other stakeholders to develop and implement policies that promote sustainable practices and protect the environment. For instance, the Paris Agreement, a binding international climate change pact, was ratified in 2015 with the aim of keeping global warming to far below 2°C over pre-industrial levels. Decades of advocacy and debate by environmental organisations,

scientists, decision-makers, and other stakeholders led to this agreement. The fact that 189 nations have ratified the pact since it was signed illustrates the effectiveness of international environmental conservation groups in influencing policy. In promoting sustainable practises and technologies, environmentalists have also been a major force. They have contributed to the development and promotion of technology that lessen pollution and waste as well as renewable energy sources like solar and wind power through studies, advocacy, and campaigning. These efforts have helped to reduce the reliance on fossil fuels and promote sustainable practices, such as recycling and waste reduction (Casey, 2011).

- **Implementing Sustainable Practices**

Global environmental protection movements also play a critical role in implementing sustainable practices at the local, national, and international levels. These movements work with communities, businesses, and governments to develop and implement sustainable practices that reduce pollution, conserve natural resources, and promote biodiversity. For example, the Zero Waste movement is a global environmental protection movement that aims to eliminate waste by promoting sustainable practices such as recycling, composting, and reducing the use of single-use plastics. Through their activism, the movement has influenced policymakers and businesses to adopt sustainable practices, resulting in reduced waste and pollution (Zero Waste International Alliance, 2021) .

Following are some significations Environmentalist Movements of the contemporary times:

4.1.5.1 Climate Strike Movement

The Climate Strike Movement, also known as Fridays for Future, is a global movement of young people demanding urgent action to combat climate change. The movement was sparked by the actions of Greta Thunberg, a Swedish student who began protesting outside the Swedish parliament in August 2018. Since then, the movement has spread to over 150 countries and has mobilized millions of young people worldwide to demand that governments take action to address the climate crisis. The Climate Strike Movement's demands include phasing out fossil fuels, investing in renewable energy, and transitioning to a low-carbon economy. The movement has also called for climate justice, highlighting the disproportionate impact of climate change on marginalized communities. The movement has had a significant impact on global policies and

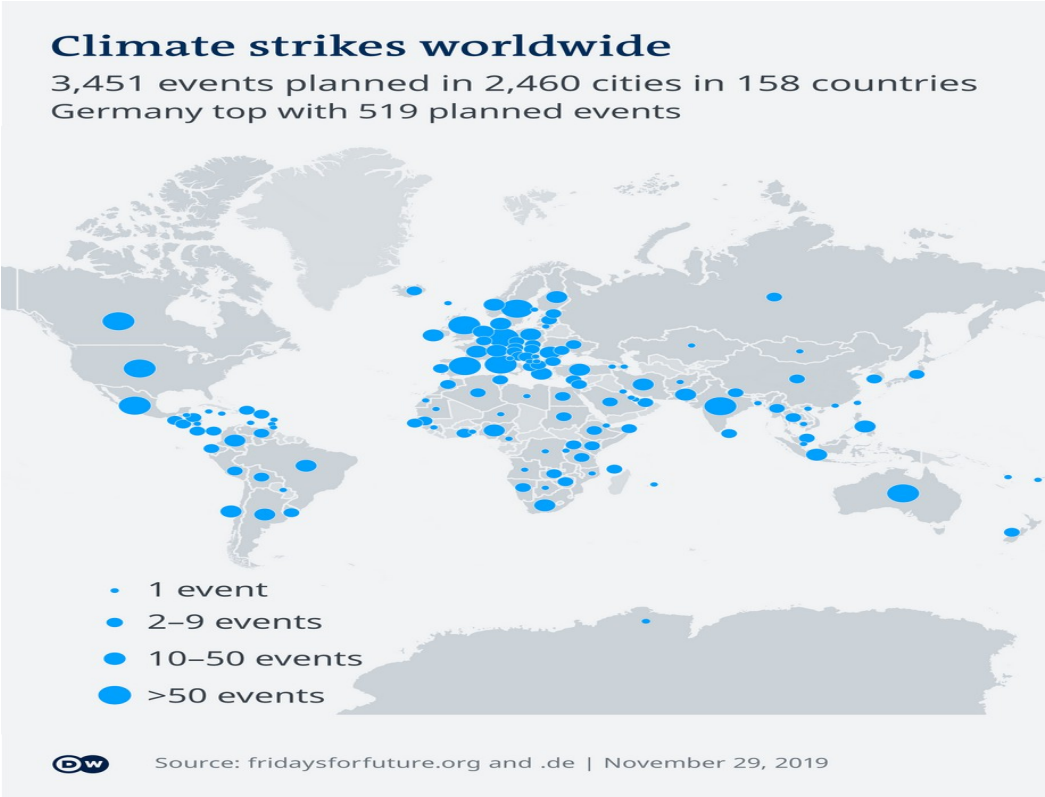
practices. In 2019, over 6 million people participated in the global climate strikes, making it one of the largest environmental protests in history. The movement has also led to the adoption of ambitious climate policies in several countries, including the European Union's Green Deal (Gould, 2019).

One of the most notable aspects of the Climate Strike Movement is its use of social media to mobilize young people worldwide. The movement's hashtag, #FridaysForFuture, has been used millions of times on social media platforms, with young people sharing photos and videos of their protests and calling on others to join them. The movement has also been successful in drawing attention to the urgency of the climate crisis. In 2019, the United Nations held a Climate Action Summit in New York, which was attended by over 100 heads of state and government. The summit was organized in response to the growing pressure from the Climate Strike Movement and other environmental groups (Sengupta, 2019).

The Climate Strike Movement has also led to significant changes in policy and practice. In September 2019, the United Nations launched a Youth Climate Compact, which called on governments to increase their climate ambition and engage young people in the decision-making process. The Compact was signed by over 30 countries, including the United States, China, and India. The movement has also led to the adoption of ambitious climate policies in several countries. In the European Union, the Green Deal has set a target of reducing greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. In the United States, President Joe Biden has pledged to rejoin the Paris Agreement and has set a goal of achieving net-zero greenhouse gas emissions by 2050 (Dolsak & Prakash, 2019).

Thousands of demonstrators assembled in front of Berlin's Brandenburg Gate to express their displeasure with what they perceived to be the government's lack of urgency. A "new start" was demanded for the government's environment strategy by the 50,000 participants. Berlin's young campaigners also went for a swim in the Spree River to show that they want to see more action. The Bundesrat, Germany's upper chamber of parliament, approved a number of emission-reduction policies as protests began. In an attempt to decrease travel by plane and vehicle, the law places obligations on government agencies, pushes up the price of fossil fuels, and lowers the cost of rail tickets (Millions march worldwide in climate protests, 2019).

Figure 13: Climate Strikes Worldwide 2019



Source: fridaysforfuture.org (November 29,2019)

Despite these successes, the Climate Strike Movement faces significant challenges. The COVID-19 pandemic has forced the movement to shift its activities online, which has made it more difficult to mobilize large numbers of people for protests and demonstrations. The movement also faces opposition from powerful fossil fuel interests and climate change deniers. Despite these challenges, the Climate Strike Movement remains a powerful force for change. The movement has demonstrated the power of young people to demand urgent action on climate change and has shown that global solidarity is possible in the face of a global crisis. As the world continues to grapple with the consequences of the climate crisis, the Climate Strike Movement will play an essential role in shaping the future of our planet (Dolsak & Prakash, 2019) .

4.1.5.2 Extinction Rebellion

Extinction Rebellion (XR) is an international environmental movement that calls for immediate action to address the ecological and climate catastrophe through nonviolent civil disobedience. In 2018, the movement was started in the UK, and it has now spread to more than 70 nations. Extinction Rebellion's main demand is that governments recognise an environmental and ecological emergency and take steps to decrease greenhouse gas emissions to zero by 2025. The movement has also called for a Citizens' Assembly, made up of ordinary people who can decide on the best course of action for addressing the climate crisis.

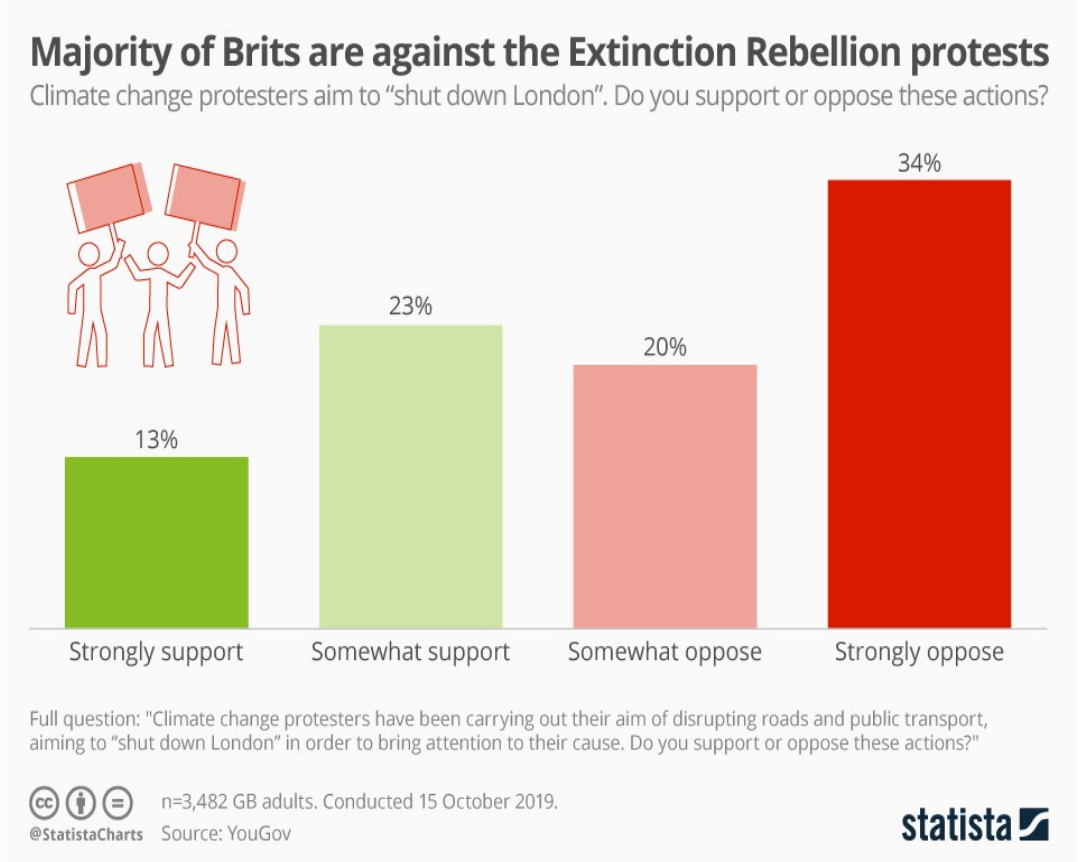
One of the most notable aspects of Extinction Rebellion is its willingness to engage in direct action and civil disobedience. The movement has organized numerous protests, including sit-ins, blockades, and mass mobilizations, often resulting in arrests. The movement has had a significant impact on global policies and practices. In the UK, the government declared a climate emergency in May 2019, following a series of protests organized by Extinction Rebellion. The movement has also been successful in pushing local governments to adopt more ambitious climate policies, such as in Bristol, where the city council declared a climate emergency and pledged to become carbon neutral by 2030 (Nugent, 2020) .

In April 2019, the first major wave of XR protests took place in London, resulting in over 1,100 arrests over 11 days. The protests brought attention to the urgency of the climate crisis and helped to shift public opinion on the issue. According to a poll conducted by YouGov, the percentage of the UK population who thought that climate change was the most important issue facing the country rose from 6% before the protests to 23% after the protests. The movement has also gained support from high-profile individuals, including celebrities, politicians, and academics. In 2019, over 200 academics signed an open letter supporting the aims of Extinction Rebellion, and in 2020, the group was endorsed by Prince Harry in a video message (Nugent, 2020) .

However, the movement has also faced criticism for its tactics and its demands. Some have argued that the goal of achieving net-zero emissions by 2025 is unrealistic and could lead to unintended consequences, such as job losses and economic instability. Others have criticized the movement for disrupting public life and causing inconvenience to ordinary people. Despite these criticisms, Extinction Rebellion remains a powerful force for change. The movement has demonstrated the

power of direct action and civil disobedience in bringing attention to the urgency of the climate crisis. As the world continues to grapple with the consequences of climate change, Extinction Rebellion will play an essential role in shaping the future of our planet (Lipson, 2023) .

Figure 14: YouGot Survey on Extinction Rebellion 2019



(Source: YouGov October 15, 2019)

Despite of the fact that 66 percent of Brits believe that climate change is the greatest danger facing the world, Extinction Rebellion protestors have not yet succeeded in persuading the majority of the populace with their tactics. According to a YouGov survey, 54 percent of the populace opposes the demonstrations to some extent, while only 36 percent support them.

4.1.5.3 350.org

350.org is a global environmental movement that aims to address the climate crisis by promoting a transition to clean energy and reducing the use of fossil fuels. The organisation was established in 2008 by Vermont's Middlebury College students and author and activist Bill McKibben. The fact that 350 parts per million of carbon dioxide are considered to be the acceptable upper limit for this gas in the atmosphere of the planet is the source of the name 350.org. The organization's main objective is to organise an international grassroots movement to accomplish this aim and to put pressure on businesses and governments to combat climate change.

The Fossil Free movement, one of 350.org's most major projects, strives to get organizations including colleges, churches, and governments to abstain from fossil fuels. Over 1,200 organizations, comprising over $14 trillion in assets, have vowed to divest from fossil fuels since the campaign's inception. Along with divestment, 350.org has also organized a number of protests and marches, such as the People's Climate March in 2014, which drew over 400,000 people to New York City to call for action on climate change. The organization has also worked to support the growth of renewable energy and to promote policies that reduce greenhouse gas emissions.

350.org has a strong presence on social media, with over 500,000 followers on Twitter and over 1.6 million followers on Facebook. The organization has also established a network of grassroots activists in over 188 countries. The impact of 350.org can be seen in the increasing public awareness of the climate crisis and the growing momentum of the global movement for climate action. In 2015, the Paris Agreement was signed, committing 196 countries to limit global warming to well below 2 degrees Celsius above pre-industrial levels. This agreement was a significant achievement for the climate movement and a testament to the power of grassroots activism. In 2019, a report from the United Nations Intergovernmental Panel on Climate Change (IPCC) highlighted the urgency of the climate crisis, calling for rapid and far-reaching changes to the global economy in order to limit the effects of climate change. The report cited the work of 350.org and other environmental organizations in raising awareness of the issue and pushing for action (Howard, 2017) .

Despite these achievements, 350.org continues to face significant challenges in the fight against climate change. The use of fossil fuels continues to grow, and governments and businesses have

been slow to adopt policies that would significantly reduce greenhouse gas emissions. However, the organization remains committed to the goal of achieving a safe and just climate future for all. In conclusion, 350.org is a vital organization in the global movement for climate action. Its focus on grassroots organizing and divestment has been successful in raising awareness of the climate crisis and putting pressure on governments and businesses to take action. The organization's impact can be seen in the growing momentum of the global climate movement and the increasing public awareness of the urgent need for action (Hertsgaard, 2014) .

4.1.5.4 Greenpeace

An international environmental group called Greenpeace was established in Vancouver, Canada, in 1971. Through peaceful protest, scientific investigation, and community outreach, the organisation seeks to advance peace, safeguard biodiversity, and avert catastrophic climate change. Greenpeace, which has taken part in numerous high-profile campaigns throughout the years, has been instrumental in raising awareness of environmental issues. Some of the organization's most notable campaigns have included efforts to stop nuclear testing, prevent whaling, and halt deforestation.

One of the organization's most significant campaigns has been its work to raise awareness of climate change and promote the transition to renewable energy. Greenpeace has played a leading role in campaigns to phase out coal-fired power plants, increase the use of wind and solar power, and promote energy efficiency. Greenpeace has also been involved in campaigns to protect endangered species and ecosystems. The organization has conducted numerous expeditions to document the impacts of human activity on ecosystems around the world, and has been involved in efforts to protect forests, oceans, and other ecosystems from destruction. Greenpeace has a strong presence on social media, with over 3 million followers on Twitter and over 2 million followers on Facebook. The organization also has a network of over 30 independent national and regional organizations, which work together to promote environmental protection and sustainability (Biagini & Sagar, 2004) .

Greenpeace has been successful in achieving significant victories in its campaigns over the years. In 1985, the organization's campaign to halt nuclear testing in the Pacific resulted in a global ban on nuclear weapons testing. More recently, the organization's campaign to halt the construction of the

Belene nuclear power plant in Bulgaria was successful, with the Bulgarian government announcing in 2012 that it would cancel the project. Greenpeace has also been involved in efforts to protect endangered species, including campaigns to prevent the hunting of whales, dolphins, and other marine mammals. In 1986, the International Whaling Commission imposed a moratorium on commercial whaling, a decision that was largely the result of the efforts of environmental organizations like Greenpeace. A global commercial whaling moratorium was established by the International Whaling Commission in 1986, in large part due to the work of environmental groups like Greenpeace.

Despite these successes, Greenpeace continues to face significant challenges in its work. The effects of climate change continue to worsen, and governments and businesses have been slow to adopt policies that would significantly reduce greenhouse gas emissions. In addition, the organization has faced criticism from some quarters for its use of direct-action tactics, which have been controversial in some contexts. In conclusion, Greenpeace is a vital organization in the global movement for environmental protection and sustainability. Its work to raise awareness of environmental issues and promote the transition to renewable energy has been successful in achieving significant victories over the years. The organization's impact can be seen in the growing awareness of the urgent need to take action on climate change and protect endangered species and ecosystems (Biagini & Sagar, 2004) .

4.1.5.5 The Sierra Club

One of the oldest and biggest environmental organisations in the US is the Sierra Club. Concerned about the effects of human activities on the environment, a group of environmentalists created it in 1892. The goal of the Sierra Club is to advocate a sustainable future for all people while safeguarding the biodiversity and ecosystems of the globe. Over the years, the organisation has taken part in a number of well-known initiatives, such as those to save endangered species, advance clean energy, and stop the degradation of natural environments.

One of the Sierra Club's most significant campaigns has been its work to promote clean energy and reduce greenhouse gas emissions. The organization has been a leading voice in the call for a transition to renewable energy and has advocated for policies that promote the use of wind, solar, and other clean energy sources. The Sierra Club has also been involved in efforts to protect

endangered species and ecosystems. The organization has been instrumental in the creation of many national parks and protected areas and has worked to prevent the destruction of natural habitats and ecosystems (Sierra Club: American conservation group, 2022) .

The Sierra Club has a strong presence on social media, with over 1.5 million followers on Facebook and over 400,000 followers on Twitter. The organization also has a network of local chapters and affiliates across the United States, which work together to promote environmental protection and sustainability. The Sierra Club has been successful in achieving many significant victories in its campaigns over the years. In 1973, the organization's efforts to protect the Arctic National Wildlife Refuge from oil drilling were successful, leading to the creation of one of the largest protected areas in the United States. More recently, the organization's work to promote the use of clean energy has helped to drive the growth of the renewable energy industry in the United States (Sierra Club: American conservation group, 2022) .

Despite these successes, the Sierra Club continues to face significant challenges in its work. The effects of climate change continue to worsen, and governments and businesses have been slow to adopt policies that would significantly reduce greenhouse gas emissions. In addition, the organization has faced criticism from some quarters for its political activism and its opposition to some forms of development, such as mining and drilling. In conclusion, the Sierra Club is a vital organization in the global movement for environmental protection and sustainability. Its work to promote clean energy, protect endangered species, and prevent the destruction of natural habitats has been successful in achieving many significant victories over the years. The organization's impact can be seen in the growing awareness of the urgent need to take action on climate change and protect the planet's natural resources and ecosystems (Sierra Club: American conservation group, 2022) .

Global environmental protection movements play a critical role in protecting the environment by raising public awareness, advocating for policy changes, and promoting sustainable lifestyles. These movements bring together individuals and organizations from diverse backgrounds to work towards a common goal of protecting the planet and its natural resources. Through their collective efforts, they have succeeded in influencing international policies, such as the Paris Agreement on climate change, and in pressuring governments and corporations to take meaningful action to reduce their environmental impact. Additionally, these movements have helped to inspire and

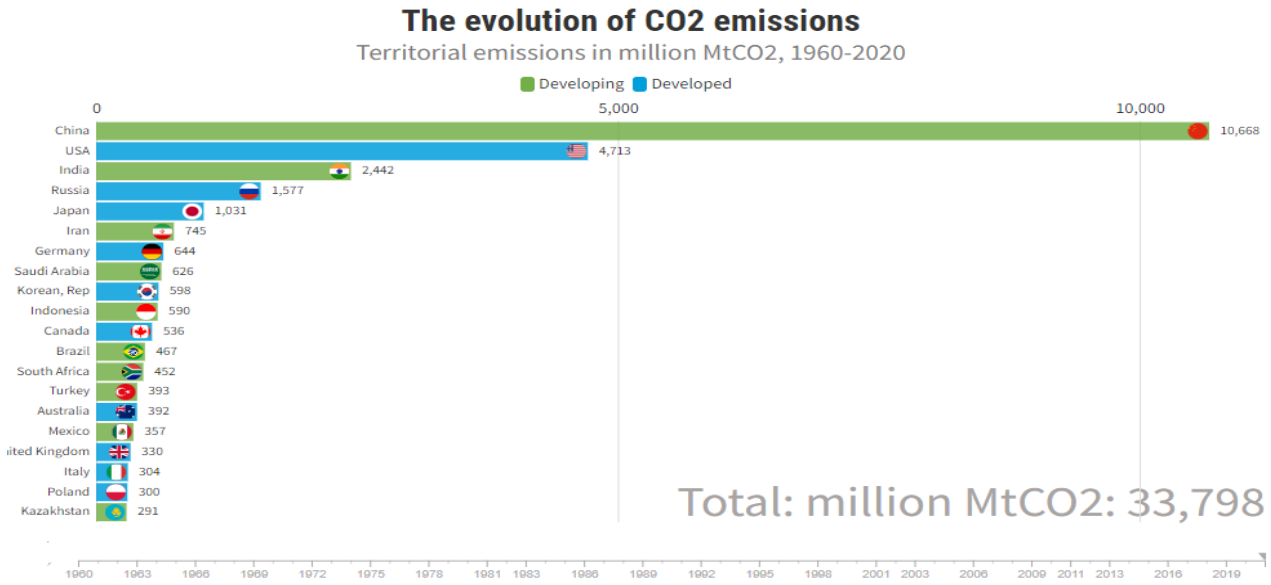
mobilize individuals around the world to take action in their own communities and to make sustainable choices in their daily lives. In conclusion, the role of global environmental protection movements in promoting environmental sustainability is essential and has had a significant impact on our planet's health and well-being (Rootes, 1999) .

4.1.6 China as a New Actor in Environmental Pollution:

In recent years, China has emerged as the world's largest producer of pollution, surpassing the United States. This shift in global pollution levels is a result of China's rapid industrialization and economic growth over the past few decades, coupled with the country's lack of adequate environmental regulations and enforcement measures. According to data from the Global Carbon Project, in 2020, China was responsible for 28% of global carbon dioxide emissions, while the US accounted for only 15%. China's carbon dioxide emissions have tripled since the year 2000, while the US's emissions have remained relatively stable.

China's reliance on coal for energy production has been a significant contributor to the country's pollution levels. The country is the world's largest consumer of coal, and coal-fired power plants are responsible for approximately 40% of China's carbon dioxide emissions. In addition, China's heavy industry, which includes steel production and cement manufacturing, is responsible for a significant amount of pollution. China's rapid economic growth has also led to significant levels of pollution from transportation, with the country's booming automobile industry contributing to high levels of air pollution. According to a study by the Health Effects Institute, air pollution in China is responsible for approximately 1.2 million premature deaths each year (Newburger, 2021)

Figure 15: China Surpassing US in CO2 Emission 2019



(UNCTAD based on data from Global Carbon Project)

Despite the country's significant pollution levels, China has taken steps in recent years to address environmental concerns. In 2015, the Chinese government announced its commitment to reducing carbon dioxide emissions and transitioning to cleaner energy sources, including solar and wind power. The government also implemented stricter regulations on industrial pollution and increased enforcement measures. However, critics argue that China's efforts to address pollution have not gone far enough, and the country's reliance on coal and heavy industry remains a significant contributor to global pollution levels. In addition, the country's air quality continues to be a major concern, with frequent smog alerts in many major cities (Newburger, 2021).

In contrast, the US has historically been one of the world's largest polluters but has taken significant steps in recent years to address environmental concerns. The Obama administration implemented numerous environmental regulations, including the Clean Power Plan and the Paris Agreement, aimed at reducing greenhouse gas emissions and transitioning to cleaner energy sources. However, under the Trump administration, many of these regulations were rolled back or weakened, leading to concerns about the US's commitment to addressing climate change. China rapid industrialization and economic growth have led to the country surpassing the US in global pollution levels. The country's reliance on coal and heavy industry, as well as its booming

automobile industry, have contributed significantly to pollution levels. While China has taken steps to address environmental concerns, critics argue that more needs to be done to reduce pollution levels and improve air quality. The US has made significant strides in addressing environmental concerns, but there are concerns about the country's commitment to addressing climate change under the current administration (Newburger, 2021).

China’s OBOR Committed Pollution

China's ambitious One Belt One Road (OBOR) initiative, also known as the Belt and Road Initiative, aims to connect China with Asia, Europe, and Africa through a network of railways, highways, ports, and other infrastructure projects. While the initiative has the potential to create economic growth and development in many countries, it also poses significant environmental risks. One of the primary concerns with the OBOR initiative is the potential for large-scale environmental degradation. The construction of infrastructure projects, such as dams, highways, and ports, can have significant impacts on local ecosystems, including the destruction of wetlands and forests, disruption of river ecosystems, and soil erosion. In addition, the OBOR initiative has led to increased investment in fossil fuel projects, including coal-fired power plants and oil and gas pipelines. These projects not only contribute to greenhouse gas emissions and climate change, but also have significant impacts on local air and water quality and can lead to displacement of local communities (Coenen, Bager, Meyfroidt, Newig, & Challies, 2020).

Another concern with the OBOR initiative is the lack of adequate environmental regulations and enforcement measures in many of the countries involved. In some cases, local governments have been willing to overlook environmental concerns in exchange for the economic benefits of OBOR projects. This lack of oversight can lead to the destruction of fragile ecosystems and biodiversity hotspots. Furthermore, the OBOR initiative has been criticized for its lack of transparency and public consultation processes. Many of the projects are funded by Chinese banks and corporations, with limited input from local communities and civil society organizations. This lack of transparency and accountability can lead to conflicts with local communities and a lack of consideration for their concerns and needs (Coenen, Bager, Meyfroidt, Newig, & Challies, 2020) .

Despite these concerns, there have been efforts to address the environmental impacts of the OBOR initiative. In 2018, China's Ministry of Ecology and Environment released guidelines for

environmental impact assessments of OBOR projects, which require comprehensive assessments of the potential environmental impacts of each project. In addition, there have been calls for increased public consultation and transparency in the planning and implementation of OBOR projects. However, there is still a long way to go in addressing the environmental concerns of the OBOR initiative. It will be important for China and other countries involved in the initiative to prioritize environmental sustainability and ensure that projects are implemented in a responsible and transparent manner. The OBOR initiative has the potential to create significant economic growth and development in many countries, but also poses significant environmental risks. The construction of infrastructure projects, increased investment in fossil fuel projects, and lack of adequate environmental regulations and enforcement measures can lead to large-scale environmental degradation and harm local communities. Efforts are needed to address these concerns and ensure that the OBOR initiative is implemented in a responsible and sustainable manner (Coenen, Bager, Meyfroidt, Newig, & Challies, 2020) .

4.1.7 International Criticism on US Committed Pollution

Industrial pollution has been a growing concern for the global community, as it poses significant threats to human health and the environment. The United States is one of the world's largest industrial powers, with a history of producing high levels of pollution from various industries. As a result, the country has faced significant international criticism for its industrial pollution. One of the primary sources of industrial pollution in the US is the fossil fuel industry, which is responsible for significant amounts of greenhouse gas emissions, air and water pollution, and other environmental impacts. The US has been criticized for its lack of action on climate change, particularly for its withdrawal from the Paris Agreement, which aimed to limit global temperature increases to well below 2 degrees Celsius (Larson, 2019) .

According to data from the World Health Organization (WHO), air pollution causes an estimated 4.2 million deaths globally each year. In the US, the Environmental Protection Agency (EPA) estimates that air pollution causes approximately 100,000 premature deaths annually. The country's reliance on fossil fuels, particularly coal, has been a significant contributor to air pollution, with the US ranking 11th globally in terms of carbon dioxide emissions per capita (WHO, 2020)

In addition to the fossil fuel industry, the US has also faced criticism for its industrial agriculture practices, which have led to significant soil erosion, water pollution, and habitat destruction. The country's reliance on large-scale industrial farming has also contributed to the loss of biodiversity, as monoculture farming has replaced diverse ecosystems. The manufacturing industry in the US has also come under scrutiny for its contribution to industrial pollution. The production of chemicals, plastics, and other industrial products has resulted in significant waste and pollution, including the release of toxic substances into the environment. According to data from the Union of Concerned Scientists, the US meat industry produces approximately 270,000 tons of manure per day, which can contaminate water sources and contribute to harmful algal blooms (Safdie, 2023) .

The manufacturing industry in the US has also come under scrutiny for its contribution to industrial pollution. The production of chemicals, plastics, and other industrial products has resulted in significant waste and pollution, including the release of toxic substances into the environment. According to the EPA, in 2019, the manufacturing sector was responsible for approximately 22% of greenhouse gas emissions in the US. The production of chemicals, plastics, and other industrial products has resulted in significant waste and pollution, including the release of toxic substances into the environment.

The US government has been criticized for its lack of regulations and enforcement measures to address industrial pollution, particularly under the Trump administration, which rolled back numerous environmental regulations and weakened the Environmental Protection Agency (EPA). According to a report from the Environmental Defense Fund, the Trump administration rolled back or weakened more than 100 environmental regulations, including regulations on air pollution, water pollution, and climate change.

The international community has called on the US to take more significant action to address industrial pollution, including implementing stricter regulations and enforcing existing laws, investing in renewable energy, and transitioning to more sustainable and environmentally friendly industries. Additionally, there have been calls for the US to rejoin the Paris Agreement and to take a more active role in global efforts to address climate change and environmental degradation. Industrial pollution in the US has been a significant concern for the international community, as it poses significant threats to human health and the environment. The country has faced criticism for its lack of action on climate change, as well as for its industrial agriculture and manufacturing

practices. The international community has called on the US to take more significant action to address these issues, and it remains to be seen how the country will respond to these calls in the coming years (Safdie, 2023).

4.2 The US Response: 2009-2022

Over the past decade, it has been emphasised repeatedly that traditional economic paradigms need to alter in order to address pressing social and economic problems like global warming, loss of biodiversity, droughts, etc. The global financial crisis of 2008–2009 served as the catalyst for this conversation, and as a result of these concerns, the concept of a "green economy" was born. A different growth and development paradigm known as the "green economy" has the potential to improve the lives of individuals and the economy while also boosting social and environmental well-being. A fundamental component of a sustainable economic strategy is encouraging the development and deployment of sustainable technologies.

A more socially equitable and compassionate economy lessens risks to the environment and creates more resources while improving human welfare. An inclusive green economy is challenging the present dominant socioeconomic paradigm, which supports waste, exacerbates resource scarcity, and poses significant risks to the planet and the general population. The green economy is the future, according to US Secretary of State Antony Blinken, who emphasised the importance of moving away from fossil fuels on January 11, 2021. Blinken said, "The impact of climate change not only challenges our economy, our infrastructure, or our safety as a nation, it's a menace to all of them, and more," at the U.S. Center's opening ceremony in Glasgow, UK. He highlighted that in order to restrict the rise in temperature to 1.5 degrees Celsius and prevent a "climate disaster," the world must raise its aspirations and take more decisive action. Blinken brought up President Joe Biden's decision to re-admit the US to the Paris Climate Accord and highlighted Washington's new commitment to reduce emissions by 50% to 52% by 2030, placing the US at zero net emissions by 2050. "This decade is pivotal. He said, "We've got to make it count, and we shouldn't depart Glasgow without admitting that." He also emphasised the necessity for corporations to fund initiatives that would result in zero emissions of greenhouse gases globally and for local and state governments to develop and implement novel local solutions.

An overview of US initiatives to transition to a green economy from 2009 to 2021 is depicted below:

4.3 President Obama's Action Plan (2009-2017)

In accordance with the Climate Action Plan, the Obama Administration has taken significant action to switch to greener energy sources and boost energy efficiency throughout our economy. By 2030, it is anticipated that the President's actions will have reduced carbon pollution by around 6 billion metric tons. That much would require removing more than 1.2 billion vehicles from the road for a whole year.

According to President Obama, anthropogenic global warming is the issue that most threatens our children, the planet, and the generations to come, and for which no other country on Earth is more positioned to guide the world towards a solution. This is why the USA under President Obama took more measures than ever before to combat climate change as the economy was growing. When the President entered office in 2009, carbon emissions actually decreased by 9% although the American economy grew by more than 10%.

4.3.1 Cut Carbon Pollution

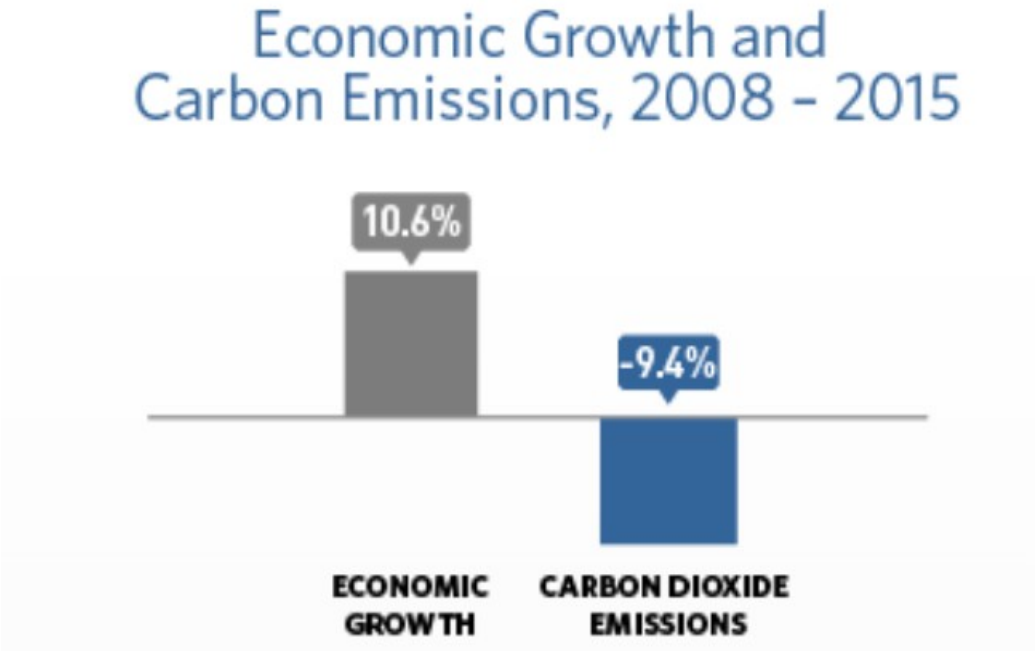
One of the key initiatives of President Barack Obama's Action Plan was to address climate change by reducing carbon pollution. In 2015, the Obama administration released the Clean Power Plan, which aimed to reduce carbon emissions from power plants by 32% below 2005 levels by 2030. The plan was considered to be one of the most significant efforts by the United States to tackle climate change.

The Clean Power Plan was designed to encourage the development of cleaner energy sources such as wind and solar power, and to incentivize energy efficiency measures. It required states to develop their own plans to reduce carbon pollution from power plants, and provided them with a range of options to achieve these goals. Some of the options included investing in renewable energy, increasing the efficiency of existing power plants, and implementing carbon capture and storage technologies (Lavelle, 2015).

The plan faced significant opposition from the fossil fuel industry and some states, which challenged its legality in court. In 2016, the US Supreme Court temporarily halted the implementation of the plan, pending further legal review. However, many states continued to move forward with their own efforts to reduce carbon emissions, and the Obama administration continued to promote clean energy and climate action through other policies and initiatives.

Despite the challenges faced by the Clean Power Plan, it was considered to be a major step forward in the fight against climate change. It demonstrated the United States' commitment to reducing carbon emissions and transitioning to a cleaner, more sustainable energy system. Although the plan was ultimately rescinded by the Trump administration in 2019, many states and cities have continued to pursue ambitious climate action goals in the years since, building on the momentum created by the Clean Power Plan and other climate policies of the Obama era (Lavelle, 2015).

Figure 16: US Economic Growth and Carbon Emission: 2008-2015



(Source Bureau of Economic Analysis Energy Information Administration: CEA Calculations)

4.3.2 Expansion in The Clean Energy Economy

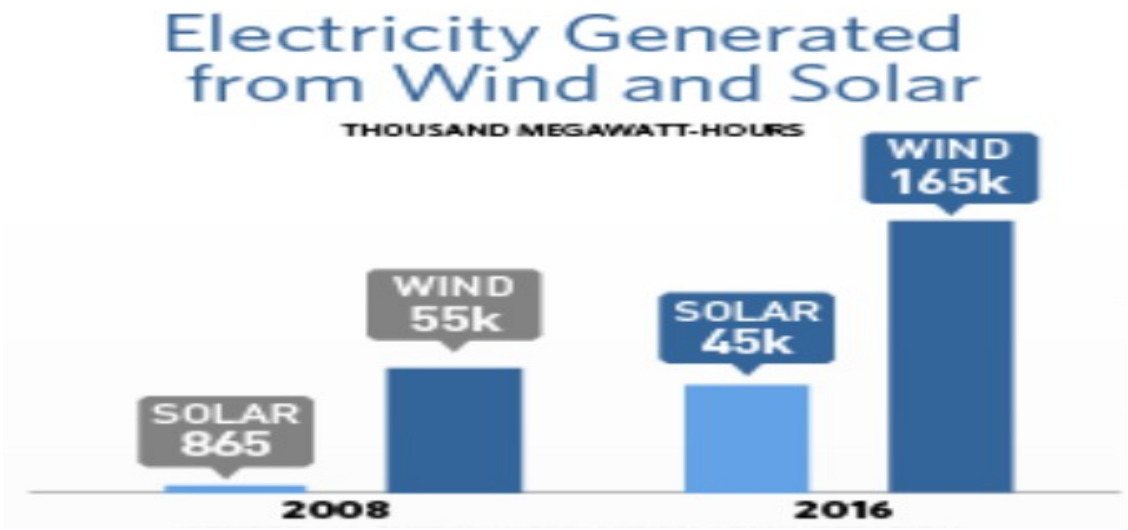
Another key component of President Barack Obama's Action Plan was to expand the clean energy economy in the United States. The Obama administration recognized the potential for clean energy to drive economic growth, create jobs, and reduce carbon emissions, and made significant efforts to support the development of the clean energy sector.

In 2009, as part of the American Recovery and Reinvestment Act, the Obama administration invested $90 billion in clean energy, including wind, solar, geothermal, and biofuels. This investment helped to stimulate the growth of the clean energy sector and create thousands of new jobs. In addition to financial support, the Obama administration implemented several policies and initiatives to promote clean energy. For example, the Department of Energy established the SunShot Initiative, which aimed to reduce the cost of solar energy and make it more competitive with fossil fuels. The Department of Defense also launched several initiatives to increase the use of renewable energy in military operations, including the installation of solar panels on military bases.

The Obama administration also made efforts to promote energy efficiency, recognizing that reducing energy consumption is an important part of transitioning to a clean energy economy. The administration established the Better Buildings Initiative, which aimed to improve the energy efficiency of commercial and industrial buildings by 20% by 2020. The administration also implemented new energy efficiency standards for appliances and other products, which helped to reduce energy consumption and save consumers money on their utility bills.

Overall, the Obama administration's efforts to expand the clean energy economy were seen as a significant step forward in promoting sustainability and addressing climate change. By investing in clean energy and promoting energy efficiency, the administration helped to create jobs, reduce carbon emissions, and establish the United States as a leader in the global transition to a clean energy economy (President Obama’s Climate Action Plan, 2015).

Figure 17: Electricity Generated by US from Wind and Solar Power 2008-2016



(Source US. Energy Information Administration Note Data For 2016 Bar Covers Through September 2016)

4.3.3 Led Global Efforts on Climate Change

The Paris Agreement, a historic worldwide agreement aimed at decreasing emissions of greenhouse gases and preventing climate change, was established during President Obama's term in office. The UN's Climate Change Conference was held in Paris in 2015 with participation from 195 nations. In order to pursue efforts to keep the temperature increase to 1.5 degrees Celsius, President Obama was crucial in achieving the highly ambitious commitment that aims to keep global warming to well below 2 degrees Celsius above pre-industrial levels. The Paris Agreement also required affluent nations to give developing nations financial aid to ease their switch to low-carbon economies and for countries to submit specific plans for decreasing greenhouse gas emissions.

The Paris Agreement, that has been marked as a significant victory in the international fight against climate change, was adopted thanks in large part to the leadership of President Obama. The Paris Agreement's future, however, is uncertain with the withdrawal of the USA under President Donald Trump. President Obama made efforts to obtain the Paris Agreement as well as actions to lower emissions of greenhouse gases within the US. The 2015 introduction of the Clean Power Plan

sought to lessen carbon emissions from power plants and move the US towards an environmentally friendly, more sustainable energy future.

President Obama's leadership on climate change went beyond the Paris Agreement and the Clean Power Plan. Throughout his two terms in office, he worked to elevate climate change as a top policy priority and helped to establish a strong foundation for future action on this critical issue. In 2009, President Obama signed the American Recovery and Reinvestment Act (ARRA), which provided significant funding for clean energy initiatives, including renewable energy, energy efficiency, and advanced vehicle technology. The ARRA included $90 billion in funding for clean energy, which helped to stimulate the growth of the clean energy economy and create new jobs. President Obama also took steps to increase the fuel efficiency of vehicles, which is a major source of greenhouse gas emissions. In 2012, his administration finalized new fuel efficiency standards for cars and light-duty trucks, which aimed to double the average fuel economy of vehicles by 2025. These standards are expected to reduce greenhouse gas emissions by approximately 6 billion metric tons over the lifetime of the vehicles sold under the program.

Former President Barack Obama played a significant role in environmental protection during his time in office. He took several steps to address climate change and protect the environment, including implementing the Clean Power Plan to reduce carbon emissions from power plants, establishing the Climate Action Plan to address the impacts of climate change, and signing the Paris Agreement to limit global temperature rise.

Additionally, he worked to protect natural resources and wildlife by designating new national monuments, expanding protected areas, and creating new marine reserves. Obama also established the Clean Water Rule to safeguard waterways from pollution and made efforts to promote renewable energy and energy efficiency.

Overall, Obama's environmental policies and initiatives aimed to address climate change, protect natural resources and wildlife, and promote sustainable energy sources. His actions helped to raise awareness about the importance of environmental protection and set a positive example for future leaders to follow..

4.4 The Role of Biden’s Government in Green Growth

The Biden administration has made addressing climate change and promoting green growth a top priority. The government has taken several steps to support and accelerate the transition to a sustainable, low-carbon economy. One of the key initiatives of the Biden administration is the American Jobs Plan, which includes significant investments in clean energy, sustainable infrastructure, and green jobs. The plan aims to create millions of new jobs while also reducing greenhouse gas emissions and strengthening the resilience of communities to the impacts of climate change.

The government has also re-engaged with international climate efforts, including rejoining the Paris Agreement, and has committed to reducing greenhouse gas emissions by at least 50% below 2005 levels by 2030. The administration has also taken steps to protect natural resources and wildlife, such as issuing a temporary moratorium on oil and gas leasing in the Arctic National Wildlife Refuge and announcing a goal of conserving 30% of U.S. lands and waters by 2030. Furthermore, the Biden administration has taken steps to promote electric vehicles, increase the adoption of renewable energy, and support research and development in clean energy technologies. The government is also working to reduce emissions from industry and agriculture and is promoting sustainable practices in these sectors. Some of major initiatives taken by Biden's government are:

4.4.1 Biden's $2 Trillion Climate Plan

The proposal put out by Joe Biden includes addressing racism as well as racism and the economic recovery from the coronavirus problem. His former detractors praised the concept. Joseph R. Biden Jr. unveiled a new plan to invest $2 trillion over four years to greatly increase the use of renewable energy in the transportation, power, and construction sectors as part of a set of comprehensive ideas aimed at building up infrastructure, expanding economic possibilities, and combating climate change. Mr. Biden expanded on his ideas for revitalizing the economy in the aftermath of the coronavirus crisis in a speech in Wilmington, Delaware, by putting a fresh emphasis on improving the country's infrastructure and stressing the significance of drastically reducing fossil fuel emissions. Republicans criticized him for his criticism of President Trump's handling of the virus and climate change, but he also faced criticism from progressives who have long questioned the extent of his climate goals (Friedman & Glueck, 2021).

The objectives set forth in Mr. Biden's plan are specific and difficult, such as achieving an emissions-free power industry by 2035 and converting over four million properties over the course of four years to the highest standards of energy efficiency. Mr. Biden set a goal of 40% of infrastructure and renewable energy gains going to underserved communities. Additionally, he made overt references to indigenous tribes and called for the expansion of internet access into tribal territory. In his initial proposal, Vice President Biden suggested spending a total of $1.7 trillion over the next ten years to reach net-zero emissions before the year 2050. The revised plan has significantly lengthened the timeline and expense. Mr. Biden, according to campaign officials, suggests "asking the richest Americans to pay their proper share," increasing the rate of corporate income taxes from 21 percent to 28 percent, and financing it with an as-yet-undetermined amount of bailout financing.

4.5.2 Decarbonize the U.S. Industrial Sector

One of the most significant steps the United States has ever done to decrease emissions and build an cutting-edge economy was the White House's announcement of new policies and programs in March of 2022 to decarbonize the industrial sector.

The future expansion of American business depends on the new industrial sector decarbonization regulations for three reasons. They first focus on a sizable source of emissions: About a third of the GHGs produced in the United States are produced indirectly by industries, which include emissions from the power they consume. There are numerous potentials to ensure cost-effective GHG reductions and technological innovation since, second, industrial GHG emissions have been largely disregarded by previous policymakers. Furthermore, any cost reductions for clean manufacturing technologies would help industrial producers internationally (for example, when foreign companies buy American industrial equipment or license American technology), aiding in the decarbonization of industry overseas. Since the United States accounts for just 7% of the global industrial emissions, these side consequences of technological advancement are quite important (Howland, 2022).

4.5.3 Buy Clean

A new federal "Buy Clean" campaign, which seeks to direct government purchases toward clean goods and resources, is one program with particularly high potential (i.e., those produced with low or zero GHG emissions). An enormous and profitable market exists for providers because of the federal government's $650 billion in annual purchases. For industrial decarbonization, it is crucial to produce basic commodities like steel, cement, and chemicals cleanly because just three industries account for more than 40% of the nation's industrial carbon dioxide (CO2) emissions.

In addition to funding the resources needed to build roads, bridges, and buildings, the federal government also purchases a sizable amount of supplies for military equipment. Clean manufacturing technologies can expand by offering a market for commodities made using low-emission methods. As a result, manufacturers can produce more of the same equipment more cheaply (a process known as "returns-to-scale") and find new methods to improve their designs and manufacturing procedures (learning-by-doing). The ability to enter a larger market is then aided by lower expenses (FACT SHEET: Biden-Harris Administration Announces New Buy Clean Actions to Ensure American Manufacturing Leads in the 21st Century, 2022).

4.5.4 Clean Hydrogen Projects

"Green hydrogen" is one of the new clean manufacturing technologies that the administration plans to scale up. Gasses like hydrogen (H2) are helpful in the industry. Hydrogen can be used to produce high-temperature heat or used as a chemical feedstock (a substance that adds to the physical makeup of a product, such as fertilizers). Because it melts materials and triggers required chemical processes, heat is crucial for the production of many materials, including metals, cement, glass, brick, and bulk chemicals. Hydrogen has the potential to be a fuel that is safe for the environment if it is generated without the release of GHGs since it burns without emitting CO2.

The government will assist in scaling up "green hydrogen" as one of the new clean manufacturing technologies. A helpful industrial gas is hydrogen (H2). To produce high-temperature heat, hydrogen can be burned or used as a chemical feedstock (a substance that contributes to the physical makeup of a product, such as fertilizers). Heat is crucial for the production of many materials, including metals, bulk chemicals, cement, glass, brick, and other materials that must be

melted and undergo essential chemical reactions. Hydrogen has the potential to be a fuel that is safe for the environment if it is generated without the release of GHGs since it burns without emitting CO2 (FACT SHEET: Biden-Harris Administration Announces New Buy Clean Actions to Ensure American Manufacturing Leads in the 21st Century, 2022).

The role of the Biden administration in promoting green growth and addressing climate change has been significant and comprehensive. The government's efforts to create a sustainable and low-carbon economy have been reflected in various policy initiatives and investments. The American Jobs Plan, which includes significant investments in clean energy, sustainable infrastructure, and green jobs, is a key initiative of the administration. This plan aims to create millions of new jobs while also reducing greenhouse gas emissions and strengthening the resilience of communities to the impacts of climate change. This shows the administration's commitment to promoting green growth while also addressing the pressing issue of job creation.

The government's re-engagement with international climate efforts, including rejoining the Paris Agreement, and its commitment to reducing greenhouse gas emissions by at least 50% below 2005 levels by 2030, highlights its commitment to addressing climate change at a global level. The Biden administration's efforts to protect natural resources and wildlife, such as issuing a temporary moratorium on oil and gas leasing in the Arctic National Wildlife Refuge and announcing a goal of conserving 30% of U.S. lands and waters by 2030, is a positive step towards safeguarding the environment.

In addition, the administration's efforts to promote electric vehicles, increase the adoption of renewable energy, and support research and development in clean energy technologies, demonstrates its commitment to promoting sustainable practices and reducing emissions. Overall, the Biden administration's efforts to promote green growth and address climate change are commendable. Its comprehensive approach to this issue is essential in creating a sustainable and resilient economy while also protecting the planet for future generations.

Overall, the role of US Presidents in environmental conservation from 2009 to 2021 has varied widely depending on their priorities and policies. President Obama was a strong advocate for environmental conservation and took several steps to reduce greenhouse gas emissions, while President Trump rolled back many of these policies. President Biden has made environmental

conservation a central part of his agenda and has taken several steps to reduce emissions and protect public lands and waters. The future of environmental conservation in the United States will likely continue to depend on the priorities and policies of future Presidents.

CHAPTER 5
CHALLENGES AND OPPORTUNITIES FOR THE USA IN ITS QUEST FOR GREEN GROWTH

5.1 Green Opportunities for USA

The United States has enormous potential for green growth opportunities. With its vast natural resources, advanced technology, and strong research and development capabilities, the country is well-positioned to become a leader in sustainable economic development. The government and private sector can work together to support the transition to a green economy, creating jobs and driving economic growth while reducing greenhouse gas emissions. Some potential areas for green growth in the U.S. include renewable energy, energy efficiency, sustainable transportation, green buildings, sustainable agriculture, and ecosystem conservation. By investing in these areas, the U.S. can reduce its carbon footprint and improve the health and well-being of its citizens, while also increasing economic competitiveness and resilience (Saha & Jaeger, 2019) .

5.1.1 Decrease Emissions While Growing the Economy.

The idea that the United States can lower emissions while growing the economy is not only possible, but it is becoming increasingly necessary to address the pressing issue of climate change. In fact, many experts argue that transitioning to a low-carbon economy can bring significant economic benefits, such as job creation, increased innovation, and reduced healthcare costs. One of the most promising ways to lower emissions while growing the economy is through the use of clean energy sources. Wind, solar, and hydropower are examples of renewable energy sources that can offer dependable and economical electricity while emitting minimal or no greenhouse gases. Renewable energy is now much more affordable than it once was, making it more and more competitive with conventional energy sources.

In addition to clean energy sources, energy efficiency measures can also help to lower emissions and save consumers money. These measures can include everything from upgrading to energy-efficient appliances to improving building insulation and using smart technology to better manage energy usage. Investment in green infrastructure is another way to lower emissions and grow the economy. Green infrastructure can include things like public transportation systems, bike lanes,

pedestrian walkways, and the creation of green spaces. These types of investments not only reduce emissions, but also create jobs and improve public health.

It is important to note that transitioning to a low-carbon economy will require investment and support from government, industry, and consumers. However, the potential benefits of this transition are significant. In addition to economic benefits, a low-carbon economy can also improve air and water quality, protect natural resources, and reduce the impacts of climate change. While the transition to a low-carbon economy may be challenging, many believe that it is necessary to ensure a sustainable and prosperous future for the United States and the world as a whole. (Saha & Jaeger, 2019) .

5.1.2 Cheaper Electricity from Renewables Resources than Fossil Fuels

In recent years, fossil fuels have faced increased competition from renewable energy sources. According to a report by the International Renewable Energy Agency (IRENA) in 2020, it is now cheaper to generate electricity from renewable sources than from fossil fuels in most parts of the world. In fact, the report states that the average cost of renewable energy has fallen to a level that is lower than the cost of new fossil fuel plants. Over the last ten years, the cost of solar electricity has decreased by approximately 90%, and the cost of wind energy has decreased by about 70%. This has increased the competition between these sources of clean energy and fossil fuels. Utility-scale solar photovoltaics (PV) and onshore wind generation were predicted to have levelized costs of electricity (LCOE) as low as $0.03 per kilowatt-hour (kWh) by 2020 in some regions of the world. This is significantly lower than the LCOE for new coal-fired power plants, which is estimated to be around $0.05 per kWh (Allen, 2023) .

In addition to being cost-competitive, renewable energy sources have other advantages over fossil fuels. They are cleaner and produce fewer greenhouse gas emissions, which contribute to climate change. They are also more sustainable and help to reduce the dependence on finite fossil fuel resources. Despite the cost advantages of renewable energy sources, there are still challenges to their widespread adoption. One of the biggest challenges is the intermittent nature of renewable energy sources such as solar and wind power. This means that energy storage solutions and grid infrastructure upgrades are needed to ensure reliable and stable energy supply.

However, many countries including the US are recognizing the benefits of transitioning to renewable energy sources and are implementing policies and initiatives to support this transition. The Biden administration unveiled a $2 trillion infrastructure plan in 2021 that includes large expenditures in infrastructure and clean energy. By 2035, the plan seeks to have a carbon-pollution-free power sector, and by 2050, it seeks to have net-zero emissions. Hence, the decreasing cost of renewable energy sources, combined with their environmental benefits and sustainability, makes them an attractive option for powering the world's future. The US and other countries are taking steps to transition to renewable energy sources, and it is likely that the use of renewable energy will continue to grow in the coming years. (Saha & Jaeger, 2019).

5.1.3 Climate-Friendly Consumer Technologies becoming Cheaper and Cleaner

Climate-friendly consumer technologies are becoming cheaper and cleaner due to advancements in technology and increased demand from consumers. Many companies are investing in renewable energy sources and developing more sustainable products to meet the growing demand for eco-friendly alternatives. Currently, the average price of petrol in the United States is $2.62, whereas the cost of recharging an electric vehicle is approximately $1.21. By 2024–2028 in the United States, electric vehicles are anticipated to be cost-competitive with gasoline-powered automobiles upfront. Many transit organizations and schools are transitioning to electric buses because they have lower lifetime maintenance and fuel expenses than diesel buses—about $400,000 less. In most new homes, electric heat pumps are more affordable and more climate-friendly than conventional gas furnaces. Electric cars and heating and cooling systems have an environmental advantage that will only grow as more coal-fired power facilities are replaced by greener alternatives.

Here are some examples of how climate-friendly consumer technologies are becoming more accessible and affordable:

Electric Vehicles: With advancements in battery technology and increased production, the cost of electric vehicles (EVs) is declining rapidly. The International Energy Agency predicts that by

2023, the cost of EVs will be on par with conventional vehicles. In addition, EVs emit significantly less greenhouse gases than gasoline-powered cars, making them a climate-friendly option.

Solar Panels: In the last ten years, the price of solar panels has decreased by 89%, making them one of the cheapest forms of electricity in several regions of the world. In fact, solar power is now cheaper than fossil fuel-based power in most countries. This has led to a surge in solar panel installations, with more homeowners and businesses opting for solar energy to reduce their carbon footprint.

LED Lighting: Compared to conventional incandescent bulbs, LED lighting is as much as 80% more energy-efficient and is capable of lasting up to 25 times longer. As a result of considerable price reductions over the years, LED bulbs are now an affordable solution for both home and commercial lighting.

Smart Thermostats: Smart thermostats use machine learning algorithms to optimize heating and cooling settings, resulting in significant energy savings. They can also be controlled remotely through a smartphone app, allowing users to adjust the temperature of their homes or businesses from anywhere.

Sustainable Packaging: Many companies are switching to sustainable packaging materials, such as biodegradable plastics, compostable paper, and reusable containers. These materials are not only better for the environment but can also reduce costs by minimizing waste and improving supply chain efficiencies.

Overall, the increasing affordability and accessibility of climate-friendly consumer technologies are making it easier for individuals and businesses to reduce their carbon footprint. As more companies invest in renewable energy and sustainable products, it is likely that we will continue to see a shift towards a more sustainable and climate-friendly future (Saha & Jaeger, 2019) .

5.1.4 Clean Energy Jobs

The clean energy sector in the US has grown significantly in recent years, and clean energy jobs are becoming an increasingly important part of the economy. According to a report by the National Renewable Energy Laboratory, clean energy jobs already employ about 3.5 million Americans,

and the sector is poised for even more growth in the coming years. The clean energy sector includes a wide range of jobs, from solar panel installers and wind turbine technicians to energy auditors and energy efficiency specialists. These jobs are found in a variety of industries, including construction, manufacturing, and professional services (Allen, 2023) .

The growth of clean energy jobs can be attributed to several factors, including falling costs for renewable energy technologies, increased public awareness of climate change and the need for sustainable energy, and government policies and incentives to promote the development of clean energy. In addition to the environmental benefits of clean energy, the sector also provides economic benefits. Clean energy jobs tend to be local and cannot be outsourced, which means that they contribute to the growth of local economies. Furthermore, these jobs tend to pay well and offer opportunities for career advancement.

Clean energy jobs are also diverse and inclusive. According to a report by the National Wildlife Federation, clean energy jobs are more likely to be filled by women and people of color than other sectors of the economy. This is important for promoting equity and social justice in the workforce. Overall, the growth of clean energy jobs in the US is an exciting development for the economy and the environment. As the sector continues to grow, it has the potential to create new opportunities for workers and contribute to a more sustainable future (Allen, 2023) .

5.1.5 Increasing Competitiveness by Innovating, Engineering and Manufacturing Clean Technologies

The transition to a greener economy presents numerous opportunities for innovation, engineering, and manufacturing of clean technologies, which can significantly increase the competitiveness of the United States. The global market for clean technologies is rapidly growing, and by investing in research and development, the U.S. can take advantage of this trend. Clean technologies include a wide range of products and services, such as renewable energy technologies like solar, wind, and geothermal, energy storage systems, electric vehicles, energy-efficient appliances, and green building materials. These technologies can significantly reduce carbon emissions and help mitigate the impacts of climate change while providing economic benefits.

Innovation, engineering, and manufacturing of clean technologies can create new job opportunities, especially in the engineering, manufacturing, and installation sectors. In 2016, the United States had over 800,000 jobs in the renewable energy sector alone, according to research by the National Renewable Energy Laboratory (NREL), and this figure is anticipated to rise in the years to come. Furthermore, investing in clean technologies can also provide significant economic benefits by reducing energy costs and increasing energy security. According to a study by the U.S. Department of Energy, transitioning to a clean energy economy could save the U.S. economy up to $190 billion per year by 2050. The expansion of low-carbon manufacturing would also result in new jobs: Between 17% and 26% of all clean jobs are manufacturing-related, making carbon-free jobs particularly manufacturing-reliant. Overall, the United States can improve its competitiveness and build a more sustainable future by developing, engineering, and producing clean technologies. This transition to a greener economy presents significant opportunities for economic growth, job creation, and environmental sustainability (Allen, 2023).

5.1.6 Saving Money Along with Boosting Economy by Energy Efficiency Standards

Energy efficiency standards are regulations that require products to meet certain energy efficiency criteria. These standards have become increasingly important in recent years as energy prices have risen, and concerns about climate change have grown. Energy efficiency standards can save consumers money on their energy bills, and also reduce the overall energy consumption of a country, leading to a reduction in greenhouse gas emissions. In the United States, energy efficiency standards have been implemented for a range of products, including appliances, lighting, and buildings. For example, the Department of Energy has set minimum efficiency standards for refrigerators, air conditioners, and water heaters. The Environmental Protection Agency has also established ENERGY STAR standards for a range of products, including appliances, electronics, and lighting. Energy efficiency standards can have a significant impact on the economy. According to a report by the American Council for an Energy-Efficient Economy (ACEEE), energy efficiency standards have saved consumers over $2 trillion since 1990. These savings are due to reduced energy consumption, which results in lower energy bills for consumers. In addition, the report estimates that energy efficiency standards have created over 2.3 million jobs in the United States (Saha & Jaeger, 2019) .

Energy efficiency standards also benefit the environment by reducing greenhouse gas emissions. According to the ACEEE report, energy efficiency standards have prevented the release of over 25 billion metric tons of carbon dioxide since 1990. This reduction in emissions is equivalent to taking over 500 million cars off the road for a year. In addition to saving consumers money and reducing greenhouse gas emissions, energy efficiency standards can also boost innovation and competitiveness. By setting minimum efficiency standards, the government encourages manufacturers to innovate and develop new technologies that are more energy efficient. This can lead to increased competitiveness in the marketplace, as companies that produce energy-efficient products gain a competitive advantage (Saha & Jaeger, 2019) .

5.1.7 Climate Action Presents Unique Economic Opportunities for Rural America

As a region that is both highly susceptible to the effects of climate change and has substantial potential for the development of renewable energy sources and climate solutions, rural America faces unique economic prospects as a result of climate action. One opportunity is the development of wind energy in rural areas. The Department of Energy's Wind Vision report found that wind energy has the potential to generate 35% of the nation's electricity by 2050, and much of this potential is located in rural areas. In addition to providing clean energy, wind projects also create jobs and economic development in rural communities. For example, a study by the National Renewable Energy Laboratory found that wind farms in South Dakota generated $9.5 million in annual land lease payments and created 1,500 jobs during construction.

Another opportunity is the development of biofuels, particularly in the Midwest. Biofuels such as ethanol and biodiesel can reduce greenhouse gas emissions from transportation and provide economic benefits for rural areas through job creation and local investment. According to the Renewable Fuels Association, the biofuels industry supports over 340,000 jobs in the United States and contributes over $43 billion to the national GDP. Finally, prospects for sustainable agriculture are presented by climate action for rural America. Precision farming, cover crops, and conservation tillage are examples of sustainable agricultural techniques that can improve soil health and lower emissions of greenhouse gases from agriculture. These practices can also increase farm profitability and support rural communities through job creation and local investment. According

to the National Sustainable Agriculture Coalition, sustainable agriculture practices can create up to 50% more jobs per acre than conventional agriculture (Allen, 2023).

5.2 Achieving Green Growth: Difficulties the USA May Face

A growing number of people are talking about the "green economy" in light of the environmental problem. For instance, UNEP has made it the focus of a significant initiative by releasing its report on the green economy. It has also grown to be a very contentious term, maybe as a result of being the focus of multinational negotiations. There is currently no international consensus or broad acceptance of the "green economy" among economists or environmentalists. As a result of its great complexity, it is implausible that anyone will be able to agree on its short-term ramifications for policy, utilization, and connotation. Not only are the current growth patterns unsustainable, but they are also incredibly ineffective. They obstruct sustainable development and its goals of social, environmental, and economic stability as a result. What is required is inclusive green growth, which uses resources effectively, is clean in that it has little negative effects on the environment and is open to all members of society. Good development policies must be adjusted to political realities and ingrained habits to promote green growth. It calls for changes to the price, regulatory, and public investment structures that arouse opposition. But it also necessitates behavioral and social norm adjustments since, despite efficiency improvements and new technologies, changing consumption habits will be necessary everywhere, not only in high-income nations. Additionally, it necessitates the thoughtful deployment of financial instruments and social marketing technologies (Stevens, 2019).

5.2.1 Challenges in Job Sector

In the United States, the green economy is improving growth and job creation, according to a recent analysis from University of London, but as the remainder of the world catches up, the nation will need to embrace new policies to remain competitive.

Climate scientists Mark Maslin and Lucien Georgeson discovered in their analysis, which was released in the online publication , that the green economy creates 9.5 million full-time jobs and $1.3 trillion in yearly sales revenue in the US. The green economy is growing and playing a bigger role in the economy because it employs a larger proportion of Americans who are of working age.

It additionally boasts a greater green economy profits per capita than China, OECD, or any G-20 country, claims the report. However, other countries are coming up and trying to take advantage of this opportunity. The United States must create energy, environmental, and educational policies that encourage development in sectors like renewable energy if it wants to maintain its competitiveness. Many academics concentrated on low-carbon businesses, such as electric automobiles and power management in buildings, to get their conclusion. 2019 (Stevens, 2019)

Against the backdrop, the 9.5 million jobs in the study comprise more than 4% of the working-age population in the US, and the $1.3 trillion equals just under 7% of the country's yearly GDP. It is difficult to predict how the green economy will affect the US. In addition to the fact that "green" has many different definitions, there is also no official information gathered by the government. As a result of funding constraints, the Bureau of Labor Statistics stopped publishing its "Green Goods and Services" survey in 2013. According to the researchers, the methodology they used can estimate the green economy's employment and sales, as well as its growth and the sectors driving it. It can also estimate the green economy's part of the overall economy of the nation. Even though the green economy usually prioritises innovation and technological advancements, the researchers only considered industries where there was a clear economic gain. Between 2013 and 2016, the green economy in the US grew by 20%, and it is projected that the expansion will carry on as the battle against global warming accelerates. The researchers asserted that once the rest of the world catches up, the United States would need to implement new regulations to protect the millions of citizens who depend on the expanding area (Stevens, 2019).

5.2.2 Effects of Resources on Conflicts

Although the ownership of natural resources has always led to conflict and bloodshed, the United Nations Environment Program reports that more than 40% of intrastate disputes in recent decades include a resource component and that these conflicts can be particularly challenging to resolve. Conflicts have been started and funded by the exploitation of contested sources of oil, gas, diamonds, or gold, as well as industrial minerals. This has also encouraged spoilers to thwart peace attempts and has resulted in the breakdown of peace agreements. In discussions about addressing climate change, the connection between resources and warfare is not frequently brought up.

However, that focus is essential to assist countries to manage the economic transition to a green economy and handle the danger of conflict in a proactive manner (Blaine & Collins, 2021).

Despite being appreciated and safeguarded by national governments and those in charge of them as easy sources of lucrative taxes and other financial "rents," multinational mining enterprises may not have many incentives to protect communities at large from harm or even destruction brought on by mining. Governments may undermine or ignore environmental norms and land tenure rights in order to keep such rent-producing mines, especially in regions where they relocate indigenous people and damage the water, soil, and air. The chance of violent conflict generated by resentment is higher in locations where only a handful of wealthy individuals rule instead of an inclusive public because governments there are opaquer and more corrupt. Since the turn of the century, conflicts involving mining activities have risen due to inadequate oversight and regulation. Water is a specific problem because mining often utilizes a lot of it. The six major mining corporations' activities have been situated in nations with a lack of fresh water for nearly 70% of the past six years (Blaine & Collins, 2021).

5.2.3 An Additional $3.5 Trillion Annually?

Recently, a new analysis has revealed the precise cost of this change, which has been eagerly proclaimed by politicians throughout the world. If we are to have any hope of reaching net zero in 2050, governments, firms, and people must increase their total annual investment in energy and land-use systems by $3.5 trillion, according to consulting company McKinsey (Broom, 2022).

That is a 60% increase over the current investment level and is equal to 50% of worldwide corporate earnings, 25% of global tax income, and 7% of family spending. Additional reallocation of $1 trillion from high-emission to low-carbon assets would also be required. According to the analysis, switching to zero emissions will come at a "substantial" expense. The majority of this will happen early in the transition, but it will affect poor countries and fossil fuel producers unevenly, raising the possibility of interruptions in the supply of energy and price increases.

Higher energy costs decreased employment in high-emission sectors, dietary changes, and greater costs to lessen our dependency on fossil fuels for transport and home heating will have the most impacts on day-to-day life. The analysis found that turning the power industry carbon-free and

enhancing electrical networks to match a projected increase of global demand by 2050 would result in costs rising by 25% over 2020 and 2040. It is advised to the world leaders to begin the transition immediately, stating that if it is delayed or sudden, it might result in a consumer reaction that could further impede efforts to reach net zero, increasing the economic and social costs. There will be shortages and price increases if the transition from high- to low-emission energy is not carefully handled (Broom, 2022).

5.2.4 Divided America Over Biden’s Climate Change Policies

More than a year into Joe Biden's term as president, public opinion on the administration's response to climate change is split: 49% of American adults believe the administration's climate policies are moving the nation in the right direction, while 47% believe they are moving the nation in the wrong direction. Deeply politicized opinions dominate assessments of Biden's stance on climate change and the federal government's involvement in addressing the problem. However, there is unhappiness within the Democratic Party even among those who believe that Biden's policies are moving the nation in the right direction. This is an indication of Democratic displeasure with the progress being made in combating climate change. Democrats who support the government's climate policies are more likely than Republicans to feel that the administration could be doing more to address the issue (61% vs 37% who say the administration is doing about as much as can be expected) (Tyson & Kennedy, 2020).

The majority of Americans still think that the federal government can do more to tackle the issue, notwithstanding disagreements about Biden's views on climate change: Only 18% think it is accomplishing too much (and 22% think it is accomplishing the right amount) to fight the issue, while 58% think it is accomplishing too little. Again, party disparities are stark. Democrats are far more likely than Republicans to believe that the federal government is doing too little to mitigate the consequences of climate change (82% vs. 28%), highlighting the broad partisan divides in this area (Tyson & Kennedy, 2020) .

Other significant results are:

- While 43% support ending the manufacturing of new gasoline-powered automobiles and trucks by 2035, a majority of 55% reject it.

- According to 42% of American people, buying an electric car seems to be something they're extremely or somewhat likely to consider doing (EV).
- Americans are more inclined to believe that tighter environmental restrictions are worthwhile than to believe that they would cost too many jobs and harm the economy, by a margin of 53% to 45%.
- Compared to older Democrats, younger Democrats are more inclined to voice their dissatisfaction with the administration about climate change.
- Adults with lower incomes, as well as those who identify as Black or Hispanic, are more likely to report environmental issues in their neighborhoods.
- Among GOP members, younger individuals are more likely than older adults to favor policies on environmental and climatic concerns or perceive a need for federal government action.

5.2.5 Domestic Challenges

Political resistance from the Republican Party is one of the main obstacles that Biden must overcome to advance his energy ambitions. Republicans' hostility to climate spending, the nature of the initiatives, and their continued doubt over the benefits of some of these programs have prevented Congress from passing legislation authorizing money. Additionally, a lot of Democrats have grown frustrated with the aggressive climate agenda of the Biden administration in light of the rise in climate-related disasters and the party's poor political chances in the November 2022 midterm elections (Vivek Mishra, 2022).

Fierce opposition from the Republican Party is one of the main obstacles that Biden must overcome to advance his energy ambitions. Republicans' hostility to climate spending, the nature of the initiatives, and their continued doubt over the benefits of some of these programs have prevented Congress from passing legislation authorizing money. Due to the increase in disasters caused by climate change and the Democratic Party's dismal political prospects in the November 2022 midterm elections, many Democrats have also grown disenchanted with the strong climate programme of the Biden administration (Vivek Mishra, 2022). For example, in February 2022, US Senate Minority Leader Mitch McConnell and Senator Shelley Moore Capito sent a message to state governors asking them to deprioritize the suggestions in a Federal Highway Administration

memorandum that outlined the kinds of projects states should pursue to improve traffic safety while also achieving clean energy goals by lowering GHG emissions (Vivek Mishra, 2022).

Republican leaders have sought to outline their views of the climate catastrophe and the approach to remedy it in addition to thwarting Biden's climate program. Republicans and Democrats remain at odds on legislation about the US environment and climate change, the carbon tax, and funding for green initiatives, which is impeding the Biden administration's progress.

The coal business is bolstering the Republicans in their argument that the Environmental Protection Agency shouldn't be allowed to control GHG emissions from power plants. Republicans claimed yesterday that the continuing conflict in Ukraine may be due to the Biden administration's overemphasis on renewable energy sources and decreased reliance on imported fossil fuels. The US's growing energy costs pose a danger to the opposition's ability to expand. The situation is also getting worse due to the strong opposition from the oil and coal lobby in the US. The coal miners saw Biden's clean energy campaign as an effort to replace their higher-paying employment, and as a result, they have demonstrated a lack of enthusiasm (Vivek Mishra, 2022).

5.2.6 Challenges of Technological Change

Solving climatic and ecological problems requires both knowledge of natural science (such as carbon-free energy technologies) and engineering proficiency in the various technology solutions that may be utilised to mitigate the negative impacts. However, there are a number of non-technical challenges associated with adopting green technological advancement in the cultural, organisational, political, and economic sectors. For instance, according to the so-called transitions literature, a variety of sectors, such as those that produce electricity or offer access to clean water, could be viewed as social-technical structures or innovation systems. These systems are composed of networks of users. In other utterance, the creation of a new entire value chain hosting actors who have not always engaged in the ancient times may be critical for the growth of, say, new carbon-free technologies. This entails a lengthy process and has the potential to change society in several ways, such as through legislative changes, altered consumer behavior, distributional effects, the creation of new infrastructure, and novel business models.

Sustained technological development requires economic and sociological change in addition to technological advancement. Several recent incidents serve as excellent examples of the need to address the institutional and organisational problems caused by technological innovation and change. In terms of advances in productivity over the 20th century, electricity appears to have provided major societal benefits. Despite the fact that electrical energy was found in the late 1870s, it took another 20 years for electric motors to become significantly more efficient. In 1900, they produced just over 5% of the mechanical power used in American manufacturing. The reason for the slow adoption of electricity was that existing businesses had to modify every aspect of their operational systems in order to properly use the latest advances in technology, including personnel hiring, training, and remuneration procedures in addition to the manufacturing procedure, architecture, and logistics. A similar story starts to emerge when you consider how computers affected overall production in the latter half of the 20th century. With little or no return, many businesses invested a lot of labour and cash in computers. However, in this case as well, structural changes were required before enterprises could profit from the computer. Giving clients more options included, among other things, democraticizing, shrinking, and streamlining supply networks.

(Söderholm, 2020).

5.2.7 Managing Global Environmental Risks

The 1960s saw the implementation of modern environmental policy, which resulted in strict restrictions on pollutants into the atmosphere and water. Even while stationary sources of pollution, including industrial facilities, are fairly easy to control and manage, for example by plant-specific emission rules, they were largely disregarded in this study. A focus on regional environmental effects, such as pollutants into nearby waterways having a negative impact on other businesses and/or houses in the same municipality, was also highly emphasised during this early time.

However, as time has gone on, environmental concerns have increasingly centred on various types of diffuse emissions. These originate from a variety of sectors, such as agriculture, transport, air travel, and transportation on roads. Dispersed source contamination, which may not be concerning on its own but can have negative consequences when mixed with other diffuse sources, affects

large regions. The increasing prominence of global environmental challenges like global warming, as well as globalisation and greater international trade in consumer products, make this challenge increasingly challenging. To overcome these issues, international conversations and burden sharing are frequently required, but these as well have proven difficult.(Söderholm, 2020).

5.2.8 Radical, Not Just Incremental, Sustainable Technological Change Attained

Incremental improvements, such higher resource and energy economy in present industrial processes, are essential for the transition to a green economy. Technical innovation that is more important, possibly even radical, is also necessary. For example, replacing petroleum and coal in the transportation sector and the production of iron and steel requires significant technical improvements rather than only tweaks to efficiency. But because of a number of problems, radical innovation will always be difficult. The following lists the three main difficulties. One obstacle is the financial market's impediment to resolving the issue of long-term risk-taking, as well as the dangers that companies that start on technical advancement must contend with. These markets might not be able to provide risk management analysis tools for emerging technologies due to a lack of historical data to evaluate risks. Second, it's possible that investors from the private sector won't be highly motivated to make investments in long-term technology development. The economics research has recognised risks related to the under-provision of freely available goods, such as knowledge generated by research and development operations and experience-based learning. Because other companies will also benefit significantly from such investments (for example, through reverse engineering), private businesses will only be able to maintain a small share of the total rate of return. Investments in long-term technical development will be futile and unsatisfactory as a result of such knowledge spillovers.

Third, established technologies frequently engage in unfair competition with new green technology. The incumbents will have a comparative competitive edge since they were allowed to expand during a period when environmental restrictions were less stringent and since they had somewhat specialised institutions and infrastructures. These incumbents may be close to counterparts to their greener competitors. Path dependencies are thereby produced, increasing the likelihood that the economy will be linked to technological paths.

5.3 Concluding Remarks

The industrial economy development of the US has had significant harmful effects on the environment, leading to negative impacts on public health, climate change, and natural resources depletion. The increase in carbon emissions, pollution of air and water, and depletion of natural resources have resulted in ecological degradation, loss of biodiversity, and the degradation of the quality of life for people. The industrial economy development of the US has heavily relied on non-renewable resources, primarily fossil fuels, to drive economic growth. This has led to an unsustainable pattern of consumption and production, which has contributed to environmental degradation and climate change. The United States is one of the largest contributors to global greenhouse gas emissions, accounting for around 15% of total global emissions.

The need for the US to pursue green growth is more crucial than ever. The pursuit of green growth present both challenges and opportunities for the USA. On one hand, there are political and economic interests that resist the shift to a greener economy, which can be a major hindrance to the implementation of laws and programmes meant to cut carbon emissions and advance sustainable development. On the other hand, there are also opportunities for innovation, job creation, and economic growth that come with transitioning towards a greener economy. To fully embrace the opportunities of green growth, the US government needs to take bold action to implement policies and regulations that incentivize the development and adoption of clean technologies, renewable energy sources, and sustainable practices. This will require strong political leadership, as well as collaboration between government, industry, and civil society. At the same time, the challenges of green growth cannot be ignored. The transition to a greener economy will likely result in job losses in certain sectors, such as the fossil fuel industry, which can have significant economic and social impacts. It is important that policies and programs are put in place to support workers and communities affected by this transition. the economy and the environment.

Green growth offers the potential to develop innovative solutions that can reduce the harmful effects of industrial growth on the environment, while also generating economic growth and creating jobs. The transition to green growth can provide numerous benefits to the US economy, including reducing energy costs, promoting technological innovation, creating jobs in the renewable energy sector, and improving the quality of life for people. The US can dramatically

lower carbon emissions, enhance air and water quality, and support resource conservation by transitioning to a low-carbon economy and implementing sustainable production and consumption habits.

In conclusion, the US must recognize the harmful effects of industrial economic development and the need for green growth. A great chance to overcome these environmental concerns is provided by the pursuit of green growth while promoting sustainable economic development and creating new opportunities for innovation and job creation. By investing in green technologies, promoting energy efficiency, and adopting sustainable practices, In the worldwide transition to a low-carbon economy, the US can take a leading role.

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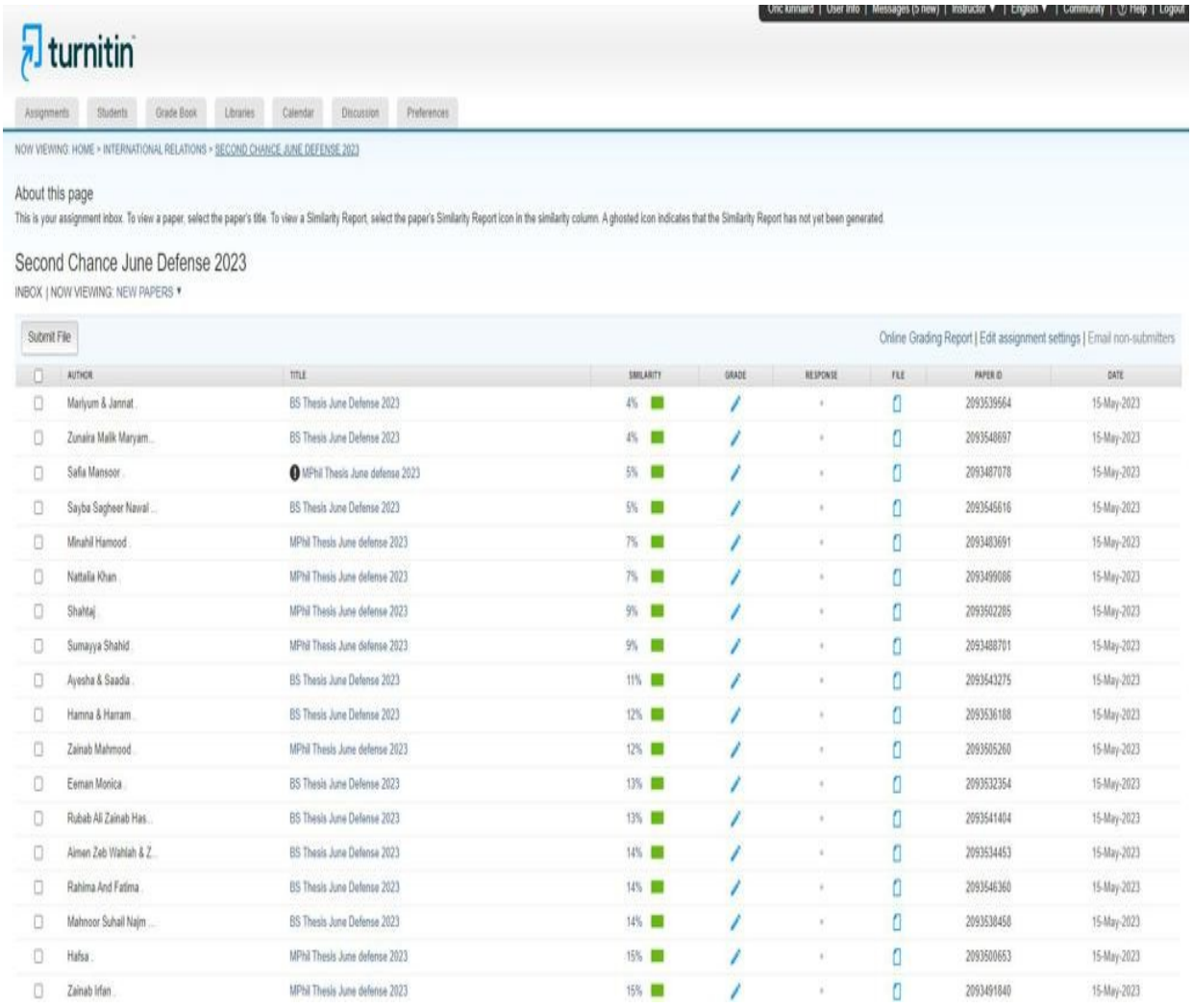

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