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**FDI in Renewable Energy a Catalyst for Green
Growth and Economic Development: A
Comparative Study of Morocco and Nigeria**

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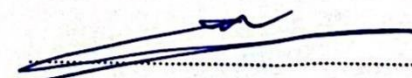
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CHAPTER ONE: INTRODUCTION

1.1. Background

The proliferation of foreign direct investment is intricately linked to the advancement of critical industries, notably renewable energy, which has surfaced as a pivotal sector in fostering sustainable development. Renewable energy is essential for achieving energy security and sustainability, characterized by a dependable, secure, and economical energy supply that satisfies local demand. Moreover, renewable energy plays a crucial role in environmental conservation and the mitigation of detrimental emissions, in accordance with global initiatives to address climate change and fulfill the United Nations Sustainable Development Goals (SDGs) for 2030 (REN21, 2022)

Renewable energy denotes power obtained from limitless natural resources that regenerate more rapidly than they are consumed. It is widely acknowledged as clean or environmentally sustainable energy, typically employed for power generation. Nonetheless, its uses encompass more industries like water heating, cooling, and transportation, underscoring the necessity for enhanced investment and innovation to fully realize its promise (OECD, 2019).

Investing in renewable energy constitutes a vital and viable pathway toward a future grounded on sustainable and eco-friendly energy solutions. In the last ten years, this industry has experienced significant expansion, accompanied by considerable rises in worldwide investment. Economists and researchers have concentrated on assessing the influence of renewable energy on economic growth while investigating its potential as a driver of sustainability (Perea et al., 2019). This development has become renewable energy an appealing industry for foreign investment across many economic and industrial domains. In addition to its ecological advantages, renewable energy promotes scientific advancement and creates job possibilities. Consequently, it is increasingly viewed as a crucial sector for capital investment and a significant catalyst for a sustainable global economy (REN21, 2022).

1.2. Problem Statement

This investigation examines the challenges of attracting and sustaining foreign direct investment (FDI) in the renewable energy sector, a critical driver of sustainable economic development. Despite the growing global emphasis on clean energy, many countries struggle to secure sufficient foreign investment due to high initial costs, inadequate infrastructure, and

complex regulatory frameworks. The level of governmental commitment to renewable energy further influences investment flows, with some nations actively fostering a favorable climate while others exhibit uncertainty or resistance to the transition.

A key concern is how policy stability or the lack thereof impacts investor confidence and economic growth. Countries with clear, consistent renewable energy policies tend to attract long-term investments that enhance economic, social, and environmental sustainability. In contrast, nations with ambiguous or fluctuating policies often deter investors, slowing progress in the sector and limiting economic opportunities. This research seeks to explore these dynamics, identifying best practices for governments to enhance investment attractiveness in renewable energy. Addressing regulatory weaknesses, improving market conditions, and providing strategic incentives are essential measures to ensure that foreign investment in renewable energy serves as a catalyst for long-term economic growth and sustainability.

1.3. Importance and Purpose of Study

Foreign Direct Investment (FDI) in renewable energy is becoming increasingly significant in light of pressing climate change issues and the worldwide transition to sustainable energy sources. The renewable energy industry is essential for global development, providing sustainable alternatives to fossil fuels and fostering economic progress. As nations endeavor to achieve the UN Sustainable Development Goals—particularly those pertaining to renewable energy, climate action, and sustainable development—foreign direct investment (FDI) serves as a crucial facilitator.

Foreign Direct Investment (FDI) enhances renewable energy through the facilitation of knowledge transfer, innovation, employment generation, and infrastructural advancement. It also facilitates the closure of financial disparities in poor countries, allowing for investments in wind, solar, and hydroelectric initiatives while diminishing dependence on non-renewable resources. Comprehending the correlation between foreign direct investment and renewable energy yields critical insights for formulating successful policies that entice investment and promote long-term sustainability.

This research possesses both personal and scholarly significance, connecting economic development, environmental science, and global investment. It seeks to enhance comprehension of how strategic investments may promote green growth and mitigate climate change.

The study examines how foreign direct investment (FDI) provides money and serves as a catalyst for sustainable development. It emphasizes advantages like improved energy security, varied energy sources, and less environmental effect. It also analyzes critical determinants affecting FDI, such as regulatory frameworks, incentives, and risks, and provides pragmatic solutions for fostering a more investment-conducive environment.

This paper provides a comprehensive perspective on the impact of foreign direct investment (FDI) in promoting renewable energy by examining both economic and social advantages, such as job creation and enhanced energy accessibility. It demonstrates how astute investments may facilitate enduring, inclusive, and ecologically sustainable development. The results will be beneficial for scholars, policymakers, and investors aiming to utilize FDI to facilitate green transitions and establish robust, low-carbon economies.

1.4. Research objectives

1. FDI in Renewable Energy

This section focuses on identifying and addressing key challenges and opportunities related to attracting foreign direct investment in the renewable energy sector:

- Identify barriers to attracting and retaining FDI in renewable energy, including financial, regulatory, and infrastructure challenges.
- Analyze gaps in current policies and market conditions that hinder FDI, particularly where they conflict with renewable energy sector needs.
- Examine the role of political stability and governance in influencing FDI inflows.
- Assess the effectiveness of incentives such as tax breaks and subsidies in encouraging investment.
- Explore how international trade agreements and bilateral treaties affect FDI in renewable energy.
- Recommend policy and market reforms to create a more favorable environment for FDI.
- Develop a framework that aligns national policies with global sustainability goals to maximize FDI potential.
- Evaluate the role of public-private partnerships (PPPs) in supporting renewable energy infrastructure through FDI.

2. Catalyst for Green Growth and Economic Development

This part highlights the broader economic and environmental impacts of FDI in renewable energy:

- Examine the consequences of limited FDI on job creation, technological progress, and energy diversification.
- Assess the environmental impacts of inadequate FDI, particularly regarding clean energy transition and climate change.
- Explore how FDI can drive sustainable development by enhancing energy security, carbon reduction, and climate resilience.
- Analyze the multiplier effect of renewable energy investments on industries like manufacturing, construction, and tech.
- Investigate how FDI can support regional development and reduce urban–rural economic disparities.
- Assess the role of FDI in promoting innovation and advanced technologies in renewable energy projects.
- Evaluate FDI’s potential in creating green jobs and upskilling the workforce.
- Examine how renewable energy investments reduce dependence on fossil fuel imports, strengthen energy security, and stabilize energy prices.
- Contribute to the body of knowledge on the FDI–renewable energy nexus, offering practical insights for academics, policymakers, and stakeholders.

1.5. Questions

This study aims to investigate the relationship between foreign direct investment (FDI) and the progress of renewable energy, emphasizing its role as a catalyst for sustainable growth and economic development. The research examines how FDI contributes to advancing sustainable energy solutions and fostering a more resilient and environmentally conscious economy, particularly in the face of governmental opposition to energy transition efforts. To achieve its main objective, this study is guided by the following fundamental questions:

- Why are investments in renewable energy necessary, especially when certain governments oppose this form of energy transition?
- What factors affect the attraction or repulsion of foreign direct investment in the renewable energy industry, and how do these factors vary across different regions or contexts?

- What are the comprehensive economic, social, and environmental consequences of foreign direct investment in the renewable energy sector, and how do these consequences influence the transition towards sustainable development?

Through a comprehensive analysis of these research topics, this study aims to clarify the connection between foreign direct investment and renewable energy. Specifically, it explores how FDI fosters technological innovation, infrastructure development, and the growth of renewable energy projects while also addressing the challenges and barriers that may hinder such investments.

Moreover, the study seeks to identify key drivers and inhibitors of FDI in renewable energy, recognizing that these factors may differ across political, economic, and geographical contexts. By understanding the conditions that either attract or deter investment, this research aims to provide insights into how various stakeholders including governments, investors, and policymakers can cultivate an environment conducive to sustainable energy development.

Furthermore, the study offers pragmatic insights for policymakers, investors, and stakeholders striving to enhance FDI's role in sustainable growth. By evaluating the economic benefits, social implications, and environmental impacts of foreign direct investment in renewable energy, this research contributes to the broader discourse on sustainable development and aids the transition to a low-carbon economy. The findings will serve as a valuable resource for those seeking to leverage FDI as a means to accelerate green growth, mitigate climate change, and promote a sustainable future.

1.6. Overview of the Chapters

This study is structured into five main chapters, each addressing a critical aspect of foreign direct investment (FDI) in renewable energy and its impact on economic development.

The first chapter introduces the research by outlining its significance, objectives, and research questions. It provides an overview of the global shift toward renewable energy and highlights the challenges and opportunities in attracting FDI to this sector. Additionally, it presents the methodology and structure of the study.

The second chapter consists of the literature review, beginning with key definitions and concepts related to FDI, green growth, renewable energy, and economic development. This chapter explores the importance of FDI in promoting sustainable energy and examines existing research on its economic and environmental impacts. It also presents two contrasting

perspectives: one supporting investment in renewable energy as a driver of economic and social progress and another arguing against such investments, often driven by governmental policies and regulatory concerns that prioritize fossil fuel industries.

The third chapter focuses on case studies, offering a detailed analysis of two contrasting countries. The first case examines a nation that has made substantial investments in renewable energy, evaluating how these investments have influenced its economic growth, social development, and sustainability. It also explores the policies and strategies that facilitated this transition. The second case study investigates a country that continues to rely heavily on fossil fuels, assessing the economic and environmental consequences of this dependency and identifying the barriers preventing a shift toward renewable energy.

The fourth chapter presents a comparative analysis of both case studies, highlighting their key differences in terms of policy approaches, investment trends, and economic outcomes. This chapter evaluates how policy certainty or uncertainty affects investor confidence and the long-term sustainability of energy sectors. By comparing the two cases, it aims to extract lessons that can inform best practices for countries seeking to attract FDI in renewable energy.

Finally, the fifth chapter concludes the research by summarizing the key findings and offering policy recommendations for governments and investors. It discusses strategies for improving the investment climate for renewable energy, addressing regulatory challenges, and ensuring that FDI contributes to long-term economic sustainability. The chapter also suggests areas for future research, emphasizing the importance of continued global efforts toward a clean energy transition.

CHAPTER TWO: UNDERSTANDING THE CONCEPTS

2.1. Overview

Foreign direct investment in the renewable energy sector is a crucial element in promoting sustainable economic growth. It encompasses not only the transfer of finance but also the transfer of knowledge and skills, facilitating the shift to clean and sustainable energy sources. Notwithstanding the myriad advantages of this investment type, several nations exhibit reluctance to adopt it owing to apprehensions over economic sovereignty, dependence on foreign money, and its implications for domestic energy policy.

This divergence in perspectives has incited extensive discourse among proponents and adversaries, with some contending that foreign investment in renewable energy represents the most effective remedy for climate change issues and sustainable development, while others assert it could result in foreign corporations monopolizing the essential energy sector.

Prior to exploring these viewpoints, it is necessary to elucidate the main terms pertaining to foreign direct investment and renewable energy, to guarantee a precise comprehension of the contextual framework of the discourse.

2.2. Understanding Foreign Direct Investment, Renewable Energy, Green Growth, and Economic Development

2.2.1. Foreign Direct Investment (FDI)

2.2.1.1. Concept of FDI

In 2008, the OECD expanded this definition by incorporating additional concepts, characterizing direct investment as a form of cross-border investment wherein an entity domiciled in one nation ("the direct investor") seeks to obtain and sustain a lasting interest in an enterprise ("the direct investment enterprise") situated in a foreign economy. The main aim of this investment is to have considerable influence over the company's management and strategic decisions, although such influence does not need obtaining a controlling interest. In several instances, the investor's relationship with the firm is sufficiently profound to enable the investor to exert control over its operations and decision-making processes (OECD, 2009)

The defining characteristic of direct investment, in contrast to other cross-border investments, is its objective to exercise influence or management control. Portfolio investments, often consisting of shares, bonds, or other securities, are largely motivated by the anticipation of returns from capital gains or dividends, without a significant purpose to affect the governance

or management of the invested entity. Conversely, direct investment establishes a more sustainable and long-term relationship, promoting steady financial inflows alongside the transfer of technology, managerial acumen, and other strategic resources, all intended to augment the long-term productivity and profitability of the multinational corporation.

This essential distinction underscores the relationship between direct investors and the firms in which they participate, since direct investors often emphasize sustained and reciprocal interaction that promotes a more cohesive global process. Direct investors prioritize long-term growth, technical innovation, and strategic control, distinguishing direct investment from portfolio investments, which are defined by a purely financial and short-term orientation. Thus, direct investment is regarded as a crucial instrument for fostering innovation, economic development, and the international proliferation of businesses, in contrast to the more passive nature of portfolio investment. (OECD 2008)

The international Monetary Fund (IMF) defines foreign direct investment as an overseas investment in which an entity from one country (the direct investor) aims to establish a lasting stake in a business located in another economy (the direct investment enterprise). A "lasting interest" signifies a protracted affiliation and a substantial degree of influence wielded by the investor over the enterprise's management (IMF, 2009).

FDI flows include the funds injected by the direct investor into the company, either directly or through subsidiaries, as well as the capital received by the investing enterprise from the direct investor. FDI consists of three main components:

1. **Equity capital:** This refers to the direct investor's purchase of shares in a company located in a country different from their home country.
2. **Reinvested earnings:** These are the profits earned by the affiliate that are not distributed as cash dividends to the direct investor but are instead reinvested in the company in proportion to the investor's ownership stake.
3. **Intra-company loans:** These include lending and borrowing transactions between the parent company and its subsidiaries, whether short-term or long-term. (OECD, 2023)

Conversely, FDI stock denotes the aggregate value of the parent company's equity in the capital and reserves of the subsidiary, encompassing retained earnings, as well as the net obligations of the subsidiary to the parent business. Nonetheless, while addressing FDI stock, it is crucial to additionally take into account FDI flows, which denote the capital movement

during a certain timeframe usually one year into or out of a nation. The definitions of FDI flows and stock utilized in the World Investment Report (WIR) may diverge from the definitions, since ideas may require adaptation for analytical objectives. For instance, when examining regional or sectoral patterns in foreign direct investment, data obtained from investment approvals may offer a more nuanced view at the nation or sector level, as seen in pertinent research (UNCTAD 2007).

2.2.1.2. FDI stock

In terms of foreign direct investment (FDI) stock, certain nations and significant economic blocs lead the rankings of principal participants in the global market. The conclusive examination of inbound and outward FDI stock underscores the degree to which these nations and blocs own global shares. The principal participants in this domain include the European Union, China, the United States, Canada, and Hong Kong, which are dominant economies in foreign direct investment flows. (Eurostat, 2024)

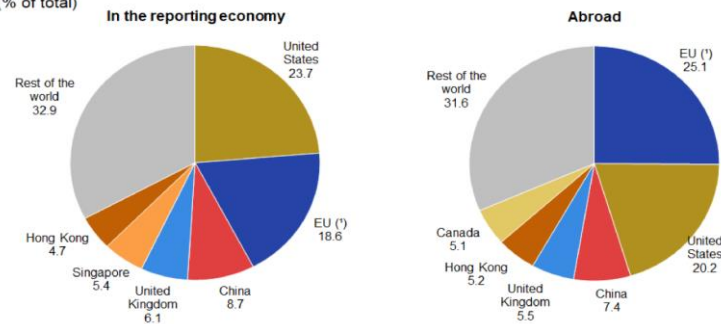
Refer to Figure 1 in 2022, the European Union represented around 18.6% of the entire worldwide inbound foreign direct investment stock, whilst the United States had 23.7% of this stock, establishing it as the foremost beneficiary of foreign investments. The European Union dominated external investments, with 25.1% of the entire world outbound FDI stock.

Consequently, the European Union occupied the first position in external investments and the second position in inward investments, whereas the United States exhibited the largest proportion of inward stock and secured the second position in outward stock.

Conversely, China and the United Kingdom occupied the third and fourth positions worldwide for the magnitude of foreign direct investments, both incoming and outgoing, underscoring their substantial influence in the global economy.

Figure 1 : world stocks of foreign direct investment 2022

World stocks of foreign direct investment, 2022
(% of total)



Source : Eurostat and UNCTAD

2.2.1.3. Types of FDI

Foreign investment takes various types. However, in this research, we will focus on the most commonly used and prevalent forms in the international economic arena. Here are some examples:

- **Greenfield investments**

Greenfield investment denotes the allocation of fresh resources and assets into a business, frequently aiding in the development of Gross Fixed Capital Formation (GFCF). This form of investment, denoting fresh capital, generally results in heightened production, job creation, and enhanced productivity, but corporate purchases may also produce efficiency improvements and greater output.

Consequently, quantifying Greenfield investment, which encompasses the creation of new branches or the augmentation of existing branch capacities, is essential for policymakers and economists to comprehend the economic ramifications of Foreign Direct Investment (FDI) and evaluate the outcomes of enacted policies. (IMF 2022 p.4)

- **Brownfield investment**

Brownfield investment refers to properties that have been impacted by prior activities and the adjacent property, frequently encountering actual or prospective pollution concerns. These sites are generally situated in established metropolitan regions but are either neglected or underused, requiring intervention for restoration and reconstruction to render them functional once more. (buildings 2023)

- **Mergers and Acquisitions**

Mergers and Acquisitions (M&A) often occur when the assets of domestic corporations are transferred to foreign entities, resulting in the amalgamation of assets and activities from multiple nations to establish a new legal organization. M&A prospects are typically perceived to be diminished in nations with lower developmental levels. The (2012 Annual Survey on Foreign Direct Investment Perception (IPAK)) indicates that, in contrast to Greenfield investments, M&A transactions "do not yield enduring advantages for the local economy, as acquisition payments are frequently made in the acquiring company's shares, implying that the proceeds from the sale may not circulate within the local economy." The principal advantage of this form of Foreign Direct Investment (FDI) is enhanced worker productivity. Nonetheless, there is a lack of definitive information about its effect on employment generation. Moreover, empirical research on this subject is inconsistent and unsatisfactory. (Zeqiri, Bajrami 2016)

- **Joint ventures**

Joint ventures (JVs) enable entities to consolidate their resources, skills, and risks to undertake a particular project or capitalize on a commercial opportunity. They function as an efficient method to broaden operations or penetrate new markets without necessitating significant capital expenditure. In a joint venture, many partners participate, distributing both risks and profits. Each partner provides distinct resources, including finance, human skills, and technology, to attain common goals. Profits and losses are distributed among the partners based on the terms outlined in the established agreements. The roles and duties of a joint venture differ based on its configuration. Some businesses need collaborative decision-making, while others allocate distinct responsibilities to each participant. A joint venture does not always need the establishment of a new legal company, enabling firms to capitalize on each other's capabilities while preserving operational flexibility. (Thomson Reuters, 2023)

- **Vertical FDI**

Vertical foreign direct investment (FDI) transpires when a multinational business (MNE) divides its manufacturing process into distinct phases across several nations. This fragmentation is motivated by the company's intention to capitalize on disparities in the relative costs of manufacturing inputs. It is termed "vertical" because to the progressive distribution of several manufacturing steps over numerous sites. The fundamental idea is that each manufacturing step necessitates distinct inputs, and due to varying input costs across

countries, multinational corporations can enhance their profitability by relocating labor-intensive phases to areas with reduced labor expenses. (Protsenko, 2003)

- **Horizontal FDI**

Horizontal multinational firms are enterprises that manufacture similar products or provide the same services at many locations across different nations, with each facility customized to meet the needs of its local market. Horizontal foreign direct investment (FDI) primarily arises from two principal factors: trade expenses and firm-specific economies of scale. The primary motivator for this investment type is the necessity to save transportation expenses or have direct access to overseas markets that necessitate local manufacturing. Horizontal models suggest that multinational activities are more probable to develop across nations with comparable economic attributes. (Protsenko, 2003)

2.2.2. Renewable Energy: Definition, Types, Benefits, and Challenges

2.2.2.1. What is Renewable Energy?

Renewable energy denotes the input of sustainable energy sources to the overall primary energy supply. This compilation encompasses hydroelectric power (except pumped storage), geothermal energy, solar energy, wind energy, and tidal and wave energy. It also includes energy obtained from biofuels, such as solid biofuels, bioethanol, biodiesel, various liquid biofuels, biogases, and the renewable portion of municipal trash.

Biofuels are described as fuels sourced directly or indirectly from biomass, comprising materials originating from living or recently deceased organisms. This encompasses wood and plant leftovers, including wood waste and energy crops, alongside ethanol, animal waste, and sulfite solutions. Municipal trash pertains to refuse produced by residential, commercial, and public service operations, which is collected by local authorities for energy generation or disposal.

This indicator is quantified in thousand tons of oil equivalent, coupled with its percentage contribution to total primary energy supply. (OCED, 2024)

2.2.2.2. Types of Renewable Energy

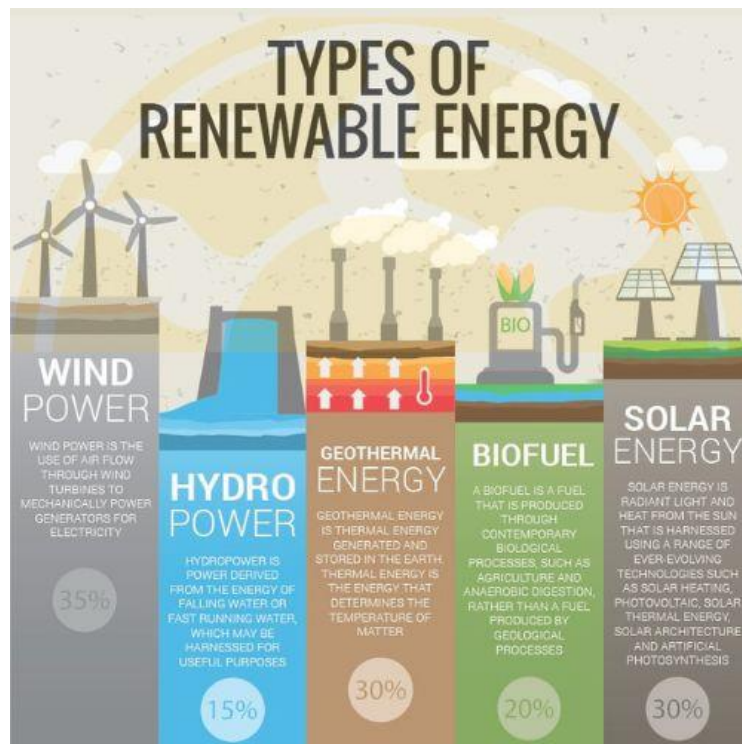


Figure 2: Types of renewable energy

Source : <https://www.summerlight.eu/sustainable-energy/renewable-energy-sources/>

- **Solar energy**

Solar energy is one of the most abundant renewable resources, as it can be used even in less-than-ideal weather conditions. It is estimated that the total solar radiation reaching the Earth is more than 10,000 times higher than the global energy consumption.

Solar energy systems are used in various sectors, such as temperature control (heating and cooling), natural lighting, electricity production, and fuel creation. These systems convert sunlight into usable energy through photovoltaic panels or mirrors designed to focus solar radiation. While not all countries have the same access to solar energy, every nation has the potential to make a significant contribution to its energy mix through direct solar energy.(UN website)

- **Wind Energy**

The kinetic energy of flowing air is collected by wind turbines, which can be placed on land or in the water, and used to generate electricity. Wind power has been around for a long time, but new turbine designs have made it much more efficient. Power generating capacity has been enhanced with the use of taller towers and larger diameter rotors.

Wind speeds vary according to geographic location, but the global potential for wind energy

far exceeds current electricity production, making large-scale expansion feasible.

Although some areas experience consistently strong winds, ideal locations for wind farms are often far from populated regions. Therefore, offshore wind energy presents a promising opportunity, with significant potential for future development. .(UN website)

- **Geothermal Energy**

Wells and alternative extraction techniques enable humans to harness geothermal energy reservoirs derived from the Earth's internal heat. Hydrothermal systems possess reservoirs with sufficient heat and permeability, whereas enhanced geothermal systems (EGS) necessitate the enhancement of permeability via hydraulic stimulation. Utilizing advanced and dependable technologies, extracted geothermal fluids are employed to produce electricity. Geothermal power plants have demonstrated reliability and longevity, showcasing their sustained efficiency after a century of operation. (UN website)

- **Hydropower**

Hydropower produces electricity by utilizing the kinetic energy of water descending from elevated to lower altitudes, either via dams and reservoirs or through natural river currents. Besides electricity generation, hydropower reservoirs supply drinking water, assist agricultural irrigation, regulate flood and drought conditions, and enhance navigation. Hydropower continues to be the predominant source of renewable energy in the global electricity sector. Nonetheless, hydropower generation is significantly contingent upon precipitation patterns, rendering it susceptible to escalating droughts attributable to climate change. Furthermore, substantial hydropower initiatives may induce adverse environmental consequences, rendering small-scale hydropower systems a more favorable alternative in certain instances to mitigate ecological harm, particularly in isolated regions. .(UN website)

- **Marine Energy**

Ocean energy harnesses the kinetic and thermal energy of saltwater, encompassing wave and tidal power, to produce electricity or heat.

Although marine energy technologies remain in nascent development phases, continuous breakthroughs are propelling progress, with several prototypes of wave and tidal energy devices presently undergoing testing. The extensive potential of ocean energy much exceeds global energy requirements, underscoring its viability as a crucial renewable energy source for the future. (United Nations, 2025)

2.2.2.3. Advantages of Renewable Energy

Renewable energy plays a fundamental role in the global transition toward sustainability, offering a wide range of economic, environmental, and social benefits.

- **Availability and Accessibility**

Reduced dependence on fossil fuel imports and decreased vulnerability to geopolitical risks. If current projections are accurate, renewable energy could account for approximately 90% of global electricity generation by 2050. This shift would enhance energy independence for nations, reducing their exposure to fluctuating fuel prices and supply disruptions. Moreover, it would drive economic growth by fostering innovation, creating jobs, and supporting the development of sustainable energy infrastructure. This transition promises a more secure and resilient energy future while contributing to global climate goals. (United Nations, 2025)

- **Cost Efficiency**

The dramatic price drops of renewable energy sources like solar and wind have made them the most cost-effective choice for electricity generation in a growing number of nations. Especially in countries with low or medium incomes, these technologies are becoming more affordable. There might be a 90% drop in energy-related carbon emissions by 2030 if renewables generate 65% of the world's power. It is crucial to accelerate the adoption of renewable energy alternatives globally, since this transformation would play a significant role in preventing climate change.(United Nations, 2025)

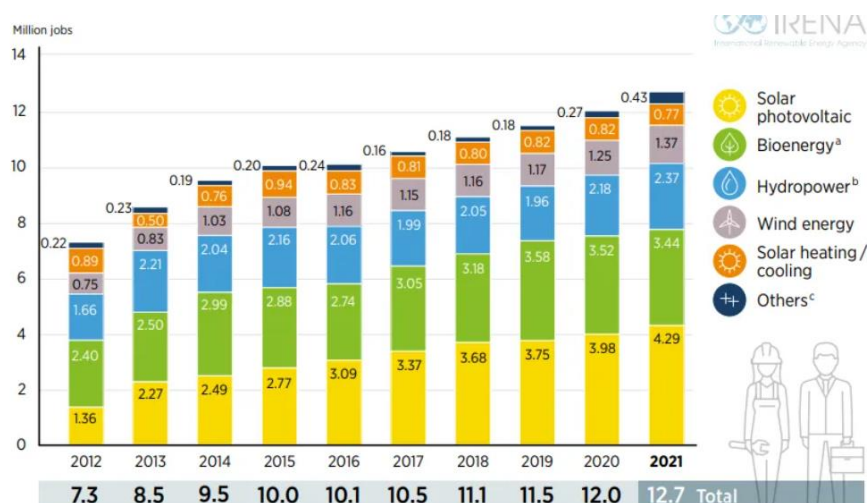
- **Public Health Benefits**

The combustion of fossil fuels produces air pollution, which in turn causes an increase in healthcare expenses and the number of early deaths throughout the world. A significant improvement in air quality might be achieved by eliminating hazardous emissions and switching to greener energy sources such as solar and wind power. In the long run, this change would save lives and reduce financial strain on healthcare systems by lowering the prevalence of pollution-related illnesses including heart and lung problems. Both the fight against climate change and the improvement of public health and welfare depend on the widespread use of renewable energy sources. (United Nations, 2025)

- **Employment Opportunities**

When compared to the fossil fuel business, the renewable energy sector has demonstrated a higher potential for employment development. Although there is a possibility that over 5 million jobs in the fossil fuel industry would be lost by 2030 due to the shift to renewable energy, a total of 9 million employment might be created. Fourteen million new positions in renewable energy and sixteen million more in ancillary fields will fuel this expansion. In addition to bolstering international initiatives to tackle climate change, this reform promotes economic expansion and opens doors for training in new environmentally friendly occupations.(United Nations, 2025)

Figure3: Employment Opportunities and Increased Demand for Trained Personnel



Source: <https://www.renewableinstitute.org/employment-opportunities-and-the-increased-demand-for-trained-personnel/>

- **Long-Term Economic Advantages**

While there is a large outlay of cash up front for renewable energy infrastructure investments, the payoff in the long run is substantial. In contrast to the present \$7 trillion in worldwide subsidies given to fossil fuels, the predicted yearly investment needed to transition to renewable energy sources is \$4.5 trillion until 2030. But this move might reduce pollution-related health expenses and climate change implications, saving almost \$4.2 trillion annually. Because of these cost benefits, switching to renewable energy sources is not only good for the environment, but also for the economy and energy security.

A clear demonstration of dedication to sustainable development is the broad use of renewable energy sources, which have substantial positive effects on the environment, the economy, and

public health. Renewable energy sources solve important global problems by decreasing emissions of greenhouse gases, improving air quality, and generating new employment possibilities. Consequently, renewable energy is being acknowledged more and more as an essential part of creating a future that is both sustainable and resilient. In addition to assisting in the fight against climate change, this shift will boost long-term economic growth and improve the quality of life for people all around the globe. the United Nations webpage (United Nations, 2025)

2.2.2.4. Opportunities and Obstacles of renewable energy

- **Opportunities**

Global energy trends reveal a transition towards renewable energy, propelled by decreasing prices, technical innovations, and favorable governmental regulations. Existing policies are developed to achieve long-term climate objectives outlined in the Paris Agreement, focusing on diminishing air pollution and guaranteeing universal energy access. Consequently, renewable technologies are progressively emerging as the favored option in energy markets. In the future, utility companies may provide renewable energy at consistent and competitive rates to entice investment.

By 2040, renewable energy is anticipated to comprise over 40% of worldwide power production. Nonetheless, coal and gas will persist in playing a substantial part in the energy composition. To accommodate the growing proportion of renewables, energy markets must enhance their flexibility, necessitating infrastructure investments, market reforms, and enabling technologies that facilitate the integration of variable renewable sources.

Advancements in energy technology are generating new prospects for industrial development and competitiveness. Minimizing industrial reliance on foreign technology is crucial for fostering innovation and achieving self-sufficiency. Significant global trends facilitating this shift are technological collaboration, the integration of information and communication technology (ICT), digitalization, a focus on high-tech businesses, and acknowledgment of the influence of transnational corporations in energy development.

In choosing a suitable energy source for the energy mix, variables such as technical advancement, cost-effectiveness, and energy storage capacity are essential for enhancing the adoption of renewable energy. The rising prominence of offshore wind energy is anticipated to draw new investors, prompting onshore wind firms to transition into this expanding industry. These developments underscore the considerable potential of renewable energy to propel

sustainable development and economic progress globally. (M.Al Qubeissi, A.El-kharouf and H.Serhad Soyhan)

- **Obstacles**

Notwithstanding the increasing interest in renewable energy, several hurdles impede its extensive deployment. These obstacles may be classified into three primary categories: financial, market dominance, and regulatory limitations.

A principal economic hurdle is the elevated production expense of renewable energy relative to conventional fossil fuels. The limited size of several renewable initiatives and insufficient technology improvement exacerbate this challenge, hindering commercialization and extensive dissemination. Market share barriers are a considerable obstacle.

Despite the rising use of renewable energy, conventional energy sources continue to prevail in the market. An advanced and competitive market is crucial for ensuring operational stability and reducing production costs, hence enhancing the viability of renewable energy sources.

Policy impediments further hinder the shift to renewable energy. The adoption and execution of effective policies are essential for enhancing renewable energy output. In the absence of robust legislative support and incentives, renewable energy sources have challenges in competing with traditional energy sources.

Moreover, sociological and cultural tendencies contribute to the impediments in the transition to sustainable energy. Numerous economies continue to function under the presumption of boundless natural resources and perpetual development, hindering the transition to a more sustainable paradigm. The building industry faces issues due to its historical reluctance to embrace innovative, sustainable designs and materials. Exorbitant restoration expenses and protracted payback durations deter investment in energy-efficient structures, hindering advancements in energy sustainability within the built environment.

Addressing these obstacles necessitates extensive legislative reforms, financial incentives, technology innovations, and a cultural transition towards sustainability. (Al Qubeissi et al., 2020)

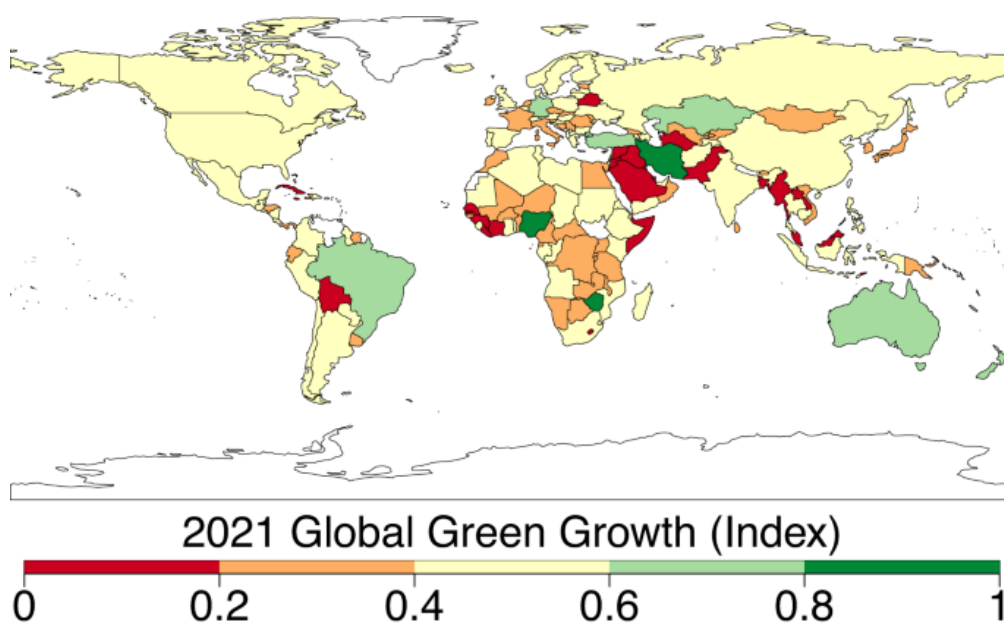
2.2.3. Understanding Green Growth

2.2.3.1. What is Green Growth?

UNESCAP defines green growth, or ecologically sustainable economic growth, as a strategy designed to promote economic development and job creation to mitigate poverty while confronting escalating resource constraints and the climate catastrophe. This strategy prioritizes investment in natural capital, seeing "green" as a fundamental catalyst for sustainable economic development. Furthermore, green growth effectively promotes the 2030 Agenda for Sustainable Development by fostering synergies across the three elements of sustainability (UNESCAP, 2025).

We can also define green growth pertains to enhancing growth processes to be more effective in resource use, environmentally sustainable, and resilient, without impeding their pace. Is this feasible? Environmental protection may directly enhance economic growth, as the environment, regarded as natural capital, functions as an input in the industrial process. Environmental preservation can augment natural capital inputs, resulting in heightened revenue. The utilization of environmental assets is typically marked by market failures, characterized by external costs and ambiguously defined property rights. Mitigating these market defects can enhance the effective supply of natural capital, thereby augmenting production. Furthermore, it may directly augment human well-being by enhancing air and water quality, aspects often overlooked by conventional GDP metrics, although they constitute the ultimate objective of economic policy. (Hallegatte et al., 2012)

Figure 4 : *Global green growth index (2021)*



Source: <https://www.nature.com/articles/s41597-023-02319-4>

2.2.3.2. Strategies for achieving green growth

Sustainability has evolved beyond mere ethics and morality; it has become a significant growth strategy. Companies that actively strive to minimize their environmental impact and embrace sustainable practices can reap numerous benefits. Here are several ways to achieve green growth:

Innovation: Keeping pace with the green transition is essential. Through our work with small and medium-sized enterprises (SMEs) and energy optimization, we have developed a variety of solutions. We are also eager to assist your company in enhancing its competitiveness through innovative approaches.

Competitive Advantage: By establishing themselves as sustainable suppliers, companies can set themselves apart from their competitors. Many consumers and business clients prefer products and services from organizations that prioritize environmental responsibility.

Future Sales Opportunities: Focusing on sustainability can open up new sales avenues. As larger companies increasingly adopt sustainability requirements in response to heightened regulations, SMEs will face pressure to comply with these standards as well. While this may initially impose limitations on SMEs, it's important to recognize that they will inevitably feel the effects of larger firms implementing such requirements.

Market Positioning: Companies that prioritize sustainability from the outset can cultivate a strong reputation and position themselves as industry leaders. This can attract investors, partners, and customers who prioritize sustainable practices.

Cost Reduction: Implementing energy-efficient solutions can result in significant long-term cost savings. This encompasses a wide range of practices, including energy optimization, waste reduction, and improved resource utilization. (Elin Sterten Eggen, 2023)

2.2.4. Economic Development

Economic development is a branch of economics focused on the examination of macroeconomic variables that impact long-term economic growth, alongside microeconomic concerns impacting individuals and enterprises, especially in developing countries. The concept of economic growth primarily pertains to economic activity and metrics such as Gross National Income (GNP) and Gross domestic product. Conversely, the concept of economic development inherently encompasses these elements; but, they are insufficient to constitute economic progress. Economic development results in a transformative alteration of

the country's socio-economic framework. In contrast to economic growth, it also addresses alterations in technological and institutional frameworks of production and distribution. (Kumari and Bhanoo, 2022)

Economic development is distinct from other areas of economics since it encompasses the examination of low-income economies and their inhabitants, integrating insights from all schools of economics. The study of economic growth closely resembles fields such as labor or health economics; however, development economics encompasses a broader scope.

Consequently, while my examples address significant issues in economic development, my conclusions are applicable to other domains of applied economics as well. In a previous study, I contended that understanding growth necessitates an examination of processes. (Deaton, 2010)

Economic development is a multifaceted concept that primarily encompasses two key areas: health and education. It focuses on enhancing human development, which significantly influences overall economic growth from various perspectives. Extensive research has analyzed the critical variables associated with economic growth, highlighting their relationship with economic development.

Additionally, several economic factors are crucial for promoting growth, including private investment, human development, educational awareness, infrastructure improvements, and trade and industrial expansion. The theory posits that human development is integral to economic development, ultimately leading to sustained economic growth. Education plays a vital role by ensuring access to quality learning opportunities and promoting knowledge that improves living standards and societal norms. Health, as a component of economic development, emphasizes the provision of essential legal and material resources to maintain the nation's health and well-being (Ahmed, Liu, & Khan, 2022).

Economic development is a complex and comprehensive process that transcends simple economic growth, incorporating many social, political, and environmental elements. It encompasses the expansion of economic production alongside the enhancement of living standards, social welfare, and the general quality of life within a community. Although conventional metrics like GDP growth and overall economic efficiency are essential for assessing economic advancement, they inadequately encompass the wider dimensions of development, especially in tackling social issues such as poverty alleviation, inequality reduction, and unemployment (Seers, 1979).

These issues underscore the necessity for a more holistic approach to development, one that incorporates both economic and non-economic elements. Alongside economic growth, development objectives encompass enhanced access to education, superior healthcare and nutrition, environmental sustainability, increased equality of opportunity, broader individual freedoms, and a more vibrant cultural and social life (World Bank, 1991, p. 4).

These factors enhance a comprehensive perspective of development, prioritizing the welfare of persons and communities over just economic achievement. For the sake of conceptual clarity, it is essential to differentiate between economic development and wider development. Economic development typically emphasizes economic growth and structural transformation, but broader development encompasses a wider array of values and aims that transcend mere economic factors.

Moreover, economic growth is not a homogeneous process; it differs among locations and cultures due to historical, institutional, and policy-related variables. Various nations may emphasize certain facets of development based on their unique difficulties and requirements. Some may prioritize swift industrialization and technical progress, while others may concentrate on social equality, environmental sustainability, or poverty alleviation as essential elements of their development strategy.

This section examines three fundamental foundations of economic development: growth, distribution, and innovation. Growth denotes the augmentation of economic production and productivity, establishing the basis for elevated earnings and enhanced living standards. Distribution pertains to the allocation of economic growth advantages across various societal sectors, guaranteeing that development is inclusive and equitable. Conversely, innovation is essential for promoting long-term growth by advancing new technologies, enhancing efficiency, and generating new economic possibilities. Collectively, these three components provide the foundation of economic growth, influencing its course and defining its societal impact. (Yong-Shik Lee, 2018)

Now that we have gained a precise understanding of the concept of economic growth, it is essential to explore the various metrics used to measure this growth. A deeper analysis of these indicators will allow us to better comprehend the extent to which renewable energy influences economic expansion and contributes to its sustainability over time.

2.2.4.1. Measurement of Economic Development:

Economic growth may be assessed using many fundamental methodologies that offer insight into a nation's comprehensive advancement and welfare. Four principal techniques are particularly notable:

Gross National Product (GNP): This statistic assesses the entire economic production of a nation, encompassing revenue produced both domestically and abroad by its population. GNP, by monitoring real national income over an extended duration, functions as a crucial indicator of a nation's economic growth and overall economic success. An enduring rise in GNP signifies economic growth, enhanced productivity, and maybe elevated living standards. Nonetheless, GNP by itself fails to represent income distribution or wealth differences among individuals. (Investopedia, 2025)

Gross National Product per Capita: Although GNP assesses total economic performance, GNP per capita offers a more accurate indication of individual economic well-being. The calculation involves dividing the total national income by the population, providing a greater understanding of how economic growth correlates with individual affluence. An increasing GNP per capita indicates a rise in average income, potentially resulting in increased living standards, enhanced access to products and services, and greater economic prospects. This statistic fails to consider income inequality, indicating that an increase in GNP per capita may still result in wealth being concentrated within a limited segment of the population.

Well-being: In addition to income-based metrics, welfare indicators evaluate the degree to which individuals gain from the influx of goods and services. These encompass access to vital services such healthcare, education, and social security, which enhance general well-being and quality of life. Economic growth alone does not ensure enhanced welfare; the advantages must be equally dispersed to encompass all societal sectors. A nation may possess a high GNP yet still encounter difficulties in providing sufficient healthcare, education, and essential services for all its residents.

Societal Metrics: In contrast to only economic metrics, social indicators offer a more comprehensive perspective on progress by taking into account fundamental human needs and quality of life. Economists Hicks and Streeten identify six essential variables that signify basic needs: ****health, education, food, water supply, sanitation, and housing****. These indicators facilitate the evaluation of a country's efficacy in fulfilling the fundamental needs of its populace. A nation exhibiting substantial economic output while deficient social

indicators may not be realizing significant development, as economic expansion must convert into concrete enhancements in individuals' lives. (Hicks, J. R. ,1937).

To enhance the quantification of social indicators and offer a more thorough assessment of progress, economists have amalgamated many measures into composite indices. A notable breakthrough in this context is the Human Development Index (HDI), established by the United Nations Development Programme (UNDP) in 1990. The Human Development Index (HDI) assesses a nation's comprehensive human advancement by examining three fundamental dimensions:

- Health: The general health, accessibility to healthcare, and average lifespan of a country's population are reflected in its life expectancy at birth.
- Education: Evaluated by metrics like mean years of schooling and anticipated years of schooling, this assesses access to and quality of education.
- Standard of Living: Indicated by Gross National Income (GNI) per capita, adjusted for purchasing power parity (PPP), this metric offers insight into economic affluence and material welfare.

Since its establishment, the Human progress Report, released yearly by the UNDP, has rated nations according to their HDI scores, providing a comprehensive view of progress that transcends just economic metrics. The HDI functions as a standard for policymakers, identifying areas needing enhancement and facilitating international comparisons of developmental advancement. Although conventional economic statistics like GNP and GNP per capita are crucial for evaluating economic success, they inadequately include the comprehensive dimensions of human well-being. By amalgamating welfare metrics with social indicators, composite indices such as the HDI offer a more precise and holistic representation of a nation's genuine growth. (Kumari and Bhanoo, 2022)

Economic development serves as the framework for progress, but genuine advancement occurs when economic growth results in enhanced human well-being. The subsequent schema delineates the hierarchical link between economic progress and human development, emphasizing the reciprocal support and reinforcement between the two.

Hierarchy of Economic development to Human Development

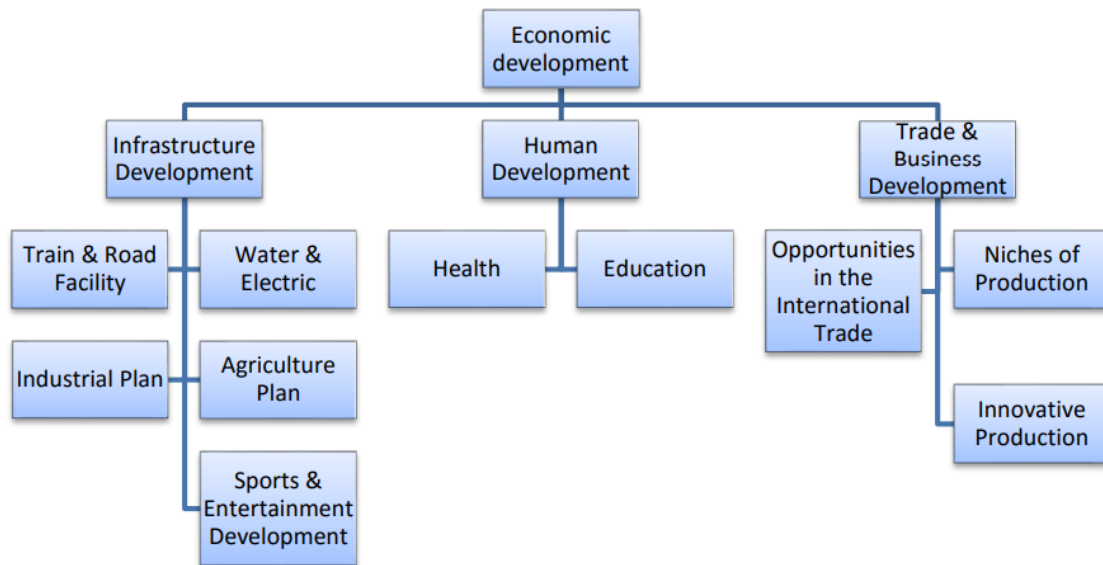


Figure 5 : *Hierarchy of Economic development to Human Development by Aasim Mashkoor*

The economic development hierarchy presented above emphasizes the essential components required for sustained growth. Economic advancement fundamentally starts with infrastructure development, which includes the physical and structural basis of a nation. An essential component of this is guaranteeing access to economical water and power, with a pronounced focus on renewable energy sources. Utilizing solar, wind, and hydropower diminishes reliance on fossil fuels while promoting enduring economic stability through reduced energy expenses, employment creation in green sectors, and the attraction of investments in sustainable businesses. Efficient transportation networks augment industry production and market accessibility. Moreover, strategic planning in agriculture is essential for ensuring food security and economic resilience. Investing in technology developments and innovation-centric sectors enhances industrialization and broadens prospects for economic diversification. The advancement of the sports and entertainment industry is essential in attracting international visitors and producing foreign cash.

In addition to infrastructure, people development is a crucial determinant of economic progress. Enhancing the workforce via education, skill acquisition, and healthcare elevates total production and increases living standards. An educated and healthy populace fosters innovation, entrepreneurship, and social welfare, constituting the foundation of a prosperous economy.

Moreover, promoting international commerce and commercial development is crucial for economic growth. By utilizing smart trade policies and exploiting international market possibilities, a nation might position itself as a commercial hub. Strengthening specialist production areas and fostering new manufacturing processes not only raises exports but also strengthens foreign currency reserves, leading to a more robust and resilient economy. A comprehensive strategy that incorporates infrastructure, human capital, renewable energy, and global commerce guarantees sustained economic development and enduring prosperity.

2.3. The Impact of Foreign Direct Investment in Renewable Energy on Economic Development and Green Growth

Foreign Direct Investment (FDI) has become a crucial catalyst for green growth and economic advancement, especially within the renewable energy industry. Various scholarly research and publications have examined the influence of foreign direct investment (FDI) on renewable energy advancement, highlighting its contribution to technical innovation, capital accessibility, and economic expansion in host nations. This section examines essential scholarly material that substantiates the claim that foreign direct investment in renewable energy acts as a catalyst for sustainable economic growth.

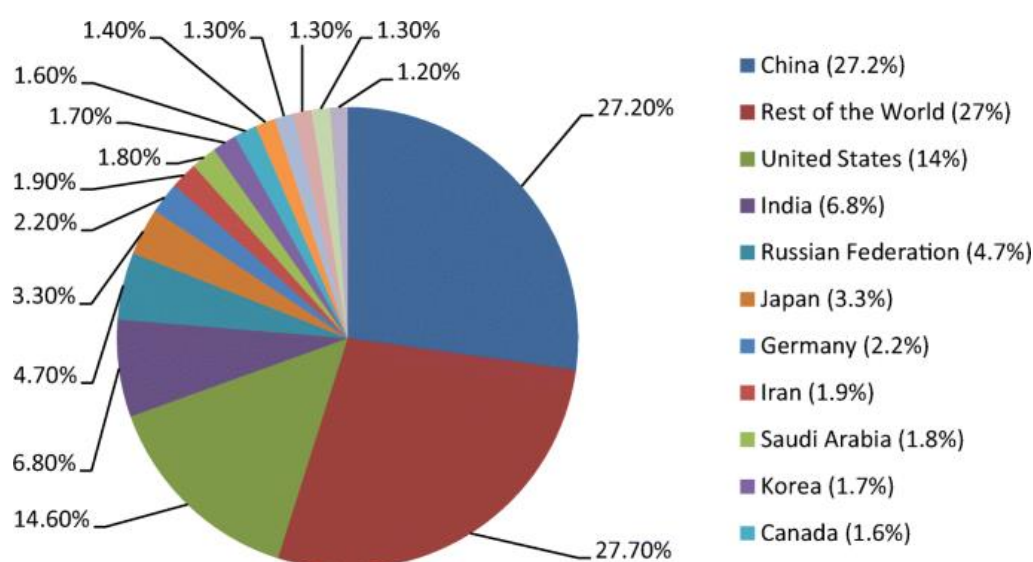


Figure 6: the parts of the world from the FDI in natural resources and renewable energy

Source: (Tan & Uprasen, 2022)

A principal advantage of foreign direct investment in renewable energy is its capacity to fund extensive infrastructure projects that may exceed the financial capabilities of domestic investors. The International Renewable Energy Agency (IRENA, 2020) asserts that the worldwide shift to renewable energy necessitates significant investment, with foreign finance being pivotal in expediting this transformation. Countries like India, Brazil, and Mexico have profited from foreign investments in extensive solar and wind initiatives, allowing them to achieve their renewable energy objectives and diminish dependence on fossil fuels. This conclusion aligns with Zhao et al. (2021), who contend that foreign direct investment (FDI) improves the financial feasibility of renewable energy initiatives by alleviating capital limitations and drawing supplementary contributions from local entities.

Foreign Direct Investment (FDI) facilitates the dissemination of innovative renewable energy technology, enabling host nations to bypass conventional energy networks and migrate straight to cleaner energy alternatives. Kim and Park (2022) conducted a research that emphasizes the contribution of multinational companies (MNCs) in disseminating advanced solar and wind energy technology to developing nations, enhancing efficiency and reducing expenses. Liu et al. (2023) assert that foreign direct investment (FDI) promotes knowledge spillovers by establishing connections between international companies and domestic businesses, resulting in the implementation of optimal practices in energy management and grid integration.

The economic ramifications of foreign direct investment in renewable energy surpass just cash contributions. Research indicates that foreign investments in the renewable energy industry provide job opportunities, invigorate local companies, and enhance government income. A research from the Organisation for Economic Co-operation and Development (OECD, 2021) indicates that foreign direct investment (FDI) in renewable energy projects generates employment in building, manufacturing, and maintenance, while concurrently bolstering local enterprises via supply chain connections. Furthermore, foreign direct investment (FDI) enhances economic diversification by diminishing reliance on fossil fuel sectors, thereby increasing economic resilience to global energy price volatility (UNCTAD, 2020).

Moreover, foreign direct investment bolsters energy security by diminishing dependence on imported fossil fuels and fostering the advancement of decentralized energy systems. Wang et al. (2022) assert that nations attracting substantial foreign direct investment in renewable energy attain enhanced energy independence and stability, as renewable sources like solar and

wind are less susceptible to the price fluctuation characteristic of oil and gas. This is especially significant for emerging economies reliant on energy imports, since it enhances their long-term energy sustainability (World Bank, 2020).

From an ecological standpoint, foreign direct investment in renewable energy is crucial for alleviating climate change and decreasing carbon emissions. The Intergovernmental Panel on Climate Change (IPCC, 2018) emphasizes that a substantial transition to renewable energy is essential for attaining global climate objectives, with foreign investments being pivotal in funding this transformation. Research conducted by Zhang et al. (2023) and Ahmed et al. (2022) demonstrates that foreign direct investment (FDI) facilitates a reduction in carbon emissions by promoting the growth of renewable energy capacity, therefore supplanting high-carbon energy sources like coal and oil.

Recent empirical studies further substantiate the correlation between foreign direct investment, sustainable growth, and economic advancement. Adegbite and Olayemi (2021) demonstrate that foreign direct investment in renewable energy positively influences GDP growth and employment formation in a survey of 30 Sub-Saharan African nations. A research by Habib and Zafar (2022) examining FDI inflows in the MENA area suggests that foreign investments in renewable energy substantially enhance economic development, technical progress, and environmental sustainability.

Notwithstanding its numerous advantages, foreign direct investment in renewable energy encounters obstacles such as regulatory impediments, political volatility, and market uncertainties. The International Monetary Fund (IMF, 2021) asserts that host nations should adopt advantageous policies, including tax incentives and simplified regulatory procedures, to attract and maintain international investments in the renewable energy industry. Moreover, collaboration among governments, private investors, and international organizations is essential for guaranteeing that foreign direct investment (FDI) advances sustainable development goals (SDGs) (United Nations, 2022).

2.4. Critiques of FDI in Renewable Energy: Examining the Challenges to Economic Development

Foreign Direct Investment (FDI) in renewable energy is frequently considered a pivotal catalyst for sustainable growth and economic advancement. Nonetheless, a corpus of scholarly literature contests this viewpoint, asserting that foreign direct investment in renewable energy does not invariably provide the anticipated economic and environmental

advantages. Critics emphasize concerns including economic reliance, environmental compromises, inefficiency in foreign-led initiatives, and the risk of displacing native investments. This section examines significant scholarly publications and books that argue against the proposition that foreign direct investment in renewable energy acts as a driver for sustainable economic growth.

A primary criticism is that foreign direct investment in renewable energy may engender economic reliance instead of promoting self-sustaining prosperity. Numerous studies contend that host nations frequently depend on foreign investors for finance, technology, and experience, hence constraining the advancement of domestic firms. Rodrik (2018) asserts that an overdependence on foreign investment in critical infrastructure projects, such as renewable energy, may result in local enterprises becoming technologically stagnant and incapable of competing on a global scale. Pérez et al. (2021) contend that foreign-led renewable energy initiatives often favor the interests of multinational businesses above the long-term developmental requirements of the host nation.

A further concern linked to foreign direct investment in renewable energy is the potential for market distortion and the displacement of indigenous investments. Research conducted by Gallagher and Zarsky (2019) suggests that foreign investors, frequently availing themselves of governmental incentives like tax concessions and subsidies, may monopolize the renewable energy sector, hence constraining prospects for local entrepreneurs and small-scale investors. The outcome is a skewed market in which indigenous companies find it challenging to compete against global organizations with superior financial and technological assets. In certain instances, local renewable energy companies must depend on subcontracting agreements, constraining their capacity for autonomous development (Sovacool & Andrews, 2020).

Environmental issues also emerge about foreign-led renewable energy initiatives. Although foreign direct investment (FDI) is anticipated to bolster sustainability, several experts contend that foreign investors prioritize profit over authentic environmental advantages. Kinda and Acharya (2022) identify that several large-scale renewable energy projects funded by foreign entities are executed with little regard for local environmental and social consequences. Lema and Lema (2016) further emphasize that technology transfer from foreign investors frequently proves inadequate or ill-suited for local circumstances, resulting in inefficiencies and suboptimal performance of renewable energy initiatives.

A further constraint of foreign direct investment in renewable energy is the volatility and unpredictability linked to foreign capital movements. In contrast to domestic investments, which tend to be more stable and aligned with national development objectives, foreign direct investment (FDI) is acutely responsive to global economic volatility, shifts in investor sentiment, and political concerns. A research by Pineda and Rodríguez (2023) analyzes instances where foreign investors retracted from renewable energy initiatives owing to economic recessions, resulting in host nations being left with unfinished or deserted infrastructure. This problem is especially evident in emerging countries, where policy uncertainty and insufficient investor trust may result in abrupt capital flight (Wei & Zhang, 2021).

Moreover, several experts contest the assertion that foreign direct investment in renewable energy genuinely fosters long-term economic development. A study by Hansen and Lema (2019) argues that while foreign investment may create short-term employment during the construction phase of renewable energy projects, long-term job creation is often minimal due to the capital-intensive nature of the sector. Unlike traditional industries, renewable energy projects require limited operational labor, meaning that their overall contribution to employment and economic diversification is lower than expected.

Critics also emphasize governance issues related to foreign direct investment in renewable energy. In many cases, host countries offer extensive incentives to attract foreign investors, such as tax exemptions and preferential land access, which can lead to economic inefficiencies and revenue losses for the government (Shen & Power, 2022). Additionally, some studies argue that foreign investors exert significant influence over energy policy decisions, often shaping regulations in ways that benefit their interests rather than those of the host country (Newell & Phillips, 2021).

Empirical research further supports these concerns. For example, a comparative study by Ghosh and Chatterjee (2022) examining FDI inflows in renewable energy across multiple regions found that foreign investment did not always translate into higher economic growth or improved energy access for local populations. Similarly, a study by López et al. (2023) analyzing renewable energy projects in Latin America concluded that while FDI increased installed renewable capacity, it failed to generate meaningful economic spillovers or contribute significantly to local technological innovation.

Overall, these critical perspectives emphasize that FDI in renewable energy is not always a straightforward catalyst for green growth and economic development. Instead, the benefits of foreign investment depend on factors such as local capacity-building, regulatory frameworks, and the extent to which host countries can negotiate favorable terms with foreign investors. Without strong governance mechanisms and strategic policies, FDI in renewable energy may lead to dependency, market distortions, and limited economic benefits for host economies.

2.5. Comparative Perspectives on FDI in Renewable Energy: Setting the Stage for Case Studies

The current research offers a multifaceted and frequently inconsistent perspective on the influence of Foreign Direct Investment (FDI) on renewable energy on economic development. Numerous studies contend that foreign direct investment (FDI) acts as a catalyst for green growth by supplying vital financial resources, fostering technical innovation, and generating job possibilities. Advocates assert that foreign investments expedite the shift to renewable energy, bolster energy security, and promote long-term economic stability by diminishing reliance on fossil fuels. Empirical research indicates that nations drawing substantial foreign direct investment in renewable energy benefit from enhanced infrastructure, augmented local capacity, and integration into global value chains.

Nonetheless, a significant corpus of evidence contradicts this positive story. Academics contend that although foreign direct investment (FDI) facilitates the growth of renewable energy, its economic advantages are frequently exaggerated or inequitably allocated. Concerns regarding economic reliance, market distortions, environmental trade-offs, and profit repatriation indicate that foreign-led renewable energy initiatives may not consistently result in enduring economic success for host nations. The instability of foreign capital, the potential for local investment displacement, and governance issues further hinder the efficacy of foreign direct investment in promoting sustainable economic growth. Additionally, some studies highlight that while FDI creates short-term employment during the construction phase of projects, the long-term job creation potential is often limited due to the capital-intensive nature of the renewable energy sector.

This disparity in academic viewpoints prompts a critical inquiry: Does foreign direct investment in renewable energy truly enhance economic growth, or does it predominantly advantage foreign investors, resulting in few long-term benefits for host nations? The answer to this question remains contested, as the outcomes of FDI in renewable energy appear to be

highly context-dependent, influenced by factors such as domestic policy frameworks, regulatory conditions, and the capacity of local industries to absorb and benefit from foreign investments. This discussion highlights the necessity for a sophisticated evaluation of FDI's involvement in renewable energy, taking into account both its potential benefits and its intrinsic constraints.

This study will conduct a comparative examination of two case studies: one nation that has successfully attracted foreign direct investment in renewable energy and another that has predominantly built its renewable industry through local investment. This comparison will examine key economic indicators, technological advancements, energy security, and policy frameworks to assess whether FDI serves as a true catalyst for economic development. This research seeks to offer empirical insights into the circumstances in which foreign direct investment in renewable energy fosters sustainable economic growth and when it may result in unexpected effects, via the analysis of real-world cases. The findings will help determine whether foreign investment is a necessary component of renewable energy expansion or whether alternative models of development can achieve similar or better outcomes.

CHAPTER THREE: ANALYZE OF FOREIGN DIRECT INVESTMENT IN RENEWABLE ENERGY

3.1. The Role of Foreign Direct Investment in Advancing Renewable Energy Development and Sustainability:

Foreign direct investment (FDI) is crucial in expediting the worldwide shift to renewable energy. As nations strive to diminish carbon emissions and augment the proportion of renewables in their energy portfolio, foreign direct investment has emerged as a vital facilitator of this transition. It supplies the financial resources required for extensive infrastructure initiatives, enables the transfer of sophisticated technology and knowledge,

promotes economic development, and enhances energy security and environmental sustainability.

A major problem in expanding renewable energy systems is obtaining adequate financing. Establishing renewable energy infrastructure, including wind farms, solar power plants, and hydroelectric facilities, necessitates substantial initial expenditures, frequently amounting to billions of dollars. Numerous nations, particularly in the developing world, contend with insufficient domestic money to finance large-scale initiatives. Foreign Direct Investment addresses this funding deficit, facilitating the development of critical infrastructure. In nations such as India and Brazil, foreign investments have been essential in facilitating the establishment of extensive solar power facilities and wind farms. Foreign investors financed the establishment of solar parks in India under the National Solar Mission, positioning the country as one of the foremost solar power producers worldwide (IRENA, 2020). In Latin America, foreign investors have significantly accelerated the growth of wind energy initiatives in nations such as Mexico, which depends on foreign direct investment to achieve government-mandated renewable energy objectives (OECD, 2021).

Foreign Direct Investment (FDI) enhances the long-term viability of renewable energy initiatives by facilitating investments in enhancements and growth. This is especially crucial as renewable energy technology advances, necessitating consistent investment to uphold efficiency and capacity.

Foreign Direct Investment is crucial for the transmission of advanced technology to host nations, especially within the renewable energy industry. Foreign investors frequently provide sophisticated technology in energy generation, storage, and grid integration that may be unavailable domestically. These technologies augment the efficiency and dependability of renewable energy while facilitating the integration of renewables into current energy infrastructures. Foreign Direct Investment (FDI) has facilitated the implementation of modern energy storage solutions, including cutting-edge battery technology and grid management systems, essential for mitigating the intermittent characteristics of renewable energy sources such as wind and solar. Corporations like of Tesla and Siemens Gamesa, which function across several nations, have facilitated the advancement of energy storage systems in partnership with local entities. These collaborations enable host nations to augment the capacity of their renewable energy systems to store surplus electricity and stabilize the grid.

Furthermore, foreign direct investment promotes capacity enhancement via skills transfer and

employee training. Through collaboration with local enterprises, international businesses contribute to the development of the human capital essential for the operation, maintenance, and enhancement of renewable energy infrastructure. Large multinational energy corporations, including Ørsted and Vestas, have invested in training initiatives for local technicians and engineers in Denmark, South Korea, and the United States, thereby fostering a proficient workforce to support the renewable energy sector (UNCTAD, 2020).

Foreign Direct Investment significantly influences economic growth, particularly in nations that are extensively investing in renewable energy. Extensive renewable energy initiatives create direct employment opportunities in the building, operation, and maintenance of energy plants. These initiatives also promote employment creation in associated areas including manufacturing, supply chain logistics, and research and development. In the United States, foreign direct investment in solar and wind energy has generated thousands of employment opportunities in production, construction, and maintenance (World Bank, 2020). The U.S. solar sector employs over 250,000 individuals, a significant number of whom participate in the building and installation of solar panels in projects financed by international investors. Furthermore, foreign direct investment in renewable energy frequently catalyzes innovation within the local economy, as enterprises in supply chains embrace novel technology and methodologies brought by foreign investors.

The Influx of foreign money yields further economic advantages. Foreign Direct Investment enhances government revenues via taxation, which may be reinvested into many sectors of the economy, including education and infrastructure development. Moreover, local enterprises gain from foreign investments through access to international markets, technology, and money, enhancing productivity and competitiveness.

Energy security is a significant advantage that foreign direct investment (FDI) contributes to renewable energy initiatives. Numerous nations, especially those significantly dependent on fossil fuel imports, exhibit susceptibility to price volatility and supply interruptions. By diversifying energy sources via investments in renewables, nations may diminish their reliance on imported fossil fuels and enhance their energy security. In nations such as Morocco and South Africa, foreign direct investment in solar and wind energy has diminished dependence on coal and imported oil, therefore mitigating susceptibility to global price fluctuations (OECD, 2021). The Noor Ouarzazate solar complex in Morocco, among the largest globally, is financed by a blend of local and international investments, positioning the

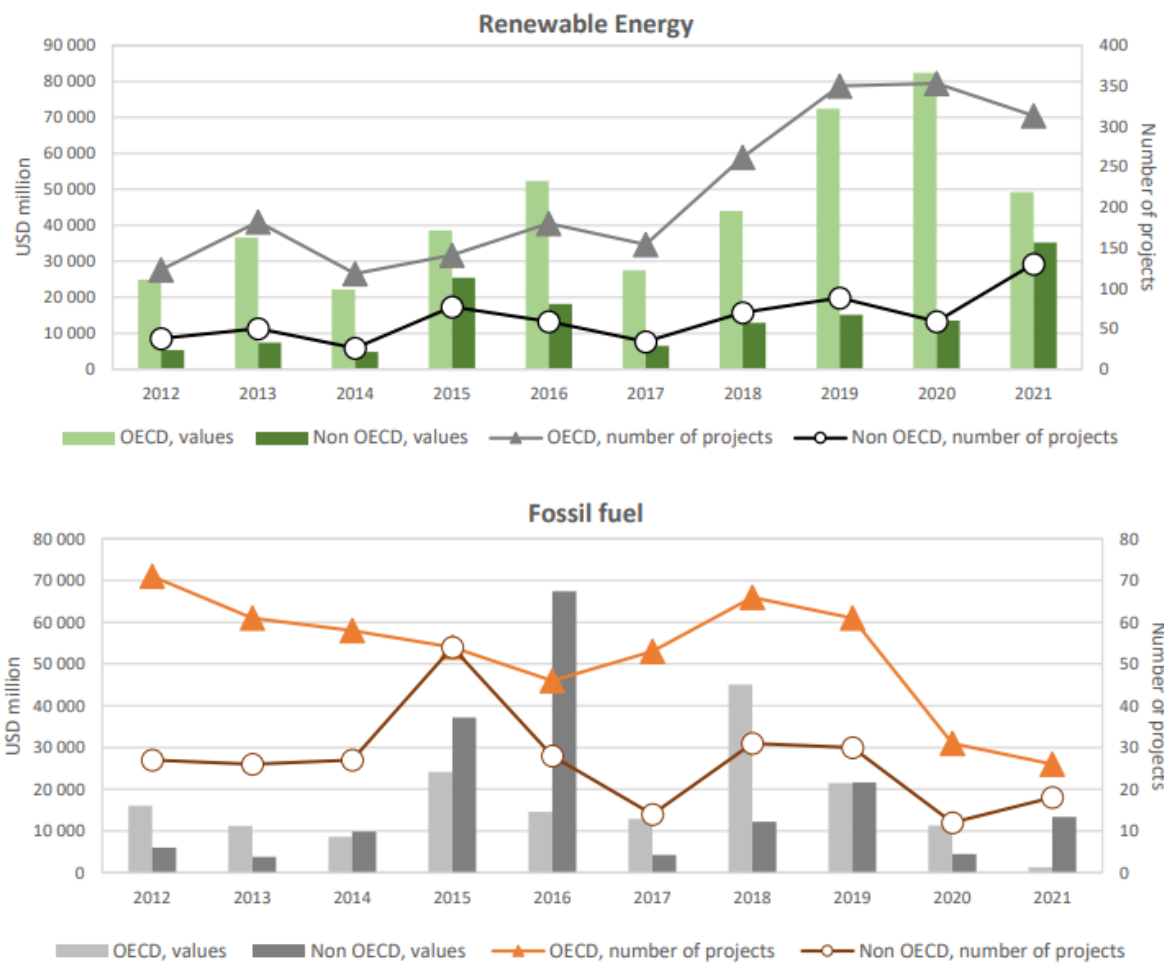
nation as a regional leader in renewable energy generation.

Furthermore, renewable energy initiatives funded by foreign direct investment enhance the resilience of energy systems through the decentralization of energy production. Diverse energy sources such as solar, wind, and hydroelectricity enable countries to better endure supply outages resulting from natural catastrophes, geopolitical conflicts, or market volatility. From an environmental standpoint, foreign direct investment (FDI) facilitates the shift to a low-carbon economy by promoting the establishment of renewable energy infrastructure that directly mitigates greenhouse gas emissions. The transition from fossil fuels to renewable energy is crucial for fulfilling international climate accords, including the Paris Agreement, and attaining net-zero emissions by 2050. Foreign Direct Investment (FDI) facilitates the decarbonization of the energy sector by funding initiatives that substitute coal, oil, and natural gas facilities with renewable energy options. The establishment of wind and solar energy farms, together with investment in energy storage technology, is essential for diminishing carbon emissions and alleviating climate change. In China, foreign investments have facilitated the development of one of the world's greatest solar energy capacity, positioning it as a significant contributor to the global initiative to mitigate emissions (IPCC, 2018).

Moreover, foreign direct investment (FDI) assists host nations in fulfilling their Nationally Determined Contributions (NDCs) as stipulated by the Paris Agreement. By augmenting renewable energy capability, nations may diminish their carbon footprint while concurrently promoting sustainable economic development. This convergence of environmental and economic objectives highlights the enduring advantages of foreign direct investment in renewable energy.

3.2. Trends in FDI related to renewable energy:

Figure 7 : Trends in greenfield investment



source: OECD – Trends, investor types and drivers of renewable energy FDI

The effects of foreign direct investment on the renewable energy market are the primary topic of this research. New investments in this area are becoming increasingly important, and we emphasize this to help you grasp these implications. There has been a steady increase in both the amount of new projects and the amount of capital expenditures announced since 2012, and in most years, this trend has outpaced the activity of new projects in the fossil fuel industry (Figure 4). Renewable energy project investments in OECD countries reached an all-time high of \$82 billion in 2020, making up 21% of all newly announced investments in these nations during the previous five years.

Total announced capital expenditures for renewable energy stayed strong in 2021, reaching \$49 billion, despite the uncertainty posed by the epidemic and its influence on investor confidence. The amount of projects also increased from 154 in 2017 to 313 in 2018, an almost fourfold increase. The general trend remains encouraging, even though certain non-OECD nations have seen less dramatic growth in new renewable energy projects. After averaging just 5% from 2012 to 2020, renewable energy investments made up 27% of all newly announced

investments in these economies in 2021.

However, new project activity in the fossil fuel industry has been on the wane in recent years. However, this trend might be changed by escalating energy supply issues caused by the Russia-Ukraine war. There was very little change in the number of fossil fuel projects from 2012 and 2021. Meanwhile, stated capital expenditures have been on the decline, falling in OECD nations since 2018 and in several non-OECD economies since 2016. In OECD nations, fossil fuel investments made up less than 1% of all newly announced spending by 2021, whereas in certain non-OECD economies, they made up as much as 10%. (OCED)

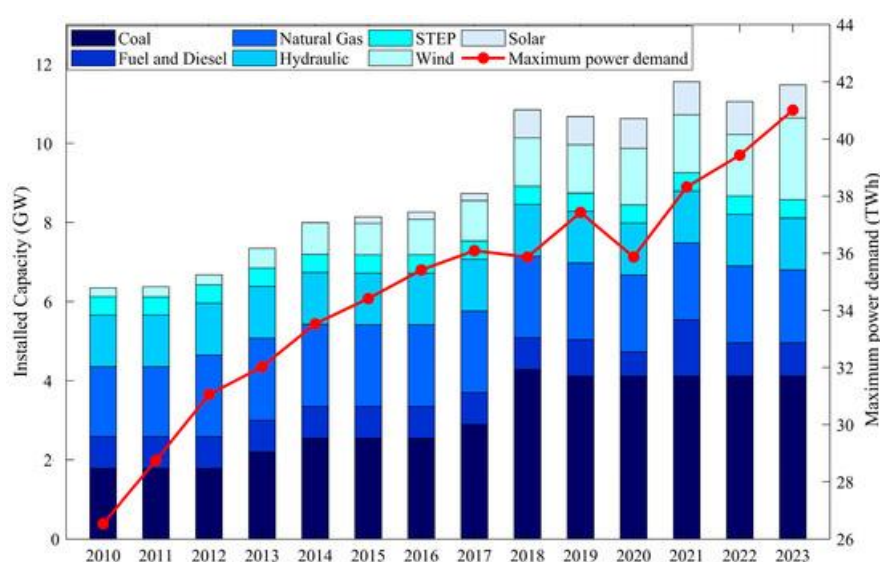
CHAPTER FOUR: Case studies (MOROCCO – NIGERIA)

4.1. Case Study 1: Morocco – A Successful Example of FDI in Renewable Energy

4.1.1. Overview of Morocco's Energy Sector and its Transition Towards Renewables

Over the past two decades, Morocco has experienced a substantial transition in its energy industry, establishing itself as a pioneer in renewable energy production in Africa and the Middle East. Historically reliant on energy imports, Morocco has strategically invested in indigenous renewable energy sources to bolster its energy security. The nation's geographical benefits, such as elevated solar irradiation and robust wind resources, have enabled this shift (El-Katiri, 2020).

Figure 8 : Installed capacity by energy source in MW and maximum power demand in MW (2010–2023) in Morocco



Source : <http://www.one.org.ma>

The energy transformation in Morocco is propelled by a confluence of economic, environmental, and strategic considerations. Historically dependent on imports for over 90% of its energy supply, the government acknowledged the imperative to diminish this reliance and alleviate energy price fluctuations. Moreover, Morocco's dedication to international climate accords, such as the Paris Agreement, has intensified the imperative to decarbonize its energy portfolio (Ben Ali & Kousksou, 2019). The nation seeks to establish itself as a regional energy center, exporting renewable power to Europe through interconnections with Spain and other European nations (IEA, 2022).

The shift of Morocco to renewable energy has been supported by significant governmental and private expenditures. The government has established a conducive climate that promotes innovation and technology transfer in the renewable energy sector. Numerous extensive initiatives, such as the Noor Ouarzazate Solar Complex and the Tarfaya Wind Farm, illustrate Morocco's dedication to attaining a renewable-dominated energy mix (Masen, 2021). These projects enhance sustainability, generate employment opportunities, and stimulate economic growth.

4.1.2. Government Policies and Regulatory Frameworks Facilitating Foreign Direct Investment in Renewable Energy

Morocco has established a comprehensive policy framework to entice Foreign Direct Investment (FDI) in the renewable energy industry. The government founded the Moroccan Agency for Sustainable Energy (MASEN) to manage renewable energy initiatives and promote public-private partnerships (PPP). The nation's energy policy is directed by the National Energy Strategy of 2009, which seeks to augment the proportion of renewable energy in the national power composition (World Bank, 2021).

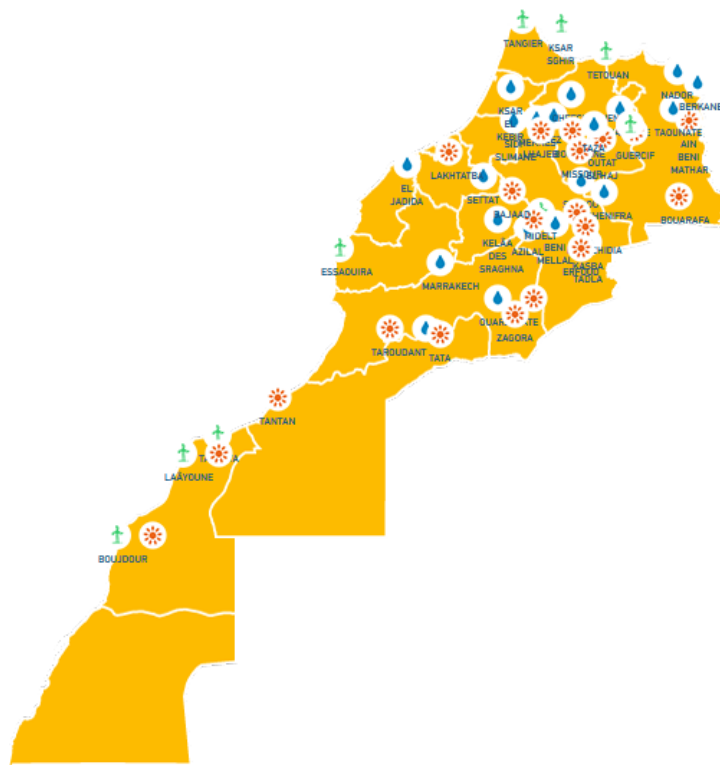
Principal regulatory incentives for foreign direct investment (FDI) are tax breaks, tariff incentives, and a legal framework for independent power producers (IPPs) to sell energy directly to customers. The enactment of Law 13-09 on renewable energy further liberalized the market by facilitating private investment and competition in power generation (Reegle, 2020). The government has collaborated with foreign institutions, like the European Union and the World Bank, to get financial and technical support for extensive projects (IEA, 2022).

Morocco has fortified its institutional and regulatory framework to augment the appeal of its renewable energy sector. The National Authority for power Regulation (ANRE) guarantees openness and stability in the power market, which is crucial for investors. Morocco has entered into many bilateral and multilateral agreements to promote cross-border power commerce, especially with European nations aiming to import renewable energy (REN21, 2022).

The Moroccan government has instituted finance structures, like the Energy Development Fund, to bolster renewable energy efforts. These initiatives correspond with the overarching national objective of sustainable development and economic diversification. Public-private partnerships are essential for accomplishing these targets, since they combine the skills and resources of both sectors to expedite renewable energy implementation (World Bank, 2021).

4.1.3. Geographical Distribution of Renewable Energy Resources and Projects in Morocco

Figure 9 : Geographical Distribution of Renewable Energy Resources and Projects in Morocco



Source : <https://www.masen.ma/en/projects>

Morocco's diverse geography provides an ideal landscape for the development of renewable energy projects, with solar, wind, and hydroelectric power spread across different regions. The country's strategic investment in renewable energy infrastructure aligns with its ambitious goal of achieving 52% of electricity generation from renewables by 2030.

As illustrated in Figure 5 renewable energy projects in Morocco are distributed based on regional resource availability:

1. Solar Energy: Morocco benefits from high solar irradiation, particularly in the southern and central regions. Large-scale solar power plants, such as the Noor Ouarzazate Solar Complex, are located in areas with abundant sunlight, including

Ouarzazate, Midelt, and Zagora. Additional solar farms are developed in Laayoune, Boujdour, and Tata, further enhancing Morocco's photovoltaic (PV) and concentrated solar power (CSP) capacity.

2. Wind Energy: The coastal and mountainous regions of Morocco experience strong and consistent winds, making them ideal locations for wind farms. The Tarfaya and Boujdour wind farms in the south, as well as the Tangier and Tétouan wind farms in the north, take advantage of the high wind potential. Other significant wind energy projects are located in Essaouira, Tantan, and Ksar Sghir.
3. Hydropower: Morocco has a well-developed network of hydroelectric plants, primarily situated in the northern and central regions where rivers and reservoirs provide a consistent water supply. Major hydroelectric facilities include those in Bin El Ouidane, Al Wahda, and Afourer, with additional projects in Beni Mellal and Oued El Makhazine. These hydro plants contribute to balancing energy supply, particularly during peak demand periods.

The geographical distribution of these projects highlights Morocco's integrated approach to renewable energy development, leveraging its natural resources to create a diversified and sustainable energy mix. By strategically positioning these projects, Morocco not only reduces its dependence on fossil fuel imports but also enhances its potential as a regional leader in renewable energy production and export.

4.1.4. Principal Renewable Energy Objectives and Accomplishments

Morocco aims to generate 52% of its electricity from renewable sources by 2030, comprising 20% from solar, 20% from wind, and 12% from hydropower. This ambition corresponds with the nation's overarching sustainable development goals and is bolstered by prominent initiatives like the Noor Ouarzazate Solar Complex, one of the largest concentrated solar power facilities globally (Masen, 2021).

As of 2023, Morocco has achieved considerable advancements in its renewable energy objectives. Wind and solar energy initiatives have proliferated, with operational capacity surpassing 4 GW. The Noor Midelt project, a hybrid solar power facility integrating photovoltaic and concentrated solar power technologies, is anticipated to augment the nation's renewable energy output (REN21, 2022). Additionally, Morocco is investing in green hydrogen as a prospective energy source, utilizing its renewable energy potential to generate and export hydrogen to global markets (IEA, 2022).

Morocco's long-term ambition, extending beyond 2030, aims for carbon neutrality by 2050, as specified in its Nationally Determined Contributions (NDCs) under the Paris Agreement. The government is investigating sophisticated energy storage systems and intelligent grid technology to incorporate a greater proportion of renewables into the national power network. The transition to a low-carbon economy is anticipated to produce environmental advantages while enhancing Morocco's energy autonomy and industrial competitiveness (Ben Ali & Kousksou, 2019).

Morocco's achievement in attracting foreign direct investment and advancing extensive renewable initiatives has established it as a paradigm for other developing countries aiming to shift towards sustainable energy. Ongoing governmental support, with technical progress and global collaboration, will be essential for attaining long-term energy sustainability goals.

4.1.5. Foreign Direct Investment Trends in Morocco's Renewable Energy Sector

Foreign Direct Investment (FDI) has been essential in the growth of Morocco's renewable energy sector. The nation has garnered substantial foreign investments owing to its robust legal system, stable political climate, and ambitious renewable energy objectives. Morocco's pledge to derive 52% of its power from renewable sources by 2030 has established it as an attractive locale for investors pursuing sustainable energy options.

Significant International Investments in Moroccan Renewable Energy Initiatives

Noor Ouarzazate Solar Facility The Noor Ouarzazate Solar Complex, among the largest solar farms globally, serves as a premier initiative in Morocco's renewable energy transition. The complex, established through a public-private collaboration, has a total capacity of 580 MW and comprises many phases utilizing both concentrated solar power (CSP) and photovoltaic (PV) technology. This initiative has garnered significant international funding from entities such as the World Bank (\$400 million), the African Development Bank (\$265 million), and the European Investment Bank (\$200 million) (World Bank, 2021). Noor Ouarzazate's achievement has established a benchmark for substantial solar investments in Africa and has bolstered Morocco's international prominence in solar energy.

Wind Energy Initiatives Morocco has obtained significant international investments in wind energy, capitalizing on its robust wind resources along the Atlantic coastline. The Tarfaya Wind Farm, the biggest wind generating plant in Africa, with a capacity of 301 MW. The Tarfaya project, a collaboration between France's Engie (50%) and Morocco's Nareva Holding (50%), marks a pivotal advancement in Morocco's shift towards renewable energy.

The project's overall investment is projected to be €450 million (Engie, 2022). Significant wind energy initiatives encompass the Akhfenir, Tangier, and Boujdour wind farms, which have secured financial support from the European Union (€130 million), the European Bank for Reconstruction and Development (€100 million), and various foreign investors (IEA, 2022).

Green Hydrogen and Novel Investments Besides solar and wind energy, Morocco is establishing itself as a significant participant in the green hydrogen market. With robust support from foreign investors, the nation has formalized agreements with Germany, the Netherlands, and the European Union to establish extensive hydrogen manufacturing plants. The Germany-Morocco Hydrogen Partnership, initiated in 2020, entails a preliminary investment of €300 million to position Morocco as a regional center for green hydrogen exports (BMZ, 2023).

The participation of international financial institutions and major energy corporations highlights Morocco's achievement in cultivating a favorable business climate. Morocco intends to enhance foreign direct investment in developing technologies, including green hydrogen and energy storage solutions, therefore solidifying its status as a regional leader in renewable energy.

4.1.6. Principal Investors in Morocco's Renewable Energy Sector

The renewable energy sector in Morocco has garnered substantial investments from many parties, including foreign governments, international enterprises, and public-private partnerships (PPPs). These investors have been instrumental in funding, developing, and augmenting Morocco's renewable energy capacity, in accordance with the nation's ambitious objective of producing 52% of its power from renewable sources by 2030. The surge of foreign direct investment (FDI) has been enabled by Morocco's advantageous regulatory environment, political stability, and geopolitical position as a link between Europe and Africa.

1. Country-Level Investments

Numerous nations have facilitated Morocco's renewable energy advancement via direct investments, financial assistance, and technology transfer.

Germany: As a prominent investor in Morocco's renewable industry, Germany has allocated significant funds for green hydrogen projects and solar energy efforts. The Germany-Morocco

Hydrogen Partnership, initiated in 2020, encompasses a preliminary investment of €300 million to enhance Morocco's green hydrogen capabilities (BMZ, 2023). German development banks, especially KfW, have supported significant solar initiatives, such as the Noor Ouarzazate Solar Complex.

France has played a pivotal role in funding and advancing wind and solar energy initiatives in Morocco. The French energy conglomerate Engie is a significant contributor to Morocco's wind energy industry, particularly at the Tarfaya Wind Farm, the largest wind power installation in Africa, boasting a capacity of 301 MW. The French Development Agency (AFD) has provided millions of euros in financing to facilitate Morocco's transition to renewable energy (AFD, 2022).

Spain is heavily engaged in Morocco's renewable energy sector, namely in cross-border energy commerce and wind power advancement. Spanish firms, including Siemens Gamesa, produce and provide wind turbines for Moroccan wind farms, notably the Tangier and Akhfenir projects (IEA, 2022).

The United Arab Emirates (UAE), via its renewable energy firm Masdar, has invested in several solar and wind initiatives in Morocco. Masdar has co-financed many renewable energy projects, enhancing bilateral energy collaboration between Morocco and the UAE (Masdar, 2023).

China has become a significant investor in Morocco's solar energy sector. Chinese companies have participated in the development of Noor III, a concentrated solar power (CSP) facility inside the Noor Ouarzazate complex, and have supplied photovoltaic (PV) technology to augment Morocco's solar energy infrastructure (World Bank, 2021).

2. Transnational Corporations and Private Investors

Prominent global firms have invested in Morocco's renewable energy industry, frequently in partnership with local government and financial institutions.

Engie (France): A significant investor in Morocco's wind energy initiatives, Engie has collaborated with the Moroccan government to establish wind farms, such as Tarfaya and Akhfenir, enhancing Morocco's total installed wind capacity to exceed 1,500 MW (Engie, 2022).

ACWA Power (Saudi Arabia): A principal investor in Morocco's solar industry, ACWA Power has significantly contributed to the construction of the Noor Ouarzazate Solar Complex, with total investments surpassing \$2.5 billion (ACWA Power, 2022).

TotalEnergies (France) has extended its involvement in Morocco's renewable energy sector, concentrating on solar and hydrogen initiatives designed to mitigate carbon emissions and bolster energy security (TotalEnergies, 2023).

Siemens Gamesa (Germany/Spain): Siemens Gamesa has been a significant provider of wind turbine technology for Morocco's wind farms, bolstering Morocco's dedication to the spread of wind energy (IEA, 2022).

Masdar (UAE): Besides direct investments at the national level, Masdar has undertaken autonomous renewable energy initiatives in Morocco, specifically in solar power generation (Masdar, 2023).

3. Public-Private Collaborations (PPCs)

Public-private partnerships (PPPs) have been essential in Morocco's renewable energy development, enabling collaboration between government agencies, international financial institutions, and private investors.

The Moroccan Agency for Sustainable Energy (MASEN) is the principal governmental entity tasked with the coordination of renewable energy initiatives in Morocco. It has enabled significant public-private partnerships, notably in the Noor Solar Complex, by obtaining financing from entities such as the World Bank, the European Investment Bank (EIB), and the African Development Bank (AfDB) (World Bank, 2021).

The Noor Ouarzazate project was established under a build-own-operate-transfer (BOOT) model, with ACWA Power and MASEN as the principal partners. This initiative secured funding from global organizations, comprising the Climate Investment Funds (\$435 million) and the Clean Technology Fund (\$100 million) (AfDB, 2022).

The Moroccan government has partnered with Engie, Siemens Gamesa, and the European Bank for Reconstruction and Development (EBRD) to finance and advance wind energy initiatives throughout Morocco (EBRD, 2023).

Green Hydrogen and Emerging Technologies: Morocco has engaged in several public-private partnerships to establish green hydrogen infrastructure. The European Union, Germany, and private sector entities like TotalEnergies and ACWA Power are collaborating on extensive hydrogen production initiatives to position Morocco as a significant participant in the global green hydrogen market (IEA, 2023).

4.1.7. The Function of International Financial Institutions in Morocco's Renewable Energy Sector

International financial institutions (IFIs) have substantially aided Morocco's transition to renewable energy via financial assistance, technical support, and policy direction. Entities such as the World Bank, International Monetary Fund (IMF), European Union (EU), and African Development Bank (AfDB) have mobilized funding and enabled extensive renewable energy initiatives.

1. World Bank and Climate Investment Funds

The World Bank allocated \$400 million to the Noor Ouarzazate Solar Complex, one of the largest concentrated solar power (CSP) facilities globally (World Bank, 2021). Moreover, Morocco obtained \$100 million from the Clean Technology Fund (CTF) to support solar and wind initiatives (CTF, 2022). The World Bank has furthermore endorsed policy measures to entice international investments in renewable energy.

2. International Monetary Fund and Economic Stability

The IMF has indirectly facilitated Morocco's renewable energy development by offering financial aid and promoting energy subsidy changes to reallocate funding towards renewables. It has also provided guidance on climate policy to entice sustainable investments (IMF, 2022).

3. European Union and Renewable Energy Collaborations

The European Union, via the European Investment Bank (EIB), has allocated in excess of €200 million for solar and wind initiatives (EIB, 2023). The EU has collaborated with Morocco to advance green hydrogen, hence reinforcing energy relations between Morocco and Europe (EU Commission, 2023).

4. Investments by the African Development Bank (AfDB)

The African Development Bank has allocated more than \$265 million in loans for Morocco's renewable energy initiatives, encompassing solar and wind projects (AfDB, 2022). It has furthermore endorsed regulatory enhancements and energy efficiency initiatives in accordance with Sustainable Development Goals (SDGs).

5. Additional Principal Financial Institutions

The European Bank for Reconstruction and Development (EBRD) invested €100 million in wind and solar projects in Morocco (EBRD, 2023).

The Green Climate Fund (GCF) has a "local" financial assistance for enhancing climate resilience and developing renewable energy capability.

Islamic Development Bank (IsDB): Funded rural solar initiatives.

4.1.8. Impact on Green Growth and Economic Development

Foreign Direct Investment (FDI) in renewable energy is revolutionizing Morocco's economy by fostering green growth and economic advancement. The renewable energy industry, including solar, wind, and hydropower, is crucial in fostering economic growth, generating employment, and advancing technology, while simultaneously promoting environmental sustainability. Moreover, it is essential for enhancing critical microeconomic statistics, such as the Human Development Index (HDI) and GDP per capita, illustrating the extensive economic influence on the well-being of Moroccan inhabitants.

Environmental Benefits

The shift to renewable energy in Morocco is fundamental to its environmental policies and is essential in decreasing carbon emissions. In its dedication to climate change mitigation, Morocco intends to derive 52% of its power from renewable sources by 2030, therefore substantially reducing greenhouse gas emissions and enhancing energy security. Renewable energy diminishes Morocco's dependency on fossil fuel imports, promoting energy autonomy and shielding the economy from global price volatility (IRENA, 2021).

As reported by IRENA, Morocco's renewable energy capacity is seeing fast growth, mostly driven by solar energy initiatives such as the Noor Ouarzazate Solar Complex, one of the largest solar facilities globally. The nation has boosted its wind energy capacity, which, in conjunction with hydropower, is essential for diminishing the national carbon footprint. These advancements enhance the sustainability of Morocco's economy and establish the nation as a regional frontrunner in renewable energy (IRENA, 2021).

Economic Benefits

The renewable energy industry in Morocco is a vital component of the nation's comprehensive economic growth plan, notably enhancing GDP growth, employment generation, industrial advancement, and technology transfer.

a) Contribution to Gross Domestic Product

The economic influence of the renewable energy sector on Morocco's economy is complex. The overall revenue from renewable energy production is predicted at 420 million USD in 2021, derived from a generation of 3,500 GWh. This revenue is essential for augmenting national income and promoting GDP growth (World Bank, 2020).

Renewable energy contributes around 0.991% to Morocco's GDP, amounting to 1.43 billion USD. This contribution includes energy production as well as other sectors, like manufacturing, construction, and services, which are invigorated by investments in renewable energy infrastructure.

b) Microeconomic Indicators and Impacts on Human Development

The renewable energy industry enhances microeconomic metrics, like the Human Development Index (HDI), GDP per capita, and poverty alleviation, alongside macroeconomic development.

The Human Development Index (HDI) of Morocco has consistently enhanced in recent years, indicating advancements in health, education, and income. As reported by the United Nations Development Programme (UNDP), Morocco's Human Development Index (HDI) score in 2020 was 0.686, positioning it 121st worldwide, indicative of significant advancements in improving the quality of life for its populace. Renewable energy initiatives, particularly in rural regions, provide enhanced power availability, hence enhancing quality of life and potentially elevating Morocco's Human Development Index by expanding access to healthcare, education, and economic possibilities (UNDP, 2020).

The renewable energy industry enhances GDP per capita, a crucial metric of economic progress. In 2023, Morocco's GDP per capita is projected to reach around 3,100 USD. Although this is smaller than in many advanced nations, investments in renewable energy, including substantial solar and wind initiatives, are anticipated to foster consistent economic growth, enhancing national and per capita income in the next years (World Bank, 2023).

The renewable energy sector contributes to poverty alleviation by generating employment and enhancing energy access in marginalized regions. This access allows communities to participate in economic activities such as agriculture, manufacturing, and services, hence aiding in comprehensive poverty alleviation initiatives. Rural regions, characterized by elevated poverty rates, have gained from the implementation of solar panels and wind farms, supplying power to residences, educational institutions, and enterprises that previously lacked access.

c) Job Creation and Industrial Development

The renewable energy sector has been a major contributor to employment in Morocco. Approximately 40,000 positions have been established across diverse sectors of renewable energy, encompassing construction, operation, and maintenance (ILO, 2018). These positions provide excellent salaries, with the average annual salary for employees in the industry around 4,000 USD, significantly augmenting household earnings in Morocco.

Moreover, renewable energy initiatives are fostering industry advancement, especially within the solar panel and wind turbine production sectors. The manufacture of solar panels and the building of wind turbines in Morocco are essential for bolstering local companies and facilitating regional export endeavors. These businesses generate employment and foster economic diversification, which is crucial for diminishing the nation's dependence on conventional sectors such as mining and agriculture (ILO, 2018).

d) Technology Transfer and Innovation

The transfer of technology from foreign investors is a substantial advantage of foreign direct investment in renewable energy. International partners strengthen local skills and stimulate innovation through advanced technology, experience, and management techniques. The projected benefit of this technology transfer is 150 million USD, indicating the improved productivity and competitiveness of local enterprises in the renewable energy industry.

Morocco's solar energy sector particularly advantages from sophisticated solar photovoltaic (PV) technologies, but its wind energy sector benefits from state-of-the-art turbine technology. Over time, local enterprises' capacity to assimilate and implement these new technologies has fostered indigenous innovation and enhanced industrial capability (UNCTAD, 2020).

e) Indirect Economic Effects (Multiplier Effect)

The renewable energy sector generates indirect economic advantages via the multiplier effect. The establishment and upkeep of renewable energy initiatives generate heightened demand for resources, transportation services, and skilled labor, hence benefiting industries such as construction, transportation, and professional services. The projected indirect effect on Morocco's GDP from these multiplier effects is almost 500 million USD (World Bank, 2023).

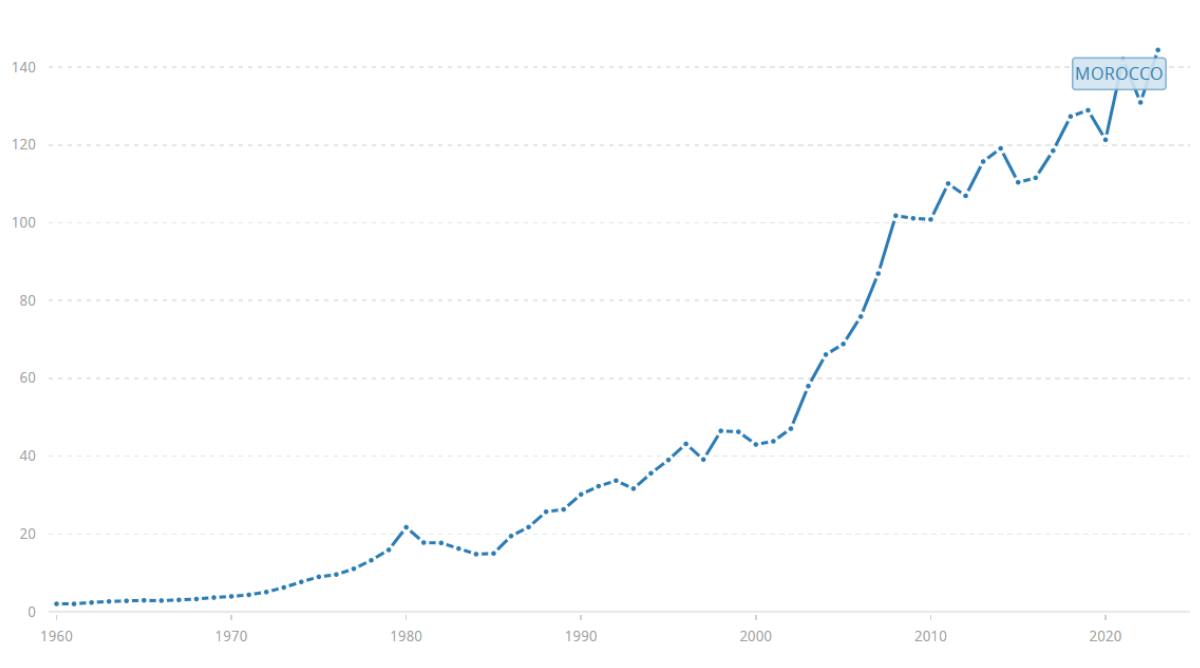
Table 1: Contribution of Renewable Energy to Morocco's GDP (Converted to USD)

Component	Value (in USD)	Explanation	Reference
Total Renewable Energy Generation (GWh)	3,500 GWh (Example)	Total amount of renewable energy generated (example: from wind, solar, hydro).	IRENA, 2021.
Average Price of Electricity (per kWh)	0.12 USD	Average price of electricity (converted from 1.20 MAD to USD).	World Bank, 2020.
Total Revenue from Renewable Energy Production	420,000,000 USD (calculated as 3,500,000,000 kWh * 0.12 USD)	Total revenue generated from renewable energy production.	World Bank, 2020.
Employment Impact (Jobs Created)	40,000 jobs	Direct and indirect jobs created by renewable energy projects.	ILO, 2018.
Average Wage per Job (per year)	4,000 USD	Average annual wage per worker employed in the renewable energy sector (converted from 40,000 MAD).	ILO, 2018.
Total Employment Income	160,000,000 USD	Total income generated from renewable energy-related jobs (calculated as 40,000 jobs * 4,000 USD).	ILO, 2018.
Renewable Energy Manufacturing and Supply Chain Contribution	200,000,000 USD	Value added by the renewable energy manufacturing sector (solar panels, wind turbines, etc.).	MASEN, 2021.
Technology Transfer and Innovation (Impact on R&D and Local Firms)	150,000,000 USD	Estimated contribution of technology transfer and innovation from foreign investors to local businesses.	UNCTAD, 2020.

Indirect Impact (Multiplier Effect on GDP)	500,000,000 USD	Multiplier effect (growth in sectors related to renewable energy, such as construction, services, etc.).	World Bank, 2023.
Total Contribution to GDP	1,430,000,000 USD	Sum of all components that contribute to Morocco's GDP.	Calculated from above components
GDP of Morocco (Nominal, 2023)	144,420,000,000 USD	Morocco's estimated GDP in 2023 (nominal).	World Bank, 2023.
Percentage Contribution of Renewable Energy to GDP	0.9901%	$(\text{Total Contribution to GDP} / \text{GDP of Morocco}) * 100.$	Calculated from above components

Source : (World Bank, 2023), (UNCTAD, 2020), (MASEN, 2021), (ILO, 2018), (IRENA, 2021)

Figure 10: GDP Morocco between 1960-2023 (Billion \$USD)



Source :

<https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2023&locations=MA&start=1960&view=chart>

Social Benefits

The societal advantages of renewable energy investments in Morocco extend beyond economic advancement and employment generation. A notable consequence is enhanced energy accessibility, especially in rural and marginalized regions. The government's investment in solar and wind initiatives has enhanced energy availability for communities that previously lacked stable power, improving quality of life and facilitating economic operations.

Moreover, investments in renewable energy foster regional development, as the establishment of new energy infrastructure stimulates local economies and facilitates the provision of public services. The enhancement of energy availability facilitates advancements in healthcare, education, and communications, hence elevating the Human Development Index (HDI). (Ouarzazate, Benali, & Mernissi, 2020).

4.1.9. Challenges and Risks of FDI in Renewable Energy in Morocco

Foreign Direct Investment (FDI) has been essential in facilitating Morocco's shift towards a sustainable and green economy, especially within the renewable energy industry. Extensive initiatives like the Noor Ouarzazate Solar Complex and the Tarfaya Wind Farm have greatly

profited from global funding, technological transfer, and specialized knowledge. Nonetheless, Morocco's increasing dependence on foreign money and investors presents several problems and hazards that may affect its long-term energy security, economic sustainability, and regulatory stability.

Key issues include reliance on foreign investment and regulatory risks linked to policy changes, both of which may provide vulnerabilities to the Moroccan economy if not properly managed. Although foreign direct investment fosters green growth, overdependence on external financing may result in economic disparities, profit repatriation, and diminished local capacity enhancement. Moreover, ambiguities in governmental policies and regulatory structures present a barrier to long-term investment security, potentially deterring prospective investors. (IRENA, 2021).

1. Dependency on Foreign Investors

Heavy Reliance on External Capital and Expertise:

Morocco has established itself as a frontrunner in renewable energy investment in Africa, drawing significant foreign investors from China, Germany, Spain, France, and the UAE, as well as financial entities including the World Bank, the European Investment Bank (EIB), and the African Development Bank (AfDB). International collaborations have facilitated Morocco's enhancement of its renewable energy infrastructure, aiding the government's objective of attaining 52% of power output from renewable sources by 2030 (IRENA, 2021).

This dependence on foreign finance and technology presents challenges to long-term energy security and economic independence. If foreign investors choose to retract their capital owing to economic recessions, geopolitical volatility, or shifts in investment focus, Morocco's renewable energy advancement may encounter considerable obstacles. The nation remains reliant on foreign technologies for wind turbines, solar panels, and energy storage systems, constraining its capacity to localize the industry and diminish prices over time.

Profit Repatriation and Limited Local Economic Benefits:

Foreign investors often want substantial returns on investment, resulting in income from Morocco's renewable energy initiatives being predominantly repatriated to investors' home countries instead of being reinvested in the local economy. This constrains the multiplier impact that might otherwise bolster Moroccan sectors, facilitate job development, and promote technical improvement (UNCTAD, 2020).

Moreover, many Public-Private Partnership (PPP) agreements entail foreign entities retaining long-term ownership and operational authority over energy assets, hindering Morocco's capacity to entirely possess and capitalize on its renewable energy resources. If profit-sharing systems are inadequately structured, Morocco may continue to be a mere beneficiary of foreign investments instead of being a significant participant in the global renewable energy industry.

Limited Domestic Industry Development

Notwithstanding attempts to enhance local content mandates, Morocco's renewable energy supply chain remains inadequately developed, with the preponderance of components remaining imported. The nation possesses an inadequate domestic manufacturing industry for solar panels, wind turbines, and energy storage systems, resulting in a trade deficit in the renewable energy sector (World Bank, 2023). In the absence of strategic measures to enhance local production, Morocco may have challenges in establishing a self-sustaining renewable energy sector, rendering it susceptible to supply chain interruptions and global market volatility.

2. Regulatory Risks and Potential Policy Shifts

Uncertainty in Government Policies and Incentives

Foreign investors require regulatory stability and policy consistency to engage in long-term commitments within the energy industry. Nevertheless, alterations in governmental regulations, subsidies, and incentives may engender uncertainty, dissuading new investments and perhaps prompting current investors to reevaluate their commitments. Should Morocco amend its tax regulations, diminish renewable energy subsidies, or alter feed-in tariffs, the financial appeal of renewable energy initiatives may diminish (IRENA, 2021).

Morocco has established power purchase agreements (PPAs) to provide long-term pricing stability for investors in renewable energy. Alterations to these agreements resulting from budgetary limitations or policy changes might undermine investor trust and impede industry expansion. This unpredictability is especially pertinent for large-scale projects, when investors need reliable returns over a 20 to 30-year timeframe.

Legal and Bureaucratic Challenges

Although Morocco has established a precise legal framework for renewable energy,

international investors continue to encounter bureaucratic obstacles with project permits, land acquisition, and environmental restrictions. Prolonged permitting processes and intricate administrative procedures might hinder project execution, escalate expenses, and deter prospective investors (MASSEN, 2022).

Moreover, difficulties in contract enforcement and regulatory discrepancies pose dangers for investors requiring robust legal safeguards for their financial obligations. Should regulatory bodies exhibit a lack of openness or alter contractual conditions, investors may be reluctant to allocate cash to long-term renewable energy initiatives in Morocco.

Political and Economic Stability Risks

Despite Morocco's stable political climate, external variables include global energy crises, economic recessions, and geopolitical conflicts may affect governmental energy policies. Economic downturns may precipitate budget cuts for renewable energy initiatives, whilst political changes might alter national objectives, diminishing governmental support for foreign-funded projects (UNCTAD, 2020).

Moreover, variations in global oil prices may influence Morocco's renewable energy plan. If fossil fuel costs decrease, the government may redirect its attention to more economical energy choices, thus diminishing incentives for investments in renewable energy. This may impede Morocco's green energy transition and generate uncertainty for long-term investment.

4.2. Case Study 2: Nigeria – A Low Performer in FDI for Renewable Energy

Nigeria, the preeminent economy in Africa, harbors extensive energy resources, encompassing both fossil fuels and renewable sources. Nonetheless, despite its considerable potential for renewable energy, the nation continues to rely extensively on fossil fuels. Energy poverty, insufficient regulatory frameworks, and inadequate incentives for foreign direct investment (FDI) have impeded the development of Nigeria's renewable energy sector. This section offers a summary of the energy industry, examines legal and policy impediments to foreign direct investment, and underscores the issues of energy poverty in the nation.

4.2.1. Overview of Nigeria's Energy Sector

The energy industry in Nigeria is predominantly controlled by fossil fuels. The International Energy Agency (IEA) reports that oil and gas provide more than 80% of Nigeria's energy supply, but the proportion of renewables is minimal (IEA, 2023). The nation's reliance on hydrocarbons is mostly attributable to the presence of extensive oil and gas reserves, which have traditionally drawn foreign investment, overshadowing renewable options. Government subsidies for fossil fuels impede the shift to greener energy sources (Obioma & Okafor, 2021).

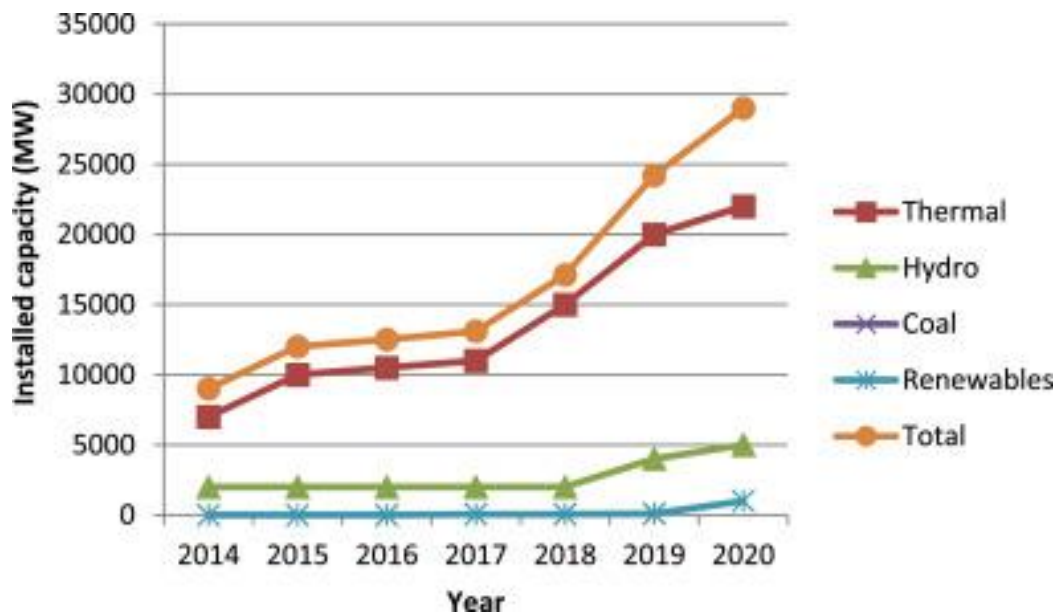


Figure 11: Installed capacity by energy source in MW (2014–2020) in Nigeria

Source : (Akuru et al., 2020.)

Nigeria, despite its reliance on fossil fuels, possesses ample renewable energy resources. The nation receives an average of 5.5 kWh/m²/day of solar radiation, positioning it among the most sun-abundant countries in Africa (Energy Commission of Nigeria, 2022). Nigeria possesses considerable hydropower potential, with major rivers like the Niger and Benue suitable for extensive hydroelectric projects (Ogunbiyi et al., 2020). Nonetheless, despite these resources, the proportion of renewables in Nigeria's energy mix remains under 10%, mostly owing to infrastructural and budgetary limitations (Statista, 2023).

The Nigerian electricity industry is marked by substantial supply deficiencies. The nation possesses an established electrical producing capacity of around 13,500 MW; however, the actual output is under 5,000 MW owing to inefficiencies in transmission and distribution systems (World Bank, 2022). As a result, more than 85 million Nigerians do not have access to dependable power, with numerous families and enterprises depending on diesel and petrol generators to fulfill their energy requirements (AfDB, 2023).

4.2.2. Regulatory and Policy Barriers to Attracting FDI

A primary impediment to attracting foreign direct investment in Nigeria's renewable energy sector is the absence of a stable and transparent regulatory framework. Investors encounter bureaucratic obstacles, erratic rules, and insufficient financial incentives that render the sector unappealing (Eleri et al., 2021). The Nigerian Electricity Regulatory Commission (NERC) supervises the nation's electricity industry; yet, the regulatory framework is disjointed, characterized by overlapping duties across governmental bodies (Okoro & Chikuni, 2020).

Nigeria has developed many renewable energy legislation; nevertheless, their implementation has been sluggish. The Renewable Energy Master Plan (REMP), initially formulated in 2005 and amended in 2012, seeks to augment the proportion of renewables in Nigeria's energy portfolio; nevertheless, its implementation has been ineffective (Obaje & Nwokoye, 2019). The National Renewable Energy and Energy Efficiency Policy (NREEEP) was established to incentivize clean energy investment; nevertheless, the absence of definitive financing instruments has impeded its effectiveness (Nwankwo, 2022).

Bureaucratic delays and administrative inefficiencies compound the issue. Investors in renewable energy must traverse a convoluted clearance procedure involving several

governmental authorities, resulting in protracted delays for project permits and grid connections (Agbaeze et al., 2020). The lack of tax incentives and long-term funding alternatives for sustainable energy initiatives deters international investment (IEA, 2023).

A significant concern is the inadequate enforcement of contracts in Nigeria. Numerous renewable energy investors have expressed apprehensions over power purchase agreements (PPAs) and the challenges of obtaining assurances from governmental entities (Akpan & Effiom, 2021). The national system's incapacity to accommodate extensive renewable energy initiatives restricts investment prospects, since grid instability continues to be a significant issue (World Bank, 2022).

4.2.3. Nigeria's Energy Poverty Challenge

Energy poverty continues to be one of Nigeria's most critical socio-economic challenges. The African Development Bank (AfDB) reports that Nigeria possesses the largest population without access to electricity in sub-Saharan Africa, with over 85 million individuals residing without a dependable power source (AfDB, 2023). The deficiency of power access is particularly evident in rural regions, where grid expansion is frequently unfeasible and costly (Ogunbiyi et al., 2020).

The dependence on conventional biomass, including firewood and charcoal, persists significantly, especially in rural areas where more than 70% of families utilize these resources for cooking and heating (UNDP, 2021). The prevalent utilization of inefficient energy sources exacerbates environmental deterioration and health issues, particularly respiratory ailments resulting from indoor air pollution (WHO, 2022).

Decentralized renewable energy options, like solar mini-grids and residential solar systems, has the capacity to mitigate Nigeria's energy poverty issue. Nonetheless, these initiatives encounter considerable financial and regulatory obstacles (IRENA, 2023). Numerous foreign investors exhibit hesitance in financing off-grid solar solutions owing to ambiguities related to tariffs, licensing, and the long-term viability of projects (Nwankwo, 2022).

4.2.4. Consequences of Low FDI in Renewable Energy

Implications of Insufficient Foreign Direct Investment in Renewable Energy

The deficiency of considerable foreign direct investment (FDI) in Nigeria's renewable energy sector yields profound environmental, economic, and social ramifications. In the absence of

sufficient investment, Nigeria continues to depend significantly on fossil fuels, leading to elevated carbon emissions, environmental deterioration, and lost economic prospects. Moreover, insufficient foreign direct investment in renewable energy intensifies energy poverty, restricting access to inexpensive and sustainable power for millions of Nigerians.

4.2.4.1. Environmental Consequences

Continued Reliance on Fossil Fuels and High Carbon Emissions

Nigeria's reliance on fossil fuels has resulted in consistently elevated greenhouse gas (GHG) emissions. The nation's oil and gas industry accounts for more than 70% of its overall emissions, mostly due to gas flaring and the burning of petroleum products (IEA, 2023). Nigeria's inadequate investment in renewable alternatives hinders its transition to a low-carbon economy, rendering it one of the foremost carbon emitters in sub-Saharan Africa (World Bank, 2022).

The deficiency of foreign direct investment in renewable energy hinders the feasibility of large-scale solar, wind, and hydroelectric projects as viable substitutes for fossil fuel-based energy production. Countries that have effectively drawn renewable energy foreign direct investment, such as South Africa and Morocco, have markedly decreased their carbon footprints while augmenting energy capacity (IRENA, 2023). Conversely, Nigeria is entrenched in a fossil fuel-dependent energy paradigm, with no advancement in emission reduction (UNEP, 2021).

High Air Pollution and Environmental Degradation

Nigeria experiences significant air pollution resulting from the combustion of fossil fuels, especially in metropolitan areas like Lagos and Port Harcourt. The World Health Organization (WHO) has designated Nigeria as one of the most polluted nations in Africa, with air pollution levels often beyond permissible thresholds (WHO, 2022). The transportation and power generating industries significantly contribute, with diesel generators extensively utilized due to unreliable energy supply (Okonkwo et al., 2021).

Besides air pollution, environmental deterioration is a significant issue. The ongoing exploitation of crude oil, especially in the Niger Delta, has resulted in extensive oil spills, deforestation, and a decline in biodiversity (Amnesty International, 2020). A transition to

renewable energy may alleviate these environmental harms; however, insufficient foreign direct investment constrains advancement in this domain (Nwankwo, 2022).

4.2.4.2. Economic Consequences

Missed Opportunities for Job Creation and Industrial Development

The renewable energy sector have the capacity to generate substantial job opportunities in Nigeria. The International Renewable Energy Agency (IRENA) projects that investments in renewable energy may create more than 500,000 employment in Nigeria by 2030 (IRENA, 2023). The present inadequate levels of foreign direct investment in renewable energy have impeded the advancement of a resilient green economy.

Countries prioritizing renewable energy investment have experienced significant economic advantages. For instance, South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has garnered over \$14 billion in investment and generated thousands of employment opportunities (IEA, 2023). Nigeria's sluggish advancement in renewable energy has led to missed economic prospects, especially in the solar and wind sectors (Obioma & Okafor, 2021).

High Electricity Costs and Energy Instability Affecting Businesses

The elevated power costs in Nigeria represent an additional economic repercussion of diminished foreign direct investment in renewable energy sources. Nigeria possesses one of the highest power tariffs in sub-Saharan Africa, with companies and people allocating a substantial amount of their income to energy expenditures (World Bank, 2022). The dependence on diesel generators stemming from an inconsistent grid supply exacerbates expenses, resulting in enterprises incurring billions yearly on self-generation (AfDB, 2023).

Energy volatility adversely impacts industrial productivity. Numerous manufacturing and technology-driven sectors encounter operational inefficiencies owing to power outages, resulting in elevated production costs and diminished competitiveness in international marketplaces (Okoro & Chikuni, 2020). Augmented investment in renewable energy might yield more dependable and cost-effective power solutions; yet, the present deficiency in foreign direct investment has rendered the country susceptible to recurrent electrical crises (Nwankwo, 2022).

4.2.4.3. Social Consequences

Worsening Energy Poverty in Rural Areas

The energy poverty challenge in Nigeria is exacerbated by insufficient investment in renewable energy. More than 85 million Nigerians, predominantly in rural regions, remain without electrical access (AfDB, 2023). The substantial expense of expanding the national grid to isolated areas renders localized renewable energy systems, such as solar mini-grids, the most feasible option. Nonetheless, restricted foreign direct investment has hindered the implementation of these initiatives, resulting in several villages lacking dependable electricity (Ogunbiyi et al., 2020).

Energy poverty exerts extensive societal repercussions, influencing healthcare, education, and economic endeavors. Rural hospitals frequently lack energy to operate medical equipment, resulting in insufficient healthcare services (WHO, 2022). Schools lacking electricity encounter difficulties in delivering effective education, as pupils and educators contend with insufficient illumination and limited access to digital learning materials (UNDP, 2021).

Limited Impact on Local Communities Due to Lack of Green Investment

Foreign investment in renewable energy can yield social advantages by enhancing local infrastructure, generating job possibilities, and facilitating community-oriented energy initiatives. Nevertheless, the minimal foreign direct investment in Nigeria's clean energy industry has resulted in several communities being deprived of the advantages of sustainable development (Nwankwo, 2022).

Countries like Kenya and Ethiopia have effectively garnered foreign direct investment in off-grid solar solutions, delivering clean and inexpensive electricity to millions of individuals (IRENA, 2023). Nigeria's insufficient green investment results in several rural areas continuing to depend on expensive and ecologically detrimental energy sources, such as kerosene and charcoal (Okonkwo et al., 2021).

Table 2: Contribution of Renewable Energy to Nigeria's GDP (Converted to USD)

Component	Value (in USD)	Explanation	Reference
Total Renewable Energy Investments	Over \$2 billion	Past decade	Ogunbiyi et al. (2022); IRENA (2023)

Average Annual Renewable Energy FDI	Approximately \$200 million	Per year (estimated)	Ogunbiyi et al. (2022)
Nigeria's GDP	\$363.85 billion	2023	World Bank (2023)
Average Annual Renewable Energy FDI as % of GDP	0,054 %		Calculated from above figures

Source : (World Bank, 2023), (Ogunbiyi et al., 2022), (IRENA, 2023)

4.3. Comparative Analysis

4.3.1. Key Success Factors for Attracting FDI in Renewables: A Comparative Analysis of Morocco and Nigeria

Securing Foreign Direct Investment (FDI) in the renewable energy industry is crucial for economic development, energy security, and sustainability. Investments in renewable energy are contingent upon numerous critical elements, including regulatory frameworks, governmental incentives, infrastructural preparedness, and integration into global energy markets. A comparative research of Morocco and Nigeria reveals substantial disparities in their capacity to attract and maintain foreign direct investment in this industry, providing insights into optimal practices and areas necessitating enhancement.

4.3.2. Policy and Regulatory Framework

A clear and stable policy framework is crucial in attracting foreign direct investment (FDI). Morocco has established an extensive legal framework that promotes investment in renewable energy. The Renewable Energy Law (Law 13-09) enables private sector involvement by permitting enterprises to generate, sell, and export renewable energy, hence fostering a competitive market landscape (Cherkaoui & Majdoub, 2021). Moreover, Morocco's National Energy Strategy (2009) has delineated explicit long-term goals, including a 52% contribution of renewables to the nation's total energy capacity by 2030 (World Bank, 2022). These unequivocal statements have instilled confidence in international investors and enabled significant renewable energy initiatives.

Conversely, Nigeria's policy landscape has been erratic, frequently marked by regulatory

ambiguity and ineffective enforcement measures. The Renewable Energy Master Plan (REMP), initially launched in 2005 and updated in 2012, sought to enhance renewable power production; nevertheless, it has mostly gone unexecuted due to bureaucratic inefficiencies and insufficient political will (Akinbami et al., 2020). In contrast to Morocco, Nigeria has had challenges with the ineffective implementation of energy legislation, resulting in investment uncertainty. Furthermore, corruption, erratic regulatory rules, and protracted approval processes for renewable energy projects have deterred foreign direct investment in the industry (Ogunkunle & Babatunde, 2021).

An effective regulatory structure is crucial for maintaining investor trust. Countries with clearly articulated policies, streamlined permitting procedures, and unambiguous legal frameworks often attract greater foreign direct investment (FDI). The Moroccan example illustrates that consistent governmental direction and robust legal frameworks provide a stable investment environment, whereas Nigeria's situation underscores the repercussions of regulatory volatility and inadequate enforcement.

4.3.3. Government Incentives and Investment Climate

Investment incentives are essential for attracting foreign finance to the renewable energy sector. Morocco has instituted several financial and economic incentives, such as tax exemptions for renewable energy projects, subsidies for infrastructure development, and the sale of Green Bonds to fund clean energy efforts (Ben Hassine, 2023). The Moroccan Agency for Sustainable Energy (MASEN) has been instrumental in orchestrating investments, establishing public-private partnerships, and obtaining international funding from entities like the World Bank and the European Investment Bank (IEA, 2022).

Nigeria, conversely, lacks a systematic and well-coordinated framework of incentives for renewable energy investment. The Nigeria Investment Promotion Act seeks to stimulate foreign investment; nevertheless, its effectiveness has been constrained by policy inconsistencies and bureaucratic obstacles (Ogunkunle & Babatunde, 2021). In contrast to Morocco, Nigeria has not established a specialized body like to MASEN to promote international investments in the renewable energy industry. The lack of explicit tax incentives, subsidies, and enduring financial inducements has dissuaded prospective investors (Akinbami et al., 2020).

4.3.4. Comparative Table: FDI in Renewable Energy – Morocco vs. Nigeria

Table 3: Comparative Table: FDI in Renewable Energy – Morocco vs. Nigeria

Aspect / Component	Morocco	Nigeria
Energy Sector Overview	Diversified energy mix with strong focus on renewables	Heavy dependence on fossil fuels, underdeveloped renewables
FDI Policies & Regulatory Framework	Pro-renewable, investor-friendly policies and regulatory stability	Regulatory and policy barriers deter FDI
Geographical Advantage	High solar and wind potential; projects spread across the country	Abundant natural resources but underutilized
Renewable Energy Goals & Achievements	Ambitious targets (52% renewables by 2030); Noor Ouarzazate success	Minimal progress on renewable targets
FDI Trends	Consistent growth in renewable energy FDI	Low and irregular FDI inflows
Key Investors	MASEN, ACWA Power, Siemens Gamesa, EDF Renewables	Limited participation from major foreign investors
Role of International Institutions	Strong partnerships (e.g., World Bank, AfDB, EIB)	Some involvement, but less effective coordination
Impact on Green Growth & Economy	Boost to GDP, job creation, infrastructure development	Missed opportunities for green economic development
Challenges / Risks	Bureaucracy, grid limitations, financing gaps	Severe energy poverty, political instability, weak institutions
Environmental Impact	Significant reduction in emissions, progress on climate goals	Ongoing environmental degradation due to reliance on fossil fuels
Social & Economic Consequences	Improved energy access, rural development, tech transfer	Worsening inequality, limited access to clean energy
Total Renewable Energy Generation (GWh)	3,500 GWh	<1,000 GWh (mostly hydro)
Average Electricity Price (USD/kWh)	0.12 USD	~0.10–0.15 USD
Total Revenue from Renewable Energy	\$420 million	< \$100 million (est.)
Employment Impact (Jobs Created)	40,000 jobs	<10,000 jobs
Average Wage per Job (Annual)	\$4,000	~\$2,000–\$3,000
Total Employment Income	\$160 million	< \$30 million (est.)
RE Manufacturing & Supply Chain Impact	\$200 million	Minimal – import-based systems

Technology Transfer & Innovation	\$150 million	Very limited
Indirect GDP Impact (Multiplier Effect)	\$500 million	Low, underdeveloped sectoral linkages
Total GDP Contribution (RE Sector)	\$1.43 billion	< \$200 million
Nominal GDP (2023)	\$144.42 billion	\$363.85 billion
RE Sector % Contribution to GDP	0.99%	0.054%
Total Renewable Energy Investment (10 yrs)	Over \$5 billion	Over \$2 billion
Average Annual RE FDI	~\$500 million	~\$200 million
Average RE FDI as % of GDP	~0.35%	~0.054%

Source: (World Bank, 2023), (Ogunbiyi et al., 2022), (IRENA, 2023), (*UNCTAD, 2020*), (*MASEN, 2021*), (*ILO, 2018*), (*IRENA, 2021*)

CHAPTER FIVE: CONCLUSION

This study aimed to investigate the correlation between Foreign Direct Investment (FDI) in renewable energy and its effects on green growth and economic development, specifically comparing Morocco and Nigeria. The research has shown, through a comprehensive analysis of conceptual foundations, empirical contexts, and country-specific case studies, that foreign direct investment in renewable energy can significantly influence sustainable economic trajectories, contingent upon the establishment of appropriate frameworks and policies.

Morocco's experience demonstrates that aggressive governmental initiatives, regulatory transparency, investment incentives, and international collaboration can successfully attract foreign direct investment and direct it towards renewable energy development. The nation's ability to utilize foreign direct investment has resulted in improved energy security, technical advancement, green job creation, and a consistent advancement towards sustainable growth and development.

Nigeria's issues, including legislative instability, insufficient infrastructure, and weak regulatory enforcement, underscore the obstacles that might hinder FDI inflows into the renewable industry. Notwithstanding its considerable renewable energy potential, Nigeria's present climate has proved unfavorable for substantial foreign investment, therefore constraining advancements in economic diversification and energy sustainability.

The comparative research highlights that the attraction and retention of FDI in renewables depend not just on natural resource availability but mostly on deliberate policy formulation, institutional robustness, and strategic governance. Essential insights from Morocco can provide a framework for Nigeria and analogous economies aiming to leverage renewable energy for sustainable development.

In conclusion, foreign direct investment in renewable energy offers a crucial opportunity for developing countries to tackle climate change, satisfy increasing energy requirements, and promote equitable economic growth. Future policies must match investment environments with global environmental objectives, acknowledging that the shift to clean energy is both essential and a strategic benefit in the 21st-century economic framework.

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