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Youth Perspectives on Accelerating the Green Economy Transition: **A Vision for a Sustainable Future**



TABLE OF CONTENTS

About the report	02
Green Economy Transition in	
Afghanistan	03
Algeria	08
Angola	14
Bangladesh	19
Brazil	24
Cameroon	30
Chad	36
Chile	46
Comoros	53
Côte d'Ivoire	61
Egypt	67
Ethiopia	75
Ghana	84
India	98
Jordan	103
Kenya	117
Lebanon	130
Libya	139
Madagascar	145
Malawi	154
Maldives	160
Mauritania	165
Mexico	173
Morocco	180
Mozambique	190
Nepal	195
Nigeria	200
Palestine	207
Philippines	213
Rwanda	221
Senegal	227
Sri Lanka	233
Sudan	240
Syria	246
UAE	253
Uganda	265
Yemen	272

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This report is an outcome of the Global Green Economy Young Leaders (GGEYL) Program, initiated by the World Green Economy Organization (WGEO) under its Global Green Innovation Initiatives. It showcases the analyses, perspectives, and insights developed by the program participants as part of their Capstone Projects, which explore green economy opportunities, challenges, and potential pathways for sustainable development in selected countries.

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About the Report

This report presents the perspectives, insights, and analyses developed by the graduates of the Global Green Economy Young Leaders (GGEYL) Program, launched by the World Green Economy Organization (WGEO) under its Global Green Innovation Initiatives. The program is designed to inspire and empower young leaders from around the world by equipping them with the knowledge, skills, and tools needed to contribute to the global transition toward a sustainable and inclusive green economy.

Bringing together participants from diverse regions, sectors, and professional backgrounds, the program provides a platform for knowledge exchange, innovation, and collaboration. Through a two-week immersive virtual learning journey, participants engaged in webinars, workshops, and interactive discussions covering key areas such as clean energy, circular economy, sustainable finance, smart cities, climate action, and emerging green technologies. The program also focused on strengthening leadership capabilities, policy understanding, and practical approaches to addressing sustainability challenges.

A key component of the program was the Capstone Project, through which participants conducted analyses of the green economy landscape in selected countries, identifying key challenges, opportunities, and potential pathways for advancing sustainable development. These projects reflect the participants' perspectives on areas such as renewable energy adoption, sustainable urban development, biodiversity conservation, resource efficiency, and innovative green solutions.

This report brings together these analyses, showcasing the diverse viewpoints, research, and recommendations developed by emerging green leaders. It serves as a platform to highlight youth perspectives on accelerating the green transition and provides valuable insights for stakeholders, including policymakers, academics, private-sector organizations, and sustainability practitioners.

Beyond documenting the participants' contributions, this report demonstrates the importance of youth engagement in shaping the future of sustainability. It reflects WGEO's commitment to fostering a new generation of green leaders capable of driving innovation, collaboration, and transformative action toward a more sustainable and resilient global economy.





PROJECT TITLE

Green Economy Transition in **Afghanistan**

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COUNTRY REPRESENTED:

Afghanistan

Introduction

Country Name	Afghanistan
Continent	Asia
Population	41.13 million
Climate Type	Arid Continental Climate
Primary Energy Consumption per Capita	677 kWh as per 2021
Primary Energy Consumption from Renewable Energy	88% of the renewable energy consumption in 2021 is from Bioenergy.
Share of the population with access to electricity	97.70% in 2021
Per Capita CO2 Emissions	0.3 t in 2022

Analysis of the Green Economy

1. Renewable Energy Status:

Although Afghanistan possesses a wealth of renewable energy resources, their contribution to the country's energy system is still small. Currently, hydropower accounts for around half of Afghanistan's energy. The Afghan government has set goals to raise the proportion of renewable energy in the country, with assistance from foreign organizations such as the World Bank and Asian Development Bank. By 2032, efforts like the Renewable Energy Policy (2015) hope to generate 5,000 MW of renewable energy, with wind and solar power playing a major role. However, due to inadequate infrastructure, security concerns, and a lack of funding, progress has been slow.

2. Electric Mobility:

In Afghanistan, electric vehicles (EVs) and charging stations are nonexistent. EVs are not significantly aided by any laws or incentives. The growth of EVs is impeded by high import charges, insufficient infrastructure, and low public awareness. The lack of investment in EV infrastructure and the absence of a clear government roadmap for the switch to electric vehicles continue to be issues.

3. Energy Efficiency Measures:

Although there are not any broad national energy efficiency regulations in Afghanistan, there are growing initiatives to encourage energy efficiency, particularly in the construction and industrial sectors. International donors fund initiatives like energy-efficient stoves and home insulation that try to lessen dependency on fossil fuels and firewood, especially in rural areas. These programs, however, are only partially implemented, and urban industry and transportation are still behind in terms of energy efficiency.

4. Smart City Initiatives:

Afghanistan prioritizes the construction of essential infrastructure and political stability over smart city ideas. Nonetheless, there have been small-scale initiatives in cities like Kabul to enhance urban infrastructure, notably in the areas of energy and water management.

5. Green Financing:

Afghanistan has very few possibilities for green financing, and Afghanistan does not have a strong enough financial system to sustain significant green initiatives. Green initiative funding is difficult for both new and established businesses to secure due to high lending rates, a lack of knowledge, and regulatory roadblocks.

6. Governmental Incentives:

There are not many incentives provided by the Afghan government to encourage green business and consumer practices. Private sector involvement in the green economy is constrained by the lack of tax breaks or subsidies for renewable energy installations, energy-efficient equipment, or environmentally conscious company practices. Although the National Environmental Protection

Agency (NEPA) and the Ministry of Energy and Water have declared policies in favor of environmental sustainability, there is little financial support and no real execution of these statements.

7. Consumer Behavior:

In Afghanistan, consumers are not very conscious of sustainable practices; instead, their priorities are frequently met by focusing on necessities like food, water, and energy. Due to financial difficulties, people typically choose the least expensive solutions, which aren't necessarily good for the environment.

8. Waste Management and Recycling:

Afghanistan has a serious problem with garbage management. Large volumes of trash are produced by cities like Kabul, yet the capacity to handle it is insufficient. Except for sporadic, small-scale informal initiatives, recycling is essentially nonexistent. Waste from homes, businesses, and industries frequently ends up in open landfills.

9. Water Management:

Afghanistan's primary industry, agriculture, uses up most of the country's water resources. Strategies for sustainable water management are essential, particularly considering water scarcity and climate change. With the help of foreign organizations, the Ministry of Agriculture, Irrigation, and Livestock (MAIL) has started small-scale programs centered on water storage and drip irrigation, although they haven't been widely implemented yet.

10. Biodiversity and Conservation Efforts:

Afghanistan's biodiversity is in danger because of overgrazing, uncontrolled mining, and deforestation. Non-government Organizations and international groups have been leading conservation efforts, with projects aimed at protecting threatened species such as the snow leopard. There are animal reserves and protected areas, but there is lenient enforcement.

In conclusion, Afghanistan's green economy is still in its early stages and faces several obstacles such as poor infrastructure, security issues, and unstable political conditions. Even though there are continuing projects, mostly in the areas of water management and renewable energy, they are primarily funded by foreign groups. Afghanistan must boost public knowledge of sustainable practices, create policy frameworks, and facilitate better access to green financing for the green economy to flourish.

Challenges and opportunities

Afghanistan's green economy is still in its early stages and faces several obstacles such as poor infrastructure, security issues, and unstable political conditions. Even though there are continuing projects, mostly in the areas of water management and renewable energy, they are primarily funded by foreign groups. Afghanistan must boost public knowledge of sustainable practices, create policy frameworks, and facilitate better access to green financing for the green economy to flourish.

SWOT Analysis

Strengths: Water Management/ hydropower and solar power potential	Weaknesses: Underdeveloped infrastructure, lack of governmental funding, and heavy reliance on traditional biomass.
Opportunities: Gaining funds from international donors and foreign groups particularly in the construction and industrial sectors and job creation potential.	Threats: Political instability and no funds/ tax breaks or laws from the government

PESTLE Analysis

Political	Afghanistan's political instability hampers large-scale renewable energy investments. However, efforts are made to attract foreign aid for renewable projects.
Economic	The country's economy relies heavily on agriculture, with limited industrial development. Renewable energy projects like hydropower and solar could reduce dependency on imported fuels and improve economic resilience.
Social	A significant portion of the population, especially in rural areas, depends on biomass for energy. Expanding access to cleaner, renewable energy sources like solar can improve living standards.
Technological	Afghanistan has untapped potential for solar and wind energy, but the lack of infrastructure and technical expertise is a major obstacle.
Legal	The regulatory environment is underdeveloped. Policies encouraging renewable energy investment and providing subsidies or incentives are necessary to attract foreign investors.
Environmental	Afghanistan is highly vulnerable to climate change. Promoting renewable energy will help reduce deforestation (caused by biomass reliance) and combat climate-related issues such as water scarcity.

Analysis findings:

Afghanistan has the potential to shift to a greener economy through the increase of renewable energy, especially in the areas of solar and hydropower, as shown by the PESTLE and SWOT assessments. Afghanistan presents chances for growth despite obstacles such as lack of infrastructure, political instability, and economic difficulties. The country has abundant renewable energy resources. The main drivers of the shift include lowering dependency on imported energy and biomass, raising living standards, and reducing environmental dangers. But achieving this promise will require strong international backing as well as better governance.

Youth Perspective and Concluding Remarks

There is a lot of unrecognized potential for renewable energy in Afghanistan; to fully utilize these resources, we need to concentrate on creative yet doable solutions. From the viewpoint of a young people such as ourselves, we should consider these suggestions:

Initiatives in Education: Putting money into education is essential to developing the technical know-how required for a sustainable future. Courses on sustainability, climate science, and renewable energy should be offered at schools and universities so that the future generation is prepared to lead green innovation.

Community Involvement: Due to their continued reliance on biomass, rural communities are more vulnerable to indoor air pollution and deforestation. Community initiatives run by youths can highlight the advantages of using solar energy for heating and cooking. Community involvement and small-scale solar projects can enable people to move away from conventional energy sources.

Technological Advancements: For off-grid rural locations, renewable energy technologies like wind turbines and solar panels can offer decentralized energy alternatives. Start-up incubators that concentrate on developing renewable technologies should be used to promote youth entrepreneurship, since this will aid in the production of jobs and sustainable energy solutions.

Strategic Alliances: Afghanistan's green economy depends on international cooperation. In order to receive technical support, funding, and technology transfer, youth might push for alliances with regional and international organizations. Through the provision of the infrastructure, expertise, and capital required for renewable energy projects, these collaborations will quicken the shift.

Advocacy for Policy: Inclusion of Youth Voices in Policy-Making Processes is vital. Young leaders have the opportunity to advocate for the creation of a regulatory framework that provides incentives for investments in renewable energy by joining advocacy groups and collaborating with the government. Policies ought to provide a plan for the energy transition, tax advantages for renewable energy companies, and subsidies for green technology.

In conclusion, by emphasizing education, technology, community involvement, and policy advocacy, Afghanistan's youth can spearhead the transition to a greener economy. The road ahead will be difficult, but we can guarantee a sustainable future for our nation by forming wise alliances and employing creative thinking.

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PROJECT TITLE

Green Economy Transition in Algeria

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Introduction

Country Name	Algeria
Continent	Africa
Population	48 million (2023 estimate)
Climate Type	Mediterranean in the north, semi-arid central plateau, and hot desert climate in the Sahara.
Primary Energy Consumption per Capita	16,994 kWh (2023)
Primary Energy Consumption from Renewable Energy	0.24% (2024)
Share of the population with access to electricity	100%(2023)
Per Capita CO2 Emissions	3.86 tonnes per person (2023)

Analysis of the Green Economy

Algeria still depends heavily on natural gas to power its electricity grid and keep the country's energy system stable. In recent years, the government has started to diversify, adding more renewable energy, mainly through large solar projects. While renewables remain a small part of the energy mix, they are slowly growing.

Renewable Energy Status

Renewables make up only a tiny part of Algeria's electricity which is about 1% or less according to independent trackers. Almost all the rest still comes from natural gas. Still, the U.S. Energy Information Administration notes that solar power capacity has been slowly growing.

In March 2024, Sonelgaz signed 19 contracts to build 20 solar power plants with a total capacity of 3 gigawatts. This marks the first big step toward Algeria's 2030 renewable energy goal. The projects, spread across several provinces, come out of tenders launched in 2023.

Adding 3 GW of solar would be a big leap from today's low starting point, and it could meaningfully boost renewable electricity between 2026 and 2030 especially in the sunny south. Still, Enerdata warns that reaching Algeria's much larger target of about 22 GW by 2030 will be a tough challenge given the current limited capacity.

Electric Mobility

EVs are still very rare in Algeria compared to the total number of cars. Even so, Sonelgaz reports that by January 2025 about 900 public charging stations had been installed, with some sources noting the milestone of 1,000 chargers. Most are located along major roads, at airports, and in cities.

The government has taken some supportive steps. Sonelgaz is leading the national charging program, and in November 2022 import rules were relaxed, allowing licensed dealers to bring in electric and other vehicles again after years of restrictions. But there are also big challenges. Fuel and electricity subsidies make conventional cars seem cheaper to own, which discourages drivers from switching to EVs. The IMF has advised Algeria to gradually reform subsidies, so clean investments become more attractive while still protecting households that need help.

For now, charging stations are being built faster than EVs are arriving. If supply improves and price signals become clearer, adoption of electric cars should start to grow from today's very low base.

Energy Efficiency Measures

Algeria has put in place several measures to improve energy efficiency in buildings, industry, and transport.

In buildings, the country updated its Thermal Building Regulation in 2016, setting requirements for insulation and thermal design in new construction. The RETA software helps designers and engineers follow the rules and calculate energy performance. Studies suggest that applying these standards can significantly reduce heating and cooling needs.

At a broader level, the National Energy Management Program (PNME) was relaunched in late 2024. Through a new digital platform run by APRUE, the program supports energy efficiency projects in housing, transport (including clean-fuel vehicle conversions), industry, and municipalities. Public updates show that calls for participation are active and attracting users.

So far, the policies and support tools are in place and being used. But cheap fuel and electricity, along with uneven enforcement of building codes, limit how much energy is actually being saved. The IMF notes that even partial reform of subsidies would speed up emissions cuts, attract more investment in renewables and efficiency, and free up public funds for social support and climate resilience.

Smart Cities Initiatives

The Green Municipalities program, led by GIZ and the Ministry of Interior, supports cities like Béchar, Djelfa, and Relizane in developing municipal energy action plans and adopting solar lighting, energy dashboards, and local renewable projects. The second phase expands climate planning tools and public engagement. Although still pilot in scale, these initiatives show the potential of local governments as key actors in sustainable urban transition.

Green Financing and Support for Businesses

Green financing remains underdeveloped. Programs like GIZ's Green & Digital Development assist SMEs with innovation and accessing funding. The government's solar tenders attract private capital, but startups and small green enterprises face obstacles such as stringent loan conditions and limited venture capital availability. Banking sector risk aversion further limits financial inclusion.

Government Incentives and Consumer Behavior

Although the government aims to encourage green practices, broad subsidies on electricity, fuel, and water weaken market incentives. Initiatives like the Green Entrepreneurship Week, supported by UNDP, promote sustainable business models. Consumer engagement is growing in urban areas but is limited by affordability, insufficient product availability, and lack of widespread information on sustainability.

Waste Management, Water Scarcity, and Biodiversity

The National Waste Strategy (SNGID 2035) targets a 47% recovery rate for household and special waste. Initiatives like Geocycle's MyGeocycle platform provide digital tracking of waste flows, improving management transparency. Projects such as AIM-WELL in Sétif and Constantine recycle organic waste into compost and bioenergy, yet illegal dumping and low recycling rates persist due to weak enforcement and limited source segregation.

Water scarcity is critical. Algeria is expanding desalination plants in coastal regions, aiming for desalinated water to cover over 40% of drinking water needs by 2030. Urban water services increasingly rely on performance-based contracts with private operators. Agricultural reuse of treated wastewater is piloted in areas like Médéa to reduce freshwater demand.

On biodiversity, the Green Dam ("Barrage Vert"), spanning 1,000 km, combats desertification. Campaigns such as "Green Algeria" engage youth and communities in reforestation and ecosystem restoration, supported by local authorities and civil society.

Challenges and opportunities

SWOT Analysis

Strengths: 1. Abundant renewable potential: Algeria has very high solar irradiation (2,000–3,000 hours/year in many areas) and suitable wind resources along the Mediterranean coasts, giving it a natural advantage for renewable energy adoption. 2. Strategic export position: Its existing role in hydrocarbon exports gives Algeria infrastructure, trade relationships, and energy sector expertise that can help pivot toward green exports (e.g. green hydrogen) in future. 3. Universal electricity access: With nearly full access to electricity already achieved, the challenge is less about expanding access and more about shifting the supply mix.	Weaknesses: 1. Heavy dependency on hydrocarbons: Over 90% of its export revenue and large share of fiscal revenues still come from oil and gas. 2. Low renewable share & underdeveloped infrastructure: Renewable energy still accounts for a small fraction of capacity; integration of intermittent renewables is challenged by grid constraints and lack of storage. 3. Policy instability & weak enforcement: Legal frameworks have sometimes been reversed, and enforcement of energy efficiency standards is inconsistent.
Opportunities: 1. Large-scale solar & green hydrogen exports: Algeria is positioning itself to produce and export green hydrogen, leveraging its renewables and pipeline infrastructure. 2. Increasing international green investments & climate financing: Global trends and donor interest in decarbonization could bring more capital, technology transfer, and concessional financing. 3. Energy efficiency, smart grid, and digitalization: Adopting modern grid controls, demand-side management, and efficiency measures could sharply reduce waste and improve integration.	Threats: 1. Political resistance & vested interests: The entrenched oil/gas sector and institutional inertia may block or slow transition efforts. 2. Climate impacts & environmental stress: Desertification, water scarcity, and harsher climate conditions threaten agriculture, lands, biodiversity, and social stability. 3. Rising domestic demand & resource constraints: Domestic energy demand is growing rapidly; failure to balance export commitments and local needs may lead to shortages or overexploitation.

PESTLE Analysis

Political	The state maintains firm control over hydrocarbons, which has historically limited space for renewable growth. Although Algeria has announced ambitious plans for solar power, implementation has been slow. As one study observes, “the 1050 MW program for the 2006–2014 period and 8000 MW for the 2016–2020 period have gone unheeded, due to a lack of political will, despite the uniqueness of the Algerian energy potential” (Friedrich-Ebert-Stiftung, Algeria 100% Renewable Energy, p.10). This reveals how political inertia continues to undermine the country’s renewable targets, even as the need for transition becomes urgent.
Economic	Economically, Algeria has struggled to pivot away from hydrocarbons. As one report explains, “the lack of a clear economic strategy prevented grasping that the only option currently accepted by financial institutions and investors is sustainable development and the low-carbon green economy. The health crisis has revealed the limits of current economic development. The lack of political will and lack of commitment of Sonelgaz, in charge of the renewable energy program, combined with conflicts of interest, eventually caused all renewable energy programs to fail” (Friedrich-Ebert-Stiftung, p. 11). This illustrates how structural inertia and vested interests undermine renewable investment, even as global finance shifts toward green growth. Also, a recent study warns that “Algeria faces a critical energy crossroads, revealing a worrying 42.2% surge in national consumption against only 12% production growth, with energy losses jumping 11.5% in 2023” (IJES, 2025, p. 582). This imbalance not only squeezes exports but also highlights the unsustainability of the current model.

Social	Socially, Algeria has made remarkable progress: by 2023, 100% of its population had electricity access (OWID). Yet this achievement rests almost entirely on fossil fuels, and the transition to cleaner energy faces resistance from both affordability concerns and employment linked to hydrocarbons. Still, renewables could reshape the social fabric. As one report stresses, “renewable energy will also be an important source of job creation of little appreciated jobs, and jobs requiring high-level training. This dual character will promote local participation and stimulate social development” (Friedrich-Ebert-Stiftung, p. 7). This suggests that, if managed well, the green transition could strengthen both social equity and skills development.
Technological	Algeria’s solar and wind potential is among the best in the world, but it remains largely untapped. Renewable energy projects rely heavily on imported technologies, and the grid lacks the modernization needed to integrate large-scale clean energy. Yet the outlook is not all bleak. Experts underline that “renewables in Algeria are gaining a foothold, with green electricity produced in abundance likely to become exportable” (Friedrich-Ebert-Stiftung, p.7). If the country invests in technology and infrastructure, it could move from lagging behind to becoming a regional leader in clean energy exports.
Legal	Legal frameworks have been inconsistent. While Algeria’s 2012 Electricity and Gas Law initially prioritized renewables, “this whole process was called into question” soon after (Friedrich-Ebert-Stiftung, p.4). Such reversals weaken investor confidence and slow down the transition. A stronger and more reliable legal framework is necessary to attract long-term investment in green energy.
Environmental	Algeria’s desert landscape makes it highly vulnerable to climate change, with droughts, desertification, and water stress already worsening. Reliance on hydrocarbons pushed emissions to 3.86 tonnes of CO ₂ per person in 2023 (OWID). The impacts are clear, but so is the opportunity: <i>“the development of renewables will end atmospheric pollution and contribute to improving human health”</i> (Friedrich-Ebert-Stiftung, p. 7). With its vast Sahara, Algeria could turn environmental pressure into a pathway for clean energy leadership.

Analysis findings:

Algeria’s green transition sits at a paradox. On one hand, the country commands universal electricity access, a strong energy infrastructure, and some of the world’s richest solar resources. On the other, these assets remain undermined by entrenched hydrocarbon dependence, subsidy distortions, and fragile regulatory consistency. The PESTLE analysis highlights how political inertia and shifting legal frameworks erode investor confidence, while environmental realities such as desertification, drought, and mounting water stress, magnify the urgency for change. From the SWOT perspective, opportunities are equally striking: large-scale solar deployment, hydrogen exports to Europe, youth-driven green employment, and integration into global climate finance. Yet, these prospects collide with structural threats; rising domestic demand, shrinking export competitiveness, and resistance from vested interests. For Algeria, the choice is less about potential than about governance. Aligning political will with coherent policy, subsidy reform, and international partnership will determine whether its vast resources become a global model of green leadership or remain an unrealized promise.

Youth Perspective and Concluding Remarks

Participating in this program has provided us with a strong understanding of emerging global trends in sustainability and innovation ideas. Through the live sessions we have joined, we gained knowledge about clean energy, climate technology, smart cities, the green economy, green finance, and green jobs. We also developed practical insights into how these areas drive sustainable development. Reflecting on the program, we recognized that the key responsibility is to think critically and propose solutions. Moreover, this program has strengthened our problem-solving skills, creativity, and strategic thinking.

Reflecting on Algeria, there are significant opportunities to translate program learning into practical solutions. For Example, Algeria has a rich amount of solar and wind resources that can be leveraged to develop clean energy projects, which will reduce the side of reliance on fossil fuels and generate green jobs for local communities. Implementing smart city technologies in the urban centers will improve the energy efficiency, transportation, and waste management. Additionally, green finance mechanisms can support the startups and small businesses in accepting sustainable practices, contributing to the growth of Algeria's green economy. In the Education programs side they should focus on renewable energy and climate technology which will prepare young people with the skills needed for emerging green jobs.

In conclusion, this program has highlighted the importance of combining knowledge, responsibility, and an innovative mindset. Applying what we learned to the Algeria context motivates us to develop sustainable and socially impactful solutions.

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PROJECT TITLE

Green Economy Transition in **Angola**

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COUNTRY REPRESENTED:

Angola

Introduction

Country Name	Angola
Continent	Africa
Population	Approximately 36 million (2023 estimate)
Climate Type	Predominantly tropical, with a rainy season and a dry season, varying from humid tropical in the north to arid desert in the south.
Primary Energy Consumption per Capita	Angola's per capita energy consumption is around 22.44 GJ, significantly lower than the global average
Primary Energy Consumption from Renewable Energy	Angola's energy mix includes around 62% renewable energy, mostly derived from hydropower
Share of the population with access to electricity	About 45% of Angola's population has access to electricity, leaving a significant portion of the rural population without reliable access
Per Capita CO2 Emissions	Angola emits roughly 0.8 tonnes of CO2 per capita annually, a relatively low figure compared to global averages, due to its reliance on hydropower but still impacted by oil production

Analysis of the Green Economy

Angola's green economy is steadily developing, largely driven by its significant renewable energy resources, particularly hydropower. However, the country faces considerable challenges in electrification, environmental management, and transitioning towards more sustainable practices. Here is a detailed analysis of the current state of the green economy in Angola, addressing key areas like renewable energy, electric mobility, energy efficiency, and more.

1. Renewable Energy Status:

Renewable energy, especially hydropower, plays a central role in Angola's energy mix, accounting for about 62% of the national energy grid(IEA). This makes Angola one of the leading African nations in renewable energy integration. Hydropower is the dominant source, but Angola is gradually exploring other renewable sources like solar and wind, especially to serve rural areas where access to electricity is limited. The government aims to increase the installed capacity of renewables and reduce its dependence on oil by implementing the National Energy Security Strategy and Renewable Energy Program. The goal is to reach 800 MW of installed renewable energy capacity by 2025(IEA). Expanding this contribution is vital as Angola still struggles with energy access inequality, with only 45% of the population connected to the grid, most of them in urban areas.

2. Electric Mobility:

Electric vehicles (EVs) are not yet widely adopted in Angola, and infrastructure for electric mobility, such as charging stations, is almost non-existent. The country's reliance on oil production and fuel subsidies has hindered the development of electric mobility policies. There are no significant incentives or regulatory frameworks supporting EV adoption, and the high cost of EVs remains a major barrier for the general population. As Angola focuses on recovering from economic crises caused by fluctuating oil prices, investing in EV infrastructure and policy development has not been a priority. Nevertheless, as part of broader regional trends, Angola may eventually explore policies to promote electric mobility in the future, particularly as neighboring countries in Southern Africa begin to adopt such practices.

3. Energy Efficiency Measures:

Angola is taking steps toward improving energy efficiency, particularly in the industrial and building sectors. The government, with support from international organizations like the World Bank and the African Development Bank, has initiated programs aimed at modernizing energy infrastructure and reducing waste. For example, efforts to improve transmission and distribution efficiency are underway, as technical losses in the energy system are high. These improvements are crucial to reducing emissions from energy generation. In urban areas, the introduction of more energy-efficient appliances and lighting systems has seen some progress, but broader implementation of energy-saving technologies is still limited. While these measures have shown promise, more robust policies and incentives are needed to accelerate energy efficiency efforts across sectors.

Challenges and opportunities

Challenges

1. **Dependence on Fossil Fuels and Economic Vulnerability:** Angola's economy is heavily dependent on oil, accounting for over 90% of its exports. This reliance exposes the country to fluctuating oil prices and global market volatility, which hampers efforts to diversify the economy and invest in greener energy sources. Shifting away from fossil fuels is a complex challenge due to the significant role the oil sector plays in national revenue, making green energy investments difficult to prioritize (World Bank).
2. **Limited Infrastructure and Access to Electricity:** While Angola has abundant hydropower resources, a significant portion of the population, especially in rural areas, lacks access to electricity. Expanding the grid and increasing renewable energy production to cover underserved regions is expensive and slow. Additionally, the absence of a developed electric vehicle (EV) infrastructure and inadequate energy efficiency systems limit progress in building a green economy (IEA)(World Bank).
3. **Financial Barriers:** Angola faces financial constraints in accessing affordable green financing. Although international organizations, such as the African Development Bank, are supporting some renewable energy projects, there is still a lack of localized green financial instruments like green bonds or funds for startups. Many companies and small businesses struggle to find affordable capital to invest in sustainable technologies or renewable energy (World Bank).
4. **Consumer Awareness and Engagement:** While urban consumers are becoming more aware of environmental issues, broader consumer engagement remains low, especially in rural areas. The population's immediate focus on securing basic resources like electricity and clean water takes precedence over adopting green practices. Additionally, government campaigns promoting sustainability have not fully penetrated rural areas, leaving a knowledge gap regarding renewable energy and sustainability (IEA).

Opportunities

1. **Renewable Energy Expansion:** Angola's vast hydropower resources and growing solar energy potential present significant opportunities for expanding renewable energy production. The government's goal of increasing renewable energy capacity to 800 MW by 2025 offers a path toward diversifying the energy mix, reducing dependence on fossil fuels, and improving rural electrification. As the country continues to stabilize, investment in solar and wind power, especially for decentralized systems in off-grid rural areas, could drastically increase energy access (IEA).
2. **International Support for Green Projects:** Angola has attracted international support from financial institutions and donors interested in funding green projects. This presents an opportunity to leverage international funding for large-scale projects in renewable energy, infrastructure improvements, and energy efficiency. By tapping into global financing mechanisms such as green bonds and partnerships with international development agencies, Angola can enhance its green transition while addressing infrastructure needs (World Bank).
3. **Sustainable Urbanization and Smart Cities:** Angola's ongoing urbanization offers a unique opportunity to implement smart city initiatives that incorporate green technologies and sustainable urban planning. As cities like Luanda continue to expand, integrating sustainable practices, such as energy-efficient buildings, improved waste management, and renewable energy systems, can create more resilient and sustainable urban environments. These efforts would align with global trends towards sustainability and smart technology use in urban settings (World Bank).
4. **Green Job Creation:** Investing in renewable energy, sustainable agriculture, and conservation efforts offers the potential to create new job opportunities in Angola. As green industries grow, there will be a demand for skilled labor in areas such as renewable energy maintenance, sustainable construction, and environmental management. Promoting education and training programs focused on these areas can equip the workforce with the skills needed for a greener economy (IEA).

SWOT Analysis

Strengths: International support, Abundant renewable energy resources	Weaknesses: Heavy reliance on oil, Limited access to electricity
Opportunities: Expansion of renewable energy, Job creation in green sectors	Threats: Financial barriers, Low consumer awareness

PESTLE Analysis

Political	Government support for renewable energy initiatives Political instability and corruption concerns
Economic	Heavy reliance on oil exports Investment opportunities in green energy projects
Social	Limited consumer awareness of sustainability practices Low access to electricity, especially in rural areas
Technological	Significant potential for hydropower and solar energy Lack of infrastructure for electric vehicles.
Legal	Environmental regulations in place but weak enforcement Lack of energy efficiency standards for buildings
Environmental	Abundant hydropower and solar resources Challenges with environmental degradation and pollution management

Analysis findings:

The SWOT and PESTLE analyses of Angola's green economy reveal key challenges and opportunities. Angola has strong potential in renewable energy, especially hydropower and solar, supported by government policies and international investment. However, the country's heavy reliance on oil exports, limited infrastructure, and low consumer awareness hinders rapid green transitions. Financial barriers, especially for green startups, and weak enforcement of environmental regulations further impede progress.

Political instability and economic dependence on fossil fuels are significant threats, while the country's abundant natural resources and international support offer pathways for growth. Expanding access to green financing, improving infrastructure for electric mobility, and raising public awareness are crucial steps for enhancing Angola's green economy. Fostering innovation in smart cities and promoting energy efficiency could further accelerate the transition (World Bank)(IEA)

Youth Perspective and Concluding Remarks

From a youth perspective, the transition to a greener economy in Angola presents both unique challenges and immense opportunities. Young people, as the future leaders and innovators, have a crucial role to play in this shift. They bring creativity, technological savviness, and the drive to enact change, making them well-positioned to spearhead efforts in renewable energy, sustainable practices, and community-level initiatives.

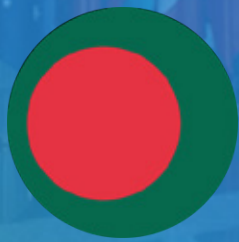
Technological Innovation and Education are key areas where youth can make an impact. By promoting education on sustainability and integrating environmental science into school curriculums, the next generation can become more environmentally conscious. At the same time, fostering entrepreneurship in renewable energy technologies, electric mobility, and energy efficiency can lead to job creation and a cleaner future. The government and private sector must provide financial and infrastructural support to enable youth to lead these efforts.

Community Engagement is another essential factor. Youth-led initiatives can focus on raising awareness at the local level, engaging citizens in waste management programs, biodiversity conservation, and water management strategies. By organizing workshops, campaigns, and collaborative projects, youth can help communities understand the importance of sustainability and their role in contributing to a greener economy.

In conclusion, the path towards a greener Angola requires collaborative efforts from the government, private sector, and, importantly, its youth. With their innovative mindset and passion, young Angolans are essential to driving sustainable practices and creating a resilient, eco-friendly economy.

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PROJECT TITLE

Green Economy Transition in Bangladesh

PARTICIPANT NAME :

1. Maryam Al Marri
2. Maryam Al Zaabi
3. Salama Al Mazrouei
4. Meera Al Mazrouei

COUNTRY REPRESENTED:

Bangladesh

Introduction

Country Name	Bangladesh
Continent	Asia
Population	173.56 million (United Nations, 2022)
Climate Type	Subtropical in the center-north (cool but sunny and pleasantly warm) and tropical in the south (warmer than the north) (Climates to Travel, 2019)
Primary Energy Consumption per Capita	2,907 kWh
Primary Energy Consumption from Renewable Energy	1.01% (Our World in Data, n.d.)
Share of the population with access to electricity	99%
Per Capita CO2 Emissions	0.6 tonnes per person (Our World in Data (Emissions), 2023)

Analysis of the Green Economy

Bangladesh's location makes solar, wind, hydro, and biomass the main renewable resources. These resources have an installed capacity of around 1183 MW and only cover 4.5% of all installed capacity in the country. Of these, solar energy is the main source that covers about 80% of the total. The government encourages the installation of the rest of the renewable sources. However, it is estimated that renewable energy will make up 10% of the total electricity demand in 2040 (Hossain et al., 2023). Bangladesh has a lot of potential for hybrid energy-based EVs since they provide an effective and sustainable way to meet the country's transportation and energy needs. Bangladesh has a wealth of renewable energy resources that can be used in EVs, like solar and wind energy, by optimizing energy use through smart charging and energy management systems. The use of EVs may face some challenges regarding peak demand and load control (Aziz et al., 2024). Moreover, to improve energy efficiency in buildings, Bangladesh's Sustainable and Renewable Energy Development Authority (SREDA) has created the Building Energy Efficiency & Environment Rating (BEEER) system. This rating assesses buildings according to their use of resources, water, and waste. It also seeks to promote green loan products by working with financial institutions and incorporating green building practices into national policies. In addition, the system is in its initial stage (Building Energy Efficiency, 2020). According to the planning for a smart city in the country, the Dhaka smart city project is in progress. However, Dhaka must develop its infrastructure, take the initiative to build it, and figure out how to replenish resources for later use (Karmaker et al., 2023). The government has established two flagship green funds, namely the Bangladesh Climate Change Trust Fund (BCCTF) and the Bangladesh Climate Change Resilience Fund (BCCRF), which, as of now, are the main sources of green finance in Bangladesh. The creation of this fund had two initial goals: to fund adaptation projects and to reduce the development time for adaptation projects (Hossain, 2018). The accessibility of green funds in Bangladesh is driven by the government's focus on climate adaptation and mitigation, streamlining the process for obtaining green finance. The BCCTF and BCCRF funds are open to various stakeholders, including government agencies, NGOs, and businesses, with transparent application processes and support from both domestic and international donors. Collaboration with financial institutions has led to favorable green loan products, offering low-interest rates, extended terms, and grants. Additionally, tax incentives, subsidies, and technical support from SREDA make green projects more affordable and accessible, promoting renewable energy adoption.

In Bangladesh, the government offers various incentives to encourage greener practices, including tax breaks, subsidies, and low-interest loans for businesses investing in renewable energy and sustainable technologies. Additionally, the government promotes solar energy adoption through policy frameworks like the Renewable Energy Policy of Bangladesh. Consumer awareness about sustainable practices is gradually increasing, especially in urban areas, with more people opting for eco-friendly products and reducing plastic consumption. However, widespread engagement is still developing. The waste management and recycling systems, while improving, face significant challenges. Bangladesh struggles with inadequate infrastructure, especially in rural areas, and limited recycling facilities for handling industrial, commercial, and residential waste. In terms of water management, the government has adopted strategies such as rainwater harvesting and promoting more efficient irrigation systems in agriculture. Urban areas are also seeing initiatives to reduce water wastage, but challenges remain in managing groundwater depletion. Biodiversity and conservation efforts are being prioritized through initiatives like the National Biodiversity Strategy and Action Plan.

(NBSAP), which focuses on conserving critical ecosystems such as the Sundarbans mangrove forest and protecting endangered species. These efforts are supplemented by partnerships with international organizations to ensure biodiversity conservation is integrated into national policies, though effective implementation remains an ongoing effort (Bangladesh Ministry of Environment, Forest and Climate Change, 2020).

Challenges and opportunities

SWOT Analysis

Strengths:

There is a significant amount of biomass in the country mainly coming from agricultural crop residues, animal manure and municipal solid waste. In fact, it has one of the highest rates of biomass extraction worldwide (Arman, etc., 2023).

Since 1980, the world bank and bangladesh have been working to promote the sustainable use of the environment, natural resources, and the blue economy. The bank is supporting them in a transition to a green growth development pathway (Creating a Green and Sustainable Growth Path for Bangladesh, 2022).

Weaknesses:

The country has increasing poverty rates as can be seen in graph 1 below the table.

Bangladesh is extremely vulnerable to both disasters and climate changed, placing it in the seventh position on the 2021 World Climate Risk Index (Climate Vulnerability Index (Draft) | United Nations Development Programme, 2023). This issue may need looking over before focusing on the transition to a greener economy.

Opportunities:

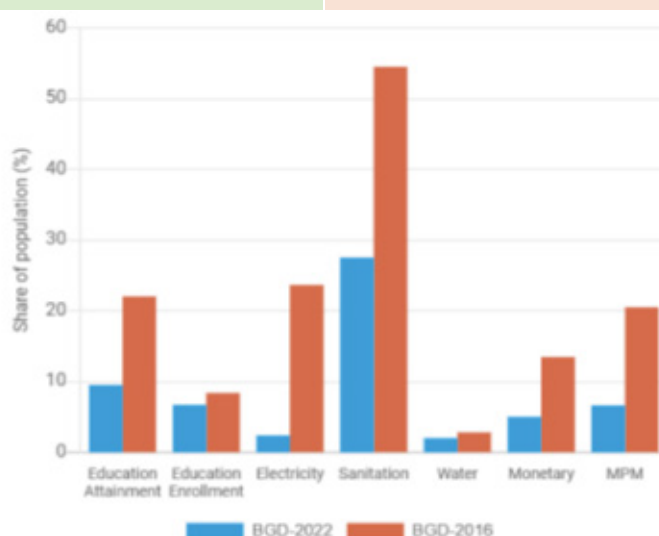
There is a growing demand in the green market, and Bangladesh has the biomass to participate in it.

Given that the world bank is supporting Bangladesh, this allows for more finance in addition to increased climate finance from other resources that want to support green projects.

Threats:

Due to the recurring natural disasters that happen from climate change, it may be hard to focus on turning green while citizens are dying from disasters and projects could be destroyed from this issue.

There is currently a growing market for green energy and green transition, which may make it harder to become the drivers of this change.



Graph 1. The graph shows the share of population in relation to resources. This is being compared from the year 2016 and 2022. The graph was obtained from Poverty and Inequality Platform (n.d.).

PESTLE Analysis

Political	Government Commitment: The Bangladeshi government has shown interest in sustainable development through policies like the Bangladesh Climate Change Strategy and Action Plan. Regulatory Framework: Policies promoting renewable energy and environmental protection can facilitate the transition but may face bureaucratic challenges due to corruption, inefficiency, lack of coordination and limited capacity.
Economic	Investment Opportunities: Green technologies and renewable energy sectors present new economic opportunities, attracting foreign investments. Job Creation: Transitioning to a green economy can generate jobs in renewable energy, sustainable agriculture, and eco-friendly industries.
Social	Public Awareness: Increasing awareness of environmental issues among citizens can drive demand for sustainable practices and products. Equity Concerns: Ensuring that the transition benefits all socio-economic groups is crucial, as vulnerable populations may be disproportionately affected.
Technological	Innovation in Green Technologies: Advancements in solar energy, waste management, and sustainable agriculture are vital for success. Infrastructure Development: Investment in green infrastructure, such as smart grids and public transportation, is necessary for sustainable growth.
Legal	Environmental Regulations: Strong enforcement of environmental laws is essential to support the green economy. International Agreements: Bangladesh's participation in global environmental agreements enhances its commitment to sustainability.
Environmental	Climate Vulnerability: As one of the most climate-affected countries, Bangladesh must prioritize resilience in its transition. Natural Resource Management: Sustainable management of resources, such as water and forests, is critical for supporting a green economy.

Analysis findings:

Bangladesh has significant biomass resources from agricultural residues, animal manure, and municipal waste, positioning it well for a green economy transition. Supported by the World Bank, the country is pursuing sustainable development amidst increasing poverty and vulnerability to climate disasters, ranking seventh on the 2021 World Climate Risk Index.

Opportunities include a growing green market and access to international climate finance. However, threats arise from recurring natural disasters, which hinder efforts to implement green projects while prioritizing immediate disaster response. The PESTLE analysis highlights political support and economic potential, but bureaucratic challenges and climate vulnerabilities must be addressed to facilitate this transition effectively. Balancing immediate needs with long-term sustainability goals is crucial for success.

Youth Perspective and Concluding Remarks

Maryam Al Marri: As a CSR Senior Specialist in the oil and gas industry, I recommend fostering green technologies and renewable energy projects to reduce environmental impact. Implementing circular economy models and waste reduction strategies can further align the sector with global sustainability goals. Strategic partnerships between public and private sectors will help scale these innovations. Educational initiatives should focus on developing youth skills in sustainability, preparing them for future leadership. Community involvement is also crucial, with grassroots projects and public awareness campaigns driving environmental stewardship. These approaches collectively support the transition to a greener economy and address local environmental challenges.

Salama Almazrouei: As a sustainability student, I recommend taking advantage of the significant amounts of biomass found in the country and using it to aid them by becoming a driver in the transition. Given that the biomass amounts are large, I would suggest two things; first is collaborating with world bank for financial support in their transition, second is since they most likely have more biomass than they did, they could take advantage of it by exporting it to other countries for funds that can be later re-invested into the transition to their green economy.

Maryam Alzaabi: To facilitate Bangladesh's transition to a greener economy, we must champion decentralized renewable energy initiatives, such as community-led solar projects, and integrate advanced agritech solutions in agriculture. Enhancing environmental literacy in educational curricula is crucial. Establishing "Green Youth Councils" for participatory urban planning and deploying tech-driven platforms for environmental monitoring will empower youth. Strategic alliances among government, private sector, and civil society are essential for scaling these transformative initiatives.

Meera Almazrouei: As an electrical engineering student, I recommend setting clear plans for green energy, since the country is one of the biggest countries in industries, and that creates a negative impact on the environment because of burning fossil fuels. After setting clear plans, I suggest creating a land for solar panels to feed the factories. Moreover, do more effort to transform Dhaka to a smart city and all that comes after solid education for the new generations and youth.

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PROJECT TITLE

Green Economy Transition in **Brazil**

PARTICIPANT NAME :

1. Asmaa Alnaqbi
2. Elaine Chiroto
3. Mariyam Rafha Abdulla

Introduction

Country Name	Brazil
Continent	South America
Population	213.4 million
Climate Type	Tropical.
Primary Energy Consumption per Capita	18.49 MWh (18,490 kWh) per capita (2024)
Primary Energy Consumption from Renewable Energy	49.62% (2024)
Share of the population with access to electricity	100% (2023)
Per Capita CO2 Emissions	2.16 tonnes per person (2023)

Analysis of the Green Economy

Brazil stands out globally for its extensive use of renewable energy, with 88.2% of its electricity coming from renewable sources, one of the highest shares worldwide (International Energy Agency, 2023). Hydropower remains the dominant contributor, but reliance on it has created vulnerability to climate variability, particularly droughts that disrupt supply. To strengthen resilience, Brazil has expanded investments in solar and wind energy, with installed capacities surpassing 37 GW and 26 GW, respectively, in 2024 (IEA, 2023). This diversification supports Brazil's efforts to secure energy supply and reduce emissions. Biomass also plays an important role, particularly sugarcane ethanol, which powers both electricity generation and the transport sector. Brazil's RenovaBio policy has promoted biofuel production, while the National Hydrogen Strategy encourages development of green hydrogen as an emerging solution (Ministry of Mines and Energy of Brazil, 2022).

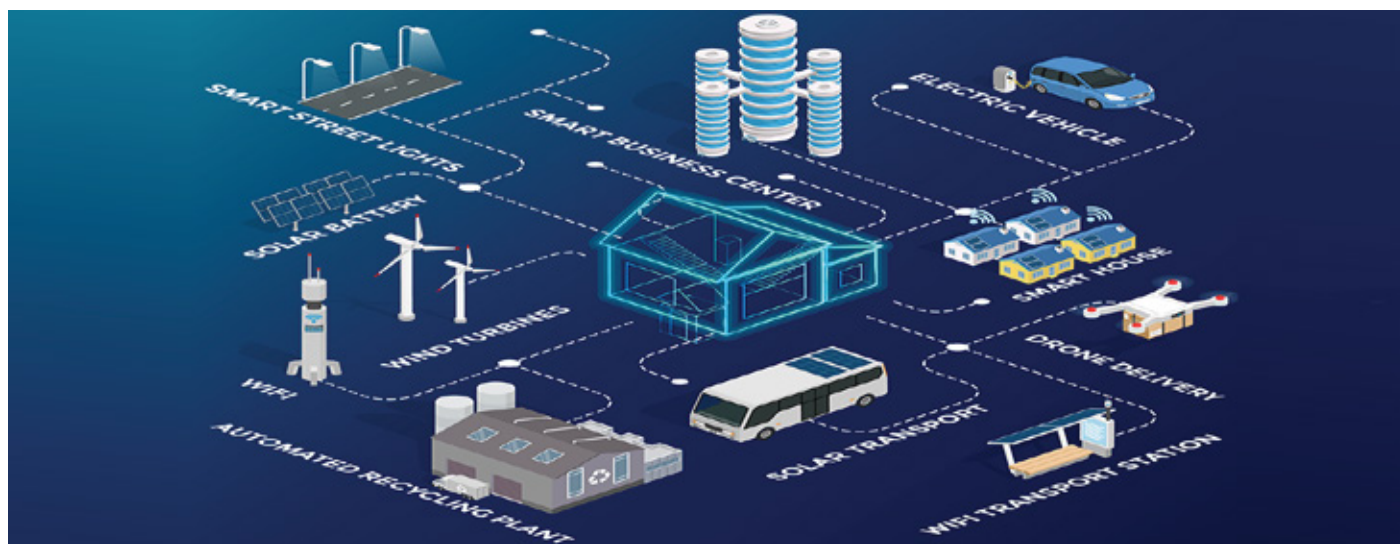


Figure 1: Overview of Smart and Renewable Energy Systems in Brazil's Green Economy

Despite progress, challenges remain. Overdependence on hydropower exposes the energy sector to climate shocks, while limited storage capacity and outdated grids constrain the integration of variable renewables like solar and wind. Expanding storage solutions, modernizing grid infrastructure, and scaling low-carbon technologies are crucial for building a more resilient energy system. Overall, Brazil's strong renewable energy base positions it as a leader in the global green transition.

Water management is another critical area, as Brazil hosts approximately 12% of the world's freshwater resources, mostly concentrated in the Amazon basin (World Bank, 2022). Unequal distribution means that water-scarce regions, particularly the northeast, face recurring droughts and water stress. To address this, Brazil has invested in infrastructure such as reservoirs, desalination plants, and large-scale projects like the São Francisco River Integration Project, which transfers water to drought-prone areas (Agência Nacional de Águas e Saneamento Básico [ANA], 2021). Integrated Water Resource Management (IWRM) frameworks, managed by river basin committees, promote stakeholder participation in planning and allocation.

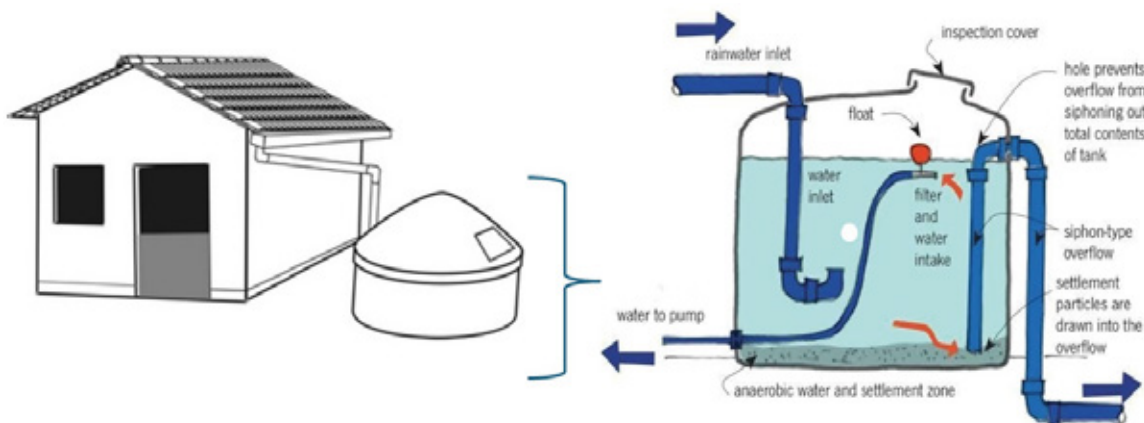


Figure 2: One Million Cisterns Program for water harvesting in Northeast Brazil (Drynet, 2015).

Brazil has also made efforts to expand access to safe drinking water and sanitation, guided by the National Basic Sanitation Plan (PLANSAB). However, disparities persist, with rural and informal settlements lagging behind in service provision. Urbanization, industrial pollution, and untreated sewage remain major threats to water quality. Climate change is expected to intensify droughts, floods, and contamination risks, placing additional pressure on existing infrastructure (ANA, 2021). Addressing these issues requires stronger investment in wastewater treatment, enforcement of pollution controls, and integration of climate adaptation measures into water policies.

Waste management has emerged as both a challenge and an opportunity for Brazil's sustainable development. The country generates nearly 82 million tons of solid waste annually, yet only about 4% is recycled (Brazilian Association of Public Cleaning and Special Waste Companies [ABRELPE], 2022). The remainder often ends up in landfills or open dumps, leading to methane emissions, soil contamination, and health risks. In response, Brazil enacted the National Solid Waste Policy (PNRS) in 2010, which introduced principles such as shared responsibility, circular economy, and extended producer responsibility. PNRS encourages municipalities, industries, and consumers to collaborate in reducing waste and improving recycling systems.

Informal waste pickers, or catadores, play a vital role in recycling, collecting and sorting significant volumes of materials. Efforts have been made to formalize and integrate them into official waste management systems, offering social and economic benefits. Despite progress, implementation gaps remain, particularly in smaller municipalities lacking adequate infrastructure. Expanding waste-to-energy technologies, improving recycling rates, and promoting sustainable consumption patterns are key priorities. Effective enforcement of PNRS and private-sector participation will also be crucial to reducing environmental impacts and aligning with Brazil's climate goals.



Figure 3: Picture of the catadores, with “UM CATADOR DO QUE DO MEIO FAZ MAIS UM MINISTRO AMBIENTE”, which means “A trash collector does more than an environment minister”.

In conclusion, Brazil has made substantial progress in renewable energy, water management, and waste management, but significant gaps remain. Its energy system is increasingly diversified, yet vulnerable to hydrological variability. Water resources are abundant but unevenly distributed, with pollution and access disparities posing risks. Waste management policies are in place but face structural and enforcement challenges. To advance sustainability, Brazil must continue to invest in technology, infrastructure, and governance while integrating climate resilience into all sectors. These measures will strengthen its role as a global leader in sustainable development.

Challenges and opportunities

SWOT Analysis

Strengths:

High renewable share in electricity (88.2% in 2024); abundant natural resources (hydro, wind, solar, biomass); nearly universal electricity access (99.8%); established institutions and policies supporting renewable energy; growing awareness of sustainability among consumers; active waste management cooperatives and programs.

Weaknesses:

Heavy dependence on hydropower, vulnerable to drought; regional disparities in energy access; transport still fossil fuel-heavy; complex regulations slowing private investment; low recycling rates (4%); inconsistent enforcement of environmental and energy policies.

Opportunities:

Expand solar and wind capacity; strengthen regional grids; scale electric mobility and sustainable biofuels; attract green finance and partnerships; leverage climate leadership in multilateral forums; implement smart city technologies; increase energy efficiency in buildings and industry.

Threats:

Extreme weather affecting hydropower; pressure to exploit offshore oil/gas; deforestation and land-use conflicts; global economic and political volatility affecting clean-energy policies; social inequality impacting access to green technologies; slow adoption of EVs due to cost and infrastructure barriers.

PESTLE Analysis

Political	The green transition is a top priority for President Lula's current administration in Brazil. Reentering the Paris Agreement, promising to stop illegal deforestation by 2030, and establishing a national carbon market in 2024 are examples of recent initiatives. Policies for offshore wind and green hydrogen have also been brought about by political support. Political momentum, however, can fluctuate, as evidenced by agribusiness resistance and contentious legislative proposals like the "Timeframe Bill".
Economic	Brazil's abundant natural resources, wind, solar, biomass, and hydro, provide a strong foundation for green growth and attract climate finance. Opportunities for renewable projects are growing as a result of green bonds and foreign investment. However, regional differences, inflationary pressures, and macroeconomic volatility raise financing risks and can impede infrastructure deployment, particularly in underprivileged areas.
Social	More Brazilians are looking for eco-friendly goods and methods as consumer awareness of sustainability grows. Access is still uneven, though, with greater participation in affluent cities than in less affluent areas. Although they operate in hazardous conditions, informal waste pickers, or "catadores," continue to play a crucial role in recycling, underscoring the need for inclusive "just transition" policies that safeguard marginalized communities and guarantee fair participation in the green economy.
Technological	Brazil has one of the cleanest electricity grids in the world, with over 80% of power generated from renewable sources such as hydropower, wind, and solar energy. The country is also a global leader in biofuels, which has provided an alternative to fossil fuels for decades. However, EV adoption is still under 1% of new car sales because of high costs and limited charging infrastructure. In addition, Brazil lacks energy storage technologies, which are crucial to balance intermittent renewable supply.
Legal	Brazil's legal framework both supports and complicates its green transition. Programs like RenovaBio incentivize biofuel expansion through tradable carbon credits, while the country has pledged net-zero emissions by 2050 and committed to ending illegal deforestation by 2030 under the Paris Agreement. The Forest Code provides a strong legal basis for environmental protection if enforced consistently. On the other hand, weak governance and fluctuating political priorities undermine these commitments. For instance, while the current administration is strengthening climate policy, the previous administration rolled back protections, creating instability and discouraging investors. In addition, slow and complex permitting processes delay renewable energy projects, while illegal deforestation and weak enforcement continue to erode progress.
Environment	Brazil's biodiversity and natural resources position it as a potential leader in sustainable development. The country holds vast renewable energy potential, with abundant sun, wind, water, and biomass resources, alongside the Amazon rainforest, which could play a central role in carbon markets and ecosystem-based solutions. Civil society and youth movements have also been increasingly active in pushing sustainability to the forefront. Yet, deforestation and biodiversity loss in the Amazon continue at alarming rates, undermining both climate and ecological resilience. Hydropower is increasingly affected by droughts linked to climate change, while floods in southern regions highlight the risks of extreme weather.

Analysis findings:

Brazil's PESTLE and SWOT analyses locate strong pillars and critical issues in the establishment of its green economy. Its strong pillars are abundant renewable resources, limited electricity availability for energy, and increasing consumer awareness for sustainability. Its weaknesses are excessive dependence upon hydropower, unequal energy access, regulatory challenges, and vulnerability to drought. Its opportunities are further innovation on solar, wind, biofuels, and smart city technology, whereas risks are created because of climate change impacts, loss of forests, fossil fuel pressures, and global financial insecurity.

PESTLE analysis adds to these findings: politically, Brazil possesses climate policy-making but is held back by agribusiness opposition; economically, foreign investment pours in with renewable growth but inflation and domestic disparities restrain it. Socially, awareness for sustainability grows but remains unequal. Technologically, Brazil is ahead on the biofuels and renewable

energy front but behind on EV releases and charging points. Legally, institutions tip green but poor enforcement stifles advancement. Environmentally, biodiversity is committed but deforestation and climate extremes diminish resilience.

Implication: Brazil must diversify renewables from hydropower, enhance governance, render accessibility inclusive, and invest in storage and EV infrastructure to create a resilient green economy.

Youth Perspective and Concluding Remarks:

As young people, we believe that Brazil's transition to a green economy must place people at its center. A truly sustainable future is one where communities, schools, and individuals are engaged and empowered to act together to reach long term change. Behavior change begins at the grassroots level, and youth can play a key role by raising awareness both in local communities and online spaces, where ideas spread quickly and inspire action.

From our perspective, several key areas demand attention. First, the expansion of affordable and clean transportation such as electric vehicles and green buses should be prioritized, ensuring accessibility for citizens while reducing reliance on fossil fuels. Second, Brazil's recycling and waste management systems must be strengthened, particularly by formally recognizing and supporting the work of catadores, who play an essential but undervalued role in waste collection and recycling. Their integration into national strategies would not only improve efficiency but also uphold social justice. Third, stronger biodiversity protection is crucial, as Brazil's rich ecosystems form the backbone of both national identity and global environmental stability, and their improved management and protection is key to environmental resilience.

Partnerships as essential to accelerating change. Businesses, governments, and young innovators must work together to make clean technologies more accessible and affordable. By fostering collaboration, we can expand renewable energy, create innovative local solutions. At the community level, youth-led initiatives such as cleanup campaigns, climate action projects, and sustainability-focused start-ups are practical ways to translate policy into action. These projects not only raise awareness but also cultivate stewardship within communities. Education must also play a central role, and will help communities connect sustainability with their everyday lives.

In conclusion, a green economy in Brazil is rooted in justice and inclusion, which includes contributions of local communities, creates opportunities for innovation, and strengthens consistent progress.

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PROJECT TITLE

Green Economy Transition in Cameroon

PARTICIPANT NAME :

1. Mbolo Mattys Ryan
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COUNTRY REPRESENTED:

Cameroon

Introduction

Country Name	Cameroon
Continent	Central Africa
Population	29,309,443
Climate Type	Equatorial climate in the south; tropical climate in the northern part. The country experiences a mix of rainy and dry seasons with varying temperatures and rainfall patterns depending on the region. It also features diverse vegetation, including coastal mangroves, tropical rainforest, and hardwood evergreen trees.
Primary Energy Consumption per Capita	-
Primary Energy Consumption from Renewable Energy	Biofuels and waste account for 55% of domestic energy production and 71% of total energy supply.
Share of the population with access to electricity	-
Per Capita CO2 Emissions	-

Analysis of the Green Economy

Chad has one of the lowest energy consumption per capita rates globally. The country's energy infrastructure is underdeveloped, and access to electricity remains limited. As of 2024, only about 12% of the population has access to electricity, with a stark divide between urban and rural areas (UN,2024). Rural electrification is almost nonexistent, and many communities rely on biomass (wood and charcoal) for cooking and heating. Chad's energy consumption is predominantly based on traditional biomass, which accounts for around 90% of the total energy consumption(UN,2024). This reliance on biomass contributes to deforestation and environmental degradation, particularly in the southern parts of the country. The country's electricity generation is primarily diesel-based, which is expensive and unsustainable. The government is exploring renewable energy solutions, particularly solar energy, given Chad's abundant sunlight throughout the year.

2.1 Analysis of The Current Status and Future Prospects of Chad's Green Economy

Chad, a landlocked country in Central Africa, faces significant environmental and developmental challenges, yet it holds potential for fostering a green economy. The country's efforts to embrace renewable energy, sustainable practices, and environmental conservation are at a nascent stage, hindered by political instability and limited resources. However, there are emerging strategies to incorporate greener practices across various sectors. This analysis explores Chad's status in renewable energy, electric mobility, energy efficiency, smart cities, green financing, government incentives, consumer behavior, waste management, water management, and biodiversity conservation.

In relation to Renewable Energy Status, Chad is highly reliant on traditional biomass (wood and charcoal) and fossil fuels for energy, contributing to deforestation and carbon emissions. The country's contribution of renewable energy to the national grid is minimal, with solar power being the most prominent renewable energy source. Solar energy plays a limited role, mostly in small-scale, off-grid applications such as solar lamps and panels for rural communities. Renewable energy contributes less than 2% to the national grid, while access to electricity remains a challenge, with only 10% of the population having regular access. Chad's government has recognized the need to expand renewable energy contributions. The National Renewable Energy and Energy Efficiency Strategy aims to increase the share of renewables in the energy mix to 25% by 2030. Solar energy is prioritized, given the country's geographic advantages, but large-scale renewable energy projects have been slow to develop due to funding constraints and infrastructure challenges. International support and public-private partnerships are vital to advancing these targets.

In terms of electric Mobility, Electric vehicles (EVs) are nearly absent in Chad, primarily due to inadequate infrastructure and economic barriers. The country lacks the essential charging stations and EV-related policies necessary to encourage adoption. The high cost of EVs compared to conventional vehicles and limited consumer awareness about electric mobility further hinder its prevalence. There are no specific government policies to promote electric mobility, although Chad's broader energy efficiency goals

could eventually support this sector. International organizations and regional partners are critical to pushing forward policies and pilot projects that could introduce EVs, starting with public transportation or government fleets. In terms of Energy Efficiency Measures, Chad has taken initial steps to improve energy efficiency in buildings, industries, and transportation, but progress is slow. The National Renewable Energy and Energy Efficiency Strategy includes measures to promote efficient energy use, particularly in urban buildings and industries. Initiatives focus on energy-efficient lighting, appliances, and promoting solar-powered solutions for residential areas. Energy efficiency in transportation, however, remains largely undeveloped. The reliance on aged, fuel-inefficient vehicles and a lack of regulations for promoting cleaner fuels are obstacles. Improvements have been marginal due to a lack of infrastructure and financing for energy-efficient upgrades.

In terms of Smart City Initiatives; currently speaking, Chad does not have fully-fledged smart city projects. However, some cities like N'Djamena have begun to explore digital solutions for urban management. Efforts include the implementation of solar street lighting and improving waste collection through digital platforms. While these initiatives are not yet comprehensive smart city plans, they represent small steps toward integrating technology and sustainability in urban planning. Expanding these initiatives could be a long-term goal, especially as access to renewable energy grows.

Green financing in Chad remains underdeveloped, though some international donors and financial institutions have begun to explore opportunities for supporting green projects. The Green Climate Fund, (GCF) and African Development Bank, (AfDB) have shown interest in financing renewable energy and climate resilience projects. However, these funds are often inaccessible to small businesses and startups due to complex application processes and the need for substantial upfront capital.

Local banks have not yet established green finance instruments, limiting access for enterprises looking to invest in sustainable projects. Encouragingly, government efforts to improve regulatory frameworks for green financing could open up new pathways for small and medium enterprises (SMEs) to access these funds

In terms of Government Incentives; Chad's government provides limited incentives for businesses or consumers to adopt greener practices. High taxes on renewable energy equipment and limited subsidies for solar projects have deterred widespread adoption. However, international pressure and environmental agreements, such as Chad's commitments under the Paris Agreement, could encourage the government to implement more robust policies in the future.

In relation to Consumer Behavior, Awareness of sustainable practices among consumers in Chad is low, primarily due to economic constraints and limited education on environmental issues. Most citizens prioritize daily survival over sustainable consumption, given the country's poverty levels. However, small shifts are occurring, particularly in urban areas where solar panels and clean cookstoves are gaining traction.

In the sector of Waste Management and Recycling too, waste management in Chad is underdeveloped, with most urban and rural areas lacking proper waste collection and recycling systems. N'Djamena, the capital city, faces significant challenges in handling industrial, commercial, and residential waste. While there are efforts to improve waste collection, recycling is virtually non-existent, and landfills are often mismanaged. In recent years, small-scale recycling initiatives have emerged, primarily driven by NGOs and local businesses. However, these efforts remain limited and require greater governmental support to be effective.

Also, water management is critical in Chad, particularly given its arid climate and reliance on agriculture. The government has developed strategies for sustainable water use in agriculture, focusing on water-saving irrigation techniques and rainwater harvesting. However, the implementation of these strategies has been uneven due to inadequate funding and infrastructure. Urban water management is equally challenging, with many cities lacking proper sewage and drainage systems. Climate change exacerbates these problems, increasing the frequency of droughts and floods.

In terms of Biodiversity and Conservation Efforts, Chad is home to unique biodiversity, but its ecosystems are threatened by deforestation, desertification, and illegal wildlife trade. The government, in collaboration with international organizations, has implemented several biodiversity conservation initiatives. Zakouma National Park is a prime example, where anti-poaching measures and conservation efforts have been relatively successful.

International partnerships with NGOs like the World Wildlife Fund (WWF) and African Parks have played a critical role in conserving Chad's wildlife. However, broader conservation efforts require more significant financial support and political stability

To wit, though Chad's green economy is still in its infancy, there is growing awareness of the need for sustainable development. The government, international organizations, and private sectors must collaborate to implement renewable energy projects, improve energy efficiency, and develop sustainable practices. Key challenges, such as inadequate financing, political instability, and poor infrastructure, must be addressed to unlock Chad's green economy potential.

Challenges and opportunities

SWOT Analysis

SWOT analysis is a tool that assesses the strengths, weaknesses, opportunities, and threats of an organization or project, which is used in the context of the green economy to evaluate the readiness, potential, and challenges of transitioning towards sustainable development.. In the case of Cameroon, its green economy SWOT analysis is as follows.

Strengths: • These include abundant solar energy, groundwater, and mineral wealth. • Also, Chad's economy is expected to perform well in 2023, with GDP growth of 4.1% and oil production increasing by 4.4%.	Weaknesses: • Low economic diversification • poor infrastructure • Poverty (38.7% of the population was in extreme poverty in 2022) • Food insecurity(12.1% of the population was food insecure by the end of 2022) • Political fragility (The country has a weak political environment, with a lack of legitimacy in leadership and fighting with armed groups) • Landlocked and prone to disasters.
Opportunities: • Eco-tourism • Reforestations • Renewable energy	Threats: • Reliance on extractive resources • Socio-cultural resistance • Political instability which hinders progress • Security threats(Chad faces security threats from Boko Haram and Islamic State – West Africa Province) • Displacement crisis (Chad is experiencing a displacement crisis due to insecurity and armed conflict in neighboring countries) • Humanitarian needs(Chad has large refugee populations from neighboring countries, including the Central African Republic, Cameroon, and Sudan)

PESTLE Analysis

Political	Chad faces autocratic governance, terrorism threats, and a weak rule of law. The country also has political fragility, with weak leaders and fighting against armed groups.
Economic	Chad's economy is dependent on oil revenues, and falling oil prices have undermined it since 2015. It also has widespread extreme poverty and food insecurity.
Social	Chad is one of the world's poorest countries, with most people living in poverty as subsistence farmers and herders.
Technological	Chad is currently working on a Technology Needs Assessment to determine which technologies to prioritize.
Legal	Chad has an inefficient regulatory system that holds back private-sector development.
Environmental	Chad is landlocked and disaster-prone, with over half of its territory being desert. The Saharan and Sahelian climatic zones have encroached on Chad's territory, and Lake Chad has shrunk to 10% of its 1960s size.

Analysis findings:

Proposed Practical and Innovative Recommendations to Enhance Sustainability of Chad's Green Economy

To support Chad's transition to a green economy, here are some innovative and practical recommendations suggested from the team's perspective that can be easily implemented to improve its green economy:

Sustainable Practices

- **Agroecological Farming:** Agroforestry and sustainable farming practices improve soil health and enhance food security. FAO highlights agroecology as key for sustainable food systems .
- **Renewable Energy Adoption:** Chad's immense solar potential offers opportunities for decentralized solar energy projects to power rural communities. According to IRENA, solar energy is critical for expanding energy access in Sub-Saharan Africa
- **Sustainable Water Management:** Rainwater harvesting and efficient irrigation systems can significantly reduce water usage. UN Water promotes these practices to address water scarcity in arid regions .
- **Waste Management and Recycling:** Efficient waste management systems and circular economy approaches are increasingly seen as solutions to pollution and resource inefficiency in Africa. UNEP supports Africa's transition to circular economies .

Technological Advancements:

- **Smart Agriculture:** this will involve IoT-based precision agriculture and drones which will help optimize resource use in farming. The World Bank discusses the potential of digital agriculture to boost productivity.
- **Mobile-based Platforms for Farmers:** Mobile applications that will provide real-time market data and weather forecasts information for farmers. For example, FarmDrive in Kenya connects farmers with financial institutions.
- **Energy Storage Solutions:** Battery storage technologies are critical for stabilizing renewable energy grids. IRENA highlights how energy storage can enhance renewable energy deployment in off-grid regions.
- **Digital Payments for Carbon Credits:** Blockchain has the potential to revolutionize carbon credit markets by making them more transparent. UNEP has studied blockchain's role in environmental sustainability.

Educational Initiatives:

- **Environmental Education in Schools:** Integrating environmental education into school curriculums is key for long-term sustainability. UNESCO advocates for sustainability education at all levels.
- **Training Programs for Renewable Energy Jobs:** Vocational training can help prepare workers for green jobs, especially in renewable energy sectors. ILO supports training initiatives for green job creation.
- **Public Awareness Campaigns:** Public campaigns that raise awareness of sustainable practices can drive individual and community action. USAID supports awareness programs across African nations to boost environmental stewardship.

Community Involvement:

- **Community-based Renewable Energy Cooperatives:** Community-based renewable energy projects can democratize access to energy. The World Resources Institute advocates for such models in Sub-Saharan Africa.
- **Local Green Innovation Hubs:** Establishing local innovation hubs can empower communities to co-create sustainable solutions. African Development Bank (AfDB) supports local entrepreneurship in green technologies.
- **Sustainable Tourism Initiatives:** Ecotourism can empower local communities while preserving biodiversity. UNEP and the World Tourism Organization promote sustainable tourism as part of Africa's green transition.

Strategic Partnerships

- **Public-Private Partnerships (PPPs):** PPPs can leverage private sector investments for green infrastructure projects. According to the African Development Bank, PPPs are vital for closing Africa's infrastructure gap.
- **International Collaboration:** International partnerships with organizations like the Green Climate Fund provide financial and technical resources to support Chad's green economy transition.
- **Partnerships with Research Institutions:** Collaborations between local and international research institutions are key for developing context-specific green solutions. The CGIAR system supports research on climate resilience in African agriculture.

Policy and Regulatory Framework:

- **Green Tax Incentives:** Fiscal incentives are powerful tools to promote green technology adoption. UNEP recommends tax incentives as part of national green growth strategies.
- **Sustainable Land Use Policies:** Policies preventing deforestation and promoting land restoration are crucial for long-term sustainability. The UN Convention to Combat Desertification (UNCCD) stresses the importance of sustainable land management.
- **Carbon Pricing Mechanisms:** Carbon pricing mechanisms incentivize industries to reduce emissions. The World Bank supports carbon pricing as an effective tool for reducing greenhouse gasses.

Conclusion

The team believes that, by integrating these recommendations in terms of sustainable practices, technological advancements, educational programs, community engagement, and strategic partnerships, Chad can effectively transition toward a green economy while ensuring long-term environmental resilience and economic growth.

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PROJECT TITLE

Green Economy Transition in Chad

PARTICIPANT NAME :

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2. Atteib Habib Doutoum (Chad)

COUNTRY REPRESENTED:

Chad

Introduction

Country Name	Chad
Continent	Africa
Population	20.3 million (2024 projection)
Climate Type	Tropical and desert climate with Saharan, Sahelian, and Sudanian zones
Primary Energy Consumption per Capita	361 kWh per year
Primary Energy Consumption from Renewable Energy	Less than 2%, primarily solar
Share of the population with access to electricity	11.27% (2021)
Per Capita CO ₂ Emissions	0.1 tons per capita (2022)

This Capstone project is a research-based project which focuses on promoting sustainable green economic practices in Chad, by introducing some realistic, innovative and practical recommendations or solutions as a team to enhance the country's green economic development after addressing into details its continent, population, climate type, primary energy consumption per capita, Primary Energy Consumption from Renewable Energy, Share of the population with access to electricity, Per Capita CO₂ Emissions, analysis on its green economy, challenges it faces and the opportunities it brings as a whole.

1.1 The Geonational Identity of Chad

1.1.1 Continent: Chad is located in Africa, the second-largest continent both by area and population. Chad, situated in the Sahel region of north-central Africa, is at the crossroads of these ecological challenges, which makes it a crucial target for green economy initiatives.



chad-africa-map – Taarifa

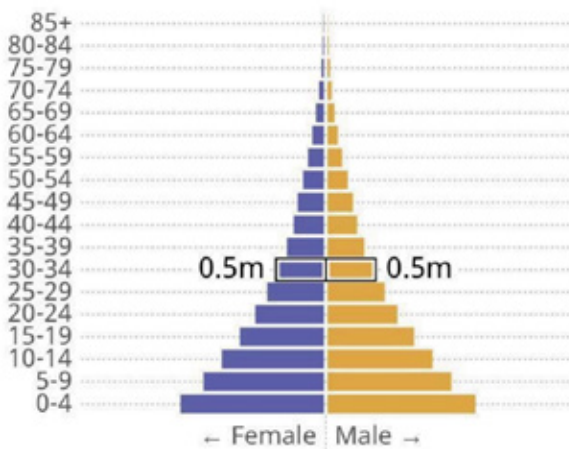
The peoples of Chad carry significant ancestry from Eastern, Central, Western, and Northern Africa.

Chad's languages fall into ten major groups, each of which belongs to either the Nilo-Saharan, Afro-Asiatic, or Niger–Congo language family. These represent three of the four major language families in Africa; only the Khoisan languages of southern Africa are not represented. The presence of such different languages suggests that the Lake Chad Basin may have been an important point of dispersal in ancient times.

1.1.2 Population: Chad's population is estimated at 17.18 million (World Population Review, 2024). However, the UN estimates the July 1, 2024 population at 20,299,123. It is a young country demographically, with more than 65% of its population under the age of 25. (WHO Data, 2023)

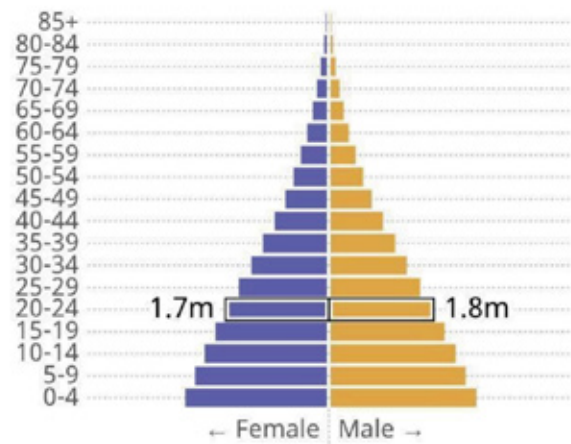
2023

Population by age and sex. Chad



2050

Population by age and sex. Chad

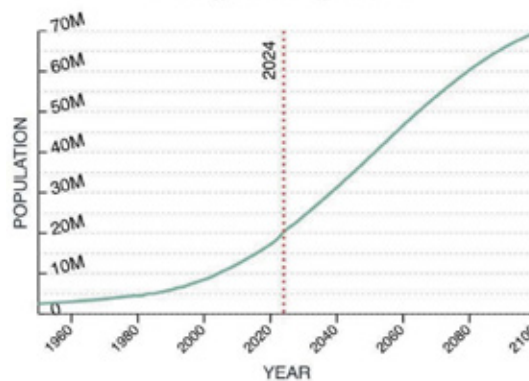


World Health Organization Data

The country's population density is relatively low compared to other African nations.

Chad Population 2024 (Live)

20,475,171



World Population Review, 2024

According to current projections, Chad's population is expected to increase for the remainder of the century. As of 2020, the population was 16.43 million people and is expected to increase to 61.5 million by 2099. Chad's population is projected to surpass 50 million people by 2076.(World Population Review, 2024)

The population of Chad is growing relatively fast at a rate of 3.00% from 2019 to 2020. This added about 479,000 people to the population. This rate has slowly decreased over the years as the fertility rate has also decreased. Despite this, the fertility rate in Chad is still one of the highest in the world at 5.80 births per woman.

Unfortunately, Chad is one of the poorest countries in the world. Chad's major problems, including a high risk of floods and droughts, widespread poverty, and frequent civil war, can all be exacerbated by rapid population growth.

1.2 Climate Type

Chad has a tropical and desert climate, with three main climatic zones:

- The Saharan zone in the north experiences extreme aridity, with very little annual rainfall and high temperatures that can reach up to 50°C (122°F) in summer.
- The Sahelian zone in the center is semi-arid, with short rainy seasons lasting from June to September. The rainfall is sporadic and highly variable, making agriculture and pastoralism precarious.
- The Sudanian zone in the south has a tropical climate with higher rainfall and more fertile soils, which supports the majority of Chad's agricultural activities

Table 1.0

Primary Energy Consumption per Capita	361kWh (1965-2021)
Primary Energy Consumption from Renewable Energy	No data disclosed
Share of the population with access to electricity	11.27 percent (1990-2021)
Per Capita CO₂ Emissions	0.1tonnes (1750-2022)

2. Energy Consumption Analysis

Chad has one of the lowest energy consumption per capita rates globally. The country's energy infrastructure is underdeveloped, and access to electricity remains limited. As of 2024, only about 12% of the population has access to electricity, with a stark divide between urban and rural areas (UN,2024). Rural electrification is almost nonexistent, and many communities rely on biomass (wood and charcoal) for cooking and heating. Chad's energy consumption is predominantly based on traditional biomass, which accounts for around 90% of the total energy consumption(UN,2024). This reliance on biomass contributes to deforestation and environmental degradation, particularly in the southern parts of the country. The country's electricity generation is primarily diesel-based, which is expensive and unsustainable. The government is exploring renewable energy solutions, particularly solar energy, given Chad's abundant sunlight throughout the year.

2.1 Analysis of The Current Status and Future Prospects of Chad's Green Economy

Chad, a landlocked country in Central Africa, faces significant environmental and developmental challenges, yet it holds potential for fostering a green economy. The country's efforts to embrace renewable energy, sustainable practices, and environmental conservation are at a nascent stage, hindered by political instability and limited resources. However, there are emerging strategies to incorporate greener practices across various sectors. This analysis explores Chad's status in renewable energy, electric mobility, energy efficiency, smart cities, green financing, government incentives, consumer behavior, waste management, water management, and biodiversity conservation.

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In terms of electric mobility, Electric Vehicles (EVs) are nearly absent in Chad, primarily due to inadequate infrastructure and economic barriers. The country lacks the essential charging stations and EV-related policies necessary to encourage adoption. The high cost of EVs compared to conventional vehicles and limited consumer awareness about electric mobility further hinder its prevalence. There are no specific government policies to promote electric mobility, although Chad's broader energy efficiency goals could eventually support this sector. International organizations and regional partners are critical to pushing forward policies and pilot projects that could introduce EVs, starting with public transportation or government fleets.

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In terms of Smart City Initiatives; currently speaking, Chad does not have fully-fledged smart city projects. However, some cities like N'Djamena have begun to explore digital solutions for urban management. Efforts include the implementation of solar street lighting and improving waste collection through digital platforms. While these initiatives are not yet comprehensive smart city plans, they represent small steps toward integrating technology and sustainability in urban planning. Expanding these initiatives could be a long-term goal, especially as access to renewable energy grows.

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In relation to Consumer Behavior, awareness of sustainable practices among consumers in Chad is low, primarily due to economic constraints and limited education on environmental issues. Most citizens prioritize daily survival over sustainable consumption, given the country's poverty levels. However, small shifts are occurring, particularly in urban areas where solar panels and clean cookstoves are gaining traction.

In the sector of Waste Management and Recycling too, waste management in Chad is underdeveloped, with most urban and rural areas lacking proper waste collection and recycling systems. N'Djamena, the capital city, faces significant challenges in handling industrial, commercial, and residential waste. While there are efforts to improve waste collection, recycling is virtually non-existent, and landfills are often mismanaged. In recent years, small-scale recycling initiatives have emerged, primarily driven by NGOs and local businesses. However, these efforts remain limited and require greater governmental support to be effective.

Also, water management is critical in Chad, particularly given its arid climate and reliance on agriculture. The government has developed strategies for sustainable water use in agriculture, focusing on water-saving irrigation techniques and rainwater harvesting. However, the implementation of these strategies has been uneven due to inadequate funding and infrastructure. Urban water management is equally challenging, with many cities lacking proper sewage and drainage systems. Climate change exacerbates these problems, increasing the frequency of droughts and floods.

In terms of Biodiversity and Conservation Efforts, Chad is home to unique biodiversity, but its ecosystems are threatened by deforestation, desertification, and illegal wildlife trade. The government, in collaboration with international organizations, has implemented several biodiversity conservation initiatives. Zakouma National Park is a prime example, where anti-poaching measures and conservation efforts have been relatively successful. International partnerships with NGOs like the World Wildlife Fund (WWF) and African Parks have played a critical role in conserving Chad's wildlife. However, broader conservation efforts require more significant financial support and political stability.

To wit, though Chad's green economy is still in its infancy, there is growing awareness of the need for sustainable development. The government, international organizations, and private sectors must collaborate to implement renewable energy projects, improve energy efficiency, and develop sustainable practices. Key challenges, such as inadequate financing, political instability, and poor infrastructure, must be addressed to unlock Chad's green economy potential.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: • These include abundant solar energy, groundwater, and mineral wealth. • Also, Chad's economy is expected to perform well in 2023, with GDP growth of 4.1% and oil production increasing by 4.4%.	Weaknesses: • Low economic diversification • Poor infrastructure • Poverty (38.7% of the population was in extreme poverty in 2022) • Food insecurity (12.1% of the population was food insecure by the end of 2022) • Political fragility (The country has a weak political environment, with a lack of legitimacy in leadership and fighting with armed groups) • Landlocked and prone to disasters.
Opportunities: • Eco-tourism • Reforestations • Renewable energy	Threats: • Reliance on extractive resources • Socio-cultural resistance • Political instability which hinders progress • Security threats (Chad faces security threats from Boko Haram and Islamic State – West Africa Province) • Displacement crisis (Chad is experiencing a displacement crisis due to insecurity and armed conflict in neighboring countries) • Humanitarian needs (Chad has large refugee populations from neighboring countries, including the Central African Republic, Cameroon, and Sudan)

PESTLE Analysis

Political	Chad faces autocratic governance, terrorism threats, and a weak rule of law. The country also has political fragility, with weak leaders and fighting against armed groups.
Economic	Chad's economy is dependent on oil revenues, and falling oil prices have undermined it since 2015. It also has widespread extreme poverty and food insecurity.
Social	Chad is one of the world's poorest countries, with most people living in poverty as subsistence farmers and herders.
Technological	Chad is currently working on a Technology Needs Assessment to determine which technologies to prioritize.
Legal	Chad has an inefficient regulatory system that holds back private-sector development.
Environmental	Chad is landlocked and disaster-prone, with over half of its territory being desert. The Saharan and Sahelian climatic zones have encroached on Chad's territory, and Lake Chad has shrunk to 10% of its 1960s size.

2.3 Proposed Practical and Innovative Recommendations to Enhance Sustainability of Chad's Green Economy

To support Chad's transition to a green economy, here are some innovative and practical recommendations suggested from the team's perspective that can be easily implemented to improve its green economy:

1. Sustainable Practices	• Agroecological Farming: Agroforestry and sustainable farming practices improve soil health and enhance food security. FAO highlights agroecology as key for sustainable food systems. • Renewable Energy Adoption: Chad's immense solar potential offers opportunities for decentralized solar energy projects to power rural communities. According to IRENA, solar energy is critical for expanding energy access in Sub-Saharan Africa. • Sustainable Water Management: Rainwater harvesting and efficient irrigation systems can significantly reduce water usage. UN Water promotes these practices to address water scarcity in arid regions. • Waste Management and Recycling: Efficient waste management systems and circular economy approaches are increasingly seen as solutions to pollution and resource inefficiency in Africa. UNEP supports Africa's transition to circular economies.
2. Technological Advancements	• Smart Agriculture: This will involve IoT-based precision agriculture and drones which will help optimize resource use in farming. The World Bank discusses the potential of digital agriculture to boost productivity. • Mobile-based Platforms for Farmers: Mobile applications that will provide real-time market data and weather forecasts information for farmers. For example, FarmDrive in Kenya connects farmers with financial institutions. • Energy Storage Solutions: Battery storage technologies are critical for stabilizing renewable energy grids. IRENA highlights how energy storage can enhance renewable energy deployment in off-grid regions. • Digital Payments for Carbon Credits: Blockchain has the potential to revolutionize carbon credit markets by making them more transparent. UNEP has studied blockchain's role in environmental sustainability.

3. Educational Initiatives	• Environmental Education in Schools: Integrating environmental education into school curriculums is key for long-term sustainability. UNESCO advocates for sustainability education at all levels. • Training Programs for Renewable Energy Jobs: Vocational training can help prepare workers for green jobs, especially in renewable energy sectors. ILO supports training initiatives for green job creation. • Public Awareness Campaigns: Public campaigns that raise awareness of sustainable practices can drive individual and community action. USAID supports awareness programs across African nations to boost environmental stewardship.
4. Community Involvement	• Community-based Renewable Energy Cooperatives: Community-based renewable energy projects can democratize access to energy. The World Resources Institute advocates for such models in Sub-Saharan Africa. • Local Green Innovation Hubs: Establishing local innovation hubs can empower communities to co-create sustainable solutions. African Development Bank (AfDB) supports local entrepreneurship in green technologies. • Sustainable Tourism Initiatives: Ecotourism can empower local communities while preserving biodiversity. UNEP and the World Tourism Organization promote sustainable tourism as part of Africa's green transition.
5. Strategic Partnerships	• Public-Private Partnerships (PPPs): PPPs can leverage private sector investments for green infrastructure projects. According to the African Development Bank, PPPs are vital for closing Africa's infrastructure gap. • International Collaboration: International partnerships with organizations like the Green Climate Fund provide financial and technical resources to support Chad's green economy transition. • Partnerships with Research Institutions: Collaborations between local and international research institutions are key for developing context-specific green solutions. The CGIAR system supports research on climate resilience in African agriculture.
6. Policy and Regulatory Framework:	• Green Tax Incentives: Fiscal incentives are powerful tools to promote green technology adoption. UNEP recommends tax incentives as part of national green growth strategies. • Sustainable Land Use Policies: Policies preventing deforestation and promoting land restoration are crucial for long-term sustainability. The UN Convention to Combat Desertification (UNCCD) stresses the importance of sustainable land management. • Carbon Pricing Mechanisms: Carbon pricing mechanisms incentivize industries to reduce emissions. The World Bank supports carbon pricing as an effective tool for reducing greenhouse gasses.

Conclusion

The team believes that, by integrating these recommendations in terms of sustainable practices, technological advancements, educational programs, community engagement, and strategic partnerships, Chad can effectively transition toward a green economy while ensuring long-term environmental resilience and economic growth

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PROJECT TITLE

Green Economy Transition in Chile

PARTICIPANT NAME :

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COUNTRY REPRESENTED:

Chile

Introduction

Country Name	Chile
Continent	South America
Population	19.76 million (U.N. Department of Economic and Social Affairs, 2024)
Climate Type	Diverse Climate: - Atacama Desert: Arid, extreme dryness in the north - Central Zone: Mediterranean climate - Southern Zone: Antarctic and polar conditions
Primary Energy Consumption per Capita	Primarily sourced from fossil fuels; renewable energy share increased to 30.53% (2023)
Primary Energy Consumption from Renewable Energy	30.53% (Energy Institute, 2024)
Share of the population with access to electricity	100%
Per Capita CO2 Emissions	High but declining over recent years (Global Carbon Budget, 2023)

Republic of Chile is located on the southwestern portion of the continent of South America, with the Andes to the west and the Pacific Ocean to the east. It borders Peru, Bolivia, and Argentina. Its longest land border is with Argentina to the east. According to the data accumulated by the U.N. department of Economic and Social Affairs-Population Division (2024) on World Population Prospect revision, the current population of Chile is 19,764,771. This population is equivalent to 0.24% of the total world population and ranked number 66 in the list of countries by population. The population density in Chile is 27 per km² (69 people per mi²) and has a total land area of 743,532 km² (287,079 sq. mi²). 84.6% of the population is urban and has a median age of 36.4 years.

Chile's unique geography and topographical features result in a wide range of climates and environments (UN, 2024). Chile has the Atacama Desert in the north, one of the most arid deserts in the world, the ice-capped Andes mountains in the east, the Pacific Ocean on the west, and Antarctic region in the south. Thus, Chile's unique climate zone range from tropical in the north, mediterranean in the center, and Antarctic in the south. According to a 2024 statistical review by the Energy Institute, Chile's per capita primary energy consumption in 2023 was primarily sourced from fossil fuels, with coal, oil, and gas being the dominant contributors. Renewable energy sources, including hydro, wind, solar, and others, also played a role, although to a lesser extent compared to fossil fuels. The share of renewable energy has increased steadily over time, with a significant acceleration in recent years (Energy Institute, 2024). As of 2023, share of primary energy consumption in Chile from renewable sources has steadily increased over time, reaching around 30.53% in recent years and the entire population has access to electricity (Energy Institute, 2024). According to the Global Carbon Budget (2023), there has been significant increase in CO₂ emissions from fossil fuels and industry in Chile over the past century, reflecting the country's industrialization and economic growth. While there has been a slight decline in recent years, Chile's per capita emissions remain relatively high.

1.2 Analysis of the Green Economy

Chile has emerged as a global leader in the transition towards a clean energy future. This commitment is driven by a combination of abundant renewable resources, supportive government policies, and a growing public awareness of environmental issues. This essay explores Chile's progress in clean energy adoption, electric vehicles, energy efficiency, smart cities, and sustainable practices, highlighting both achievements and ongoing challenges.

Chile boasts exceptional natural resources for renewable energy generation. Its vast stretches of coastline offer ideal conditions for wind power, while the Atacama Desert – the driest non-polar desert in the world – provides exceptional solar radiation for photovoltaic energy production (Londono, 2017). Hydropower has historically been a significant player, contributing to nearly 27% of the country's installed capacity in 2022 (IEA, 2022). This diverse mix of renewable sources has propelled Chile to a prominent position – it's been dubbed "a world leader in renewable energy development" (Madariaga and Allain, 2020).

The country has set ambitious goals, aiming for 70% of its electricity to come from renewable sources by 2030 and achieving carbon neutrality by 2050 (Juan et al., 2020). 3 Driven by these goals, the contribution of renewable energy to the national grid

has witnessed a significant rise. According to the International Energy Agency (IEA, 2022), non-conventional renewable energy sources (NCRE) accounted for 45% of the energy generated for new electric capacity installations between 2014 and 2025 (Centre for Public Impact, 2023). Notably, in 2022, for the first time, solar and wind energy surpassed coal as the primary source of electricity generation (Chilean Ministry of Energy, 2024).

The Chilean government plays a crucial role in fostering the clean energy transition. It has implemented supportive policies, incentives, and a clear regulatory framework (IEA, 2022). These include financial instruments like the Renewable Energy Fund (FONDEN) and the Energy Efficiency Fund (FIEE) to support green projects (Chilean Ministry of Energy, 2024). Additionally, investments in transmission infrastructure have been crucial in integrating renewable energy sources into the national grid (Dialogue Earth, 2024).

Electric vehicles (EVs) are key to decarbonizing the transportation sector, a major contributor to emissions (GIZ, 2023). In line with this, Chile has seen a steady increase in EV adoption, driven by government incentives and an expanding charging infrastructure. The National Electromobility Strategy outlines the country's commitment to promoting EVs and supporting technologies (Chilean Ministry of Energy, 2024). The government has also invested in building a network of charging stations across the nation, further encouraging wider adoption.

Energy efficiency is another vital area in Chile's green transformation. The government has implemented energy efficiency standards for buildings to reduce energy consumption. Additionally, initiatives such as energy audits and support for energy-efficient technologies in industries are helping to create a more sustainable future (Chilean Ministry of Energy, 2024). Investments in public transportation and electric vehicles aim to improve transportation overall efficiency and lower carbon emissions (Chilean Ministry of Transport and Telecommunications, 2024).

Chile has embraced the concept of smart cities to improve urban living, enhance sustainability, and drive economic growth. These cities leverage technologies like the Internet of Things (IoT), big data, artificial intelligence (AI), and smart grids to optimize resource management and improve quality of life (Jirón et al., 2021). Smart city projects prioritize sustainable practices like renewable energy integration, energy efficiency, and waste management. Santiago, the capital city, serves as a prime example. Recognized as the smartest city in Latin America, it utilizes technology to manage energy remotely, streamline transportation, and encourage eco-friendly practices ("Daytours4u," 2019).

While Chile has made significant strides in clean energy and sustainability, challenges remain. Waste management and recycling rates are relatively low, with a significant amount of waste ending up in landfills or informal waste management systems (OECD, 2024). The government is addressing this by investing in infrastructure and implementing regulations to improve waste collection and recycling practices. Additionally, the Extended Producer Responsibility law (Law 20.920) mandates manufacturers to take responsibility for recycling specific waste streams (Chilean Ministry of Energy, 2024). Another concern is water scarcity. Climate change and agricultural practices have exacerbated water.

1.3 Challenges and Opportunities

The transition is not without its challenges. Grid integration, especially for renewable energy sources in Patagonia, may require significant upgrades. Social and environmental conflicts could arise from large-scale renewable energy projects. The current regulatory framework, particularly the net-billing scheme for solar prosumers, may limit their contribution to the energy transition. Heat pumps and district heating systems face investment costs and energy price challenges, hindering their widespread adoption in the heat sector. Overcoming entrenched interests and promoting a more decentralized energy system can also be challenging.

Despite these challenges, Chile's abundant solar and wind resources offer significant opportunities for renewable energy generation. The country's well-connected electrical grid provides a solid foundation for integrating renewable energy. Chile's geographic location and natural resources make it well-suited for green hydrogen production, which can be used for various energy applications. A successful green transition can create new jobs, stimulate economic growth, and reduce dependence on fossil fuels.

SWOT Analysis

Strengths: - Abundant renewable resources. - Favorable geography - Existing infrastructure - Government commitment - Innovative mindset	Weaknesses: - High cost of renewable energy - Grid integration challenges - Dependence on copper - Water scarcity
Opportunities: - Job creation - Economic growth - Environmental benefits - International leadership	Threats: - Global economic uncertainties - Technological risks - Social and environmental resistance - Policy changes

Strengths

- Abundant renewable resources:** Chile possesses significant solar and wind energy potential, providing a strong foundation for a green economy.
- Favorable geography:** The country's geographic location and climate conditions are conducive to renewable energy generation.
- Existing infrastructure:** Chile has a well-developed electricity grid and infrastructure that can support the integration of renewable energy.
- Government commitment:** The Chilean government has demonstrated a strong commitment to transitioning to a green economy through policies and incentives.
- Innovative mindset:** Chile has a reputation for innovation and technological advancements, which can be leveraged to drive the green economy transition.

Weaknesses

- High cost of renewable energy:** While costs have decreased, renewable energy technologies can still be more expensive than traditional fossil fuels.
- Grid integration challenges:** Integrating large-scale renewable energy sources into the existing grid can pose technical difficulties.
- Dependence on copper:** Chile's economy is heavily reliant on copper, and the transition to a green economy may require diversification.
- Water scarcity:** Water scarcity can be a challenge for certain renewable energy projects, particularly in arid regions.

Opportunities

- Job creation:** The green economy transition can create new jobs in renewable energy, energy efficiency, and related sectors.
- Economic growth:** A successful green transition can stimulate economic growth and reduce dependence on fossil fuels.
- Environmental benefits:** Transitioning to a green economy can help mitigate climate change, reduce pollution, and protect biodiversity.
- International leadership:** Chile can position itself as a global leader in renewable energy and sustainable development.

Threats

- Global economic uncertainties:** Economic downturns or geopolitical tensions can hinder investments in the green economy.



- **Technological risks:** Technological advancements in fossil fuel extraction or alternative energy sources could pose challenges to the competitiveness of renewable energy
- **Social and environmental resistance:** Implementing large-scale renewable energy projects may face opposition from local communities or environmental groups.
- **Policy changes:** Changes in government policies or regulations could create uncertainty and hinder the green economy transition.

PESTLE Analysis

Political	• Government support: The Chilean government has demonstrated strong support for the green economy transition through policies, incentives, and regulations. • Regulatory framework: A clear and supportive regulatory framework is essential for attracting investment and facilitating the development of renewable energy projects. • Political stability: Political stability is crucial for long-term investment and the successful implementation of green economy initiatives.
Economic	• Economic growth: A strong and growing economy can provide the resources and investment needed for the green economy transition. • Competitiveness: The competitiveness of Chile's economy in the global market can influence its ability to attract investment and develop new green technologies. • Economic diversification: Diversifying the economy beyond traditional sectors can reduce reliance on fossil fuels and promote sustainable development.
Social	• Public awareness: Increasing public awareness of environmental issues and the benefits of a green economy is essential for driving consumer demand and social acceptance. • Cultural values: Cultural values and attitudes towards sustainability can influence the adoption of green practices and technologies. • Social equity: Ensuring that the benefits of the green economy transition are distributed equitably among different socioeconomic groups is important for social acceptance and long-term sustainability.
Technological	• Renewable energy technologies: The advancement of renewable energy technologies, such as solar and wind power, is crucial for driving the green economy transition. • Energy storage: Developing efficient and cost-effective energy storage technologies is essential for integrating renewable energy into the grid. • Smart grid technologies: Implementing smart grid technologies can improve grid efficiency, reliability, and integration of renewable energy
Legal	• Legal framework: A clear and supportive legal framework is essential for regulating the green economy transition and ensuring compliance with environmental standards. • International agreements: Chile's participation in international agreements, such as the Paris Agreement, can provide opportunities for cooperation and knowledge sharing.
Environmental	• Natural resources: Chile's abundant renewable energy resources provide a strong foundation for the green economy transition. • Environmental regulations: Strict environmental regulations can help protect ecosystems and ensure sustainable development. • Climate change: Addressing climate change is a key driver for the green economy transition, and Chile's efforts to reduce greenhouse gas emissions are essential.

1.4 ANALYSIS FINDINGS

To support Chad's transition to a green economy, here are some innovative and practical recommendations suggested from the team's perspective that can be easily implemented to improve its green economy:

1. Sustainable Practices	• Agroecological Farming: Agroforestry and sustainable farming practices improve soil health and enhance food security. FAO highlights agroecology as key for sustainable food systems. • Renewable Energy Adoption: Chad's immense solar potential offers opportunities for decentralized solar energy projects to power rural communities. According to IRENA, solar energy is critical for expanding energy access in Sub-Saharan Africa.
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	• Sustainable Water Management: Rainwater harvesting and efficient irrigation systems can significantly reduce water usage. UN Water promotes these practices to address water scarcity in arid regions. • Waste Management and Recycling: Efficient waste management systems and circular economy approaches are increasingly seen as solutions to pollution and resource inefficiency in Africa. UNEP supports Africa's transition to circular economies.
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4. Community Involvement	• Community-based Renewable Energy Cooperatives: Community-based renewable energy projects can democratize access to energy. The World Resources Institute advocates for such models in Sub-Saharan Africa. • Local Green Innovation Hubs: Establishing local innovation hubs can empower communities to co-create sustainable solutions. African Development Bank (AfDB) supports local entrepreneurship in green technologies. • Sustainable Tourism Initiatives: Ecotourism can empower local communities while preserving biodiversity. UNEP and the World Tourism Organization promote sustainable tourism as part of Africa's green transition.
5. Strategic Partnerships	• Public-Private Partnerships (PPPs): PPPs can leverage private sector investments for green infrastructure projects. According to the African Development Bank, PPPs are vital for closing Africa's infrastructure gap. • International Collaboration: International partnerships with organizations like the Green Climate Fund provide financial and technical resources to support Chad's green economy transition. • Partnerships with Research Institutions: Collaborations between local and international research institutions are key for developing context-specific green solutions. The CGIAR system supports research on climate resilience in African agriculture.

6. Policy and Regulatory Framework:	• Green Tax Incentives: Fiscal incentives are powerful tools to promote green technology adoption. UNEP recommends tax incentives as part of national green growth strategies. • Sustainable Land Use Policies: Policies preventing deforestation and promoting land restoration are crucial for long-term sustainability. The UN Convention to Combat Desertification (UNCCD) stresses the importance of sustainable land management. • Carbon Pricing Mechanisms: Carbon pricing mechanisms incentivize industries to reduce emissions. The World Bank supports carbon pricing as an effective tool for reducing greenhouse gasses.
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The team believes that, by integrating these recommendations in terms of sustainable practices, technological advancements, educational programs, community engagement, and strategic partnerships, Chad can effectively transition toward a green economy while ensuring long-term environmental resilience and economic growth

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PROJECT TITLE

Green Economy Transition in Comoros

PARTICIPANT NAME :

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3. Moina Rahamata Youssouf

COUNTRY REPRESENTED:

Comoros

Introduction

Country Name	Comoros
Continent	Africa
Population	852,075
Climate Type	Tropical climate
Primary Energy Consumption per Capita	1.64 kWh (2021), with total primary energy consumption at 1 TWh (2023)
Primary Energy Consumption from Renewable Energy	Data highlights solar PV systems dominating with 52% of renewable resource potential
Share of the population with access to electricity	87.94% (2021)
Per Capita CO2 Emissions	0.5 tonnes (2022)

The Comoros is an archipelago located in the Indian Ocean, consists of three main islands: Grande Comore, Moheli and Anjouan. The Comoros is often referred to as the "Perfume Islands" due to its historical production of fragrant essential oils derived from its indigenous flora. Despite its natural beauty and potential, the Comoros faces significant economic and environmental challenges. The islands have limited natural resources, a small domestic market, and a heavy reliance on agriculture and fishing for livelihood. The population, which is predominantly rural, grapples with issues such as high unemployment rates, food insecurity, and inadequate infrastructure. In recent years, the Comoros has begun to recognize the importance of sustainable development and renewable energy as pathways to economic growth and environmental preservation. The government and various stakeholders are increasingly focused on initiatives aimed at promoting energy efficiency, harnessing renewable energy sources, and fostering community engagement in environmental conservation. This country, while characterized by its rich biodiversity and unique ecosystems, faces significant challenges in transitioning to a greener economy. This report aims to explore the current state of renewable energy in the Comoros, the challenges faced in the transition to a green economy, and actionable strategies for sustainable development.

Primary Energy Consumption per Capita: As per Figure 1, the energy use per person is 1.64 kWh in 2021 and in Figure 2, the primary energy consumption is 1 TWh as of 2023



Figure 1 Energy Use per Person

Primary energy consumption, 2023

Primary energy consumption is measured in terawatt-hours, using the substitution method.

Our World
in Data

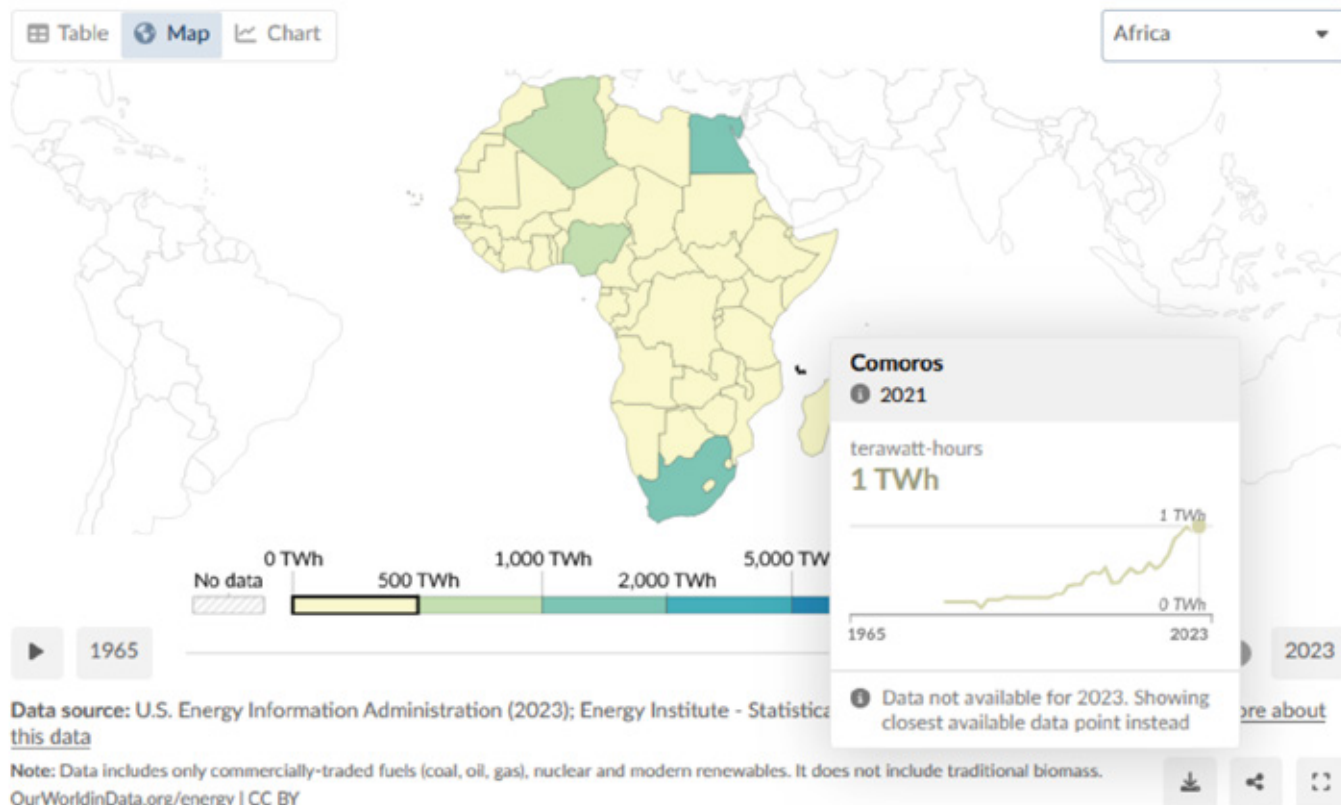


Figure 2 Primary Energy Consumption per Capita

Primary Energy Consumption from Renewable Energy: Figure 3 depicts the renewable energy consumption by sector

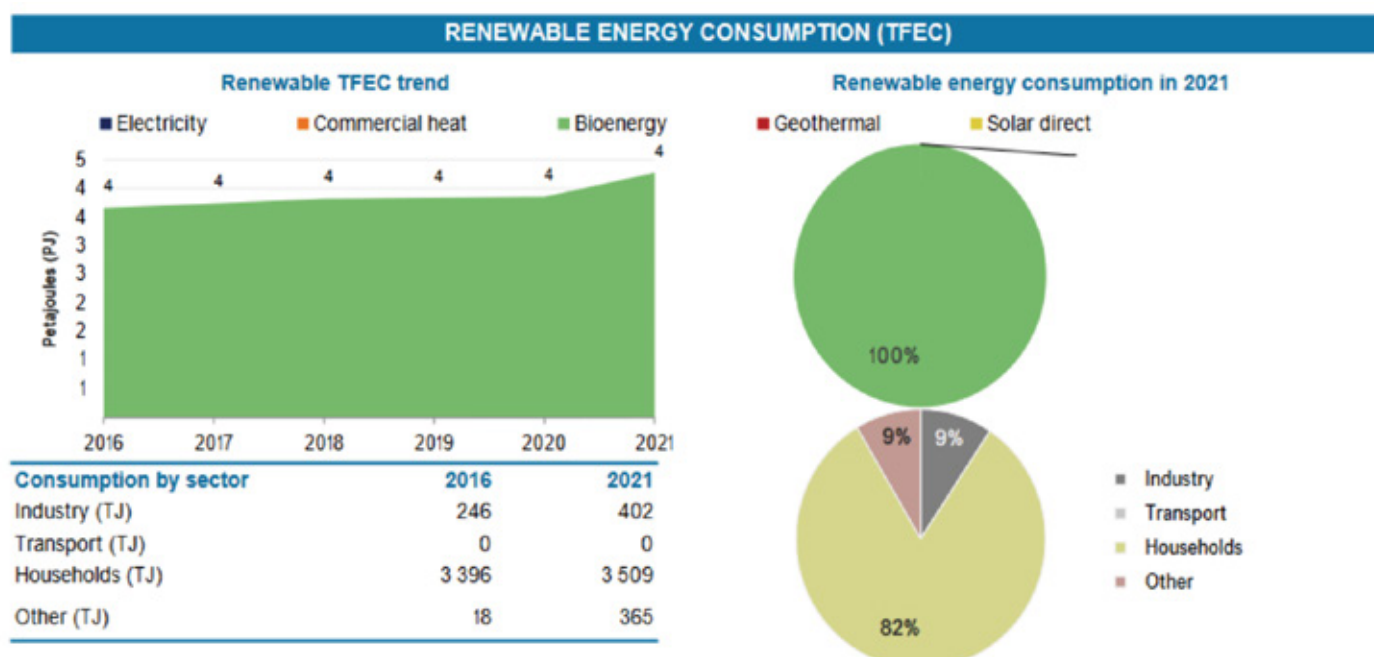


Figure 3 Renewable Energy Consumption

Share of the population with access to electricity: According to Figure 4, it is 87.94% as of 2021.

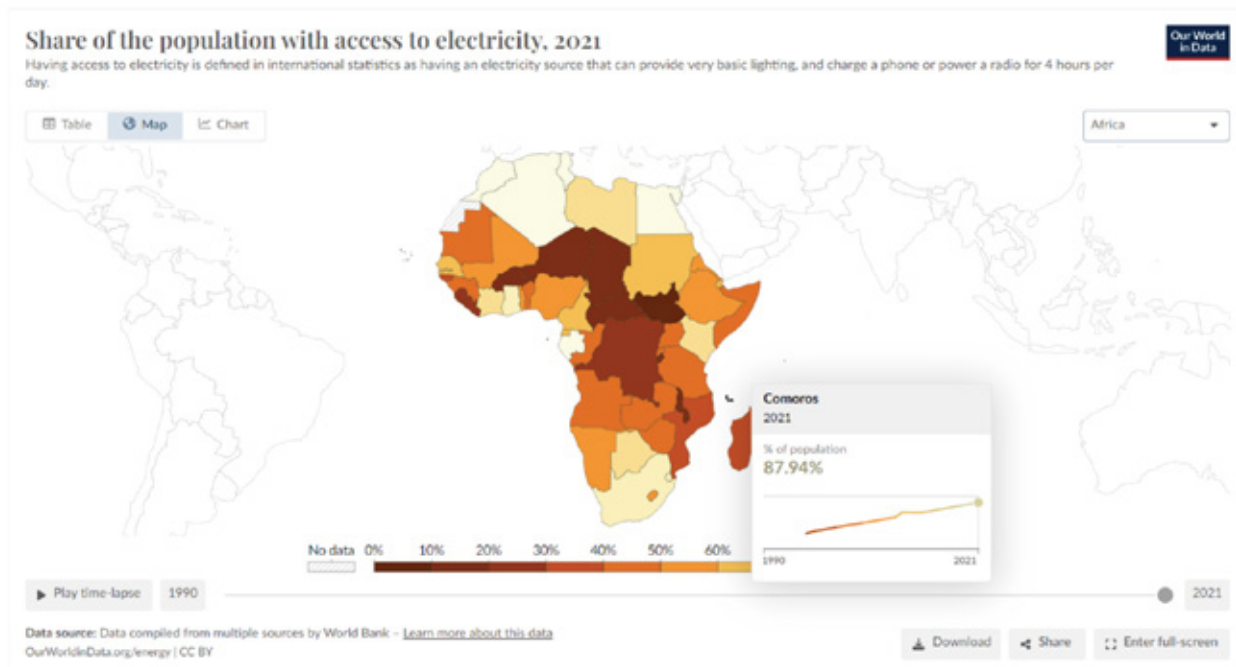


Figure 4 Share of the Population with Access to Electricity

Per Capita CO₂ Emissions: According to Figure 5, it is estimated at 0.5 t in 2022.

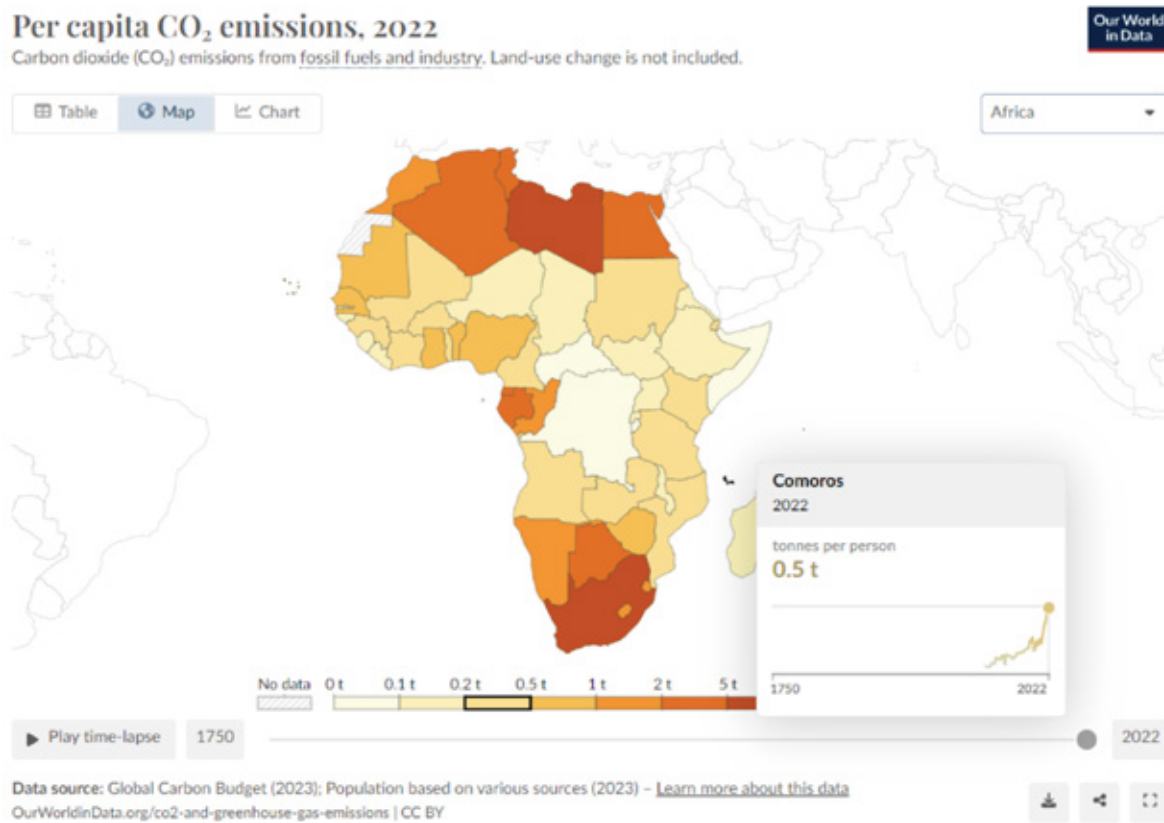


Figure 5 Per Capita CO₂ Emissions

1.2 Analysis of the Green Economy

The current state of the green economy in Comoros presents both challenges and opportunities.

1. Renewable Energy Status: The energy sector in Comoros has a theoretical capacity of 93 MW, with 204,667 MWh of renewable energy resources identified. Currently, the installed capacity of hydropower stands at 610 kW, which is not operational. Solar energy dominates the renewable sector, with solar photovoltaic (PV) systems accounting for 52% of the total renewable resource potential. However, the existing infrastructures require substantial rehabilitation and expansion to harness this potential effectively. The government has initiated several policies aimed at enhancing renewable energy usage, but these initiatives require further investment and support for implementation.

2. Electric Mobility: Electric vehicles (EVs) are not yet prevalent in Comoros due to the limited availability of charging infrastructure and high costs associated with EV adoption. However, the *'Plan Comores Émergent 2030'* reinforced that the promotion of electric mobility is essential for modernizing transportation and reducing reliance on fossil fuels. The plan recognizes the need to develop infrastructure that supports electric vehicles (EVs), including charging stations, to facilitate their adoption. By incorporating electric mobility into urban planning, Comoros can not only reduce greenhouse gas emissions but also enhance the overall efficiency of its transportation system.

3. Energy Efficiency Measures: There are minimal energy efficiency measures in place across buildings, industries, and transportation. While some awareness exists, the implementation of energy-saving technologies remains low. Implementing energy efficiency measures in buildings, industries, and transportation will require the establishment of standards and incentives, which can be guided by the principles outlined in the *'Plan Comores Émergent 2030'*. The plan calls for a comprehensive approach to improving energy efficiency across all sectors.

4. Smart City Initiatives: Comoros has initiated the planning of comprehensive smart city projects aimed at improving government efficiency through enhanced communication and collaboration between various ministries. The Smart City program builds on the achievements of the RCIP4 e-governance project, which includes platforms for online governance, business registration, e-commerce, and e-procurement. The Smart City initiative will connect government institutions and streamline administrative procedures, reducing the time required for public services. This will not only improve data sharing among ministries but also enhance public access to simplified administrative processes, increasing transparency and fostering citizen participation. The project is expected to have a significant impact on public administration, citizens, and the private sector, with funding requirements amounting to €16.5 million.

5. Green Financing: Access to green financing remains a challenge for both startups and established businesses. Although there are some financial instruments aimed at supporting green projects, such as grants and micro-financing, the availability and awareness of these funds are limited.

6. Government Incentives: The government of Comoros is beginning to explore incentives to encourage greener practices among businesses and consumers. However, these incentives are often not well-publicized, resulting in low engagement from stakeholders. A more proactive approach to promoting these incentives could foster greater adoption of sustainable practices.

7. Consumer Behavior: Public awareness regarding sustainable practices is growing but remains insufficient. Educational programs focused on sustainability could enhance consumer engagement and promote a culture of environmental responsibility.

8. Waste Management and Recycling: Waste management systems in Comoros face significant challenges. The current systems for industrial, commercial, and residential waste management are inadequate, leading to environmental concerns. Efforts to improve waste recycling and management practices must be prioritized to minimize waste generation and promote resource recovery.

9. Water Management: Sustainable water management strategies are critical, especially given the agricultural reliance of the Comorian economy. Current practices require improvement to ensure the efficient use of water resources and to address issues of scarcity in urban settings. The *'Plan Comores Émergent 2030'* emphasizes the need for efficient use of water resources, particularly in agriculture and urban settings. Implementing integrated water resource management strategies will ensure that Comoros can address issues of water scarcity and improve resilience to climate-related challenges, contributing to the overall objectives of sustainable development.

10. Biodiversity and Conservation Efforts: Comoros is home to diverse ecosystems that are under threat from climate change and unsustainable practices. Initiatives focused on biodiversity conservation are crucial, and the government, alongside local communities, must work collaboratively to protect these invaluable resources.

Survey Results on the Green Economy Transition in Comoros

Three experts contributed to the survey¹, sharing valuable insights on the green economy transition in Comoros. Farida Ahmed Karim, Project Coordinator at UNDP, assessed the current state of renewable energy as average, highlighting solar, hydro, biomass, and geothermal as having significant growth potential. She noted challenges to electric vehicle (EV) adoption, including insufficient infrastructure and high initial costs, recommending the development of charging stations powered by solar energy and customs exemptions for EVs. Farida emphasized the need for government regulations and public awareness campaigns to improve energy efficiency, while advocating for the integration of real-time energy management in future smart city initiatives. She described current waste management as very ineffective and proposed solar-powered irrigation for agriculture, linking biodiversity conservation efforts to community education.

Snehal Soneji, Representative at UNDP, echoed the average assessment of renewable energy, identifying solar and geothermal as key growth sources. He highlighted barriers to EV adoption, including infrastructure and after-sales service, and called for a comprehensive approach to building the electric mobility value chain. Snehal stressed the importance of government incentives and public awareness for energy efficiency and suggested integrating waste management systems into smart city initiatives. He viewed waste management as very ineffective and proposed better pricing and enforcement for water management. Snehal emphasized community involvement in biodiversity efforts through eco-tourism and encouraged youth leadership in the green economy transition.

Mohamed Chaheire, Geophysicist and National Director of the Geothermal Project at the Comoros Geological Bureau, rated the state of renewable energy as poor, with geothermal and solar identified as the most viable options. He outlined significant barriers to EV adoption, including infrastructure and a lack of skilled mechanics, advocating for geothermal energy to power charging stations. Mohamed called for government support for solar installations and stable energy solutions to enhance industrial efficiency. He proposed rainwater harvesting for agricultural water management and community training for biodiversity conservation. He stressed the need for governmental awareness of the benefits of local renewable energy to reduce greenhouse gas emissions.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: • Unique and endemic biodiversity. • International partnerships for green projects. • Strong political will to increase renewable energy.	Weaknesses: • High dependence on fossil fuels. • Limited energy infrastructure. • Low access to green financing for small businesses.
Opportunities: • Potential for solar and wind energy. • Opportunities in sustainable agriculture and water management. • Growth of international green financing.	Threats: • Climate vulnerability (rising sea levels, droughts). • Deforestation and ecosystem degradation. • Dependence on fossil fuel imports.

PESTLE Analysis

Political	The Comoros are committed to international sustainable development initiatives, such as the Sustainable Development Goals (SDGs). The government shows an increasing interest in renewable energy, notably through partnerships with international institutions like the World Bank and the Global Environment Facility. However, the implementation of green policies is often hindered by political instability, limited institutional capacity, and ineffective public management.
Economic	The Comorian economy is vulnerable due to its reliance on imported fossil fuels and manufactured goods. The renewable energy sector, although still in its infancy, could provide a lever for sustainable growth. Foreign investment in green sectors (solar, wind) could improve the trade balance by reducing energy imports. However, the high initial infrastructure costs hinder the development of green projects. While green financing is growing, it remains limited to large initiatives.
Social	The majority of the Comorian population is rural and heavily depends on agriculture for subsistence. This represents an opportunity for implementing sustainable agricultural practices and conserving natural resources. However, high poverty rates and low awareness of environmental issues hinder the widespread adoption of eco-friendly behaviours. Educational and awareness campaigns are necessary to encourage sustainable consumption practices.
Technological	The Comoros lack in technology, particularly in energy and resource management sectors. Access to green technologies, such as solar panels and efficient irrigation systems, is still limited. However, the country has significant development potential in renewable energy, with ongoing pilot solar energy projects. Technological development is crucial for enhancing energy efficiency and modernizing infrastructure, especially in water and waste management.
Legal	Legal frameworks for environmental issues exist but are often poorly enforced due to limited regulatory capacity. The government has adopted laws to encourage renewable energy and sustainable resource management, but implementation often lacks follow-up. Stricter regulations, especially regarding waste management and ecosystem protection, are necessary to support the green transition.
Environmental	The Comoros are extremely vulnerable to climate change due to their status as small islands. Rising sea levels, coastal erosion, deforestation, and seasonal droughts pose significant threats to the environment and local livelihoods. On the other hand, the country possesses unique biodiversity, and protecting these ecosystems could become an asset for attracting green funding and promoting ecotourism.

Analysis Findings

The SWOT and PESTLE analyses of the Comoros reveal a country with significant potential for transitioning to a sustainable, green economy, primarily driven by its unique biodiversity and increasing political commitment to renewable energy. However, challenges such as high dependence on fossil fuels, limited infrastructure, and inadequate green financing for small businesses hinder progress. The PESTLE analysis underscores issues related to political instability, economic vulnerability, and technological lag, which further complicate the implementation of green initiatives.

Despite these obstacles, opportunities exist in expanding solar and wind energy, promoting sustainable agriculture, and leveraging international green financing. Addressing climate vulnerabilities and enhancing public awareness are critical for fostering community engagement in environmental practices. Ultimately, effective collaboration among government entities, international partners, and local communities will be vital to overcoming challenges and realizing the Comoros' green potential, ensuring long-term ecological and economic resilience.

Furthermore, addressing climate vulnerabilities and enhancing public awareness are critical for fostering community engagement in environmental practices. Initiatives such as educational programs on sustainability and local environmental projects can empower citizens to take active roles in preserving their ecosystem. Ultimately, effective collaboration among government entities, international partners, and local communities will be vital to overcoming challenges and realizing the Comoros' green potential. This holistic approach will not only ensure long-term ecological resilience but also drive economic growth, making the Comoros a model for sustainable development in the region.

Youth Perspective and Concluding Remarks

As participants in the Global Green Economy Young Leaders Program, we recognize the critical role of youth in driving the transition to a greener economy in Comoros. To effectively tackle environmental challenges and seize opportunities, we recommend implementing educational initiatives that focus on sustainability and renewable energy in schools and communities. Encouraging youth involvement in local environmental projects, such as tree planting and waste management campaigns, will foster community resilience. Promoting technological advancements in renewable energy through partnerships with universities and creating incubators for green startups will help develop innovative solutions. Additionally, fostering collaboration between governmental bodies, NGOs, and the private sector will enhance resource sharing and the impact of sustainable initiatives. We also advocate for equipping youth with the tools to influence stronger environmental policies and engage in advocacy campaigns. Lastly, working with financial institutions to create tailored financing options will support youth-led green projects, enabling young entrepreneurs to invest in sustainable technologies and practices.

Therefore, transitioning to a greener economy in Comoros, a multifaceted approach is essential. Sustainable agriculture practices should be promoted through training and urban farming initiatives, enhancing food security and reducing transportation emissions. Education and awareness campaigns, including eco-education in schools and community workshops on sustainability, will foster a culture of environmental stewardship. Strengthening legal and institutional frameworks with regulatory incentives for green practices and enhancing government capacity for enforcement are crucial for effective policy

implementation. Moreover, ecosystem restoration projects, like mangrove restoration and biodiversity conservation initiatives, can protect vital habitats while involving local communities. Finally, leveraging technology through mobile apps for farmers and smart waste management systems could optimize agricultural practices and improve recycling rates. Through these recommendations, young people in Comoros can play a pivotal role in shaping a greener future. The insights gained from the Global Green Economy Young Leaders Program emphasize the importance of collective action, innovation, and community engagement in addressing our environmental challenges. By embracing these strategies, we can foster a more sustainable economy that benefits both the planet and its people.

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PROJECT TITLE

Green Economy Transition in Côte d'Ivoire

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COUNTRY REPRESENTED:

Côte d'Ivoire

Introduction

Country Name	Côte d'Ivoire
Continent	Africa
Population	28,641,422 (2023)
Climate Type	- Southern Zone: Equatorial, high humidity, year-round rainfall, two rainy seasons (May-Jul, Sep-Nov). - Central Zone: Tropical savanna, wet season (May-Oct), dry season (Nov-Apr). - Northern Zone: Semi-arid, prolonged dry season, shorter rainy season (May-Oct).
Primary Energy Consumption per Capita	2,371 kWh (2023)
Primary Energy Consumption from Renewable Energy	34.8%, primarily from hydropower (2023)
Share of the population with access to electricity	71.14% (2021)
Per Capita CO2 Emissions	0.4 tonnes (2021)

Côte d'Ivoire, located in Africa, has a population of 28,641,422 people. Covering an area of 322 462 km², it is the 68th largest country in the world. Côte d'Ivoire is located between 4° and 10° North latitude and 0° and 10° West longitude. It is an agriculturally driven economy, with cocoa production playing a central role. In recent years, the country has experienced political stability, leading to economic development. However, like many developing nations, Côte d'Ivoire faces challenges in transitioning to a greener economy.

The country experiences three distinct climate zones. Along the southern coast, an equatorial climate brings high humidity and year-round rainfall, with two rainy seasons occurring from May to July and September to November. The central region has a tropical savanna climate, marked by a wet season from May to October and a dry season from November to April. In the north, a semi-arid climate prevails, characterized by a prolonged dry season and a shorter rainy season, typically from May to October.

Côte d'Ivoire's energy generation is heavily dependent on fossil fuels, particularly natural gas, which accounts for about 70% of its electricity production. This reliance on natural gas has contributed to the country's greenhouse gas emissions. Hydropower contributes between 25% and 30% of the country's electricity generation, with minimal contributions from other renewable sources such as solar energy. According to World Bank data, this fossil fuel dependence poses environmental concerns due to gas emissions from the energy sector, prompting the country to explore energy transition strategies in line with global climate goals.

Although urban electrification rates in Côte d'Ivoire are relatively high, rural areas continue to lag, with approximately 71.14% of the total population having access to electricity as of 2021. This demand puts pressure on the country to expand its energy grid and explore offgrid renewable solutions for remote regions. Renewable energy accounts for about 34.8% of Côte d'Ivoire's total energy consumption, primarily from hydropower, though other renewable sources remain underdeveloped.

Per capita energy consumption in Côte d'Ivoire remained at 2,371 kilowatt-hours as of 2023. As of 2021, the country's per capita CO₂ emissions stood around 0.4 tons annually, reflecting its lower energy consumption and the significant share of hydropower in its energy mix. These figures align with broader trends in developing economies, particularly in Sub-Saharan Africa, where energy access and sustainability are key challenges.

1.2 Analysis of the Green Economy

Côte d'Ivoire is making significant strides in advancing renewable energy sources, such as hydraulic and biomass energy, which provide clean alternatives to fossil fuels. However, concerns about environmental impacts and supply limitations have led to a reduction in biomass energy use, prompting a shift toward other renewable sources. Despite these efforts, renewable energy development faces challenges, including inadequate planning, limited financial support, and weak policy frameworks. The Energy Directorate, through the SubDirectorate of Energy Control and Renewable Energies, oversees renewable energy management, but institutional barriers such as a lack of financial incentives and outdated legal frameworks continue to hinder expansion. Additionally, limited access to advanced technologies and the high cost of renewable energy systems restricts broader adoption. Moving forward, further research on wind and biogas energy, combined with increased financial support, is essential for accelerating renewable energy deployment.

Côte d'Ivoire is also progressing in electric mobility, with major advancements expected by 2024. EVTech, a start-up, is raising funds to deploy electric vehicle (EV) charging stations nationwide. Led by Florent Thomas, EVTech is in a Series A funding round, aiming to raise 4.2 billion CFA francs from national and international investors. The company plans to expand from Abidjan to other cities like Yamoussoukro, where residents heavily rely on polluting transportation. EVTech's "Neo" app enhances sustainable mobility by allowing users to locate charging stations and check real-time availability, promoting greener transport options.

Energy efficiency efforts, particularly in the electricity sector, are also underway. From 2011 to 2017, Côte d'Ivoire increased its installed generation capacity by 58%, largely due to hydroelectric dams like Soubré and expansions in gas-fired power plants. The government aims for renewable energy to constitute 42% of installed capacity by 2030, with solar energy contributing 6%. The country's solar potential is significant, with an average of six hours of sunshine daily, positioning solar energy as a key part of future energy plans.

Smart city initiatives are helping modernize urban infrastructure. Trilliant, a global tech company, has launched a pilot project to implement a smart metering network in Côte d'Ivoire, connecting 250 homes initially. This project supports smart city applications like connected CCTV cameras. Trilliant's hybrid wireless communication platform allows for rapid deployment and easy integration, creating a scalable solution for smart grid infrastructure that will support evolving urban needs.

Green financing is gaining momentum through initiatives like the African Development Bank's (AfDB) African Green Bank Initiative, which helps Côte d'Ivoire meet its Nationally Determined Contributions (NDCs) under the Paris Agreement. The initiative supports green financing by offering technical assistance, fundraising, and co-financing opportunities for sustainable projects. Côte d'Ivoire has also secured \$35 million from the World Bank's Emission Reductions Payment Agreement (ERPA) for reducing 7 million tons of carbon emissions, which supports forest conservation and emphasizes the role of international cooperation in promoting sustainability.

Government incentives, coupled with evolving consumer behavior, are driving environmental consciousness in Côte d'Ivoire. Increasing trust in eco-friendly brands, growing awareness of ecological issues, and the influence of social media have all contributed to more sustainable purchasing habits. Corporate social responsibility (CSR) initiatives further support this shift, encouraging consumers to make environmentally friendly choices.

Waste management and recycling remain areas of concern, with challenges such as poor governance, financial constraints, and technical deficiencies. The World Bank-backed Urban Resilience and Solid Waste Management Initiative aims to improve waste collection and recycling, particularly in Abidjan. AfricWaste is also working to increase plastic waste recovery, although the national recycling rate remains low at around 5%. Insufficient waste collection and inadequate recycling facilities contribute to environmental pollution, but ongoing efforts could help modernize the system.

Water management strategies are being adopted to ensure sustainability in both rural and urban environments. Water-efficient farming, biodiversity conservation, and responsible mining practices are being promoted to protect ecosystems. In urban areas, nature-based solutions such as mangrove restoration and water recycling are helping to combat coastal erosion and water pollution.

Biodiversity conservation is also advancing through the management of national parks and reforestation programs. Engaging local communities in conservation and promoting sustainable agricultural practices, such as agroecology, are key to preserving Côte d'Ivoire's natural heritage.



Collaboration with NGOs and academic institutions is improving biodiversity monitoring and research, ensuring the resilience of ecosystems against environmental threats.

By addressing these environmental challenges with innovative technologies, financial mechanisms, and community-driven initiatives, Côte d'Ivoire is positioning itself as a leader in the transition toward a greener, more sustainable economy.

1.3 Challenges and Opportunities

Côte d'Ivoire is steadily progressing toward a greener economy, leveraging its natural resources and growing commitment to sustainability. However, the country faces challenges and opportunities in renewable energy, waste management, electric mobility, and environmental policy. This analysis examines Côte d'Ivoire's current state through a SWOT (Strengths, Weaknesses, Opportunities, Threats) and PESTLE (Political, Economic, Social, Technological, Legal, Environmental) framework, providing a comprehensive view of the factors shaping its green economy. These insights will help identify strategies for driving sustainable development and fostering a greener future for the nation.

SWOT Analysis

Strengths: - Abundant renewable energy resource - International partnerships - Growing awareness of sustainability - Government commitment and policies	Weaknesses: - Limited electric mobility infrastructure - Poor waste management systems - Consumer behaviour - Challenges in green financing
Opportunities: - Expansion of renewable energy projects - Growth of smart city initiatives - Government support for green technology	Threats: - Dependence on fossil fuels - Climate change and environmental degradation - Slow pace of policy implementation - Social and economic inequality

PESTLE Analysis

Political	- Government Commitment to Sustainability - International Cooperation - Political Stability and Governance
Economic	- Economic Growth and Investment Climate - Green Financing - Dependence on Agriculture and Natural Resources.
Social	- Awareness and Education on Sustainability - Urbanization and Population Growth - Income Disparity and Social Inclusion.
Technological	- Advancements in Renewable Energy Technology - Electric Mobility and Infrastructure - Smart City Technologies.

Legal	• Environmental Regulations • Renewable Energy Policies • Challenges in Regulatory Enforcement
Environmental	• Climate Change Vulnerability • Deforestation and Biodiversity Loss • Waste Management and Pollution.

Deductions from the Analyses

Côte d'Ivoire's green economy has strong potential, driven by abundant renewable energy resources, government commitment, and international partnerships. However, challenges include limited electric mobility infrastructure, underdeveloped waste management, and uneven access to green financing. Rapid urbanization and rising public awareness offer growth opportunities, but income inequality and technological gaps hinder the widespread adoption of green solutions.

From a PESTLE perspective, political stability and supportive policies, alongside international cooperation, create a favorable environment for green investments. Economic growth, paired with technological advancements, enhances prospects in renewable energy and smart city initiatives. However, climate vulnerability, weak regulatory enforcement, and environmental degradation present significant risks.

To enhance the green economy, Côte d'Ivoire must improve regulatory enforcement, increase public awareness, and ensure equitable access to green technologies. Strengthening waste management systems, expanding electric mobility infrastructure, and fostering innovation in renewable energy are key to sustainable development.

4.0 Enhancing Sustainable Practices in Côte D'Ivoire: Youth-Led Recommendations

Côte d'Ivoire is at a crucial point in its journey toward sustainability, and engaging the country's youth is essential to driving a green economy. Establishing youth-led green innovation hubs across urban and rural areas would provide the resources, mentorship, and funding for young entrepreneurs to develop sustainable solutions such as solar energy systems, waste recycling, and eco-friendly agriculture. These hubs would encourage collaboration, helping youth address local environmental challenges with innovative, impactful ideas.

Additionally, leveraging technology through digital education platforms could raise awareness of sustainability issues. These platforms could offer courses, webinars, and interactive content on climate change, biodiversity, and green practices. Adding gamification elements would make learning more engaging, motivating young people to actively participate and share knowledge within their communities.

Organizing community environmental action projects is another way to foster youth involvement. Tree planting, community gardens, and clean-up campaigns could be developed with local NGOs to give young people hands-on experience in environmental stewardship. Competitions for the best sustainability projects could incentivize youth to develop practical solutions. Simultaneously, partnerships with educational institutions would ensure sustainability is integrated into curricula through project-based learning. Students could work on real-world environmental challenges and gain valuable experience through internships with green businesses, inspiring future careers in sustainable industries.

Empowering youth to advocate for environmental policies is also critical. Forming youth-led advocacy groups would give young people a platform to raise awareness of pressing environmental issues and push for policy changes at local and national levels. Encouraging their participation in local government meetings would ensure their voices are heard in decision-making processes regarding sustainability.

Supporting sustainable entrepreneurship through training programs would provide young entrepreneurs with the skills and knowledge to start green businesses that contribute to both economic growth and environmental protection. Green business incubators could offer the 10 mentorship and resources necessary to help these businesses succeed while highlighting successful local ventures that would inspire others to follow in their footsteps.

Engaging youth in technology-based environmental monitoring through citizen science projects would allow them to collect and analyze data on pollution levels and biodiversity using mobile apps. This data could be used to advocate for policy changes and community improvements. Networking platforms could also connect young people working on sustainability projects, fostering collaboration and innovation. Regular workshops, hackathons, and forums focused on sustainability would encourage knowledge exchange, while partnerships with international youth organizations could bring in global perspectives and best practices.

In conclusion, Côte d'Ivoire can harness the energy and creativity of its youth to drive the transition toward a green economy. By establishing innovation hubs, enhancing digital education, fostering community involvement, supporting sustainable entrepreneurship, and promoting environmental advocacy, young people can play a vital role in building a sustainable future. Their involvement ensures that solutions are relevant, impactful, and tailored to the needs of their communities, contributing to a greener and more prosperous Côte d'Ivoire.

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PROJECT TITLE

Green Economy Transition in Egypt

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Introduction

Country Name	Egypt
Continent	Africa
Population	118 million (2025)
Climate Type	Hot desert climate.
Primary Energy Consumption per Capita	~10,000–10,500 kWh per person per year (≈9,969 kWh in 2022)
Primary Energy Consumption from Renewable Energy	~11.5% (2024)
Share of the population with access to electricity	Nearly 100% (2023)
Per Capita CO2 Emissions	~2.2 tonnes per person (2023)

Egypt's energy system remains heavily dependent on fossil fuels, particularly natural gas, which accounts for the bulk of electricity generation. As of 2024, renewables contributed only about 11.5% of the power mix, though the government aims to increase this share to 42% by 2030 (African Energy Council, 2024). Despite this ambition, Egypt recently lowered its 2040 renewable target to 40%, signaling continued reliance on natural gas (Arab News, 2024).

The country plans to add around 30 GW of renewable capacity, with solar and wind expected to rise to about 6,470 MW by 2026 raising renewables' share to nearly 20% of generation (Enerdata, 2025a, 2025b). These steps align with Egypt's updated Nationally Determined Contributions (NDCs) and its National Climate Change Strategy 2050, which prioritize clean energy expansion and emissions reduction (Government of Egypt, 2023; SIS, 2024).

However, challenges persist, including infrastructure constraints, heavy dependence on fossil fuels, and financing needs (Climate Action Tracker, 2023). At the same time, climate risks such as sea level rise in the Nile Delta and increasing water scarcity underscore the urgency of a just and inclusive energy transition.

Population

Egypt's population in 2025 is estimated at more than 118 million, making it the largest in the Arab world and one of the fastest growing in the region. The annual growth rate of around 1.6% means that millions of new citizens are added every few years, creating rising demand for housing, infrastructure, jobs, and especially energy. Most of the population is concentrated in the narrow strip of the Nile Valley and the Nile Delta, resulting in some of the highest population densities in the world within these areas, while vast desert regions remain sparsely inhabited. This uneven distribution influences how energy infrastructure is planned and delivered, as urban centers experience heavy demand while rural and remote areas face different challenges (Worldometer, 2024).

Climate Type

Egypt's climate is classified as a hot desert climate, characterized by very high temperatures and low rainfall throughout the year. Summers are extremely hot and dry, especially in the southern and inland regions, while winters are generally mild with cooler nights. Rainfall is scarce and occurs mainly along the northern Mediterranean coast, leaving most of the country arid. The average

annual temperature is above 18°C, and frequent sunshine makes Egypt one of the sunniest and driest countries in the world. This climate strongly influences agriculture, water resources, and daily life (Climate to Travel, 2019).

Primary Energy Consumption per Capita:

Egypt's primary energy consumption per capita is around 10,000-10,500 kilowatt-hours per person per year. In 2022, the value was approximately 9,969 kWh/person and modest growth in energy use and population suggests the 2023 value is slightly higher. This metric includes energy from all sources (fossil fuels, hydropower, renewables, etc.) and reflects both the rising demand from energy sectors and the expanding population. Most of this energy comes from natural gas and oil, with renewables playing a smaller, but growing role (Our World in Data, 2023).

Primary Energy Consumption from Renewable Energy:

Primary energy consumption from renewable energy in Egypt is calculated using the substitution method, which expresses renewable output in terms of the fossil fuel input that would have been required to produce the same amount of electricity in a thermal power plant with an assumed efficiency of 38%. This means that renewables and nuclear energy are measured in "input-equivalent" terms, reflecting the energy that fossil fuels would have consumed to generate the same output. For example, if Egypt produced 100 TWh from renewables, this would be translated into approximately 263 TWh, or 0.95 EJ, of primary energy. This approach accounts for the inefficiencies in fossil fuel-based power generation, offering a more realistic comparison of renewables' contribution to total energy consumption in Egypt (Our World in Data, 2025)

The population with access to electricity:

In terms of electricity access, Egypt has made remarkable progress. In the early 1990s, only about 93% of the population had access to electricity, but today coverage has reached almost 100%. This achievement reflects decades of investment in expanding the grid and improving energy services. However, universal access does not mean that the energy challenge is solved. With a youthful population and continued population growth, future demand for electricity is expected to rise sharply. Ensuring that this demand is met through sustainable and renewable energy sources will be critical for Egypt's transition toward a greener economy (Our world in data, 2023).

Per Capita CO₂ Emissions:

Key Figures & Trends

Metric	Value / Approximate	Notes / Year
CO ₂ emissions (territorial / production-based) per capita	~ 2.285 tonnes	2021 (CEIC / OWID)
CO ₂ emissions (territorial) per capita	~ 2.2 tonnes	2023 (World Bank data for Egypt)
Recent power-sector per capita emissions	~ 1.2 tonnes	For electricity generation (not full economy) in recent years (Ember)
Historical trend (2005–2015)	+47 % (per capita)	Emissions per person increased by about 47 % over that decade

Interpretation & Context

- The per capita CO₂ emission values for Egypt are modest compared to many developed countries, reflecting its lower overall industrialization and energy intensity relative to higher emitters.
- The gap between “power sector emissions per capita” and “full territorial emissions per capita” indicates that much of Egypt’s emissions are distributed across industry, transport, buildings, etc.
- The growth in per capita emissions over past decades is tied to rising energy demand, economic growth, expansion of infrastructure, and heavier industrial activity, such as cement production (Atlantic Council, 2021; Ember, 2024).
- According to a European Parliament briefing, Egypt’s per capita GHG emissions (all gases) in 2019 were estimated at about 3.5 tonnes CO₂-equivalent (European Parliament, 2022).
- In assessments such as the Climate Change Performance Index, Egypt is characterized by relatively low per capita emissions (~2.08 tCO₂e) but also weak performance on renewable deployment and mitigation ambition (Climate Change Performance Index [CCPI], 2025).

Analysis of the Green Economy

Renewable energy status

Egypt has made renewable energy a central pillar of its energy strategy, driven by large-scale solar and wind projects (e.g., Benban and new Gulf-of-Suez wind farms). The government’s publicly stated target has trended upward in recent years, aiming for a large share of renewables in the power mix (official targets have included ~42% from renewables by 2030/2035 in different policy documents), and recent project deals (e.g., financial close on GW-scale solar and wind projects) show continued momentum. Despite this, renewables currently still represent a relatively small share of total generation compared with natural gas: estimates in reporting around 2024–2025 put renewables in the low double-digits percentage of electricity generation, with natural gas remaining dominant. The gap between ambitious targets and near-term reality reflects both strong project pipelines and ongoing challenges: grid modernization, financing scale-up, and balancing supply variability while ensuring energy security (Study, 2022).

Electric mobility (EVs)

Electric mobility in Egypt is nascent but developing. Policy steps exist to lower barriers, for example, customs-duty exemptions on EV imports and measures to incentivize local assembly and the government has discussed funding for charging infrastructure roll-out. Still, EV adoption is limited by affordability, limited public charging networks, and consumer familiarity. Many EVs remain relatively expensive for the typical buyer, and infrastructure investments are only just beginning to scale, although pilot charging programs and investment commitments were reported in 2024–2025. In short: legislative signals and pilot funding are positive, but practical uptake depends on more accessible vehicle prices, expanded charging coverage, and clearer incentives for private sector charging investment (Thabo Nkosi, 2025).

Green financing

Egypt has attracted multilateral support and begun to develop green financing instruments. The country has engaged with institutions such as the World Bank and Green Climate Fund on renewable and adaptation financing, and there have been sovereign and green-labeled financing initiatives aimed at climate projects. However, the domestic green capital market and accessible funding for early-stage green startups remain limited compared with OECD peers: larger project finance flows tend to target utility-scale renewables and infrastructure rather than smaller enterprises. Continued expansion of green bonds, blended finance, and de-risking instruments will be crucial to channel both private and local institutional capital into smaller, distributed green projects and climate services. Strengthening project pipelines, transparent eligibility standards for green labeling, and capacity-building for local banks would improve access for startups and SMEs (Reuters Staff, 2025).

Waste management & recycling

Waste management presents both a major challenge and a comparative advantage. Egypt generates very large volumes of municipal and agricultural waste, and historically collection and formal disposal have suffered from gaps in coverage and infrastructure. At the same time, informal recycling systems (notably Cairo’s Zabbaleen community) have demonstrated extremely high recovery rates for the waste they handle, and recent national programs (the National Solid Waste Management Programme and related reforms) aim to scale and formalize improved collection, recycling and circular-economy approaches. Progress is tangible, increased recycling rates in places and donor-supported modernization projects, but nationwide impact depends on expanding formal collection coverage, integrating informal recyclers into formal value chains, and building local recycling industries and markets (AUDI, 2025).

Overall assessment & recommendations

Egypt's green economy is advancing in clear, project-level ways (large renewables deals, pilot EV incentives, green finance instruments, and waste reforms), but systemic scaling will require (1) continued grid and storage investments to absorb variable renewables, (2) targeted incentives and infrastructure to make EVs affordable and convenient, (3) broader green finance mechanisms accessible to SMEs and startups, and (4) formalizing and scaling successful local recycling models while improving collection coverage. If these pieces come together with strong public–private coordination and capacity-building, Egypt can convert current momentum into durable green-economy growth that supports jobs, resilience, and climate goals (Thabo Nkosi, 2025).

Detailed Analysis of the Current State of Egypt's Green Economy

Egypt's journey toward a green economy is steadily progressing, marked by growing investments in renewable energy, sustainable urban planning, and environmental protection. However, the country still faces structural and financial challenges in achieving its long-term sustainability goals. The Egyptian government, alongside international partners and the private sector, has been actively implementing policies and programs that support the transition toward cleaner and more resource-efficient growth.

1. Renewable Energy Status

Egypt has made remarkable strides in renewable energy development, especially in solar and wind power. As of recent years, renewable energy sources contribute around 20% of Egypt's total electricity generation, primarily from the Benban Solar Park in Aswan—one of the largest solar installations in the world—and several large-scale wind farms in the Gulf of Suez and Zafarana. The government aims to increase this share to 42% by 2035, as outlined in its Integrated Sustainable Energy Strategy. Ongoing projects supported by international agencies such as the World Bank and the European Bank for Reconstruction and Development (EBRD) are helping Egypt enhance grid stability and attract private investments in clean energy.

2. Electric Mobility

Electric mobility is still in its early stages in Egypt, but there are promising signs of growth. A few years ago, the government launched plans to locally manufacture electric vehicles (EVs) in cooperation with Chinese companies. While the number of EVs remains small compared to traditional vehicles, charging infrastructure is expanding, particularly in Cairo and Alexandria. Policies supporting EV adoption, such as reduced import tariffs, subsidized charging stations, and plans for EV assembly plants, are helping to build momentum. However, challenges like high upfront costs and limited charging availability still hinder mass adoption.

3. Energy Efficiency Measures

Egypt has implemented several initiatives to promote energy efficiency across sectors. The Egyptian Energy Efficiency Unit (EEU) works under the Ministry of Electricity to develop national programs for efficient lighting, appliance standards, and industrial audits. Many government buildings have shifted to LED lighting, and awareness campaigns have encouraged consumers to reduce energy waste. The industrial sector, particularly cement and manufacturing, has seen improvements through energy audits and retrofitting projects. While progress is noticeable, further enforcement of building codes and industrial standards is needed to sustain long-term efficiency gains.

4. Smart City Initiatives

Egypt's New Administrative Capital, currently under development, is a flagship example of a smart and sustainable city initiative. Designed to reduce congestion in Cairo, the city integrates renewable energy systems, smart grids, digital waste management, and green spaces. Other planned smart cities like New Alamein and New Mansoura also aim to combine sustainability with modern infrastructure. These projects reflect Egypt's broader vision of urban modernization, though maintaining affordability and ensuring equitable access remain ongoing concerns.

5. Green Financing

Green financing has become an increasingly important tool for supporting Egypt's sustainability goals. The government issued the first sovereign green bond in the Middle East and North Africa (MENA) region in 2020, raising \$750 million for clean transportation, sustainable water management, and renewable energy projects. International development banks have also provided soft loans and grants to fund Egypt's green transition. However, access to green financing remains more accessible to large firms than to small startups, which often lack the technical capacity and financial guarantees required to secure such funding.

6. Government Incentives

The Egyptian government has introduced a variety of incentives to promote greener practices, including tax exemptions for renewable energy equipment, subsidies for solar installations, and tariff guarantees for independent power producers.

In agriculture, programs encourage water-saving irrigation systems and organic farming methods. These policies demonstrate the government's commitment, but greater decentralization and local-level implementation could make incentives more effective.

7. Consumer Behavior

Public awareness about sustainability is gradually increasing, particularly among youth and urban residents. Campaigns led by NGOs and universities have helped promote recycling, energy saving, and reduced plastic use. However, in many communities, environmental awareness remains secondary to economic concerns, limiting consumer-driven demand for sustainable products.

8. Waste Management and Recycling

Egypt generates around 90 million tons of waste annually and managing it effectively is a significant challenge. Although recycling initiatives exist, particularly in Cairo and Giza, the system remains fragmented. The informal sector plays a major role in waste collection and recycling but lacks official recognition. The government's National Solid Waste Management Program, supported by the German Development Bank (KfW), aims to improve waste sorting and landfill management, but implementation is still uneven.

9. Water Management

Water scarcity is one of Egypt's most pressing environmental issues. With the Nile River providing over 90% of the country's freshwater, sustainable management is critical. Egypt has adopted the National Water Resources Plan (2017–2037), focusing on modern irrigation, wastewater reuse, and desalination projects. The government is also promoting drip irrigation systems to enhance efficiency in agriculture, which consumes the majority of water resources.

10. Biodiversity and Conservation Efforts

Egypt hosts diverse ecosystems, from deserts to coastal wetlands. Conservation efforts are led by the Ministry of Environment, which manages 30 protected areas covering about 15% of the country's land area. Projects such as coral reef protection in the Red Sea and wildlife conservation in Sinai reflect growing national commitment. However, urban expansion, pollution, and tourism-related pressures continue to threaten biodiversity, requiring stronger enforcement and community engagement.

Conclusion

Overall, Egypt's green economy is advancing, supported by strong government initiatives, international partnerships, and growing youth awareness. While significant challenges remain in waste management, water scarcity, and financing accessibility, Egypt's long-term vision and strategic reforms show that the transition toward sustainability is both achievable and already underway.

Challenges and opportunities

SWOT Analysis

Strengths: -High solar and wind potential; large projects like Benban Solar Park. -Strategic location to export renewable energy to Europe. -Government committed to 42% renewables by 2030 with major investments.	Weaknesses: - Renewables only 11.5% of electricity mix. - Low EV adoption; limited charging infrastructure. - Energy efficiency measures not fully implemented.
Opportunities: - Expand solar/wind projects (e.g., Sactec 1 GW solar, 900 MW wind). - EV infrastructure and local EV production. - Green financing programs and incentives. - Smart city developments promoting sustainability.	Threats: - Economic instability raising tech import costs. - Continued reliance on fossil fuels. - Climate impacts: heat and water scarcity affecting energy systems.

PESTLE Analysis

Political	• Government supports renewables (42% target by 2030) • Policies encourage green projects and smart city development.
Economic	• Growing investments in renewable energy and green financing • Currency fluctuations and economic instability can hinder imports and projects
Social	• Rising awareness of sustainability, but EV adoption is low. • Population exposed to energy efficiency and conservation campaigns.
Technological	• Advanced solar and wind technology projects (Benban, Gulf of Suez). • Smart city initiatives integrate sustainable tech and energy management.
Legal	• Renewable energy incentives and regulations exist. • Need for stronger enforcement of energy efficiency and waste management laws.
Environment	• High solar/wind potential due to climate. • Vulnerable to water scarcity, heat, and climate change impacts.

Analysis findings:

The SWOT and PESTLE analyses highlight both the opportunities and challenges for Egypt's transition to a greener economy. Egypt's abundant solar and wind resources, strategic location for energy exports, and strong Government commitment to renewable targets (42% by 2030) provide a solid foundation for growth. Large scale projects like the Benban Solar Park and smart city developments show progress in integrating sustainable technologies. However, weaknesses such as low current renewable energy share, limited EV adoption, and partial implementation of energy efficiency measures indicated areas needing improvement. Economic and political factors, including currency fluctuations and policy enforcement, could affect the green investments, while environmental challenges like water scarcity and extreme heat underscore the urgency of sustainable solutions. Overall, enhancing Egypt's green economy will require expanding renewable energy projects, improving infrastructure for electric mobility, strengthening legal frameworks, promoting public awareness, and leveraging financial incentives to ensure a balanced and effective energy transition.

Youth Perspective and Concluding Remarks:

As young leaders, we view Egypt's green transition as both a responsibility and an opportunity. Based on the program's insights, we propose the following actionable recommendations:

1. Youth-Led Renewable Energy Hubs

- Establish solar and wind innovation hubs at universities where students can design, test, and deploy small-scale renewable systems (e.g., rooftop solar for schools, solar irrigation for farms).
- These hubs can serve as living labs and incubators for green startups.

2. Shared Electric Mobility Solutions

- Launch youth-driven e-bus and e-scooter services in university districts and dense neighborhoods to build public familiarity with clean transport.
- Encourage partnerships between startups and municipalities for affordable charging stations.

3. National Green Startup Fund for Youth

- Create a financing mechanism that provides seed funding, mentorship, and incubation for projects led by entrepreneurs under 35.
- Focus areas: clean energy, waste-to-value innovations, sustainable agriculture, and digital green apps.

4. Community Awareness and Education

- Integrate sustainability into school curricula from early grades.
- Support youth-led peer campaigns on energy conservation, recycling, and water-saving.
- Use social media platforms creatively (TikTok, Instagram Reels) to make sustainability relatable and attractive.

5. Smart & Inclusive Cities

- Empower youth as “green ambassadors” in new smart city projects.
- Involve them in designing apps for energy monitoring, waste tracking, and water management at the neighborhood level.

6. Strategic Partnerships

- Expand partnerships between government, private sector, and NGOs to co-fund youth-led initiatives.
- Engage international organizations for knowledge transfer and training programs targeted at young professionals.

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PROJECT TITLE

Green Economy Transition in **Ethiopia**

PARTICIPANT NAME :

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2. Christian Yao Amegavi
3. Muluken Habtamu Ergudo

COUNTRY REPRESENTED:

1. Ethiopia
2. Ghana

Introduction

Country Name	Ethiopia
Continent	Africa
Population	Approximately 126 million (2023)
Climate Type	Southern Zone: Tropical monsoon, year-round rainfall, and high humidity. Central Zone: Tropical savanna with a wet season (May-Oct) and dry season (Nov-Apr). Northern Zone: Semi-arid with prolonged dry seasons and shorter rainy seasons.
Primary Energy Consumption per Capita	860-872 kWh (2021)
Primary Energy Consumption from Renewable Energy	More than 90% of electricity is generated from hydropower, with ongoing investments in solar, wind, and geothermal projects.
Share of the population with access to electricity	National average: 54.19% (2021) Urban areas: 97% Rural areas: 32%
Per Capita CO2 Emissions	0.2 tonnes (2021)

Climate Type: Ethiopia has a diverse climate, ranging from tropical in the lowlands to chilly and cool in the hills. It is mostly classed as a tropical monsoon, with variations in desert, semiarid, and temperate climates throughout different locations.

Primary Energy Consumption per Capita: Ethiopia's primary energy consumption per capita is predicted to be 860-872 kWh in 2021, which is much lower than the global average. This low energy consumption reflects the country's emerging economy and inadequate energy access, especially in rural areas.

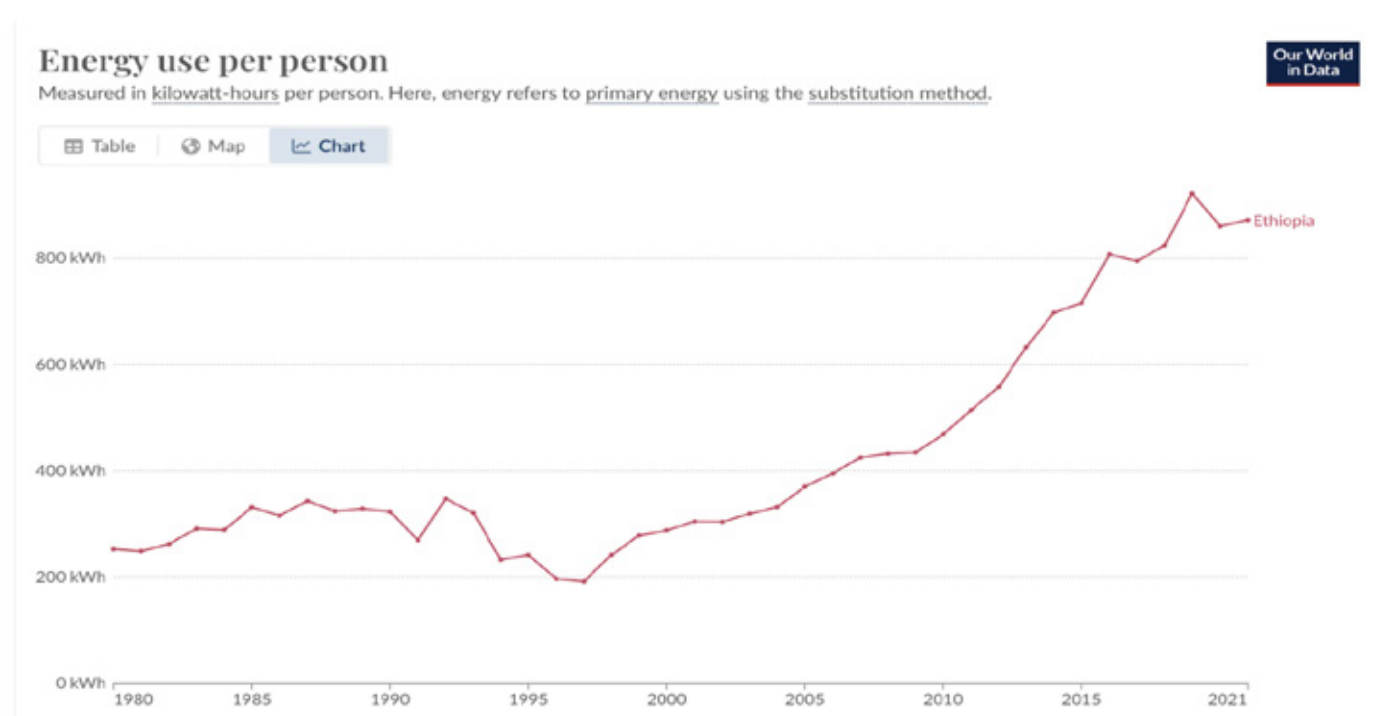


Figure 1- 1

Primary Energy Consumption from Renewable Energy: Hydropower generates the majority of Ethiopia's electricity, accounting for more than 90% of the total. This makes it one of the world's largest renewable energy producers as a percentage of its electricity mix. Ethiopia has abundant renewable energy resources and has the potential to generate over 60,000 megawatts (MW) of electric power from hydroelectric, wind, solar, and geothermal sources. Ethiopia is actively building wind, solar, and geothermal energy projects to diversify its renewable energy portfolio and lessen reliance on hydropower, particularly given its vulnerability to droughts. The Ashegoda Wind Farm and geothermal projects like the AlutoLangano are important advances toward diversification.

These activities are consistent with Ethiopia's objective of becoming carbon neutral by 2030 under its Climate Resilient Green Economy (CRGE) plan, which focuses on sustainable energy development.

Share of the population with access to electricity: In terms of expanding the percentage of its population with access to electricity, Ethiopia has been making significant strides. As of 2021, 54.19% of the population has access to electricity. Having a dependable source of electricity for needs like radio power, phone charging, and lighting is known as access to electricity. Urban areas have achieved a high degree of electricity (97%), whereas rural areas trail behind (32%).

To close this disparity and accomplish general electricity by 2025, the Ethiopian government is choosing:

Developing renewable energy infrastructure: To enhance the production of electricity, the nation is funding wind, solar, and hydroelectric projects.

Increasing grid connectivity: There are initiatives in place to connect rural areas to the electrical grid, especially those with substantial economic potential.

Ethiopia's electricity generation capacity has reached about 5,200 megawatts. Planning to increase the country's electric power supply coverage to 96 percent in the next 10 years, Ethiopia wants to guarantee that all of its people may take advantage of the advantages of electricity, such as enhanced quality of life, increased economic prospects, and social advancement, by tackling these obstacles.

Share of the population with access to electricity

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.

Our World in Data

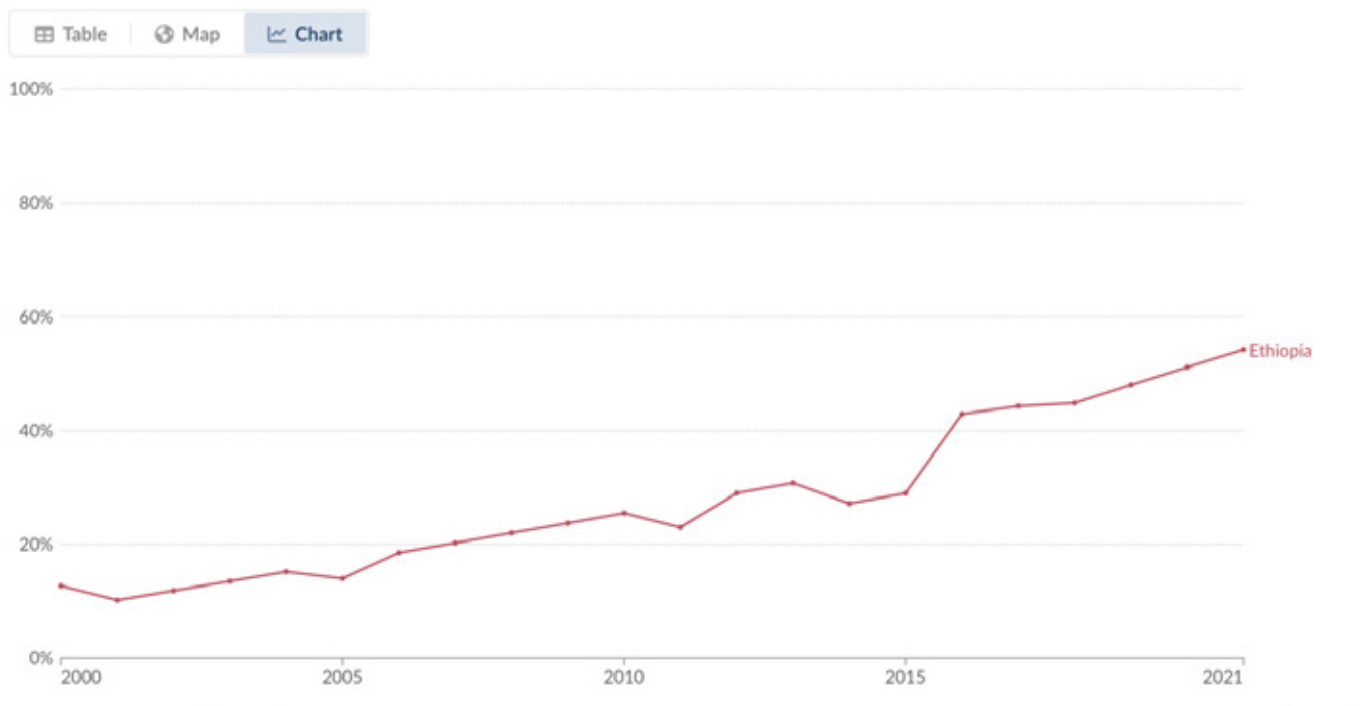


Figure 1- 2

Per Capita CO₂ Emissions: Ethiopia's Capita 0.2 t, is lower than many developing countries. This is in part due to its low industrialization and reliance on traditional energy sources like wood and biomass.

Important Elements Affecting Ethiopia's Low Emissions:

Economic Development: Ethiopia is still developing, and its industrial sector is low, which helps to decrease greenhouse gas emissions.

Energy Mix: The country relies primarily on renewable energy sources such as hydropower, which emits far fewer emissions than fossil fuels.

Agriculture and forestry are important areas in Ethiopia's economy, and they often absorb carbon dioxide.

While Ethiopia's emissions are now low, growing development and urbanization may result in increased CO₂ emissions in the future. To reduce this risk, the country prioritizes sustainable development and clean energy technologies.

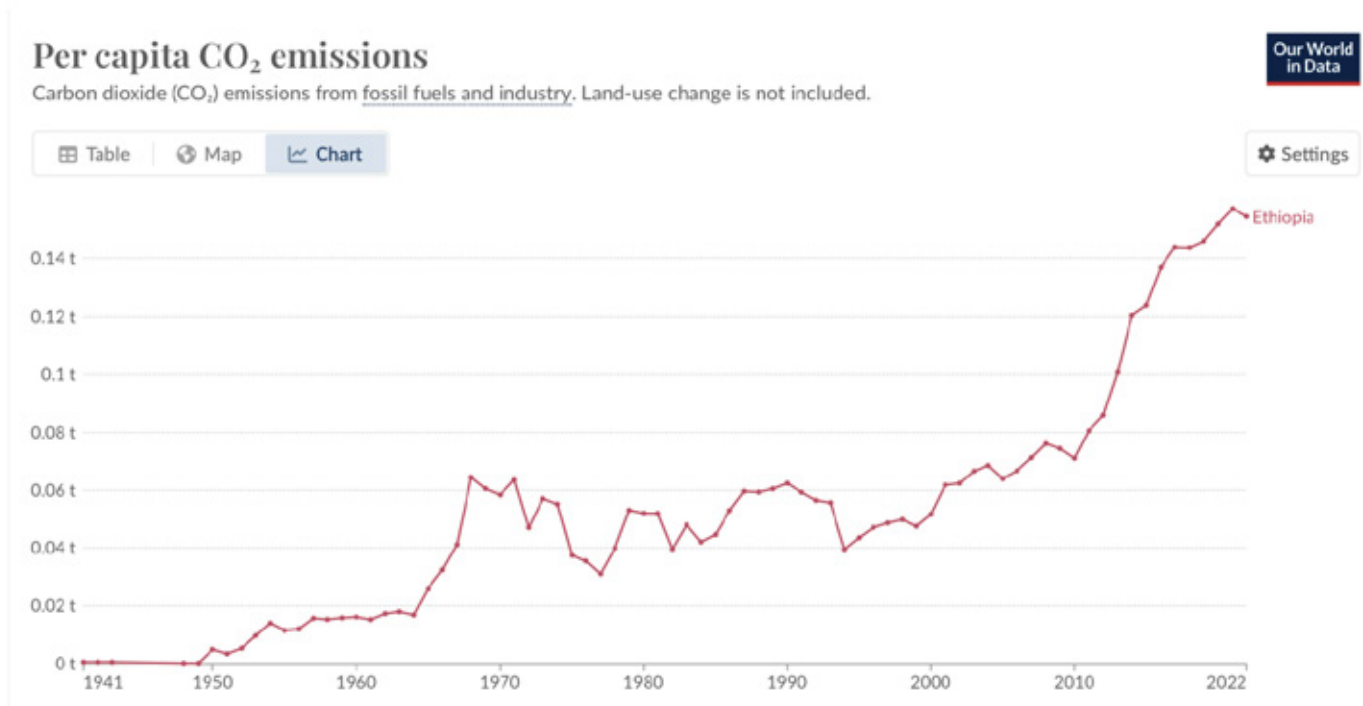


Figure 1- 3

1.2 Analysis of the Green Economy

Questions to Guide Analysis:

- **Renewable Energy Status:**

Ethiopia has made amazing progress toward integrating renewable energy into its national system. Hydropower remains the primary source of electricity generation, however investments in solar, wind, and geothermal are increasing. The government wants to achieve universal electrification by 2025, with a focus on renewable energy to power villages, reduce dependence on fossil fuels, and meet climate targets. Key measures involve seeking investment, executing policy reforms, and developing international collaborations to boost Ethiopia's renewable energy potential, allowing it to exceed its sustainable energy targets.

- **Electric Mobility:**

Ethiopia's electric vehicle (EV) market has expanded significantly, with more than 100,000 EVs on the road by 2024. This rise is being driven by government incentives such as tax rebates, investments in charging infrastructure, and the burgeoning local production of EVs. However, problems remain, including a limited charging network, high initial costs for customers, and concerns about grid capacity. Despite these challenges, Ethiopia is on course to become Africa's leader in sustainable transportation through ongoing governmental support and infrastructure upgrades.

- **Energy Efficiency Measures:**

1. Ethiopia is implementing many energy efficiency strategies in critical sectors:
2. Buildings: include energy codes and standards, as well as upgrading existing structures with efficient systems.
3. Industries: Energy audits and incentives for using efficient production processes.
4. Transportation: increasing public transportation and establishing fuel efficiency standards for autos.

Challenges include low awareness, financial limits, and infrastructure limitations. The government is tackling these challenges by raising awareness, providing financial incentives, and improving infrastructure, with the goal of increasing energy efficiency throughout the country.

- **Smart City Initiatives:**

Ethiopia is pursuing smart city projects, particularly in Addis Ababa, to upgrade urban areas with sustainable technology such as IoT, AI, and big data. These programs concentrate on integrating renewable energy (solar and wind), establishing green infrastructure (parks and sustainable transportation), and improving digital governance to improve public services.

- **Green Financing:**

Ethiopia has been actively promoting green financing to support sustainable development projects. Green bonds, green loans, and climate financing are some of the key financial instruments available. While startups may face challenges, there are increasing efforts to provide them with access to green funds through incubators and crowdfunding. Established companies have better access to green financing through traditional channels. Overall, green financing in Ethiopia is becoming more accessible, but there is still room for improvement.

- **Government Incentives:**

There are tax waiver packages for importing renewable energy technologies and equipment.

There are also investments in electric rail systems in urban areas, particularly Addis Ababa, to encourage greener transportation options.

Ethiopia participates in the Clean Development Mechanism (CDM), which can provide financial incentives for projects reducing greenhouse gas emissions.

The government has programs encouraging tree planting, which may include incentives for businesses and communities participating in reforestation efforts.

The National Biogas Programme for Ethiopia (NBPE) establishes biogas digester plants that provide smallholders with alternative, renewable, clean, and safe energy (biogas) for cooking and lighting, as well as organic fertilizer (bio-slurry) to improve their crop yields and improved sanitation. The project brought these combined economic, social, and environmental benefits to about 14,000 smallholders, from 1,600 biogas digester plants installed in 2009. The NBPE is being implemented in the four main crop-growing regions of the country: Amhara, Oromiya, Southern Nations, Nationalities and Peoples (SNNP), and Tigray Regional States.

- **Consumer Behavior:**

Awareness is higher in urban areas, particularly Addis Ababa, where exposure to global trends and environmental education is more common. Rural areas, which comprise a significant portion of Ethiopia's population, typically have lower

awareness due to limited access to information and more pressing immediate economic concerns. Higher-income and more educated segments tend to be more aware and engaged with sustainability issues. While awareness is growing, it's from a relatively low base compared to more developed economies. Economic development remains a primary focus for many Ethiopians, which can sometimes overshadow environmental concerns.

- **Waste Management and Recycling:**

Management of industrial waste is inconsistent. Some larger industries have their waste management systems, but many smaller operations lack proper disposal methods. The Reppie Waste-to-Energy Facility in Addis Ababa, operational since 2018, is a notable development, but its effectiveness and environmental impact are debated. In urban areas, there's some level of collection of commercial waste, but proper sorting and recycling are limited. Waste management in rural areas is often minimal or non-existent, with waste typically burned or disposed of locally. In major cities like Addis Ababa, waste collection has improved but remains inconsistent. Many areas, especially informal settlements, have limited or no formal waste collection services.

Overall, while there have been some improvements, particularly in urban areas, Ethiopia's waste management and recycling systems face significant challenges in effectively handling the country's waste. The rapid urbanization and economic growth are outpacing the development of waste management infrastructure.

- **Water Management:**

Agricultural Water Management:

1. Promotion of small-scale irrigation projects to reduce dependence on rain-fed agriculture.
2. Implementation of water-efficient irrigation techniques like drip irrigation.
3. Integrated watershed management programs to improve water retention and reduce soil erosion.
4. Construction of small dams and water harvesting structures to capture and store rainwater for agricultural use.
5. Promotion of drought-resistant crops and farming practices that conserve water.

Urban Water Management:

1. Development of wastewater treatment facilities, though coverage remains limited.
2. Encouragement of rainwater harvesting in urban buildings, particularly in water-scarce areas.
3. Establishment of River Basin Authorities to manage water resources at the basin level.

- **10. Biodiversity and Conservation Efforts:**

The Ethiopian Wildlife Conservation Authority (EWCA) manages 13 national parks, wildlife reserves, and sanctuaries, covering over 3.75 million hectares of natural habitat. This includes 1.8 million hectares of forest and woodlands, which is about 20% of the total remaining natural forest cover in Ethiopia.

The National Policy on Biodiversity Conservation and Research, issued in 1998, provides a general framework for effective conservation, rational development, and sustainable utilization of genetic resources. This policy includes topics such as sustainable management of protected areas, control of invasive species, rehabilitation and restoration of degraded areas, and access and benefit sharing.

During the Ethiopian Millennium celebrations, a nationwide initiative led to the establishment of community-managed millennium parks in every village. These parks focus on indigenous tree species and community-led conservation efforts.

Projects like the one in the Kafa Biosphere Reserve involve local communities in forest management, sustainable forest use, and the production of energy-efficient cooking stoves. This approach strengthens participatory community management and regional development.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Abundant renewable energy potential (hydropower, wind, solar, geothermal) - Strong political commitment to green growth (Climate Resilient Green Economy strategy) - Large agricultural sector with potential for sustainable practices - Young, growing workforce - Rich biodiversity and natural resources	Weaknesses: - Limited financial resources for green investments - Low technological capacity and innovation in green sectors - Weak infrastructure, particularly in rural areas - Limited public awareness of environmental issues - High poverty rates constraining green consumer choices
Opportunities: - International Climate finance and Development aid - Growing global market for sustainable products - Potential for green job creation - Leapfrogging to clean technologies - Carbon credit markets	Threats: - Deforestation and land degradation - Climate change impacts (droughts, floods, Landslides) - Rapid urbanization straining resources - Regional geopolitical tensions affecting resource management - Global economic fluctuations impacting investment

PESTLE Analysis

Political	- Stable government commitment to a green economy - Policies supporting renewable energy development - Participation in international climate agreements - Decentralization efforts affecting local environmental management - Regional cooperation on transboundary resources (e.g., Nile Basin Initiative)
Economic	- Fast-growing economy with potential for green sectors - High poverty rates limiting green investments - Dependence on agriculture vulnerable to climate change - Limited access to finance for green projects - Emerging green bond market
Social	- Young population receptive to new ideas - Growing urban middle class with increasing environmental awareness - Traditional practices often aligned with sustainability - Gender inequality affecting resource management - Rural-urban migration changing resource use patterns
Technological	- Increasing mobile phone and internet penetration - Limited R&D capacity in green technologies - Growing adoption of renewable energy technologies - Challenges in technology transfer and adaptation - Emerging local innovations in sustainable agriculture

Legal	• Environmental Protection Authority established • Evolving legal framework for climate change and sustainability • Challenges in the enforcement of environmental regulations • Land tenure issues affecting sustainable land management • Intellectual property rights potentially limiting technology adoption
Environmental	• Diverse ecosystems with high biodiversity • Vulnerability to climate change impacts • Ongoing deforestation and land degradation • Water scarcity in some regions • Air quality issues in urban areas

Analysis findings

Implications for Enhancing Ethiopia's Green Economy:

- **Leverage Renewable Energy Potential:** Ethiopia should continue to invest heavily in its abundant renewable energy resources, particularly hydropower, wind, and solar. This can provide clean energy for domestic use and potentially for export.
- **Strengthen International Partnerships:** Given the limited domestic financial resources, Ethiopia should actively pursue international climate finance and partnerships for technology transfer. This can help address the weaknesses in technological capacity and infrastructure.
- **Invest in Education and Awareness:** To address the weakness of limited public awareness, Ethiopia should invest in environmental education and awareness campaigns. This can help create a more environmentally conscious population and workforce.
- **Develop Green Entrepreneurship:** Encourage and support green startups and SMEs, leveraging the young, growing workforce. This can help create green jobs and drive innovation in sustainable technologies.
- **Invest in Climate Resilience:** Given the high vulnerability to climate change, invest in climate adaptation measures, particularly in water management and disaster risk reduction. Develop Local Green Technology: Invest in R&D and support local innovations in green technology to reduce dependence on imports and create solutions tailored to Ethiopia's specific needs.

Youth Perspective and Concluding Remarks

Recommendation

From a youth perspective, supporting Ethiopia's transition to a greener economy requires a multi-faceted approach that leverages the country's young, dynamic population and addresses its unique challenges and opportunities.

Green Transportation Challenge: Launch a nationwide "Green Transportation Challenge" for youth to design and implement sustainable urban mobility solutions. This could include developing bike-sharing programs, creating apps for carpooling, or designing energy-efficient public transportation routes. The best ideas could be piloted in major cities with government support.

Sustainable Agriculture Youth Corps: Establish a "Sustainable Agriculture Youth Corps" that trains young people in climate-smart agricultural techniques. This corps can work with rural communities to implement water-efficient irrigation systems, promote agroforestry, and introduce drought-resistant crops. This initiative addresses both youth unemployment and agricultural sustainability.

Youth Environmental Policy Forum: Establish a "Youth Environmental Policy Forum" that gives young people a voice in shaping Ethiopia's environmental policies. This forum should have direct channels to communicate with policymakers and participate in decision-making processes related to the green economy.

Green Skills Development Program: Establish a national "Green Skills Initiative" that integrates sustainability and environmental education into school curricula and vocational training. This program should focus on practical skills like renewable energy

installation, sustainable agriculture techniques, and green entrepreneurship. Partner with local businesses to offer internships and apprenticeships in green sectors, providing youth with hands-on experience and potential employment pathways.

These recommendations aim to harness the energy, creativity, and digital savviness of Ethiopia's youth to drive the transition to a greener economy. By focusing on skill development, innovation, community engagement, and policy participation, these initiatives can create a generation of environmentally conscious leaders and entrepreneurs. The key to success will be ensuring these programs are accessible to youth across different regions and socioeconomic backgrounds, truly making the green transition an inclusive, nationwide movement.

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PROJECT TITLE

Green Economy Transition in Ghana

PARTICIPANT NAME :

1. Sharon Asiamah Agyeman
2. Edem Agbodeka
3. Grace Yayra Kagatse
4. Piagubo Korkor Elike-Ogbete

COUNTRY REPRESENTED:

Ghana

Introduction

Country Name	Ghana
Continent	Africa
Population	Approximately 30.8 million (2021)
Climate Type	Tropical climate with wet (April–October) and dry seasons (November–March)
Primary Energy Consumption per Capita	3,483 kWh (2021)
Primary Energy Consumption from Renewable Energy	Hydropower: 34.9%, Other renewables: 0.7%, with efforts to increase solar and wind projects
Share of the population with access to electricity	86.3%
Per Capita CO2 Emissions	0.6 tonnes (2021)

Ghana is a developing West African country with Accra as its capital city which possesses a growing economy and population. Geographically, Ghana borders Burkina Faso to the north, Togo to the east, Côte d'Ivoire to the west and at the southernmost tip of the country is the Gulf of Guinea which forms the trade and economic practices with the main sea passage to the Atlantic Ocean. According to the Ghana Statistical Service (2021), the country's population which is conducted every ten years is approximately 30.8 million. The country has a tropical climate regime characterized by distinct wet seasons which lasts from April to early October and dry seasons extending from November to March. These prevalent rain and dry weather conditions have great implications on agricultural production and energy consumption in this part of the world.

According to the Energy Commission of Ghana (2024), hydropower and thermal plants are expected to produce 8,734 GWh (34.9%) and 16,091 GWh (64.4%) of the whole electricity supply in 2024. The rest of the supply, 172 GWh corresponds to 0.7% and is presumed to be covered by other renewables, such as solar PV and biogas operating at sub-transmission levels. Moreover, Ghana is a signatory to the Paris Agreement that seeks to ensure access to cleaner energy sources by 2030 and meet its nationally determined contributions (NDCs). (Calcagnini et al., 2016; Amponsem B. et al., 2023).

While these initiatives are intended to diversify its energy mix, the share of renewable energies excluding hydropower in the total energy supply remains relatively limited. Solar and wind display considerable potential in Ghana, especially in the northern regions, which get sufficient sunshine and enjoy good conditions for wind.

With high solar irradiation levels throughout the year, Ghana has significant potential to expand solar energy production, particularly through off-grid systems in rural areas and large-scale solar farms. The government is already pursuing this under its Scaling Solar initiative. Good wind conditions are found both along the coasts and in some northern parts of the country for power generation. The development of a wind farm also provides a significant source of clean energy to complement hydropower and solar energy. Another resource is biomass energy from agricultural waste, particularly the cocoa sector, that provides energy without any waste. Alternatively, wastes can be converted into useful energy through waste-to-energy projects by lowering energy demand through improved efficiency in buildings, appliances and industrial processes.

The contribution to such an effort would be immense, while on the other side allowing for green building techniques such as mounted solar panels, green roofing and walling systems and passive cooling systems. This, through the implementation of a circular economy approach, would mainly involve recycling, waste-to-energy projects and proper mining in an environmentally friendly manner, all of which could reduce environmental degradation and increase green jobs which is very important to problems such as plastic pollution and illegal mining.

Ghana has the potential to be a leading sustainable development practitioner in Africa as it transitions to a green economy. In order to achieve a more sustainable future that is able to withstand or recover easily from various forms of environmental crisis, it will be very important to transit to a green economy with public education as part of it and improved government regulations. During this transition process, power corporation should look at more renewable energy capacity especially solar, hydropower and wind to minimize dependence on natural gas or diesel and oil and to meet its long-term energy goals. Despite Ghana having 86.3%

of its population with access to electricity, its energy consumption per capita being 3,483kWh and its CO2 emissions per capita at 0.6 tons (Our world in data, 2023)

Primary Energy Consumption per Capita: 3,483 kWh

Energy use per person

Measured in kilowatt-hours¹ per person. Here, energy refers to primary energy² using the substitution method³.

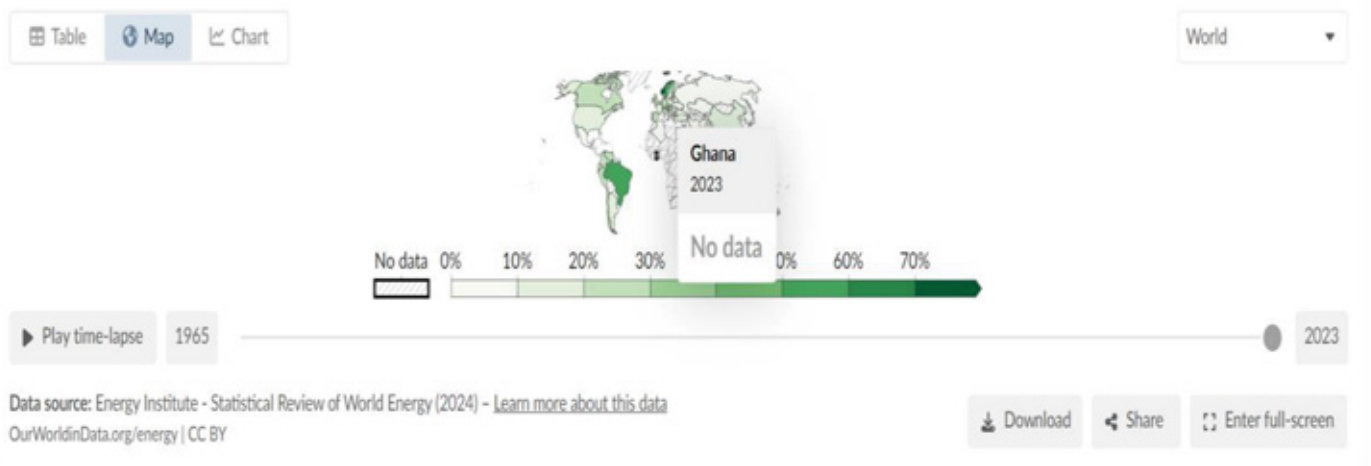


Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2024); Population based on various sources (2023)
OurWorldinData.org/energy | CC BY

Primary Energy Consumption from Renewable Energy: no data found on Ghana

Share of primary energy consumption from renewable sources, 2023

Measured as a percentage of primary energy using the substitution method. Renewables include hydropower, solar, wind, geothermal, bioenergy, wave, and tidal, but not traditional biofuels, which can be a key energy source, especially in lower-income settings.

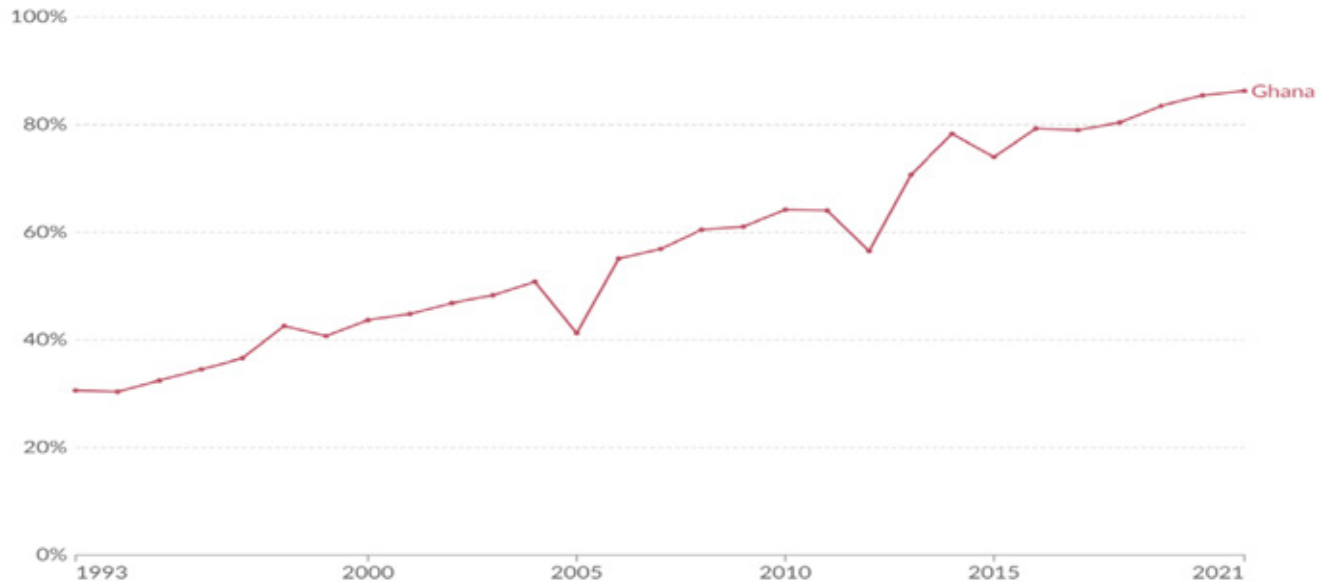


Share of the population with access to electricity: 86.30%

Share of the population with access to electricity

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.

Our World
in Data



Data source: Data compiled from multiple sources by World Bank

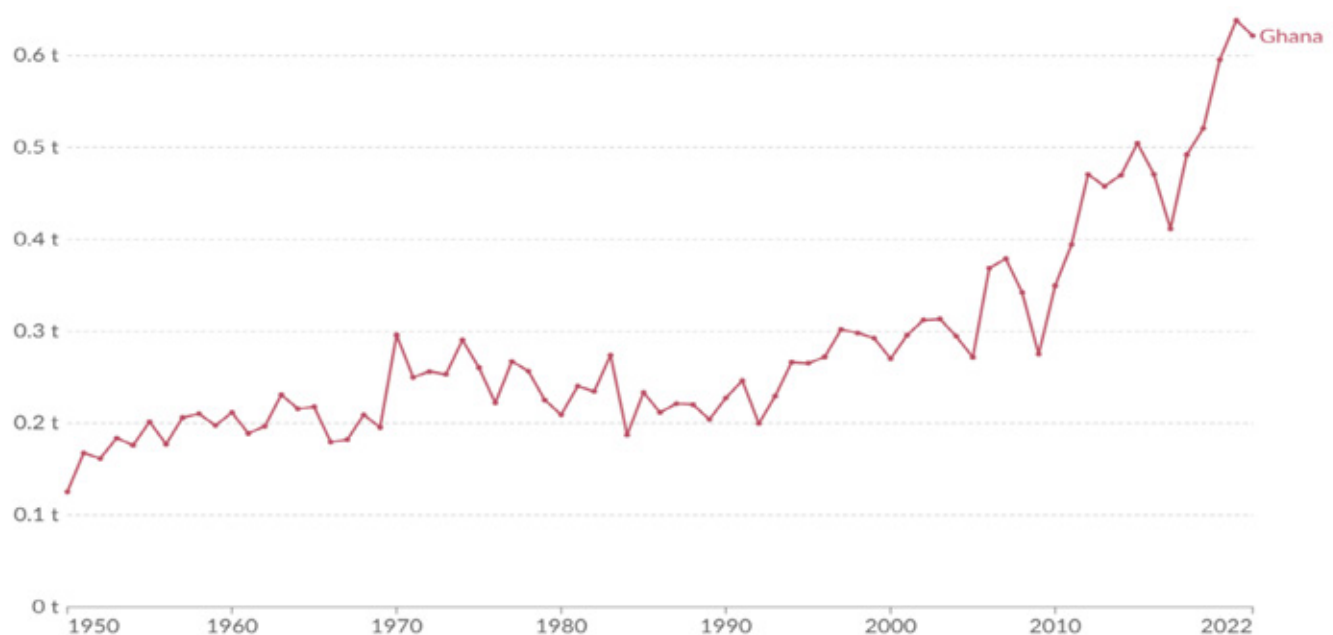
OurWorldinData.org/energy | CC BY

Per Capita CO₂ Emissions: 0.6tonnes

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land-use change is not included.

Our World
in Data



Data source: Global Carbon Budget (2023); Population based on various sources (2023)

OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

¹ Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

1.2 Analysis of the Green Economy

Ghana's journey towards a sustainable and green economy reflects a combination of progressive initiatives and persistent challenges. As the country seeks to transition away from dependence on fossil fuels, its green economy efforts span across various sectors, from renewable energy to waste management, electric mobility, and biodiversity conservation. This analysis will explore the current state of Ghana's green economy, focusing on renewable energy, electric mobility, energy efficiency, smart city initiatives, green financing, and more.

Renewable Energy Status

Ghana's energy mix is heavily reliant on hydropower, which currently accounts for around 29.1% of the country's total energy production (Energy Commission of Ghana, 2020). Ghana has three major hydro-plants erected over her river bodies. The first is the Akosombo power dam which was built in 1966 on Volta river which serves as the first largest source of hydroelectric power in Ghana and one of the largest man-made dams in West Africa. It produces up to 1020MWs at peak periods. Kpong hydro power plant located at the Volta River was also commissioned and has a capacity of 160MWs which is lesser than that of Akosombo. Another is the Bui Hydroelectric Power Plant with an installed capacity 400MWs located on Bui River.

In spite of this heavy reliance, the country still relies on fossil fuels especially natural gas and oil to meet the growing energy demands from its industrial and transportation sector. However, solar and wind energy sources are still at their infancy stages but display enormous potential more so in the northern parts that receive high solar irradiations.

In an attempt to diversify the energy mix, Ghana has set high targets. The Scaling Solar Initiative looks forward to increasing massive solar farm installations especially in the rural areas, while the Renewable Energy Master Plan seeks to achieve 10% of nonhydro renewable energy generation by 2030 (Aboagye et al., 2021). As per Ghana's vision to provide easy and affordable access to efficient and clean energy to emerge as a preferred energy hub, Power Africa assisted the Bui Power Authority (BPA) to bring into existence the first phase of the 250 MW and 50 MW solar- hydro project. The first 50 MW plant has doubled Ghana's grid-connected solar power and is expected to reduce greenhouse gas emissions by more than 47,000 tons annually. The project generates electricity from solar produced during the day to supplement electricity from hydropower and incorporates a 1 MW floating solar component (Bui Power Authority, n.d).

There are various wind energy projects that are being undertaken particularly along the coast and biomass energy from agricultural waste, are also being explored. A flagship example of investment in wind energy is the Ayitepa Wind Farm, which is under development by Netherlands-based IPP Lekela Power, engineering company NEK Ghana, and Upwind Ayitepa. Situated at Ningo-Prampram District in the Greater Accra Region, the farm is expected to become not only Ghana's first wind farm but also the largest wind power project in West Africa. It is expected to produce 400GWh of clean energy, enough to power 150,000 homes. It is also forecasted to offset 200,000t of carbon emissions every year. (Mwenda, 2023)

These efforts reflect the country's commitment to expanding its renewable energy capacity and reducing its reliance on fossil fuels.



The Akosombo Dam



The Bui Dam



The 1MW Floating Solar at Bui, Eastern Region

Site Report



The Kpong Dam



Ayitepa Wind Farm

Electric Mobility

Electric vehicles (EVs) are in their infancy in Ghana, but efforts towards adopting them are increasing. While the numbers of EVs on the roads are relatively small, there is an ever-growing interest in them, partly because of global sustainability trends and commitments Ghana has made to lower greenhouse gas emissions.

According to Ayetor (2021), approximately 70% of all transport-related emissions in Africa can be found within only seven countries, of which Ghana is one. At the rate of 7% annually, transport-related emissions are increasing in Africa, with a total population of vehicles in use numbering 72 million (Ayetor, 2021). In Ghana, the contribution to greenhouse gas emission stood at 44% in 2016 out of a total number of vehicles registered, which was 2.5 million. EVs have been identified as one of the cleanest ways of cutting emissions in the transport sector, achieving SDG 13: climate action as it addresses the reduction of emissions which poses as one of the biggest emitters of carbon. Ghana has turned out to be one of the best electricity markets in Africa. This is contained in the April 2023 report by the World Bank titled "Africa's Pulse" in its review of countries based on the rate of access to power across Africa from 2015-21, with Ghana topping the chart with 81.2% (Africa's Pulse, 2023). This makes Ghana among those seven countries on the African continent that are found to have relatively high potential for EVs, due to its high electricity access rate. For instance, the Ghana Energy Commission estimated that excess capacity would reach 1,030 MW in 2021 and it did. A remarkable point, however, is that the percentage share of renewable energy sources for electricity generation has decreased from 92% in the year 2000 to 36% in 2020.

Nevertheless, electric vehicle charging stations are being constructed with the likes of the Porsche Charging Station located at Palace Mall, Spintex, the Total Energies Charging Station located at Total Fuel Station, Liberation Road, but they still remain quite scarce and are mostly driven by urban cities such as Accra. A few private individuals and companies, like Solar Taxi and Siemens, have begun investing to build out charging stations. Meanwhile, the government has also been working to enhance charging infrastructure via public-private partnerships. Additionally, the development of charging stations in urban centers supports SDG 7: affordable and clean energy, by promoting efficient energy use at a low cost. The Energy Commission of Ghana, coupled with the country's Ministry of Energy, is implementing initiatives intended to spur electric mobility. Ghana's National Energy Policy encompasses objectives aimed at transitioning to cleaner energy sources, which includes the promotion of electric vehicles (EVs). The nation's Automotive Development Policy offers tax incentives for manufacturers and importers of EVs.

However, despite such supportive policies, no full-fledged regulatory framework has yet been finalized with electric vehicles in mind, and high import duties on vehicles remain a barrier to large-scale adoption.



Ghana's Energy Minister receiving the first Electric Vehicle (June 16, 2021)



Porsche Charging Station located at Palace Mall, Spintex

Energy Efficiency Measures

To encourage the use of energy efficient appliances and minimize waste, Ghana has put in place the Energy Efficiency and Conservation Programme (EECP). At the moment, around 30% of electricity generated is lost as a result of inefficient devices. The nation has also made it a requirement to observe energy-efficient building codes for new designs in order to promote sustainable practices. Nonetheless, the program's efficiency is compromised by the laxity in enforcement measures and the low levels of public awareness. More focus on public education and redesigning older infrastructures would perhaps yield greater energy savings.

Smart City Initiatives

The target of smart city projects in major urban areas such as Accra and Kumasi are to embed smart traffic systems, energy-conserving street lights, as well as AI-driven waste disposal mechanisms that are sustainable which aligns with SDG 11; sustainable cities and communities, meaning the integration of cities that are sustainable, safe, inclusive and resilient. At their piloting stage, these undertakings need more investment for extensive deployment. Partnership among the state, private financiers and international allies is imperative for expediting these actions.

Accra was awarded a grant for the IBM Smarter Cities Challenge, a concession that helped in bringing drastic improvement in the social and infrastructural development of the city. Accra was one of four African cities among the 33 cities chosen. IBM's Smarter Cities Challenge, launched in 2014, is a three-year, US\$50 million initiative in which IBM sends teams of experts in a range of disciplines, using ICTs as a driving tool to help cities formulate strategies for improving the quality of life for their citizens (K. Eduam, n.d). According to a report by Owusu Manu et al (2021), making Ghanaian cities smart and sustainable should involve formulating smart policies aimed at promoting smart living. For example, if IoT principles were to be embedded in Ghanaian cities, its movement would be improved, and there would be connected platforms which would foster trade and entrepreneurship within the municipality.

Green Financing

In 2010, 194 countries established the green climate fund (GCF) that provides financial capacity in mitigating greenhouse emissions around the world (Cui and Huang, 2018). By promoting and supporting green finance initiatives, the fund set out to globalize the increasing recognition of the concept. Green financing is gradually becoming available in Ghana through green bonds, climate funds, and low-interest loans. Green bonds are monetary assets that pay a steady rate of interest. These bonds are designed for buildings that adopt practices to conserve the environment and the climate. Green buildings constitute a wide variety of different types of green bonds which are specialized in funding climate or environmental projects (Agyekum et al., 2021). However, access remains limited, especially for startups and SMEs. Simplifying the financing process could foster greater innovation in the green sector.

Government Incentives

In Ghana, government has grasped the need to move towards an economy that is friendly to the environment, and it has provided an array of measures to support people and companies intending to embrace environmentally friendly measures. These incentives aim at minimizing cost implications of incorporating renewable power systems and efficient energy appliances. Here eminent among them are tax exemptions for companies pursuing renewable power production, such as the solar and wind power projects and companies that use energy efficient equipment in their manufacturing processes. This tax relief assists in cutting operating expenses that will create a chance for the business to go green.

Consumer Behaviour

Consumer awareness of sustainable practices has increased in Ghana, mainly due to work done by Environmental NGOs as well as government campaigns and media collaborations that emphasize the necessity of leading eco-friendly lives. Subjects such as climate change, use of plastics and advantages associated with renewable energy are gaining ground in the cities such as Accra and Kumasi where many are now conscious of their impacts on the environment. However, there are economic constraints inhibiting wide choice for environmentally friendly products especially since most green alternatives for example power saving devices or biodegradable substances cost more hence less affordable. Broader public education campaigns are required in order to overcome these obstacles. The campaigns should go beyond the urban centers highlighting the long-term financial gain resulting from using the green products. In addition to this, there should be collaboration between the government as well as private sector such as offering subsidies or incentives for reducing their prices to acceptable levels. When coupled together with raising awareness among Ghanaians then everyone will embrace sustainability while buying products.

Waste Management and Recycling

The management of waste, especially plastic waste, remains a prominent challenge in Ghana. Even though measures have been put in place to enhance waste collection and establish recycling systems, the country's infrastructure is still wanting. An innovative solution is adopting a waste-to-energy technology, where solid waste is changed into useful energy resources, in order to reduce landfill use and dependence on fossil fuel. Ghana can be pushed further in moving into a zero-waste society and a circular economy where waste generation would be reduced, reused and recycled. This would minimize any environmental impact and protect biodiversity with green jobs. Of course, for that to happen, Ghana will need to significantly invest in recycling infrastructure and create collaborations among the government, commercial sector and local communities.

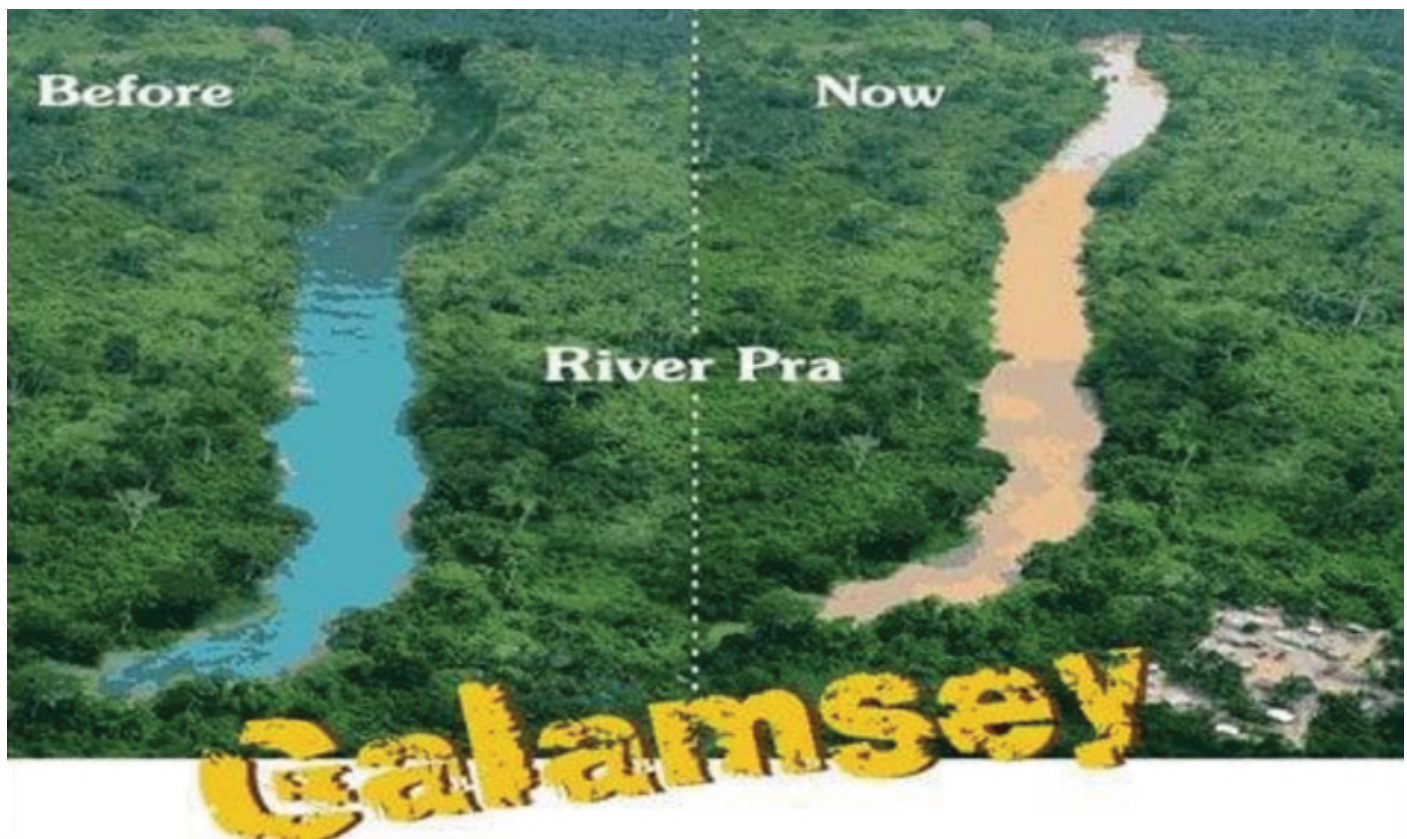
Water Management

The tropical climate of Ghana is a leading cause of the country's erratic rainfall patterns, which greatly affects the management of water resources. During certain seasons, areas devoted to agriculture and cities experience either extreme rainfall or dry spells. Rainwater harvesting and drip irrigation techniques are among the sustainable practices that are currently being encouraged in agro-practices to avert wastage of water. In water demanding urban centers, technology led water management with the help of AI and IoT is starting to capture the efficient use of water. Systems using AI can detect leakages by analyzing the flow of water at all times and systems with smart water meters and even smart gardening technologies incorporating automatic irrigation equipment designed to track the amount of water used in the remotely controlled systems thus eliminating wastage, others do this job by checking on purity as well as distribution using IoT sensors. Nonetheless, the lack of necessary capabilities and the high costs limit their application for the masses.

Biodiversity and Conservation Efforts

Ghana's geographical landscape with respect to its biodiversity for instance forests, wetlands and coastal regions are faced with numerous threats like deforestation, over use of land for agriculture and engaging in activities such as illegal mining (galamsey). The consequences brought about by 'galamsey' are multi-faceted; rivers like the Pra, Ankobra, and Birim rivers that should be providing water to communities are heavily polluted with chemicals like mercury and have become health hazards to people and aquatic life when utilized. This is contrary to the biodiversity and environmental health that are key features of SDG 3: ensure healthy lives and promote well-being for all at all ages, SDG 6: ensure availability and sustainable management of water and sanitation for all, SDG 14: conserve and sustainably use the oceans, seas and marine resources for sustainable development and SDG 15: life on land, which aims at protection, restoration and promotion of the use of ecosystems sustainably. Beside the protection of natural resources through national parks and forest reserves, illegal mining continues and has irreversibly damaged the environment and biodiversity in Ghana.

To mitigate these problems, there is a need for enhanced monitoring systems which incorporate AI and drones together with IoT sensors which can allow one to achieve real-time surveillance in unreachable areas of 'galamsey' effects through satellite image learning for illegal activities and continuously monitor the water and soil quality for early detection of contamination as well as encouraging local communities' involvement towards conservation. Besides, advocacy on the need to value biodiversity as well as sustainable land-use, would enhance the protection of the natural resources within Ghana.



The River Pra before and after illegal mining.



River Ankobra before and after measures were put in place to seize illegal mining

1.3 Challenges and Opportunities

The future of renewable electricity generation for Ghana can get both benefits and hurdles when it turns to green economy. Thus, the further significant progress in the field of renewable energy, smart city development and achievements in the preservation of the biological diversity remains. However, these initiatives have not solved concerns such as the high price for green technologies, low consumers' demand and insufficiency of the recycling & waste management infrastructure. Government policies and especially financial support do not remain stable which also affects the green projects expansion. Nonetheless, there is a tremendous potential in fields such as electric mobility, energy savings or green financing, the role of the politics of sustainable energy in Africa. Ghana has a great potential in renewable energy particularly in solar and wind energy if more investments and appropriate policies are put to support common wealth industry for sustainable economic growth.

SWOT Analysis

Strengths:

- Strong hydropower base.
- Potential for solar and wind energy.
- Growing awareness of sustainability.

Weaknesses:

- Reliance on fossil fuels.
- Limited infrastructure.

Opportunities:

- Expansion of renewable energy.
- Adoption of green financing mechanisms.

Threats:

- Negative impacts of illegal mining and plastic waste disposal.
- Climate vulnerability.

PESTLE Analysis

Political	• Growing political support for sustainability initiatives.
Economic	• Economic limitations slow progress. • Inadequate legal frameworks hinder development.
Social	• Increasing public awareness of sustainability. • Need for broader educational efforts to foster a culture of sustainability.
Technological	• Potential for AI and IoT to enhance efficiency in water and waste management. • High costs and underutilization of innovative technologies.
Legal	• Inadequate legal frameworks for supporting renewable energy and sustainability
Environmental	• Vulnerability to climate change impacts. • Environmental degradation due to illegal mining practices.

Analysis findings

According to the SWOT analysis, Ghana has assets in hydropower and renewable future in sight, in addition to rising sustainability concerns. However, opportunities like increased infrastructure and the availability of cheap and large amounts of energy have some weaknesses that have challenges like; fossil fuel dependency as well as limited infrastructure. The opportunities include increasing deployment of renewable energy and green financing. While threats posed by Illegal mining and climate vulnerability must be managed.

According to the PESTLE analysis, the political environment shows great support for sustainability practices but the state's economic structures and lack of legal regulations hinders the process. Current advancements in intelligent systems, AI, and IoT could bring improvement in the water of waste management system but are too costly to be implemented. In social terms, there is greater public awareness of sustainability, but much more general education is required for mainstream end-to-end application of green practices. They are attributes that social plans need increased population enlightenment to propagate a sustainable culture require.

To help the green economy in Ghana grow, weaknesses and threats have to be managed while strengths and opportunities have to be capitalized. This is further spearheaded by the promotion of capital goods such as the renewable energy equipment, refining legal rules, and enhancing technology focus in harmony with education and rising awareness levels for sustainability.

Youth Perspective and Concluding Remarks

As we reflect on how the direction of our journey towards a green economy in Ghana and as participants of the Global Green Economy Young Leaders Program, truly, the transformation of the future lies with us. From environmental degradation and reliance on fossil fuel to continued threats posed by illegal mining, there is no gainsaying the fact that challenges which we are confronted with are in no way insurmountable. Innovation, collaboration and uncompromising commitment have, therefore, placed Ghana at the threshold of leading Africa into a sustainable future.

Besides that, it is the strength of the youth, abetted by technology, education and policy reforms, holds the key in reshaping the environmental and economic topography of Ghana. Imagine a future where cities are powered by renewable energy, where electric vehicles have dominated our streets, and every community is conserving natural resources. In fact, these may be endless possibilities, but they do relate to that bold step that must be taken today. This must be our generation to turn these possibilities into realities.

In fact, the call to action can no longer be louder, innovating everything from AI waste management systems to smart energy solutions. And most importantly empower local communities and make them environmental stewards, inspire collaboration between the government and businesses in the creation of an unstoppable movement toward a greener, resilient Ghana.

Together we can create a legacy not for ourselves, but for future generations. And let us rise to that challenge, leading from the front as the whole world watches.

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PROJECT TITLE

Green Economy Transition in India

PARTICIPANT NAME :

1. Ayesha Batoun
2. Mariam Alkaabi
3. Mariam Alneyadi
4. Azza Alamin

Introduction

Country Name	India
Continent	Asia
Population	1.46 billion (2025)
Climate Type	Tropical monsoon climate.
Primary Energy Consumption per Capita	Approximately 2,748 kWh per person per year (2024)
Primary Energy Consumption from Renewable Energy	9.15% (2024)
Share of the population with access to electricity	99.5% (2023)
Per Capita CO2 Emissions	2.13 tonnes per person (2023)

Analysis of the Green Economy

India's green economy is swiftly developing, propelled by ambitious governmental policies and increasing market forces. The shift is farthest along in the energy sector, whereas sectors such as transportation and waste management are still in the process of expanding [6].

Sustainable Energy and Conservation

Renewable energy is at the forefront of India's green movement. The nation has surpassed its original Paris Agreement goals, with non-fossil fuel sources now making up over 40% of its installed electricity capacity [6]. The ambitious target is to achieve 500 GW by 2030. Solar energy has been the main catalyst for this expansion. Alongside this, energy efficiency initiatives have been a subtle achievement. The Bureau of Energy Efficiency's programs, such as compulsory star ratings for devices and the Perform, Achieve, and Trade (PAT) scheme for sectors, have effectively reduced energy consumption and emissions [7].

Electromobility & Intelligent Urban Areas

The electric vehicle (EV) sector is gaining traction, driven by two-wheeled and three-wheeled vehicles. Subsidies from the FAME-II scheme have been essential for the adoption process. The primary obstacles are the significant upfront expense of vehicles and the requirement for a more extensive network of charging stations. In urban development, the Smart Cities Mission incorporates sustainability by advocating for intelligent energy grids, effective public transportation, and water preservation in more than 100 cities, although the pace of implementation differs significantly.

Sustainable Finance & Buying Patterns

Green financing is expanding, especially with the government's release of Sovereign Green Bonds for funding clean initiatives. New regulations mandate large companies to reveal their sustainability performance, bringing ESG principles into the spotlight. Consumer awareness of sustainability is increasing, particularly in urban regions, fueling the demand for environmentally friendly products and energy-saving appliances, although price sensitivity continues to be an important aspect.

Garbage, H₂O, and Preservation

Waste management systems face pressure due to low segregation rates and a significant dependence on an informal recycling industry. In water management, national initiatives aim to supply tap water to rural homes and encourage micro-irrigation in farming. Conservation initiatives for iconic species such as tigers have achieved positive results, and these efforts are now broadening to include protection at the landscape level.

Conclusion

In conclusion, India has built a robust policy framework for a green economy, achieving significant progress in renewable energy and efficiency. The upcoming essential stage will focus on advancing EV infrastructure, enhancing waste management, and making certain that green finance supports smaller enterprises to foster a genuinely inclusive and sustainable shift.

Challenges and opportunities

SWOT Analysis

Strengths: • Weaknesses • Slow progress in transportation and waste management sectors. • High prices required for electric vehicles (EVs). • Limited inclusivity in green finance access.	Weaknesses: • Slow progress in transportation and waste management sectors. • High prices required for electric vehicles (EVs). • Limited inclusivity in green finance access.
Opportunities: • Growth of green finance through ESG investments. • Rising awareness of sustainability, especially among urban consumers. • Expansion of renewable energy capacity and innovation.	Threats: • High price sensitivity among consumers. • Vulnerability to climatic changes. • Overdependence on informal sectors and small-scale initiatives.

PESTLE Analysis

Political	India is the world's largest democratic nation with no partisanship present prominently among Indian citizens [8]. Most major parties support and include environmental development in their manifesto [9]. Thus, environmental progress is a shared goal regardless of the current ruling party. However, many of these parties do not prioritize or work toward a greener economy seriously.
Economic	Energy, mobility, industry, infrastructure, and agriculture count for 90% of India's greenhouse gas emissions. Potential for green development lies in these sectors, with the possibility of being the world's first \$5 trillion off- carbon economy [10].
Social	India's population is greatly concerned about the impact of climate change, as a recent survey indicated [11]. India had and still has a culture of "living in harmony with nature," which contradicts modern humankind's exploitation of natural resources [12].
Technological	India is known for its thriving technology sector; however, a major drawback for the research and development sector was—and still is—insufficient funding. More than half of the universities in India do not conduct serious research. This situation is hopefully changing as the country recently announced new investments in the research sector [13].
Legal	Internationally, India has conformed to many environmental responsibilities such as the Paris Agreement and its candidacy to host COP33. However, local environmental law enforcement has sometimes taken a grey-environmental stance, often prioritizing development over sustainability [14].
Environment	India possesses a great deal of green natural resources and aims to be a leader in green energy. Unfortunately, the nation's biggest current energy producer is coal, followed by oil and natural gas [15].

Analysis findings:

India's green economy development is supported by strong political consensus and growing public awareness of sustainability. However, limited implementation of green policies, insufficient R&D funding, and weak law enforcement slow progress. Economically, the country holds vast potential in renewable energy, green finance, and sustainable sectors like agriculture and infrastructure, but high EV prices and limited access to green financing remain barriers. Socially, India's cultural values align with eco-friendly living, offering a foundation for behavioral change. Technological innovation and expanding ESG investments create opportunities for green growth, while climate vulnerability and consumer price sensitivity pose threats. To enhance the green economy, India must strengthen environmental law enforcement, improve green finance inclusivity, and invest in research and renewable infrastructure. Emphasizing affordable green technologies and sustainable transportation can drive India toward its ambition of becoming a leading low-carbon economy and achieving long-term environmental resilience.

Youth Perspective and Concluding Remarks:

Being young members of the Global Green Economy Young Leaders 2025 program, we have become aware that India is at a crossroad on its way to green transition. India is currently experiencing one of the fastest-growing population and economies in the world, with the twin challenge of supporting its growing energy demands and cutting emissions. However, this difficulty can be also an opportunity: India boasts one of the highest potential of solar power in the world, a dynamic youth market, and is increasingly start-up based, which can elevate it into a world leader in sustainable development. The use of renewable energy on a grassroots level is the most important issue as seen through the eyes of the youth. In India, though the country has strong solar and wind goals, the communities particularly the rural communities are still not classifying on clean energy, which is reliable and affordable. Youth-based projects may assist in closing this divide through pilot projects to install rooftop solar in educational institutions and general community areas, establish local EV charging stations, and utilize micro-grids to supply small business operations. These projects do not only solve the issue of energy poverty but also create awareness and belief in clean technologies. Secondly, the Indian business environment should adopt sustainable business practice as a source of competitiveness. In manufacturing, supply chains as well as in the textile and packaging sectors, the potential to innovate when it comes to reducing waste, using resources efficiently, and a model of a circular economy is enormous. The young professionals and entrepreneurs will be on the front line to develop the digital solutions in carbon tracking, scaling recycling businesses, and developing startups that will rebrand the concept of sustainable products as a daily routine. The solutions will rely on government-supported incubators and access to climate financing to make these solutions scale. Thirdly, the high rate of urbanization in India requires smart and sustainable cities to be created. Such cities as Delhi, Bengaluru, and Mumbai are under the pressure of air pollution, congestion, and waste. Youth can become a transformational force by collaborating with the local authorities to bring bike-sharing services, promote more environmentally friendly means of transport and devise community-based recycling systems. Being prepared to use AI, IoT, environmental science, and urban planning skills will help young Indians become the people who will be able to actively transform the cities they inhabit. Lastly, there will be a need to have strategic alliances between government, civil society, private sector and the youth. Programmes that are based on the examples of the Climate Investment Platform at IRENA can be adapted locally to finance young climate projects in India. To sum up, the young generation in India should not be perceived as change agents but also joint developers of solutions. India can ensure that it is fast-tracked through a green economy by promoting entrepreneurship, instituting sustainability in education and empowering community-based projects, enabling the transition to be both inclusive, innovative and robust.

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PROJECT TITLE

Green Economy Transition in **Jordan**

PARTICIPANT NAME :

1. Razan Yousef Altoum
2. Rula Yaser Abed-Eddin
3. Anas Ahmed Salem

COUNTRY REPRESENTED:

Jordan

Introduction

Country Name	Jordan
Continent	Asia
Population	Approximately 11.2 million (2023 projection)
Climate Type	- Semi-arid to arid, with hot, dry summers and cooler winters. - Highly vulnerable to water scarcity and climate change impacts.
Primary Energy Consumption per Capita	Approximately 1,200 kWh (2021, estimate based on regional averages).
Primary Energy Consumption from Renewable Energy	- By 2020, renewable energy accounted for 20% of electricity consumption. - Solar and wind are primary sources, with flagship projects like Ma'an Solar Park (160 MW) and Tafila Wind Farm (117 MW).
Share of the population with access to electricity	100% (national electricity grid coverage).
Per Capita CO2 Emissions	3.4 tonnes (2021)

In this report, we aim to address several crucial topics concerning the green economy in Jordan. As the country strives to navigate its unique environmental challenges while leveraging its available resources, understanding these key areas is essential for fostering sustainable development.

We will explore advancements in **green energy**, examining how renewable sources are being integrated into Jordan's energy mix to reduce reliance on fossil fuels and decrease carbon emissions. The transition to sustainable energy is not only vital for environmental protection but also plays a crucial role in ensuring energy security for the nation.

Additionally, our report will delve into **green technology**, highlighting innovative solutions that are being adopted to enhance sustainability across various sectors. This includes advancements in clean technologies that contribute to efficient resource management and reduced environmental impact.

The development of **green cities** is another focal point of our discussion. We will look at how urban planning and eco-friendly initiatives are being implemented to create smart, sustainable urban environments that improve the quality of life for Jordanian citizens while preserving natural ecosystems.

Furthermore, we will investigate the principles of the **green economy**, emphasizing the importance of sustainable business practices and the implementation of a circular economy. This approach aims to minimize waste and promote resource efficiency, which is essential for fostering long-term economic growth in a sustainable manner.

The topic of **green finance** will also be addressed, where we will explore the financial mechanisms available to support sustainable initiatives in Jordan. Understanding how green investments can drive economic resilience is crucial for the successful implementation of environmentally friendly projects.

Finally, our report will discuss the importance of developing **green skills** within the workforce. Education and training play a pivotal role in equipping individuals with the necessary knowledge and skills to contribute effectively to the green economy, ensuring that Jordan can meet its sustainability goals.

Through this comprehensive exploration of these key topics, our report aims to provide valuable insights into Jordan's journey towards a greener economy. By highlighting the ongoing efforts and initiatives in these areas, we hope to contribute to the broader

dialogue on sustainable development in the country, ultimately supporting the vision of a prosperous and environmentally responsible future for all Jordanians.

Green energy:

Jordan has made significant strides in advancing its green energy sector over the past decade. Faced with energy security challenges and reliance on imported fossil fuels, the country has turned to renewable energy sources, particularly solar and wind power.

Key Drivers of Green Energy Development

- **Energy Independence:** Jordan imports over 90% of its energy needs, driving the need to develop local, renewable energy sources to reduce dependence on external suppliers.
- **Government Policies and Incentives:**

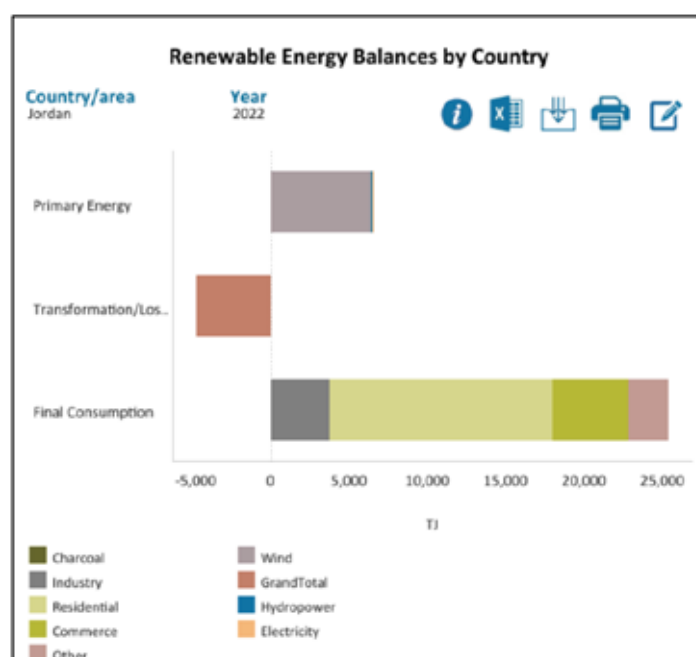
LATEST POLICIES, PROGRAMMES AND LEGISLATION

1 Energy Academy in Germany and Jordan	2017
2 JS 2108:2013 - Energy efficiency labeling of air conditioners	2014
3 Jordan 20 000 subsidised solar water heaters programme	2013
4 JS 2095:2013 Technical regulation on eco-design requirements for Glandless standalone circulators and glandless circulators integrated in products	2013
5 JS 2106 Technical Regulation on eco-design requirements for televisions	2013

The government has implemented favorable policies, including the **Renewable Energy and Energy Efficiency Law (2012)**, to attract investments and promote green energy projects.

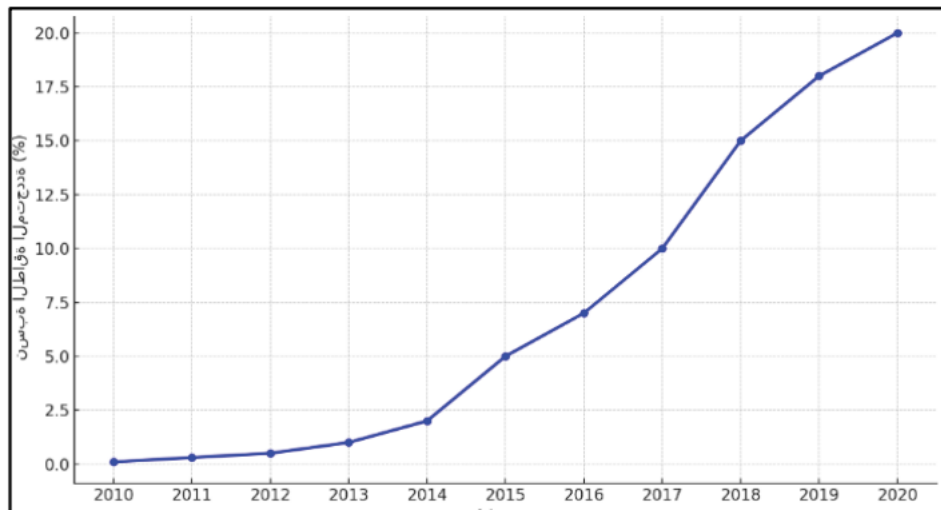
International Funding: Jordan has received significant financial support from international institutions such as the World Bank and the European Union, which has facilitated the rapid expansion of renewable energy projects

Major Renewable Energy Projects



- **Solar Power:** Jordan's sunny climate makes it ideal for solar energy. The **Ma'an Solar Park**, a flagship project, produces 160 MW of power and has played a critical role in increasing the share of solar energy in the country.
- **Wind Power:** Projects like **Tafila Wind Farm**, generating 117 MW, have been instrumental in meeting Jordan's growing energy needs through sustainable means.
- **Private Sector Participation:** The government has encouraged private sector investments, and companies such as **Masdar** and **ACWA Power** have significantly contributed to the energy landscape.

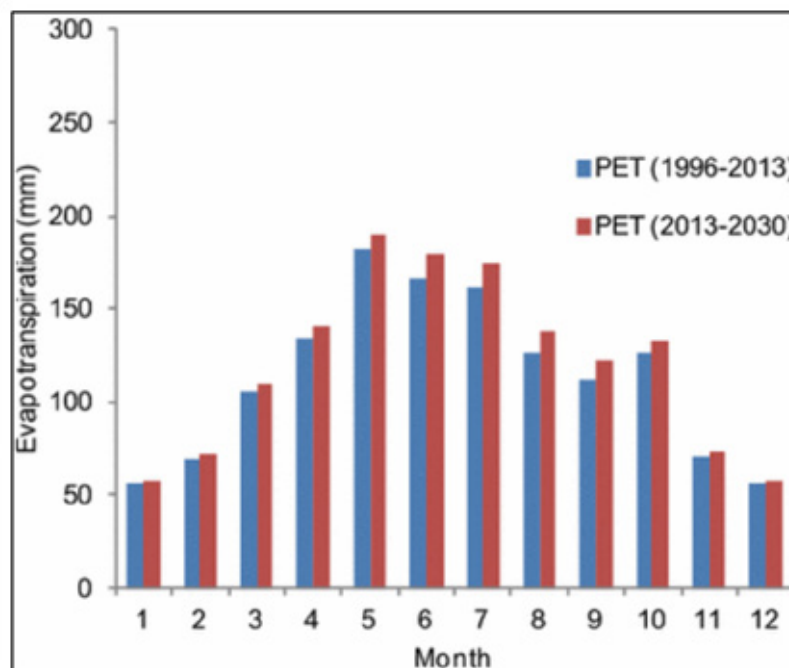
Achievements and Current Status



- By 2020, Jordan achieved a **20% share** of renewable energy in its electricity mix, up from almost 0% a decade earlier.
- Jordan's target for renewable energy is **30% by 2030**, reflecting continued commitment to green energy development.

2. Green Energy Transition in Jordan

The Need for a Green Energy Transition



- **Environmental Impact:** Jordan is highly vulnerable to the impacts of climate change, including extreme temperatures and water scarcity. The green energy transition is seen as crucial for reducing the country's carbon footprint.
- **Economic Diversification:** Moving to a green economy will diversify Jordan's economy, creating jobs in the renewable energy sector and reducing reliance on imported oil.

Policies Supporting Green Energy Transition

- **National Energy Strategy (2020-2030):** This strategy outlines ambitious targets for renewable energy development, energy efficiency improvements, and carbon emissions reduction.
- **Net-Metering Policy:** Jordan introduced a net-metering policy, allowing individuals and businesses to generate their electricity using solar panels and sell excess energy back to the grid.

Barriers and Challenges to Transition

- **High Initial Costs:** Despite declining prices, the initial capital required for renewable energy projects remains a barrier, particularly for smaller enterprises.
- **Grid Capacity and Stability:** Jordan's energy grid must be upgraded to handle the variability of renewable energy sources like solar and wind.
- **Public Awareness and Education:** There is still a need to raise awareness among the population about the benefits of renewable energy and energy conservation.

Future Outlook

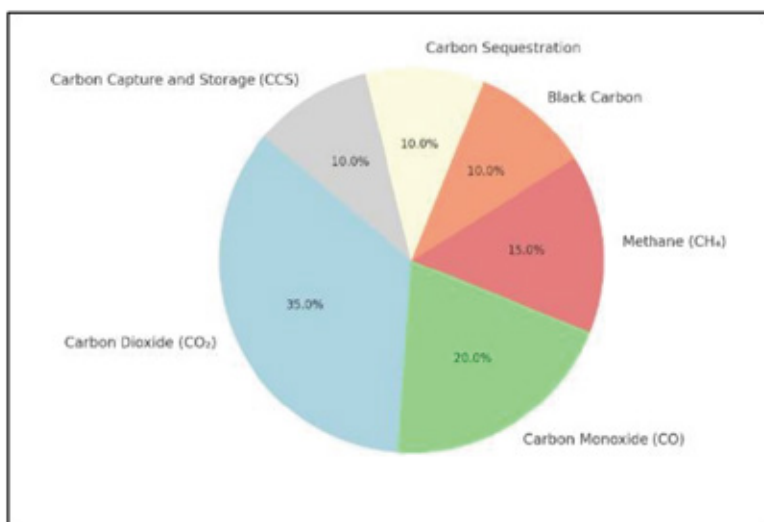
- Jordan is seen as a regional leader in green energy transition due to its strong government support and investment from the international community. The focus is now on expanding renewable energy capacity, improving energy efficiency, and creating more sustainable economic opportunities.

3. Green Technology: Toward Resilience – Harnessing Innovation for a New Clean Tech Era

Introduction

The global clean tech revolution is redefining how societies produce and consume energy. Innovation in green technology is essential to creating resilient systems capable of adapting to environmental and economic challenges.

The Role of Innovation in Green Technology



- **Advanced Energy Storage:** Innovations in battery storage, such as **lithium-ion and flow batteries**, are critical to stabilizing renewable energy systems and ensuring a reliable power supply.
- **Smart Grids:** The development of **smart grid technology** allows for real-time monitoring and optimization of energy use, enabling better integration of renewable energy into national grids.
- **Carbon Capture Technologies:** Innovations like **Carbon Capture and Storage (CCS)** are emerging as key solutions to reduce greenhouse gas emissions from industrial processes.

Case Studies of Resilient Green Technologies

- **Solar-Powered Water Desalination:** Innovative technologies are being developed to desalinate seawater using solar energy, addressing water scarcity in arid regions.
- **Energy-Efficient Building Technologies:** Green building practices that include passive solar design, energy-efficient appliances, and sustainable materials contribute to reduced energy consumption.

Challenges and Opportunities

- **Investment in Research and Development:** Continued investment in R&D is critical for advancing green technologies and reducing costs.
- **Public-Private Partnerships:** Collaborations between governments and private sectors can facilitate the development and deployment of innovative solutions.

Green cities:

Amman, the capital of Jordan, is a modern city with a rich history. The first Southern and Eastern Mediterranean metropolis to join **EBRD Green Cities**, the city commenced its Green City Action Plan (GCAP) process in December 2018.

The **EBRD**, in collaboration with the **OECD** and **ICLEI**, developed a four-step methodology to boost cities' environmental performance: assessing baseline conditions, creating an action plan, implementing the plan, and monitoring progress. This framework supports Amman's journey towards sustainable urban development.

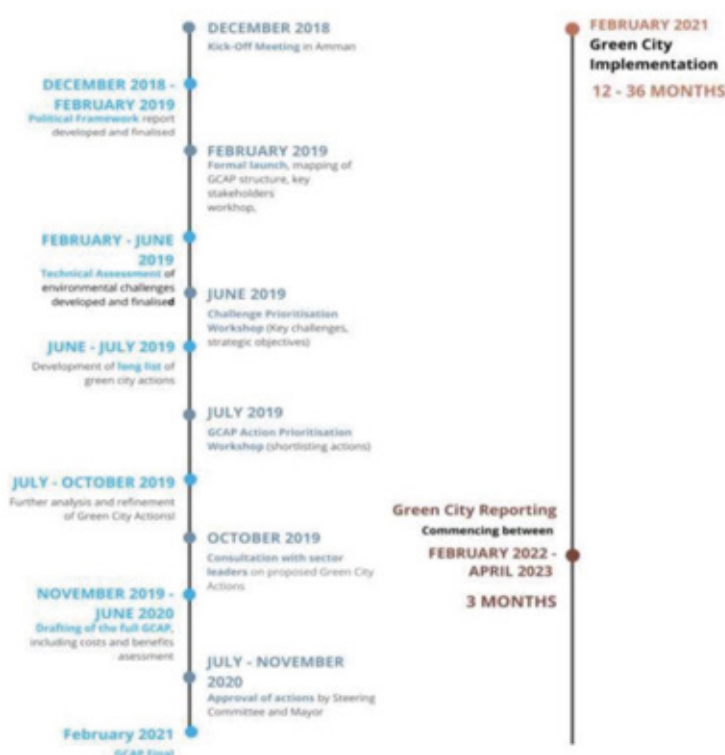


Figure 1:GCAP Process in Amman

GAM have been working on several different strategies in recent years. Each of these has produced a vision for the city, which are outlined in Figure 2:

Amman Resilience Strategy Vision (2017)	"A welcoming, young and diverse city, balancing the old and the new, the progressive and the traditional. Amman promotes a culture of sharing and inclusivity, pioneering regional change".
Climate Action Plan Vision (2019)	"To transform the city of Amman to become a sustainable, green and liveable city that works efficiently to preserve its resources for future generations".
National Green Growth Plan (2014)	"Behind the National Green Growth Plan is a clear vision for Jordan as a country with an expanding and sustainable economy that creates jobs, income for its citizens, and is resilient to external shocks and instability in the region. A country of economic opportunity for everyone that provides decent work and living conditions based on an environmentally sustainable economic growth model".

Source: AECOM, 2020.

Figure 2: Existing visions for Amman

Rather than produce a new vision, GAM ensured that the GCAP was developed in such a way that it reflects the social and economic aspirations set out in the above visions. The key themes the GCAP are centered around are set out in Figure 3:



Figure 3: Themes from Amman's existing visions

The governance of environmental assets and sectors in Amman involves multiple actors, and understanding their roles is vital for the Green City Action Plan (GCAP). The Greater Amman Municipality (GAM), established in 1987, is responsible for the GCAP's implementation. The mayor, appointed by the King, leads the City Council, while the City Manager oversees day-to-day management, supported by six Deputy Mayors responsible for:

Public Services Sector, covering:

- Public transport and infrastructure projects
- Traffic planning
- Road maintenance
- Public facilities and gardens (open spaces)
- Fleet maintenance
- Engineering

Districts and Environment, covering:

- Solid waste management
- Construction inspections
- Environmental licensing

Health and Agriculture, covering:

- Agriculture and forest management
- Health inspections
- Management of public markets

Community Development, covering:

- Cultural affairs
- Sports and entertainment

Planning and Economic Development, covering:

- Planning, master planning, and zoning
- Building control and licensing

Finance and Administration, responsible for:

- Financial control
- Municipality revenues and expenses

The GCAP identifies relevant action owners from GAM's directorates and highlights areas requiring coordination with national ministries, ensuring compliance with national legislation and active involvement of key stakeholder in Table 4:

Table 1: Key National Ministries relevant to the GCAP

National Ministry	Description of Responsibilities
Ministry of Environment (MoEnv)	Established in 2003 with the mandate of maintaining and improving the quality of the environment in Jordan. In accordance with the Environment Protection Law No. 6 of 2017, MoEnv is responsible for the overall protection of the environment and its ecosystems by setting the strategic policy framework and enacting legislation and enforcement, through licensing, monitoring and inspection. MoEnv is also responsible for promoting environmental culture (behavioural change), enhancing environmental monitoring, and transitioning Jordan to a green economy.
Ministry of Health (MoH)	MoH is responsible for public and environmental health in Jordan. It has the power to take any necessary action or protocol to ensure the implementation of laws and health standards. The MoH is given the authority to offer preventive and treatment medical services, environmental health management, license and supervise all public and private health establishments, and provide public health insurance. The MoH, through a special Directorate of Environmental Health, focuses on air quality, pest control, industrial and medical emissions and effluents among many other aspects of environmental health.
Ministry of Agriculture (MoA)	The MoA is responsible for regulating the agricultural policy for Jordan, managing the agricultural sector and improving the status of farmers. In addition, the MoA are responsible for controlling, organising and legalising the use, import, and export of pesticides and fertilizers used in the agricultural sector. This Ministry is important for the GCAP as most of the city's growth in the last 30 years has taken place on agricultural land to the west of the city. This has resulted in complex and conflicting development between industrial, agricultural and urban zones.
Ministry of Transport (MoT)	The MoT is mandated to develop general transport policy and supervise its implementation in coordination and collaboration with the relevant entities. It regulates, licenses, and monitors road and rail freight transport sector and services. GAM, however, has responsibility for implementing policy around transport planning, road maintenance and public transportation.

Table 2 outlines GAM's jurisdiction and autonomy in managing environmental assets and pressures, shaping the GCAP to focus on area where GAM can have the most impact.

GAM's level of influence	
High	Has full autonomy to set policy and/or make investment decisions.
Medium	Has autonomy to set policy and/or make investment decisions around some aspects only; or Has the capacity to make investments but must comply with policy set by the Autonomous Republic of Adjara or National Government actors.
Low	No autonomy to set policy and/or make investment decisions. The City's main vector to influence policy and investments is advocacy.

Table 3: The level of jurisdiction of GAM over key environmental indicators

Indicator	Local Governance Arrangements
Air Quality	The national government rather than GAM holds responsibility for setting air quality standards; however, GAM can take measures to achieve the standards. GAM can influence transportation planning, public transportation, green buildings, use of renewable energy, and green areas within its jurisdiction.
Climate and Disaster Risk	In 2017, GAM developed the Amman Resilience Strategy, and as part of C40 Cities, Amman has committed to delivering net-zero emissions and climate resilience by 2050. Additionally, Amman recently released its Climate Action Plan. Municipalities Law No. 29 of 1955 and its Amendments enable GAM to instigate disaster risk management (DRM) precautions within new constructions. The Municipalities Law No. 14 of 2007 provides responsibilities to GAM to address issues and concerns that include city plans and buildings, sanitation and health, fires, flooding, aid to victims, risk prevention, and financial requirements.
Biodiversity	There are no enforced standards around biodiversity that the national government enacts, but GAM has significant scope to address biodiversity in their own activities. GAM has no specific structural unit for implementing environmental activities related to biodiversity. GAM's Agriculture and Forest Directorate is responsible for controlling and managing green areas and parks as well as ensuring agricultural areas are managed in line with national legislation.
Greenhouse / Climate Change	GAM has no greenhouse emissions reduction strategy, although the recently released Climate Action Plan sets the groundwork for mitigation. Specific activities carried out by GAM includes the conservation of water and electricity, the implementation of building control and the Jordan Green Building Guide and provision of incentives to Amman citizens to implement the Green Buildings criteria.
Soil	GAM does not have any Amman-specific policies or strategies for contaminated land or strategies for combatting desertification. There are also no clear standards that GAM or the national government has set regarding these areas.
Water Supply, Sanitation and Drainage	Water supply and sanitation are implemented through three governmental companies. Miyahuna is responsible for water supply networks and wastewater treatment plants in Amman, Zarqa, and Madaba. Surface drainage and rain water management are the responsibility of GAM.
Buildings	Building codes and incentive structures are set at the national level, but GAM is responsible for granting building licenses, monitoring construction and destruction of buildings and elevating design according to GAM requirements. GAM is also responsible for producing a new master plan under the Regulation of Buildings and Zoning of Towns and Villages No.136/2016.
Industries	Industrial zones are classified through the Amman Building and Urban Regulation (2011). GAM is responsible for enforcing industrial zones and providing permit of operation for any industry or craft within Amman.
Energy	The National Electric Power Company is responsible for the distribution of electrical power within the Amman area among others. City level governance has little influence over national grid policies, however GAM has encouraged solar power use, by creating and sharing a Solar PV Rooftop Guideline.

Indicator	Local Governance Arrangements
Land Use	The Deputy City Manager for Planning and Economic Development is responsible to the Planning Directorate and Licences (buildings) Directorate within GAM. These directorates are responsible for master planning, urban zoning and building permitting respectively through the Amman Building and Urban Planning Regulation of 2011.
Transport	GAM is responsible for local road maintenance and public transportation services within its boundaries. It includes a design department that implements 'standard' public realm designs.
Solid Waste	GAM is fully responsible for municipal solid waste in Amman, including collection, transportation, and disposal. The regulation "Prevention of Health Nuisance and Waste Collection Fees within GAM Areas no. 150/ 2016", regulates the collection, management, transfer, recycling, treatment and disposal of waste with the approval of the GAM council.

Existing Plans and Projects:

Title	Type	Timeframe	Description	Relation to GCAP
Amman Resilience Strategy	Plan	2016	Outlines a holistic set of actions to address the well-being of Amman's environment and its citizens. The Amman Resilience Strategy provides a vision of what Amman's citizens hope to see in the future.	The underlying themes and several specific actions were carried forward into the development of the GCAP. Key goals outlined in the Resilience Strategy are promoting walkability, improving mobility systems, institutionalizing planning, and applying green building codes.
Amman Bus Rapid Transit Network (BRT)	Project	2010–2020	BRT is nearing the end of construction and will be active in 2020/2021. The new BRT has a bearing on future transport planning in Amman as it aims to shift citizens to public and low-/no-emission transport.	The actions within the GCAP have been developed to complement and build on the BRT system. This includes actions that promote awareness of public transport and investments that will further integrate mobility systems.
Amman Climate Change Action Plan	Plan	2018–2020	Led by the World Bank, this plan outlines specific climate mitigation and adaptation measures GAM will take to meet its INDCs and improve its resilience.	Several of the actions were incorporated into the GCAP.
National Green Growth Action Plan	Plan	2018–2020	A Global Green Growth Institute (GGGI) initiative that developed a national strategy for green growth. The Green Growth National Action Plan 2021–2025 lays out pathways for sustainable development that increase resilience, strengthening Jordan's capacity to contain shocks and recover from catastrophic events.	The GCAP was developed to complement the proposed actions that comprise the National Green Growth Action Plan, ensuring that municipal actions are in line with national goals.
GIZ Green Infrastructure Project	Project	2017–2022	This project aims to increase and enhance green infrastructure in Amman and employs vulnerable populations to develop these spaces.	Given that one of the PECs identified is Amman's competing land use priorities and pressures, the GCAP can build on this GIZ project and ensure there is no redundancy in locations of functional green spaces proposed or implemented via GIZ or the GCAP.

Green City Actions for Amman:

Strategic objectives (SOs)

- | | |
|------|---|
| SO1 | Increase renewable energy supply by 25% by 2035 to improve energy diversity, independence and resilience. |
| SO2 | Reduce the rate of energy demand by 15% by 2030 by improving the energy efficiency of building and electrical systems. |
| SO3 | Increase the modal share of public transportation by 30% by 2030 by institutionalising and normalizing public transport |
| SO4 | Develop a public realm strategy that supports pedestrian travel |
| SO5 | Incorporate smart systems in transport planning |
| SO6 | Improve resource management by increasing the efficiency of solid waste management regimes |
| SO7 | Integrate circular principles into waste management |
| SO8 | Reduce the amount of waste sent to landfill by 12% by 2030 |
| SO9 | Upgrade waste management infrastructure |
| SO10 | Reduce flood risk in critical areas by 50% by 2040 |
| SO11 | Reduce water network losses by 70% by 2040 |
| SO12 | Improve access to water and wastewater networks to 100% of Amman's by 2040 |
| SO13 | Improve water efficiency in buildings by 25% by 2030. |
| SO14 | Increase the amount of quality green space in Amman |
| SO15 | Develop an up-to-date land use plan to ensure equitable development across Amman |
| SO16 | Improve the public realm |
| SO17 | Institutionalise climate resilience into all aspects of municipal operations and policies |
| SO18 | Mitigate or maintain the urban heat island effect and carbon emissions in Amman through blue and green infrastructure |
| SO19 | Improve public awareness of climate change |

Thematic Area	ID	Action
Energy and Buildings	EB1	Invest in large grid-scale solar projects
	EB2	Integrate LED systems into municipal street lighting
	EB3	Finance smart meters and batteries to promote grid stabilisation
	EB4	Increase awareness of green building design
	EB4.1	Pilot municipal green building retrofit
	EB4.2	Establish green school buildings
	EB5	Develop solar-powered bus stands
	EB6	Expand the existing Landfill Gas Recovery System
Accessible, diverse and low-carbon mobility systems	T1	Expand integrated bus network and low-emission bus fleet
	T2	Conduct pilot project to promote active mobility
	T3	Install Intelligent Transport Systems
	T4	Introduce car free days in city centre to promote city centre events and active mobility
	T4.1	Provide free bus service to and from the pilot pedestrian area on specified days
	T5	Develop an integrated sustainable transport strategy
	T6	Implement an on-street parking system
Resource efficient and holistic waste management systems	SW1	Waste prevention and recycling strategy
	SW2	Improve Al-Shaer waste transfer station
	SW3	Expand road sweeper operations to improve the public realm
	SW4	Construct an additional landfill cell
	SW5	Partner with large-scale commercial sectors to collect organic waste
	SW6	Establish a WEEE waste transfer facility
	SW7	Construct a clean material recovery facility and establish recycling programme

21

Thematic Area	ID	Action
Integrated water resources management	W1	Develop water conveyance and/or storage to reduce flood risk
	W2	Upgrade Ain Ghazal Treatment Plant
	W3	Develop Al Ghabawi Septic Tank Facility
	W4	Integration of WSUD and SuDS
	W4.1	Pilot SuDs implementation on municipal property
	W5	Implement nature-based solutions for Ruseiffa natural lagoon
	W6	Upgrade and expand access to water and wastewater networks
	LU1	Invest in expanding green spaces
	LU1.1	Develop an integrated green infrastructure strategy
	LU2	Develop a servicing and implementation plan for East Amman
Comprehensive and reflective land-use planning	LU3	Finalise and implement the Amman Strategic Master Plan 2060
	LU4	Establish a centralised GIS database
Responsive and forward-looking climate adaptation practices	CA1	Develop green and/or shaded parking infrastructure
	CA2	Implement a Climate Change Community Engagement Plan
	CA3	Develop and deliver a Flood Resilience Strategy

Green economy:

Green Finance is crucial for advancing green growth in Jordan, as outlined in the National Green Growth Plan (NGGP). While green growth offers benefits like job creation, energy and water access, and reduced environmental impacts, it requires significant financial investment to succeed. This includes mobilizing public and private funds, both domestically and internationally. Although renewable energy and efficiency technologies are now cost-effective, barriers such as limited awareness and a lack of "bankable" projects need to be addressed to attract private sector involvement. Recommendations focus on enhancing green finance to support sustainable development in Jordan.

Green Finance refers to funding for sustainable projects, such as renewable energy, green buildings, water-resource management, and environmental protection. It also includes developing intangible assets like human capital and sustainable behaviors. Key areas of green investment include:

1. Renewable energy
2. Energy efficiency
3. Sustainable waste management
4. Sustainable land use (forestry & agriculture)
5. Biodiversity conservation
6. Clean transportation
7. Sustainable water management
8. Climate change adaptation

Globally, green finance is growing, with significant investments from banks and funds. Critical success factors for financing green growth in Jordan include:

1. Enabling policy and legislative frameworks
2. Concrete incentives for green investments
3. Diversified, steady funding sources
4. Established, transparent funding institutions
5. Accessible green financing tools
6. Strong pipeline of attractive projects
7. Strict compliance with social, environmental, and financial criteria

Where does Jordan stand?

Policy and Legislative Framework:

- International Engagement: Jordan signed the UNFCCC in 1993 and ratified the Kyoto Protocol in 2003.
- INDC Submission: In 2015, Jordan submitted its Intended Nationally Determined Contribution (INDC) before COP21, signaling commitment to green growth.
- Paris Agreement: Signed at COP21, emphasizing ambitious efforts from all parties.
- Aid and Development Finance: Jordan is classified as an upper middle-income country by the OECD DAC, making it eligible for various funding, including:
- LIFE Programmed: Funded nine projects as of 2012.

Relevant National Policies:

- Strong government commitment enhances investor confidence through various policies, including:
- Higher Green Economy Steering Committee: Supports green policy development and project implementation.
- Ministry of Environment (MOENV): National Climate Change Policy (2013-2020), Government National Agenda for Sustainable Development (2006-2015), Modified Environmental Protection Law (2015).
- Ministry of Energy and Mineral Resources (MEMR): Renewable Energy and Energy Efficiency Law (2012), National Energy Strategy (2007-2020), National Energy Efficiency Action Plan (NEEAP, 2013).
- Ministry of Water and Irrigation (MWI): National Water Strategy (2016-2025).
- Other Policies: Waste Strategy (2015), Transport National Strategy (2014), Amman Master Plan (2008), Amman Sustainable Action Plan (2012)

National Green Growth Plan (NGGP):

- This cross-sectoral plan complements existing policies, providing a framework that signals Jordan's commitment to green growth to the international finance community.

Challenges relevant to Green Finance:

- Taxes are too high on private international financing, necessitating a reduction in taxes on international lending.
- Prudential banking regulations need to be relaxed, especially for Islamic banks.
- Limited ESCO services market: Jordan lacks a comprehensive market for delivering water and energy efficiency services. Many ESCOs currently focus on solar installations, and there are limited standards and regulations ensuring quality and compliance with performance standards for comprehensive ESCO services.
- Onerous implementation requirements on the public sector: Government-led large-scale programs require not just funding but also human and institutional capacity, which are often insufficient to deliver tangible results.
- Lack of transparency and coordination of green projects and programs in the public sector: There is a complex network of partners, donors, and funding programs directed at renewable energy (RE) and energy efficiency (EE) sectors in Jordan. The lack of coordination among program owners limits their ability to track program progress, impact, and cost-effectiveness, hindering effective policy design and increasing the risk of duplicated efforts.
- Barriers to the implementation of laws: Some policies, like energy efficiency regulations, have not fully realized their potential. Effective enforcement requires good oversight, stakeholder awareness campaigns, technical guidance, and defined enforcement procedures.
- Increase central bank involvement to support green financing regulation.

What kind of finance do Jordan's Green Growth Projects need?

Green Growth "Interventions"	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
 Utility scale solar and wind projects NGGP Example: Fujeij wind farm Status: In development Size: Medium (\$130m)	Typical Project scale: \$80-200m (M) - Large project debt and equity Finance – with 20+ year life - Loan Guarantees	- Developed as IPPs through direct proposals/tendering to MEMR, and contracted PPAs with NEPCO. - Benefits from co-financing through development banks to de-risk and reduce WACC and LCOE. GAPS: - Growing but lacking private sector finance involvement. - Growing but lacking 'readiness' for accessing international climate finance for the RE plans in Jordan (e.g. GCF) - The pace of project origination and financing deployment (project by project), slowing down the pace of RE deployment targeted in the National RE strategy and NGGP	Clean electricity – remunerated in power Purchase Agreement (PPA) with NEPCO - Note at current technology costs these green growth projects represent commercially viable "bankable" projects – wind PPAs in the region of JOD 0.08/kWh (\$0.11/kWh) and solar PPAs range from \$0.06-0.08/kWh and falling	- CO₂ emissions reduction from solar or wind compared to oil, gas or coals fired electricity - Ranging from 380 to over 1000g of CO₂e per kWh	- Increased private sector engagement on RE finance to accelerate pace - Consider specific commercial financing facility for utility-scale RE (e.g. proposed Jordan Green Growth Fund)
 Electric Vehicles with solar PV project (EVs)	Typical Project scale: >\$100m Infrastructure (M) PPPs for EV charging stations & PV	With high capital expenditure and OPEX costs, a JV with the private sector (PPP model) is suitable for the initiative. Public financing can include the provision	- User charges (for electricity from charging stations) - Sale of excess PV electricity	- Decrease in CO₂ emissions in the atmosphere - Less air pollution in Jordan's metropolitan areas	Develop PPP with infrastructure developers, with the government support including provision of land

Green Growth "Interventions" (contd.)	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
Status: Charging network pilot stage Size: Medium (\$120m)	capacity: - Public support and private finance (debt or equity) For EVs: - Grant financed rebates lowering purchase price for EV buyers - Low interest car loans for EVs	of land, licenses for advertisements at charging stations, etc, to attract private investment. GAPS: With continuing low oil prices, EV uptake may be low unless incentivised by the government. In countries where EV uptake has been high (see Norway), significant subsidies are provided for EV purchases by consumers	into the grid to NEPCO Advertisement revenue on charging station sites		and other non-cash incentives such as advertisement options on sites. To incentivise EV use: 1 Ensure exemption all EVs from import tariffs, custom duties and licensing fees to induce investment by private market 2 Consider extending JREEEF's scope and available capital to cover EV rebates and low interest rate loans
 Renewable desalination Example: Solar Powered Reverse	Typical Project scale: >\$350m (L) - Large project Debt and Equity Finance – with 20+ year life - Loan Guarantees	- Can be developed through direct proposals/tendering to MEMR, with private EPCs and contracted PPAs as other pure wind/solar projects. - Benefits from co-financing through development banks to	Clean electricity – remunerated in power Purchase Agreement (PPA) with NEPCO - Desalinated water – remunerated through agreements	- CO₂ emissions reduction from solar compared to oil, gas or coals fired electricity - Reduced water stress	1 Position project as innovative multi-benefit development project for concessional finance (grants and loans) from international development banks and

Green Growth "Interventions" (contd.)	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
Osmosis desalination plant (RO) Status: Concept phase Size: Large (\$364m)		de-risk and reduce WACC and LCOE. GAPS: Limited awareness / experience of financing joint RE/ RO technologies	with the Jordan Water Company		donors 2 Engage private sector and NEPCO on co-financing through commercial debt and equity arrangements Undertake detailed financing strategy project
 Freight rail Jordan freight rail Status: Planning stage Size: Large project (\$4.2bn over 5 years)	Project scale: >\$4 billion (L) PPP's an option: Public funding Private finance (debt and equity) Public loan guarantees to reduce investor risk	- Considered a mega project, freight rail requires significant upfront project capital costs, which would require government backing either through a PPP or loan guarantees (subsidization of rail is common around the world). GAPS: - Financing at the scale of this MEGA project a common challenge - A clear business case is required to demonstrate customer demand to justify investment outlay, since any potential commercial lender will be undertaking the same assessment.	Revenue from freight companies and private sector users through cargo/container carriage fees	- CO₂ emissions reductions given efficiency of tonne-kilometers for rail over trucks - Traffic decongestion - Reduced air pollution - Decreased wear-and-tear to road transport system	1 Position project as multi-benefit development project for concessional finance (grants and loans) from international development banks and donors, alongside public and private finance. 2 Undertake detailed financing strategy project

Green Growth "Interventions" (contd.)	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
 Green spaces Public park Status: Design phase Size: Small (\$16m)	Project scale: >\$15m (S) Public or donor funding	The most appropriate financing mechanism would be public expenditure by the relevant municipality, with the addition of donor grants where it is available.	Lease revenue from cafes and other commercial amenities built on the park grounds	NA	- Finance with public funding via JEF (supplemented by development finance if necessary) - Seek donor grants if public funding cannot be provided
 Recycling / waste-to-energy Materials Recovery Facility (MRF) and Refuse-derived fuel (RDF), Al Ekedder Status: Feasibility studies completed Size: Medium (\$147m)	Project scale: >\$150m (M) Public or grant financing are the optimal options	- Given high capital costs and limited commerciality, highly unlikely to obtain commercial financing. The best option would be to finance the project with government or donor financing. - Donor finance for Syrian refugees in Jordan is also a potential option given the social and economic impacts of this project	Return on investment from sale of electricity from RDF energy generation and recovered materials	- Reduction in CO₂ emissions - Socio-economic benefits including for the health of nearby residents and scavengers	Finance with public funding, development finance, and supplemented by aid grants (e.g. Madad fund)
 Public transportation infrastructure Bus rapid	Project scale: >\$100m (M) - PPP's an option: - Public funding - Private finance (debt	Significant capital costs, can be financed with public or private debt and equity. Private sector financing can be induced with loan guarantees from public sources,	- Revenue from ticket sales to users - Advertising fees from buses, bus stations and terminals	- CO₂ emission reductions from increased use of public transport - Air pollution reduction - Traffic de-	Develop a PPP between the government and private enterprises to obtain either debt financing

Green Growth "Interventions" (contd.)	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
transport Status: Planning stage Size: Medium (\$176m)	and equity) Public loan guarantees to reduce investor risk	and by providing exclusive options for advertisement throughout the BRT system, and development rights around major terminals. GAPS: Large up-front costs may not be offset by usage fees for a long time.	Commercial leases from bus terminals	congestion	or provide equity for investments required. 2 Undertake detailed financing strategy project
 Transport hub infrastructure Dry Port (Aqaba) Status: Planning stage Size: Small (\$50m)	Project scale: >\$50m (\$) PPP's an option: - Public funding - Private finance (debt and equity) - Public loan guarantees to reduce investor risk	- The project can be financed through either a guaranteed loan (public, private or both). Nonrecourse loan options can also be used utilised to guarantee the loan with the value of the underlying assets with private lenders. Another option is a PPP model, where the government provides the land/ access to port facilities and other inducements to obtain private investment and/or lending. Note: Project needs to be aligned with development of the freight rail – might not be built if the Freight Rail is pursued	- Revenue from shipping companies (importers and exporters) - Increased trade will benefit state revenues through custom duties	Improved freight mobility enabling economic growth and development	1 Develop a PPP between the government and private enterprises to obtain either debt financing or provide equity for investments required.

Green Growth "Interventions" (contd.)	Project scale and financing needs	Comments and Gaps	Revenue Sources from Green Growth Benefits (basis for loan repayments or equity returns)	Green Growth Returns not monetized under current policy regime	Considerations going forward
 Waste-to-energy / wastewater Wadi al Arab wastewater biogas Status: Design phase Size: Small (\$1.5m of a \$28m total)	Typical Project scale: >\$28m (\$) for programme of numerous plant - Debt and equity finance option - Grant funding for individual plants - Grants to de-risk private investment (through loan guarantees, interest rate subsidies)	Significant upfront project capital costs, which can be provided with debt and/or equity, with guarantees provided through public funding or with grant funds. If project is commercially viable private investors can be sought. If not, grant funding should be sought, and coupled with state financing.	Revenue from the sale of electricity generated by burning methane gas to NEPCO.	Decreased methane emissions (major GHG contributor)	- Co-financing through JREEF (as this generates RE) and private finance (repaid from NEPCO PPAs) - Consider development loans/grants to complement - Group individual projects into larger programme, seeking financing for consolidated programme

Other Green Growth interventions considered:

Agriculture New crop variety introduction Status: Ongoing Size: TBC	Public or donor funding	Public or donor funding through direct grants is the most appropriate financing option for this project. Once the new seed varieties are tested. Without clear proof of concept that the new seed varieties will provide commercial benefits farmers are unlikely to pick up the costs.	Revenue from increased crop production	More efficient use of land and water for the production of food	- Finance with public funding via JEF (supplemented by development finance if necessary) - Seek donor grants if public funding cannot be provided
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Green finance key for Jordanian industrial sector's green transition:



The study, titled **“Jordan’s Green Industrial Transition: What Role Can Green Finance Play?”**, is implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) and the Frankfurt School of Finance & Management.

The study, launched during a recent event organized by the EDAMA Association for Energy, Water and Environment, details the potential demand and supply of green finance in the industrial sector.

According to the research, renewable energy investments are not perceived to be risky, as the impact is seen directly after installation in almost certain cost savings. On the other hand, other green projects are also perceived as risky due to limited familiarity.

Banks need to consider more flexible terms and conditions when developing green finance, with more competitive interest rates and longer tenors, according to the study.

The study said a review of the banks’ internal strategies, policies and procedures and proper marketing is needed to achieve the desired results with green finance products.

For the industrial sector, the study said it is important to bridge the knowledge gap on how to adopt green technologies and solutions that reduce climate-related risks and other environmental dangers, and increase their production efficiency.

Increased awareness about banking products available to enable green energy investments is also important within the industrial sector to improve access to finance through better understanding of conditions to fulfill, or rules and procedures to follow to request credit, as well as after credit has been approved.

It is also important to raise institutions’ capacity to become bankable and eligible to obtain credit facilities, if not already so, in terms of proper bookkeeping, holding bank accounts and building credit histories.

For policy-makers, the study called for developing incentives for green investments to the industrial and financial sectors, aligned with current strategies on energy, water, and waste management.



It said the Central Bank in Jordan should revise its subsidized fund to include green loans, rather than only renewable energy, also recommended to streamline loan processes and increase loan ceilings for larger industrial enterprises and increase group limits for enterprises that are parts of groups. Sectoral dialogue between banks and industrial firms should be improved, the study observed.

The study also recommended the development of a green business ecosystem of providers of green business development services and vendors for green technologies.

This can be achieved by gathering information about green vendors and service providers to be made available to the industrial sector by chambers and other sector organizations or through increased monitoring by government entities, it said.

President of the Jordan Environment Union Omar Shoshan said that any strategy for green financing in Jordan should focus on increasing accessibility to finance.

“We need to build a strong national programme for green financing with the cooperation of all banks that can create jobs and stimulate the economy,” Shoshan told The Jordan Times.

According to the study, the industrial sector remained a key pillar of the Jordanian economy, contributing 22.4 per cent of GDP and providing 14.2 per cent of total employment with 227,000 jobs in mostly low-to-medium skilled positions in 2021. With its indirect impact on transportation, storage, retail and banking, the industrial sector is estimated to contribute as much as 40 per cent to the GDP, the study said.

Industry in Jordan was not affected by COVID-19 as severely as other sectors such as tourism and transport; nevertheless, year-over-year output contracted by as much as 6.9 percent (JD1,481 million to 1,378 million) and 5.3 percent (JD1,842 million to 1,745 million) in Q2 and Q3 of 2020, and it took until Q3 of 2021 for the sector's output to return to pre-pandemic levels.

The sector's contribution to the current account with a share of 59 percent of exports amounting to JD5.8 billion also improves the foreign exchange reserves and supports the stability of the Jordanian dinar's peg against the US dollar, the study said.

For industrial firms to remain competitive despite recent challenges and the increased negative effects of climate change, it is crucial to transition towards more environmentally friendly and resource-efficient production methods, according to the study.

As the world's second most water-scarce country, the limited availability of water resources has considerably restricted Jordan's industrial sector, the study noted.

The industrial sector remains almost entirely dependent on oil and gas imports for its energy needs, accounting for about a quarter of total energy consumption and thus having a “significant indirect share of greenhouse gas emissions.”

As Jordan's green finance market is in its infancy, the banking sector currently lacks tailored products for the industrial sector's investments in environmentally friendly and resource-efficient production technology, the study said.

However, banks are recognizing the need to gear asset portfolios towards more sustainable investments and have also started to launch some initiatives, the study noted.

Despite the absence of dedicated green financial products for the industrial sector in Jordan, demand for green business development services (Green BDS) has allowed for some degree of investigation concerning how projects related to environmentally friendly and resource-efficient production methods are implemented and financed, as well as the obstacles they encounter.

Green Finance

Potential of green investments

In Jordan, green finance and investments are gaining momentum as the country strives to promote sustainability and environmental responsibility. The potential of green investments in Jordan lies in supporting renewable energy projects, promoting energy efficiency, and fostering sustainable practices across various sectors. By embracing green finance, Jordan can work towards a greener and more sustainable future while also attracting investors who prioritize environmental impact and sustainability.

In Jordan, there are several specific green projects that aim to promote sustainability and environmental conservation. Some notable green projects include:

1. **Renewable Energy Initiatives:** Jordan has been focusing on developing renewable energy sources such as solar and wind power. The Ma'an Solar Park, for example, is one of the largest solar projects in the region, contributing significantly to the country's renewable energy goals.
2. **Water Conservation Projects:** Given Jordan's water scarcity, projects that focus on water conservation and efficient use of water resources are crucial. Initiatives like wastewater treatment plants and water recycling projects help in preserving this precious resource.
3. **Sustainable Agriculture Programs:** Jordan has been investing in sustainable agriculture practices to reduce water usage, promote organic farming, and enhance food security. Projects that focus on drip irrigation systems and sustainable farming techniques are examples of such initiatives.
4. **Green Building Developments:** The construction sector in Jordan is also moving towards green building practices to reduce energy consumption and environmental impact. Projects that incorporate energy-efficient designs, use sustainable materials, and prioritize waste management contribute to sustainable urban development.

These green projects in Jordan demonstrate the country's commitment to environmental sustainability and the importance of integrating green practices into various sectors for a more sustainable future.



Skills for Green and Digital Transitions and Employment in Jordan

This study was made possible with the financial support of the **European Regional Development and Protection Program for Lebanon, Jordan, and Iraq (RDPP II)**, which is backed by the Czech Republic, Denmark, the European Union, Ireland, and Switzerland.

The **International Labour Organization (ILO)** Partnership with the RDPP II in Jordan aimed to address the youth employment challenge and improve the livelihoods of young Syrians and Jordanians through evidence-based research and analysis. This study examines the potential of six high-potential sectors to create green and digitally enabled jobs. The sectors include **biofarming and agricultural technology, renewable energy, e-mobility, tourism and hospitality, water management, and information and communications technology (ICT)**.

The report offers recommendations for policy interventions to address skills gaps and priority areas for future action and highlights the urgent need to upgrade skills training to ensure that skilled individuals are available to support the country's green and digital transformation.

Learn about the key findings and how the Jordanian government has made the green transition a national priority.

Jordan joins the world in observing **International Youth Day**, which falls on the 12th of August each year. This year, the UN elected to celebrate the 2023 International Youth Day under the theme '**Green Skills for Youth: Towards a Sustainable World**'. This international event aligns with Jordan's support and sponsorship of ambitious youth and their fundamental role in establishing a sustainable, environmentally friendly future. '**Youth**', as defined by the United Nations, are individuals between the ages of 15 and 24. According to data published by the Jordanian Department of General Statistics, approximately 2.25 million young men and women comprise about one-fifth of the population of Jordan.

At the international level, initiatives and programs in '**Green Skills**' undertaken for the empowerment of youth are effective contributions toward achieving the **Sustainable Development Goals (SDGs)**, which ensure a balance between economic, social, and environmental dimensions. From this standpoint, fostering cooperation between governments, institutions, and civil society is crucial to create an environment conducive to the development and empowerment of youth. To mark this day, the Higher Population Council (HPC) highlights the importance of improving knowledge in **Green Skills** among the youth to address growing environmental and economic challenges. Developing Green Skills is essential for achieving **SDGs 2030, Jordan's Vision 2025, the Economic Modernisation Vision 2033**, and preserving Jordan's natural resources for future generations while protecting them from environmentally unfriendly consumption and production patterns. Special attention is required for preserving cultivated and agricultural lands, wooded spaces, groundwater, and natural reserves.

The role of youth in achieving sustainable development expands through their contributions to environmentally friendly programs, engaging in work and earning proceeds to eradicate poverty, and enrolling in technical education, vocational training, and crafts. These efforts aim to reduce unemployment while maintaining healthy, hale, and hearty lifestyles. Through this press release, the Higher Population Council emphasizes the demographic opportunity, representing economic and social shifts due to the growth of youth and the working-age population. A demographic shift towards smaller families aids in increasing family and governmental savings, which boosts investments in education and vocational training, leading to increased productivity, economic growth, and affluence.

HPC noted that Jordan is witnessing ongoing efforts to empower young people with **Green Skills** through investments in environmental education and vocational training. Furthermore, the government aims to equip young people with the necessary knowledge to enhance their opportunities in the labor market, as reflected in national policies, strategies, visions, and plans with the National Youth Strategy 2019- 2025, including: the National Employment Strategy, the Poverty Reduction Strategy, and the National Strategy for Human Resources Development 2016-2025.

Stemming from HPC's strong conviction that youth play an important role in achieving sustainable development and preserving the environment, the Council is committed to providing support and supervision of efforts to empower young people with Green Skills and direct them towards an effective contribution to achieving Sustainable Development Goals (SDGs). To this end, HPC formed the National Population Strategy 2021-2030, and the National Strategy for Reproductive and Sexual Health 2020-2030. The two strategies included a special area dedicated to youth. The Council also prepared a document on the national standards for youth-friendly sexual and reproductive health services that are practiced in several health centre throughout Jordan



Effective leadership in the field of environmental sustainability and green energy is crucial for achieving sustainable development. It requires a strategic vision aimed at promoting the use of renewable energy sources and reducing harmful emissions.

Leadership in sustainability in the green energy sector involves fostering innovation and adopting clean technologies to improve energy efficiency and enhance environmental sustainability. Additionally, leaders should promote awareness of the importance of clean energy use and encourage investment in renewable energy projects.

Through effective leadership in the green energy sector, tangible progress can be made towards achieving environmental and economic sustainability goals in our communities.

In addition to "Shams Ma'an" solar project and the "Northern Wind Farm," Jordan is also focusing on green building initiatives like the "Abdali Project" in Amman, which aims to create a sustainable urban environment through energy-efficient buildings and green spaces. Furthermore, the "Al-Hussein Park Development Project" in Amman is transforming a former military airfield into a green public park with recreational areas and sustainable landscaping. These projects showcase Jordan's commitment to sustainability and green initiatives, contributing to a more environmentally friendly and energy-efficient future.

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PROJECT TITLE

Green Economy Transition in Kenya

PARTICIPANT NAME :

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3. Kezia Sika Osabutey
4. Duong Ky Nguyen

COUNTRY REPRESENTED:

Ghana & Vietnam

Introduction

Country Name	Kenya
Continent	Africa
Population	Approximately 54 million (2023 estimate)
Climate Type	- Tropical along the coast, arid to semi-arid in the interior, and temperate in the highlands. - Distinct wet and dry seasons influenced by monsoon winds.
Primary Energy Consumption per Capita	Approximately 215 kWh (2021).
Primary Energy Consumption from Renewable Energy	- Over 80% of electricity generated from renewable sources, primarily geothermal (largest in Africa), hydroelectric, and wind. - Major renewable projects include Lake Turkana Wind Power Project and Olkaria Geothermal Plants.
Share of the population with access to electricity	Approximately 75% (2023). - Urban areas: 92%; Rural areas: 68%.
Per Capita CO2 Emissions	0.3 tonnes (2021)

Kenya is an East African country estimated to be populated by about 54 million people as of 2023. It borders Ethiopia in the north, Somalia in the east, Tanzania in the south, Uganda in the west, and South Sudan in the northwest. The Indian Ocean borders the country's southeast and gives it a wide range of ecosystems, from lush coral reefs to deserts and mountains. Its capital city, Nairobi, is one of the major regional hubs for both business and culture.

The climate varies from tropical along the coast to arid and semi-arid in the interior, especially in northern Kenya. The central highlands, where Nairobi city and the environs of Mount Kenya are located, have an eternally spring-like climate. The long rains fall between March and May, while the short rains fall between October and December.

On energy transition, Kenya arguably is a leading country in sub-Saharan Africa because of its high dependency on renewable energy sources. It is estimated that more than 70% of Kenya's electricity emanates from renewable sources, mainly geothermal and hydropower, in addition to wind energy (Africa News, 2023). This leadership in renewable energy is mostly driven by the country's geothermal resources, especially in the Rift Valley, where several geothermal plants are currently in operation. These have made geothermal power a no-brainer in Kenya's energy strategy.

In fact, solar energy has vast prospects for Kenya because the country has high sunshine throughout the year, and thus the deployment of solar power, particularly in the areas not connected to the national grid, is increasingly strong. Solar solutions provide an indispensable source of energy in these off-grid communities, which again make a crucial contribution to Kenya's overall electrification.

Despite the success Kenya has witnessed in renewable energy, the country is still struggling to transition towards a greener economy. For instance, much of the infrastructure development still needs scaling-up to support the transition holistically to green energy. More than that, the transport sector remains highly dependent on petroleum products, a big enough deterrent towards full decarbonization. The other critical issue that still needs to be overcome is ensuring adequate financing for big projects in renewable energy.

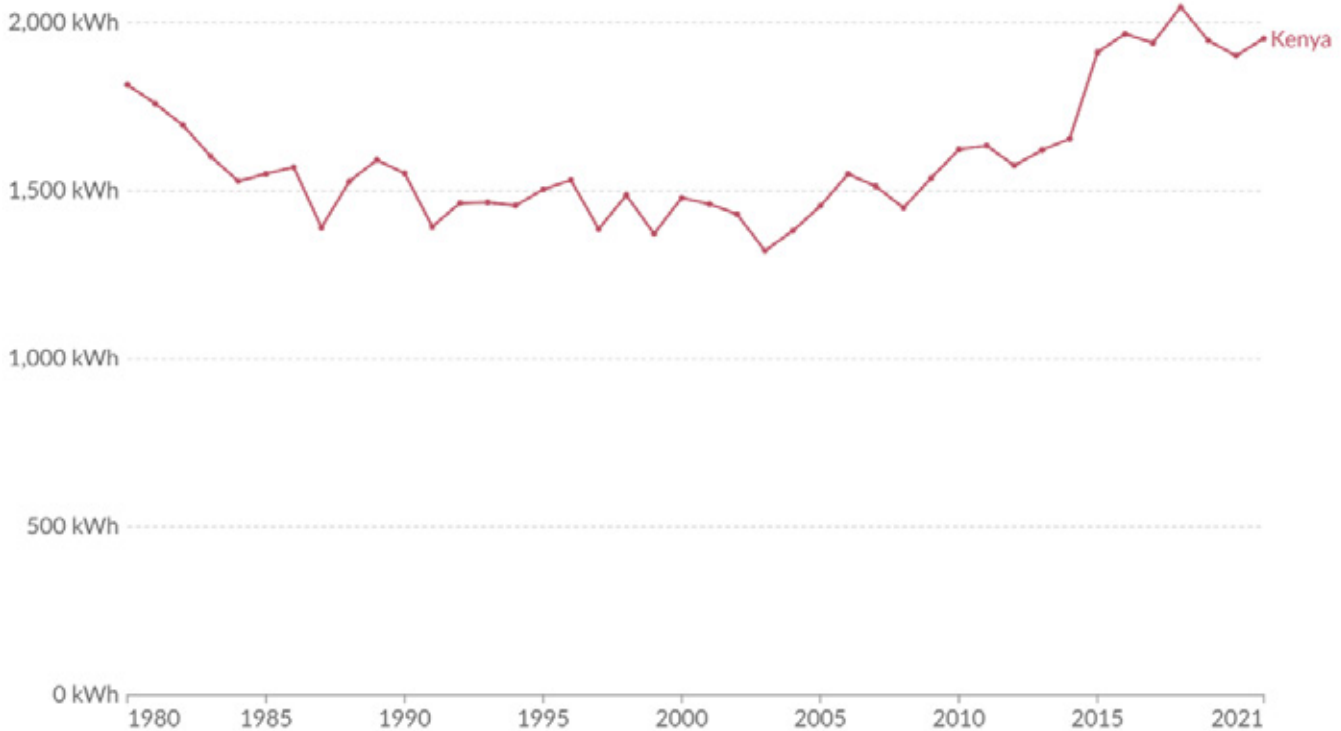
The Kenyan government is committed to reducing carbon emissions in line with international climate commitments such as the Paris Agreement (Falkner, 2016). But the country also has ambitious targets, further increasing its renewable energy capacity and integrating green technologies into its economy. While there has been huge progress, an effective and comprehensive energy transition will need sustained investment in energy infrastructure alongside policy reforms.

Primary Energy Consumption per Capita: 1,953 kWh

Energy use per person

Measured in kilowatt-hours¹ per person. Here, energy refers to primary energy² using the substitution method³.

Our World
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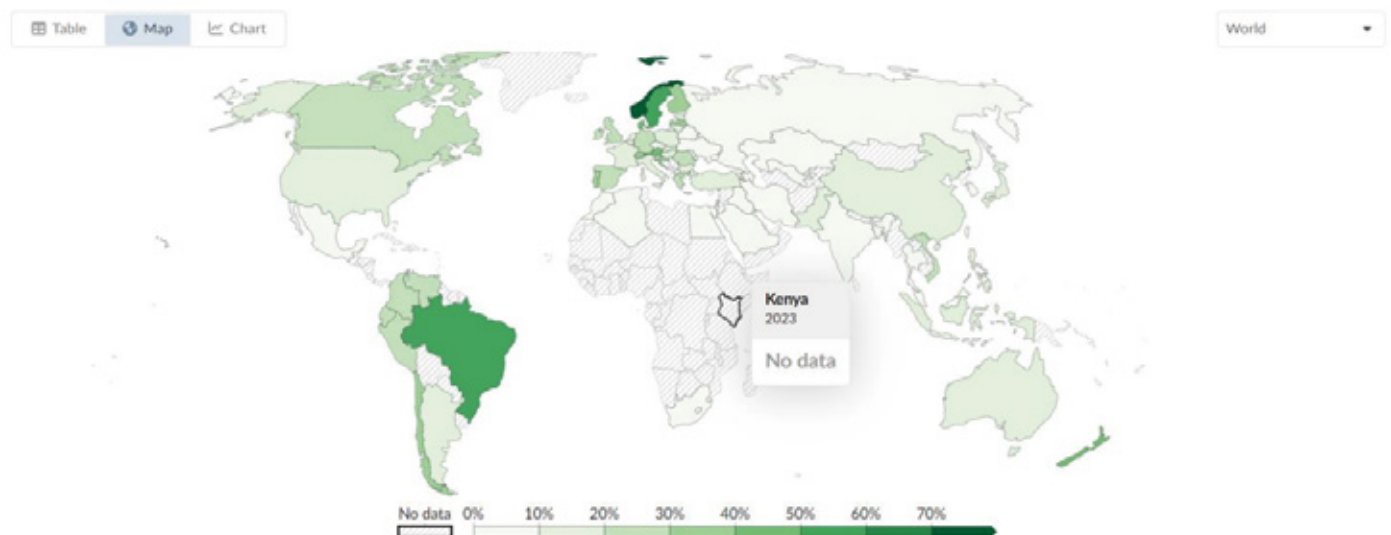
Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2024); Population based on various sources (2023)
OurWorldinData.org/energy | CC BY

Primary Energy Consumption from Renewable Energy: NO DATA

Share of primary energy consumption from renewable sources, 2023

Measured as a percentage of primary energy using the substitution method. Renewables include hydropower, solar, wind, geothermal, bioenergy, wave, and tidal, but not traditional biofuels, which can be a key energy source, especially in lower-income settings.

Our World
in Data

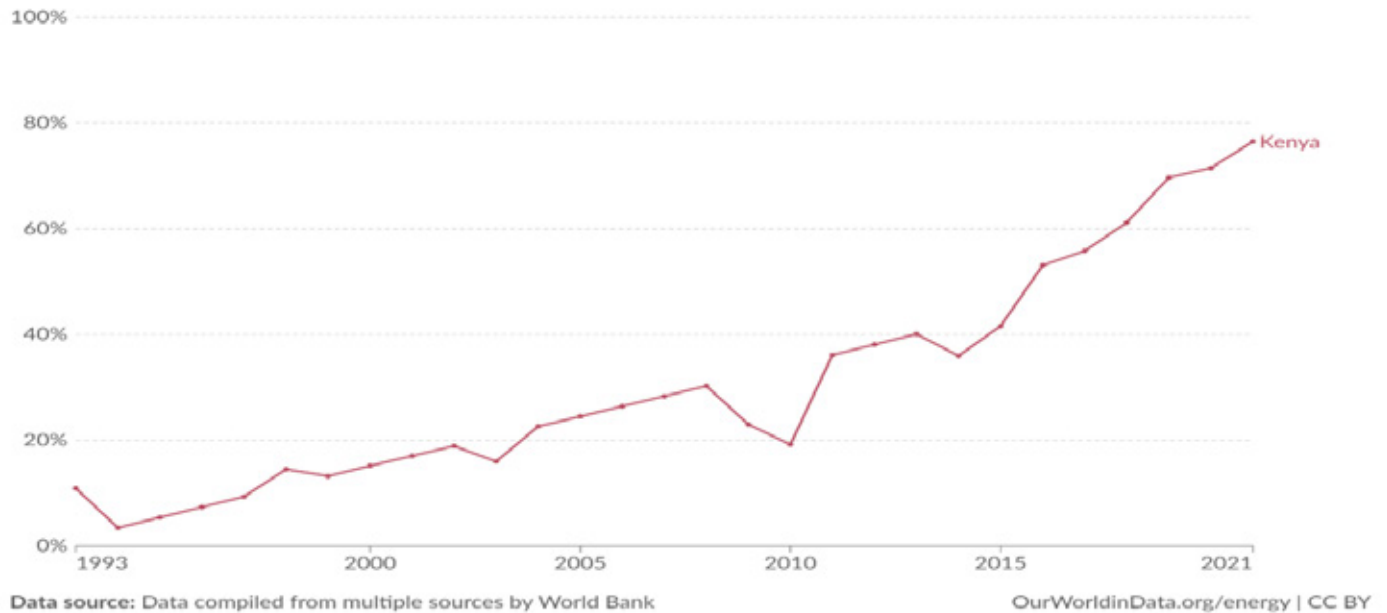


Share of the population with access to electricity: 76.54%

Share of the population with access to electricity

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.

Our World
in Data

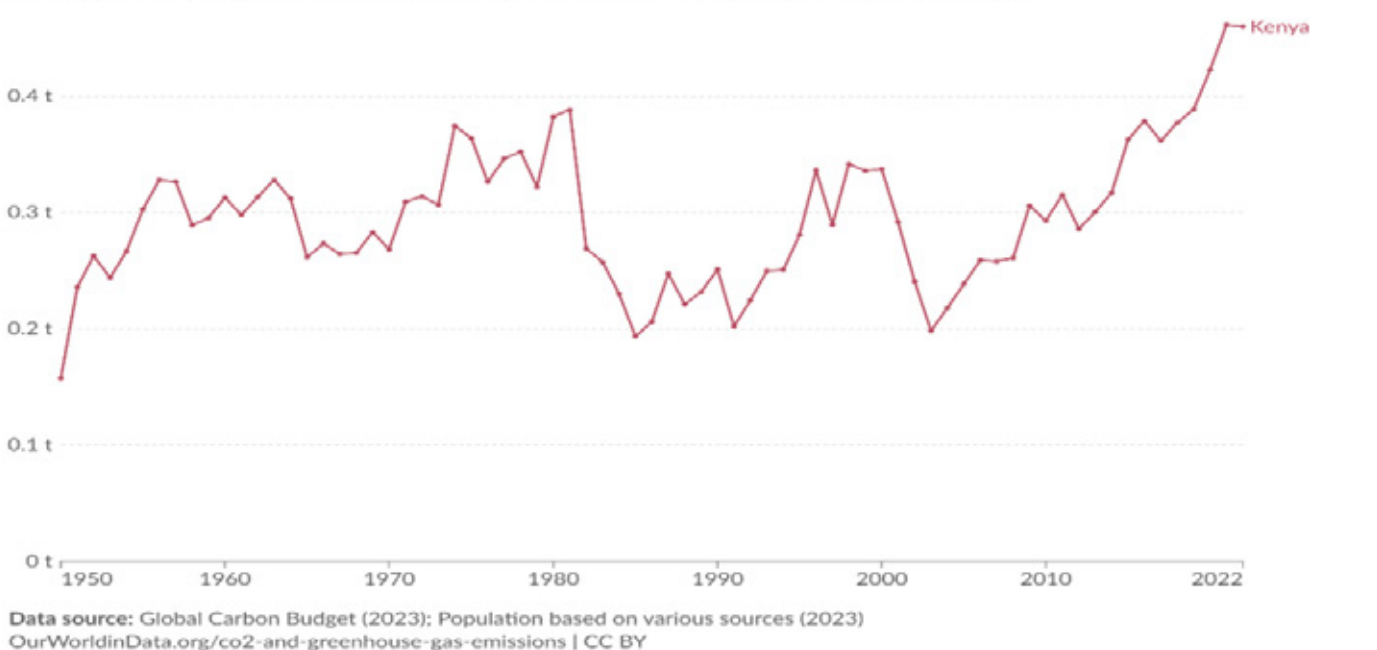


Per Capita CO₂ Emissions: 0.5tonnes

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land-use change is not included.

Our World
in Data



¹ **Fossil emissions:** Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

1.2 Analysis of the Green Economy

Through heavy emphasis on renewable energy, sustainability projects, and environmental conservation, Kenya is making relentless efforts toward the green economy. Geographical diversity coupled with strong governmental policies provides a unique setting for green innovation and economic growth. Although a number of challenges still remain, Kenya remains well-placed to serve as a model for sustainable development in the African continent.

Renewable Energy Status

As one of the best renewable energy sectors in Africa, Kenya contributes more than 70% to the national energy grid (Africa News, 2023). It has a mix of geothermal, hydropower, solar, and wind energy; this makes it a regional leader in the transition to clean energy. By far, the most contributing is geothermal energy, accounting for about 50% of national electricity generation (Kabeyi, 2019). This is largely because of the country's unique positioning along the East African Rift Valley, which itself harbors immense geothermal potential. Power plants like the Olkaria Geothermal Plant are absolutely vital to the maintenance of this renewable energy generation.

The government has thus set ambitious targets for increasing renewable energy capacity to achieve universal energy access by 2030, while simultaneously ensuring a reduction of dependence on fossil fuel sources. Key initiatives in this direction include the development of expanded geothermal projects; scaling wind energy farms, such as the Lake Turkana Wind Power Project; and fostering decentralized solar power systems, particularly for off-grid rural communities. Its policy on Renewable Energy Auctions, coupled with partnerships with private investors and international bodies, has demonstrated the commitment of the government towards broadening the contribution of renewables toward the national grid. However, huge projects are still a challenge to finance, integrate into the existing energy infrastructure, and meet the needs of a growing Kenyan population.



Olkaria Geothermal Plant



Lake Turkana Wind Power Project

Electric Mobility

The shift to electric mobility has grown significantly in the last ten years due to a number of factors, one of which is the pressing need to mitigate the effects of internal combustion enginepowered private transportation on climate change (Pawlak et al., 2023). Over the last ten years, Electric Vehicles technology has advanced significantly, resulting in new breakthroughs, production advances, and commercialization initiatives (Gicha et al., 2024). And yet, despite that, progress is underway, Electric public buses are being piloted in Nairobi by companies like BasiGo, showcasing Kenya's willingness to transition to electric public transportation

Governments are putting policies in place to spur the adoption of EVs, which include reduction of import duties on electric vehicles (Zhang et al., 2014). There are also plans for the expansion of charging stations, particularly in urban areas. These initiatives go hand-in-hand with the Kenyan National Energy Efficiency and Conservation Strategy, which points out that electric mobility will make a certain contribution toward reduction of the greenhouse gas emissions burden from the transport sector. However, limited public knowledge and the slow expansion of charging infrastructure are factors hindering faster adoption of EVs (She et al., 2017). Any scaling up would also have to be done for local manufacturing or assembly of EVs to offer electric vehicles at reasonably affordable prices for the greater proportion of the population.



Electric public buses by BasicGo company

Energy Efficiency Measures

Some of the energy efficiency initiatives put in place as Kenya pursues sustainability in key sectors include industries, transport, and house systems. The Kenya Energy and Petroleum Regulatory Authority (EPRA) has made provisions that ensure energy audits are conducted in all industries; this provision allows the adoption of energy-saving regulations. (Wakajumah, and Kimaku, 2023). Most large-scale manufacturers have already replaced their machinery with ones that use less energy, hence saving energy and consequently cutting down the cost of production.

While energy-efficient lighting and solar water heaters are increasingly becoming standard in both new residential and commercial buildings in the building sector, the Green Building Society of Kenya has also developed green building certification systems to foster sustainable architecture (Ampratwum et al., 2021). These energy efficiency measures are commendable, but still enforcement is disparate, especially in informal settlements and among small enterprises. Wide adoption in all sectors can be achieved when there are more aggressive public campaigns and incentives on energy-efficient products.

Smart City Initiatives

The smart city projects represent one of the important strands in Kenya's green economy strategy. In this regard, Konza Technopolis, the flagship smart city, located approximately 64 kilometers away from Nairobi is uniquely positioned to host sustainable practices, including smart energy grids, energy efficient buildings, and waste to energy solutions. This positioning is supposed to establish the city as a regional technology hub and, therefore, attract investments in green technology and innovation

Large cities like Nairobi are also trying to implement solar powered smart street lighting systems, reducing the consumption of electricity and increasing security in the urban environment. A series of smart city initiatives are carried out in order to integrate green infrastructure into these cities using advanced technology; they are still at the initial stages and have many logistical and financial challenges. Scaling up such projects requires regular investment and collaboration from public and private sectors

PROJECTS

All

Completed

Ongoing



KENYA ADVANCED
INSTITUTE OF SCIENCE &
TECHNOLOGY



KONZA NATIONAL DATA
CENTRE & SMART CITY
FACILITIES PROJECT



HORIZONTAL
INFRASTRUCTURE FOR
PHASE 1 KONZA
TECHNOPOLIS

Ongoing KONZA Technopolis Projects

Green Financing

Access to green finance is accordingly an integral element of Kenya's sustainable development. Consequently, Kenya issued its maiden green bond in 2019 (Climate Bond Initiative, 2019), targeting the financing of energy-efficient real estate projects. The measure heralded a crucial step in integrating financial markets with environmental objectives. Several banks like the Kenya Commercial Bank also give out loans, referred to as green loans, to support green projects such as renewable energy, energy efficiency, and many others.



Despite all these advances, high-interest rates or complicated application procedures often make small businesses helpless regarding access to green finance. Government incentives and the intervention of international development partners have ensured some access to funds, but more comprehensive policy and support mechanisms are crucially required so that green finance reaches a larger number of people.

Government Incentives

The government of Kenya has established a broad-based incentive framework, which is basically intended to ease business and consumer transition towards greener practices necessary for a shift toward a low-carbon sustainable economy. This encompasses a number of major initiatives that were put in place to spur private sector investments and foster adoption across multiple industry segments. Among these, tax exemptions for renewable energy equipment and recycling initiatives are the major driving forces. zero-rated taxes in those sectors ease the economic burden that companies would have invested in green technologies. This policy is part of the larger National Green Fiscal Incentives Policy Framework published in January 2023, guiding the Kenyan economy toward a low-carbon, climate-resilient development pathway. These fiscal interventions are meant to attract investment in green technologies and practices by the private sector.

Aside from tax exemptions, the government subsidizes solar products to increase access to alternative energy solutions. This is quite an important factor for a country where the greater part of households has not yet accessed electricity. Increasing access to solar energy solutions means that, in effect, the government is promoting renewable energy and freeing the country from its traditional dependency on fossil fuel, thus putting into action its climate goals.

Lastly, cutting tariffs on electric vehicles, part of a ten-point strategy to slash carbon emissions from transport, becomes another important component of this framework. The low tariff will make electric vehicles more affordable and thus enhance their adoption by households and businesses. The initiative is very important because transport is among the major contributors of greenhouse gas emissions in Kenya. In addition to these, the policy considers other mechanisms: concessional loans for projects relating to renewable energy, a Green Investment Bank that leverages financing to green projects, and a Waste Management Fund intended to catalyse more sustainable waste management practices in all sectors. These collectively create an enabling environment for business enterprises to adopt greener practices, while at the same time attracting foreign direct investment into climate-related projects. These incentives shall be fully implemented and coordinated on the ground by different government agencies, ensuring support for green investments throughout the country.

Consumer Behavior

Consumer awareness and engagement regarding sustainable practices in Kenya are gradually increasing. Recent studies show that many consumers indicate their willingness to pay for sustainability leading brands, but there is still a gap between attitudes and actual purchasing behaviour. Other key drivers for consumer behaviour are environmental awareness. While increased awareness of the climate change factor and resultant environmental degradation makes people seek out greener alternatives, this economic consideration acts as a considerable barrier to the adoption of such products because people generally believe that green products are more expensive than conventional ones. Another important factor is convenience in accessing such sustainable products, wherein in their daily purchases, people rather go for convenience than sustainability.

Besides all this, the observed trend seems to be toward more sustainable consumer behaviours, mainly for the growing demand for ethical brands and products within the young generation. For instance, in a study carried out in Nairobi, it was found that 86.3% of consumers considered price when making purchases but, where preference was to be indicated, only 40% preferred environmentally friendly products (Abong et al., 2021). Also, various factors inhibiting the purchase of green products included a lack of enough information and unavailable products (Abong et al., 2021). Indeed, the results imply that while interest in sustainability issues is on the rise, efficient strategies that promote green consumerism must handle these barriers by the improvement in availability and affordability of such sustainable products, adding to raising public awareness of their benefits (Imbambi, 2017).

Waste Management and Recycling

The emergence of waste management and recycling is one of the major challenges that face Kenya due to rapid urbanization and a rise in population. There is a huge amount of waste emanating from industrial, commercial, and residential aspects. The country generates over 22,000 tonnes of waste per day. Only about 38% of this waste is collected and correctly disposed of (Kejani Cleaning Services, 2023). Infrastructural deficiencies are manifested in most urban areas in the form of inadequate waste collection equipment and a lack of treatment facilities. All this combines to result in improper disposal practices that, in turn, lead to environmental pollution and health hazards (Council of Governors, 2021). There is general unawareness amongst the public about



the importance of recycling practices and segregation of wastes at the source. Most residents are not well educated on practices concerning waste disposal; hence, the problem of illegal dumping and open dumpsites is severe, thus acting as a breeding point for some disease vectors like rats and mosquitoes.

Against this challenge, the Kenyan government has embarked on various initiatives that are geared towards increasing the rates of recycling and making sustainable practices in waste management. These initiatives include offering incentives for companies that are engaging in plastic recycling and establishing a Waste Management Fund to promote means of improving waste management (EY, 2023). While these are positive initiatives that have been implemented, much more is required for anything to be achieved. The Sustainable Waste Management Act 2022 is targeted to achieve a circular economy through the minimization, recovery, reusing, and recycling of wastes (Vertesolutions, 2024). Success in these initiatives would need focused implementation by and coordination between various government agencies so that such sustainable practices may be embraced more broadly within the country.

Water Management

In Kenya, especially concerning agriculture and urban areas, water management is of great significance as the country is plagued by problems concerning water shortage and contamination. An appropriate established approach to these challenges is Integrated Water Resource Management (IWRM), an approach that furthers integrated development and management of water resources between different sectors so as to guarantee maximum economic and social welfare without compromising the sustainability of the vital ecosystems. This approach will address the intricately connected relationships of water and land, along with the various cultures involved, to ensure that this precious and scarce resource is used prudently and, in a manner, consistent with achieving maximum agricultural and domestic use. According to Global Water Partnership, good Integrated Water Resource Management (IWRM) increases access to more water of better quality by small-scale farmers to raise agricultural productivity and resilience to climate variability, Resilient Food Systems Knowledge Centre, (n.d.).

In addition to Integrated Water Resource Management (IWRM), rainwater harvesting approaches are also being promoted within agriculture to augment the availability of water during periods that are normally dry. In that aspect, it will improve community resilience to climate variability, too, and be conducive toward sustainable agricultural practice by adequately capturing and utilizing the rainwater. Secondly, rainwater harvesting in urban areas, among them Kenya, is being implemented through approaches such as water re-cycling and reuse systems with the view of reducing the gap in the supply of water in sustainable urban development. The initiatives will reduce demand for the already overstretched water supplies and improve the overall management of water in the rapidly growing cities. With such strategies, Kenya is on its way to a more sustainable approach to water management, with attention to both current challenges and those in the near future, Resilient Food Systems Knowledge Centre, (n.d.).

Biodiversity and Conservation Efforts

Kenya is a country with rich biodiversity, though threatened by serious habitat loss, climate change, and human activities. Because of this, it has a large number of protected areas in the form of national parks and reserves. These are very important in the survival of wildlife habitats. They protect areas of rich biodiversity, help support eco-tourism, and thus provide a contribution to local and national economies. Terrestrial protected areas cover about 12.42% of the land area in Kenya, and marine protected area coverage is about 0.76% (Otieno, 2023).

The National Biodiversity Strategy and Action Plan stipulates strategic objectives and actions that address biodiversity conservation in Kenya, highlighting the increasing threats that call for the effective management of these protected areas against cases like poaching and habitat degradation (National Environment Management Authority, 2023).

Besides the creation of protected areas, several community-based conservation initiatives have been felt in the landscape, which involve local communities in conservation. The goal is to provide the community with opportunities for the protection of their natural resources while economically benefiting from tourism activities. Such an approach recognizes that local communities are often the custodians of biodiversity and can play an important role in its conservation (AFD, 2024). So far, the Kenyan government has been implementing a number of reforestation projects where the restoration of degraded ecosystems is considered vital in the context of increased carbon sequestration. Such projects result in biodiversity conservation in addition to aiding in reducing the impacts of climate change by promoting the growth of forests and hence enhancing the habitat for different species (Convention on Biological Diversity, 2024). All these initiatives are one comprehensive step toward biodiversity conservation in Kenya by considering both ecological and socio-economic dimensions of sustainability.

1.3 Challenges and Opportunities

Characterized by big challenges and promising opportunities, transition of Kenya to green economy faces a range of challenges; the economy is highly reliant on fossil fuels, especially in the transport sector, which still remains a major contributor to greenhouse gas emissions. While the government is committed to increasing renewable energy capacity in line with international agreements on reducing carbon emissions, most are incompletely scaled and integrated to fully support the transition of the country into green energy. Major large-scale renewable energy financial obstacles exist: high interest rates and complicated application procedures prevent access to green finance for small businesses and startups. Overcoming these barriers and responding to such ambitious climate changes obviously demands effective policy reforms and sustained investment in energy infrastructure.

On the other side, there is an unparalleled opportunity to develop Kenya's green economy. Already leading within the region in renewable energies, the country derives more than 70% of its electricity from renewable sources like geothermal energy, wind, and solar (Africa News, 2023). The good foundations set up form a very excellent base for further development of green technologies. These include the establishment of a Green Investment Bank, further incentives in finding solar energy solutions, and their application in different industries. Community-based tree planting and conservation is another area of opportunity that is open for the people to contribute in an effort to improve biodiversity amidst climate change impacts. This geographical advantage, together with the available renewable resource base, presents an opportunity for Kenya to be a model in the arena of sustainable development, not only for African countries but for other parts of the world as well.

SWOT Analysis

Strengths: - Abundant Renewable Resource. - Government Support. - Innovative Private Sector.	Weaknesses: - Infrastructure Challenge. - High Initial cost. - Regulatory Delays.
Opportunities: - Growing Global Demand for Green Energy. - Job Creation Potential. - Technological Advancement.	Threats: - Market Uncertainties. - Competition from Fossil Fuels. - Climate Change Impact

PESTLE Analysis

Political	- Government Commitment to green energy. - Supportive Policies with regards to green energy.
Economic	- Investment Opportunity. - Cost Consideration.
Social	- Public Awareness and Engagement. - Job Creation.
Technological	- Innovation in Renewable Technologies. - Research and Development.
Legal	- Regulatory Framework. - Compliance with International Standards.
Environmental	- Biodiversity Conservation. - Climate Change Mitigation.

Analysis findings

SWOT Analysis

The strengths for transition to green energy in Kenya include, but are not limited to: rich renewable resources, supportive government, and very innovative private sector. In excess of 70% of the energy produced by Kenya today comes from renewable resources such as geothermal, hydro, and wind energies; this thereby cements its position as a regional leader within the African continent in respect to renewable energy production (Africa News, 2023). This is complemented by a good government policy of zero tariffs on solar panel importation and incentives on projects relating to renewable energy, which raises the bar for investment attraction in the sector (International Trade Administration, 2023). A dynamic private sector also pursues various projects around green energy, especially in solar and geothermal technologies. Such innovation engenders competition, cost reduction, and efficiency in the Kenyan energy domain.

The transition, though, is not devoid of various weaknesses and threats. Thus, infrastructural gaps still persist, especially in the countryside, with unreliable electricity supply. The high upfront capital required for most renewable energy technologies acts as a deterrent to consumers and businesses due to possible long-term savings (International Trade Administration, 2023). Apart from that, the delayed regulatory processes of approval for Power Purchase Agreements (PPAs) result in the slowing down of project implementation processes and discouragement of investment (International Trade Administration, 2023). On one hand, this fluctuation in energy prices in the global markets creates market uncertainties that threaten to destabilize investment. Besides, Kenya is exposed to the impacts of climate change that threaten energy production and infrastructure resilience. Continued reliance on fossil fuels in some markets further complicates efforts towards the transition of the green economy.

PESTLE Analysis

The Kenyan political landscape is considered pivotal in the transition toward renewable energy, usually propelled by a commitment to supportive policies from the government. The government of Kenya has initiated renewable energy within the national development agenda and mainly in the Vision 2030, which aspires to achieve sustainable development on the basis of increased utilization of clean sources of energy. During the Africa Climate Summit in 2023, President William Ruto said that indeed Africa can depend fully on renewable energy, hence taking the lead in the initiative (Africa News, 2023).

These include incentives for developing this sector, such as zero tariffs on the importation of solar panels and accessories, as a government policy to increase the use of solar energy in all sectors (AFSIC, 2023). In addition, initiatives taken to better the production of geothermal and wind energy have favourably positioned Kenya to be among the leading countries in renewable energy in Africa. Today, over 70% of the electricity produced in Kenya is derived from renewable resources: geothermal, hydro, and wind (Africa News, 2023). These efforts not only contribute to ensuring domestic needs for energy but also meet global goals of sustainability, positioning Kenya as a major player in the transition to green energy across the continent (Clyde & Co, 2024) and (Standard Bank, 2024).

Youth Perspective and Concluding Remarks

The energy transition in Kenya brings with it a number of challenges and opportunities, particularly from the perspective of the youth. First, some of the major setbacks are that the renewable technologies, such as solar panels and wind turbines, are very expensive and beyond the reach of most low-income households. In this regard, we propose the adoption of financing models, such as pay-as-you-go solar systems, to make green energy accessible and more affordable. Besides, training programs can be designed that will give the young experience in renewable energy technologies and further improve local capacity besides employment.

Technological advancements are very crucial to developing green energy. More investment in research and innovation will offer more efficient and cost-effective solutions to suit the specific needs in Kenya. Localized solar and wind energy solutions can also be innovated to enable rural communities to move away from relying on expensive and unpredictable energy sources.

Another critical aspect is community involvement. Awareness campaigns led by youth can be used to educate the community on the positive side of green energy for wider acceptance and utilization. Involvement of schools in energy conservation, green initiatives, and projects can help instil a culture of sustainability from an early age.

It will attract investment in renewable energy infrastructure through strategic partnerships involving government, the private sector, and international organizations. Since Kenya creates favourable conditions and gives incentives for businesses to adopt green energy, more investors emerge, bringing positive impacts on the environment and economy.

The green energy transition in Kenya, therefore, presents a clear pathway into the future of sustainability. With green financing, advancing technology, increased education, and building partnerships, young people can drive this change from the front. Combined efforts will go a long way in ensuring that Kenya not only meets its energy needs in a sustainable manner but also emerges as a hub of green energy for Africa.

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PROJECT TITLE

Green Economy Transition in Lebanon

PARTICIPANT NAME :

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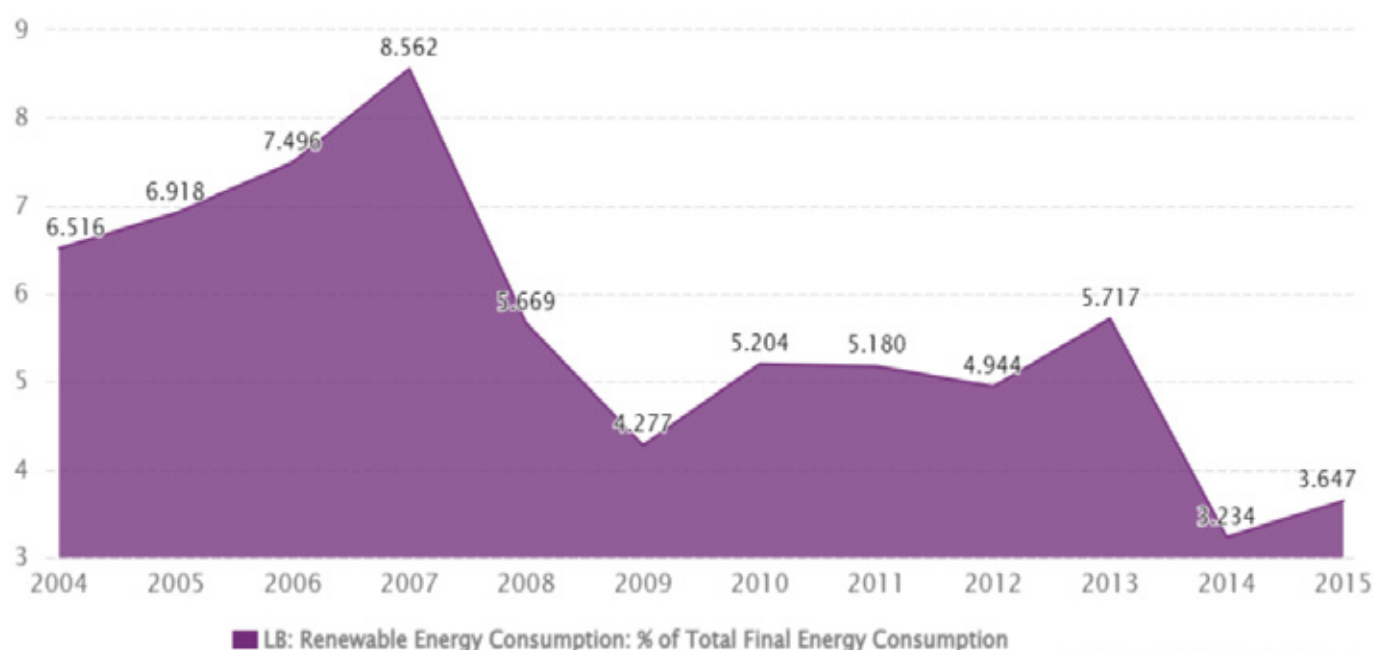
COUNTRY REPRESENTED:

Lebanon

Introduction

Country Name	Lebanon
Continent	Asia
Population	Approximately 5.3 million (2023 estimate)
Climate Type	Mediterranean climate with mild, wet winters and hot, dry summers.
Primary Energy Consumption per Capita	Approximately 1,000 kWh (2021 estimate based on regional averages).
Primary Energy Consumption from Renewable Energy	Limited renewable energy usage; primary reliance on fossil fuels. Efforts are ongoing to expand solar and wind energy projects.
Share of the population with access to electricity	Approximately 98% access to electricity, though reliability and quality are challenges.
Per Capita CO2 Emissions	Approximately 4.4 tonnes (2021)

Primary Energy Consumption from Renewable Energy:



Share of the population with access to electricity:

The global electricity access rate increased from 87 per cent in 2015 to 91 per cent in 2021, serving close to an additional 800 million people

Per Capita CO2 Emissions:

Year	Fossil CO2 Emissions (tons)	CO2 Emissions Change (%)	CO2 Emissions Per Capita	Population	Population Change (%)	Share of World's CO2 Emissions (%)
2022	23766110	4.46	4.14	5744489	0.46	0.07
2021	22751910	5.49	3.98	5718122	0.28	0.06
2020	21568080	-20.19	3.78	5702398	-1.59	0.06
2019	27024050	-1.71	4.66	5794594	-3.17	0.07
2018	27495300	-6.15	4.59	5984119	-2.86	0.08
2017	29296530	5.13	4.76	6160128	-2.58	0.08
2016	27866690	3.57	4.41	6323060	-2.31	0.08
2015	26906280	7.77	4.16	6472469	1.98	0.07
2014	24967460	8.07	3.93	6346990	10.51	0.07
2013	23102560	-1.42	4.02	5743436	9.7	0.06
2012	23434920	11.7	4.48	5235742	2.74	0.06
2011	20980200	1.56	4.12	5096020	1.09	0.06
2010	20657220	-4.18	4.1	5041288	0.98	0.06
2009	21557680	17.97	4.32	4992287	1.36	0.06
2008	18273380	22.43	3.71	4925354	1.68	0.05
2007	14926030	-7.46	3.08	4844118	1.96	0.04
2006	16128730	-2.69	3.39	4751136	1.71	0.04
2005	16573820	-0.69	3.55	4671102	1.56	0.05
2004	16688310	1.33	3.63	4599279	1.63	0.05
2003	16468660	0.03	3.64	4525508	1.39	0.05
2002	16463850	-0.32	3.69	4463504	1.4	0.05
2001	16516440	7.9	3.75	4401918	1.68	0.05
2000	15306500	-9.67	3.54	4329340	1.74	0.04
1999	16944580	3.05	3.98	4255277	1.77	0.05
1998	16443560	-0.7	3.93	4181281	1.77	0.05
1997	16559800	9.8	4.03	4108405	1.82	0.05
1996	15081340	3.84	3.74	4034781	1.87	0.04
1995	14523360	15.93	3.67	3960735	1.82	0.04
1994	12527540	9.86	3.22	3889799	1.81	0.03
1993	11403690	43.25	2.98	3820647	1.96	0.03
1992	7960440	7.42	2.12	3747371	2.14	0.02
1991	7410650	24.04	2.02	3668912	2.05	0.02
1990	5974530	0	1.66	3595175	1.98	0.02
1989	5974500	0.69	1.69	3525285	2.04	0.02
1988	5933400	-22.86	1.72	3454649	2.04	0.02
1987	7691870	2.26	2.27	3385555	2.58	0.02
1986	7521930	5.59	2.28	3300365	2.58	0.02
1985	7123790	16.38	2.21	3217376	2.05	0.02
1984	6121000	2.18	1.94	3152744	1.87	0.02
1983	5990400	6.68	1.94	3094996	1.31	0.02
1982	5615500	-26.35	1.84	3054931	1.53	0.02
1981	7624410	1.19	2.53	3008981	2.18	0.02
1980	7534620	1.13	2.56	2944763	2.16	0.02
1979	7450560	12.42	2.58	2882635	2.12	0.02
1978	6627690	21.01	2.35	2822682	2.19	0.02
1977	5477040	-13.08	1.98	2762155	1.31	0.02

1.2 Analysis of the Green Economy

The study titled "The Effect of Green Marketing on Lebanese Consumer Behavior in Retail Market" explores how green marketing has influenced consumer behavior in Lebanon. It emphasizes the growing awareness of environmental issues among Lebanese consumers and their willingness to modify their purchasing habits to adopt more responsible behavior. Green marketing, defined as the promotion of environmentally safe products, has played a crucial role in shaping this behavior. The study focuses on various factors, including sociodemographics, green advertising, and external influences such as culture and social interests, to analyze their effects on consumer behavior.

According to the findings, Lebanese consumers are increasingly responsive to the concept of green marketing, demonstrating a willingness to pay more for eco-friendly products. This shift toward environmental consciousness is seen as a result of the growing awareness of the detrimental impacts of traditional consumer practices on the environment. However, the research also identifies significant challenges that hinder the full potential of green marketing in the country.

One of the major challenges is that green promotion strategies, such as initiatives that plant a tree for every product purchased, do not significantly affect consumer behavior. Despite their positive intentions, these strategies have not been effective in driving a large-scale shift in purchasing habits. Additionally, the study reveals that the enforcement of environmental laws in Lebanon is weak, limiting the impact of such regulations on promoting green products and practices.

The study also examines the role of socio-demographic factors in shaping consumer behavior. Interestingly, it finds that variables such as gender, education level, and age do not have a significant influence on ecological behavior. This suggests that awareness and willingness to adopt green practices are widespread across different demographics, but other factors, such as economic constraints and regulatory enforcement, are more critical in determining the extent of green consumerism.

Another key factor that influences consumer behavior is culture and social interests. Lebanese culture, which places a strong emphasis on social responsibility and collective well-being, has a notable impact on consumers' willingness to engage in environmentally friendly practices. This cultural aspect, combined with the influence of social groups, plays a pivotal role in shaping consumers' attitudes toward green marketing and ecological consumption. In order to make the shift to sustainable transportation, electric vehicle (EV) charging infrastructure is essential. This topic holds special relevance given the current state of energy and transportation in Lebanon. With a 127% growth between 2020 and 2022, the nation has witnessed a notable surge in EV registrations. With the goal of reducing Lebanon's dependency on fossil fuels, the Lebanese Foundation for Renewable Energy (LFRE) encourages the nation to switch to renewable energy. Utilizing Lebanon's abundant natural resources—such as solar, wind, and hydro—to lower energy costs and pollution, boost employment, and promote economic growth in impoverished areas is something that LFRE strongly supports. 50% green energy by 2030 is their target. Building wind and solar power plants, upgrading hydropower facilities, and lowering dependency on gas-powered power plants are some of the strategic priorities they suggest.

Energy efficiency in Lebanon's industrial sector is the main topic of the CEDRO Report. The significance of energy audits in maximizing energy efficiency, cutting expenses, and lowering greenhouse gas emissions is emphasized. A mixed-use facility, an industry, and a university were all audited; energy monitoring, compressed air optimization, and steam system upgrades might result in savings of as much as 53%. It stresses how important energy audits are to finding ways to save costs and improve energy efficiency in facilities in Lebanon.

In Lebanon, the WEPS project is implemented in collaboration with the Ministry of Energy and Water and the Ministry of Agriculture, and is guided by the multidisciplinary team of the water scarcity initiative that gather key stakeholders interested in water issues.

Amidst growing water scarcity and threats associated with climate change, the project's overarching objective is to achieve food and water security for sustainable development. The project is compliant with the agriculture ministry's and the energy and water ministry's national strategies. Furthermore, the project aligns with the FAO Lebanon's Country Programming framework (CPF), as its output pertains to "initiatives for sustainable land, forest, and water management in response to Climate Change". With regard to the agriculture sector, it focuses more particularly on the "contribution to the improvement of sustainable and integrated water management practices in addition to improving water efficiency and productivity.

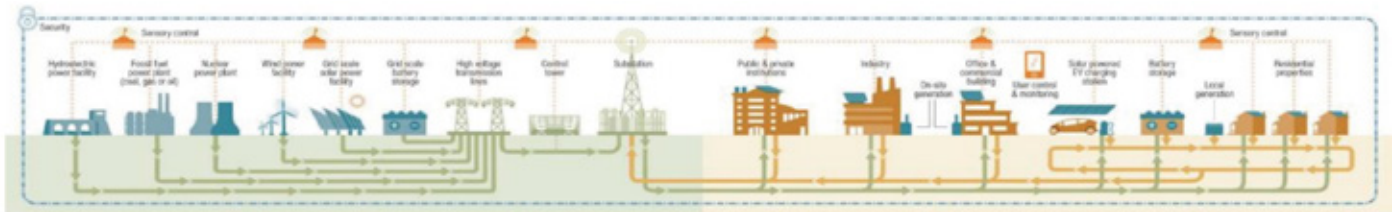
The Nahr El Kalb River Basin, Akkar Governorate, and Bekka Valley are the main areas of concentration for the project's activities. A Mediterranean watershed currently impacted by groundwater extraction and deteriorating water quality, the Nahr El Kalb is significant for Beirut's water supply. Two significant agricultural regions in the nation are the Bekka Valley and the Akkar Governorate. The demand for agricultural water in those areas is rapidly approaching capacity due to the rapid irrigation development made possible by both public and private investment.

Topic	Date	Results
Water accounting (WA)		
Crop Mapping	2019	A detailed land use and crop map using remote sensing was prepared for Akkar site for two cropping seasons, with the aim of assessing better crop water consumption.
	2019	Two experts were trained on the realization of crop maps using remote sensing and the use of the FAO Wapor Database.
ET measurement	2019- 2020	Installation of an instrument of the ET Network at the Lebanese Agricultural Research Institute (LARI) Tal Amara research station in the Bekka valley. ET field measurement is done using different instruments for direct (ex. Lysimeter) or indirect measurement (ex. energy balance measurement). One of the instrument installed is an improved agrometeor stations completed by sensors (ET Cordova station) to measure cereal evapotranspiration comparing between different treatments. Monitoring is currently ongoing.
	2019	Two Lebanese experts were trained on the fabrication and installation of the ET Cordova station.
Piloting WA	2019-2020	A case study on Rapid Water Accounting (RWA) was realized on the Nahr El Kalb watershed to analyze the realities and opportunities of water scarcity (report under development).
	2020-2021	Establishing a robust water accounting system providing the evidence base for the full water budgeting for Nahr El Kalb River Basin is currently ongoing.
WA Institutionalization	2020-2021	Supporting the establishment of a Water Accounting Unit or functions at the Lebanese Ministry of Water Resources is currently ongoing.
Training on WA and auditing	2019	Two national experts were trained to become analysts on advanced water accounting and auditing in a regional training implemented by FAO with IHE-Delft, and IWMI-MENA in Cairo.
	2020	Twenty-five national experts were trained on the water accounting assessment process covering the RWA and the advanced WA and its different approaches, through working with actual WA case studies and reviewing international experiences. Training was implemented with IWMI-MENA in Amman.
Water Productivity (WP)		
WP assessment	2018	Four experts were trained on the concepts and methodologies of WP.
	2019	Four experts share their WP experience at the regional WP conference in Tunisia and successfully joined the WP community of practice.
WP at field level: farmer experimentation	2019-2020	Two Farmer Field Schools (FFS) were established in Akkar governorate, with the support of CONCERN and the Ministry of Agriculture (MoA). The FFS's were implemented in two villages on good agricultural practices for tomato under greenhouses, with 25 farmers in each school and six experimental plots.
	2020	A 10 days Training of Trainers refresher course was carried out in Akkar governorate by CONCERN and MoA facilitators.
	2020	192 semi-skilled and unskilled agricultural workers of which 60 percent are women, were trained on good agricultural practices including trainings on mulching, seeding, weeding and leafing.
	2020 - 2021	LARI is implementing a nation-wide WP baseline and a fieldlevel WP assessment with a detailed farmer survey on farmer practices versus water. This activity is ongoing.

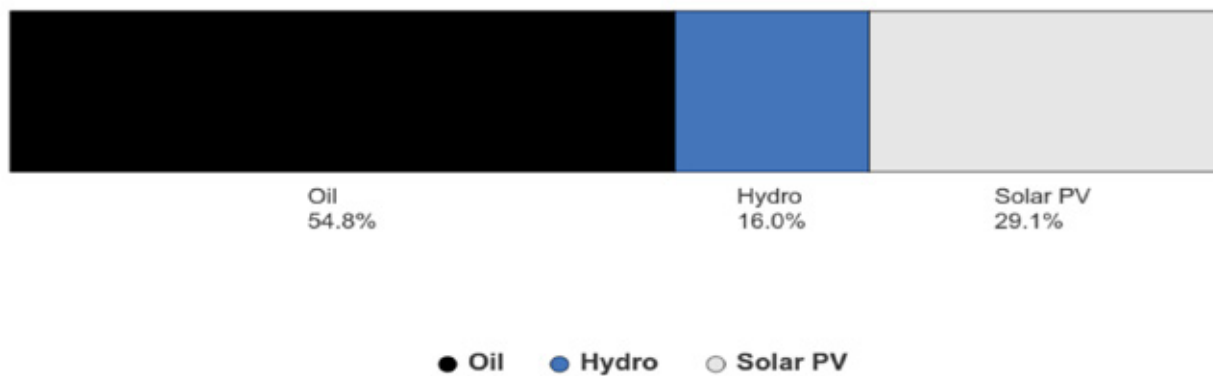
The country's first NBSAP, published in 1998, was updated with consideration for both local and global needs in the National Biodiversity and Action Plan (NBSAP) 2016– 2030, a sectoral policy document that addresses Lebanon's obligations under Article 6a of the Convention on Biological Diversity (CBD). Integrating biodiversity into sectoral and cross-sectoral plans, programs, and strategies is one of the primary goals of the NBSAP. The Strategy focuses on making agriculture, forestry, and fisheries more productive and sustainable by: enforcing laws that restrict unsustainable resource exploitation practices,

particularly in impoverished areas of the nation; managing 50% of all natural ecosystems properly; creating incentives and establishing a legislative framework for the private sector's engagement in biodiversity actions ; maintaining and sustaining existing protected areas while creating new ones creating and implementing rehabilitation plans in at least 20% of degraded sites raising

In conclusion, while green marketing is gaining traction in Lebanon, its full potential remains untapped due to several economic and regulatory barriers. The weak enforcement of environmental laws, coupled with ineffective green promotion strategies, limits the widespread adoption of eco-friendly behaviors. To fully capitalize on the benefits of green marketing, Lebanon must address these challenges by strengthening regulatory frameworks, creating more effective promotional strategies, and providing financial incentives to make eco-friendly products more accessible to the broader population. Furthermore, fostering a collaborative approach that engages both public and private sectors, as well as civil society, will be crucial in driving a more sustainable consumer market in the country. Through such efforts, green marketing could become a powerful tool in transforming Lebanon's retail market and promoting long-term environmental sustainability.

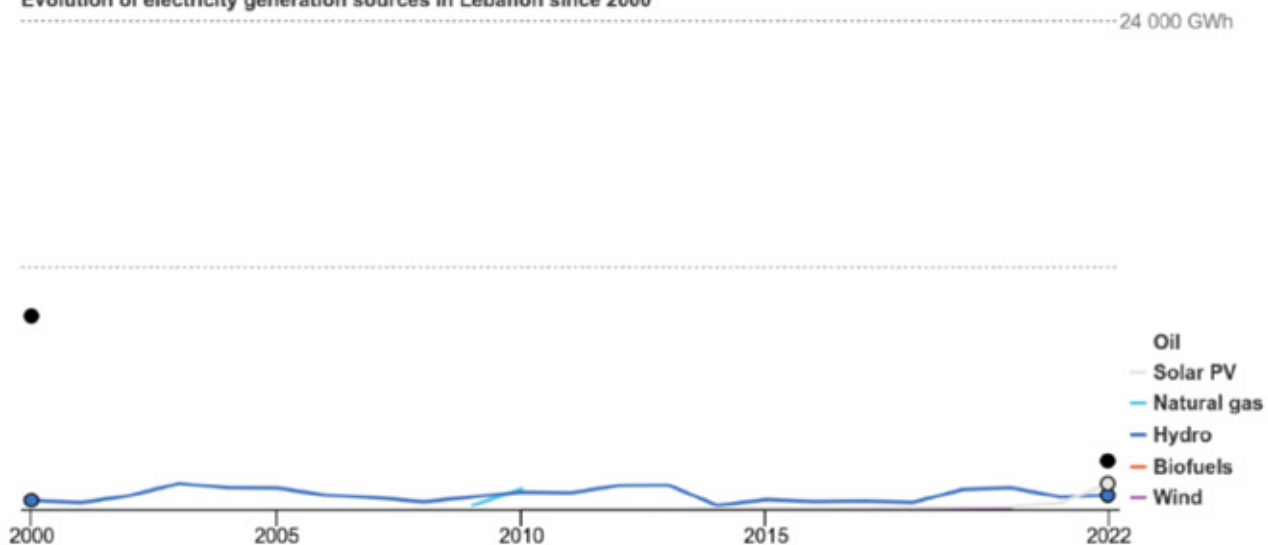


Electricity generation sources, Lebanon, 2022



Source: International Energy Agency. Licence: CC BY 4.0

Evolution of electricity generation sources in Lebanon since 2000



Source: International Energy Agency. Licence: CC BY 4.0

1.3 Challenges and Opportunities

SWOT Analysis

An explanation of Strengths, Weaknesses, Opportunities, and Threats has been provided by a SWOT analysis carried out specifically for Lebanon.

Strengths are those elements that currently allow for the growth of green and circular enterprises. Factors are the definition of weaknesses hindering the growth of companies in the green and circular economies at the moment. Opportunities are characterized as upcoming changes. It might make it possible for companies in the green and circular economies to prosper. Potential future developments that could pose a threat are referred to as jeopardize the development of the circular and green economies.

Strengths:

- Despite the present economic crisis, Lebanon's private sector and startup ecosystem remain vibrant. VCs, accelerators, and incubators. Companies that provide coaching and training are already reputable, possess their network and knowledge.
- Strong support is provided by cultural and social standards with business owners in mind. Culture in Lebanon emphasizes initiative, originality, and creativity which promotes taking calculated risks in business.
- More and more citizens, particularly young people, are knowledgeable about environmental concerns. Several NGOs, movements, and environmental projects have appeared throughout the past seven years, particularly at the colleges.
- Literacy rate is high and general technical expertise exists in the local market

Weaknesses:

- Economic crisis, monetary crisis and hyperinflation reduces investment and private funding opportunities, shifts consumers' priorities towards cheap products and demotivates entrepreneurs to start a new business.
- Lack of a clear legal framework and incentives to support or promote green and circular economy businesses can slow down and demotivate green business owners.
- Bureaucracy, slow and unclear public procedures hold back reforms and new policies from being developed, implemented and enforced.
- Lack of awareness and knowledge about existing environmental policies and incentives.

Opportunities:

- Electricity is a real challenge in Lebanon. Power cuts reached (more than) 22 hours a day in July 2020. Clean energy production is consequently on the rise and may present a good alternative opportunity for households and businesses.
- Coordination initiatives between stakeholders and players in the circular economy sector may result in better programmes design, coordination and impact and better support for green entrepreneurs / SMEs
- Unemployment in Lebanon is currently high. Job creation in the circular economy sector may be a good opportunity for Switch-med and other programmers to get people's attention.
- The economic crisis is creating opportunities for local products that become much more competitive than imported ones

Threats:

- Hyperinflation, economic and monetary crisis shifts the government's priorities towards economic rather than environmental issues.
- Lack of citizens' trust in its politicians and public sector may result in clientelism or patronage suspicions around initiatives, policies or programmers led by public institutions.
- Policies not being enforced in several sectors assumes any new environmental policies may not be enforced.
- Lack of awareness around circular economy may limit projects to clean energy production, organic fruits / vegetables production and solid waste management initiatives rather than reducing waste & pollution through proper strategies and eco-design.
- Political, security and economic instability in the region makes Lebanese focus on their short-term livelihoods' priorities rather than other long-term projects and vision.

PESTLE Analysis

The PESTEL analysis that follows shows that Lebanon is caught up in a complex web of difficult issues. A systematic and comprehensive strategy is extremely necessary given the current state of political unrest, economic collapse, societal tensions, technical limitations, environmental stresses, and governance deficits. The present research sheds light on Lebanon's complex circumstances and emphasizes the necessity of taking prompt action to guide the country towards stability and sustainable development.

Political	Political instability is only one of the many issues that Lebanon has been dealing with for almost three years. The governing environment is difficult because of frequent changes in the administration and outside factors. To solve the current social and economic issues, the government's capacity to implement and enforce reforms is essential.
Economic	A substantial GDP contraction, notable inflation, and unemployment have resulted from Lebanon's economic crisis, which was exacerbated by the COVID-19 epidemic and the explosion at the Port of Beirut. Fiscal management and economic recovery are critical issues since the banking industry is weak and subject to capital controls, which exacerbates the economic difficulties.
Social	The crisis has affected social cohesion by deepening sectarian differences and tensions throughout Lebanese society. Potential social upheaval has been sparked by the disproportionate impact of declining income, increased unemployment, and inadequate basic services on vulnerable groups.
Technological	Lebanon's IT infrastructure is still lacking in certain areas, despite recent improvements. Further obstructing the nation's chances for recovery and progress are the obstacles of economic collapse and scarce resources, which have discouraged investment in technical innovation.
Legal	Reinstating confidence and fostering an atmosphere that supports healing and rebuilding require successful legal and governance reforms. In order to attract foreign aid and investment, it is imperative that swift action be taken to improve openness, accountability, and the rule of law. As a result, political unrest, economic collapse, social difficulties, technology constraints, environmental stressors, and governance concerns all interact intricately in Lebanon's condition. A comprehensive and wellcoordinated strategy that involves vitalizing important industries, encouraging good governance, stabilizing the macrofinancial environment, and enticing foreign assistance is essential to the nation's recovery. Inaction on the crisis could worsen socioeconomic inequality, extend the length of the crisis, and impede Lebanon's chances for long-term peace and prosperity.
Environmental	Public health and Lebanon's natural resources are under further stress due to the environmental effects of the Port of Beirut explosion as well as ongoing issues like waste management, air pollution, and water scarcity. Sustainability over the long run depends on addressing these problems.

Analysis findings

Lebanon's green and circular economy faces both challenges and opportunities. Strengths include a resilient private sector and rising environmental awareness, particularly among youth. However, economic crises, bureaucratic delays, and a lack of regulatory support hinder progress. The energy crisis and high unemployment present opportunities for clean energy initiatives and job creation in the circular economy. Conversely, political instability and low public trust threaten long-term sustainability efforts. Addressing these challenges through coordinated policies and reforms is crucial to fostering green growth and economic recovery.

Youth Perspective and Concluding Remarks

The report "The Effect of Green Marketing on Lebanese Consumer Behavior in Retail Market" investigates how green marketing influences consumer behavior in Lebanon. It highlights that Lebanese consumers are becoming increasingly aware of environmental issues and are willing to adopt more eco-friendly habits. Green marketing, which involves promoting environmentally safe products, plays a significant role in shaping this behavior. Consumers are generally open to paying a premium for green products, but challenges remain, including weak government enforcement of environmental laws and limited consumer purchasing power. Factors such as gender, education, and age do not significantly affect green consumer behavior, but cultural and social interests do have an impact.

The future of green marketing in Lebanon depends on several key actions mentioned in the study:

- Strengthening government enforcement of environmental regulations to promote ecofriendly products.
- Increasing consumer awareness through targeted green marketing campaigns.
- Encouraging businesses to adopt more sustainable practices.
- Improving accessibility to affordable green products to accommodate a wider range of consumers.
- Fostering collaboration between public institutions, private companies, and civil society to create a supportive ecosystem for sustainable development.

These steps will help promote the growth of green marketing and further influence Lebanese consumer behavior towards sustainability.

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PROJECT TITLE

Green Economy Transition in **Libya**

PARTICIPANT NAME :

1. Clarissa El Jurdi
2. Marina Markarian

COUNTRY REPRESENTED:

Libya

Introduction

Country Name	Libya
Continent	Africa
Population	Approximately 7 million (2024 est.)
Climate Type	Arid and Mediterranean (hot, dry summers and mild, wet winters along the coast)
Primary Energy Consumption per Capita	31,496 kWh/year (2021)
Primary Energy Consumption from Renewable Energy	Less than 0.05% (2020)
Share of the population with access to electricity	100%
Per Capita CO2 Emissions	7.24 metric tons (2020)

1.2 Analysis of the Green Economy

Libya, a country heavily reliant on fossil fuel exports, faces a significant challenge in transitioning toward a greener economy. Due to political instability and a lack of infrastructure investment, its energy sector remains dependent on oil and natural gas. However, there are emerging opportunities and global pressures to adopt sustainable practices, particularly as the world moves toward greener energy solutions. Below is a detailed analysis of Libya's current green economy and the potential for growth in renewable energy and sustainable practices.

1. Renewable Energy Status

Libya's reliance on fossil fuels is almost absolute, with over 99% of its energy consumption coming from oil and gas. Renewable energy sources, such as solar and wind, contribute less than 0.05% to the national grid. This is despite Libya having substantial solar energy potential due to its geographic location in the Sahara desert, where sunlight is abundant year-round.

Libya's government has announced its interest in expanding renewable energy capacity, especially solar energy, through the General Electricity Company of Libya (GECOL). Targets have been set to produce 20% of the country's energy from renewable sources by 2030. Several small-scale solar projects have been initiated, and Libya has partnered with international organizations to attract investment in its renewable energy sector. However, these initiatives face setbacks due to ongoing conflicts and lack of funding.

2. Electric Mobility

The adoption of electric vehicles (EVs) in Libya is extremely limited. Factors contributing to this are the absence of infrastructure such as charging stations, the high upfront cost of electric vehicles, and the lack of supportive government policies. Libya has yet to introduce regulations or incentives that promote EV adoption, making it one of the most challenging markets for electric mobility in the region.

Despite the lack of progress in this area, there is potential for EVs to reduce the nation's dependency on fossil fuels. Regional initiatives, especially in neighboring countries like Egypt, could inspire Libya to develop the required infrastructure. Furthermore, international pressure on North African countries to reduce emissions could lead to policy shifts in the future, but for now, electric mobility is in its infancy.

3. Energy Efficiency Measures

Efforts to improve energy efficiency in Libya have largely been hampered by the political situation. While there are some energy efficiency programs targeting building infrastructure and industrial processes, they remain minimal and often lack coordination.



The residential sector, for instance, uses outdated equipment that consumes excessive electricity, and there is little public awareness of energy-saving practices.

In terms of effectiveness, energy efficiency programs have yet to make a significant impact. Libya's government recognizes the need for better energy management, especially given the strain on its national grid, but progress has been slow. The development of building codes that enforce energy-efficient designs, as seen in other North African countries, could be a significant step forward if implemented.

4. Smart City Initiatives

There are no large-scale smart city projects currently underway in Libya. The country's infrastructure is still struggling to meet basic needs, and as such, smart city developments have not been prioritized. However, the potential for smart cities in Libya is significant. With proper investment and governance, cities like Tripoli and Benghazi could integrate renewable energy, efficient transportation, and digital governance as part of their future urban development.

Looking to the future, smart city initiatives could potentially integrate renewable energy solutions and energy-efficient designs, especially with the rising global demand for sustainability. While Libya is currently behind in these areas, there is growing interest among international organizations to help Libya modernize its infrastructure, which could include smart city elements .

5. Green Financing

Libya's financial system has not fully embraced green financing options. While there are some international programs providing financial support for renewable energy projects, domestic banks and financial institutions are not yet actively involved in green lending. For startups and companies that wish to invest in sustainable projects, access to financing remains difficult.

However, Libya can benefit from global green financing initiatives such as the Green Climate Fund or partnerships with international organizations like the World Bank. For Libya to attract more green investment, the government needs to create a favorable legal and economic environment. This includes introducing incentives like tax breaks for green energy projects and creating regulatory frameworks that encourage sustainable investments .

6. Government Incentives

Libya's government offers limited incentives for businesses and consumers to adopt greener practices. The country's political instability and economic challenges have delayed the development of structured policies like tax exemptions or subsidies for renewable energy projects. Initiatives are primarily supported by international organizations, like the United Nations Development Programme (UNDP), which have promoted green initiatives such as renewable energy and energy efficiency. However, large-scale government incentives, such as those for solar panel installation or electric vehicle purchases, remain largely absent. In contrast, other North African countries have introduced tax rebates and subsidies to promote sustainability, and Libya could benefit from implementing similar policies (UNDP, 2022).

The General Electricity Company of Libya (GECOL) has expressed interest in developing Libya's renewable energy sector, with specific targets for solar energy. This has attracted some foreign investment, but progress is slow due to governance issues and lack of long-term planning (GECOL, 2023). Expanding these incentives to a wider audience could spur growth in green business practices.

7. Consumer Behavior

Consumer awareness regarding sustainable practices in Libya is generally low, due to the nation's economic struggles and prolonged political conflicts. Many Libyan citizens focus on meeting their basic economic needs rather than prioritizing environmental sustainability. Public environmental campaigns and education programs are minimal, though grassroots movements are emerging, particularly in urban centers like Tripoli and Benghazi (World Bank, 2021). These movements, often supported by NGOs, aim to raise awareness about issues such as plastic waste reduction and energy-saving practices, but they have not yet reached a critical mass of participation.

The engagement of younger generations with environmental concerns is growing, especially with the rise of social media platforms where global environmental issues are discussed. However, without formal education programs or widespread government campaigns to promote sustainable consumer behaviors, progress remains slow. Comparative studies have shown that countries with sustained government-backed environmental education programs have seen far higher levels of consumer engagement in sustainability (FAO, 2020).

8. Waste Management and Recycling

Libya's waste management system is plagued by inefficiencies due to insufficient infrastructure, irregular services, and weak governance. Waste collection in urban areas, particularly in Tripoli and Benghazi, is inconsistent, and recycling systems are underdeveloped. Industrial, commercial, and residential waste is predominantly sent to poorly managed landfills, which are significant sources of environmental pollution (UNEP, 2021).

9. Water Management

Water scarcity is a major issue in Libya, especially for agriculture, which consumes the majority of the country's water resources. Libya primarily relies on the Great Man-Made River (GMMR) project, which channels water from underground aquifers in the Sahara Desert to urban areas and agricultural fields. While the GMMR has been vital for the country's water supply, the over-extraction of water from these aquifers raises concerns about long-term sustainability (FAO, 2021).

Current water management strategies in Libya remain limited, particularly in the agricultural sector, where outdated irrigation systems lead to significant water wastage. International organizations, including the Food and Agriculture Organization (FAO), have advocated for more sustainable practices, such as the introduction of drip irrigation and the promotion of water recycling. However, these initiatives are in their early stages. The lack of government-driven water conservation policies has hampered widespread adoption, despite increasing pressure to develop more efficient water management strategies in response to growing urban demands and desertification (World Bank, 2022).

10. Biodiversity and Conservation Efforts

Libya hosts diverse ecosystems, particularly in its coastal and desert regions, but conservation efforts are severely limited due to political instability and weak environmental governance. Biodiversity conservation programs in the country have traditionally been underfunded and poorly implemented, though international support has led to the creation of some small-scale projects. For instance, Libya has participated in the Mediterranean Action Plan, which aims to protect marine biodiversity and promote sustainable fishing practices in the Mediterranean Sea (UNEP, 2020).

On land, efforts to protect endangered species, such as the Barbary sheep and the Saharan cheetah, have been hindered by a lack of resources and political will. While several protected areas have been proposed, the country's ongoing conflicts have delayed their establishment and management. Nevertheless, some NGOs, alongside international conservation bodies, continue to work on promoting sustainable land use and biodiversity protection through localized community projects (IUCN, 2021).

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Has potential to build solar panels and wind turbines. - Ideal geographic location for trade and regional cooperation. - Oil and gas resources can be used to fund environmental projects.	Weaknesses: - Ongoing political conflicts. - Underdeveloped infrastructure. - Lack of expertise in governing bodies.
Opportunities: - Prepare for international cooperation and follow through - Invest in innovative solutions. - Begin to shift away from using non-renewable resources.	Threats: - Rising sea-level, desertification and other extreme natural disasters. - Increased population growth -> need for resources. - Tied to international economy that could thrive or fail at any given time.

PESTLE Analysis

Political	Lack of stable government, conflict and turmoil has hindered and continues to limit initiatives to improve Libya's environmental regulations and projects.
Economic	Libya's reliance on oil makes them vulnerable to the changes in its pricing on the global scale. Investments in renewable energy resources would be a good fit to promote sustainable economic growth.
Social	As in other parts of the world, the growing reliance on natural resources paired with overconsumption has created problems in waste management due to not being able to control pollution levels.
Technological	Libya has the resources such as sunny regions and strong winds to power solar panels and wind turbines.
Legal	There are some regulations, both international and national, that task Libya with the responsibility of mitigating climate change. These regulations are not enforced properly or are not up to date.
Environmental	Libya faces significant environmental challenges due to its desert climate that adds to water scarcity and land degradation

Analysis findings

Libya has a unique geopolitical landscape that battles complex issues relating to climate change for various reasons. While the country possesses significant renewable energy potential and a strategic location, it is faced with political instability, infrastructure deficiencies, and limited institutional capacity. To overcome these challenges, Libya must prioritize political stability, invest in their infrastructure, build stronger governments, foster international cooperation, raise public awareness, and develop/ enforce effective policies. By addressing these factors, Libya can harness its potential and transition towards a more sustainable and prosperous future.

Youth Perspective and Concluding Remarks

As youth deeply invested in our nation's future, we believe it's imperative to embrace a greener economy, specifically with climate adaptation. This transition will not only safeguard our natural ecosystem but also create sustainable economic opportunities.

To foster a more sustainable future, we advocate for promoting renewable energy, such as solar power, through incentives and investments in large-scale solar plants. A circular economy is essential, requiring policies that incentivize businesses to reduce waste, recycle, and reuse. Smart agriculture using advanced technologies can optimize water usage, reduce pesticide use, and increase crop yields, contributing to food security and minimizing environmental impact. Electric vehicles can be promoted through subsidies, expanded charging infrastructure, and awareness campaigns. All of which have had a great and strong impact in the UAE over the last decade.

Environmental education should be integrated into our curriculum, even deeper than it already is, from a young age to foster awareness, knowledge, and responsibility. Youth engagement through workshops, competitions, and volunteer programs can further drive sustainable initiatives. Many already exist, however involving international corporations can better the value of the experience. Strategic partnerships are also crucial for addressing regional environmental challenges and leveraging resources. International collaboration with the youth of Gulf states can facilitate knowledge sharing and joint initiatives.

These suggestions require the involvement of all stakeholders to create a sustainable future for our nation. The youth should come together and embrace the challenge by working together to build a greener world for generations to come.

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PROJECT TITLE

Green Economy Transition in **Madagascar**

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COUNTRY REPRESENTED:

Madagascar

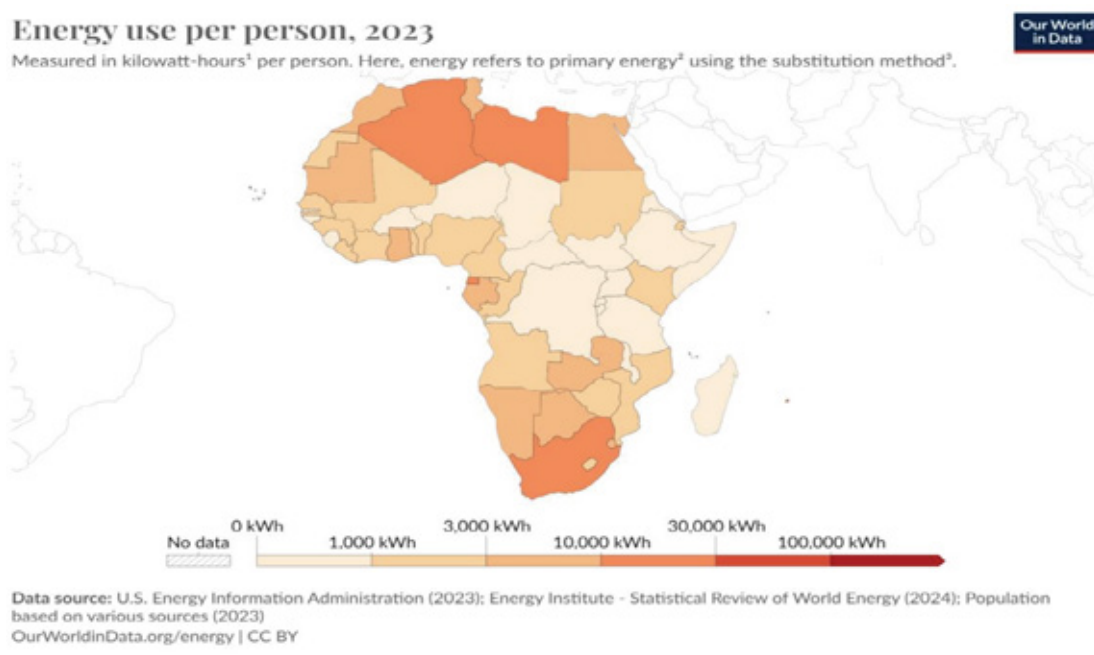
Introduction

Country Name	Madagascar
Continent	Africa
Population	32,153,952 (2023 projection)
Climate Type	Tropical dry and humid
Primary Energy Consumption per Capita	240-300 kWh per year (estimate based on regional averages)
Primary Energy Consumption from Renewable Energy	High potential for renewable energy (5-10% current share), dominated by biomass (75-80%) and hydropower
Share of the population with access to electricity	27% (2020), with a target of 70% by 2030
Per Capita CO2 Emissions	0.1 metric tons (2020)

Madagascar confronts considerable energy issues, with around 70% of its population lacking access to power (World Bank, 2021). The country has significant untapped renewable energy potential, particularly in hydropower, where nearly 90% is currently underused (International Energy Agency, 2020). Besides, it possesses also an huge sun power potential. However, reliance on fossil fuels and deforestation worsens environmental problems (United Nations Environment Program, 2019). The Malagasy government has implemented many initiatives to encourage renewable energy and increase access to power, including the National Energy Development Plan 2015-2030 (Ministry of Energy of Madagascar, 2021). Significant international financial support is required to make this transition possible (Green Climate Fund, 2022). This project seeks to investigate Madagascar's energy transition requirements toward a greener economy.

Primary Energy Consumption per Capita:

Madagascar's main energy usage per capita is predicted to be between 240 and 300 kilowatt-hours (kWh) per year. Madagascar consumes less energy than many other nations, owing to its underdeveloped economy and limited access to power in rural regions.



Primary Energy Consumption from Renewable Energy:

Madagascar has a high potential for renewable energy, particularly from biomass, hydropower, and solar energy. Biomass accounts for 75-80% of primary energy use, with the majority being utilized for cooking.

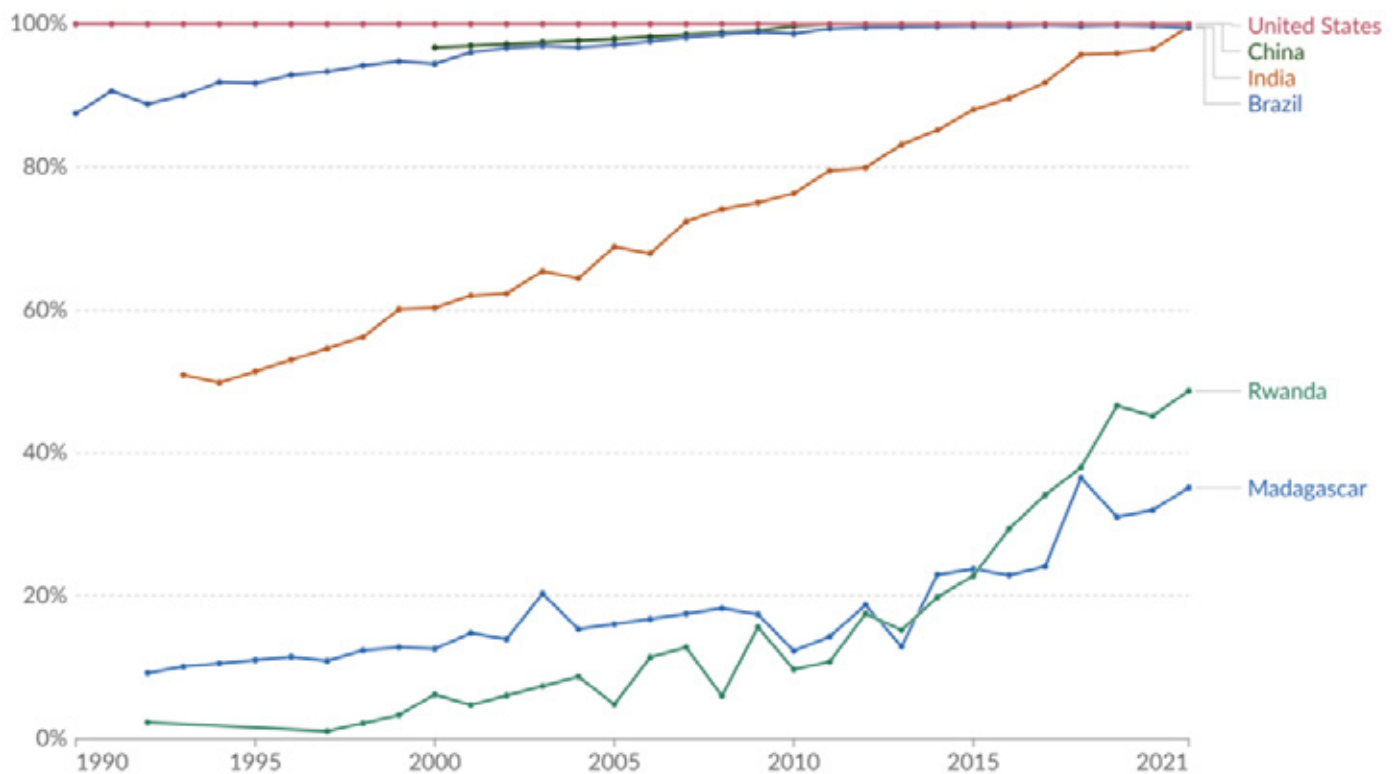
Hydropower also plays an important role, with numerous projects now ongoing, and solar energy is starting to emerge, particularly in off-grid regions. However, the percentage of current renewable sources in overall consumption is still modest, at roughly 5-10%. Efforts are now underway to expand this share and improve energy availability

Share of the population with access to electricity:

In 2020, the International Energy Agency estimates that around 27% of Madagascar's population will have access to electricity. This statistic has improved, but it still reflects severe energy access difficulties in the country. The government has set an ambitious objective of 70% power coverage by 2030.

Share of the population with access to electricity

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.



Data source: Data compiled from multiple sources by World Bank

OurWorldinData.org/energy | CC BY

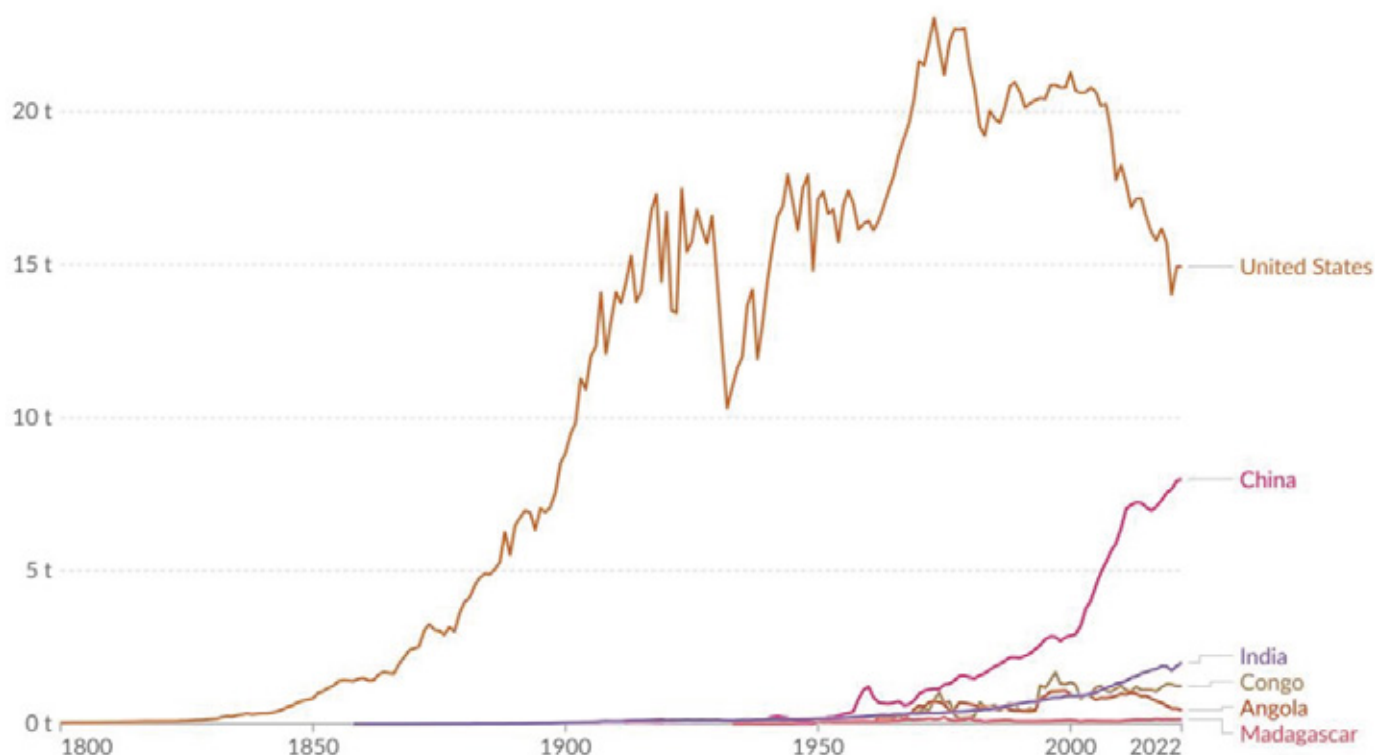
Per Capita CO2 Emissions:

Madagascar's per capita CO2 emissions in 2020 were about 0.1 metric tons. This low statistic reflects the country's use of less carbon-intensive energy sources than many industrialized nations (IEA) (World Bank Open Data 2020). Madagascar's energy industry is made up of a variety of renewable energy sources, however access to power remains restricted for a large section of the population (World Bank Open Data 2020).

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land-use change is not included.

Our World in Data



Data source: Global Carbon Budget (2023); Population based on various sources (2023)
OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

1.2 Analysis of the Green Economy

1. Renewable Energy Status

Madagascar has significant renewable energy potential, particularly in hydropower and solar energy. According to the "National Development Plan" (2015-2019), renewable energy contributes about 30% of the electricity produced in the country. However, national goals aim to increase this contribution to 70% by 2030, primarily through the expansion of solar and hydro infrastructure (Rural Electrification Development Agency, 2022). Madagascar generated 1.68 TWh of electricity in 2020, with 57.7% sourced from fossil fuels (45.3% oil and 12.4% coal) and 42.3% from renewable energy (39.4% hydro, 1.4% biomass, and 1.4% solar). The African Development Bank projects that Madagascar could achieve over 90% renewable energy in its power generation mix within a decade. Solar energy will play a pivotal role in reducing fossil fuel dependency, as evidenced by ongoing projects to construct 50 MW solar parks."

"Madagascar produced 1.68 TWh of electricity in 2020, relying heavily on fossil fuels. However, the government is accelerating the transition to renewable energy, aiming for over 90% renewable generation by 2030. The construction of 50 MW solar parks and large-scale hydropower projects like Volobe, Sahofika, and Ranomafana are key initiatives to diversify the energy mix and reduce reliance on fossil fuels."

"Madagascar's electricity generation in 2020 was primarily fueled by fossil fuels, accounting for 57.7% of the total. To address this, the government is prioritizing solar energy projects, such as the development of 50 MW solar parks. This strategic shift is expected to significantly reduce the country's reliance on fossil fuels and position Madagascar as a leader in renewable energy in the region."

2. Electric Mobility

Electric vehicles (EVs) are still very rare in Madagascar. Charging infrastructure is almost nonexistent, limiting the market's growth. There is not yet a national policy to encourage the adoption of EVs, although private initiatives, such as “Jirogasy”, have begun experimenting with solar solutions for mobility. Last year, Madagascar made a significant stride towards sustainable mobility by exempting electric and hybrid vehicles from VAT. This marked the government's first initiative to promote electric vehicles. While still in its early stages, the adoption of EVs is gaining traction, particularly in the capital. Concerns about range, charging infrastructure, and battery replacement costs are common. However, a World Bank report highlights the economic benefits of EV adoption in developing countries like Madagascar.

ELECTRIC MOBILITY IN NUMBERS

EV market share in Madagascar: less than 1%.

3. Energy Efficiency Measures

The “National Energy Efficiency Action Plan” (PANEE) aims to improve energy efficiency in the transport, building, and industrial sectors. For example, the use of energy-saving light bulbs is encouraged in households. There are also some projects related to clean cooking stove. However, the results have been modest due to a lack of investment and limited consumer awareness.

4. Smart City Initiatives

Madagascar does not yet have official “smart city” projects. However, local initiatives, such as in Antananarivo, integrate water and electricity management technologies, particularly through solar mini-grid projects (Energy Agency of Madagascar, 2020). On 2020, there was a smart project. The Smart Village project was deployed in late 2020 in the Atsimo-Andrefana region with the goal of promoting digital inclusion. Three out of the five planned communes are now part of the Smart Village project in the region. Tongobory (Betioiky), The buildings have solar panels and VSAT satellite technology, providing basic and specialized postal services. MiharyTaheza (Sakaraha), and Itampolo (Ampanihy) have new buildings equipped to provide internet access to their remote rural communities. Published Saturday, March 27, 2021, by l'express Madagascar.

But also ,Another exciting project is the New City of Tanamasoandro, which will be a cutting-edge, smart city prioritizing social and environmental sustainability, Al Jaber Group is dedicated to reducing the environmental risks of the project.

Lastly, the Antananarivo Urban Commune is launching a new initiative called “ECONNECT”. This project, funded by the French Development Agency, aims to transform Antananarivo into a smart city. The goal is to support five innovative projects focused on developing technologies that benefit the city's residents. The CUA has identified five key areas: government transparency and citizen engagement, healthcare, waste management, transportation, and cultural heritage.”

5. Green Financing

Green financing remains limited in Madagascar, although some international financial instruments, like the “Green Climate Fund”, are available. However, access to these funds is often complicated for small businesses due to high administrative requirements and a lack of technical support. MORONDAVA – The United States is helping Madagascar preserve its unique biodiversity and provide new sources of income for some of its most vulnerable populations by supporting a new presidential initiative for the Menabe Antimena Protected Area.

The United States and the Government of Madagascar are working together as “mpirahalaha mianala” to protect the country's unparalleled biodiversity and precious natural resources with an investment of over \$60 million since 2013

For the Atsinanana region, the official launch of this year's reforestation campaign took place on February 23, 2024, in the Fokontany Antaratasy, Rural Commune of Foulpointe. Under the initiative of the Regional Directorate of Environment and Sustainable Development Atsinanana and the Atsinanana Region, this event brought together development actors from the city of the large port.

In the Analanjirofo region, the launch of the 2024 reforestation campaign also took place on February 23, 2024. The reforestation took place in Tampolo, in the Rural Commune of Ampasina Maningoro, District of Fenoarivo Atsinanana, over an area of 2.2 hectares. The FID team, accompanied by the beneficiaries of Asa Avotra Mirindra in this area, was able to plant 270 young trees during this event.

As part of the implementation of the "FIER" project funded by the United Nations Joint Fund for the Sustainable Development Goals, companies can access concessional loans, guarantees, and complementary grants to finance renewable and sustainable energy projects in Madagascar.

The objective, according to the project promoters, is to develop a financing line for sustainable energy, clean cooking, and energy efficiency projects in Madagascar. Only rural electrification projects (domestic solar systems, mini/small grids, nanogrids), clean cooking projects (improved stoves, bioethanol, green charcoal), and energy efficiency projects will be eligible for this facility.

6. Government Incentives

The Malagasy government offers some incentives for renewable energy, notably tax exemptions for importing solar equipment. However, incentives for other green practices remain weak and fragmented, hindering widespread adoption.

"A training was conducted by the Ministry of Environment and Sustainable Development in partnership with UNDP. The training was designed for Mayors and Fokontany Chiefs. The individuals who were trained are now organizing with them to raise awareness about reforestation and adaptation and mitigation techniques. Additionally, these community mobilizers were trained in 2020 on communication approaches for development, including home visits, community dialogues, carnivals, traditional songs (vakodrazana), and radio listening groups, to disseminate information and raise awareness about the importance of climate action. In total, 91 community mobilizers, including 59 men and 32 women, were trained in the Analamanga, Atsinanana, Anosy, Atsimo Andrefana, and Androy regions. They were equipped with communication tools (posters, tarpaulins, solar radios, etc.) and bicycles to enable them to reach multiple villages and sensitize vulnerable communities to combat climate change.

7. Consumer Behavior

Consumer awareness of sustainable practices is increasing but remains limited to urban areas. Initiatives such as "Votary" aim to promote local eco-friendly products, but they struggle to reach rural communities where access to information is more restricted (Votary Madagascar Association, 2021).

8. Waste Management and Recycling

The waste management system in Madagascar is largely ineffective, especially in urban areas like Antananarivo, where only 60% of waste is collected (UNICEF, 2020). Recycling initiatives are marginal, though some companies, like "Madacompost", are beginning to offer local solutions.

"While many countries are currently grappling with the challenge of waste recycling, Madagascar has yet to reach that stage. In fact, most waste is not even collected on a national scale. In a single year, the capital, Antananarivo, produces approximately 250,000 tons of waste, the vast majority of which is neither collected nor properly treated. This results in illegal dumping, most often in the vicinity of local communities. Once again, economic conditions are at the heart of this societal issue. However, the authorities seem to be aware of the problem: in 2017, a national day of rest was declared at the government's initiative to undertake a collective street cleaning action.

9. Water Management

Madagascar faces significant challenges in water management, particularly in agriculture, which accounts for 80% of water consumption. Sustainable irrigation projects, such as those supported by the "World Bank", aim to improve water use efficiency in rural areas.

10. Biodiversity and Conservation Efforts

Madagascar is renowned for its unique biodiversity, but it is seriously threatened. The "Forest Conservation Program" (PCF) and the "Protected Areas Network" are two of the main initiatives in place. However, illegal deforestation and agricultural pressure continue to present major challenges to the implementation of these programs.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Abundant natural resources - Unique biodiversity - Growing commitment	Weaknesses: - poverty too high - Insufficient infrastructure - High upfront costs - Limited access to information
Opportunities: - International support - Growing market - Innovative technologies	Threats: - Political instability - Climate change - Competition for resources

PESTLE Analysis

Political	The Malagasy government's commitment to renewable energy is a testament to environmental awareness and a desire for sustainable development. The policies and programmes put in place aim to encourage the use of clean energy resources and reduce dependence on fossil fuels. However, political stability is crucial to ensure the continuity and success of these initiatives. Investors should therefore be attentive to the political dynamics that may influence the long-term viability of their renewable energy investments in Madagascar.
Economic	The high upfront costs associated with renewable energy infrastructure in Madagascar represent a strategic investment for the future. These upfront expenses are typically amortized over the long term through savings on energy costs and reduced reliance on fossil fuels. In addition, international assistance plays a crucial role in providing the financial and technical resources needed to overcome initial obstacles and accelerate the development of renewable energy in the region. This is a testament to the global commitment to a sustainable energy future and recognition of Madagascar's potential in this area
Social	Public awareness of renewable energy is crucial for the energy transition. Initiatives such as integrating renewable energy education into school curricula and the use of social media and community events are key to raising awareness. However, unequal access to these energy sources, especially in rural areas, remains a major obstacle. Efforts are needed to reduce these disparities and ensure that the benefits of renewable energy are accessible to all.
Technological	Innovation in renewable energy is crucial for a sustainable future. Technologies such as solar panels and microgrids are booming, but to reach their full potential, they require more support, including financing, research and development. At the same time, the modernisation of existing infrastructure is essential for a smooth and efficient integration of these green technologies, which will allow for a smoother and faster energy transition to an environmentally friendly model.
Legal	Creating an enabling regulatory environment is crucial for the development of renewable energy. This requires clear and consistent laws that encourage investment and growth in this sector. Equally important is addressing land ownership issues, as it ensures access to the sites needed for renewable energy projects. A balanced and well-informed approach can overcome these obstacles and foster a sustainable energy transition.
Environmental	Madagascar, with its exceptional biodiversity, faces a crucial challenge: integrating the development of renewable energies while preserving its unique ecosystems. The transition to sustainable energy sources is imperative, especially given the country's vulnerability to climate change. These initiatives must be designed to protect endemic flora and fauna, while providing clean and reliable energy to support economic and social development.

Analysis findings

Madagascar has significant potential for renewable energy, thanks to its abundant natural resources, including water, solar, and geothermal energy. The government's commitment to sustainability, supported by NGOs, highlights an increasing focus on environmental preservation and biodiversity conservation. However, challenges such as high poverty levels, outdated infrastructure, and substantial upfront costs hinder the adoption of renewable technologies. Limited public awareness, particularly in rural areas, further complicates the energy transition. Opportunities exist through international support and a growing global market for sustainable energy, along with innovative technologies like microgrids. Political stability is essential for the success of renewable projects, while climate change poses risks to resource availability. Additionally, competition for land may lead to conflicts with agricultural needs. To ensure a successful transition, Madagascar must establish a supportive regulatory framework, promote public education on renewable energy, and balance development with biodiversity conservation, ultimately fostering sustainable economic and social growth.

Youth Perspective and Concluding Remarks

Firstly, implementing a clean development strategy: This begins with protecting Madagascar's forests by reducing pressure on them through conservation efforts. This includes managing the use of biospheres in a way that benefits current generations while ensuring sustainability for future generations. Additionally, we must promote sustainable alternatives to destructive exploitation of forest resources and meet the needs of the population. A reforestation in urban areas would be a good initiative, by focusing on areas most susceptible to pollution. Planting like five trees in each locality, such as ravintsara, ravinala, and neem for their effective ability to purify the air, it would be a good option to purify those polluted air in cities.

Secondly, protecting biodiversity: This involves creating and strengthening protected areas, establishing new nature reserves, and improving the management of existing parks to safeguard endemic species. Furthermore, we need to promote community-based conservation, empowering local communities to manage natural resources and providing them with economic incentives for conservation. Reforestation and forest management initiatives should be implemented, such as launching reforestation projects with native species to restore degraded ecosystems. Additionally, agroforestry practices should be promoted to integrate trees into farming systems, enhancing soil fertility and biodiversity.

Thirdly, adopting renewable energy: This includes developing of hydropower, solar and wind energy by investing in renewable energy projects to reduce dependence on fossil fuels. However, we must also improve governance and seek partnerships to maximize the benefits and opportunities of renewable energy projects. Implementing microgrids for rural communities, encouraging the installation of solar panels, and developing wind farms are key steps. Additionally, hydroelectricity can be harnessed through small-scale hydropower plants in rivers, while ensuring sustainable watershed management. Moreover, we should encourage energy conservation, community engagement, and investment in renewable projects. Promoting sustainable transportation and adopting energy-efficient practices is also crucial.

Fourth point, promoting sustainable agriculture: This involves adopting eco-friendly agricultural techniques, such as organic farming and sustainable practices to reduce the use of pesticides and chemical fertilizers. Farmers should be trained in sustainable and climate-resilient agricultural practices. A combination of agriculture and aquaculture (Aquaponics), boost this practice, given that it is well-suited to Madagascar's climate and can create jobs in rural areas, as demonstrated by the Mangily project as an example. Promote its widespread adoption, invest in this sector, and create policies to support and strengthen producer training, as well as access to technology. But also, boost the use of screens for industrial and factory wastewater: Filter out large debris like wood and plastic. Implement a double screening system, one for large debris and another for heavy metals. Wastewater free of large debris should be purified for reuse in plantations or rice paddies to prevent water shortages.

Fifth point: The waste management is also a field that the country should be treated because it generates a lot of co-benefits such as the improvement of air quality, avoidance of infiltration of heavy metals in groundwater, reduction of emission of Methane from the waste and composting biodegradable waste.

Sixth point: Investing in plant-based biodiesel offers a promising and highly exploitable resource for the country, especially with crops like *Jatropha* and *Pongamia*. With sufficient investment, this can become a widely adopted energy source, like in the Région Melaky did years ago from now.

Finally, raising awareness and providing training on renewable energy through workshops, media campaigns, and community events is essential. Public-private partnerships and tax incentives for businesses investing in renewable energy should be explored and improved."

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PROJECT TITLE

Green Economy Transition in **Malawi**

PARTICIPANT NAME :

1. Margaret Chilinda
2. Owusu Emmanuel Kwarteng
3. Kusi Christabel Boatemaa

COUNTRY REPRESENTED:

Malawi and Ghana

Introduction

Country Name	Malawi
Continent	Africa
Population	21.7 million (2023 projection)
Climate Type	Sub-tropical, relatively dry and strongly seasonal
Primary Energy Consumption per Capita	465 kWh per year (estimated)
Primary Energy Consumption from Renewable Energy	No specific data collected yet; relies heavily on hydropower (95% of electricity generation)
Share of the population with access to electricity	14.19% (2022)
Per Capita CO2 Emissions	0.1 metric tons (2022)



Diagram 1. Source: <https://maps-malawi.com/>

Malawi is a landlocked country in the southeastern part of Africa, with a population of about 21.7 million. Malawi has a sub-tropical climate, which is relatively dry and strongly seasonal. The warm-wet season stretches from November to April during which 95% of the annual precipitation takes place. The cool, dry winter is from May to August with mean temperatures varying between 17 and 27 degrees Celsius, and temperatures between 4 and 10 degrees Celsius. The hot, dry season lasts from September to October with average temperatures varying between 25 and 37 degrees Celsius.

The primary energy consumption per person in Malawi is estimated to be about 465kWh; with about 14.19% of the total population having access to electricity. Each person in the country was estimated to emit about 0.1 tons of CO2 in 2022. No data has been collected on the amount of primary energy consumed that is produced from renewable energy.

1.2 Analysis of the Green Economy



Diagram 2. Source: Discussions at World Green Economy Summit Ahead of COP26, Khemkalyani (2021)

The reality for many Malawians is that as climate change throws a wrench into the works of their hydropower-dependent grid, droughts and erratic rainfall patterns have also turned the once-reliable Shire River into a fickle partner for the country. Malawi is a country heavily relies on hydropower, which is about 95% of electricity generation. The Shire River hosts major hydropower plants like Nkula, Tedzani, and Kapichira, but climate-induced challenges are reducing their effectiveness. This results in frequent power shortages, forcing many Malawians to rely on energy sources, such as firewood and charcoal, which exacerbates deforestation. To address this, Malawi has set ambitious goals under the Malawi Renewable Energy Strategy (2017-2030). The addition of 70 megawatts (MW) of solar energy to the national grid is a priority, with the 60 MW Salima Solar Farm launched in 2021 marking a significant milestone.

The country transport sector is dominated by imported used vehicles from Asia, which are more affordable and they prevent the adoption of electric vehicles (EVs) with the country having very few electric cars and motorcycles. The lack of charging infrastructure and the high costs of EVs present additional challenges while the National Transport Policy (2019) includes goals for promoting cleaner transportation, these are still in the very early stages. Energy efficiency is another critical aspect of Malawi's green economy transition. The National Energy Policy (2018) aims to enhance energy efficiency across various sectors. The Malawi Energy Efficiency and Electrification Project, backed by the World Bank, promotes the use of energy-saving bulbs and efficient appliances. In buildings, there is a growing but limited uptake of energy-efficient technologies like solar water heating and better insulation. More needs to be done to incentivize energy-saving practices, particularly in rural areas where access to such technologies is still minimal.

Urban development in Malawi is taking early steps toward modernization, with smart city initiatives beginning to emerge in cities like Lilongwe and Blantyre. These efforts are focusing on sustainable urban planning, using digital technology to enhance waste management and transportation systems. However, the path forward is not without challenges. Inadequate infrastructure and limited technical expertise have slowed progress. While smart cities hold immense promise for reducing energy consumption and strengthening urban resilience, Malawi will require substantial financial and technical support to fully realize these opportunities.

For startups and small businesses, accessing green finance is a major obstacle; International funds such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF) offer grants and loans for environmentally friendly projects, but these are often difficult for smaller enterprises to access. Locally, banks like the National Bank of Malawi are beginning to offer green financing options, but for many entrepreneurs, these remain out of reach. Though the government has made progress by offering incentives like import duty exemptions for renewable energy equipment such as solar panels, broader incentives are lacking, and enforcement of sustainability policies is weak. The National Climate Change Management Policy encourages businesses to adopt sustainable practices, but without stronger enforcement, its impact is still limited.

Consumer awareness of sustainability is on the rise, particularly in urban areas, thanks to the efforts of environmental advocacy groups like the Green Girls Platform and the Clean Cities Project. These groups have been instrumental in educating the public on the benefits of solar energy, waste reduction, and water conservation, with youth leading the way in environmental stewardship. However, awareness remains low in rural areas, where unsustainable practices like charcoal burning persist due to a lack of viable alternatives. Urban areas, meanwhile, grapple with inefficient waste collection systems, and poorly managed landfills continue to pose significant health and environmental risks. Companies like Waste Advisors are making strides in recycling plastics and paper in Lilongwe and Blantyre, but the informal waste-picking sector still dominates. More investment in recycling infrastructure and public awareness campaigns is needed to improve waste management across the country.

Water management remains a critical issue, particularly for agriculture, which employs over 80% of Malawi's population. The National Irrigation Policy (2016) and the Water Resources Act (2013) have helped expand irrigation systems and promote water



1.3 Challenges and Opportunities

SWOT Analysis

Strengths: Relevant frameworks and strategies are in place. The nation has high hydropower and solar energy potential. Youth are more aware of the issues affecting sustainability.	Weaknesses: The frameworks and strategies need to be enforced and strengthened. Rural areas have little access to funding for green strategies. Lack of unreliable electricity affects livelihoods.
Opportunities: International funding towards green initiatives is driving innovations through the youth and private sector. Further investments in wind power and off-grid solar solutions are needed, especially in rural areas. To promote electric mobility, Malawi has to implement subsidies, have reliable charging stations and launch awareness campaigns. Untapped hydropower sites across the country	Threats: Unawareness of climate change, Access to funds, High cost of EVs

PESTLE Analysis

Political	Conflicts of interests, other influential would rather have weak enforcements on unsustainable practices because they benefit from them. Corruption, funds are not allocated adequately
Economic	Funding is a big challenge as banks or funders want proven track record. Lack of energy access hinders ways in which people can make money.
Social	People in urban areas are open to using greener alternatives while those in rural areas are not even aware.
Technological	Adoption of new methods is hard for local communities and backward people in the urban areas or influential positions. An approach that is being used to implement mini solar grids. Solar water heating systems
Legal	Frameworks are there but it is hard to enforce e.g. Water resources Act (2013) and National Irrigation Policy (2016)
Environmental	Carbon emitting cars contribute greatly to urban pollution. Sustainable water and waste management strategies should be strengthened.

Analysis findings

The SWOT and PESTLE highlight various factors that need to be carefully considered when looking at the green economy transition of the country. These factors are things that can either hinder or drive green economy in a country. For Malawi, a country that has various opportunities to grow and prosper in the green economy, frameworks and strategies like the Water resources act (2013), National irrigation policy (2016), National energy policy (2018) are there to help to contribute to international goals such as the Paris Agreement; but enforcing them is a challenge just as it is to facilitate adoption of new technologies. People in urban areas are open to using greener alternatives while those in rural areas are not even aware of green innovations such as smart cities and solar water heating. Unfortunately, funding is not easily accessible for small scale entrepreneurs as banks or funders want proven track. Additionally, in the political aspect, conflicts of interests may cause problems where influential people would rather have weak enforcements on unsustainable practices because they personally benefit from them. Lastly inadequate waste management systems and carbon emitting cars that contribute greatly to urban pollution are significant issues that need to be addressed along with strengthening water conservation.

Youth Perspective and Concluding Remarks

As Malawi transitions toward cleaner energy and a more sustainable economy, raising awareness of greenhouse gas emissions and their impact on climate change is vital. Youth, as the leaders of tomorrow, must be at the forefront of this shift. By driving grassroots advocacy, adopting green technologies and promoting sustainability within their communities, young people can play a pivotal role in shaping the future. Enhancing energy efficiency across industries, transportation, and households will not only reduce environmental footprints but also improve energy security. Governments can support these efforts by offering subsidies for solar power installations and enforcing stringent energy efficiency regulations to accelerate the adoption of greener practices.

The agricultural sector, which significantly contributes to deforestation, water usage, and greenhouse gas emissions, must adopt sustainable practices such as organic farming, regenerative agriculture, and agroforestry. These methods can minimize environmental impacts while ensuring food security. Additionally, promoting local food production and managing food waste can further strengthen sustainability within Malawi's food system, making it more resilient to future challenges.

Youth Green Hubs which will be community-driven innovation hubs that offer guidance, resources and training to young people interested in green technology, sustainable agriculture and renewable energy should be established. In addition to providing practical skill development, these hubs would act as incubators for young people-led businesses that prioritize environmentally friendly solutions. These might give young innovators the handson assistance they need to grow their ideas and enterprises by tying them into public programs and private sector investments.



Diagram 3. Source: Journal of Cleaner Production, Lin et al (2024)

A shift toward a circular economy; emphasizing recycling, reusing, reducing and repurposing materials could drastically cut waste and reduce dependence on finite natural resources. Designing products for longevity and reparability, along with regulations



holding producers accountable for proper disposal, will foster a more sustainable production-consumption cycle. Investments in green infrastructure, such as energy-efficient buildings, electric vehicles and nature-based solutions like parks and wetlands, can reduce carbon emissions while enhancing biodiversity and improving urban resilience to climate impacts.

It will be necessary to train the workforce in renewable energy, sustainable agriculture and advanced green technology in order to support the shift to a green economy. The commercial sector and the Malawian government can start training courses and frequent conferences to provide workers the skills they need to prosper in the rapidly changing green economy. Annual conferences like the National Energy Conference may provide a forum for exchanging ideas and best practices, keeping employees and businesses at the forefront of the adoption of sustainable energy.

In conclusion, Malawi has to give strategic investments in infrastructure, policy enforcement and education top priority if it is to make a smooth transition to a green economy. We can create the conditions for a more sustainable and prosperous future by encouraging public-private partnerships, increasing community involvement and using innovative solutions. A wealthy and affluent future. Youth, policymakers, and business players must be actively involved in bringing about this shift in order to benefit not just individual countries but also the international effort to slow down global warming.

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PROJECT TITLE

Green Economy Transition in **Maldives**

PARTICIPANT NAME :

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2. Doaa Rafeq Al Alimi
3. Dana Hassan Alhammadi
4. Bashayer Ahmed Alyammahi

Introduction

Country Name	Maldives
Continent	Asia
Population	601,269 (2024)
Climate Type	Tropical climate.
Primary Energy Consumption per Capita	14,913 kWh (2024)
Primary Energy Consumption from Renewable Energy	No significant reported share / negligible contribution
Share of the population with access to electricity	100% (2023)
Per Capita CO2 Emissions	3.92 tonnes per person (2023)

Analysis of the Green Economy

Renewable Energy Status: Electricity generation has relied more on diesel, but the council aims for 33% renewables by 2028. Solar mini-grids and gable systems are expanding across islands, and large floating solar projects are underway. Current puncture, however, remains modest due to reliance on backup diesel and fragmented island grids. Scaling up will need storage solutions and enhanced infrastructure.

Electric Mobility: EV use is growing, primarily in the form of electric motorcycles and small vehicles in Malé and resort spaces. Pilot is charging stations working by the state utility STELCO, and solar-powered charging attempts exist, but their implementation is slowed by high makes costs, limited infrastructure, and island-specific road networks. Policies help EVs, but stronger tax motivation, and more charging rollouts are needed.

Energy Efficiency Measures: The Maldives showed appliance energy labels in 2015, reducing inefficient imports, and grid upgrades are planned to cut distribution low. Hulhumalé's made codes include more professional design, but nationwide, furnishing and professional incentives are limited. Progress is shown but uneven, particularly outside urban centres .

Smart City Initiatives: Hulhumalé, a planned smart city, is the flagship green urban project. It makes sustainable transport walkways, energy networks, and climate-resilient infrastructure. While promising, replicating Hulhumalé's model between smaller islands will require localized adaptations.

Green Financing: The Maldives has assembled significant donor and climate finance, including Green Climate Fund and World Bank projects. Some Innovative tools like the debt-for-nature switch and private investment in floating solar are emerging. However, local startups and SMEs still face obstruction because of limited concessional loans and complicated access details.

Government Incentives: The government has set renewable energy targets and aims for one third of its electricity to come from renewables. It runs programs that promote solar energy, waste reduction, and ecofriendly tourism, often in partnership with donors. While tax incentives are still limited, the government supports green projects through easier regulations, concessional loans, and technical help. Expanding these programs equally across all islands remains a key challenge.

Consumer Behavior: Awareness about sustainability is growing, especially among tourists who prefer eco friendly resorts and low carbon options. This has encouraged many hotels and resorts to adopt greener operations. Local consumers are also becoming more aware but still face challenges like higher prices and fewer sustainable products. More education and awareness campaigns could help promote greener lifestyles.

Waste Management and Recycling: Managing waste is one of the country's biggest issues because of its island geography. The government's new Waste Management Policy promotes recycling and has set up local waste centers, but logistics and costs make it difficult to manage waste efficiently. Some resorts handle their own waste, yet recycling at the national level is still limited. More private sector involvement and consistent implementation are needed.

Water Management: Water scarcity is a major concern. The Maldives uses desalination, rainwater harvesting, and groundwater recharge to secure water supply, supported by international funding. These projects have improved access, but operating costs remain high and maintenance is challenging. Investing in renewable powered systems and training local operators can make the system more sustainable.

Biodiversity and Conservation: The Maldives is rich in biodiversity, especially coral reefs and mangroves that support tourism and fisheries. The government's Biodiversity Strategy aims to protect these ecosystems through marine protected areas and partnerships with international organizations. Coral restoration and conservation projects are ongoing, but funding and enforcement still need improvement to ensure long term results.

Challenges and opportunities

SWOT Analysis

Strengths: - Rich natural resources (marine biodiversity, sun, wind) → strong potential for renewables and eco-tourism. - High dependency on tourism → incentive to maintain environmental sustainability. - Government commitment → Maldives was among the first to declare carbon neutrality goals. - Global visibility → Maldives often represents Small Island Developing States (SIDS) in climate discussions.	Weaknesses: - Limited land and freshwater resources → challenges in sustainable agriculture and energy storage. - High dependence on imported fossil fuels → vulnerability to price shocks. - Lack of skilled workforce in green tech and sustainability sectors. - Weak waste management systems and environmental regulations enforcement.
Opportunities: - International climate funding (e.g., Green Climate Fund). - Partnerships in clean energy & sustainable tourism with global stakeholders. - Blue economy development (fisheries, marine protection, ocean-based renewable energy). - Digital tools & smart tech for sustainable resource management.	Threats: - Climate change and sea-level rise → existential threat. - Global economic shocks affecting tourism. - Limited influence in global climate policy as a small nation. - Over-tourism and reef degradation from unsustainable practices.

PESTLE Analysis

Political	• Strong government commitment to climate action and green transition (goal of carbon neutrality). • Support from international organizations (e.g., UN, Green Climate Fund). • Political stability aids long-term planning, but there's high reliance on external aid and diplomacy. • Maldives is an active voice among Small Island Developing States (SIDS) in climate negotiations.
Economic	• Heavy reliance on tourism (around 28% of GDP), which is vulnerable to climate change and global crises. • High initial costs for green infrastructure and renewable energy transition. • Potential for green job creation and sustainable tourism. • Opportunity for foreign investment in renewable energy, waste management, and water systems.
Social	• Growing environmental awareness among locals and tourists. • Vulnerability of coastal communities to climate-related displacement. • Youth unemployment presents an opportunity for training in green skills. • Importance of integrating local communities and preserving cultural heritage in green policies.
Technological	• Opportunities for solar energy expansion, water desalination, and smart waste management. • Limited local technical expertise and infrastructure. • Dependence on international cooperation for technology transfer. • Digital tools and smart systems can support sustainable resource management.
Legal	• Existing environmental policies and renewable energy targets in place. • Gaps in enforcement and regulatory capacity. • Need for updated legal frameworks to attract green investments. • Importance of integrating sustainability into national planning and legislation.
Environment	• High exposure to climate change threats (sea level rise, coastal erosion, coral bleaching). • Rich marine biodiversity and ecosystems at risk. • Need for urgent sustainable management of water, waste, and energy resources. • Opportunities for eco-tourism and marine conservation projects.

Analysis findings:

Together, the SWOT and the PESTLE analysis show strengths and weaknesses in developing a green economy for the Maldives. The country has positive solar and wind power potential and is supported by a government with a strong dedication to becoming carbon neutral. Politically, the Maldives is also advantageous since it is an engaged member of Small Island Developing States (SIDS), bringing in international attention and climate dollars. On the other hand, the economy is still vulnerable to fluctuations in international prices because of excessive dependence on foreign fossil fuels, and lack of proper technical capabilities and proper management of wastes is development-inhibiting. These findings suggest that the Maldives will have to maximize international cooperation and blue economy potential to finance green projects. Shifting to sustainable infrastructure and renewable energy is not just required in a bid to attain climate goals but also needed to protect the economy and future of the country against rising sea levels and climate risks.

Youth Perspective and Concluding Remarks:

Transitioning to a greener economy in the Maldives requires youth-led innovation, inclusive collaboration, and transparent governance. Insights from global sustainability programs and the capstone analysis show that the Maldives faces two major challenges: high vulnerability to climate change and a strong dependence on imported fossil fuels. However, the country also has great potential to become a global leader in sustainable island development through renewable energy, blue economy growth, and youth empowerment. From a youth perspective, advancing this transition hinges on three interconnected pillars: education and capacity building, innovation in resource management, and strategic partnerships for inclusive growth.

1. Green Skills and Education Reform:

A significant hurdle remains due to the lack of local expertise in renewable energy and sustainability. Creating a National Green Skills Pipeline would help integrate climate education and environmental literacy from schools to universities and vocational programs. Offering specialized courses in solar photovoltaic (PV) installation, electric mobility, waste-to-energy technologies, and coral reef restoration would prepare young Maldivians for emerging green jobs. Partnering with international organizations like the World Bank and the Green Climate Fund could improve technical training and connect education with practical applications, tackling youth unemployment and skill gaps.

2. Innovation and Practical Resource Management:

Youth-led innovation can effectively address some of the Maldives' urgent issues—waste management and water scarcity. A Decentralized Green Innovation Fund could offer microgrants and low-interest loans to youth startups working on island-specific sustainability solutions. Projects might include compact, solar-powered recycling units for remote islands, community rainwater harvesting apps, or digital tools for marine conservation. Creating "Island Innovation Hubs" in schools, universities, and local councils would further encourage collaboration and co-develop practical, tech-based solutions. These efforts not only boost environmental performance but also foster entrepreneurship and strengthen community resilience.

3. Strategic Partnerships and Transparent Governance:

The Maldives' path to sustainability needs coordinated actions among government agencies, private resorts, NGOs, and youth-led organizations. Forming multi-stakeholder partnerships can embed corporate sustainability practices into local community projects—especially in waste reduction, energy transition, and coral restoration. Additionally, improving transparency in managing national environmental funds, including the Green Fund and Green Tax revenues, is vital. Public reporting and youth oversight committees could ensure funds are used effectively for local ecosystem protection and community climate initiatives.

Finally, creating a National Youth Green Innovation Network would institutionalize youth involvement in policy development and monitoring of the NDCs. This platform would give young people a voice in climate strategies and connect them to regional and global sustainability networks.

By equipping youth with green education, financial resources, and leadership roles, the Maldives can turn vulnerabilities into strengths. The goal of becoming a resilient, carbon-neutral island nation depends on the creativity, cooperation, and dedication of its youth—transforming today's environmental challenges into opportunities for sustainable growth.

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PROJECT TITLE

Green Economy Transition in **Mauritania**

PARTICIPANT NAME :

1. Mohamed Elhabib Diallo
2. Aissa Moussa Lam

COUNTRY REPRESENTED:

Mauritania

Introduction

Country Name	Mauritania
Continent	Africa
Population	5 million (2023 projection)
Climate Type	Desert and semi-arid climates with Saharan, Sahelian, and coastal zones
Primary Energy Consumption per Capita	Not explicitly stated; heavily reliant on fossil fuels but transitioning to renewables
Primary Energy Consumption from Renewable Energy	Current renewable energy share is 30% from wind and solar, with a target of 60% by 2030
Share of the population with access to electricity	48% (2022)
Per Capita CO2 Emissions	-

Mauritania, located in West Africa, is a country of high potential in renewable natural resources, particularly solar and wind energy. With a population of approximately 5 million inhabitants (2023 estimate), nearly half of whom lack access to electricity, the country faces significant challenges in energy and sustainable development. Transitioning to a green economy is therefore crucial to meet growing energy needs while preserving the environment. The country has adopted a national strategy aimed at reducing its greenhouse gas (GHG) emissions by at least 92% by 2030 in conditional. To achieve this goal, Mauritania plans to increase the share of renewable energies in its energy mix to 60% by 2030. This aligns with the Nationally Determined Contributions (NDCs) of 2021 under the Paris Agreement on climate.

Mauritania benefits from abundant sunlight, making it an ideal candidate for solar energy development. Projects like the Toujounine solar power plant, which can produce 50 MW, already illustrate the country's efforts in this area. The country has also invested in wind farms, with an installed capacity reaching 30 MW in 2015. These renewable energy sources are not only sustainable but also reduce emissions from fossil fuels. Mauritania is positioning itself as a future key player in the production and export of green hydrogen, with projects aimed at leveraging its renewable resources to meet European and North American markets.

Although access to electricity doubled to 48% in 2022, it remains crucial to extend access to rural and nomadic populations who are often left behind. Developing adequate infrastructure is essential to integrate renewable energy solutions and ensure efficient electricity distribution throughout the country. Attracting affordable capital to finance renewable energy projects is vital to achieve the country's ambitions for an energy transition.

The energy transition represents not only an environmental necessity but also an economic opportunity and growth. By developing sustainable energy solutions, Mauritania can create jobs particularly green jobs for, improve effective of its mining sector, and strengthen its position in international markets through the export of green hydrogen and Liquefied Natural Gas (LNG). Mauritania has considerable assets to lead an energy transition towards a greener economy. By capitalizing on its natural resources and implementing effective policies, the country can not only enhance energy access but also make a significant contribution to combating climate change while stimulating its economic development.

Mauritania primarily exhibits a desert climate (Köppen classification: BWh) with regional variations. The country is characterized by (see figure 1):

Saharan Climate: The northern part of the country is dominated by the desert, with temperatures often exceeding 40°C during the summer months.

Sahelian Climate: The southern region has a more humid climate, featuring a short rainy season that typically occurs between July and September.

Coastal Zone: The coastal region, including the capital Nouakchott, experiences a semi-arid climate influenced by sea breezes.



Fig 1 : Mauritania country card

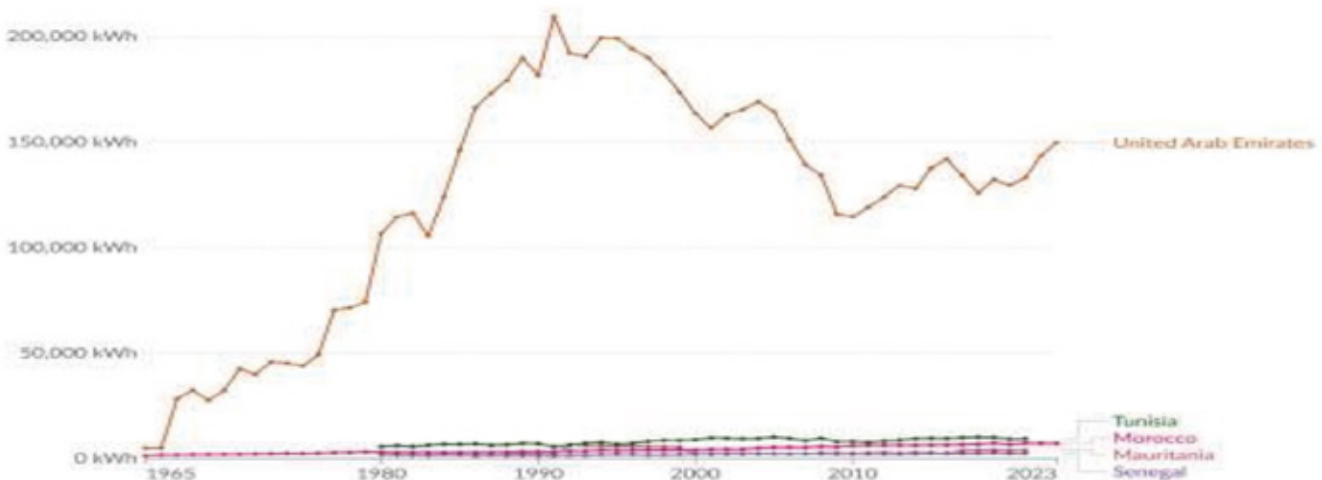
(source

:https://www.researchgate.net/publication/273786157_Malaria_in_Mauritania_Retrospective_and_prospective_overview?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6Ii9kaXJlY3QiLCJwYWdlIjoieX2RpcmVjdCJ9fQ)

Energy use per person

Measured in kilowatt-hours¹ per person. Here, energy refers to primary energy² using the substitution method³.

Our World
in Data

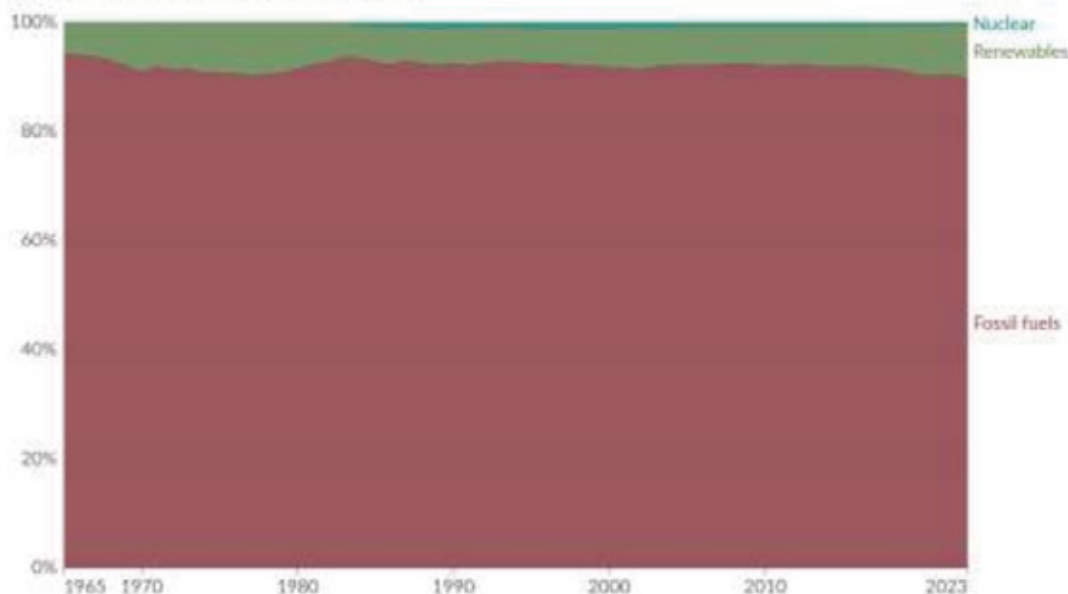


Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2024); Population based on various sources (2023).
OurWorldinData.org/energy | CC BY

Fig 2: Energy use per person in Mauritania compared with other countries

Primary energy consumption from fossil fuels, nuclear and renewables. Africa

Primary energy¹ is based on the substitution method². Renewables include hydropower, solar, wind, geothermal, wave and tidal, and bioenergy, but not traditional biofuels.



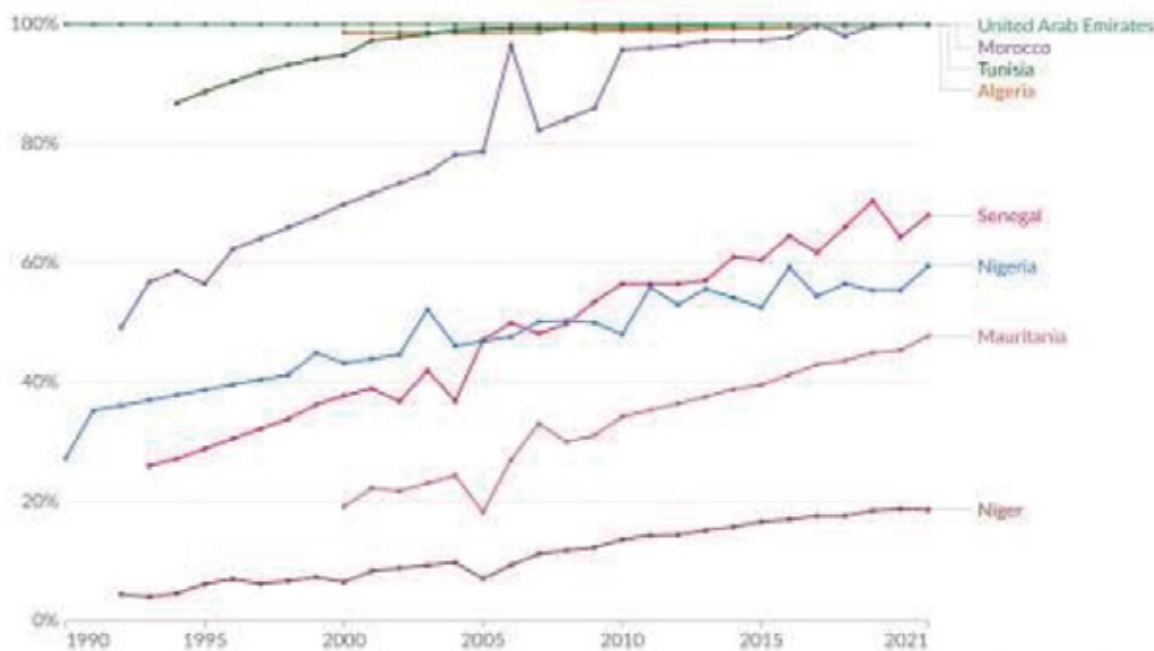
Data source: Energy Institute - Statistical Review of World Energy (2024)

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Figure 3 : Primary energy consumption from fossils fuels, nuclear and renewables. Africa

Share of the population with access to electricity

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.



Data source: Data compiled from multiple sources by World Bank

OurWorldinData.org/energy | CC BY

figure 4 : Share of the population with access to electricity in Mauritania compared with other Africans countries

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land-use change is not included.



Data source: Global Carbon Budget (2023); Population based on various sources (2023)
OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

Figure 5 : CO₂ emissions per capita in Mauritania compared with others countries

Analysis of the Green Economy in Mauritania

The funds secured by Mauritania for its energy transition reflect a significant commitment to developing renewable energies, primarily through projects supported by international financial institutions. In 2022, Mauritania signed agreements with the African Development Bank (AfDB) totaling \$289.5 million. These funds are allocated to two key projects:

Electricity Interconnection Project (PIEMM): This project aims to establish a 225 kV electrical interconnection between Mauritania and Mali, facilitating electricity transport and integrating associated solar power plants.

Rural Electrification Project (RIMDIR): With a budget of \$16 million, this initiative focuses on rural electrification in 40 localities by installing hybrid mini photovoltaic power plants.

Initiatives by UNDP and IRENA : The United Nations Development Programme (UNDP) and the International Renewable Energy Agency (IRENA) also support Mauritania in its efforts to enhance access to sustainable energy. These initiatives aim to demonstrate the viability of renewable energy solutions and attract further investments.

Mauritania has set several ambitious objectives in its national energy transformation strategy, such as increasing the share of renewable energies (Green Hydrogen, solar, and wind). While the country has made significant progress in mobilizing funds for its energy transition, several challenges remain:

- **Dependence on Foreign Funding:** Mauritania relies heavily on external resources to finance its climate actions, necessitating diversification of funding sources.
- **Energy Infrastructure:** Developing an interconnected infrastructure is crucial for ensuring efficient distribution of electricity produced from renewable sources.

The funds acquired by Mauritania for its energy transition demonstrate a strong commitment to sustainable development and improving energy access. Through partnerships with international institutions and a clear strategy focused on renewable energies, the country is on track to achieve its energy objectives while contributing to the fight against climate change.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: • Abundant Natural Resources: Mauritania has significant potential in renewable energies, including solar, wind, and hydroelectric, as well as substantial gas reserves • Government Commitment: The country has adopted a national strategy aiming to increase the share of renewable energies to 60% by 2030 and to reduce its greenhouse gas emissions by at least 92% • Economic Growth: Mauritania is experiencing a period of economic growth, which can facilitate investment in energy infrastructure	Weaknesses: • Limited Access to Electricity: Although access to electricity has doubled in recent years, around 50% of the population still lacks access, particularly in rural areas • Insufficient Infrastructure: Energy infrastructure remains underdeveloped and requires significant investment to improve access and reliability of services. • Institutional Challenges: The lack of institutional capacities, resources and institutional arrangements to effectively regulate the energy sector hinders the implementation of policies.
Opportunities: • Foreign Investments: Mauritania is attracting international interest for its green hydrogen and renewable energy projects, which could stimulate economic and technological development • Sustainable Development: The energy transition provides an opportunity to enhance energy efficiency in the mining sector, which is energyintensive and represents a significant portion of the economy. • Universal Energy Access: The deployment of renewable energies could enable universal access to electricity, thereby improving the quality of life for rural populations.	Threats: • Climate Change: The impacts of climate change, such as droughts and floods, can affect the availability of water and energy resources. • International Competition: The rise of other countries in the renewable energy sector could reduce Mauritania's competitiveness in the global market • Political and Economic Instability**: Political uncertainties may hinder the investments needed to support the energy transition

PESTLE Analysis

Political	Mauritania has implemented ambitious policies to guide its energy transition. The government is committed to reducing greenhouse gas (GHG) emissions by at least 92% by 2030 and increasing the share of renewable energies to 60% in its energy mix. However, political instability and institutional challenges may hinder the effective implementation of these policies. A strong regulatory framework and effective institutions are crucial to support these initiatives
Economic	The Mauritanian economy is heavily reliant on extractive sectors, particularly oil and gas, which account for a significant portion of government revenue. Transitioning to renewable energies could diversify the economy and reduce this dependence. However, the rate of access to electricity remains low, especially in rural areas (approximately 45% in 2019). Developing energy infrastructure is essential to stimulate economic growth and create jobs
Social	The energy transition has significant social implications. Mauritania is experiencing rapid urbanization, with a growing young population that requires increased access to energy. Initiatives aimed at integrating women and youth into the transition process are essential to ensure that the benefits are shared equitably. Programs such as the National Gender Institutionalization Strategy aim to promote equity in development

Legal	The legislative framework in Mauritania needs to evolve to support the energy transition. Recent laws have been adopted to guide investments and promote the use of renewable energies. However, the country must strengthen its institutional capacities to effectively implement these laws and ensure transparency in the management of energy resources
Technological	The energy transition in Mauritania is characterized by a strong commitment to harness renewable resources, particularly solar, wind, and green hydrogen. The country has launched several significant projects, such as the Sheikh Zayed solar power plant and green hydrogen initiatives, including the Aman project, which aims to produce ten million tons of green ammonia annually. These projects leverage advanced technologies and seek to diversify the national energy mix, which is expected to reach 60% renewable energy in the coming years. However, Mauritania must overcome major challenges, such as developing the necessary infrastructure to integrate these new energy sources, attracting funding to support these initiatives, and training a skilled workforce.
Environmental	Mauritania faces significant environmental challenges, particularly related to climate change and desertification. Sustainable management of natural resources is essential to minimize negative environmental impacts. Transitioning to renewable energy sources could help mitigate these effects while addressing the growing energy needs of the population.

In conclusion, the energy transition in Mauritania presents both significant opportunities and considerable challenges. An integrated approach that considers political, economic, social, legislative, technological and environmental dimensions is essential for successfully achieving this transformation.

Perspectives and Insights from Youth

We as Young Leader in Mauritania, We should play an increasingly significant role in the energy transition by adopting innovative initiatives and actively engaging in renewable energy projects. More and more Mauritanian youths are choosing to get involved in renewable energy efforts, such as solar parks and biogas systems. These initiatives reflect a heightened awareness of environmental issues and a desire to contribute to the country's energy sustainability.

For example, young Mauritanian entrepreneurs are developing biomass-based solutions to produce methane gas from waste, providing a clean energy source while also addressing waste management challenges.

We are aware of Mauritania's natural assets, particularly its solar and wind potential. We recognize that harnessing these resources is essential for reducing CO2 emissions and combating climate change. While motivated, We face challenges such as limited access to modern technologies and financing to develop our projects. The high cost of energy storage systems remains a major barrier to the expansion of renewable energy in Mauritania.

There is an urgent need for training programs to enhance our technical skills in the renewable energy sector. Raising awareness about the importance of the energy transition is also crucial for mobilizing greater community engagement.

The energy transition is viewed as a significant opportunity to create green jobs, particularly for youth. We need projects led by us and for us. Youth aspire to inclusion in decision-making processes". We aspire to be included in decision-making processes regarding energy and environmental policies. Our active participation is vital to ensure that implemented solutions meet local needs and promote sustainable development.

We are not only aware of the challenges related to the energy transition, but We are also ready to act as agents of change. By overcoming barriers related to funding and training, We can play a key role in developing a sustainable energy future for the country. Institutional support and inclusion in decision-making processes will be critical to maximizing our impact.

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PROJECT TITLE

Green Economy Transition in **Mexico**

Introduction

Country Name	Mexico
Continent	North America
Population	130.9 million (2024)
Climate Type	Tropical, Temperate, Desert/Steppe & Mountainous.
Primary Energy Consumption per Capita	17,654 kWh (2024)
Primary Energy Consumption from Renewable Energy	8.25% (2024)
Share of the population with access to electricity	99.7% (2023)
Per Capita CO2 Emissions	8.22 tonnes per person (2023)

Analysis of the Green Economy

1. **Renewable Energy Status:** What is the current contribution of renewable energy sources to the national energy grid? What targets or initiatives exist to expand these contributions?

As of 2024, Mexico generated 22% of its electricity from renewable sources, including solar (8%), wind (10%), and biomass. Although this represents an increase from 12% in 2013, it remains below the global average of 32% and the Latin American average of 62%. The country's government has set a target of achieving 35% clean energy by 2024, reflecting its commitment to international climate agreements. However, a recent rollback of supportive policies has raised concerns about future growth in the sector, with limitations placed on new installations. Moreover, the integration of battery storage requirements for new solar and wind projects indicates a shift towards enhancing grid reliability and efficiency.

2. **Electric Mobility:** How prevalent are electric vehicles (EVs) and related infrastructure (like charging stations) in your country? What policies support or hinder their adoption?

Electric vehicle (EV) adoption in Mexico has surged, with a 187% increase in the light electric vehicle fleet from 2022 to 2024, reaching approximately 444,071 units. The number of public EV charging stations has grown from 100 in 2015 to over 42,000 by the end of 2024, demonstrating substantial infrastructure development. However, this infrastructure is concentrated in urban areas like Mexico City, Monterrey, and Guadalajara, leaving rural regions underserved. The National Electric Mobility Strategy aims to facilitate further growth, though inconsistent policies and insufficient incentives pose challenges to broader adoption.

3. **Energy Efficiency Measures:** What measures are in place to improve energy efficiency in buildings, industries, and transportation? How effective have these measures been to date?

Mexico has implemented various energy efficiency measures across different sectors. In buildings, initiatives include the adoption of efficient lighting, improved thermal insulation, and smart technologies, which have the potential to reduce greenhouse gas emissions by 17% by 2035. The industrial sector is subject to environmental regulations that promote sustainable operations, although compliance remains a challenge. The National Strategy for the Electricity Sector (2024-2030) emphasizes increasing renewable energy use and capacity generation, enhancing overall energy efficiency.

4. **Smart City Initiatives:** Are there any ongoing or planned smart city projects? How do they integrate sustainable practices or technologies?

Several Mexican cities, including Mexico City, Guadalajara, and Monterrey, are leading the way in smart city initiatives that integrate sustainable practices. For instance, Mexico City is implementing an advanced traffic management system using IoT and AI to reduce congestion and emissions. Smart city projects focus on enhancing public transportation, promoting green mobility, and utilizing technology to optimize urban resource management. The National Digital Strategy

supports the development of digital infrastructure, aiming to foster a knowledge economy that aligns with sustainability goals.

5. **Green Financing:** What financial instruments or incentives are available to support green projects? How accessible are these funds for startups and established companies?

Financial instruments supporting green projects in Mexico have evolved, especially after the closure of the National Entrepreneur Institute (INADEM), which previously provided crucial support to startups. Alternative financing options, including the National Program for Financing Microentrepreneurs (PRONAFIM) and private investment funds, continue to emerge. Additionally, green bonds and loans have gained traction, aligning with the government's Sustainable Financing Mobilization Strategy aimed at supporting environmentally friendly projects. Despite progress, access to funding remains uneven, particularly for startups.

6. **Government Incentives:** What incentives does the government offer to encourage businesses and consumers to adopt greener practices?

The Mexican government offers various incentives to encourage businesses and consumers to adopt greener practices. Programs like PRONAFIM provide favorable credit conditions for micro-enterprises, while the Technological Innovation Fund (FIT) supports technological advancements in small and medium enterprises. Recent tax incentives, including accelerated depreciation for investments in sustainable assets, aim to stimulate green investments.

7. **Consumer Behavior:** How aware and engaged are consumers in your country regarding sustainable practices and products?

Mexican consumers are increasingly aware of sustainability issues, with many expressing a willingness to pay more for environmentally friendly products. However, economic factors and price sensitivity remain significant barriers to widespread adoption of sustainable goods. Awareness campaigns and educational initiatives are vital for enhancing consumer engagement in sustainable practices.

8. **Waste Management and Recycling:** How effective are the waste management and recycling systems in handling industrial, commercial, and residential waste?

Mexico's waste management systems face challenges amid rising urbanization. While recycling initiatives have gained momentum, illegal dumping and ineffective waste collection persist. The government is working to improve solid waste management through regulatory frameworks that promote recycling and sustainable practices. Partnerships with organizations like the World Bank aim to enhance waste management and recycling efforts.

9. **Water Management:** What strategies are in place for sustainable water management, particularly in agriculture and urban settings?

Sustainable water management strategies in Mexico focus on integrating new technologies and promoting decentralized systems. The 2024-2030 National Water Plan aims to ensure equitable access to water while enhancing infrastructure and promoting water reuse technologies. Urbanization intensifies competition for water resources, necessitating data-driven solutions for effective management.

10. **Biodiversity and Conservation Efforts:** What are the major initiatives for biodiversity conservation and how are they being implemented?

Mexico has made major progress in biodiversity conservation through its National Biodiversity Strategy and Action Plan (NBSAP), first adopted in 2000 and now being updated along six strategic lines focusing on knowledge, conservation, sustainable use, and governance. The National Commission for the Knowledge and Use of Biodiversity (CONABIO) has expanded these efforts by promoting State Biodiversity Strategies, with 22 states participating and several already implementing their plans. Despite these advances, Mexico faces rising CO₂ emissions and plastic waste, posing challenges to achieving SDGs 13, 14, and 15. To address environmental pressures, the government supports green startups through seed and venture capital funding, encouraging sustainable production and innovation. Additionally, initiatives using data-driven water management aim to balance agricultural and urban needs, linking biodiversity protection with climate resilience.

Challenges and opportunities

SWOT Analysis

Strengths: - Expanding EV Market: EV sales grew 80% between 2022 and 2024, with more than 15,000 new electric cars in 2024. Public charging points rose to over 3,300 by 2023. - Energy Efficiency Measures: Buildings are adopting efficient lighting, thermal insulation, and smart technologies; industries are subject to environmental laws requiring monitoring and reporting of emissions. - Increasing private capital opportunities for eco-friendly projects due to global warming threats. - Certain maturity in the green startup sector. - Increasing entrepreneurial initiatives.	Weaknesses: - Policy Inconsistency: National Electric Mobility Strategy lacks detailed implementation guidelines, and incentives for EVs and renewable projects are inconsistent across regions. - Standardization Issues: Inconsistent charging technology standards hinder integration and create uncertainty for manufacturers and users. - The Government is no longer playing a central role after the closure of INADEM - Low share of venture and seed capital goes to green financing. - Lack of financial instruments tailored explicitly for green startups.
Opportunities: - EV Market Growth: Rural and intercity charging infrastructure represents a major growth opportunity for public-private partnerships and private investment. - Smart City Expansion: Scaling successful pilot projects (IoT traffic systems, Ecobici) to other urban centers and integrating circular economy principles could amplify environmental benefits. - Mexico's international commitment for the reduction of CO2 emissions enforces the government to enact laws that will attract capital into green startups. - Private investors have more interest in funding, compared to the government. - Global warming stimulates the demand for green startups in the country.	Threats: - Technological Fragmentation: Lack of standardization (especially in EV charging) could increase costs for consumers and slow mass-market adoption. - Economic Constraints: Macroeconomic pressures (inflation, fiscal limits) may reduce government capacity to fund green programs and subsidize innovation. - Green investment is expensive and less profitable in the short-run; thus, most of the startups may fail to sustain. - Despite Mexico's international commitment for the reduction of CO2 emission, the government is fostering hydrocarbon promotion by investment in oil refineries and relevant extractive industries.

PESTLE Analysis

Political	Mexico has integrated sustainable development strategies into its 2025–2030 National Development Plan, with a particular focus on environmental sustainability (BBVA Research, 2025).
Economic	Economically, Mexico has demonstrated potential for growth in green industries, supported by international collaboration and green financing mechanisms like sustainability-linked bonds. Despite these advancements, the nation faces obstacles such as limited budgets for green stimulus policies and a lack of cohesive strategies in its [National Development Plan] (https://greeneconomytracker.org/country/mexico). Socially, the green economy intersects with efforts to address inequality, particularly through programs promoting green jobs and sustainable practices in agriculture and forestry.
Social	Socially, the green economy intersects with efforts to address inequality, particularly through programs promoting green jobs and sustainable practices in agriculture and forestry.

Technological	Technological innovation is a key driver of Mexico's green economy, with advancements in renewable energy technologies and digital infrastructure offering new opportunities. However, the sector requires stronger policy support and investment to fully realize its potential.
Legal	Legally, Mexico's commitment to international agreements like the Paris Agreement underscores its dedication to sustainability, but inconsistencies in policy implementation and legal disputes, such as the Greenpeace Mexico court case, highlight areas for improvement.
Environment	Environmentally, Mexico's rich biodiversity and natural resources are both an asset and a responsibility. The country's efforts to restore degraded lands, conserve protected areas, and promote sustainable resource management are integral to its green economy. However, challenges such as climate change, deforestation, and water scarcity necessitate a more robust and integrated approach.

Analysis findings:

Mexico's green economy shows strong potential, driven by rapid EV market growth, rising private investment, and expanding energy efficiency initiatives. However, inconsistent policies, limited financing for green startups, and weak government coordination hinder progress. Opportunities lie in strengthening public-private partnerships, scaling smart city projects, and leveraging Mexico's international climate commitments to attract sustainable investments. Yet, risks such as economic instability, technological fragmentation, and continued fossil fuel investments threaten long-term momentum.

From a PESTLE perspective, Mexico's political commitment and international cooperation provide a supportive foundation, while social programs promoting green jobs enhance inclusivity. Technological innovation offers major growth prospects, but regulatory and financial constraints persist. Environmental assets, including rich biodiversity, require stronger protection and integrated management. Overall, improving policy coherence, expanding green finance, and reinforcing institutional capacity are essential to accelerate Mexico's transition toward a resilient and sustainable green economy.

Youth Perspective and Concluding Remarks:

As global experts have emphasized, youth are *"drivers for change"* in achieving climate goals and play a pivotal role in accelerating the transition to a greener, fairer economy. From a youth perspective, the challenges facing Mexico's green transformation also present profound opportunities for our generation to innovate and lead. We inherit a world shaped by today's choices and it is imperative that young people are empowered to design, implement and sustain solutions that drive both environmental and social progress. Drawing on insights gained through the Global Green Economy Young Leaders Program, we offer the following recommendations to mobilize youth potential for Mexico's transition toward a resilient, inclusive green economy.

Green Education and Skills Development

Education lies at the heart of any long-term green transition. Mexico must integrate sustainability and climate awareness into all levels of education, from primary schools to universities and vocational centers. This involves updating curricula to focus on renewable energy systems, environmental science, circular economy principles and sustainable entrepreneurship. Initiatives like *Green Generation MX* demonstrate the effectiveness of combining academic knowledge with hands-on experience through partnerships between schools, government and private industry. Scaling such programs nationwide (through STEM scholarships, technical training in solar and wind installation and electric-mobility maintenance) can build a workforce equipped to drive the clean energy revolution. Youth participants consistently highlight the need for capacity-building programs and environmental education to ensure sustainability becomes a core competency of Mexico's future labor force.

Empowering Youth Innovation and Entrepreneurship

Mexico's young innovators need greater access to funding, mentorship and institutional support to transform their ideas into market-ready solutions. Re-establishing green startup funds or seed-grant programs (similar to the former INADEM) would close a critical gap in early-stage financing for environmentally focused ventures. Partnerships between government, venture capital firms

and incubators can provide seed capital, technical guidance, and exposure to international investors. The impact of youth-led innovation is already visible: initiatives such as UNESCO-Nestlé's 2024 seed-funding program have supported projects in climate-smart agriculture, digital education and circular-economy solutions. Expanding such mechanisms would enable thousands of young entrepreneurs to launch solutions in renewable energy, sustainable transport, waste recycling and water efficiency, converting environmental challenges into engines of inclusive growth.

Community Engagement and Grassroots Action

Transformational change begins locally. Empowering youth to lead sustainability initiatives in their communities can build environmental consciousness from the ground up. Activities such as urban gardening, recycling drives, tree-planting or clean-up campaigns foster responsibility and collaboration while addressing pressing urban challenges. Social media and digital storytelling can amplify these efforts, encouraging behavioral shifts across broader audiences. To sustain engagement, small-scale funding, competitions and recognition programs for student eco-clubs and green volunteers should be introduced. By turning awareness into tangible community action, youth can help normalize sustainable lifestyles and promote collective accountability.

Youth Participation in Policy and Partnerships

To ensure lasting impact, youth must be included in Mexico's environmental decision-making. Establishing a *Youth Advisory Council on Climate and Green Economy* would institutionalize intergenerational dialogue and allow young voices to contribute directly to policy design. Incorporating youth representatives into existing frameworks (such as Mexico's National Climate Change Council) would strengthen transparency and accountability. Furthermore, the government should align policy incentives with climate justice and intergenerational equity, for instance by phasing out fossil-fuel subsidies and redirecting funds toward renewable energy and green education. Expanding strategic partnerships among government agencies, universities, private companies and international organizations would also provide young people with training, internships and innovation platforms that bridge the gap between ambition and implementation.

Conclusion

Empowering youth through education, innovation, community participation and inclusive governance is not just an investment in the future (it is the foundation of Mexico's sustainable transformation). Our creativity, technological fluency and commitment to justice make us indispensable allies in tackling the climate crisis. By enabling young people to co-design and lead the nation's green transition, Mexico can ensure that sustainability is not only a goal but a shared legacy, one that secures prosperity for both present and future generations.



PROJECT TITLE

Green Economy Transition in **Morocco**

PARTICIPANT NAME :

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2. Meera Nawaf Aljneibi
3. Reem Yousif Almansoori

COUNTRY REPRESENTED:

Morocco

Introduction

Country Name	Morocco
Continent	Africa
Population	38 million (2024 projection)
Climate Type	Semi-arid and desert climate
Primary Energy Consumption per Capita	5,800 - 7,000 kWh per year
Primary Energy Consumption from Renewable Energy	37% (2023), target of 52% by 2030, and 80% by 2050
Share of the population with access to electricity	Nearly 100% (2022)
Per Capita CO2 Emissions	2.0 tons per capita (2023)

Morocco is located in North Africa estimated 38 million people living there in 2024 [3]. The country made strides in improving energy accessibility. According to the data depicted in the chart, fewer, than half of Morocco's inhabitants had access to energy sources in 1992. Subsequently, there was a growth trend between 1995 and 2007 with the percentage of people with electricity nearing coverage by 2022. The government's focus and investments in energy sources such as wind and solar power played a role, in achieving this remarkable progress. Morocco's commitment, to achieving energy self sufficiency and promoting practices has led to improved quality of life, for its citizens by boosting development and making electricity more accessible.



Figure 1: Access to electricity percent of population - Morocco[4]

Morocco is a country that suffers a lot from climate change, as it now has higher temperatures and more frequent droughts, which jeopardize its capacities of agriculture and available water. The United Nations Development Programme (UNDP) claims that the country is implementing and planning to implement a number of measures that would harness these effects, among them improving water management and developing especially agriculture. The Kingdom has adopted domestic policies consistent with these international commitments and will help reduce some greenhouse gas emissions while creating national climate change resilience policies. Essential for the sustainable development, these measures are important in relation to the challenges of climate change. [5]

In recent history, Morocco is on a developmental path in an attempt to adopt more foremost renewable energy sources. As per transaction to descriptions by 2023, renewable energy sources comprise about 37% of Total Primary Energy Use in that Country. It has been stated by the government of Morocco that by the year 2030 this target should reach 52% and that this will be achieved mainly through the development of solar and wind energy facilities. One of the projects that underline the will of Morocco towards renewable energy is probably the largest of its kind in the world the Noor Solar Complex in Ouarzazate. On the other hand, the desire to secure these benefits must contain new sources of energy as a renewable energy shift is critical to prolong economic growth in developing countries. [6]



Figure 2: Renewable energy consumption in Morocco (1965-2023)

Primary Energy Consumption per Capita:

Energy use Per Person Measured in kilowatt-hours per person. Here, energy refers to primary energy using the substitution method. In kilowatt-hours (kWh), Morocco's primary energy consumption per capita is approximately 5,800 to 7,000 kWh per person annually as shown in Figure 3 & 4. This is the equivalent of the 0.5 to 0.6 tons of oil equivalent (TOE) converted to kWh (1 TOE $\approx$ 11,630 kWh).

Country/area ↓	↑↓ 1965	↑↓ 2023	↑↓ Absolute Change	↑↓ Relative Change
Morocco	1,327 kWh	7,169 kWh	+5,842 kWh	+440%

Figure 3 : Primary energy consumption per Capita in kWh per person for Morocco[1]



Figure 5: Energy use per person chart for Morocco(kWh)[1]

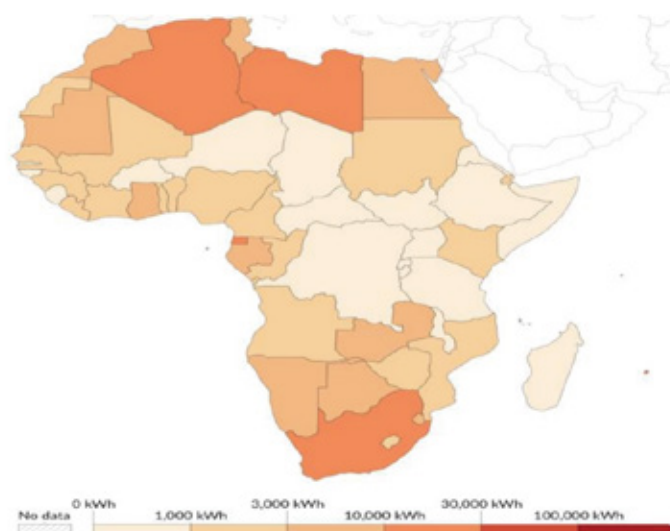


Figure 4: Energy use per person map for Morocco in kWh[1]

Per Capita CO2 Emissions:

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included. Per capita CO₂ emissions in Morocco are approximately 2.0 tons per person annually. This is relatively low compared to the global average but is increasing as the country develops and consumes more energy. This reflects the country's efforts to manage emissions while growing its economy.

Country/area ↓	↑↓ 1928	↑↓ 2022	↑↓ Absolute Change	↑↓ Relative Change
Morocco	0.0 t	1.8 t	+1.8 t	+39,364%

Figure 6: Annual CO₂ emissions per Capita in tonnes per person for Morocco[2]



Figure 8:

Per Capita CO₂ emissions chart for Morocco in tonnes[2]

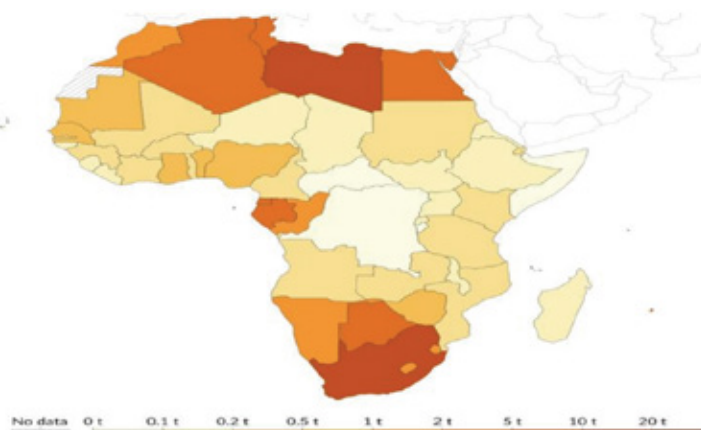


Figure 7:

Per Capita CO₂ emissions map for Morocco in tonnes[2]

1.2 Analysis of the Green Economy

Renewable Energy Status

Morocco is making strides, towards achieving energy self sufficiency and decreasing its dependency on fuels by focusing on energy sources like solar and wind power as key components of sustainable growth in the nation's development efforts. Morocco holds promise for utilizing wind energy resources which has prompted the government to launch ambitious projects such, as the Noor solar power plant[7]. One of the biggest solar facilities worldwide. Furthermore, Morocco is actively embracing wind power as part of its energy investments. In 2022, Morocco energy sector made strides. It represented 38 percent of the nations installed capacity at 4,031 MW predominantly sourced from sources. Wind energy played a role accounting for 1,430 MW or 13.48% of the capacity. Another key contributor was generating 1,771 MW or 16.70% of the total capacity. Solar energy had the share. Still contributed 830MW making up 7.82 % of the total[8]. Morocco aims to increase its energy share, in electricity production from 20 percent to 52% by 2030 and further to 80% by 2050[9].



Figure 9: Noor Midelt II CSP project[10]

2. Electric Mobility:

The emergence of Electric vehicle (EVs) and related infrastructure in Morocco seems to show a growing inclination towards a less polluting and more portable way of commuting in 2023. Up to date, the well-established EV industry is still small in comparison to countries who have more experience, but plans are underway to enhance the station charging points especially within the cities and major highways, and these can have a considerable impact on the achievement of the goals outlined. However about 1000 such infrastructure developments are estimated to exist in any of the countries but most of them are based in major towns. By 2026, it plans to install more than 2000 more charging stations in Morocco. Within the context of its broader agenda on developing renewable energy, the Moroccan government has been particularly promoting the use of the electric vehicles in order to cut down the carbon emissions. There is also a tendency to remove tariffs on the importation of EVs despite the fact that this can be targeted at importation incentives which are still low. The use of electric cars is still high limited due to factors like the cost of these cars, the failure to meet the demand with regard to the inspirational stations and the need for more education. There is a gradual shift towards encouraging cleaner and electrical forms of transportation in Morocco, but these needs some measures to be addressed. [11-13]



Figure 10: I-Smart: electric vehicle charging[14]

Energy Efficiency Measures:

Morocco has designed measures with the aim of promoting energy efficiency in the transport, industrial, and residential edifices. There are energy efficiency codes and asset rehabilitation programs in place in buildings to cut down consumption levels. The industries are supported with energy audits, and encouragement to adopt energy efficient technologies is provided. The principal tasks in transport are to encourage the use of electric cars, as well as, create and renew public transport. Owing to these efforts, energy consumption and emissions have made a remarkable decrease. [15-17]

Smart City Initiatives:

Particularly in the cities of Rabat and Casablanca, Morocco is embarking on smart city projects at a breakneck speed. The aim of this effort in Casablanca is to improve urban services using data analytics technology, smart lighting, effective traffic management, and population safety enhancement. In respect of weighty infrastructural facilities, Rabat is more inclined towards improving the energy efficiency of the grid and the transportation network and making use of smart grids and alternative energy resources. These projects are implemented with the goal to enhance the quality of life in cities as well as promote sustainability through reducing energy consumption and cutting down emissions. Morocco has made a commitment that, by 2026, there would be six cities that would have smart city capabilities. It began, in 2016, with the City of Casablanca, Aerodrome and still has the towns of Marrakech, Rabat, Tangier, Ifrane and Fez yet to complete the project. Benguerir is also part of the Green City project which focuses on resource efficiency and green construction. These smart city projects are in conformity with the broader ambitions of Morocco to deploy technology for smarter sustainable development and consequently, more liveable places for its population. [18-20]



Figure 11: The Green City of Benguerir[21]

Green Financing:

In a bid to create a transition to a more sustainable economy, Morocco has sought to enhance green financing mechanisms. The country has introduced several financial products including green bonds which played an important role in the funding of renewable energy projects such as solar facility as well as energy-efficient buildings. Up till early 2020 five green bonds which cost around \$417 million were issued in Morocco with the participation of local and foreign entities including the European Bank for Reconstruction and Development EBRD, and the European Union. Such funds are available to through the Green Economy Financing Facility GEFF, which provides loans to local banks to finance green initiatives by SMEs and start-ups. To make sure that these funds are utilized correctly, Morocco has established a robust governance structure via the Moroccan Capital Markets Authority (AMMC). The regulatory framework for such economic instruments as green bonds issued obliges the customers of the bonds to complete projects that are green, and this has raised the concerns of regulatory bodies in Africa. While Morocco continues to strengthen its position as the innovative hub of the region, incorporating green financing, an increasing number of start-ups and established companies have access to these funds. [22]

Government Incentives:

To motivate companies and consumers towards greening their business and consumption behavior, the Moroccan government provides some measures of support. These include the tax preferences, the grants, and the public private partnerships (PPPs), especially in relation to the renewable energy and energy efficiency sectors. One of the banners is represented by the funding of large concentrated solar power and wind power projects offered by Masen (Moroccan Agency for Sustainable Energy). These developments are frequently supported by international financial organizations and aim to attract private funds by providing fixed rates for renewable energy producers through feed-in.[22] Among consumers, the government initiated informational campaigns and financing that is designed to enhance the uptake of energy efficiency and renewable energy technologies, such as solar photovoltaic (PV) systems. However, issues persist in extending these programs beyond urban centers to rural populations where awareness has been poor and infrastructure is very low. In addition, the government encourages the usage of electric cars (EVs), abolishing tax and lowering import duties, however, emobility is still suffers from the absence of its enabling infrastructure. [23]

Consumer Behavior:

The level of participation by consumers in sustainable practices in Morocco is on the rise, that is more in urban areas where there is a better understanding of the environmental concerns. Campaigns led by the government, NGOs, and other international bodies have increased the depth of knowledge regarding issues related to sustainability particularly with regard to energy use, waste and eco-friendly products. This rising consciousness has been translated into a growing appetite for renewable solutions including solar panels for rooftop as well as energy efficient equipment.

Nonetheless, there are still obstacles, especially in rural areas where poverty and poor information provision hamper the uptake of green practices. Morocco isn't immune to these trends as global warming concerns become a more urgent concern for citizens more of the increasingly younger Moroccan consumers tend to purchase greener products. This change in attitude is encouraging businesses to keep up with the demands of sustainability standards. [22]

Waste Management and Recycling:

In Morocco, waste management and recycling are improving but still face challenges. The country has made efforts to modernize its waste management system, especially in big cities, with more organized waste collection and disposal services.

Residential Waste: There are systems in place to collect and dispose of household waste in most urban areas. However, in rural areas, these systems are less developed, and waste management can be inconsistent.

Industrial and Commercial Waste: For businesses and factories, Morocco is working to improve how they handle waste, but there are still gaps, especially in controlling hazardous and industrial waste. Some industries don't follow strict waste disposal practices.

Recycling: Morocco has launched recycling initiatives, including some efforts to recycle plastics, paper, and metal. However, the recycling rate is still low, and there's a need for more public awareness and infrastructure.

Overall, while Morocco has made progress in waste management and recycling, there is still room for improvement in making the systems more efficient, widespread, and ecofriendly.

Water Management:

In Morocco, water management is a big challenge due to its limited water resources and periods of drought. The country has put strategies in place to use water more efficiently, especially for agriculture (which uses most of the water) and in cities. Here's a simple breakdown:

Agriculture: Morocco uses a lot of water for farming. To save water, the government promotes more efficient irrigation methods, like drip irrigation, which delivers water directly to plant roots. This helps reduce water waste and increase crop yield.

Dams: Morocco has built many dams to store water and manage its supply during dry seasons. These dams are important for providing water to both farms and cities.

Urban Water Management: In cities, the government is improving water infrastructure to reduce leaks and waste. They're also working on water recycling using treated wastewater for things like landscaping or industrial use, which helps save fresh water for drinking.

Desalination: Morocco is building desalination plants that turn seawater into freshwater, especially in areas where water is very scarce.

In short, Morocco is focusing on efficient irrigation, dams, and desalination to manage its water sustainably, but the growing demand and climate change continue to be challenges.

Biodiversity and Conservation Efforts:

In Morocco, biodiversity and conservation efforts aim to protect the country's unique wildlife and natural habitats. Morocco is home to a variety of ecosystems, including forests, mountains, deserts, and coastal areas, which are under threat from things like climate change, deforestation, and pollution. Here are some major initiatives:

Protected Areas and National Parks: Morocco has created national parks and protected areas to preserve important ecosystems and species, such as the Atlas Mountains, SPuss-Massa, and Toubkal National Parks. These areas help safeguard endangered species and plant life.

Conservation Programs: Morocco runs breeding programs for endangered species, like the Barbary macaque (a type of monkey) and the bald ibis (a rare bird), to help boost their populations and prevent extinction.

Reforestation: To combat deforestation and desertification, Morocco is working on reforestation projects, planting trees in areas where forests have been damaged. This helps restore habitats and improve soil quality.

Marine Conservation: There are also efforts to protect marine biodiversity along Morocco's coastlines. Projects focus on preserving coral reefs and marine life by regulating fishing practices and reducing pollution. In simple terms, Morocco is protecting its natural heritage by creating national parks, saving endangered species, replanting forests, and protecting marine life. However, more work is needed to fully address the threats to its biodiversity.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: • The availability of useful solar and wind resources. • Strong political willingness focused towards renewables. • Assistance from international partners and green financing.	Weaknesses: • Heavy reliance on petroleum products. • Poor development of renewable energy and EV electric charging infrastructure.
Opportunities: • Possibility of emerging as an electricity exporter based on renewable energy resources. • Increased interest by investors in green technologies	Threats: • Vulnerability to the ups and downs of the world energy market. • Water shortages and political tensions in the region.

PESTLE Analysis

Political	Morocco presents itself as a stable political environment, fully supported by its government in the renewable energy sector, specifically the 2009 Energy Strategy, which enhances energy supply chains through the use of renewables and favors the use of policies that cut energy dependence through incentives. [24]
Economic	The country is still broadly dependent on external assistance for its energy needs; however, it is anticipated that renewable energy investments will cut costs in the medium and long term and bring in foreign capital in the solar and wind energy industries. [25]
Social	Green energy projects have enhanced electricity supply in rural communities and received positive feedback from the citizens. However, further awareness creation on sustainability is necessary in order to enable people to participate more. [24]
Technological	Even if Morocco is advancing with capacities of solar and wind technology, there remain some issues related to the storage of energy and interrelationship with the grid system, which are essential in achieving targets of renewable energy. [26]
Legal	Investment prospects in renewable energy in Morocco have been boosted by laws that provide for tax breaks, fiscal regimes, and subsidies. Agencies such as MASEN, relevant to project development, also enforce such policies. [24]
Environmental	Morocco is on track with the global bulge on embracing renewable energy policies; however, California's weather is warm and cold period, coupled with a serious water shortage in the region, presents serious concerns, especially with water for energy. [25]

Analysis findings

The SWOT and PESTLE tools emphasize how effective Morocco is in developing its green economy. On the political level, there's support from the Government towards renewable energy development backed by the 2009 Energy Strategy. On the economic side, it is unavoidable to note that there is a dependence on external

assistance; investments in solar and wind are projected to bring costs down and therefore bring in foreign investments. On the social side, having improved the rural electrification rate through green projects, there seems justification for raising the public interest further. On the technological side, even though solar and wind capacity has improved, there are still constraints in the energy storage and grid interconnections market. On the legal level, there are also existing laws and incentives that create positive development scenarios for investments. From the ecological point of view, it has been noted that water scarcity is a serious threat. In the SWOT analysis, the presence of solar and wind is a strength while the dependency on petroleum is identified as a weakness. Second, growing markets, where Morocco can function as a renewable energy hub, opportunities that have emerged include establishing itself as an exporter of renewable energy whilst threats include market fluctuations and political sports.

Youth Perspective and Concluding Remarks

To support Morocco's transition to a greener economy, youth play a pivotal role in driving innovation, advocacy, and community involvement. First, focusing on expanding renewable energy projects like solar and wind power is essential to reducing Morocco's dependency on fossil fuels and mitigating the impact of climate change. Youth-led initiatives can promote green entrepreneurship, encouraging startups that offer sustainable solutions in sectors such as energy, waste management, and agriculture. Furthermore, enhancing electric mobility by supporting the development of electric vehicle infrastructure and incentivizing the adoption of cleaner transportation can significantly reduce carbon emissions.

Water management remains a critical challenge in Morocco, and young leaders can promote the adoption of efficient irrigation methods, water recycling, and desalination to combat water scarcity. Integrating environmental education into school curriculums will raise awareness about sustainability and empower future generations to make eco-friendly decisions. Additionally, smart city initiatives, which focus on using data and technology to improve energy efficiency, traffic management, and public safety, should be a key focus for youth advocating for more sustainable urban development.

Partnerships between government, private sectors, and international organizations will be crucial in achieving these goals. By encouraging cross-sector collaborations, youth can help create a unified approach to addressing climate challenges. In this way, young Moroccans can act as catalysts for innovation and action, ensuring that sustainable practices become central to the country's future economic and social development.

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PROJECT TITLE

Green Economy Transition in **Mozambique**

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COUNTRY REPRESENTED:

Mozambique

Introduction

Country Name	Mozambique
Continent	Africa
Population	32 million (2023)
Climate Type	Humid tropical with hot, humid and cool, dry seasons
Primary Energy Consumption per Capita	Relatively high, mostly from hydro and bioenergy
Primary Energy Consumption from Renewable Energy	Hydropower dominant; solar and wind growing. Around 25% of energy-related emissions are from hydropower.
Share of the population with access to electricity	31.49%
Per Capita CO2 Emissions	0.2 tons per capita

Mozambique is a country located on the African continent with a predominantly humid tropical climate, with a hot and humid season (between November and March) and a cool and dry season (from April to October), with a population of approximately 32 million inhabitants. According to the Global Climate Risk Index (GermanWatch, 2021), Mozambique was ranked as the country most impacted by extreme weather events in 2019. The data shows that Mozambique has relatively high emissions per capita of 0.2 tons. And a percentage of the population with access to electricity:31.49%. Mozambique's energy potential is vast and is not limited to coal or natural gas. Mozambique has large rivers with enormous potential for energy production. It has strong and constant winds near the sea and in the high regions of the interior. It has sunshine throughout the country. It has forests, rice fields, palm groves and extensive areas with excellent conditions for the production of sugar cane. It has hot springs with water at high temperatures. All of these renewable sources can be converted into energy. Mozambique is already one of the largest producers of renewable energy in the Southern African Development Community (SADC) region. The Cahora Bassa Hydroelectric Power Plant, with its 2,075 MW, is one of the largest hydroelectric plants on the African continent and the country's main source of electricity generation. Solar energy, in hundreds of decentralized projects, already brings energy to millions of Mozambicans in rural areas.

1.2 Analysis of the Green Economy

Mozambique has great potential for the use of renewable energy sources, given its abundant natural resources. The country is endowed with large rivers that allow for the generation of hydroelectric power, as well as promising potential for solar and wind energy. Hydropower, which accounts for the majority of electricity generated in the country, is responsible for around 25% of energy-related emissions. One of the government's main goals is to increase the share of renewable sources in the national electricity grid, including the development of large solar and wind projects and the promotion of the use of bioenergy. The aim is to align the development of these sources with the goals of the Paris Agreement and the National Development Strategy, promoting sustainable and low-carbon economic growth.

However, the prevalence of electric vehicles (EVs) in Mozambique is still low. The government is committed to creating policies that encourage the transition to more sustainable mobility, such as tax incentives for the import of EVs and investments in electric charging infrastructure. However, the lack of adequate charging stations and the high cost of EVs hinder their large-scale adoption.

Furthermore, Mozambique has been working to develop financial mechanisms to support green projects, especially in renewable energy and climate change adaptation. These include international partnerships, access to the Green Climate Fund, and frameworks such as the REDD+ Strategy, which aims to conserve forests and reduce emissions. However, these financing mechanisms are still difficult to access, especially for startups. The government has been working to create adequate financing conditions and increase investment in green infrastructure, aiming to attract private capital and international support.

Regarding waste management, the country still faces significant challenges, especially in urban areas. In 2015, waste emissions were estimated at around 1 million tons of CO₂e, most of which came from unmanaged landfills in large cities such as Maputo, which account for 83% of total emissions from the sector. Projections indicate that by 2050, waste emissions could quadruple,

driven by population growth and urbanization. Despite some improvements, the waste management system in Mozambique still lacks efficiency, with limited recycling and waste treatment infrastructure still underdeveloped. Sustainable water management is a growing concern, especially in relation to subsistence agriculture and the impact of climate change on access to water. Inefficient land and water use contributes to greenhouse gas (GHG) emissions in the agricultural sector. Strategies are being developed to improve irrigation and mitigate soil degradation.

Biodiversity conservation is also a priority, with initiatives focused on preserving forests and mitigating land-use degradation. Net emissions associated with agriculture and land use accounted for around two-thirds of the national total in 2015, with deforestation being a major contributor. To mitigate these impacts, the government is implementing measures under the Nationally Determined Contribution (NDC) and its 2020-2025 Operationalization Plan, which include promoting sustainable agricultural practices, reforestation and restoration of degraded lands.

In the energy sector, the National Energy Fund (FUNAE) seeks to expand solar and hydropower in rural and isolated areas, with ambitious capacity targets by 2050. EDM's Integrated Master Plan projects the expansion of solar and wind power to meet up to 20% of domestic demand by 2043.

Although the use of carbon capture and storage (CCS) technologies is considered an option to mitigate emissions from large industrial facilities, high costs and challenges limit its application. However, the Rovuma basin presents adequate storage potential for CCS. In agriculture, soil conservation practices and the use of organic fertilizers, aligned with the National Strategic Plan for Agricultural Development, are key to reducing emissions and improving productivity. Agroforestry and ecosystem restoration initiatives are planned to capture carbon, preserve habitats, and increase coastal resilience.

These mitigation efforts have the potential to create around 240,000 green jobs by 2050, with investments largely directed towards the energy sector. Thus, the Mozambican government's actions to mitigate climate change have focused on implementing policies that promote adaptation and emissions reduction in key sectors such as energy, agriculture, forestry and infrastructure, aiming at sustainable and inclusive development.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: Abundance of resources such as natural gas, coal, minerals and biodiversity. And, fertile soil and favorable climatic conditions for sustainable agriculture	Weaknesses: Limited roads, energy and basic services hinder economic development; Economy heavily based on agriculture and resource extraction, vulnerable to price fluctuations.
Opportunities: Potential to expand solar, wind and hydroelectric energy; Attracting foreign investment and collaborating with NGOs and international institutions; Potential to promote ecotourism and environmental conservation.	Threats: Risks of internal conflicts and instability that can affect investment and economic growth; Vulnerability to extreme weather events that can impact agriculture and infrastructure

PESTLE Analysis

Political	Mozambique has faced periods of political instability and conflict, which can negatively impact investment and market confidence; The government has committed to sustainable development initiatives and policies that promote the green economy, although actual implementation varies; The presence of NGOs and international agencies that support sustainability projects can positively influence the green economy
Economic	Despite the difficulties, Mozambique has potential for economic growth, especially in sectors such as energy and sustainable agriculture; The economy is heavily dependent on agriculture and resource extraction, which can be an obstacle to diversification; Attracting foreign direct investment (FDI) in sustainable projects is an opportunity, but instability may discourage such investments
Social	Growing awareness of environmental issues among the population can lead to greater demand for sustainable products and practices; Poverty and inequality are significant challenges that affect access to sustainable products and services; Changing consumer preferences towards environmentally friendly products can boost the green economy.
Technological	Advances in renewable technologies such as solar and wind power present opportunities for the green economy; the lack of adequate technological infrastructure can limit the implementation of innovative solutions. Partnerships with research institutions and universities can promote innovation in sustainable technologies.
Legal	Protecting property rights can encourage investment in green technologies and sustainable practices; Adherence to international agreements on climate change and sustainability can bring additional benefits and requirements to the country; Compliance with environmental standards and the implementation of laws that favor sustainability are essential for the green economy.
Environmental	Mozambique has a rich biodiversity, which can be preserved and enhanced through sustainable practices; The country is vulnerable to extreme weather events, such as droughts and floods, which impact agriculture and natural resources; Conservation initiatives and sustainable management of natural resources are crucial for the development of the green economy

Analysis findings

Mozambique has great potential to develop a green economy, with abundant natural resources and market opportunities. However, it faces significant challenges, such as inadequate infrastructure and dependence on traditional sectors. Investments in education, infrastructure and strategic partnerships are essential to capitalize on the opportunities and mitigate the threats the country faces.

The Government of Mozambique has also implemented policies to ensure that national infrastructure, such as roads and sanitation systems, is more resilient to climate change. Investment in sustainable infrastructure, especially in areas vulnerable to natural disasters, is part of the mitigation and adaptation strategy. These actions demonstrate Mozambique's commitment to addressing the challenges of climate change and adopting solutions that promote sustainable development and environmental protection. However, the success of these initiatives largely depends on international financial support and cooperation between the public and private sectors.

Youth Perspective and Concluding Remarks

The transition to a greener economy requires the engagement of all parts of society, and young people play a key role in this process. By participating in the Global Green Economy Leaders Program, we have gained a deep understanding of key topics such as Sustainability Leadership, Green Skills, Green Finance, Green Economy, Green Cities, Green Technology and Green Energy. Based on these learnings, we present below some practical recommendations to promote a greener economy in our country:

First, it is crucial to encourage educational initiatives focused on green skills. Developing green skills in the areas of technology, finance and energy should be a priority to prepare future generations for sustainable careers. This can be done by integrating green economy concepts into school curricula and technical training programs. Initiatives such as workshops and practical training can empower young people with the tools and knowledge they need to contribute to the ecological transition.

Furthermore, encouraging green entrepreneurship can create new sustainable business opportunities. Young entrepreneurs should be empowered with access to green finance, such as low-interest loans for sustainable startups. This financing would enable the creation of businesses that utilize greener technologies, such as solar energy, regenerative agriculture, and waste recycling, boosting the local economy while mitigating environmental impacts.

Community participation is another key element in the successful transition to a green economy. Projects that directly involve communities in the creation and maintenance of local initiatives, such as urban gardens and recycling programs, can generate not only environmental benefits, but also social benefits, such as job creation and improved quality of life.

Finally, strategic partnerships between governments, businesses and NGOs are essential to scaling these solutions. Creating collaborative networks that share resources and knowledge will accelerate the implementation of sustainable practices and ensure that solutions are inclusive and comprehensive.

Young people can push for policies that prioritize sustainable urban mobility. Encouraging the use of bicycles, electric public transport and shared vehicles can reduce pollution in cities. Promoting carpooling initiatives among students and workers also helps reduce the carbon footprint; Creating and using digital platforms to encourage more conscious consumption, facilitating access to sustainable and fair trade products. This includes apps that connect consumers with small local producers or sustainable businesses, promoting responsible consumption. Finally, a practical and easy-to-implement recommendation is to adopt and promote a culture of waste reduction, whether in the use of water, energy or products. Participating in recycling campaigns, reusing materials, and encouraging the purchase of sustainable products among friends and on social networks can have a significant impact.

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PROJECT TITLE

Green Economy Transition in **Nepal**

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Introduction

Country Name	Nepal
Continent	Asia
Population	30,147,000
Climate Type	Subtropical monsoon, temperate mountain, alpine, and sub-freezing climates at higher elevations.
Primary Energy Consumption per Capita	1,935 kWh (2023)
Primary Energy Consumption from Renewable Energy	3.10% (2023)
Share of the population with access to electricity	94% (2023)
Per Capita CO2 Emissions	0.56 tonnes per person (2023)

Analysis of the Green Economy

- Renewable Energy Status:** Nepal's electricity mix is overwhelmingly renewable, with hydropower supplying roughly 98–99% of grid generation; solar and wind are still small contributors. This gives Nepal an almost fully renewable electricity profile but creates seasonal vulnerability (low river flows in dry months). The government is pursuing rapid capacity expansion (plans aiming toward tens of GW over the next decade), stronger diversification (more solar and storage) and institutional reforms under the GRID program; including the Second GRID Development Policy Credit (US\$100 million) to improve green instruments, irrigation, forest management and waste systems.
- Electric Mobility:** EV adoption has surged in recent years: imports and sales of EVs rose sharply, and reporting indicates roughly ~400 public charging stations (concentrated in urban areas) with plans to expand the network. The government has used tax/import duty incentives and preferential fiscal measures to accelerate EV uptake, and has set ambitious targets (high shares of new vehicle sales to be electric by 2030). Key constraints remain: charging coverage outside cities is limited, heavy-duty and public-transport electrification (buses, trucks) lags, and affordability/vehicle variety are still hurdles. Overall, policy has been strongly supportive but infrastructure and fleet-level measures need scaling.
- Energy Efficiency Measures:** Nepal runs formal EE programmes (e.g., Nepal Energy Efficiency Programme - NEEP) and donor-supported projects like Building Energy Efficiency in Nepal (BEEN) promoting climate-responsive design, efficient appliances, lighting and industrial motor upgrades. Implementation has produced successful pilot results (public buildings, appliance programmes), but national impact is limited by weak enforcement of standards, scarce long-term financing/incentives for large-scale retrofits, and incomplete monitoring frameworks. Strengthening institutional capacity and creating scalable finance mechanisms remain priorities to translate pilots into economy-wide savings.
- Smart City Initiatives:** The government has proposed multiple “smart city” and new-town projects (commonly cited: Lumbini, Nijgadh, Bharatpur and others; reports list plans for around a dozen+ smart cities). These plans explicitly include digital governance, smart mobility, waste management and green urban design components. Most projects are still in planning or early stages; their sustainability impact will depend on finance; local governance capacity and how well digital solutions are paired with resilient infrastructure and community inclusion.
- Green Financing:** Nepal has recently moved to formalize green finance: Nepal Rastra Bank published a national Green Finance Taxonomy (2024) to guide banks and investors, and multilateral lenders (World Bank, ADB) provide DPOs, credit lines and project finance for renewables, water and waste. That said, access for SMEs and startups remains constrained by collateral needs, co-financing requirements and risk appetite of local banks. Policymakers and donors are prioritizing

instruments like credit lines, technical assistance, guarantee schemes and (emerging) green-bond possibilities to improve inclusion; but more targeted guarantee/seed instruments would help scale private-sector participation.

6. **Government Incentives:** Nepal's transition to a green economy is supported by policy incentives. The Government, with help from the World Bank, implemented the Green, Resilient, and Inclusive Development (GRID) framework to help implement sustainability into different sectors. The Second GRID Development Policy Credit (2024) devoted 100 million US Dollars to improve green instruments, improve irrigation systems, enhance sustainable forest management, and improve solid waste systems. These actions include the introduction of Green Tax, incentives for electric vehicle import, and measures to promote private investment in low-carbon development (World Bank, 2024).
7. **Consumer Behavior:** Public awareness and participation in green practices is increasing in Nepal. A study by Shrestha et al. (2023) showed that environmental worry, perceived quality, and the willingness to purchase influenced Nepalese individuals' decisions to buy green products. Affordability and access are also shaping purchase behaviour. There is an increased interest in youth in environmentally friendly and organic goods and items which is a sign of a shift to sustainable consumption.
8. **Waste Management and Recycling:** Waste management is one of Nepal's main environmental issues. Research says that less than 10% of total solid waste is being recycled, while urbanization is increasing landfill pressure (Subedi et al., 2023). Studies stress that a circular economy approach is extremely important to help with waste reduction and loss of resources, this can be done through segregation of waste at its source, recycling facilities, and strict enforcement and implementation (Labra Cataldo et al., 2024).
9. **Water Management:** Water Security and Sustainability is major to Nepal's green growth journey. The Asian Development Bank (2023) is supporting Nepal's initiatives for green development and water security by financing integrated water resources management and climate resilient infrastructure. However, there are challenges such as uncontrolled groundwater extraction activities and droughts.
10. **Biodiversity and Conservation efforts:** Biodiversity protection is a huge part of Nepal's sustainability agenda. The National Biodiversity Strategy and Action Plan (2018) mentions targets for ecosystem restoration, community forestry, and the expansion of protected areas which cover more than 23% of the country. There are issues such as climate stress and habitat disruption that threaten species diversity, emphasizing the importance of long-term funding and conservation programs.

Challenges and opportunities

SWOT Analysis

Strengths:

Nepal possesses abundant renewable energy resources, primarily hydropower, solar, and biomass, which provide a strong foundation for sustainable growth. The country's rich biodiversity and extensive forest cover (around 45% of total land area) create opportunities for eco-tourism and carbon-credit generation. Additionally, Nepal's growing policy focus on green development through frameworks such as the Green, Resilient, and Inclusive Development (GRID) initiative demonstrates strong institutional commitment to sustainability (World Bank, 2024).

Weaknesses:

Despite these strengths, Nepal faces limitations such as insufficient infrastructure, low industrial diversification, and limited green financing mechanisms. The lack of advanced technology and skilled labor restricts large-scale adoption of renewable energy. Moreover, the dependence on traditional biomass energy sources (over 60% of total consumption) hinders progress toward cleaner alternatives (WECS, 2024).

Opportunities:

There is high potential for foreign investment and public-private partnerships in clean energy, sustainable agriculture, and eco-innovation. Expanding green jobs for youth and integrating sustainability into the education system could support long-term development. Additionally, international climate funding (e.g., from the Asian Development Bank and World Bank) provides strong backing for infrastructure modernization and low-carbon projects (ADB, 2023).

Threats:

Nepal remains highly vulnerable to climate change, including glacial melt, floods, and droughts, which threaten agriculture and water resources. Political instability and policy inconsistency can slow project implementation. Urbanization without proper waste and land-use management also poses risks to sustainable development (Subedi et al., 2023).

PESTLE Analysis

Political	Nepal's government has adopted several green policies such as the GRID framework and Nationally Determined Contributions (NDCs) aligned with the Paris Agreement. However, frequent changes in political leadership and bureaucratic inefficiency can delay project execution.
Economic	The green economy presents major growth potential through renewable energy and eco-tourism. Yet, the country faces high unemployment and dependency on remittances, limiting local investment capacity. Sustainable financing from global institutions is therefore crucial for progress.
Social	Public awareness of environmental issues is increasing, especially among youth and urban populations (Shrestha et al., 2023). Social acceptance of green products and lifestyle changes is improving, though rural populations still depend heavily on traditional fuels.
Technological	Nepal is in the early stages of adopting green technologies such as electric mobility, waste recycling, and smart irrigation systems. Lack of domestic research and limited access to modern equipment remain obstacles, but partnerships with universities and international donors are helping bridge the gap.
Legal	Environmental policies are governed by frameworks such as the Environmental Protection Act (2019) and the National Climate Change Policy (2019). Enforcement, however, remains weak due to limited institutional capacity. Strengthening regulatory compliance is necessary for long-term sustainability.
Environment	Nepal's geography makes it rich in natural resources yet prone to environmental hazards. Deforestation, water pollution, and solid waste accumulation threaten ecological balance. Expanding conservation programs and implementing circular economy models could help mitigate these risks (Labra Cataldo et al., 2024).

Youth Perspective and Concluding Remarks:

Nepali youth increasingly view the green economy transition not as a distant ideal but as an urgent pathway for their future. Through initiatives like Nepali Yuwa in Climate Action and Green Growth, young people are being empowered to act as change-makers, driving sustainable entrepreneurship, climate advocacy, and policy engagement. Projects such as GreenShift Nepal further mobilize youth in circular economy interventions, converting plastic waste into usable products, piloting zero-waste practices in municipalities, and fostering community activism.

However, youth confront structural barriers: limited access to green finance, lack of institutional support, and disconnects between educational curricula and green sector skills. Many young people feel constrained by high unemployment (19 % youth unemployment in Nepal) and see few green job opportunities locally. To make a real transition, young innovators emphasize the need for enabling policies, capacity building, mentorship, and equitable funding pipelines.

Youth also highlight the importance of education reform to include green economy themes, such as climate science, renewable energy, eco-entrepreneurship, and sustainable agriculture, in school and university curricula. Building green technical skills through vocational training would better align youth talent with emerging green jobs.

Moreover, young people urge stronger collaboration between local governments, private sectors, and youth-led organizations. Establishing innovation hubs, green business incubators, and climate action fellowships could accelerate this collaboration. Additionally, amplifying rural youth voices, especially those affected by climate change, is key to ensuring an inclusive green transition.

In conclusion, youth are not just stakeholders but essential architects of Nepal's sustainable future. Their vision, creativity, and energy must be integrated into national strategies for a green economy. If Nepal invests in its youth today, it invests in climate resilience, innovation, and long-term prosperity.

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PROJECT TITLE

Green Economy Transition in Nigeria

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COUNTRY REPRESENTED:

- Nigeria
- Ghana

Introduction

Country Name	Nigeria
Continent	Africa
Population	223 million (2023)
Climate Type	Tropical climate with wet (April to October) and dry (November to March) seasons
Primary Energy Consumption per Capita	2,548 kWh (2021), 0.74 tonnes of oil equivalent per capita
Primary Energy Consumption from Renewable Energy	Renewable energy target of 36% by 2030; currently 20% hydro, 80% thermal
Share of the population with access to electricity	55% overall (30% rural, 90% urban as of 2020)
Per Capita CO2 Emissions	0.64 tons per capita (2021)

Country Name: Nigeria

Continent: Africa

Population: Approximately 223 million (United Nations Populations report, 2023)

Climate Type: Nigeria has a tropical climate, characterized by two main seasons: the wet season (from April to October) and the dry season (from November to March).

Primary Energy Consumption per Capita:

Nigeria, Africa's most populous country and largest economy, plays a crucial role in the continent's energy landscape. Understanding Nigeria's primary energy consumption per capita is essential for assessing the country's energy efficiency, economic development, and progress towards a sustainable future. The total primary energy consumption in Nigeria reached about 2,548kWh as of 2021 with per capita primary energy consumption estimated at about 0.74 tonnes of oil equivalent (toe) per person, which is relatively low compared to global averages.

Primary Energy Consumption from Renewable Energy:

Nigeria faces significant challenges in meeting its growing energy demands. While the country is rich in fossil fuel resources, particularly oil and natural gas, there is an increasing focus on diversifying the energy mix through renewable sources. The country in 2006, initiated the Renewable Energy Master Plan with the objective of “increasing the power supply from renewable electricity (wind, solar, biomass, and small hydro) from 13% of total installed electricity capacity in 2015 to 23% in 2025 and 36% by 2030” (Power systems and renewable energy guide, 2023). Statistics have shown that Nigeria's on-grid energy mix constitutes 80% of thermal and 20% of hydro power generating sources (ibid). With the Sustainable Energy for All Action Agenda, the country aims to achieve 20% and 19% contribution from solar energy to the national grid by 2020 and 2030 respectively.

Share of the population with access to electricity:

The energy demand of Nigeria is a significant challenge. With a population exceeding 200 million and a generation capacity of approximately 35.7 thousand gigawatt-hours as of 2020, and a demand of 29 terawatt-hours, there still remains a gap. Statistics have shown that, as of 2020, access to electricity in Nigeria was limited to about 55% of the population. Rural communities had access to about 30% as compared to about 90% access in urban areas (Statista, 2024).

Per Capita CO₂ Emissions:

CO₂ emissions in Nigeria have been increasing gradually over the years, primarily due to its reliance on fossil fuels, deforestation, and gas flaring. In 2021, Nigeria's total CO₂ emissions were approximately 133 million metric tons, ranking as one of the largest emitters in sub-Saharan Africa. Despite this, the country's per capita emissions remain relatively low at around 0.64 metric tons per person, significantly below the global average of 4.5 metric tons per person. Fossil fuel consumption accounts for a large portion of Nigeria's emissions. According to CO₂ Emissions Sub-Saharan Africa (2021), Nigeria flared about 7 billion cubic meters of gas in 2021, emitting significant amounts of CO₂.

Analysis of the Green Economy

Nigeria is heavily reliant on non-renewable sources like oil and gas, which account for about 20% of the GDP. However, the country has abundant renewable resources, particularly solar, wind, and hydro. The government's National Renewable Energy and Energy Efficiency Policy targets increasing renewable energy contribution to 23% of electricity generation by 2025. Major projects including the development of solar farms and small hydroelectric plants are in progress.

One potential to the transition to a green economy is the development of Electric Vehicles (EVs), which is still in its infancy. The major challenges to this development are lack of infrastructure, high vehicle costs, and unreliable electricity supply. However, there are plans to introduce charging centers and mass electric transportation systems in major cities.

Nigeria energy consumption has been classified into three groups (industrial, residential, and street light consumption) (Oyedepo, 2012). Due to the country's inability to meet the power need of the population, there is a need for more efficient power management practices. In response, the country has implemented several measures to improve energy efficiency.

In transportation, Nigeria has made efforts to improve fuel efficiency standards and promote the use of cleaner fuels. Through the National Automotive Design and Development Council, the government has been working on implementing fuel efficiency standards for vehicles. Promotion of electric and hybrid vehicles are on course, with plans for more electric vehicle charging stations.

Nigeria has been at the forefront of smart city initiatives in Africa. The country Smart City Project was launched in 2017, with the aim of initiating "sound and actionable strategies for transforming Nigeria's major urban centers from traditional dysfunctional cities to modern, efficient, responsive ones capable of satisfying the needs of present and future generation of Nigerians" (Ogunseye et al., 2022, pp3).

To achieve this objective, cities such as Lagos and Abuja have set in motion the mechanisms towards actualizing this goal. Lagos launched its Smart City Project, in 2019 with the goal of connecting "human capital, social capital, and ICT infrastructure to address public issues, achieve sustainable development and increase the quality of life of citizens within the short possible time" (Ogunseye et al., 2022, pp4). The project is expected to leverage technology to improve urban living with development in key aspects such as e-government, safe city, mobility/WiFi/digital citizens, open data, smart farming/agriculture, smart buildings, and, smart grid/energy/utilities (ibid). Also, Abuja has also embarked on this initiative. The Abuja Technology Village is a planned smart city within Abuja, focusing on creating a technology hub that incorporates sustainable urban planning principles. To achieve sustainability, these smart city initiatives incorporate several green elements including; plans for integration of solar power in public lighting and buildings, the implementation of smart water metering systems to reduce waste and improve distribution, the incorporation of urban green spaces and vertical gardens in city planning and the promotion of electric vehicles and improved public transportation systems.

Several financial instruments are available to support green projects in Nigeria. These include green bonds, climate financing from international institutions, and governmentbacked loans specifically for renewable energy initiatives. Notably, the Nigerian Economic Sustainability Plan allocates funds for solar energy projects, including a US\$ 620 million scheme aimed at increasing access to electricity through solar home systems. To encourage green practices, the government offers a range of incentives including tax breaks for companies investing in renewable energy, subsidies for agricultural practices that promote sustainability, and support for research and development in eco-friendly technologies.

Awareness of sustainable practices among Nigerian consumers has been growing, fueled by increasing environmental education and the visibility of climate change impacts. Consumers are becoming more conscious of eco-friendly products such as the pay-

as-yougo solar home systems. However, the high cost of green products remains a barrier. There has also been campaigns to increase awareness in sustainable practices including the "Lagos Go Green campaign", "Cleaner Lagos Initiative" and others

Nigeria's waste management and recycling system faces significant challenges across residential, commercial, and industrial sectors due to inadequate infrastructure, weak regulation, and limited public awareness. In residential areas, only about 20-30% of the 32 million tons of waste generated annually is properly collected, with much of it ending up in open dumpsites or being burned, creating severe environmental and health risks. Many urban areas lack consistent waste collection services, particularly in informal settlements, which contributes to waste buildup and pollution. Recycling at the household level remains minimal, despite emerging initiatives like Wecyclers.

Commercial waste management is structured, particularly in cities like Lagos where private companies handle waste collection for businesses. However, many small enterprises either do not have access to regular collection services or fail to comply with waste disposal regulations, leading to illegal dumping. Recycling in the commercial sector remains low, with little innovation in this area.

Industrial waste management is the weakest sector, with many small and medium-sized industries failing to comply with regulations for the proper handling of hazardous waste. Larger industries, especially in manufacturing and oil production, tend to have better waste management systems due to stricter regulations, but enforcement is inconsistent. Recycling in this sector is also underdeveloped, despite initiatives like the Extended Producer Responsibility framework introduced by NESREA.

To improve waste management, Nigeria needs stronger regulatory enforcement, better infrastructure, and more public-private partnerships, alongside increased public awareness and recycling programs.

Nigeria's water management system faces significant challenges from population growth, urbanization, and climate change. Although the country has abundant water resources, only 61% of Nigerians have access to improved water sources, with rural access at just 43% (National Bureau of Statistics report, 2021). Agriculture is vital to Nigeria's economy, but it is heavily dependent on rain-fed systems. Of the 84 million hectares of arable land available, only 1.5 million hectares are irrigated, leaving the sector highly vulnerable to climate events such as droughts and floods. To address these issues, the government is expanding irrigation schemes like the National Irrigation Development Programme which aims to expand infrastructure and promoting water harvesting techniques to enhance water availability. Climate-smart agricultural practices and farmer training are also encouraged to help farmers optimize water use. In urban areas, water supply systems suffer from poor maintenance, with up to 50% non-revenue water loss (Federal Ministry of Water Resources report, 2017). Efforts to improve urban water management include; infrastructure upgrades, public-private partnerships, regulatory frameworks, and innovative technologies like real-time monitoring and GIS mapping.

Nigeria's diverse ecosystems, including mangroves and rainforests, host many endemic species. However, rapid urbanization, deforestation, pollution, and climate change threaten this biodiversity. The World Wildlife Fund ranks Nigeria among the top 10 countries with the highest biodiversity loss, resulting in habitat degradation and declining wildlife populations. To address biodiversity challenges, Nigeria has launched conservation initiatives in partnership with government agencies, NGOs, and international organizations. A key effort is the National Biodiversity Strategy and Action Plan, aligned with the Convention on Biological Diversity, focusing on sustainable management, ecosystem restoration, and integrating biodiversity into national policies. Protected areas like Yankari, Gashaka Gumti, and Cross River National Parks have been established, while community-based projects, such as the Wildlife Conservation Society, promote local involvement in conservation. Despite these efforts, challenges remain due to limited funding, weak law enforcement, corruption, and low public awareness. Illegal activities like logging and poaching persist, highlighting the need for stronger conservation policies, increased community involvement, better funding, and educational programs to protect Nigeria's biodiversity and ensure long-term sustainability.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Abundant renewable energy resources (solar, wind, hydro, biomass) - Large and growing population, providing a potential market for green products and services - Government commitment to renewable energy targets (e.g., Renewable Energy Master Plan) - Presence of international support and partnerships for green initiatives - Growing awareness and interest in sustainable practices among youth and urban populations	Weaknesses: - Heavy reliance on fossil fuels, particularly oil and gas - Inadequate infrastructure for renewable energy and green technologies - Limited access to financing for green projects - Insufficient skilled workforce in green technology sectors - Weak enforcement of environmental regulations
Opportunities: - Potential for job creation in renewable energy and green technology sectors - Increasing global demand for sustainable products and services - Possibility of leapfrogging to newer, cleaner technologies - Growing interest from international investors in green projects - Potential for improved energy access in rural areas through off-grid renewable solutions - Emerging carbon credit markets	Threats: - Political instability and security challenges affecting investment - Fluctuating oil prices impacting government revenue and green investment - Competition from cheaper, non-renewable energy sources - Climate change impacts (e.g., desertification, flooding) affecting resources and infrastructure - Rapid urbanization putting pressure on existing infrastructure and resources - Brain drain of skilled professionals in green technology sectors

PESTLE Analysis

Political	- Government commitment to renewable energy targets (e.g., Renewable Energy Master Plan) - Political instability in some regions affecting green investments - Corruption and bureaucracy hindering implementation of green policies - International agreements and pressures for climate action influencing policy decisions
Economic	- Dependence on oil and gas sector for government revenue - Limited access to financing for green projects - Potential for job creation in renewable energy sectors - Fluctuating oil prices affecting investment in green technologies - Growing interest from international investors in green projects
Social	- Large and growing population creating demand for sustainable solutions - Increasing awareness of environmental issues, especially among youth - Urbanization putting pressure on existing infrastructure - Cultural attitudes towards waste and consumption - Education and skill gaps in green technology sectors

Technological	- Increasing adoption of renewable energy technologies (solar, wind) - Limited local manufacturing capacity for green technologies - Growing mobile and internet penetration enabling smart solutions - Need for grid modernization to accommodate renewable energy - Emerging technologies in waste management and recycling
Legal	- Environmental regulations and policies supporting green initiatives - Weak enforcement of environmental laws - Intellectual property rights issues affecting technology transfer - Land use regulations impacting renewable energy projects - Evolving legal framework for carbon trading and emissions reduction
Environmental	- Abundant renewable energy resources (solar, wind, hydro) - Climate change impacts (desertification, flooding) affecting resources - Environmental degradation from oil and gas activities - Deforestation and loss of biodiversity - Water scarcity and pollution issues in urban areas

Analysis findings

The analyses reveal that Nigeria has significant potential for green economy development, primarily due to its abundant renewable resources and large, growing population. However, the country faces substantial challenges, including heavy reliance on fossil fuels, inadequate infrastructure, and limited access to green financing.

Political instability, weak enforcement of environmental regulations, and economic dependence on oil present significant hurdles. Nevertheless, opportunities exist in job creation, growing global demand for sustainable solutions, and increasing environmental awareness among youth.

To enhance its green economy, Nigeria should focus on:

- Strengthening policy implementation and enforcement
- Improving access to green financing
- Investing in education and skills development for green sectors
- Modernizing infrastructure to support renewable energy integration
- Leveraging international partnerships and investments
- Addressing environmental degradation and climate change impacts

Youth Perspective and Concluding Remarks

As young leaders committed to a sustainable future for Nigeria, we propose the following recommendations to support the country's transition to a greener economy:

First, policy makers should consider integrating green economy concepts into school curricula from primary to tertiary levels. Authorities should establish vocational training centers focused on renewable energy, sustainable agriculture, and green construction to equip the youth with the necessary skills. Additionally, online platforms should leverage for free sustainability courses and organizing nationwide "Green Skills Hackathons" to foster innovation.

To encourage youth entrepreneurship, we suggest the country should develop a "Green Startup Incubator" program that offers mentorship and seed funding for green businesses. A national competition for innovative business ideas, along with partnerships with tech hubs for low-cost workspaces, can further support this initiative.

Community engagement is crucial, and launching a "Green Champions" program can empower youth to lead environmental projects. Utilizing social media for awareness and organizing community clean-up events will also promote sustainability.

Technological advancements can be harnessed through a national youth-led "Green Tech Challenge" and partnerships with tech companies for resources. Moreover, fostering strategic partnerships between universities and renewable energy firms will enhance research and development.

Finally, policy advocacy through a "Youth Green Policy Advisory Board" and promoting sustainable agriculture and renewable energy initiatives will solidify Nigeria's path toward a greener future.

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PROJECT TITLE

Green Economy Transition in **Palestine**

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COUNTRY REPRESENTED:

Palestine

Introduction

Country Name	Palestine
Continent	Asia
Population	5.61 million (2024)
Climate Type	Mediterranean climate with regional variations
Primary Energy Consumption per Capita	3,999 kWh per person
Primary Energy Consumption from Renewable Energy	7.07% from renewable energy (solar is the primary source)
Share of the population with access to electricity	100%
Per Capita CO2 Emissions	0.7 tons per capita

Occupied countries face many difficulties and multiple challenges that affect their political, economic, social, and environmental aspects. As is known, Palestine is one of the occupied countries, and like any occupied country, it does not have the right to independence, sovereignty, or self-determination, among other challenges. Palestine faces difficulty in achieving sustainable development due to restrictions imposed on the use of natural resources and environmental management, and causing devastating economic problems affecting the productive, commercial, and service sectors.

A Palestinian study by the Palestinian Economic Policy Research Institute reported that more than 90% of electricity is imported from the occupation electricity company, indicating the need to develop the sustainable energy sector to reduce this percentage

But with all the challenges and difficulties facing Palestine under the occupation, this did not affect its interest in striving to achieve sustainability. According to the previous study, the Palestinian government seeks to develop the regulatory framework and policies, improve the sustainable energy sector, and reduce imports by 50% by 2030.

1.2 Analysis of the Green Economy

State of Renewable Energy:

Contributions to renewable energy in Palestine are based on solar energy, given that Palestine is located in a geographical location that receives high solar radiation, as the average solar radiation per day in Palestine reaches 5.4 kilowatts of solar energy per square meter, which is equivalent to an annual production of 1950 kilowatt hours of energy, which enabled Palestine to be one of the best areas for exploiting solar energy, and the possibility of investing in it is economically feasible.

The existing goals to expand these contributions are to reduce dependence on purchasing electricity from the occupying state, since Palestine is an occupied state, it consumes electricity from the occupation. Gradually obtaining 240 Gigawatt hours (at least) to generate electricity from renewable energy sources.

Increasing the size of locally produced capacity, exploiting local sources, and reducing dependence on imports. Increasing the percentage of energy produced from energy sources Renewables in the overall energy mix to reduce negative environmental impacts. Diversify renewable energy sources to include electricity generation from waste and other alternative energy sources. Supply natural gas to the Gaza Power Plant and provide natural gas sources to build power plants in the West Bank

Electric mobility:

The prevalence of electric vehicles is very low, with the number of cars licensed in the Palestinian market reaching 30.8 thousand vehicles, while the total number of vehicles in the Palestinian market is approximately 300 thousand vehicles [4].

However, the spread of electric cars in the local market is still timid, and is limited to certain agencies, and a small number of vehicles, due to the lack of the necessary infrastructure for their spread.

What are the policies that support or hinder their adoption?

- As the prices of electric cars are very high.
- There are no fast charging stations.
- There are no technicians specialized in electric cars.
- Battery prices in the event of a battery malfunction are very high.
- Existence of taxes on electric cars.

The measures in place to improve energy efficiency in buildings, industries and transportation:

The government is working to give courses and interviews to people on how to conserve energy, the most important of which are:

- Supplying natural gas to the Gaza Power Plant and providing natural gas sources to build power plants in the West Bank.
- Exploiting the natural gas discovered in the Gaza Sea and potential oil sources in the West Bank.
- Ending the phenomenon of net lending.
- Completing the drafting of the trade agreement with the Israel Electric Corporation regarding the import of electricity.

How effective are these measures so far?

Direct financial returns to the state treasury worth \$150 million Annually resulting from the export of natural gas discovered in the Gaza Sea
 § Direct financial returns to the state treasury in the amount of 10-15 million dollars annually resulting from the development of the Rantis oil field
 § A power purchase agreement between the Palestinian Electricity Transmission Company and the Israel Electric Corporation resulting in a decrease in the cost of energy for the final consumer by 8-10% from the current tariff
 § A decrease in the price of energy production from the Gaza Electricity Generation Company by 60% from the current cost price
 § Gradually reducing the electricity debt to the government from local authorities and distribution companies to reach an end to the phenomenon of net Lending with what this requires of the government's commitment to paying its obligations to companies and bodies .

Smart city projects underway or planned:

The "Ramallah - Smart City" project. The agreement was signed by the CEO of the Palestinian Telecommunications Group, Ammar Al-Aker, and the Mayor of Ramallah, Musa Hadid, in the presence of the representative of President Mahmoud Abbas, Adnan Samara, and the Minister of Communications and Information Technology, Dr. Allam Musa, and the Director of GIZ Programs in Palestine, Ulrich Nitschke", and the Chairman of the Board of Directors of the Palestinian Information Technology Association "PITA", Hassan Qasim, and the Chairman of the board of directors of Masar International Company, Bashar Al-Masry, and a number of legal figures concerned with the field of communications and information technology in Palestine.

What financial instruments or incentives available to support green projects? How accessible are these funds to startups and existing companies?

The Palestine Investment Fund, with co-financing from the European Union, launched the Jerusalem Financing Program over the past six years, which resulted in supporting more than 75 Jerusalem projects, creating and maintaining more than 650 job opportunities, and injecting approximately 4.0 million euros through providing direct grants to projects operating in Jerusalem, and contributed a similar amount from the project owners themselves due to the nature of the grant that requires the contribution of the beneficiaries.

Government incentives:

What incentives does the government provide to encourage companies and consumers to adopt greener practices?

- The incentives provided by the Investment Promotion Law in 2019 amounted to 43 projects (79.6% of the total number of projects) with a capital of \$50.4 million (77.8% of the total capital value).
- Rewarding incentives for investment and attracting new investments using the latest promotional methods, ensuring a competitive investment environment in Palestine.
- Incentives are also provided to investors and tenants in the areas Industrial, where it enjoys a package of tax incentives, and provides advanced infrastructure.

Consumer behavior:

The percentage of sales in Palestine has increased significantly in renewable energy, which indicates that consumers are aware and interested in sustainable practices and products.

Table 1: The percentage of sales in renewable energy in Palestine.

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
POWER (MW)	1221	1291	1365	1441	1521	1605	1690	1790	1885	1970	2065	2160	2220	2335
Energy (Twh)	5.28	5.67	6.05	6.49	6.93	7.41	7.92	8.47	9.05	9.65	10.31	11	11.77	12.85

Paper waste management system:

Diversify renewable energy sources to include electricity generation from waste and other alternative energy sources. The technical studies for the establishment of the first power station through waste treatment in the Zahrat Al-Finjan landfill in Jinin Governorate have been completed. It is expected that competitive bids will be issued in this field during the coming period 2020- 2021, as this station will generate electricity with a capacity of approximately 27 megawatts, according to the technical study.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths:

- **Abundant Solar Potential:** Palestine enjoys ample sunshine, making it ideal for solar power projects. Solar energy initiatives, such as rooftop photovoltaic systems, are gaining momentum [8].
- **International Support and Investments:** International bodies, including the EU and Germany, are supporting Palestine's green energy transition through projects like Green Growth Palestine, which provide financial and technical aid for renewable energy initiatives [9].

Weaknesses:

- **Energy Infrastructure Limitations:** Palestine suffers from outdated and damaged energy infrastructure, particularly in Gaza, where electricity access is intermittent. This hampers efforts to scale up renewable energy projects.
- **High Initial Investment Costs:** Though renewable energy has long-term economic benefits, the upfront costs of installation and infrastructure development are high, which may deter widespread adoption.

Opportunities:

- **Access to International Funding:** Palestine is eligible for substantial international funding and support for renewable energy projects, such as from the Team Europe Initiative and other green energy financing programs.
- **Job Creation and Economic Diversification:** Transitioning to renewable energy can create jobs and diversify Palestine's economy by reducing reliance on energy imports.

Threats:

- **Political Instability and Conflict:** The ongoing Israeli-Palestinian conflict poses a major threat to infrastructure development and foreign investment. Political instability limits long-term energy planning and project execution.
- **Water Scarcity:** Biomass energy solutions, which could be an alternative in rural areas, require significant water resources, a scarce commodity in Palestine. This could limit the types of renewable energy that can be utilized.
- **Dependency on External Energy Sources:** Despite efforts to transition, Palestine remains reliant on external energy imports, particularly from Israel, making it difficult to fully achieve energy independence.

PESTLE Analysis

Political	• Political Instability and Conflict: The ongoing Israeli-Palestinian conflict creates significant uncertainty, especially for large infrastructure projects. Political tensions often lead to disruptions in energy supplies and hinder long-term planning for renewable energy projects. • Governmental Support for Green Initiatives: The Palestinian Authority has shown a commitment to supporting green energy initiatives, but progress is often delayed by limited political capacity and dependence on international funding.
Economic	• International Investments: Palestine relies heavily on international financial support to drive renewable energy projects. • High Initial Infrastructure Costs: The high capital costs of renewable energy infrastructure present a challenge in a fragile economy.
Social	• Access to Electricity: While urban areas have relatively stable access to electricity, rural areas, especially in Gaza, face frequent power cuts. Renewable energy projects could help improve energy access in these regions. • Public Awareness and Education: As the global focus on climate change grows, there is increasing awareness among the Palestinian population about the need for renewable energy and sustainability. Educational campaigns and initiatives to promote energy efficiency are gaining traction.
Technological	• Solar Energy Advancements: Technological advancements in solar energy, such as photovoltaic systems, are making solar power more accessible and cost-effective for Palestinians. These developments align well with the country's abundant sunshine. • Infrastructure Challenges: Palestine's energy infrastructure, particularly in Gaza, is outdated and often damaged by conflict. This presents a significant challenge for integrating renewable energy sources into the grid.
Legal	• Regulatory Barriers: Palestine's legal framework for renewable energy is still developing, and regulatory hurdles can delay the implementation of green energy projects. Harmonizing policies across the West Bank and Gaza is also a challenge [10]. • Energy Agreements with Israel: The dependency on energy imports from Israel is governed by complex agreements, which limit Palestine's ability to transition independently to renewable energy sources.
Environmental	• Abundant Solar Resources: Palestine is ideally located to exploit solar energy, particularly in the West Bank and Gaza, where there is an abundance of sunlight throughout the year. • Water Scarcity: Water is a crucial resource for some renewable energy technologies, such as biomass. However, Palestine faces severe water scarcity, especially in Gaza, which limits its options for certain renewable technologies.

Analysis findings

Palestine has promising opportunities in renewable energy, especially solar power, due to its abundant sunshine and international support from organizations like the EU and Germany. However, the country faces significant challenges, such as outdated and damaged infrastructure, particularly in Gaza, which hinders the expansion of renewable energy projects. Although investing in renewable energy requires high upfront costs, there is potential access to international funding that can support these initiatives, helping to create new jobs and diversify the economy. Nonetheless, ongoing political conflict and water scarcity continue to limit the available options for renewable energy, along with dependence on energy imports from Israel. Therefore, comprehensive strategies are needed to overcome these challenges and harness the available potential to achieve energy sustainability in Palestine.

Youth Perspective and Concluding Remarks

Promoting renewable energy:

→ Tax incentives and government support should be provided to companies and individuals who invest in solar energy systems. Farmers can be provided with soft loans to install solar panels on rooftops or on agricultural land.

Water management:

→ Implement rainwater harvesting programs in urban and rural areas, which helps store water for use in agriculture and drinking.

Promoting environmental awareness and education:

→ Sustainability and environmental concepts should be integrated into school curricula from primary schools to universities, which helps build strong environmental awareness among young people.

→ Organize workshops and awareness events in communities on the importance of preserving the environment, recycling, and using resources sustainably.

Community engagement and strategic partnerships:

→ Government and private companies should work with NGOs to promote environmental projects and scientific research.

→ Provide incentives for companies that adopt environmentally friendly practices, such as recycling or reducing waste. Competitions can be organized for companies to encourage innovation in this area.

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PROJECT TITLE

Green Economy Transition in **Philippines**

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3. Hind Salem Altamimi
4. Mariam Alnuaimi

Introduction

Country Name	Philippines
Continent	Asia
Population	117 million
Climate Type	Tropical climate.
Primary Energy Consumption per Capita	828 kWh per person per year (2023)
Primary Energy Consumption from Renewable Energy	Approximately 22% of electricity generation from renewable sources (hydro, geothermal, solar, wind, and biomass)
Share of the population with access to electricity	98% (2023)
Per Capita CO2 Emissions	1.40 tonnes per person (2023)

Primary Energy Consumption per Capita:

Energy consumption per capita measures how much energy an individual uses in a year. In the Philippines, this figure stood at about 0.57 tons of oil equivalent (toe) per person in 2023, which is roughly 828 kWh per person annually (ENERDATA, 2023). This level is relatively low compared to the global average. The Philippines' lower rate reflects its status as a developing country, where industrialization remains moderate and many households particularly in rural areas live with modest energy needs. In addition, the hot and humid tropical climate contributes to increased reliance on cooling systems such as fans and air conditioners in urban areas.

Primary Energy Consumption from Renewable Energy:

Renewable Energy & Green Transition

Renewable Energy Share & Trends

- The “Share of primary energy consumption from renewable sources” dataset (Our World in Data) shows how much of a country’s total energy comes from renewables (using the “substitution method”)
- According to the Philippines country profile on Our World in Data, the country’s share of energy from renewable sources is tracked among other energy indicators.
- As of recent years, about 22 % of the Philippines’ electricity generation comes from low-carbon / renewable sources.
- Within that mix, key contributors are:
 - o Hydropower — a traditional renewable source
 - o Geothermal energy — an important renewable source for the Philippines (given its volcanic geography)
 - o Solar + Wind — smaller but growing shares. For example, wind + solar currently make up ~3.8 % of electricity generation in the Philippines (2024) .
- The Philippines still relies heavily on fossil fuels: in 2024, 79 % of its electricity was generated from fossil fuels.

Strengths & Challenges

Strengths / advantages:

- Geothermal potential: The Philippines is located along the Pacific “Ring of Fire,” which gives it strong geothermal resources.
- Diverse renewable resources: The country has access to hydropower, solar, wind, biomass, and geothermal.
- Ambitious targets and international investment: For example, there’s a \$15 billion renewable energy agreement with UAE’s Masdar to boost solar, wind, and battery systems.

Challenges / barriers:

- High dependence on fossil fuels: The majority of electricity is still generated from coal, oil, and gas.
- Wind / solar underutilization: Wind and solar currently have relatively low shares and need further scaling.
- Financial, regulatory, and community hurdles, especially for geothermal development (exploration costs are high, risk is significant).
- Infrastructure and grid integration: Upgrading grid capacity, transmission, and storage to absorb more variable renewables is necessary.

Outlook & Goals

- The Philippines has committed to increasing its renewable capacity — for example, aiming for 50 % renewable power capacity by 2030 (in some policy proposals) .
- Under the Masdar partnership, the Philippines aims to deploy up to 1 GW of clean energy by 2030, with potential scale-up to 10 GW by 2035.
- To meet its climate goals (as part of NDC commitments), the Philippines will need to accelerate deployment, reduce fossil fuel dependency, and strengthen policies supporting clean energy.

Share of the population with access to electricity:

Reference / Source

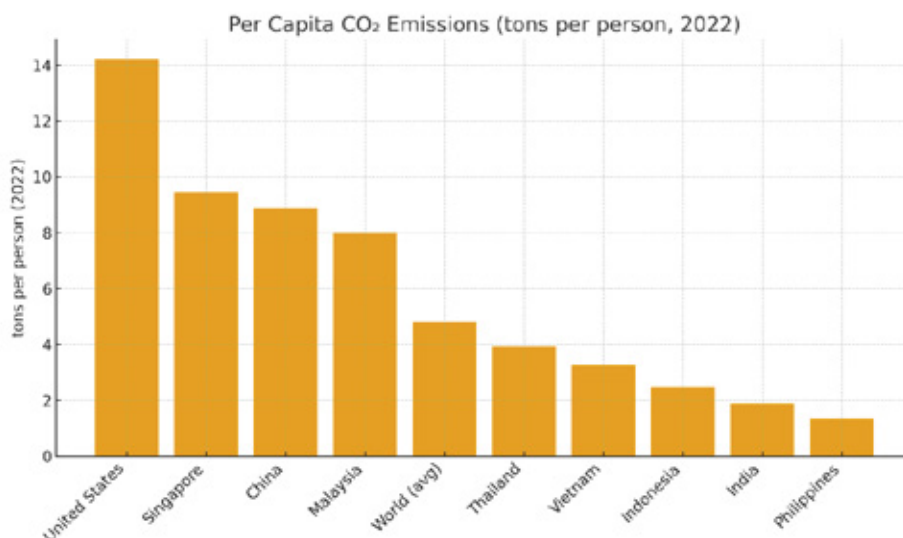
- Our World in Data – CO₂ country profile: Philippines
- The Global Economy data: 1.40 metric tons CO₂ per capita (2023)
- World meter (2022): ~ 1.36 tons CO₂ per capita

Key Figures

- 2023 (latest): ~ 1.40 metric tons of CO₂ per person
- 2022: ~ 1.36 tons per person (based on fossil CO₂ emissions).
- World average (2023): ~ 4.76 tons per person (excl. land use change)

Interpretation & Comparison

- The Philippines' per capita CO₂ emissions are significantly below the global average.
- Over time, the per capita emissions have been gradually increasing (from ~1.32 in 2022 to ~1.40 in 2023).
- The relatively low figure reflects:
 - o Lower industrialization intensity per capita compared to developed nations
 - o Large population base
 - o Significant reliance on less carbon-intensive sectors (for now)



Per Capita CO₂ Emissions:

Key Figures & Trends

According to the Macro Trends data (drawing on World Bank data), about 94.8% of the Philippine population had access to electricity in 2022. Moreover, according to the Our World In Data, by 2023, Share of the population with access to electricity reached 98%.

In 2020, the World Bank / EIA data placed access at around 96.8%. (Helgi Library, n.d.) Based on government statistics, the electrification rate for households in 2021 was about 90.4%, indicating that nearly 10 million people (~9.6% of the population) still did not have electricity access by that time. (Department of Energy, n.d.)

Urban vs Rural & Regional Disparities

Urban households are far more likely to have electricity access than rural households. In 2021:

- 96.1% of urban households had access. (Department of Energy, n.d.)
- 84.3% of rural households had access. (Department of Energy, n.d.)

Among the major island groups (Luzon, Visayas, Mindanao):

- Luzon had very high electrification (~98.7%) (Department of Energy, n.d.)
- Visayas was close behind (~96.8%) (Department of Energy, n.d.)
- Mindanao lagged (~86.0%) in 2021. (Department of Energy, n.d.)

Challenges & Observations

A think-tank study (by PIDS) noted that about 16 million Filipinos remain without electricity. (PIDS, n.d.). The rural electrification rate is much lower than urban, reflecting the higher cost and difficulty of extending grid infrastructure to remote or geographically dispersed areas. (Gonzales, n.d.) The disparity is especially visible in Mindanao compared to Luzon and Visayas.

Analysis of the Green Economy

The Philippines is at a transitional — and uneven — stage in building a green economy. Policy frameworks and high-profile projects signal ambition, but legacy dependence on fossil fuels, gaps in implementation, and uneven access to finance and infrastructure constrain rapid progress.

Renewable energy status

Renewables (hydro, geothermal, solar, wind, biomass) have grown but still make up a minority of electricity generation. Recent trackers put low-carbon generation near the low 20% range of total electricity, while coal remains dominant (recent analysis shows very high coal shares, and the DOE's generation data indicate increasing RE capacity but not yet displacement of coal). The government has set targets to raise renewables (announced targets include ambitious shares by 2030–2040) and is opening the sector to full foreign ownership and large foreign investments (e.g., multi-billion partnerships and planned auctions for hydro, pumped storage and geothermal). Progress is visible in capacity additions, but meeting targets will require faster permitting, grid upgrades and storage.

Electric mobility

E-mobility is actively promoted: the Electric Vehicle Industry Development Act (EVIDA) plus extended zero-tariff import policies for EVs, e-motorcycles and parts (extended through 2028) are major policy moves to lower upfront costs. However, EV market penetration and public charging infrastructure remain nascent outside Metro Manila; adoption is strongest in two-/three-wheelers (e-tricycles, e-bikes) and fleets, while private EV ownership is limited by affordability, range anxiety and slow charger rollout. Continued incentives plus public-private charging investments are accelerating deployment but more spatial coverage and local manufacturing are needed for scale.

Energy efficiency

Legal frameworks—the Energy Efficiency and Conservation Act and the National Energy Efficiency and Conservation Plan (NEECP) 2023–2050—establish standards, appliance labeling, building codes (revised BEEC) and industrial measures. Implementation has begun (policy, pilot retrofits, labeling), but enforcement and technical capacity at local government and building levels remain the bottleneck; measured savings are emerging in public buildings and large industrial sites, but nationwide uptake will require finance and stronger compliance mechanisms.

Smart city initiatives

Large planned developments such as New Clark/Clerk Green City position themselves as “smart” and climate-resilient hubs, integrating digital systems, resilient infrastructure, and dedicated green zones. Yet independent reporting highlights that planned renewable penetration in some “green” cities is modest (e.g., New Clark City’s planned RE share reported around ~30%), underscoring the challenge of reconciling master plans with the national grid reality. Smart cities can be testbeds but must be linked to cleaner grid and affordable housing to be genuinely sustainable.

Green financing & government incentives

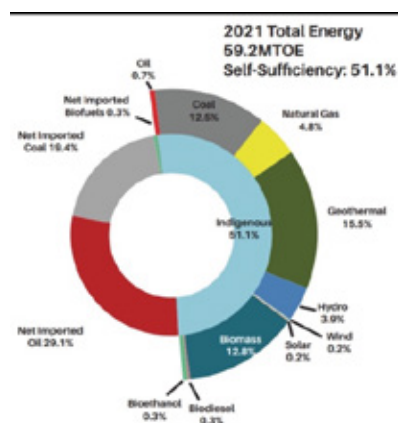
Domestic banks (DBP, Land Bank) and multilateral funds (Green Climate Fund, climate facility projects) offer green loans, concessional financing, green bond frameworks and de-risking instruments. The Development Bank of the Philippines and Climate Bonds analyses show instruments exist but access is easier for large projects than startups; blended finance, guarantees and technical assistance are still needed to reach SMEs and early-stage cleantech. Tax incentives, feed-in/tender arrangements and tariff preferences for EVs further support uptake.

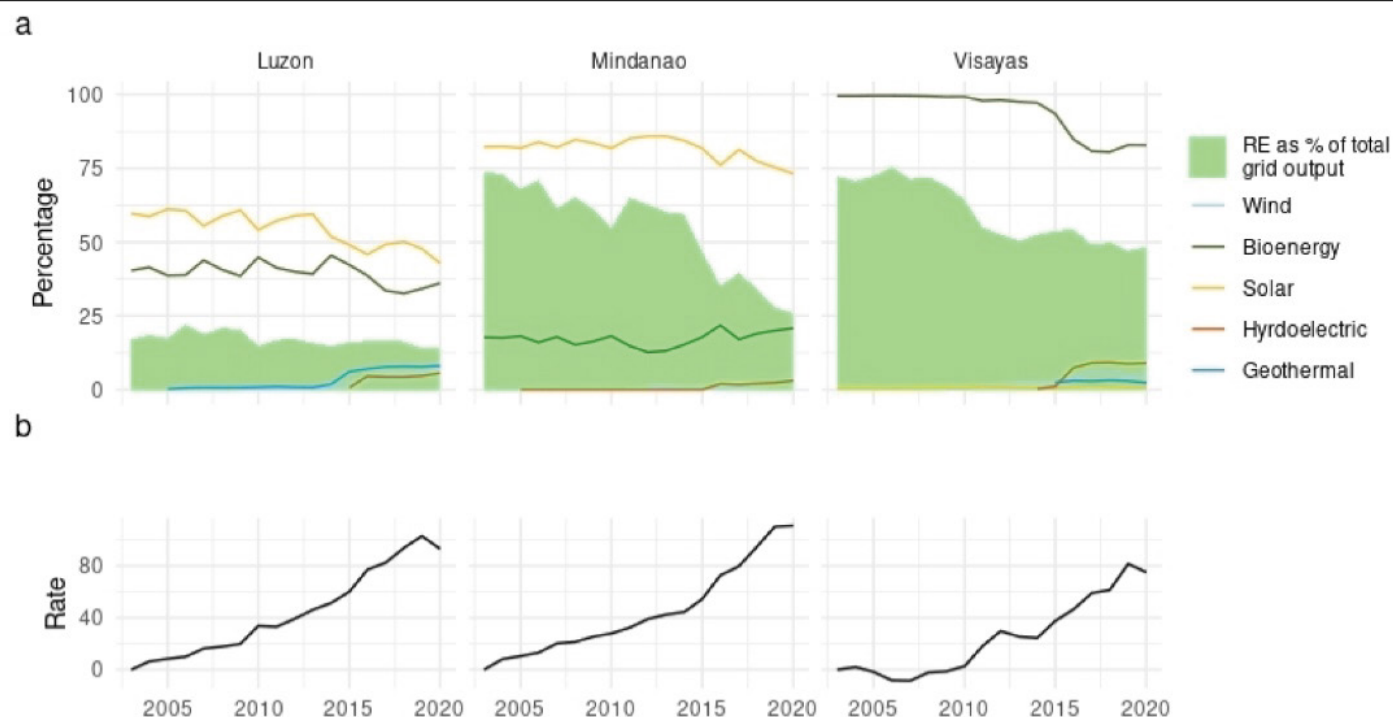
Consumer behavior, waste & water management, biodiversity

Consumer awareness of sustainability is growing (recycling, conscious purchasing), but behavior is uneven across income and geographic lines. Solid waste management is governed by the Ecological Solid Waste Management Act (RA 9003) but implementation is variable; many localities struggle with collection, segregation and informal recycling integration. Water governance is improving (NWRB actions and proposed water resources department), but urban water stress and agricultural irrigation efficiency remain priorities. Biodiversity protection is guided by NIPAS/E-NIPAS and the PBSAP 2015–2028; community-based management and protected area expansion continue but face enforcement and financing gaps.

Conclusion

The Philippines has strong policy building blocks and notable investments that could push a green transition, especially in renewables, e-mobility and green finance. Yet high coal reliance, infrastructure and permitting bottlenecks, uneven local implementation, and accessibility of finance for smaller actors are the immediate constraints. Closing these gaps — faster grid modernization, scaled storage, broader green finance for SMEs, and stronger local enforcement — will determine whether policy ambition translates into a resilient, inclusive green economy.





Challenges and opportunities

SWOT Analysis

Strengths: Abundant renewable resources- strong solar wind, geothermal and hydropower potential clean National targets and policy Framework policy support for e mobility	Weaknesses: Climate hazards and physical risks, policy reversal or inconsistent implementation ,lobal market headwinds and financing climate
Opportunities: Grid and intergration challenges, dependence on fossil fuel imports,Transitional LNG, Financing gaps and volatility in green investment,	Threats: Large scale projects pipelines and foreign partnership, distributed renewable and energy access, green financve instruments and infrastructure Bonds

PESTLE Analysis

Political	The Philippines presented its fourth Voluntary National Review in 2025, emphasizing collaboration between national and local governments, civil society, and the private sector to achieve sustainable development goals (DEPDev, 2025).
Economic	Renewable energy investments reached USD 3.2 billion in 2023, supported by incentives and feed-in tariffs, positioning the Philippines as a leading emerging market in Asia-Pacific for green finance (Philstar, 2025).
Social	The Philippine Action Plan for Sustainable Consumption and Production (PAP4SCP) promoted circular economy practices across over 1,200 SMEs, reducing approximately 12,000 tons of waste and creating sustainable livelihoods (NEDA, 2023).
Technological	Decentralized wastewater treatment systems, including DHS, MSL, and MBBR, have demonstrated 85-95% pollutant removal efficiency, improving urban and peri-urban water quality (Selerio, 2024).
Legal	The UN-Philippines Sustainable Development Cooperation Framework 2024–2028 aligns national legislation with SDGs and ensures accountability and policy coherence for environmental and economic planning (DEPDev/UN, 2024).
Environment	Water stress remains critical, with only 1,100 m ³ per capita/year, below the 1,700 m ³ threshold for scarcity; infrastructure investments aim to achieve universal access by 2030 (Tatler Asia, 2023).

Analysis findings:

The SWOT and PESTLE analyses reveal that the Philippines possesses strong renewable energy potential, robust policy frameworks, and growing green investments supported by national and international partnerships. Political commitment, as shown in the 2025 Voluntary National Review and the UN-Philippines Cooperation Framework, ensures multi-sectoral collaboration and policy coherence. Economically, rising renewable energy and circular economy investments drive sustainable growth, while social initiatives like PAP4SCP create green jobs and reduce waste. Technological advancements in wastewater treatment highlight innovation capacity. However, weaknesses such as limited grid infrastructure, financing volatility, and persistent water stress threaten progress. To enhance the green economy, the Philippines must strengthen institutional coordination, modernize energy and water systems, expand green finance, and invest in resilience-building. Prioritizing inclusive, technology-driven, and climate-resilient policies will enable sustainable economic transformation and ensure long-term energy and resource security.

Youth Perspective and Concluding Remarks:

Youth Recommendations for Supporting the Transition to a Greener Economy

From a youth perspective, the transition to a greener economy requires inclusive participation, innovation, and sustained policy support. Throughout this program, I have learned that young people are not just beneficiaries of sustainable development but essential drivers of change through creativity, entrepreneurship, and advocacy.

In Zimbabwe, youth can champion climate-smart agriculture, renewable energy cooperatives, and waste-to-value enterprises. The government and private sector should create green incubation hubs and provide access to youth climate funds to help scale community-led innovations. Strengthening environmental education in schools and vocational training will also empower the next generation with practical green skills.

In Madagascar, youth involvement in reforestation and biodiversity conservation can strengthen ecosystem resilience and livelihoods. Support for youth-led eco-tourism and sustainable fisheries should be expanded through micro-grants and mentorship programs. Regional collaboration with NGOs can enhance technology transfer and data sharing for community-based adaptation projects.

In the UAE, where green technology and innovation are rapidly advancing, young people can focus on research, clean energy entrepreneurship, and digital green jobs. Government initiatives such as the Green Skills Academy can be expanded to include exchange programs with African youth to promote south–south collaboration.

Across all three countries, partnerships between governments, private sectors, and youth organizations are essential to accelerate the green transition. Building youth networks, supporting start-ups, and integrating climate action into education systems will turn knowledge into measurable impact. The key insight is that empowering youth with resources, skills, and decision-making spaces will make the transition to a greener economy not only achievable but inclusive and sustainable for all.

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PROJECT TITLE

Green Economy Transition in **Rwanda**

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Introduction

Country Name	Brazil
Continent	South America
Population	213.4 million
Climate Type	Tropical.
Primary Energy Consumption per Capita	18.49 MWh (18,490 kWh) per capita (2024)
Primary Energy Consumption from Renewable Energy	49.62% (2024)
Share of the population with access to electricity	100% (2023)
Per Capita CO2 Emissions	2.16 tonnes per person (2023)

Analysis of the Green Economy

Rwanda’s green economy mixes tangible progress with clear gaps: the country shows strong political will, targeted policy instruments, and visible pilot projects (especially around renewable power, waste recovery, and smart urban development), but it still needs sizeable investment and capacity to scale clean technologies nationwide.

Renewable energy status

Rwanda’s grid is dominated by hydro and thermal, with solar and methane contributing smaller shares. Recent regulatory snapshots show hydro providing roughly half the generation and solar around 4%–5%, while thermal (including diesel/thermal and imported/backup) remains significant. The government’s Energy Sector Strategic Plan and Least Cost Power Development Planning set explicit targets to raise the renewable share substantially (the government has publicly aimed for around 60% renewables in the generation mix by 2030), and the regulator’s medium-term plans call for a major expansion of installed capacity to meet rising demand. These targets emphasize solar, additional hydro, methane recovery, and exploration of geothermal/bioenergy.

Electric mobility

Rwanda is in an early adopter phase for electric mobility. Policymakers have introduced incentives (including import duty exemptions for electric and hybrid vehicles) to lower upfront costs for EVs and e-mobility options, and national strategy documents outline categories and roadmaps for e-mobility adaptation. Private firms—local charging operators and startups—are actively rolling out charging stations (with targets from some providers to deploy dozens of stations to improve intercity coverage), but overall EV numbers remain small and concentrated in Kigali. Scaling will depend on blended finance, public-private partnerships, and grid upgrades to support fast charging.

Energy efficiency measures

Rwanda has adopted energy-efficiency planning within its national energy strategy: standards and regulations for appliances and public buildings, utility-driven demand-side management pilots, and industry outreach programs. Implementation is uneven: public and commercial buildings in Kigali often meet higher efficiency standards, while rural and informal sectors lag because of finance, technical capacity, and enforcement challenges. Continued work on appliance standards, building codes, and industrial audits is underway, but needs stronger incentives and financing to scale impact.

Smart city initiatives

Kigali is repeatedly recognized as a leader among African cities for cleanliness, planning, and digital services; large projects such as Kigali Innovation City aim to create an innovation-oriented smart district integrating ICT, energy-efficient buildings, and cluster-driven economic activity. These projects are positioned to embed sustainable transport, low-carbon infrastructure, and digital governance, though actual sustainability outcomes will depend on implementation choices and inclusion of circular-economy features.

Green financing & government incentives

Rwanda Green Fund (FONERWA) and related climate finance mechanisms are central to mobilizing grants, concessional loans, and blended finance for green projects. Rwanda also accesses international funds (e.g., Green Climate Fund projects) and leverages development partners for program financing. For many startups, the funds exist in principle, but application complexity, co-finance requirements, and scale limitations make access harder for early-stage companies; larger projects and proven implementers fare better.

Waste, water, biodiversity, and consumer engagement

Kigali has invested in modernizing waste management (upgrades to Nduba landfill, recycling pilots, private-sector sorting and recovery initiatives) and aims to move toward greater circularity, but nationwide systems still struggle with informal disposal and financing for treatment facilities. Water management emphasizes watershed protection and irrigation efficiency in agriculture, with integrated catchment projects, but ongoing vulnerability to seasonal variability. Biodiversity conservation is a relatively strong area — Rwanda actively manages national parks (e.g., Nyungwe, Akagera) and implements reforestation and ecosystem restoration projects — though balancing tourism, community needs, and restoration remains a challenge. Consumer awareness in urban areas is rising (recycling programs, clean-energy messaging), but behavior change in rural and peri-urban communities will require continued outreach and affordable green options.

Bottom line — strengths and constraints

Rwanda benefits from strong government direction, explicit renewable targets, nascent green finance platforms, and visible pilots in waste, EV charging, and smart urban development. The main constraints are financing scale, technical capacity to implement at the national scale, and the need to move from isolated pilots to sustained, market-based systems that make green choices cheaper and easier for businesses and consumers. Priorities to accelerate the green economy include streamlining access to blended finance for SMEs, scaling distributed solar + storage, expanding low-cost EV charging, enforcing efficiency standards, and strengthening circular waste-value chains.

Challenges and opportunities

Challenges:

- Gaps in electrification and affordability. Although access to electricity has increased rapidly, over 36% of individuals still did not have it in 2023–2024, and many newly connected homes continue not to use it frequently due to the low cost of appliances.
- limited demand for productivity and total energy consumption. In addition to limiting productive applications, low per capita power and appliance ownership also make it more difficult for private investment and utility cost recovery.
- Extensive use of conventional biomass for cooking. About 70–80% of primary energy comes from biomass, such as firewood or charcoal, which leads to issues with sustainability, deforestation, and human health.
- System and infrastructure resilience (hydro risk). Although crucial, hydropower is susceptible to climate change and hydrological unpredictability; large-scale projects that rely entirely on one source increase the danger of climate change.

Opportunities:

- A diverse range of clean resources, including geothermal, hydro, solar, and Lake Kivu methane, will be developed. Diverse low-carbon mixes are made possible by Rwanda's unrealized solar and geothermal potential.
- Clear policy frameworks and a history of rapid electrification. A robust policy foundation that draws in climate funding and private investment is created by strong political commitment (National Plans, Revised Green Growth & Climate Resilience Strategy).
- Decentralized solar + storage and mini-grids have a lot of promise. Off-grid and mini-grid technologies can speed up beneficial usage in rural regions and affordably extend connectivity in challenging terrain.
- Access to global green investment instruments and climate funding. In order to de-risk infrastructure, Rwanda's green plan and donor involvement make concessional financing, grants, and blended finance possible.

SWOT Analysis

Strengths: Rwanda has shown exceptional leadership in sustainability. Guided by Vision 2050 and the Green Growth and Climate Resilience Strategy, the country has placed environmental protection at the core of national policy. Around 70% of Rwanda's electricity comes from renewable sources such as hydropower, solar, and methane gas. Strong governance, along with programs like FONERWA and Kigali Green City, demonstrates real progress in green infrastructure and energy efficiency.	Weaknesses: Despite strong ambition, Rwanda still faces financial and technical constraints. Access to electricity remains limited in rural areas, and renewable technologies are often too costly for low-income communities. The country relies heavily on external donors and imported technologies, and there is a shortage of local expertise in renewable systems and green industries.
Opportunities: Rwanda's climate and geography create strong potential for solar, hydro, and biomass energy. Expanding green finance programs and youth-led innovation hubs such as KLab and Norrsken Kigali can promote sustainable startups and eco-tourism. The nation's clear vision and regional stability make it an attractive destination for green investment.	Threats: Rwanda is vulnerable to climate change impacts like floods, droughts, and landslides. Rapid urbanization, population growth, and dependence on foreign funding could slow its green transition. Poor waste management and rising pollution also remain ongoing environmental threats.

PESTLE Analysis

Political	Political stability is the order of the day under Vision 2050 and long-term government development policies.
Economic	The country's GDP grew by around 8.9% in 2024, fueled by services and infrastructure sectors.
Social	Youthful population inspires labor potential, but poverty and rural inequality remain challenges.
Technological	Government initiatives like Kigali Innovation City inspire ICT and digitalization.
Legal	The rule of law in Rwanda is conducive to investment, yet human rights remain a concern.
Environment	The nation aims to cut emissions by 38% by 2030, but remains vulnerable to climate threats.

Analysis findings:

SWOT and PESTLE analyses both show that Rwanda has a good base for developing its green economy. Its political stability, well-articulated national visions like Vision 2050, and superior renewable energy resource base of about 70% for hydropower, solar, and methane are its advantages. Its advantages include solar, hydro, and biomass development, youth-innovation hubs, and green investment due to the stability in the region. However, low rural electrification shortfalls, technology being costly, and dependence on external skill are set to keep pace back, while ongoing threats of climate change, urbanization, and pollution continue to present ongoing challenges. PESTLE factors also recognize economic development, young labor force, ICT innovation, and positive legal framework, but mention social inequities and environmental vulnerabilities. Together, these studies show that Rwanda has the potential to revamp its green economy by investing in regional renewable technologies, building technical ability, increasing green finance scale-up, and establishing effective urban and environmental planning for inclusive and sustainable growth.

Youth Perspective and Concluding Remarks:

I learned so much from the Global Green Innovation Initiatives programme in regards to how policy, youth, and innovation can intersect to build a future of sustainability. There was always some novel aspect of the green transformation every day — climate technology to renewable energy, green cities, green finance, and green jobs — that proved that sustainability is not so much one hope but rather a web of interconnectedness that demands collaboration and imagination.

During the 2nd Day of Clean Energy, speakers Waleed AlHallaj and Marko Mijatovic addressed localizing clean energy solutions and bringing these to all societies. Their speeches made me think of how in the UAE, our solar potential can be better leveraged through microgrid startups led by youth and community solar programs.

Day 3 included a presentation by Irena Spazzapan on climate technology and how decarbonization can be accelerated through investment and innovation in climate tech start-ups. It reminded me of how one could talk to young engineers to develop prototype technologies that are designed for the UAE desert climate, such as energy-efficient cooling or water-saving technologies.

Day 4 Presentations by Steven Velegrinis and Ayman Ismail revealed how urban sustainability and data-driven design can create a better life. I discovered that environmental awareness and digital design technology need to be taught to the next generation of Emirati engineers and architects so they would be able to design smarter and more sustainable cities.

Green Economy and Finance with Mark Kane, Sergio Campobasso, Karim Megherbi, and Tarig Ahmed emphasized the manner in which collaboration programs, as well as expected investments, could make sustainability a growth driver. Engagement of the youth in green entrepreneurship finance and innovation can empower the scaling up of innovative ideas into real projects.

Finally, Green Jobs Day with Dr. Luca Brusa and Reshma Francy again highlighted that the transition to a sustainable economy also involves building an employable green-skilled workforce. It can be achieved through revamped curriculum on campus, internships in sustainable industries, and mentoring networks to facilitate the bridging of the student with practitioners.

I have realized through this initiative that the secret to success in reaching the UAE's Net Zero 2050 vision is empowering the future generations to innovate, collaborate, and drive the sustainability agenda. Education, technology, and society can empower us to convert today's green challenges into tomorrow's opportunities — a cleaner, smarter, and more inclusive world for all.

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PROJECT TITLE

Green Economy Transition in **Senegal**

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COUNTRY REPRESENTED:

Senegal

Introduction

Country Name	Senegal
Continent	Africa
Population	18.2 million (2024)
Climate Type	Tropical with dry (October-May) and rainy (June-September) seasons
Primary Energy Consumption per Capita	2,505 kWh per person (2021)
Primary Energy Consumption from Renewable Energy	No data [2023] (Our World in Data, 2023)
Share of the population with access to electricity	67.98% (2021)
Per Capita CO2 Emissions	0.7 tons per capita (2022)

Analysis of the Green Economy

Renewable Energy Status

Senegal has made significant progress toward enhancing its renewable energy sector; as of right now, 30% of the country's energy comes from renewable sources (International Energy Agency [IEA], 2023). Hydroelectric, wind, and solar energy are examples of this. Through its Plan Sénégal Emergent (PSE), the nation has set lofty goals to raise the proportion of renewable energy in the energy mix to 40% by 2030 (Reuters, 2023). Senegal's usage of fossil fuels has steeply declined as a result of the implementation of initiatives like the Taïba Ndiaye wind farm and the construction of solar parks, which were put in place to attain these aims (GIZ, 2023).

Electric Mobility

Electric vehicles (EVs) sector in Senegal is still relatively new. While electric vehicles are becoming popular worldwide, Senegal has not yet seen a large-scale adoption of EVs or the construction of infrastructure necessary for them, such as charging stations. Though policy frameworks for EVs are being discussed, the adoption of EVs has been hampered by a lack of incentives and minimal government support (Green Economy Coalition, 2023). As a country, Senegal lacks infrastructure to facilitate EV distribution is a major obstacle, particularly in rural regions. Nonetheless, the nation wants to increase its investments in electric mobility by partnering with foreign financial sources.

Energy Efficiency Measures

Senegal is focusing on the energy efficiency sector, especially in large cities. Senegal applied regulations into place to enhance energy efficiency in industrial and building sectors, with an emphasis on adopting energy-saving technology, upgrading insulation, and lighting more efficiently (IEA, 2023). In addition, the Senegalese government is collaborating with foreign agencies like GIZ to improve transportation and public building energy efficiency. Even if these actions are beginning to pay off, especially in terms of lowering total energy usage in cities, their efficacy is still hampered by a lack of mass adoption and consumer education (GIZ, 2023).

Smart City Initiatives

Senegal has realistic intentions for developing smart cities, specifically with PSE-related projects. The creation of Diamniadio, a proposed smart city intended to relieve traffic in Dakar, the capital, is one noteworthy initiative (World Bank, 2023).

Intelligent traffic management systems, digital infrastructure, and energy-efficient buildings are examples of sustainable technologies used in these projects. Nevertheless, the incorporation of these technologies into urban administration is still in its nascent stages, requiring continuous endeavors to draw in capital and technological proficiency (BCS, 2023).

Green Financing

In the previous years, Senegal has established financial ways and tools to promote green projects and formed international collaborations to make green funding more accessible. Senegal is implementing foreign money to promote its transition to a green economy through initiatives like the Just Energy Transition Partnership (JETP), which intends to gather €2.5 billion to boost renewable energy (Reuters, 2023). Senegal's local financial institutions have already begun to offer climate finance products and green bonds; nevertheless, due to strict qualifying requirements, accessibility for startups and small businesses continues to be a concern (Green Economy Coalition, 2023).

Government Incentives

The Senegalese government offers various incentives to promote the adoption of greener practices among businesses and consumers. These include tax breaks for companies investing in renewable energy and green technologies, as well as subsidies for energy-efficient appliances and solar installations in rural areas (UNEP, 2023). However, the reach of these incentives is limited, particularly for smaller enterprises and low-income households, which may lack the capital to take full advantage of the available programs (IMF, 2023).

Consumer Behavior

Consumer awareness and engagement in sustainable practices in Senegal are gradually increasing, especially in urban areas. Government campaigns promoting renewable energy use, recycling, and water conservation have been rolled out, but widespread consumer participation remains low, particularly in rural regions (Green Economy Coalition, 2023). Efforts to increase public awareness are ongoing, with more educational programs and workshops aimed at promoting sustainability at the community level.

Waste Management and Recycling

Waste management in Senegal, particularly in urban areas, is improving, though challenges remain. Dakar has made strides in implementing better waste collection systems and recycling programs, but the infrastructure for handling industrial and residential waste in rural areas is lacking (UNIDO, 2023). Additionally, recycling facilities are limited, and much of the waste ends up in open dumps. There are ongoing initiatives to improve waste management, including public-private partnerships aimed at increasing recycling rates and managing hazardous waste more effectively (GIZ, 2023).

Water Management

Water management, particularly for agriculture, is a critical issue in Senegal, given the country's arid climate. Senegal is implementing sustainable water management strategies, such as the use of solar-powered irrigation systems in agricultural settings, which have been supported by the Global Green Growth Institute (GGGI, 2023). Urban water management has also seen improvements, with more efficient water use policies and infrastructure upgrades aimed at reducing water waste, particularly in cities like Dakar (GIZ, 2023).

Biodiversity and Conservation Efforts

Senegal is home to rich biodiversity, and efforts to protect this are enshrined in national conservation strategies. The country has established several national parks and reserves aimed at protecting wildlife and natural habitats. Major initiatives include the *Saloum Delta Biosphere Reserve* and *Niokolo-Koba National Park*, both of which are recognized as UNESCO World Heritage Sites (Green Economy Coalition, 2023). However, enforcement of conservation laws is inconsistent, and there are ongoing efforts to strengthen these initiatives through international cooperation and funding for biodiversity protection.

Challenges and Opportunities

SWOT Analysis

Strengths: - Abundant renewable energy sources - Strong government commitment through (PSE) - Growing international investment in green projects	Weaknesses: - Limited EV infrastructure - Inadequate waste management and recycling systems - Insufficient local funding and green financing accessibility for start-ups
Opportunities: - Potential for large-scale renewable energy projects - Development of smart cities - Growing global demand for green investments	Threats: - Climate change impacts on agriculture and water resources - Inconsistent enforcement of environmental laws - Dependence on international financing for key green initiatives

PESTLE Analysis

Political	- Strong government support for renewable energy and smart cities - International partnerships (JETP) for green energy
Economic	- Access to international green finance, but limited local capital - Growing green job creation potential
Social	- Increasing consumer awareness of sustainability, but limited in rural areas - Efforts to promote sustainable practices in agriculture
Technological	- Limited electric mobility infrastructure - Emerging smart city technologies
Legal	- Inconsistent enforcement of environmental regulations - Tax incentives for green technologies, but accessibility issues
Environmental	- Rich biodiversity but under threat from climate change - Increasing renewable energy adoption]

Analysis findings:

The analysis reveals that Senegal has significant strengths in renewable energy potential and government support, particularly through initiatives like Plan Sénégal Emergent and international partnerships such as the Just Energy Transition Partnership (JETP). However, challenges persist, including limited infrastructure for electric mobility, insufficient waste management systems, and inconsistent enforcement of environmental regulations. Opportunities exist in scaling up renewable energy projects and smart city initiatives, while threats like climate change and dependency on external funding need to be addressed. The transition to a green

economy could be accelerated by improving local financing mechanisms, enhancing public awareness, and creating a more enabling environment for green investments.

Youth Perspective and Concluding Remarks

The integration of green hydrogen with solar, wind, and hybrid energy system enhances the transition of Senegal to a greener economy. Renewable hydrogen can be stored in a fuel cell and used in different applications to overcome the limitations of the renewable sources such as solar and wind which are often intermittent. Due to excess sun and wind opportunities, Senegal can carry out electrolysis of water to generate hydrogen using renewables and then store it for use in times of low renewable energy generation (IEA, 2023).

This complementary addition of hydrogen production with solar or wind power plants would develop a hybrid energy structure which would be more energy secure. These systems depend on the storage of excess green energy that is used to produce hydrogen and supplied to various sectors such as transportation including (Fuel Cells), heavy industry, backup energy, and even transported to regions with excess energy demand (McKinsey, 2023). In addition, hydrogen can help in decarbonizing industries that are so hard to abate such as steel manufacturing and aviation hence catapulting Senegal into the forefront of the green energy transition within Africa (IRENA, 2023).

Constructing the needed infrastructures for hydrogen generation and its transportation will be fundamental. This will involve investing in electrolyzers, establishing hydrogen storage and transport systems. These initiatives, supported by public-private partnerships and international collaborations, can unlock funding opportunities while fostering technological innovation. The advancement of green hydrogen would not only mitigate the negative impact on carbon emissions in Senegal but also pave the ways for investment in new sectors and markets (McKinsey, 2023).

Embracing green hydrogen as an opportunity with its solar and wind potential, Senegal is likely to fast-track its green economy transition and help secure energy independence while also helping the cause of climate change.

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PROJECT TITLE

Green Economy Transition in Sri Lanka

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4. Salahuddin Alobeidli

COUNTRY REPRESENTED:

Sri Lanka

Introduction

Country Name	Sri Lanka
Continent	Asia
Population	Approximately 22 million (as of 2024)
Climate Type	Sri Lanka experiences a tropical climate with distinct wet and dry seasons. The country has a generally warm and humid climate throughout the year, with regional variations. It is influenced by two major monsoon seasons: ● Southwest Monsoon (May to September): Affects the southwestern parts, bringing heavy rainfall. ● Northeast Monsoon (December to February): Brings rain to the northeastern regions. In between these monsoons, there are two inter-monsoonal periods (March-April and October-November), characterized by less predictable weather.
Primary Energy Consumption per Capita	-
Primary Energy Consumption from Renewable Energy	40% (2023); hydropower, solar, and wind dominant
Share of the population with access to electricity	100%
Per Capita CO2 Emissions	0.6 tons per capita

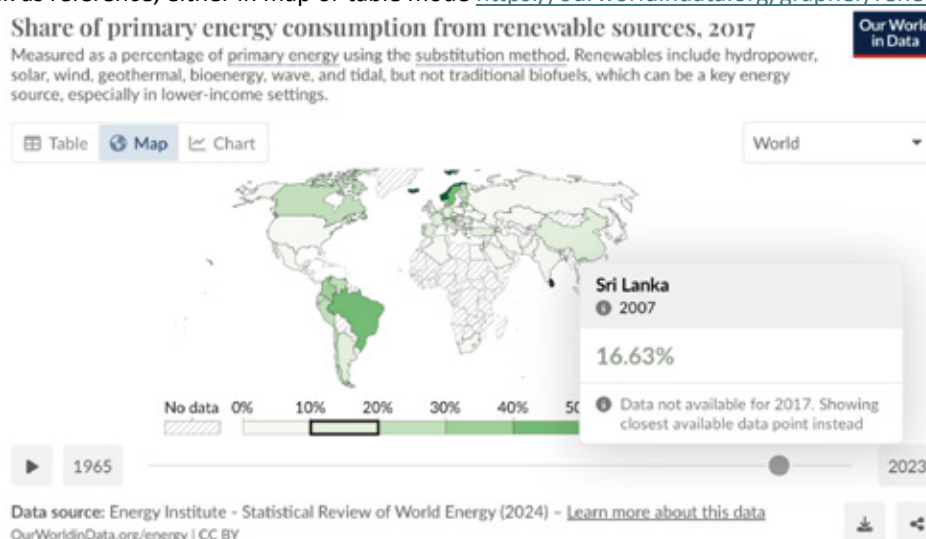
Primary Energy Consumption per Capita:

(you can use this link as reference, either in map or table mode <https://ourworldindata.org/grapher/per-capita-energy-use?time=2023>)

Country/Area	1965	2023	Absolute Change	Relative Change
Sri Lanka	947 kWh	4,536 kWh	+3,589 kWh	+379%

Primary Energy Consumption from Renewable Energy:

: (you can use this link as reference, either in map or table mode <https://ourworldindata.org/grapher/renewable-shareenergy>)



Share of the population with access to electricity:

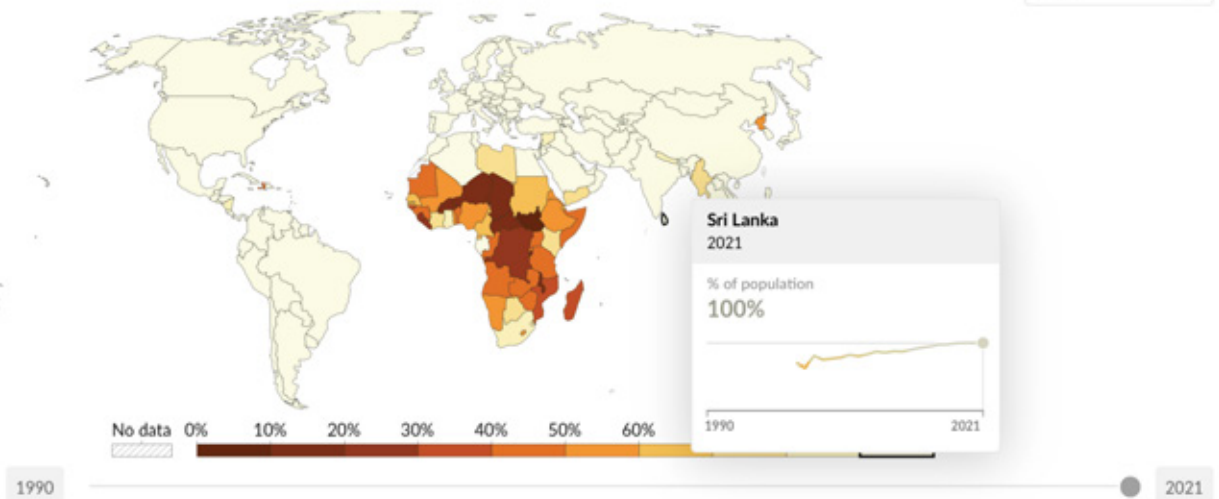
you can use this link as reference, either in map or table mode <https://ourworldindata.org/grapher/share-of-the-population-with-access-to-electricity>)

Share of the population with access to electricity, 2021

Having access to electricity is defined in international statistics as having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.

Our World
in Data

World



Data source: Data compiled from multiple sources by World Bank - [Learn more about this data](#)
OurWorldinData.org/energy | CC BY

Per Capita CO2 Emissions:

you can use this link as reference, either in map or table mode

[https://ourworldindata.org/explorers/co2?](https://ourworldindata.org/explorers/co2?tab=map&hideControls=false&Gas+or+Warming=CO%E2%82%82&Accounting=Territorial&Fuel+or+Land+Use+Change=All+fossil+emissions&Count=Per+capita&country=CHN~USA~IND~GBR~OWID_WRL~TCD)

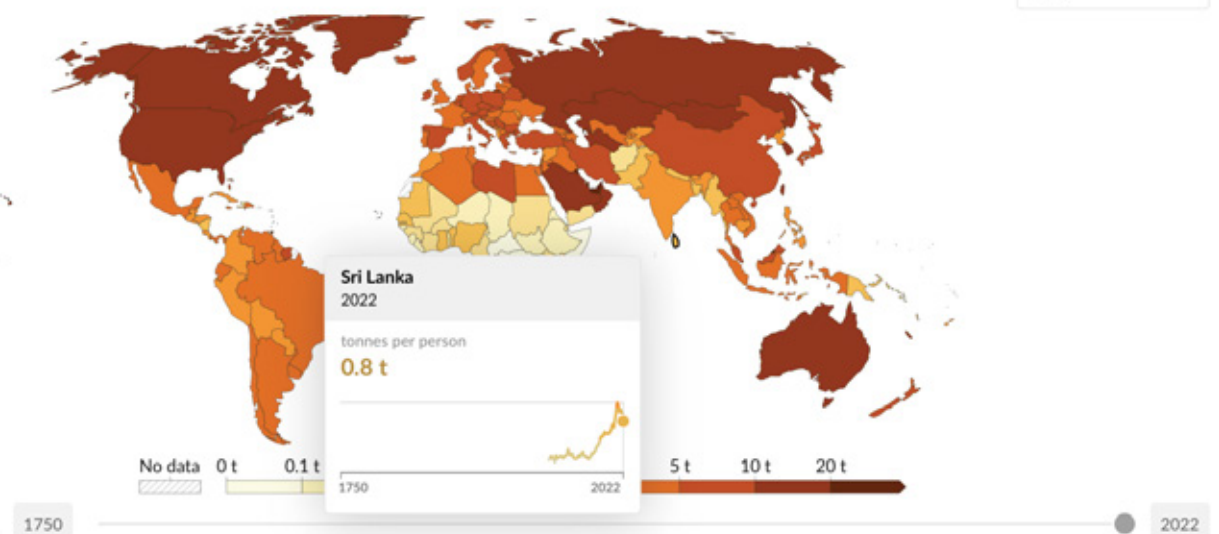
[tab=map&hideControls=false&Gas+or+Warming=CO%E2%82%82&Accounting=Territorial&Fuel+or+Land+Use+Change=All+fossil+emissions&Count=Per+capita&country=CHN~USA~IND~GBR~OWID_WRL~TCD](https://ourworldindata.org/explorers/co2?tab=map&hideControls=false&Gas+or+Warming=CO%E2%82%82&Accounting=Territorial&Fuel+or+Land+Use+Change=All+fossil+emissions&Count=Per+capita&country=CHN~USA~IND~GBR~OWID_WRL~TCD)

Per capita CO₂ emissions, 2022

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.

Our World
in Data

World



Analysis of the Green Economy

Sri Lanka, a developing island nation, is making strides toward building a sustainable and green economy. With its strategic location, abundant natural resources, and growing environmental awareness, the country has embarked on initiatives to address climate change, protect biodiversity, and promote renewable energy. However, challenges persist due to economic constraints and infrastructural gaps. Below is a detailed analysis of Sri Lanka's green economy, addressing key areas of renewable energy, electric mobility, energy efficiency, and more.

Renewable Energy Status :

Sri Lanka has significant potential for renewable energy, particularly in hydropower, wind, and solar energy. As of 2023, renewable energy contributes around 40% of the national energy grid, with a majority coming from large hydropower plants, followed by solar and wind power installations. The government has set ambitious targets to increase the contribution of renewable energy to 70% by 2030. Several key initiatives include the promotion of rooftop solar panels through the "Soorya Bala Sangramaya" program, which incentivizes households and businesses to install solar panels. Wind energy is also being developed, particularly in the northern regions like Mannar, which has one of the largest wind farms in South Asia.

Challenges include dependency on fossil fuels, slow adoption of advanced technology, and gaps in the integration of renewable sources into the national grid. The intermittency of renewable sources also presents issues, necessitating investment in energy storage technologies.

Electric Mobility

The adoption of electric vehicles (EVs) in Sri Lanka is still at a nascent stage, though there has been notable growth in recent years. As of 2023, there are over 10,000 registered EVs in the country, but infrastructure is limited, with around 200 charging stations nationwide. Most of these are concentrated in major urban areas like Colombo, leaving a significant gap in rural regions.

Government policies have been inconsistent, with a history of fluctuating import taxes on EVs, which hindered widespread adoption. However, there are signs of renewed support, with recent initiatives to reduce import taxes on EVs and introduce incentives for EV-related infrastructure development, including low-interest loans for setting up charging stations.

Energy Efficiency Measures

Sri Lanka has initiated several energy efficiency measures, particularly in the industrial and building sectors. The Sri Lanka Sustainable Energy Authority (SLSEA) has spearheaded programs to improve energy efficiency by mandating energy audits for large industries and encouraging the adoption of energy-efficient lighting, air conditioning, and insulation in buildings. Public awareness campaigns have promoted energy-saving behaviors among households.

However, the effectiveness of these measures has been uneven, largely due to limited enforcement and financial constraints among smaller businesses and residential consumers. Additionally, while the government has pushed for more efficient public transport, the sector still relies heavily on outdated and fuel-inefficient buses and trains.

Smart City Initiatives

Sri Lanka has launched its first smart city project in Colombo, known as Colombo Port City. This ambitious development integrates sustainable practices, including energy-efficient buildings, smart grids, and advanced waste management systems. Another ongoing project is Kandy's Smart City initiative, which aims to address urban congestion and promote green transport. Despite the focus on smart technologies, the integration of sustainable practices in other cities is still at an early stage. Limited digital infrastructure and financial constraints pose challenges to scaling these projects.

Green Financing

Sri Lanka has seen growth in green financing, with banks and financial institutions offering loans for renewable energy projects, electric vehicles, and eco-friendly businesses. Institutions like the National Development Bank (NDB) have introduced green bonds and loans aimed at financing renewable energy ventures. Additionally, the Green Energy Development and Energy Efficiency

Improvement Investment Program, supported by international funding bodies such as the Asian Development Bank (ADB), provides financial incentives for green projects.

Access to these funds remains uneven, especially for startups and small businesses, which face bureaucratic hurdles and lack the collateral needed for loans.

Government Incentives

The government offers a variety of incentives to promote greener practices, such as tax breaks on renewable energy investments and duty reductions on energy-efficient appliances. The Ministry of Environment has also introduced carbon credits for industries reducing their emissions. However, inconsistent policies and bureaucratic delays have hindered the full potential of these incentives.

Consumer Behavior

Awareness about sustainability among Sri Lankan consumers has improved, especially in urban areas. More individuals are adopting eco-friendly products like biodegradable packaging and energy-saving appliances. However, there remains a gap between awareness and action, particularly in rural regions, where economic constraints limit access to sustainable alternatives.

Waste Management and Recycling

Sri Lanka faces significant challenges in waste management, particularly in urban areas where population density leads to large volumes of waste. The recycling rate is low, with much of the country still relying on landfills. However, efforts have been made to improve waste separation at the source, and several municipalities, including Colombo, have introduced recycling initiatives. The Western Province Waste Management Authority is also exploring waste-to-energy projects.

Water Management

Water management is a key issue in Sri Lanka, especially with its large agricultural sector. The government has promoted **sustainable irrigation techniques** such as **drip irrigation** to conserve water in farming. In urban areas, efforts are being made to recycle and treat wastewater, though these remain limited in scope. The country's vulnerability to droughts and erratic rainfall patterns poses a significant challenge to sustainable water management.

Biodiversity and Conservation Efforts

Sri Lanka is a biodiversity hotspot, and efforts to conserve its rich flora and fauna are ongoing. National parks like **Yala** and **Sinharaja Forest** are central to conservation strategies. Additionally, the government has launched reforestation programs and marine conservation initiatives, especially in response to the growing threat of **coral bleaching**. However, deforestation, illegal poaching, and unsustainable tourism practices continue to pose threats to biodiversity conservation.

To sum up, Sri Lanka's green economy is in a transitional phase, with numerous opportunities and challenges. While the country has made notable strides in renewable energy, green financing, and conservation, infrastructural and policy-related obstacles remain. To sustain momentum, stronger government support, increased financial accessibility, and consistent policies will be crucial in driving the green economy forward.

Challenges and Opportunities

SWOT Analysis

Strengths: • Strategic Location • Tourism Potential • Skilled Workforce • Natural Resources	Weaknesses: • Political Instability • Economic Challenges • Infrastructure Issues • Ethnic Tensions
Opportunities: • Tourism Development • Foreign Investment • Digital Transformation • Renewable Energy • Agricultural Modernization	Threats: • Economic Vulnerability • Climate Change • Geopolitical Risks • Health Crises • Competition in Tourism

PESTLE Analysis

Political	Government Stability, Foreign Relations, Regulatory Environment, Corruption, Post-Conflict Reconciliation.
Economic	Economic Growth, Tourism and Remittances, Foreign Direct Investment (FDI), Currency Fluctuations, Employment.
Social	Demographics, Education and Skills, Urbanization, Cultural Diversity,
Technological	IT and Digitalization, Innovation, Telecommunications, Automation and Industry, E-Governance
Legal	Business Regulations, Labor Laws, Intellectual Property Rights (IPR), Taxation Policies, Legal System.
Environmental	Climate Change, Biodiversity, Sustainable Development, Renewable Energy Potential, Waste Management.

Analysis findings

Sri Lanka has a great deal of potential to grow its green economy by utilizing its abundant natural resources and highly qualified labor force. A strong base is provided by opportunities in digital innovation and renewable energy, combined with strengths in tourism and agriculture. But there are major obstacles in the form of political unpredictability, economic difficulties, and inadequate infrastructure. The PESTLE study emphasizes the necessity of investing in technology and environmentally friendly infrastructure, as well as stable governance and simplified laws. In order to promote innovation and draw in green investments, these problems must be resolved.

Important tactics include investing in infrastructure upgrades, providing incentives for green technologies, and developing consistent, long-term policy for renewable energy.

Enhancing climate resilience and advancing green skills education are equally important. The shift to a resilient, sustainable economy can be accelerated by fortifying public-private partnerships. Sri Lanka can establish itself as a leader in the global green economy and promote environmental conservation and sustainable growth by concentrating on these areas.

Youth Perspective and Concluding Remarks

Sri Lanka's youth must play a leading role in the transition to a greener economy because they can lead the way in developing creative solutions for pressing environmental problems. We may start this shift by installing energy-efficient air conditioning and lighting in our houses. To facilitate this change, school curricula must include comprehensive environmental education, social media awareness campaigns, and green entrepreneurship programs that train young people in sustainable business practices. Young people can be further engaged by creating eco-friendly technologies, working with local governments, and supporting community-based renewable energy projects. A solid basis for youth-led environmental action can also be established by strengthening waste management programs, developing green areas, supporting supportive policies, and establishing strategic alliances. In addition to improving air quality by filtering pollutants, creative solutions like constructing living walls and green roofs in urban areas also provide natural insulation, which reduces the amount of energy needed for heating and cooling. By providing habitats for different species, these green areas also promote biodiversity and improve the health of the urban ecology. Reliance on imports was one area of weakness we found in our SWOT analysis; modernizing agriculture, especially through vertical farming, which makes the most use of available space and resources, is a practical way to minimize food imports. Furthermore, Sri Lanka's infrastructure problems—such as antiquated energy systems and insufficient transportation—offer a chance to upgrade to clean energy infrastructure and invest in green building standards. Examples of such infrastructure include wind turbines and community-based solar microgrids that can provide local energy solutions, minimize transmission losses, and improve access in remote areas. Throughout this program, we have learned that achieving a sustainable future requires a thorough understanding of how green energy, technology, and sustainable practices are interconnected across various sectors. Additionally, fostering innovation, developing green skills, and leveraging green finance are crucial for facilitating the transition to resilient and sustainable economies and communities.

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PROJECT TITLE

Green Economy Transition in Sudan

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3. Amar Hayder Ahmed Elsheikh
4. Nooralbagie Adam Ahmed

COUNTRY REPRESENTED:

Sudan

Introduction

Country Name	Sudan
Continent	Africa
Population	49.4 million (pre-2023 war)
Climate Type	Arid in the north, tropical and savannah in the south
Primary Energy Consumption per Capita	200-300 kilograms of oil equivalent (kgoe) annually
Primary Energy Consumption from Renewable Energy	20-25% from hydro and small-scale solar systems (2021)
Share of the population with access to electricity	56-60%
Per Capita CO2 Emissions	0.3 to 0.5 metric tons per capita

Analysis of the Green Economy

Sudan is gradually transitioning towards a green economy, driven by environmental challenges and the need for sustainable development. This analysis explores the current state of the green economy, its challenges, drivers, and potential for growth in the country.

Renewable Energy Status:

Energy use is rapidly increasing, primarily driven by traditional biomass, especially in rural areas with limited electricity access. Despite electricity consumption growing at **13%** annually, only **47%** of the rural population is connected to the grid. High electricity subsidies and climate-related declines in hydroelectric generation, decreasing at **4%** per year, pose significant challenges. To address these issues, a national strategic roadmap for promoting renewable energy has been developed, focusing on **69 recommendations** across three key themes: enhancing access to sustainable energy for poverty reduction and women's empowerment, transforming the energy sector, and building resilience against development shocks.

Electric Mobility: Limited Adoption:

Electric vehicles (EVs) are not widely available or adopted in Sudan. The market is still dominated by traditional internal combustion engine vehicles, largely due to limited infrastructure and high costs. Giad Group electric light vehicle project (The group's partners include: **MAN, Renault, Hyundai, and BYD**).

Energy Efficiency Measures:

In Sudan, energy efficiency initiatives remain limited but are gradually improving. For example, urban areas are adopting energy-efficient lighting and solar water heaters, contributing to a **10% reduction** in household energy usage in select regions. The industrial sector has made modest gains, with energy optimization efforts reducing waste by around **5–7%**. Public transportation is still largely inefficient, with limited adoption of electric or hybrid vehicles. Solar power use is growing, accounting for roughly **4%** of the country's energy generation.

Smart City Initiatives:

Smart city initiatives in Sudan are primarily driven by the United Nations, focusing on sustainable infrastructure aligned with global goals. The initiative aims to improve industrial efficiency and environmental sustainability by **2030**, leveraging applied technologies and enhancing digital access. For instance, Sudan's industrial sector, which accounts for about **29%** of the GDP, faces challenges in modernization due to ongoing political instability, limiting effective implementation. Despite these efforts, only **36%** of the

population has reliable access to electricity, making it difficult to advance smart city projects comprehensively. A robust recovery strategy is crucial for realizing the full potential of smart technologies in urban settings.

Green Financing:

The ongoing conflict in Sudan has severely hindered economic stability and investment opportunities, creating substantial barriers to green financing development. Although investments in renewable energy and sustainable agriculture projects have surpassed **\$200 million**, the war complicates efforts to address climate change and sustainability. Green financing is evolving, primarily supported by international organizations like the African Development Bank (**AfDB**) and the United Nations Development Programme (**UNDP**). However, local startups face limited access to these resources due to bureaucratic challenges and an underdeveloped financial infrastructure. A UNDP report highlights that while green bonds and loans are emerging, only about **25%** of startups access traditional banking services. Enhanced financial instruments and supportive policies are crucial for fostering sustainable development amid ongoing instability.

Government Incentives:

The government has been slow to promote sustainable practices, local organizations and youth-led initiatives are driving significant progress in the renewable energy sector. Groups like the Sudanese Youth Network are actively implementing community-based solar projects that enhance energy access and empower local communities. These grassroots efforts are crucial in the context of ongoing conflict, which has limited governmental support and infrastructure development. Collaborations with international organizations, such as the United Nations Development Programme (UNDP), further amplify these initiatives by providing funding and technical expertise. The commitment of these local entities showcases the potential for sustainable development despite significant challenges.

Consumer Behavior:

Consumer awareness and engagement in sustainability in Sudan are evolving, though still in the early stages. About **30–40%** of consumers, especially in urban areas, show interest in eco-friendly products. This is driven by a global shift towards sustainability, but limited options and higher costs reduce adoption. Rural areas face even greater barriers due to lower income levels and lack of access to sustainable goods. Research shows that globally, **60–70%** of consumers, particularly Gen Z, prefer brands with strong environmental practices. However, in Sudan, these numbers are much lower, likely under **20%**, due to economic challenges and limited awareness.

Waste Management and Recycling:

Estimated Waste Amount

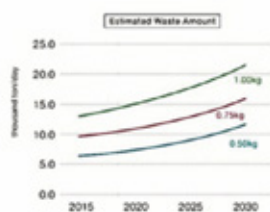
The future amount of waste generation is estimated based on the projection of urban population at three waste generation rates, i.e. 0.5, 0.75, and 1.0 kg/person/day.

Year	2015	2020	2025	2030
Total	28,648	43,541	49,000	54,842
Urban	13,099	15,349	18,220	21,775

Generation rate	2015	2020	2025	2030
0.50 kg/person/day	6.5	7.7	9.1	10.9
0.75 kg/person/day	9.8	11.5	13.7	16.3
1.00 kg/person/day	13.1	15.2	18.2	21.8

Waste Amount = (Generation rate) x (urban population)

Source: for population: United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, Online Edition.



Waste management in Sudan is critical, with around 1.5 million tons of waste generated annually, yet only 10% is recycled. Approximately 70% of solid waste remains uncollected, causing environmental and health issues. Investment in infrastructure and public awareness initiatives is essential for improving waste management and recycling efforts.

Water Management:

Sustainable water management is severely challenged, with agriculture consuming nearly 90% of available water resources and traditional irrigation methods wasting up to 60% of water. While major dams like Merowe and Sennar help regulate supplies, only about 10% of irrigated land uses efficient systems. In urban areas, around 40% of the population lacks access to clean drinking water, and distribution networks lose 30-40% through leakage. Despite rainwater harvesting efforts capturing only 5% of potential rainfall, political instability and climate change further complicate water management, necessitating significant investment in infrastructure and modern technologies.

Biodiversity and Conservation Efforts

Biodiversity conservation is crucial for ecosystem health, providing essential services like pollination, nutrient cycling, and climate regulation, with around 50% of global GDP relying on these natural resources. The Intergovernmental Panel on Climate Change highlights that ecosystem-based adaptation can help mitigate climate vulnerabilities for up to 2 billion people by 2050. Economically, sustainable biodiversity management could enhance local economies, with a \$5 trillion market in biodiversity-related products. However, global wildlife populations have plummeted by 68% since 1970, necessitating urgent conservation efforts. Collaborative strategies among governments, NGOs, and local communities are vital for sustainable development and reversing biodiversity loss.

Challenges and Opportunities

SWOT Analysis

Strengths:

- **Abundant Solar Resource:**
Sudan receives significant sunlight year-round, making it ideal for solar energy generation.
- **Renewable Energy Potential:**
Solar power can help reduce reliance on imported fossil fuels, providing a clean, sustainable energy source.
- **Low Operational Costs:**
Once installed, solar panels require minimal maintenance and have long lifespans, reducing long-term operational costs.
- **Job Creation:**
Solar projects can create local jobs in construction, installation, and maintenance.
- **Energy Independence:**
Solar energy can enhance energy security by reducing the country's dependence on oil imports.

Weaknesses:

- **High Initial Capital Costs:**
Solar installations, particularly large-scale projects, require significant upfront investment, which can be a barrier in a developing economy like Sudan.
- **Energy Storage Challenges:**
Solar energy is intermittent, and without proper storage solutions (like batteries), it may not provide consistent power, especially during cloudy periods or at night.
- **Limited Local Expertise:**
The lack of skilled labor in the solar energy sector may slow down project implementation and increase reliance on foreign expertise.
- **Grid Reliability:**
Sudan's existing grid infrastructure may not be equipped to handle large amounts of renewable energy input without upgrades, leading to inefficiencies.

Opportunities:

- **Government Support & International Aid:**
There is potential for financial support from international donors, development banks, or organizations focused on sustainable development.
- **Growing Energy Demand:**
Sudan's rising population and urbanization create a growing demand for electricity, providing a clear market for solar energy.
- **Expansion of Off-Grid Solar:**
Solar systems could provide electricity to rural and remote areas not connected to the grid, offering a decentralized energy solution.
- **Private Sector Investment:**
There is an opportunity for partnerships with private investors or companies interested in green energy and infrastructure projects.
- **Reduction of CO₂ Emissions:**
Solar energy contributes to reducing carbon emissions and improving air quality, aligning with global climate goals and attracting potential carbon credit incentives.

Threats:

- **Political and Economic Instability:**
Sudan faces ongoing political and economic challenges, which could disrupt project financing, operations, and long-term stability.
- **Currency Fluctuations:**
The instability of the Sudanese pound makes importing solar equipment expensive and risky for investors.
- **Lack of Regulatory Framework:**
Without clear renewable energy policies or incentives, private investment may be discouraged, and project approval may be slow.
- **Competition from Fossil Fuels:**
Fossil fuel industries, particularly oil, may resist solar energy initiatives due to concerns over market displacement.
- **Climate Risks:**
While Sudan has abundant sunshine, extreme heat and dust storms in some regions could potentially impact the efficiency and maintenance of solar panels.

PESTLE Analysis

Political	The political landscape in Sudan is marked by instability and conflict, which complicates efforts to implement a green economy. The transitional government has expressed a commitment to sustainable development and has signed international agreements, including the Paris Agreement. However, ongoing political turmoil often hinders effective policy implementation and investment in green technologies (World Bank, 2021).
Economic	Economy heavily relies on agriculture, contributing about 30% to GDP, but it faces challenges due to fluctuating commodity prices and the impacts of climate change. Investments in renewable energy are emerging, but overall financing for green projects remains limited, with only about 10% of energy investments directed toward renewables.
Social	Grassroots movements are increasingly mobilizing youth and local communities to champion renewable energy projects, such as solar micro-grids. A recent survey indicated that over 75% of young people support transitioning to renewable energy sources, recognizing their potential for economic development and environmental sustainability.
Technological	With an estimated 84% of the population lacking reliable electricity, off-grid renewable energy projects are crucial. Initiatives to provide energy access could impact up to 1.5 million people, as noted by the UNDP, enhancing energy availability in rural and underserved areas.
Legal	While there are some legal frameworks for environmental protection, enforcement is weak due to ongoing conflicts and lack of resources. The government is encouraged to adopt clearer policies supporting renewable energy projects, but implementation remains a challenge.
Environmental	Ongoing environmental issues, including deforestation and land degradation, have been exacerbated by the conflict. Climate change poses a significant threat, with projections suggesting a possible reduction in agricultural productivity by 30% by 2050.

Analysis findings

The transition to a green economy in post-war Sudan is marked by resilience and innovation, primarily driven by local communities despite significant challenges. By leveraging international support and focusing on grassroots initiatives, Sudan can pave the way for a sustainable and inclusive economic future.

In the aftermath of conflict, Sudan faces a critical juncture in its transition to a green economy. The war has significantly disrupted economic activities, yet it has also galvanized local communities and organizations to seek sustainable solutions.

Sudan's abundant solar energy potential presents a promising opportunity to transition toward a more sustainable energy future. With government support and international aid, solar energy could meet growing electricity demand, particularly in off-grid rural areas. However, the country faces significant challenges, including high initial costs, limited local expertise, and political instability. To fully realize the benefits of solar energy, these challenges must be addressed through targeted investments, regulatory frameworks, and efforts to overcome resistance from the fossil fuel industry.

Youth Perspective and Concluding Remarks

Perspective on Green Energy in Sudan

- **Abundant Renewable Resources:**

Sudan has immense potential for green energy development, particularly in solar and wind energy. Over 3,200 hours of sunshine annually make it an ideal location for solar power projects. The northeastern region of Sudan holds significant wind energy potential.

- **Energy Diversification:**
Green energy presents an opportunity to diversify Sudan's energy mix and reduce dependency on fossil fuels. Renewable energy can help meet the country's growing energy needs, reduce carbon emissions, and foster economic growth.
- **Challenges:**
Economic instability and political uncertainty hinder large-scale renewable energy projects. Limited infrastructure, lack of capital, and weak regulatory frameworks are additional barriers. Insufficient technical expertise and skilled labor make the adoption of green energy more challenging.
- **Need for Collaboration:**
Government, private sector, and international organizations need to collaborate closely to invest in and promote renewable energy projects. Stronger regulatory support and investment incentives are essential to encourage private sector participation.

Concluding Remarks

- **Strategic Importance:**
Transitioning to green energy is essential for Sudan's sustainable development and climate change mitigation. Leveraging solar and wind resources can address energy deficits, improve electricity access, and create jobs.
- **Policy and Investment:**
Comprehensive policies are needed to encourage local and foreign investments in renewable energy. International partnerships and financial support will be key to driving green energy projects forward.
- **Capacity Building:**
Investment in education, training, and research is crucial to developing local expertise in renewable energy technologies.
- **Long-Term Vision:**
Strong political will and long-term planning are needed to overcome existing barriers and transition Sudan to a sustainable energy future. With coordinated efforts, Sudan can become a leader in renewable energy in Africa.

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PROJECT TITLE

Green Economy Transition in Syria

PARTICIPANT NAME :

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2. Hasan Kanjo
3. Aisha Naimi

COUNTRY REPRESENTED:

Syria

Introduction

Country Name	Syria
Continent	Asia
Population	22 million
Climate Type	Arid and semi-arid inland, Mediterranean along the coast
Primary Energy Consumption per Capita	15 gigajoules per person annually
Primary Energy Consumption from Renewable Energy	0.1% of total energy consumption from renewables
Share of the population with access to electricity	94.9% (mainly urban areas)
Per Capita CO2 Emissions	1.3 tons per capita

Primary Energy Consumption per Capita:

In Syria, it is estimated that energy use per capita is around 15 gigajoules per person per year. Due to limited industrialization and heavy dependence on non-renewable resources, part of the primary energy use is satisfied by renewable energy sources at a much lower rate compared to the global average.

Primary Energy Consumption from Renewable Energy:

Despite some developments in hydropower and small-scale solar projects, the renewable energy infrastructure is underdeveloped. Renewable energy sources account for a negligible share of Syria's energy balance—approximately 0.1% of total energy consumption. Fossil fuels, particularly oil and gas, are the primary energy resources.

Share of the Population with Access to Electricity:

About 94.9% of the Syrian population has access to electricity, with urban areas enjoying nearly complete access. However, the electrical grid faces issues with reliability and efficiency, which hampers stable electricity provision.

Per Capita CO2 Emissions:

CO2 emissions per capita in Syria are low, at about 1.3 tons per year. This reflects the country's low industrial activity and energy use but highlights opportunities for future growth in adopting cleaner and sustainable practices.

Analysis of the Green Economy

Questions to Guide Analysis:

- Renewable Energy Status:** What is the current contribution of renewable energy sources to the national energy grid? What targets or initiatives exist to expand these contributions?
- Electric Mobility:** How prevalent are electric vehicles (EVs) and related infrastructure (like charging stations) in your country? What policies support or hinder their adoption?

3. **Energy Efficiency Measures:** What measures are in place to improve energy efficiency in buildings, industries, and transportation? How effective have these measures been to date?
4. **Smart City Initiatives:** Are there any ongoing or planned smart city projects? How do they integrate sustainable practices or technologies?
5. **Green Financing:** What financial instruments or incentives are available to support green projects? How accessible are these funds for startups and established companies?
6. **Government Incentives:** What incentives does the government offer to encourage businesses and consumers to adopt greener practices?
7. **Consumer Behavior:** How aware and engaged are consumers in your country about sustainable practices and products?
8. **Waste Management and Recycling:** How effective are the waste management and recycling systems in handling industrial, commercial, and residential waste?
9. **Water Management:** What strategies are in place for sustainable water management, particularly in agriculture and urban settings?
10. **Biodiversity and Conservation Efforts:** What are the major initiatives for biodiversity conservation and how are they being implemented?

Syria's Green Economy

Syria's green economy is confronted with considerable obstacles stemming from ongoing conflict and economic volatility; however, emerging initiatives are aimed at promoting sustainability. The contribution of renewable energy, particularly solar and wind, to the national grid remains minimal. Nevertheless, efforts are underway to enhance this contribution by installing solar panels in urban settings and developing wind projects along the coastline. Additionally, the government has established a Renewable Energy and Energy Efficiency Fund to encourage small-scale solar initiatives in remote areas.

The presence of electric vehicles (EVs) in Syria is limited, primarily due to the insufficient infrastructure, such as charging stations, and the excessive costs associated with importing these vehicles. Although the government has not provided substantial support for EVs, the damaged energy grid further complicates the transition to electric mobility. Consequently, the emphasis continues to be on the maintenance and repair of conventional fuel-powered vehicles.

Improvements in energy efficiency are observed within the construction sector. Initiatives like the Syrian Energy Efficiency Program have introduced energy standards for new buildings, although the ongoing conflict has significantly hindered progress. While private enterprises are gradually adopting energy-efficient technologies, this trend is confined to newer construction projects.

The notion of smart cities is still in its nascent phase in Syria. Some urban areas have initiated small-scale projects, such as energy-efficient lighting, but comprehensive smart city developments have yet to be realized. Current rebuilding efforts take precedence, although future initiatives may incorporate sustainable technologies.

Green financing presents a promising opportunity, yet it remains underdeveloped. International organizations are crucial in funding green projects, although many local startups face challenges in accessing these funds. The government has begun exploring green bonds and subsidies, but these initiatives are still in the preliminary stages of development.

The government has implemented various incentives aimed at promoting the adoption of renewable energy sources, including tax exemptions for both businesses and households utilizing solar energy. Additionally, there are initiatives to establish net metering, which would enable users to sell surplus energy back to the grid. Nonetheless, political instability and sanctions pose significant obstacles to these initiatives.

In Syria, consumer priorities revolve around necessities such as food and shelter. As a result, sustainability is not a primary concern for the majority. However, in more stable areas, there is an increasing interest in energy-efficient appliances and solar-powered technologies, particularly as individuals seek to lessen their dependence on the unreliable electricity grid.

The systems for waste management and recycling in Syria are significantly underdeveloped, a situation exacerbated by years of conflict. While certain cities have established rudimentary waste management systems, the recycling industry remains informal and is primarily operated by small enterprises. There is a pressing need for a comprehensive national recycling strategy to enhance waste management across all sectors.

Water management is of paramount importance, especially in the agricultural sector, where water scarcity presents a critical challenge. The government has advocated for the use of drip irrigation and other conservation techniques. Although international aid has contributed to the restoration of some damaged water infrastructure, achieving sustainable water management continues to be a formidable challenge, particularly in areas affected by conflict.

Biodiversity in Syria has been adversely impacted by the ongoing war; however, initiatives are being undertaken to safeguard the country's ecosystems and wildlife. The General Commission for Environmental Affairs is collaborating with international partners to rehabilitate damaged habitats and protect endangered species, although funding for these efforts remains inconsistent.

In summary, Syria's green economy encounters numerous challenges, yet there are potential avenues for advancement in renewable energy, energy efficiency, and water management. The international community's support and necessary policy reforms will be crucial in facilitating the development of a sustainable and resilient future for the country.

Challenges and Opportunities

Potential for Energy Transition and Greener Economy:

With the given geography and climate in Syria, particularly, incredibly special opportunities are presented concerning renewable energy transition. The country is highly insulated with solar energy throughout, especially in arid areas; hence, it is particularly well-positioned for undertaking projects on solar energy. The next section gives an overview of the potential pathways that Syria might lead in transitioning towards renewable energy sources.

Solar Energy:

With almost 300 sunny days per year, Syria has immense potential in solar energy. This investment in solar power plants and decentralized solar solutions will go a long way in ensuring that the nation is reducing dependence on fossil fuels, especially in rural and off-grid areas

Wind Energy

There are, howsoever at a lesser scale, regions in Syria with powerful wind currents—mostly falling along the coastal areas. The potential of the wind resource could complement solar initiatives as a renewable source.

Hydropower

Hydropower is in small quantities available; there is greater potential, however, for extending the contribution of this source to the energy mix, mainly in areas of major rivers like the Euphrates. Modernization of the already existing infrastructure may result in increases in efficiency and capacity

Biomass and Geothermal:

Other areas of biomass energy from agricultural waste and geothermal energy are also depicted to exist in some parts of Syria, but these too are underinvested and under-researched.

Energy Challenges and Future Directions:

As far as the assurance of the fact that Syria embarks upon the path of a greener economy is concerned, several matters must receive particular attention:

Investing in Renewable Infrastructure:

Improvement and expansion of renewable energy infrastructures are urgently needed for better exploitation of the country's solar and wind energies potential. This would require indispensable international cooperation besides investment by private sectors.

Energy Efficiency Improvements:

The generated waste will be reduced; hence, there will be more reliability in terms of power, especially within the electrical grid. For this, the improvement of energy efficiency shall be ensured. The introduction of newer technologies in the field of energy storage and distribution

Public-Private Sector Collaboration:

Collaboration between the public sector, the personal business community, and international partners can accelerate the project development process for renewable energy sources and attract the required financing.

Environmental Policy and Education:

The strong environmental policies reduce carbon emissions and educate the occupants about the problems of sustainability. It can also be backed by educating people on informing energy saving practices.

SWOT Analysis

Strengths: • Solar Potential • Hydropower Resources • Low Labour Cost	Weaknesses: • Political instability • Limited infrastructure • Lack of Funding
Opportunities: • Foreign investments • Green Jobs • Tech Transfer	Threats: • Climate risks • Economic Sanctions • Limited Expertise

PESTLE Analysis

Political	Government Instability Sanctions Policy Gaps
Economic	Weak Economy High Unemployment Investment Opportunities
Social	Low Public Awareness Migration Issues High Energy Demand
Technological	Limited R&D Low Innovation Renewable Tech Potential
Legal	Regulatory Challenges Lack of Incentives Environmental Laws
Environmental	Climate Vulnerability Water Scarcity Biodiversity Loss

Analysis findings

The SWOT and PESTLE analyses indicate considerable opportunities and obstacles for Syria's green economy. Strengths include vast solar and hydroelectric resources, whilst possibilities reside in international investments and renewable energy objectives. Nonetheless, deficiencies such as political instability, inadequate infrastructure, and financial limitations impede development. Challenges are exacerbated by threats such as climatic dangers, economic restrictions, and water shortages.

From a PESTLE standpoint, political instability and sanctions hinder policy formulation, while an underperforming economy and little public awareness obstruct the implementation of sustainable practices. Technological constraints and insufficient innovation impede progress; yet investment in renewable energy technology might be transformative. Environmental issues, particularly water constraint and biodiversity decline, underscore the need for sustainable solutions.

Improving Syria's green economy necessitates the stabilization of the political landscape, the augmentation of foreign investments, and the execution of sound environmental policies to promote the advancement of renewable energy and green technology.

Youth Perspective and Concluding Remarks

1. Harnessing the Power of Technology and Innovation:

- **Promote digital literacy and tech skills:** Equipping young people with the necessary digital skills will empower them to develop and implement innovative green solutions.
- **Encourage green tech startups:** Foster an ecosystem that supports youth-led green startups. This could involve providing access to funding, mentorship, and incubation programs.
- **Leverage social media and online platforms:** Use digital platforms to raise awareness about environmental issues, share sustainable practices, and mobilize youth action.

2. Empowering through Education and Awareness:

- **Integrate sustainability into the curriculum:** Incorporate environmental education into all levels of education, from primary school to university.
- **Launch youth-led awareness campaigns:** Encourage young people to design and implement their own awareness campaigns on topics such as renewable energy, waste reduction, and water conservation.
- **Organize workshops and training programs:** Conduct workshops and training programs to equip young people with the knowledge and skills necessary to lead the green transition.

3. Fostering Community Engagement and Participation:

- **Establish youth-led environmental clubs:** Encourage the formation of environmental clubs in schools and communities where young people can collaborate on green projects.
- **Organize community clean-up drives and tree-planting initiatives:** These activities can foster a sense of responsibility and ownership among young people for their environment.
- **Engage with local communities:** Partner with local communities to identify and address environmental challenges that affect them directly.

4. Building Strategic Partnerships:

- **Collaboration between government, private sector, and civil society:** Foster partnerships to leverage resources, expertise, and networks to support the green transition.
- **Engage international organizations:** Seek support from international organizations for capacity building, technology transfer, and funding.
- **Mentorship programs:** Connect young people with experienced professionals in the environmental field to provide guidance and support.

5. Policy Advocacy and Youth Representation:

- **Establish youth advisory councils:** Create platforms where young people can voice their concerns and contribute to policymaking on environmental issues.
- **Engage in advocacy and lobbying:** Empower young people to advocate for policies that support a green economy and hold decision-makers accountable.

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PROJECT TITLE

Green Economy Transition in **UAE**

PARTICIPANT NAME :

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2. Shaikha Saeed Alremeithi

COUNTRY REPRESENTED:

United Arab Emirates

Introduction

Country Name	United Arab Emirates (UAE)
Continent	Asia
Population	11.1 million (2024 estimate)
Climate Type	Arid desert climate, characterized by extremely high temperatures in summer and mild winters
Primary Energy Consumption per Capita	149,830 kWh (2023)
Primary Energy Consumption from Renewable Energy	5% (2022)
Share of the population with access to electricity	100%
Per Capita CO2 Emissions	25.8 tons per capita (2022)

1.2 Analysis of the Green Economy

The United Arab Emirates (UAE) has made significant strides in its transition to a green economy. Driven by ambitious government initiatives and substantial investments, the country has positioned itself as a regional leader in sustainable development. However, challenges and opportunities remain as the UAE continues its journey toward a more environmentally friendly future.

1. Renewable Energy Status

The UAE has made remarkable progress in advancing its renewable energy sector, with a strong focus on solar power. As of 2024, renewable energy sources contribute approximately **25% of the national energy mix**, reflecting significant progress in diversifying the country's energy portfolio [3] [4]. A key driver of this achievement is the **Mohammed bin Rashid Al Maktoum Solar Park**, one of the world's largest solar power projects [5].

Looking ahead, the UAE has set ambitious targets under the **UAE Energy Strategy 2050**, aiming to increase the share of renewables to **50% by 2050** [6]. Achieving this goal will require substantial investments in solar, wind, and emerging technologies such as green hydrogen. The country is also advancing through initiatives like the **Barakah Nuclear Energy Plant** and **Masdar's international renewable energy projects**, which further strengthen its clean energy ambitions.

Moreover, the UAE's commitment to renewable energy is underscored by its **Hydrogen Leadership Roadmap**, positioning the country as a leader in clean hydrogen production and innovation. These efforts reflect a comprehensive approach to achieving long-term energy sustainability, reducing carbon emissions, and leading the transition to a greener economy.

2. Electric Mobility

The United Arab Emirates (UAE) has positioned electric vehicles (EVs) as a pivotal element of its sustainable transportation strategy. Currently, electric vehicles constitute approximately 3% of the total vehicle population in the UAE, reflecting a nascent but growing market compared to leading countries like Norway, where EVs account for over 54% of new car sales [7].

To facilitate the adoption of EVs, the UAE government has enacted a series of supportive policies and incentives. These include provisions for free parking in designated areas, exemptions from tolls on specific roads, and reduced registration fees for electric vehicles [8] [9] [10] [11]. Notably, the Dubai Electric Vehicle Strategy aims to elevate the proportion of EVs in the city to 20% of the total vehicle fleet by 2030, underscoring the government's commitment to fostering a greener transportation landscape[7].

Infrastructure development is also a significant focus, with a plan to install 1,000 charging stations across the nation by 2050[12]. As of mid-2023, approximately 400 public charging stations have been established, representing a marked increase in infrastructure to support electric mobility[7].

Despite these advancements, several challenges hinder the accelerated adoption of EVs in the UAE. Key obstacles include limited consumer awareness regarding the advantages of electric vehicles, the relatively higher initial purchase costs compared to conventional vehicles, and concerns about the availability of charging infrastructure, particularly in less urbanized regions.

In conclusion, while the UAE demonstrates a strong commitment to electric mobility through targeted initiatives and infrastructure investments, addressing the barriers to adoption will be crucial for achieving the ambitious objectives outlined in the country's green transportation strategy.

3. Energy Efficiency Measures

The UAE has undertaken a comprehensive approach to improving energy efficiency across buildings, industries, and transportation. These efforts are critical to achieving the country's sustainability and carbon reduction goals.

Buildings: The UAE has introduced stringent energy efficiency regulations, such as the Dubai Green Building Regulations and Abu Dhabi's Estidama initiative. These measures promote sustainable building practices by focusing on reducing water and energy consumption through energy-efficient designs, local materials, and advanced technologies. For example, Dubai's building codes, which became mandatory in 2014, enforce strict guidelines to ensure that all new constructions meet specific sustainability criteria [13]. Ras Al Khaimah's Barjeel regulations aim to reduce energy and water use by 30% in new buildings, setting a high bar for sustainability in the region [14].

Industries: In the industrial sector, the Emirates Energy Star (EES) initiative plays a key role in improving energy efficiency by retrofitting existing buildings with energy-saving systems. The program helps businesses achieve energy savings ranging from 10% to 35%, depending on the measures adopted [15]. Additionally, the UAE has implemented demand-side management policies, optimizing energy use and reducing waste in industrial operations. These policies focus on enhancing energy distribution systems and minimizing energy losses through advanced technologies.

Transportation: The transportation sector has seen significant efforts to improve fuel efficiency and encourage the use of electric vehicles (EVs). Dubai's Clean Energy Strategy integrates policies that promote electric public transportation and the development of EV infrastructure, including widespread installation of charging stations. These initiatives are crucial to reducing the carbon footprint of the transportation sector and shifting away from fossil fuel dependency.

Effectiveness: The effectiveness of these energy efficiency measures is evident. The UAE is projected to save AED 10 billion by 2030 through building efficiency measures alone [16]. Moreover, the Sharjah Conservation Initiative aims for a 30% reduction in power and water consumption, while national efforts are set to reduce carbon emissions by 30% overall [17] [16]. These initiatives not only demonstrate the UAE's commitment to sustainability but also highlight its progress in transitioning toward a more energy-efficient and environmentally responsible economy.

In summary, the UAE has implemented a wide range of energy efficiency measures across key sectors, showing significant progress in reducing energy consumption and emissions. These efforts align with its broader vision of sustainability and long-term environmental stewardship.

4. Smart City Initiatives

The UAE has initiated several ambitious smart city projects aimed at enhancing sustainability and improving urban living standards. Leading these initiatives, Dubai and Abu Dhabi focus on minimizing environmental impacts and optimizing resource use through innovative technologies.

A cornerstone of this effort is Dubai's Smart Dubai 2021 initiative, which emphasizes the integration of Internet of Things (IoT) technologies, artificial intelligence (AI), and smart infrastructure across various sectors, including energy, transportation, and waste management [18].

Key components of this initiative include the testing of autonomous vehicles, the incorporation of solar energy, and the development of advanced waste management systems that convert waste into energy. Notably, The Sustainable City in Dubai exemplifies this approach by utilizing renewable energy sources and promoting eco-friendly living through car-free areas.

Future projects, such as Desert Rose City and Sharjah Sustainable City, are designed to operate entirely on renewable energy and include recycling facilities, further reinforcing the UAE's commitment to sustainability [19].

These initiatives align with the UAE's broader vision to emerge as a global leader in sustainable smart cities, targeting carbon neutrality by 2050. Through these transformative urban projects, the UAE not only enhances its urban landscape but also sets new global standards for smart and green urban development [18].

5. Green Financing

The UAE has established a strong framework for green financing to encourage investment in sustainable projects. Key financial instruments include green bonds issued by both government and private entities, and the Abu Dhabi Green Fund, which supports renewable energy initiatives and green technology startups. Additionally, the Dubai Green Fund offers low-interest loans for energy efficiency projects [20] [21].

These funds are designed to be accessible to both startups and established companies, with streamlined application processes to facilitate participation in the green economy. Through these efforts, the UAE aims to mobilize significant investment in sustainability and climate resilience [22].

6. Government Incentives

The UAE government has implemented a range of incentives to promote green practices, including tax breaks, subsidies, and grants for renewable energy projects, energy-efficient technologies, and sustainable transportation. Regulatory frameworks, such as the National Climate Change Plan 2017-2050, support the transition to a green economy [23].

7. Consumer Behavior

In recent years, consumer awareness and engagement in sustainable practices have markedly increased in the UAE. A 2023 survey revealed that 70% of respondents believe the financial costs associated with climate disruption and pollution will outweigh the necessary investments to mitigate these issues, indicating a growing concern for environmental sustainability. Furthermore, 63% of consumers expressed a willingness to pay a premium for products made from recycled materials [24].

The UAE government has implemented various initiatives to promote sustainability, including the "National Recycling Programme," which encourages residents to recycle through convenient collection points and educational efforts. Additionally, campaigns like "Beat Plastic Pollution" raise awareness about reducing single-use plastics and enhancing recycling practices [25]. These initiatives demonstrate the UAE's commitment to fostering environmental responsibility among its citizens. [26].

While there remains room for improvement in sustainable consumption habits, current consumer behavior trends reflect a positive shift toward environmental responsibility. This progress is driven by both governmental initiatives and an increasing engagement from consumers with eco-friendly products and services.

8. Waste Management and Recycling

The UAE has made significant investments in waste management and recycling infrastructure, establishing various facilities aimed at diverting waste from landfills. As of recent reports, the overall recycling rate in the UAE is approximately 20-25% of total waste generated, with specific initiatives targeting residential, commercial, and industrial sectors. The government has set an ambitious goal to increase this recycling rate to 75% by 2025, supported by initiatives such as public awareness campaigns, incentives for businesses, and the implementation of advanced sorting technologies [27].

Despite these efforts, challenges persist, including the need for more comprehensive sorting facilities and low public engagement in recycling practices. A 2023 survey revealed that while awareness of recycling is high, actual participation remains below expectations, highlighting the need for ongoing improvements in education and infrastructure to meet sustainability goals.

9. Water Management

The UAE faces significant water scarcity due to its arid climate and growing population. To address this, the government has implemented sustainable water management strategies, including desalination, water conservation, and wastewater treatment.

Central to these efforts is the UAE Water Security Strategy 2036 [28], which aims to enhance water use efficiency in both agricultural and urban settings through initiatives like:

- Efficient Irrigation Systems: Promoting advanced irrigation technologies to minimize water waste.
- Public Awareness Campaigns: Educating residents on the importance of water conservation.

With over 70% of its water supply coming from desalination, the Emirates Water and Electricity Company (EWEC) plays a key role in ensuring a stable water supply [29]. The International Water Management Institute (IWMI) notes that the UAE has one of the highest per capita water consumption rates globally, highlighting the need for continued sustainability efforts.

10. Biodiversity and Conservation Efforts

The UAE has made significant strides in biodiversity conservation, recognizing its importance for environmental sustainability. Key initiatives include the establishment of protected areas, such as the Al Wathba Wetland Reserve, which provides vital habitats for migratory birds and diverse wildlife [30]. The UAE National Biodiversity Strategy outlines specific actions aimed at enhancing conservation efforts and promoting the sustainable use of biological resources.

Currently, over 13% of the UAE's land is designated as protected, encompassing a network of national parks and nature reserves that play a crucial role in safeguarding ecosystems [31]. Additionally, public awareness campaigns have been launched to engage communities and foster appreciation for the country's natural heritage.

The UAE also collaborates with local and international organizations to focus on research, habitat restoration, and species monitoring, ensuring that conservation strategies are informed by the latest scientific findings. These comprehensive efforts reflect the UAE's commitment to preserving its unique biodiversity while promoting sustainable practices that benefit both the environment and local communities.

The UAE has made significant progress in its transition to a green economy. The country's ambitious initiatives and investments in renewable energy, energy efficiency, and sustainable practices have positioned it as a leader in the region. However, challenges remain, and ongoing efforts are needed to ensure a sustainable future for the UAE.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: • Strong Government Commitment and Initiatives • Leadership in Renewable Energy • Advanced Infrastructure Development • Robust Green Financing Mechanisms • Progressive Energy Efficiency Measures	Weaknesses: • Early-Stage Electric Vehicle (EV) Market • Infrastructure Gaps • High Water Consumption • Consumer Awareness and Behavior
Opportunities: • Expansion of Renewable Energy Projects • Growth in Electric Mobility • Advancements in Smart City Technologies • Enhancement of Green Financing • The outcomes of COP28	Threats: • Economic Volatility • Technological Barriers • Regulatory Risks • Environmental Challenges • Social Resistance

Strengths:

Strong Government Commitment and Initiatives

- The UAE Energy Strategy 2050 aims to increase the renewable energy share to 50%, highlighting long-term planning.
- Significant funding is directed toward projects like the Mohammed bin Rashid Al Maktoum Solar Park and Barakah Nuclear Energy Plant.
- Initiatives such as the Hydrogen Leadership Roadmap and National Climate Change Plan 2017-2050 demonstrate a comprehensive sustainability approach.
- The UAE is also investing in Carbon Capture, Utilization, and Storage (CCUS) technologies to address high energy demand while minimizing carbon emissions.

Leadership in Renewable Energy

- Hosting one of the world's largest solar parks positions the UAE as a solar energy leader.
- The diversification of the energy portfolio, including wind, green hydrogen, and nuclear energy, enhances energy security.

Advanced Infrastructure Development

- The deployment of over 400 public EV charging stations supports electric vehicle adoption, with plans to increase this to 1,000 by 2050.
- Smart city projects integrate IoT and AI with renewable technologies to optimize resource use.

Robust Green Financing Mechanisms

- The establishment of the Abu Dhabi Green Fund and Dubai Green Fund facilitates investment in renewable energy and green technologies.
- Accessible financial instruments, like low-interest loans, encourage participation from startups and established firms.

Progressive Energy Efficiency Measures

- Regulations such as Dubai Green Building Regulations and Abu Dhabi's Estidama initiative enforce energy-efficient designs in construction.
- Initiatives like the Emirates Energy Star (EES) achieve significant energy savings through retrofitting and demand-side management.

Weaknesses:

Early-Stage Electric Vehicle (EV) Market

- EVs make up only about 3% of the total vehicle population, indicating limited market development.
- Higher initial costs deter widespread adoption.

Infrastructure Gaps

- The availability of charging stations, especially in rural areas, remains insufficient.
- Current recycling rates of 20-25% are below targets, reflecting inadequate sorting facilities and low public participation.

High Water Consumption

- Reliance on desalination (over 70% of water supply) leads to high per capita consumption, posing sustainability challenges.
- Desalination processes are energy-intensive, potentially offsetting renewable energy gains.

Consumer Awareness and Behavior

- There is a need for increased education about the benefits of sustainable practices and technologies.
- Despite high awareness, actual participation in recycling and sustainable consumption is below expectations.

Opportunities:

Expansion of Renewable Energy Projects

- Investment in emerging technologies, such as green hydrogen, can diversify the energy mix.
- International collaborations, like Masdar's renewable projects, offer avenues for global partnerships.
- IRENA statistics indicate the UAE's potential to increase its renewable energy capacity by 50% by 2030, positioning it as a key player in the global landscape.

Growth in Electric Mobility

- Government incentives can accelerate EV adoption, supported by infrastructure expansion to enhance accessibility.

Advancements in Smart City Technologies

- Leveraging IoT and AI can optimize resource management and enhance urban sustainability.

Enhancement of Green Financing

- Expanding green bonds can attract more investors and support sustainable project development.

COP28 Outcomes

- The outcomes of COP28 have reinforced global commitments to climate action, providing the UAE with enhanced international support and collaboration opportunities for its energy transition.

Threats:

Economic Volatility

- The UAE's economy still heavily relies on hydrocarbons, making the transition susceptible to global oil market fluctuations.

Technological Barriers

- Rapid technological changes may challenge resource allocation and infrastructure development.

Regulatory Risks

- Changes in government policies could disrupt ongoing green projects.

Environmental Challenges

- Extreme climate conditions can impact the efficiency of renewable energy systems.

Social Resistance

- Shifting consumer behavior towards sustainable practices may encounter cultural resistance.

This SWOT analysis highlights the UAE's strategic position in the green economy, emphasizing its strengths while acknowledging weaknesses and external challenges. By leveraging opportunities, the UAE can enhance its sustainability trajectory and transition towards a greener economy.

PESTLE Analysis

Political	The UAE government demonstrates a strong commitment to sustainable development through various strategic initiatives. The UAE Energy Strategy 2050 aims to increase the share of clean energy in the total energy mix to 50% by 2050, fostering a diverse energy portfolio. The government supports international agreements such as the Paris Agreement, reinforcing its role in global climate action. Additionally, the UAE's hosting of events like COP28 enhances its leadership in climate discussions and showcases its commitment to a sustainable future.
Economic	The UAE's economy heavily relies on hydrocarbons, which presents both challenges and opportunities for the green economy. While the oil sector contributes significantly to GDP, fluctuations in oil prices can threaten economic stability. However, the UAE is diversifying its economy through substantial investments in renewable energy projects. Initiatives like the Mohammed bin Rashid Al Maktoum Solar Park and the Barakah Nuclear Energy Plant exemplify this shift. Moreover, the International Renewable Energy Agency (IRENA) estimates that the UAE can increase its renewable energy capacity by 50% by 2030, which could position it as a leader in the renewable energy sector.
Social	The public's awareness and acceptance of sustainable practices are crucial for the success of the green economy. While there is growing interest in environmental sustainability, actual participation in initiatives like recycling remains low. Factors such as cultural preferences and lack of incentives can hinder the adoption of green technologies. To overcome this, targeted educational campaigns can promote the benefits of sustainable practices, encouraging community engagement and participation.
Technological	Technological advancements play a pivotal role in the UAE's green economy. The country is investing in cutting-edge technologies such as Carbon Capture, Utilization, and Storage (CCUS), which can help manage the challenges of high energy demand while minimizing carbon emissions. The UAE is also exploring innovative solutions like green hydrogen and smart grid technologies. By fostering partnerships between government, academia, and private sectors, the UAE can drive technological innovation and enhance its green economy.
Legal	Legal frameworks and regulations are essential for promoting sustainable practices. The UAE has implemented several initiatives, such as the Dubai Green Building Regulations and Abu Dhabi's Estidama initiative, which enforce energy efficiency in construction. However, ensuring compliance with these regulations can be challenging. Strengthening enforcement mechanisms and providing incentives for adherence can improve the overall effectiveness of sustainability initiatives.
Environmental	The UAE faces significant environmental challenges, including water scarcity and extreme climate conditions. Reliance on desalination for water supply is energy-intensive, which can offset renewable energy gains. However, the UAE is committed to addressing these issues through sustainability initiatives, such as increasing the percentage of protected land and enhancing biodiversity. Furthermore, projects aimed at improving water management and energy efficiency can contribute to a more sustainable future.

Analysis findings

The SWOT and PESTLE analyses indicate that the UAE has a solid foundation for enhancing its green economy, characterized by strong government commitment and significant investments in renewable energy projects. While the UAE Energy Strategy 2050 aims for a 50% share of clean energy, challenges such as an early-stage electric vehicle market and high water consumption present hurdles. Opportunities exist in expanding renewable energy initiatives and increasing public engagement in sustainability practices.

Politically, strong support and international collaborations are crucial, while economic diversification reduces reliance on hydrocarbons. Socially, raising awareness and participation in green practices is vital for success. Technological advancements, including CCUS and smart grid solutions, can drive innovation. Legal frameworks must be strengthened to enforce sustainability regulations. Addressing environmental challenges like water scarcity will further contribute to the UAE's transition toward a sustainable future, positioning it as a leader in the global green economy.

Youth Perspective and Concluding Remarks

The transition to a greener economy in the UAE presents both challenges and opportunities that require the active involvement of youth. Throughout the Global Green Economy Young Leaders Program, we gained valuable insights into the pressing environmental issues facing our country and the vital role we can play in addressing them.

To support this transition, we propose several actionable solutions grounded in our learnings.

Promoting Green Education and Awareness:

A crucial step in fostering a sustainable future is enhancing educational initiatives focused on environmental stewardship. Schools and universities should integrate sustainability into their curricula, emphasizing practical applications of green technologies and sustainable practices. Workshops and awareness campaigns can be organized to engage students and communities, encouraging them to adopt eco-friendly habits such as recycling, reducing waste, and conserving energy.

Leveraging Technology for Sustainability:

The UAE is well-positioned to harness technological advancements to drive sustainable practices. Youth can advocate for the adoption of innovative technologies such as smart energy management systems and sustainable agriculture solutions. Collaborating with local startups and tech companies can facilitate the development of applications that promote sustainable living, such as platforms for sharing resources and information about green products and services.

Encouraging Community Involvement:

Engaging local communities is essential for promoting sustainability at the grassroots level. Youth can initiate community-based projects that focus on environmental conservation, such as tree planting drives, clean-up campaigns, and educational workshops. These initiatives not only raise awareness but also foster a sense of responsibility and ownership among community members regarding their environmental impact.

Building Strategic Partnerships:

Forming strategic partnerships with governmental bodies, NGOs, and private sector organizations can amplify the impact of youth-led initiatives. Collaborating on sustainability projects can provide resources and support for implementing innovative solutions. Youth can also participate in policy-making processes, advocating for regulations and incentives that promote sustainable practices and green investments.

Fostering a Culture of Sustainability in Business:

Encouraging businesses to adopt sustainable practices is vital for the broader transition to a greener economy. Youth can promote awareness of corporate social responsibility (CSR) among local businesses, urging them to integrate sustainability into their operations. This can involve developing partnerships with businesses to create programs that highlight the benefits of sustainability for both the environment and their bottom line.

In conclusion, the transition to a greener economy in the UAE is a collective effort that necessitates active participation from youth. By promoting green education, leveraging technology, encouraging community involvement, building strategic partnerships, and fostering a culture of sustainability in business, we can contribute to a sustainable future. Our insights and recommendations reflect a commitment to addressing environmental challenges while seizing opportunities for innovation and collaboration. Together, we can pave the way for a more sustainable and resilient UAE.

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PROJECT TITLE

Green Economy Transition in Uganda

PARTICIPANT NAME :

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2. Aurelia Abemigisha

COUNTRY REPRESENTED:

Uganda

Introduction

Country Name	Uganda
Continent	Africa
Population	50,295,584 (2023 estimate)
Climate Type	Tropical climate
Primary Energy Consumption per Capita	767 kWh per person (2021)
Primary Energy Consumption from Renewable Energy	90.9% of total energy consumption (2022)
Share of the population with access to electricity	45.22% of the total population (2022)
Per Capita CO2 Emissions	0.1 tons per capita (2022)

Primary Energy Consumption per Capita:

Energy use per person

Measured in kilowatt-hours per person. Here, energy refers to primary energy using the substitution method.

Our World
in Data

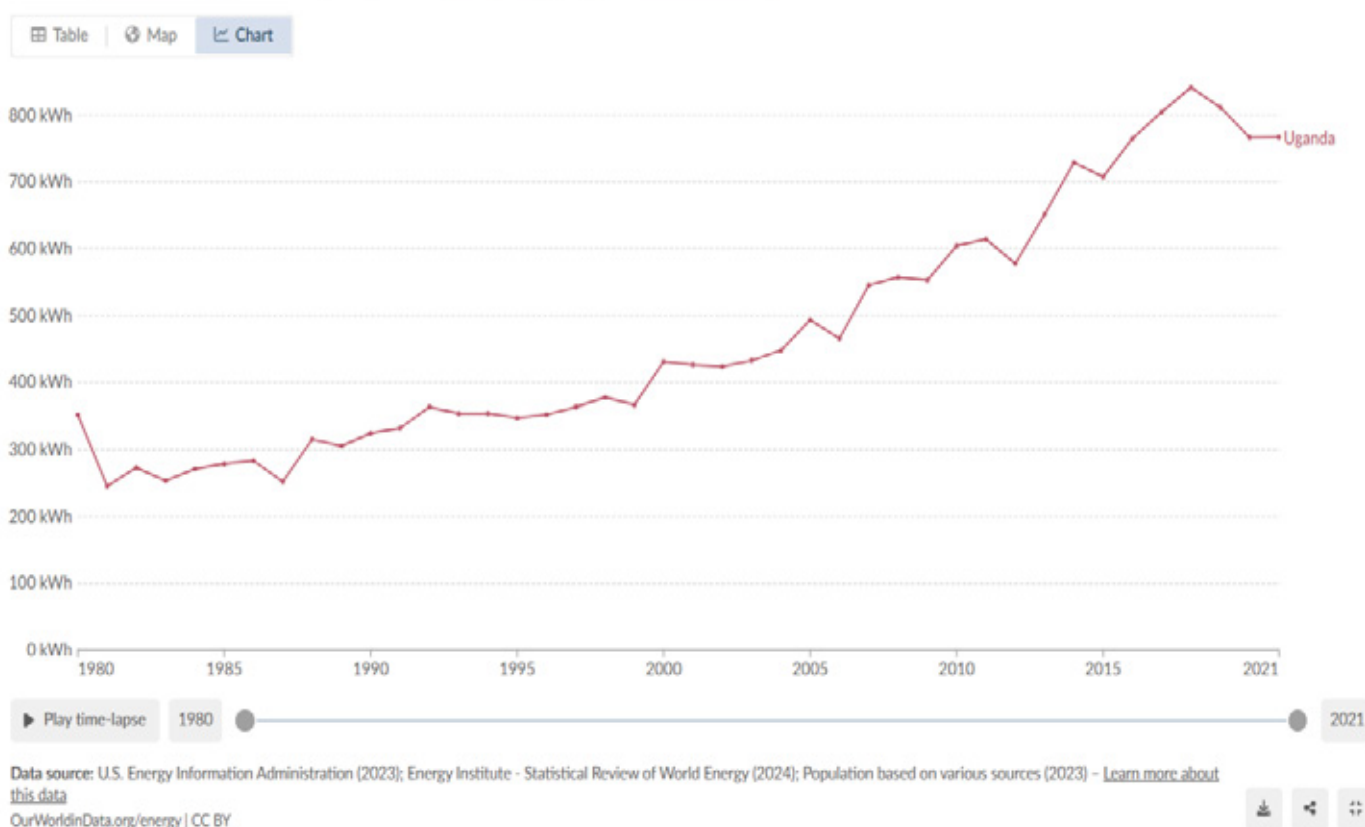


Table 1: Energy use per person measured in kilowatt-hours per person. As of 2021, Uganda has 767 kilowatt-hour energy consumed per person (Data from [Energy use per person \(ourworldindata.org\)](#))

Primary Energy Consumption from Renewable Energy:

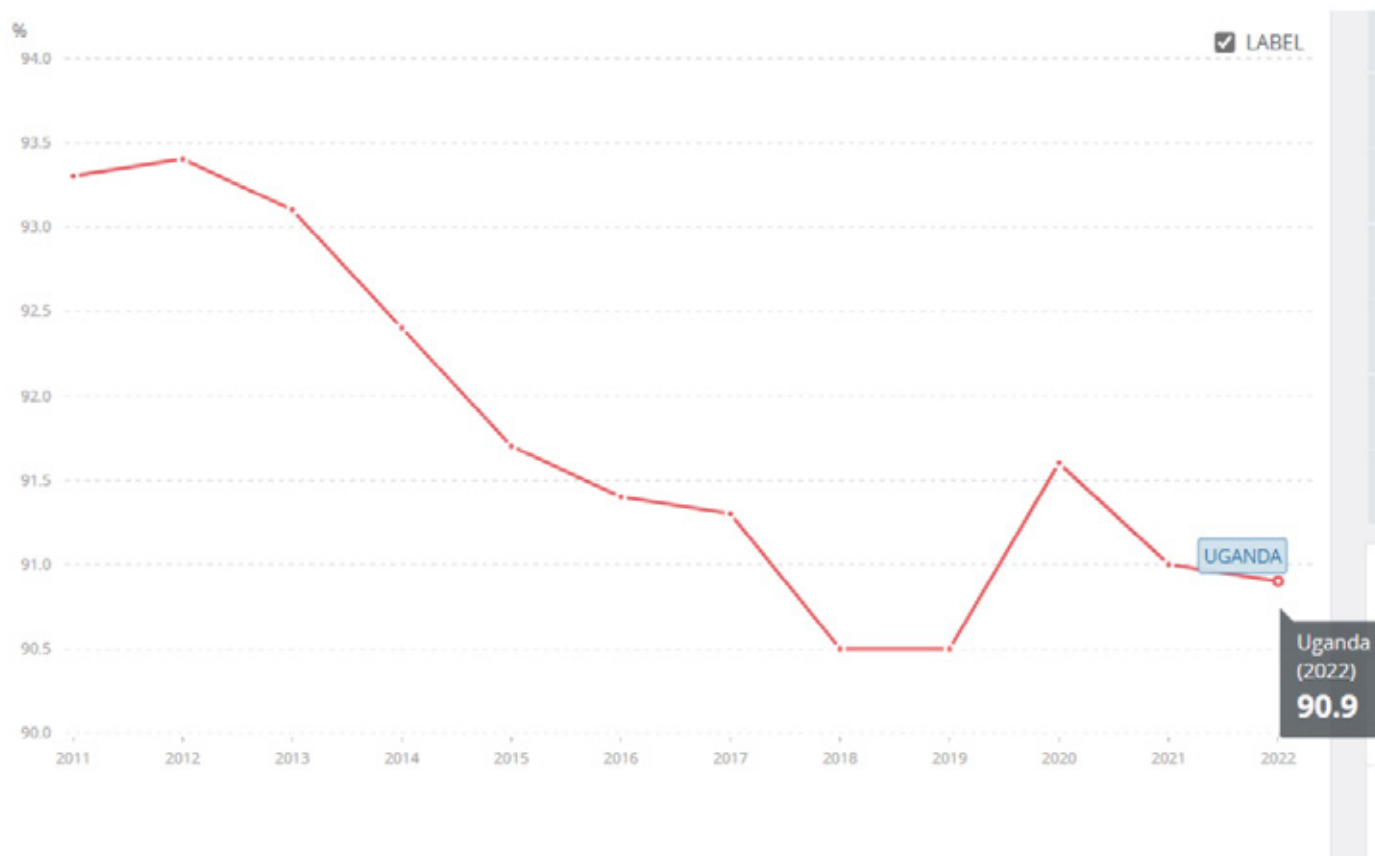


Table 2: Renewable energy consumption (% of total final energy consumption). As of 2022, Uganda has renewable energy sources accounted for approximately 90.9% of the country's total energy supply (Data from [Renewable energy consumption \(% of total final energy consumption\) - Uganda | Data \(worldbank.org\)\)](#))

Share of the population with access to electricity:

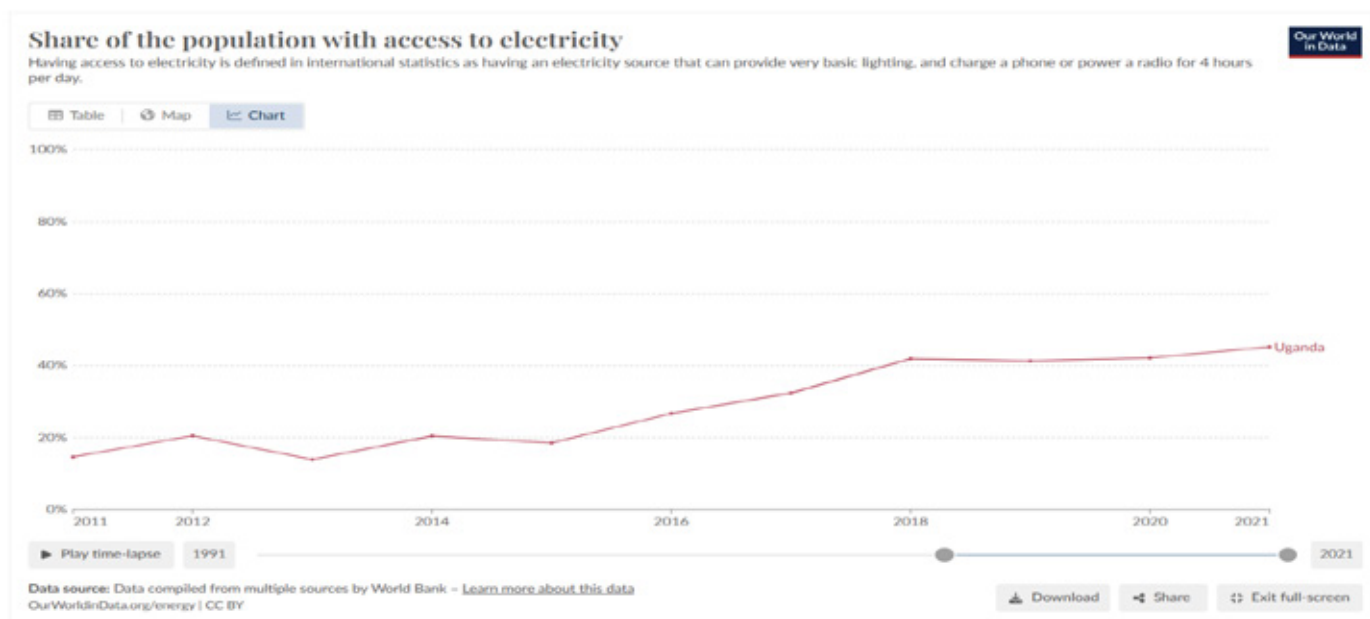


Table 3: Share of the population with access to electricity. As of 2022, Uganda has 45.22% of the total population having access to electricity (Data from [Share of the population with access to electricity \(ourworldindata.org\)\)](#))

Per Capita CO₂ Emissions:

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.

Our World
in Data

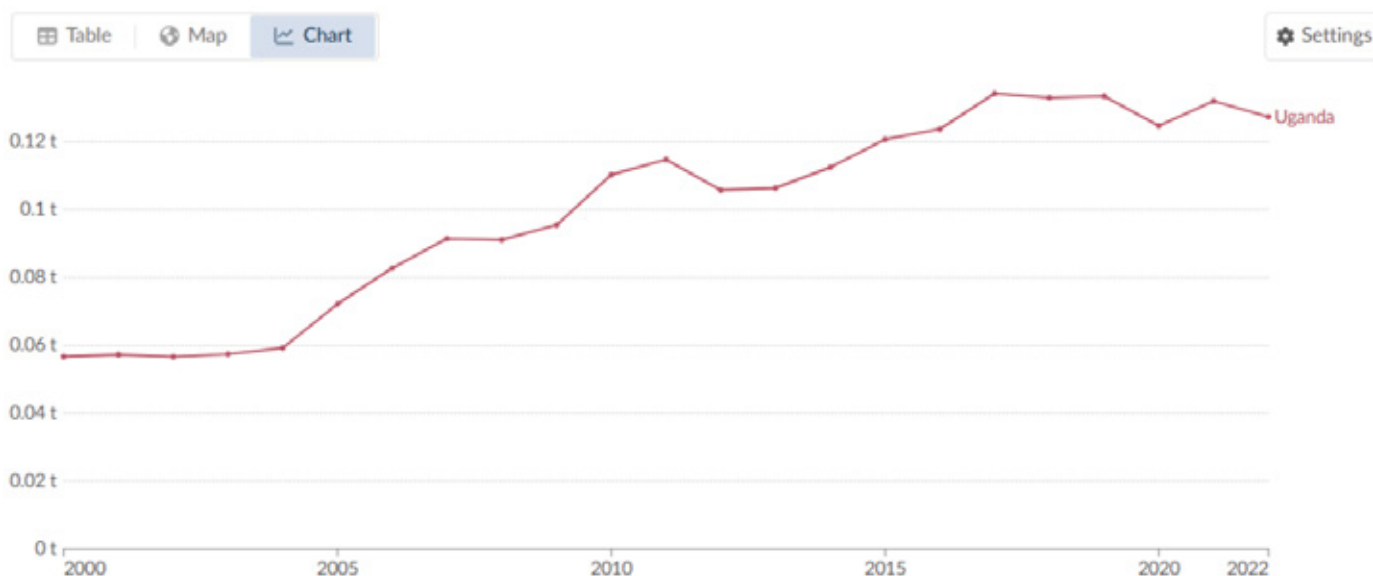


Table 4: Uganda CO₂ emissions per capita. As of 2022, Uganda had 0.1 ton of emissions per person. (Data from [CO₂ and Greenhouse Gas Emissions Data Explorer - Our World in Data](#))

Analysis of the Green Economy

Uganda has been making strides in developing a green economy, with initiatives across multiple sectors such as agriculture, energy, forestry, and transport [1,2]. Renewable energy sources, particularly hydropower, dominate Uganda's energy mix. As of recent reports, over 80% of Uganda's electricity generation capacity comes from renewable sources. The government has ambitious plans to develop its substantial energy and mineral resources, promote economic development, end energy poverty, and lead the country to a just energy transition in its Vision 2040 [3]. Uganda is part of the Scaling-Up Renewable Energy Program (SREP), which aims to increase access to clean energy, reduce reliance on fossil fuels, and enhance energy security [4]. However, electric vehicles (EVs) are not widespread, and the infrastructure, like charging stations, is limited. While policies such as tax incentives for EV imports exist, high costs, limited public awareness, and insufficient infrastructure are barriers to greater adoption [5].

Energy efficiency measures in Uganda include updated building codes, industrial energy audits, and fuel-efficient vehicle policies. These measures aim to reduce energy consumption and environmental impact, but their effectiveness has been inconsistent, largely due to funding challenges and limited awareness. Progress is notable in the commercial sector, though more investments are needed to fully integrate energy efficiency across all sectors. Meanwhile, smart city initiatives are beginning to take shape, focusing on sustainable urban planning. Projects such as smart lighting systems, waste management, and digital infrastructure aim to improve urban services while reducing environmental impacts, contributing to the development of eco-friendly cities [6,3].

Green financing is available through instruments like green bonds and grants, but startups face challenges in accessing these funds due to stringent criteria [7]. Established companies with proven records have better access, but efforts are underway to simplify application processes and improve capacity-building initiatives [8]. The government also offers incentives like tax exemptions for renewable energy investments and energy-efficient technologies, as well as subsidies for small and medium-sized enterprises (SMEs) adopting sustainable practices. These initiatives are further supported by public-private partnerships (PPPs), which offer financial and technical assistance for green projects. Consumers are encouraged to adopt greener practices through rebate programs for energy-efficient appliances and awareness campaigns on waste reduction and recycling [7].

Waste management and recycling in Uganda face significant challenges, particularly in urban areas where infrastructure struggles to handle growing waste volumes. Public participation in waste segregation remains limited, which hampers recycling efforts [9]. However, Uganda is exploring waste-to-energy technologies like anaerobic digestion to manage waste more efficiently while

generating energy [10]. Collaborative efforts between the government and the private sector are aimed at improving waste management systems, though implementation remains a challenge [9].

In terms of water management, Uganda has adopted climate-smart agriculture techniques like mulching and conservation tillage to optimize water use. Efficient irrigation systems, such as drip and sprinkler irrigation, are promoted to reduce water wastage in agriculture. In urban areas, integrated water resource management (IWRM) is being applied to balance water use with sustainable development, alongside innovations like rainwater harvesting and greywater recycling to address water scarcity [11].

Biodiversity conservation is a priority, with initiatives like USAID’s Biodiversity for Resilience (B4R) and the BIOPAMA Action Component focusing on protecting key ecosystems [12]. National policies, such as the National Environment and Wildlife Policies, guide these efforts, while community-based conservation projects aim to economically empower locals through sustainable practices, integrating conservation with community development. These collective efforts are crucial for safeguarding Uganda’s biodiversity and ensuring it remains integrated into national development strategies [13]

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Rich Biodiversity and Natural Resources - Abundant Renewable Energy Resources - Government commitment (Uganda's Vision 2040) [3]	Weaknesses: - Limited Access to Modern Energy in Rural Areas - Inadequate Infrastructure for Electric Mobility - Limited Green Financing for Startups
Opportunities: - Sustainable Tourism and Conservation - International Partnerships and Development Aid - Potential for Green Industrialization - Growing Global Demand for Green Products and Carbon Markets	Threats: - Climate Change and Environmental Degradation. - Policy Instability and Inconsistent Enforcement. - Dependence on Fossil Fuels - Slow Technological Adoption

PESTLE Analysis

Political	Government Commitment to Sustainability, International Collaboration
Economic	Low GDP Per Capita, Oil Production and Economic Diversification [3], Low GDP Per Capita
Social	Urbanization, Inequality and Disparities, Access to Education
Technological	Renewable Energy Potential, Slow Adoption of Green Technologies
Legal	Environmental Laws and Regulations, Renewable Energy Incentives, Lack of Comprehensive Energy Efficiency Standards
Environmental	Climate Change Vulnerability, Deforestation and Biodiversity Loss, Mineral Resources

Analysis findings

In Uganda, a SWOT analysis reveals strengths such as abundant renewable energy resources and a growing number of green initiatives, while weaknesses include inadequate infrastructure and limited funding. Opportunities exist in the increasing global demand for green products, but threats include policy instability and the impacts of climate change. A PESTLE analysis highlights that political stability supports green policies, economic growth encourages investment, societal awareness drives green practices, technological advancements improve efficiency, legal frameworks promote sustainability, and environmental concerns necessitate eco-friendly measures. To enhance its green economy, Uganda can leverage its strengths, address weaknesses through infrastructure development, capitalize on global opportunities, mitigate threats by ensuring stable policies, and align its strategies with political, economic, social, technological, legal, and environmental factors to achieve sustainable growth.

Youth Perspective and Concluding Remarks

Uganda is among the fastest-growing countries in the world, with its economic growth trajectory offering significant potential for transformation. Despite this, Uganda remains a low-income country, with a GDP per capita 40% below the sub-Saharan Africa average. However, real GDP has grown at an impressive annual rate of 6% over the past two decades. To maintain this pace of growth, while ensuring sustainability, Uganda must step up efforts to develop its energy systems and address the environmental challenges that come with rising energy demand. Uganda is rich in domestic energy and mineral resources that could fuel its energy transition, including significant potential for solar, hydroelectric, and geothermal power [3].

Building infrastructure to provide electricity to vulnerable communities should be Uganda's priority. Expanding off-grid solar systems and solar micro-grids will allow remote and low-income communities to access affordable renewable energy. Ensuring that these communities have access to modern energy is critical to improving livelihoods and fostering equitable development. At the same time, building infrastructure for proper schooling in these areas is equally important to ensure that children receive quality education. Uganda has made progress in increasing school enrollment, but access to education remains inequitable [14]. Integrating environmental education and training in sustainability practices, such as renewable energy and climate-smart agriculture, into the curriculum will empower the next generation to contribute to Uganda's green economy. Adding such practical classes will also allow kids to help nurture their abilities in operating and troubleshooting their community's electricity grids, as well as adopt more sustainable practices into their lives.

This will also boost public engagement, which currently remains low, despite the country's rapid growth in commercial and industrial activity. Uganda should introduce nationwide sustainability awareness programs, focusing on energy conservation, waste reduction, and recycling. Educating consumers about energy performance standards, particularly for imported appliances and building materials, could help rein in growing energy consumption. Government-led campaigns should also emphasize the benefits of adopting smart urban design and public transit to reduce private vehicle demand, alleviate traffic congestion, and minimize carbon emissions. With deforestation remaining a major environmental issue, driven by the need for land and fuelwood, which contributes to soil erosion and reduced biodiversity [15], there should be initiatives to focus on that. The government should launch a national tree-planting campaign, encouraging every citizen to plant trees on a large scale. This would help protect infrastructure from damage during heavy rainfall, prevent soil erosion, and promote reforestation. Agroforestry programs that integrate tree planting with farming activities can create green jobs, improve agricultural productivity, and support economic growth. As for the problem of farmers relying heavily on artificial fertilizers and manures, which contribute to soil degradation and environmental pollution [15]. Government-led initiatives to train farmers in sustainable farming techniques and provide access to organic fertilizers could reduce the environmental impact of agriculture while improving long-term productivity.

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PROJECT TITLE

Green Economy Transition in Yemen

PARTICIPANT NAME :

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COUNTRY REPRESENTED:

Yemen

Introduction

Country Name	Yemen
Continent	Asia
Population	40 million
Climate Type	Subtropical arid and hot desert climate
Primary Energy Consumption per Capita	1,080 kWh per capita
Primary Energy Consumption from Renewable Energy	0.09%
Share of the population with access to electricity	74.88% (grid-connected); limited reliable access
Per Capita CO2 Emissions	0.3 tons per capita

Yemen is part of Western Asia, with over 40 million inhabitants, and faces a number of challenges regarding the shift to a greener economy. The country falls within a subtropical arid and hot desert climate, which significantly influences the requirements and accessibility of energy. At present, Yemen's per capita primary energy consumption is 1,080 kWh and is considered to be low as compared to global averages. The country is very less dependent on renewable sources of energy as only 0.09% of the consumed energy is drawn from renewable sources. A very small fraction of the population has access to electricity as 74.88% are connected with grid and big proportion of population lacks access to reliable means of power. Moreover, Yemen has per capita CO₂ emissions of 0.3 tons per person, proving that the country has very minimal industrialization and highlights opportunities for growth in clean and renewable energy sources. There is great need for energy transition in Yemen, and this should be particularly focused on the variation of renewable energy, promotion of access to electricity, along with reduction of reliance on fossil fuels in response to climate change. Indeed, the abundant sunlight of the country promises a rich opportunity to develop solar energy. Strategic investment in its green technology could enable Yemen to make good strides toward a sustainable energy future.

1.2 Analysis of the Green Economy

The Republic of Yemen has enormous potential for the renewable energy resources in relation to solar, wind, geothermal, and biomass resources. Theoretically estimated potentials reach the record of 2,446,000 MW for solar and 308,000 MW for wind. Despite these opportunities, the renewable energy sector is vulnerable by ongoing conflict, economic instability, and inadequate infrastructure, resulting in renewables contributing a mere 0.009% to Yemen's energy mix. The ambitious goal of the Yemeni government is to increase the share of renewable energy to 15% by 2025. Certainly, achieving this goal means overcoming enormous challenges. On a bigger scale, the Middle East and Africa have made great strides with renewable energy, countries like Djibouti, they set ambitious targets, while overall growth in capacity signals a shift toward more diversified sources.

The town of Ibb, in Yemen, is still on the way to development regarding electric vehicles and support systems that will enable them to run. It is progressing, though, as shown through an increased number of EV charging stations set up for the growing need for electric transport. Policies and plans are being put in place to support this change by adding more charging stations and giving benefits to owners of EVs. With these efforts, there are still some challenges that might delay quick adoption due to initial infrastructure constraints and possible financial constraints. Whatever that may be, Ibb's progress denotes a commitment to integrating modern technology with traditional appeal, which positions Ibb to be a potential leader in electric mobility in Yemen.

Energy efficiency steps in Yemen cover the building, industries, and transportation sectors, while being included in national plans. However, due to political instability and weak infrastructure, these plans face a lot of challenges.

- **Buildings:** Yemen is making its buildings more energy-efficient by promoting the use of energy-saving lights and appliances, including compact fluorescent lamps (CFL) and improved refrigerators. There is no comprehensive building-specific plan, however, and such initiatives have not been effectively implemented due to lack of enforcement and financing.

- **Industries:** Specific goals in the industrial sector include reducing the amount of diesel fuel used, as well as the use of renewable energy and natural gas. Plans also call for the installation of efficient combined heat and power systems by 2025, while replacement of diesel generators with solar PV systems, especially in farming and small businesses, has been envisioned. While there has been some progress, mostly in rural areas where solar energy is on the increase, this is still relatively insignificant.
- **Transportation:** Transportation has been an energy-intensive sector, and its initiatives are underway towards streamlining fuel economy. This sets standards for fuel economy in vehicles and, secondly, promotes the use of natural gas instead of diesel in heavy-duty trucks and buses, while targeting 85% by 2025. Most of these implementation programs have remained only on paper due to ongoing conflict and resource constraints
- **Effectiveness:** The political and economic crisis of Yemen is limiting how well these energy-saving measures can work. In fact, solar power use has increased due to fuel shortages, but the quality of the installations and lack of rules have affected their longterm success. Overall, there is slight use of energy-saving measures due to various reasons, such as lack of finance, infrastructure, and institutional capacity for their implementation

Yemen is also working on smart city projects, at the moment especially dealing with recovery and infrastructure problems. One of the main projects included providing solar power systems to health facilities, under the World Bank's Yemen Integrated Urban Services Emergency Project – YIUSEP. This work started because of huge problems that had been caused by the conflict. It is done with help from the United Nations Office for Project Services UNOPS. The goal is to use sustainable practices by installing solar power systems in 76 health facilities in key cities such as Aden, Sana'a, and Hodeida

Green financing in Yemen is granted from international groups to support the development of plans that generate low emissions, for instance, the World Bank and UNOPS. The funds develop capacities in the institutions for strategy formulation and involve the private sector. This fund is not accessible easily due to the prequalification criteria necessary to access it; however, coming up with strong monitoring systems and specific plans for each sector can allow both new companies and existing businesses to access such funds.

People's awareness in Yemen is relatively low about sustainable practices because of economic problems and ongoing conflicts that make them focus more on surviving day-to-day rather than thinking about the future. Not having enough information and education about sustainability makes it even harder for consumers to get involved. Still, projects like the World Bank's solar power program in health facilities show that awareness of sustainable technologies is starting to grow. Even with these efforts, many consumers still do not know much or engage with sustainable products and practices.

In Yemen, waste management is the responsibility of local government. Municipal teams responsible for waste collection, transportation, and disposal have been affected by problems associated with the fuel crisis and issues over workers' pay, apart from a shortage of equipment and vehicles. The collection rate reaches 65% in cities, while it is only 5% in the countryside. Most of the cities use open dumping because of the lack of landfills. This causes environmental and health hazards due to contaminated water and greenhouse gas emissions. The recycling industry is on the surge, with over fifty registered plants in major cities involved in plastics, metals, and glass. However, recycling remains an informal sector, and few special places for dangerous waste disposal exist, such as medical waste.

Yemen adopts various practices of water management, in agriculture as well as in cities. They encourage effective methods of irrigation, like drip irrigation, to conserve water in farms, whereas in cities, they work on enhancing the water systems and conserving water. However, these practices face success impacted by ongoing conflicts and a shortage of resources.

The main efforts towards nature conservation in Yemen rely on the NBSAPY. This plan aims at saving and restoring Yemen's many biological resources through wise usage, protection of ecosystems, resource management, a judicious blend of traditional knowledge combined with modern methods, and involvement of the community in conservation choices. Besides, Yemen looks forward to the local and global support to develop the conservation efforts and to address biodiversity issues.

1.3 Challenges and Opportunities

SWOT Analysis

Strengths: - Abundant solar (2,446,000 MW) and wind (308,000 MW) potential. - Government targets for 15% renewable energy by 2025. - International support from projects like World Bank and UNOPS. - Emerging recycling industry in major cities. - Local knowledge in water and land management.	Weaknesses: - Ongoing conflict and political instability hinder development. - Underdeveloped energy infrastructure and limited renewables. - Poor enforcement of energy efficiency policies. - Slow adoption of electric vehicles (EVs). - Low consumer awareness of sustainability. - Inadequate waste management, particularly in rural areas.
Opportunities: - International green financing and partnerships. - Expansion potential for solar and wind energy. - Leverage global sustainability trends for aid and investment. - Smart city initiatives for urban areas like Sana'a and Aden. - Job creation in renewable energy and green technology sectors. - Improved water management techniques.	Threats: - Continued conflict and security issues. - Economic instability limits project financing and growth. - Climate change impacts on water resources and agriculture. - Lack of institutional capacity for large-scale renewable projects. - High costs of transitioning to renewable energy. - Fuel dependency in transportation sectors slows natural gas conversion.

PESTLE Analysis

Political	- Conflict and instability delay development. - Target to reach 15% renewable energy by 2025. - Reliance on international aid (e.g., World Bank, UNOPS).
Economic	- Economic instability limits investment in renewables. - High potential for solar and wind energy. - Green financing available but challenging to access.
Social	- Low public awareness of sustainability due to economic challenges. - Population growth strains resources. - Community involvement in conservation efforts is encouraged.
Technological	- Underdeveloped renewable energy infrastructure. - Early-stage adoption of electric vehicles, with limited charging stations. - Smart city projects include solar-powered health facilities.

Legal	• Weak enforcement of energy and environmental policies. • Supported by international legal frameworks (e.g., World Bank projects). • Existing environmental protection laws need better enforcement.
Environmental	• Significant solar and wind energy potential. • Vulnerable to climate change impacts, especially water shortages. • Poor waste management, leading to environmental degradation.

Analysis findings

Considering its excellent solar and wind resource potentials, a most promising green economy in Yemen is possible. At the same time, political problems, conflicts, and weak infrastructure present substantial obstacles to seizing such opportunities. Economic challenges and general lack of public awareness about environmental problems pose extreme obstacles to finding solutions to these issues, while international support and green financing provide some reason for optimism.

The social aspect is recording good progress, with communities adopting renewable technologies for health facilities and electric vehicles appearing in some places. However, better regulations and infrastructure are required for appropriate growth. Additionally, environmental challenges, especially the management of waste, mark how seriously sustainable practices are important.

For Yemen to improve its green economy, having political stability is very important. The country should work on making policies that support sustainability, draw in international investments, and raise public awareness about taking care of the environment and using renewable energy. These actions will help ensure a greener, more sustainable future for Yemen.

Youth Perspective and Concluding Remarks

Drawing from these insights of the program, the following are some actionable recommendations to support Yemen in transitioning toward a greener economy:

Promote Renewable Energy Projects:

Community Solar Initiatives: Initiate community solar projects that allow locals to invest in or use solar power. This would help reduce dependency on diesel and also lower the energy costs for them. This might involve small solar farms or rooftop panels already installed, both in cities and countryside.

Educational Workshops: Provide workshops and training to youth on the benefits accruing from solar technology and how the installation is done. This will create a new generation of green energy supporters and technicians.

Encourage Sustainable Agriculture:

Precision Agriculture: Instruct smart farming, employing tools like GPS and drones to better utilize water and handle crops. Sponsor farmers using these types of tools or provide financial assistance.

Training Programs: Program training for the young farmers on sustainable methodologies and use of bio-pesticides for better results to reduce environmental degradation and increase productivity.

Enhance Waste Management Systems:

Youth-Led Recycling Initiatives: Empower a youth-led approach towards recycling programs in the community, with the main activities focusing on collection and sorting of plastics, metals, and glass. Awareness and participation are ensured through the involvement of local schools and universities.

Innovative Waste Solutions: Engage technology startups for the development of waste-to-energy solutions or improved technologies for waste management and recycling.

Support Green Technology Adoption:

Vehicle-to-Grid (V2G) Technology: Incentivize the use of V2G technology in new electric vehicles to increase the stability of power grids and promote electric transportation. Organize information campaigns on the benefits derived from it.

Modular Construction: Encourage modular construction methodologies to be implemented in new building and infrastructure projects to minimize construction waste and time. Community-based design competitions and workshops can be organized for innovative ideas that come forward.

Strengthen Education and Awareness:

Sustainability Curriculum: Support the inclusion of sustainability subjects in school and university programs in order to raise awareness and train the next generation of leaders in environmental care.

Public Awareness Campaigns: Implement campaigns that identify the importance of sustainability. Utilize social media, events at the local level, and influencers for broader coverage

Foster Strategic Partnerships:

Collaboration with NGOs: Partner with non-governmental organizations (NGOs) and international associations to access funding and expertise for green projects. Collaborate on initiatives such as reforestation, water conservation, and biodiversity preservation.

Private Sector Engagement: Encourage local businesses to adopt sustainable practices and support green innovations. Create incentives for companies that invest in renewable energy, waste reduction, and other eco-friendly initiatives

By focusing on these areas, Yemen can channel the energy and creativity of its young people into actual change. These recommendations are designed to address the current environmental concerns while at the same time opening up new opportunities for innovation and community involvement. It is with teamwork and wise steps that Yemen can advance towards a better and greener future.

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