ENERGY TRANSITION – COST, OPPORTUNITIES AND POLICY OPTIONS FOR GHANA

Final Study Report

CIVIL SOCIETY PLATFORM ON OIL AND GAS (CSPOG)

With the Support of Gower Street

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ACRONYMS

CCS	Carbon Capture and Storage
CCSR	Carbon Capture Storage and Removal
CSO	Civil Society Organisation
CSPOG	Civil Society Platform on Oil and Gas
CSR	Corporate Social Responsibility
EC	European Commission
EV	Electrical Vehicle
FDI	Foreign Direct Investment
GHG	Green House Gas
GNPC	Ghana National Petroleum Corporation
GUPC	Ghana Upstream Petroleum Chamber
HFO	Heavy Fuel Oil
ICE	Internal Combustion Engine
ICE	Internal Combustion Engine
IEA	International Energy Agency
IOC	International Oil Company
IPP	Independent Power Producer
JET	Just Energy Transition
LCO	Light Crude Oil
NREG	Natural Resource and Environmental Governance Programme

OECD	Organisation for Economic Cooperation and Development
PRMA	Petroleum Revenue Management Act
REDD+	Reducing Emissions from Deforestation and Forest Degradation
UNFCCC	United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

This report analyzes Ghana's energy transition within the global, regional, and national landscape. It explores the political economy factors shaping the energy transition debates in Ghana, including regional and national considerations. The report assesses the potential benefits and drawbacks of the transition for Ghana's economy, evaluates policy options and their economic implications, and concludes with key recommendations from Ghanaian civil society organizations (CSOs) in the energy sector. These recommendations aim to ensure a just and equitable energy transition that benefits all Ghanaians, particularly the most vulnerable.

The report advocates for a pragmatic approach to Ghana's Energy Transition, and makes demands in terms of policy commitments, by political parties contesting the 2024 general elections.

Key Observations and Required Policy Commitments:

1. Energy transition is imminent, due to the urgent actions needed to be taken across all sectors to reduce the world's climate crisis and existential threats to our planet. It is understood that by moving faster to facilitate investments in clean technologies and thereby energy transition, governments can leverage and seize first mover opportunities that do not only lead to net zero but also enhance economic growth. The next government ought to realise that, the global energy transition agenda has sparked off a new race for global hegemony in energy supply, and that, if Ghana joins the race too late it will miss investment opportunities in the green economy. A pragmatic approach is therefore preferable to a 'business as usual' approach.
2. Ghana is endowed with several of the critical minerals needed for the transition. The next government should commit to a roadmap to develop policies that emphasise value maximization and retention in the exploitation of Ghana's transition minerals, achievable through enhanced fiscal terms for the extraction, local content and local participation in the industry value chain, and beneficiation.
3. To leverage first mover advantages in during the transition, countries are advised to develop clear and ambitious timelines to net zero. The next government should commit to a more ambitious transition timelines, and to be more deliberate in its efforts at attracting investments into its renewable energy sector. Specifically, oil and gas companies operating in Ghana should be incentivized to consider investing in the downstream beneficiation

activities in the green minerals sector. With its abundant silica, lithium and graphite deposits Ghana can easily become the renewable energy hub in West Africa. The Abosso Glass Factory should be revived to produce solar panels, while discussions on setting up a lithium processing facility taken very seriously.

4. The next government should commit to develop a comprehensive, clear and transparent, fiscal regime geared towards the green and critical minerals sector. This is critical to discouraging further investments in high carbon emission sectors and encouraging investments in low carbon and green sectors. The government of Ghana attempted to introduce the Vehicle Emissions Levy in January 2024 with a primary intention to raise revenues but not to discourage emissions from the transport sector. There were very limited or no public consultations, hence it was heavily decried by the public and hence suspended by the government. Ghanaians will need to be convinced about what the expected revenue would be used for, or how it will support the country's energy transition, or how it will enhance the country's climate resilience etc.
5. The next government must leverage the country's vast forests into obtaining carbon credits from other nations or large emitting companies through carbon trading. This is key for raising additional finance to invest in R&D in green technologies. Ghana's potential to sequester, including planned interventions by some oil companies operating in the country must be evaluated for this purpose.
6. The next government should commit to enforce the Petroleum Revenue Management Act, 2015 (Act 815) to leverage the country's current and future petroleum revenues to finance its transition, just like other developed countries and International Oil Companies (IOCs) are doing. Act 815 enjoins the Minister of Finance to select programmes under thirteen areas, including the development of alternative energy sources (often interpreted to be renewable energy), however this category has never been selected in the 13 years of oil production in Ghana.
7. The transition to Electric Vehicles (EVs) in the global transportation system is seen as one of the key strategies to sustainable energy transition. Ghana has developed an EV policy and further facilitated investments in vehicle assembly plants, but investors are not under any obligation to assemble EVs. The next government must commit to develop the relevant and necessary legislations to regulate the manufacturing, asemblaing or engaging the

vehicle assembly plants in the country and to agree on timelines for producing EVs for the Ghanaian market.

8. The government's facilitation of investments in EV manufacturing, assembling, or maintenance is largely focused on EV uptake and not the disposal of waste from the EV subsector. The next government should consider a longer term investments in facilities and infrastructure for the disposal of lithium batteries when they are used up after their 6-year typical life span. Recycling is touted as a sustainability strategy but the process is said to be cumbersome and dangerous because lithium is highly reactive and must be carefully handled. It involves dissembling and separations of various components for recycling and disposal of electrolytes. Besides, the process is said to currently cost more than the cost of mining the mineral.
9. The next government must invest in geological data acquisition and exploration for other green minerals that contributes to the transition. For instance, identify and adopt selective natural earth resources such as silica sand for the production of solar panels, lithium and graphite for the production power storage batteries and accessories, and to promote these to investors who may be interested in beneficiation of these critical minerals.
10. The next government must incentivize technological innovation to scale up renewable energy solutions, by rewarding novel inventions and providing tax waivers to companies who specialize in Research and Development of renewable energy, and energy efficiency technologies. This could be achieved through the collaborative engagements between R & D institutions, and industry and clear incentive schemes that facilitates product development and texting processes for renewable energy solutions. Industry must be incentivized to direct substantial portion of its Corporate Social Responsibility (CSR) expenditures into green climate technologies such as small town off-grid solutions, liquid biofuels, carbon capture and storage, hydrogen, offshore technologies (wind farms etc). Another relevant option is to consider providing incentives for oil and gas companies operating in Ghana, to invest part of their profits in downstream beneficiation of green minerals to make them diversified energy companies.
11. The next government should commit to a baseline of current emission levels for each project or sector must be established, and a roadmap developed for each project on how the emissions would be mitigated or abated.

1.0 Introduction

1.1 Background

Globally, countries continue to face significant vulnerability to climate change. Rising sea levels, drought, desertification, higher temperatures, and erratic rainfall are all expected to negatively impact food security, agricultural livelihoods and overall development outcomes. To address the erratic climatic variabilities, a structural shift from fossil fuel dependence to renewable energy sources has been proposed as an urgent mitigation against global warming and its associated changes in climatic conditions. The International Energy Agency (IEA) in its net zero by 2050 road map, highlighted that, the global energy sector needs to achieve a significant reduction in the use of hydrocarbons by 2040, including the phasing out of all unabated coal and oil power plants to reach net zero by 2050. Though the IEA report does not look at the opportunities and challenges of the transition at the country-level, it is imperative that each country assesses its own strengths, opportunities, and challenges in fashioning out a broad national strategy for this transition. Oil and gas companies, as major stakeholders would also have to rethink their portfolios and business models and innovate to survive this new energy landscape.

Ghana is taking significant steps to reduce its fossil fuel dependency to pursue a low carbon development, however there is a need for a more strategic funding to leverage opportunities presented by the transition. The country's commitment to achieving a low-carbon and climate-resilient future is reflected in its national policies and plans, as well as its international obligations and initiatives, such as the Paris Agreement, the Sustainable Development Goals, and the Africa Renewable Energy Initiative. The National Energy Policy, the Renewable Energy Act, the National Climate Change Policy, the Sustainable Energy for All Action Plan, and the National Energy Transition Framework, developed by Ghana demonstrates the progress made towards a clean energy future.

Ghana's transition requires high upfront capital investments in infrastructure to unlock the full investments opportunities under the transition. However, Ghana's current economic challenges pose significant challenges to its energy transition. To achieve a net zero in 2060, Ghana would need around US$ 550 billion in capital investment to 2060 (US$ 140 billion more than under business as usual (BAU)), with most of the investment going to the power and transport sectors[1]. Traditional financing models (such as direct government funding, bilateral funding) might not be sufficient due to the current and medium-term economic challenges. Low economic growth in the medium term, coupled with high debt levels and inflation restricts the government's ability to borrow to finance its infrastructure needs under the transition. Notwithstanding the comprehensive debt restructuring achieved in 2023, debts to GDP ratio is only expected to lower from 2028. Inflation has been on the decline due to measures supported by the IMF; however, it remains high compared to Ghana's peers in the region. These factors create negative perception about Ghana for private investor due to the economic fluctuations and uncertainties in future investment outcomes.

Ghana needs to explore innovative financing mechanisms such as green bonds, carbon trading schemes, and public-private partnerships to attract additional capital. Notwithstanding the progress made in the awareness to issue green bonds, Ghana has struggled to raise funds. Electrification and renewables; carbon capture and storage; low carbon hydrogen, battery electric technologies; clean coking technologies; and technology driven negative emissions solutions are the key areas that required investments for Ghana's transition.

Ghana's current and future petroleum revenues offer a strategic opportunity to finance its energy transition, mirroring the approach of many developed countries and International Oil Companies (IOCs). However, an overly relaxed timeline could lead to missed opportunities. The EU Taxonomy program, for instance, incentivizes investments in green technologies while discouraging fossil fuel dependence. This program represents a significant current opportunity for Ghana.

Furthermore, a concerning aspect of Ghana's proposed green transition framework is the lack of prioritization for renewable energy despite its inclusion within the Petroleum Revenue Management Act (PRMA). The Act allows the Minister for Finance to allocate petroleum revenue to four prioritized expenditure areas every medium term. However, in the 14 years of oil production, renewable energy has never been chosen as a priority area.

[1] SE4ALL - Ghana Energy Transition Investment Plan (2023). https://www.seforall.org/system/files/2023-09/report-ghana-etip_WEB.pdf

It is therefore critical to create the needed awareness and mobilize broad-based citizens' support for a review of Ghana's Energy Transition Framework to encourage investments in renewable energy technology, to ensure that Ghana does not enter the energy transition race too late.

CSPOG and its members recognise the importance of electioneering campaign seasons and their heightening of the receptiveness of the political class to citizens' voices, concerns and demands, and so takes advantage to develop a CSOs' energy transition paper around which it intends to mobilise citizens to make specific demands of the political parties in the lead up to the 2024 general elections in Ghana.

1.2 Study Objectives

The study seeks to assess and document the threats and opportunities presented by Energy Transition in Ghana to inform policy positioning of the major political parties ahead of the 2024 general elections. Specifically, the study seeks to:

1. Examine global trends in fossil fuel investments, production and consumption;
2. Analyse the national and sub-national ramifications of global trends in fossil fuel investments;
3. Establish Ghana's Energy Transition Baseline;
4. Identify the challenges and the down-side effects of energy transition on Ghana
5. Identify opportunities afforded by the transition, and how they may compensate for the down-side effects;
6. Discuss the policy options available to Ghana and their implications for economic growth and poverty reduction.
7. Provide recommendations for policy consideration
8. Suggest key advocacy messages from study

1.3 Scope

The chart below depicts the scope of the study.

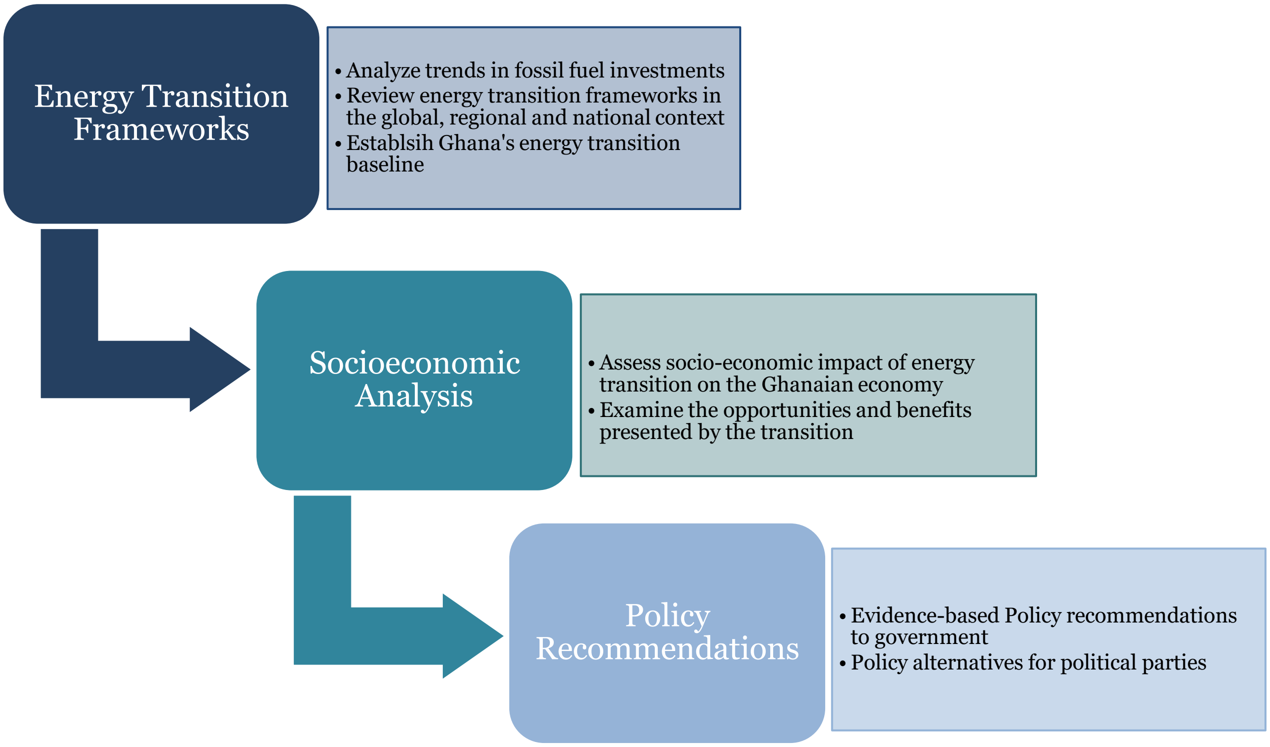

Fig 1: Scope of Study

1.4 Study Methodology

Desk Review

A thorough review and analysis of relevant documents on energy transition in the global and national context was conducted, with special focus on energy transition frameworks, global protocols and national initiatives. The goal of the desk review was to get an enhanced contextual understanding of energy transition frameworks in the global, regional and national contexts to inform the study.

1.5 Study Limitations

- The exclusion of a field assessment from the scope of work limited the documentation of novel real-life stories of the potential impact of energy transition on individuals, businesses and communities. This was due to resource and time constraints.

2.0 The Energy Transition Conversation

2.1 Global Perspectives

Global efforts on energy transition have been progressive, evidenced by national and regional level commitments through the ratification of international protocols, national policies, plans and legislations. The Paris agreement marked a significant milestone in the shift from fossil fuel dependency, galvanizing global efforts in reducing Green House Gas (GHG) emissions that contribute to global warming, through the adoption of sustainable energy sources. The accord, which targets reduction in global emissions to 1.5°C2, has birthed various international protocols and initiatives anchored on the gradual shift from fossil fuel-based energy to renewable energy sources.

Though not the only contributor to GHGs, fossil fuels are seen as **the largest source of carbon dioxide**[3] **emissions**, contributing to about 73 percent of GHG emissions world-wide. Thus, the global perspectives have centred on the premise that revolutionising the energy sector is key to achieving a net-zero emission by 2050[4].

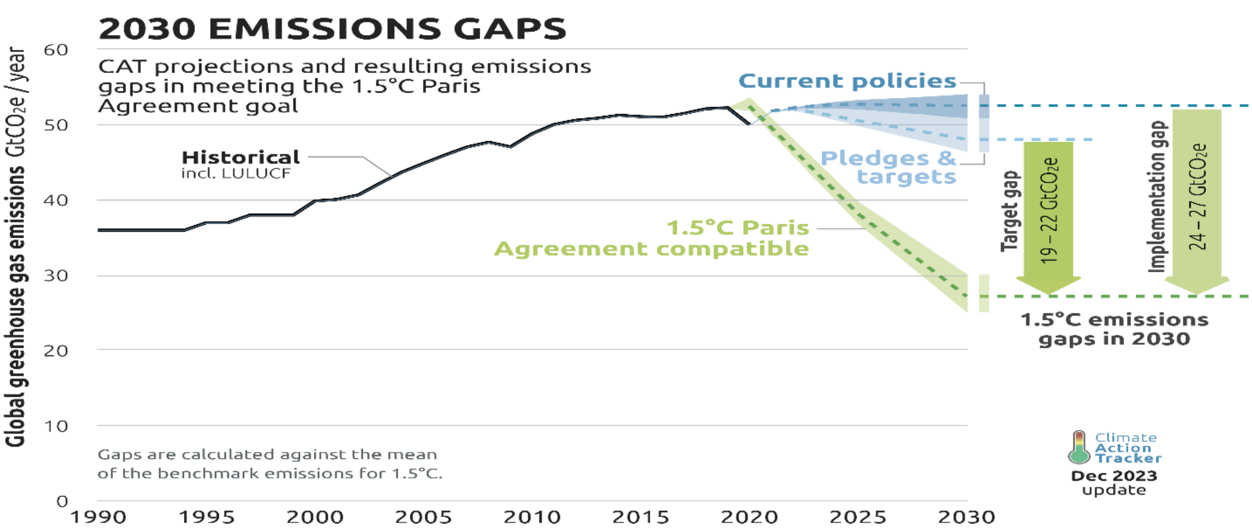

Fig 2: 2030 Emissions Gaps

Source: [CAT Emissions Gap | Climate Action Tracker]

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2 https://unfccc.int/most-requested/key-aspects-of-the-paris-agreement
3 Decarbonizing the energy sector: How the SBTi is approaching this transformation - Science Based Targets
4 Energy Transition | United Nations Development Programme (undp.org)

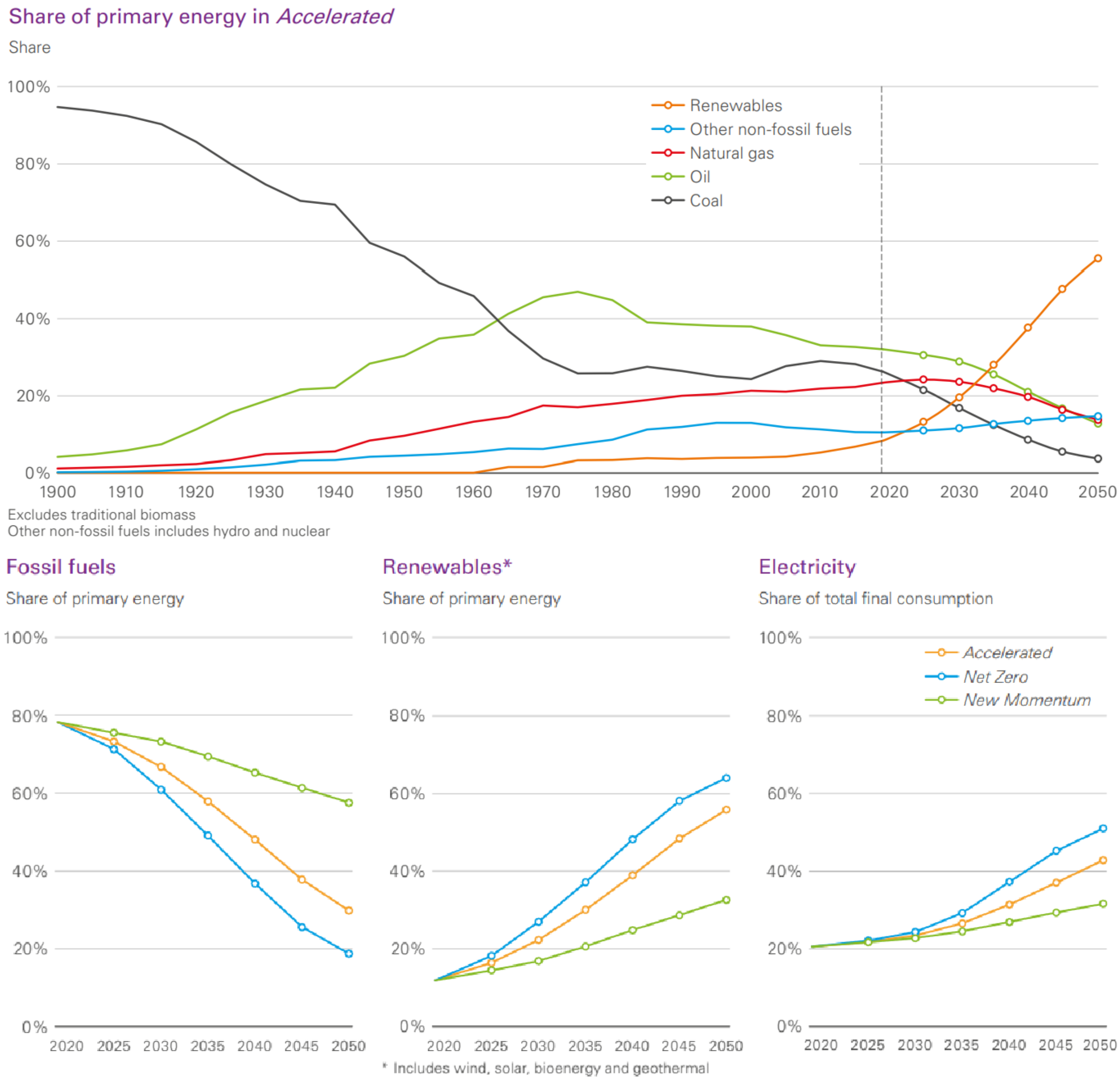

Fig 3: Share of Primary Energy Sources

Source: BP Energy Outlook 2022

The recognition of natural gas as a transitional fuel during the energy transition era has been hailed by many as a much-needed measure, albeit temporary, to ensure energy accessibility and sustainability in the period leading to the net-zero target. Natural gas, according to the International

Energy Agency (IEA), has a low carbon emission rate compared to other fossil fuels[5]. Reliable, affordable and critical in ensuring a just transition, natural gas acts as a bridging factor in the hydrogen revolution and remains key in the fight against energy poverty[6].

Globally, progress has been made in the establishment of energy transition regulatory frameworks, however the underlying challenge remain adequate mobilisation of funding. Central to the energy transition conversation is the financial investments required into renewable energy sources, made by countries. The United Nations estimates that a global investment of $4 trillion[7] is required to achieve a net-zero emission by 2050. The International Renewable Energy Agency records that the global investment in energy transition reached USD 1.3 trillion in 2022 with the majority of the investment going into solar PVs and on-shore wind[8]. Developing countries, including Ghana have had some funding through dedicated global funds, however these are very specific to certain climate adaptation programmes and not geared toward achieving their own transition.

As at 2019, the top 15 countries investing in renewables were all outside Africa, even though Africa has great renewables potential. This could either be a result of the huge initial capital outlay required for renewable energy projects, or lack of carefully crafted incentive regime to attract FDI into the renewable energy sub-sector. However, in the last decade, Africa has seen renewable energy yearly investments increase from about US$ 0.5 billion in the 2000-2009 phase to US$ 5 billion in 2010-2022 (IRENA, 2022a). Renewable energy investment in sub-Saharan Africa also took a big leap from US$ 2.3 billion in 2016 to US$ 7.4 billion in 2018 (Adegoke, 2020), with the potential to increase significantly in the medium terms due to the promised influx of US$100 billion per year to developing countries globally.

[5] https://www.iea.org/energy-system/fossil-fuels/natural-gas

[6] https://www.ief.org/news/4-reasons-natural-gas-is-a-critical-part-of-the-energy-transition

[7] Energy Transition | United Nations Development Programme (undp.org)

[8] IRENA and CPI (2023), Global landscape of renewable energy finance, 2023, International Renewable Energy Agency, Abu Dhabi.

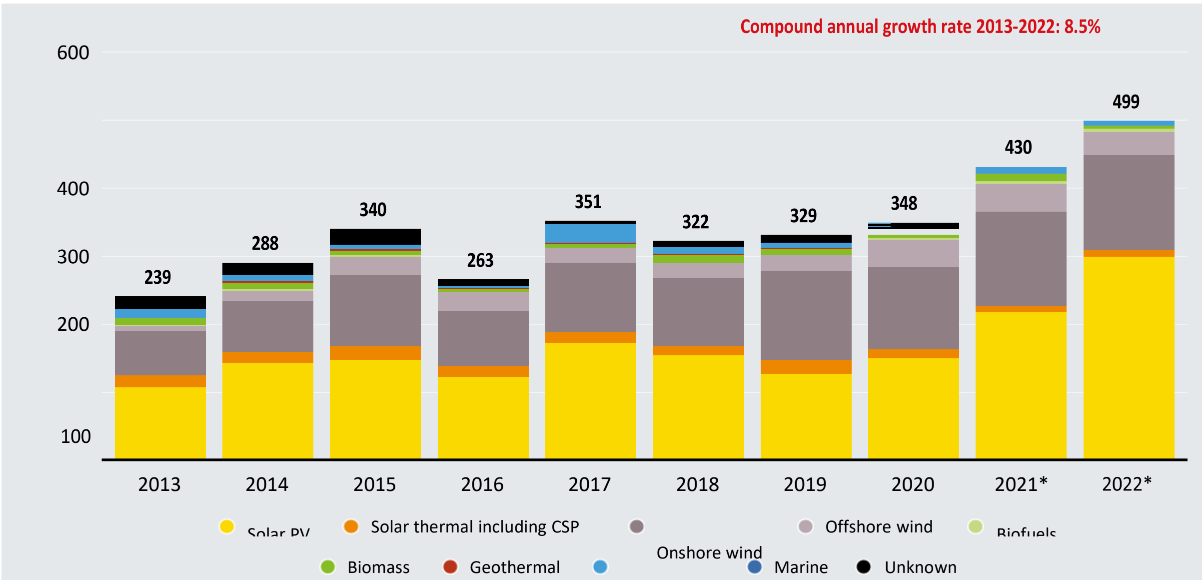

Fig 4: Annual Financial Commitments in Renewable Energy, by Technology, 2013-2022

Source: Global Landscape of Renewable Energy Finance 2023

2.2 Global trends in Fossil fuel investments, production and consumption

Post COP 21, global trends in fossil fuel investment have decreased from 1319 billion USD (2015) to 1050 billion USD (2023), with the decline peaking in 2020 (839 billion USD), signalling countries' commitment to reducing fossil fuel dependency. Encouragingly, on the other hand, investments in clean energy have risen from 1,074 billion USD in 2015 to 1740 billion USD in 2023[9].

[9] IEA (2023), World Energy Investment 2023, IEA, Paris https://www.iea.org/reports/world-energy-investment-2023, License: CC BY 4.0

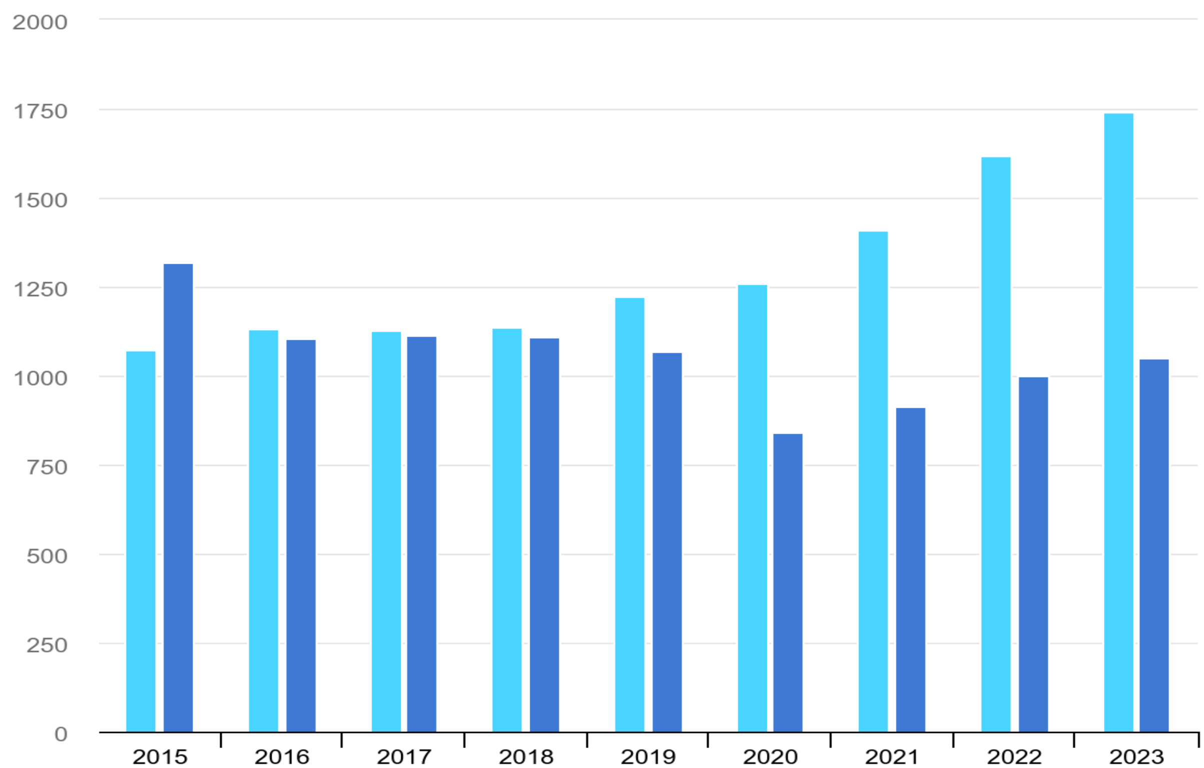

Fig 5: Global energy investment in clean energy and in fossil fuels, 2015-2023 in Billion USD

NB: Fossil Fuel (Deep blue). Clean energy (light blue)

Source: World Energy Investment 2023

Despite a reduction of investment into fossil fuel, global consumption of fossil fuel continues to increase. The use and burning of fossil fuel began during the industrial revolution but the consumption of fossil fuel increased over 80 years ago in 1950 and the rate of fossil fuel consumption doubled in 1980[10]. Post the Paris Agreement, there have been an increase in the

[10] https://ourworldindata.org/fossil-fuels

consumption of fossil fuel worldwide. Using the annual carbon dioxide emissions as an indicator for fossil fuel consumption, global CO2 emission in 2015 was estimated to have reached 35.46 billion metric tons (GtCO2), while CO2 emission in 2022 totalled 37.15 billion metric tons ($GtCO_2$). There was however a decrease in total emissions in 2020 due to COVID-19 and its associated decline in industrial production arising out of disruptions to global supply chains and restrictions of movement during the pandemic[11].

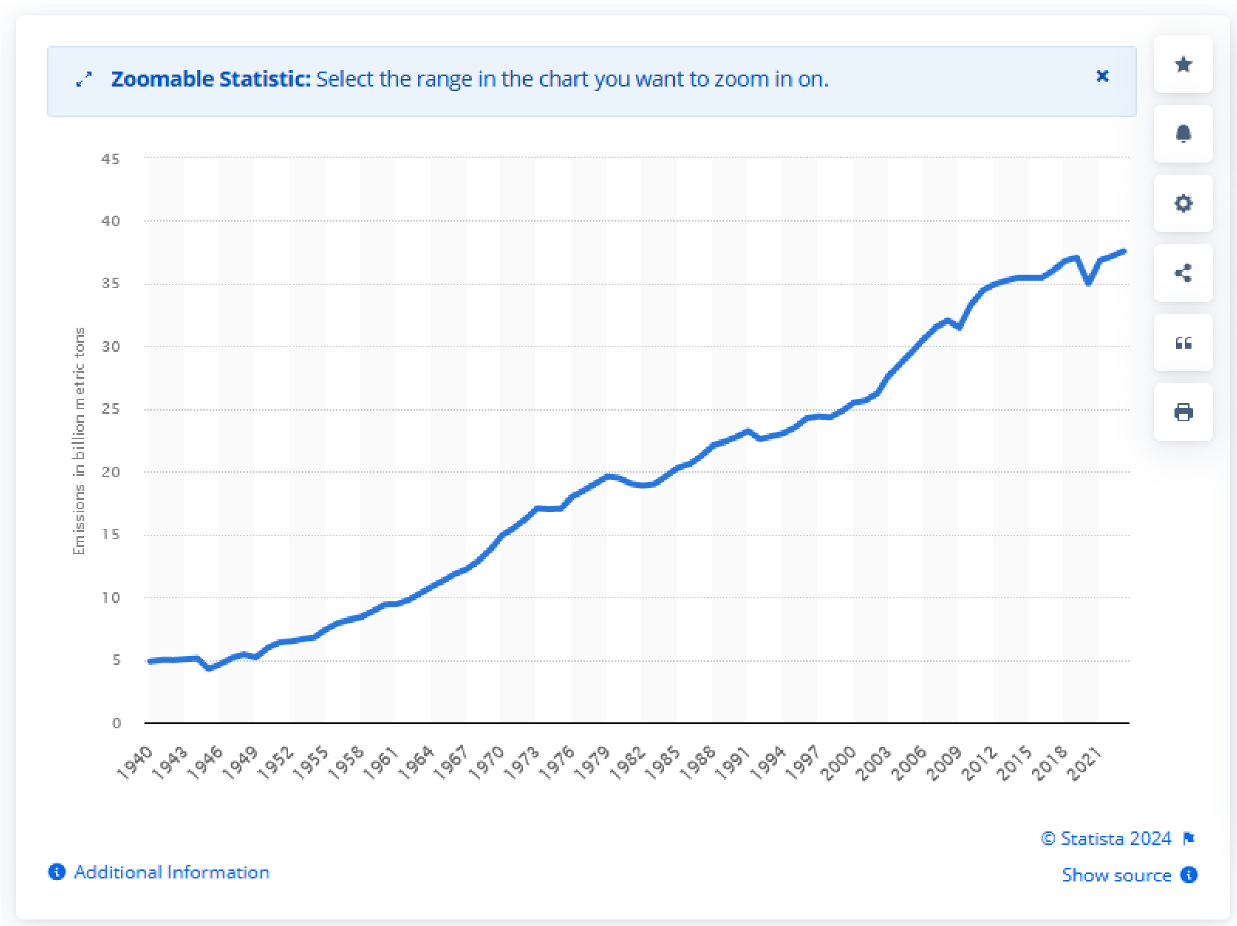

Fig 6: Annual carbon dioxide (CO_2) emissions worldwide from 1940 to 2023 (in billion metric tons)

Source: Statista

[11] https://www.statista.com/statistics/276629/global-co2-emissions/

The increase in the consumption of fossil fuel has ostensibly led to increased production to meet growing demand. Data from OECD shows, fossil fuel support services in production have increased significantly in G20 countries, from 45397.774 million USD in 2015 to 70800.269 million USD in 2022[12].

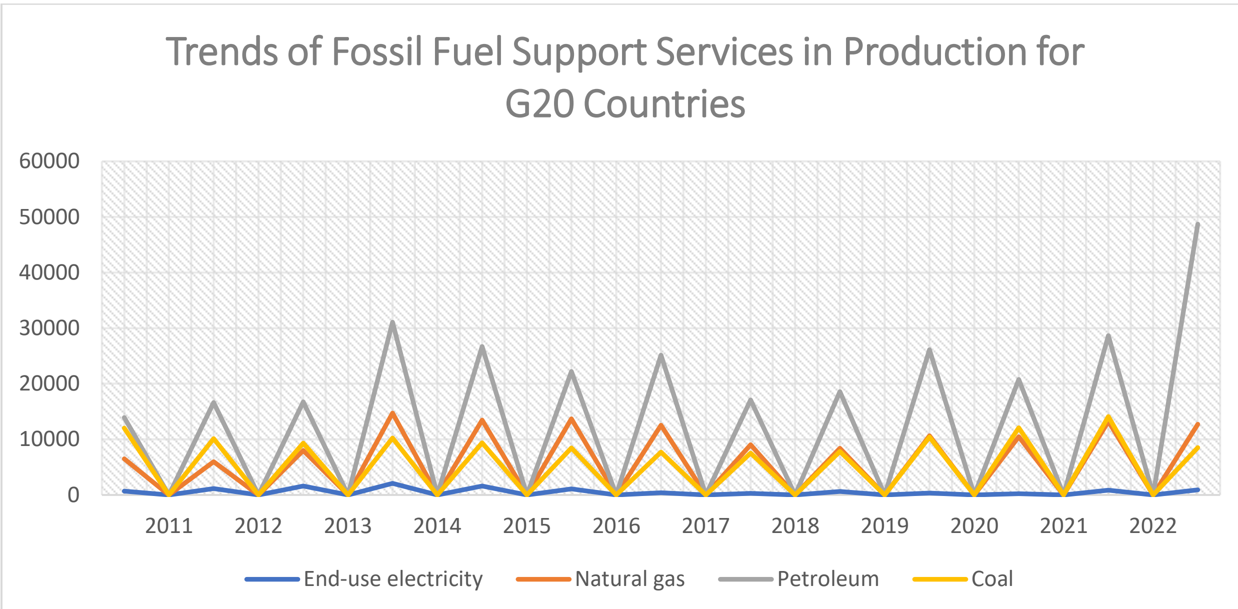

Fig 7: Trends of Fossil Fuel Support Services in Production for G20 Countries

Source: Author's Construct based on OECD database on fossil fuel support

On the contrary, data from OECD further shows that 23 countries in the European Union have decreased fossil fuel support services in production post COP 21, from 12468.411 million USD in 2015 to 12198.732 million USD in 2022[13].

[12] https://stats.oecd.org/Index.aspx?DataSetCode=FFS_INDICATOR_DETAILED%20
[13] https://stats.oecd.org/Index.aspx?DataSetCode=FFS_INDICATOR_DETAILED%20

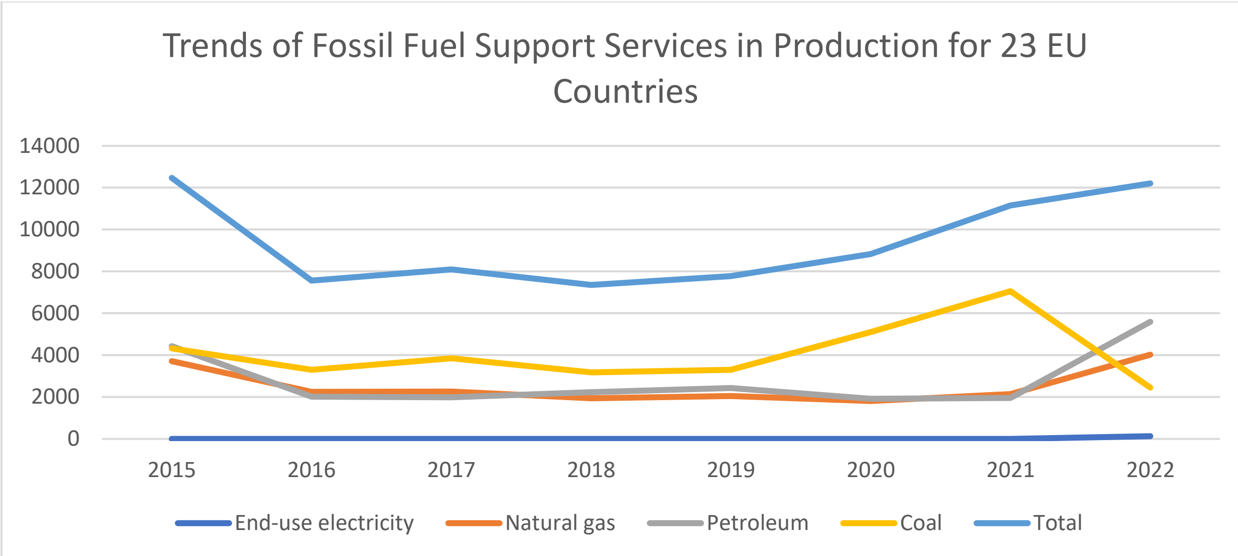

Fig 8: Trends of Fossil Fuel Support Services in Production for 23 EU Countries

Source: Author's Construct based on OECD database on fossil fuel support

The decline in fossil fuel support services in production, though may be a good sign, on the flip side, evidence adduced in the Ghana Upstream Petroleum Chamber's energy transition position paper, published in 2021, suggest that, some countries and international oil companies are signing new contracts in the post Paris agreement period, some as recently as 2021.

The paper contends that while attempts were being made to discourage the granting of licenses for new fossil fuel projects through new financing rules, some countries have continued to grant exploration and production licenses for new and existing fossil fuel projects in the post Paris Agreement period.

Table 1. Details of some specific hydrocarbon licenses issued as recently as 2021 (after the Paris agreement)

DOCUMENT	COUNTRY	YEAR	RESOURCE	CONTRACT TYPE
IEOC Production B.V., BP Exploration (Delta) Limited, West Sherbean Onshore area, Concession 2021.	Egypt	2021	• Gas • Hydrocarbons	• Concession Agreement
BP Exploration (Delta) Limited, Tharwa Petroleum Company S.A.E., North El Salum Offshore Area, Concession, 2021.	Egypt	2021	• Gas • Hydrocarbons	• Concession Agreement
Chevron Egypt Holdings C PTE. Ltd, Tharwa Petroleum S.A.E, Nargis Offshore Area, Concession, 2021	Egypt	2021	• Gas • Hydrocarbons	• Concession Agreement
Orcadian Energy (CNS) Ltd, Parkmead (E&P) Limited, P2516, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license
Talon Petroleum (UK) Limited, P2526, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license
United Oil & Gas PIc, P2519, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license
Chrysaor Production (.K.) Limited, P2538, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license
Chrysaor Production (U..) Limited,	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license

Ithaca Oil and Gas Limited, Neo Energy (ZEX) Limited, Spirit Energy North Sea Limited, P2525, Exploitation License, Exploration License, 2021				• Exploration permit/license
Chrysaor Limited, P2547, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license
Hartshead Resources Ltd, P2607, Exploitation License, Exploration License, 2021	United Kingdom	2021	• Hydrocarbons	• Exploitation permit/license • Exploration permit/license

Source: resourcecontracts.org

As evidenced in the table above, in 2021, some super players, including BP and Chevron, despite their global pledges to the Energy Transition, signed new exploration contracts, and invested in new projects in the UK and Egypt. While this may seem odd, it is not to be construed as reneging on their pledges, but rather as a pragmatic approach to the transition. For instance, while BP is involved in new fossil fuel projects, it is at the same time on track for its target of developing 20GW renewable power capacity by 2025 and scaling it to 50 GW by 2030 (BP, 2022). The essence of maintaining a pragmatic stance is to ensure global energy security and affordability. As Exxon Mobil CEO, Darren Woods, puts it, an abrupt energy transition or underinvestment in fossil fuels at this time, will lead to high gas prices[14] and undermine global energy security. He therefore urged a balance between the current demands for affordable energy with the need for lower emissions.

In the view of the Ghana Upstream Petroleum Chamber (GUPC), new frontier petroleum producers like Ghana, must not be stampeded into rushing to halt exploration and production of hydrocarbons, but must be allowed to develop their own national frameworks and strategies in ways that do not compromise their national economic and social viability.

[14] Exxon's CEO made the observation in an interview with CNBC on 26 June, 2022

2.3 Global Energy Transition Frameworks

The growing concern of global warming and its effect on the environment have caused the shift from fossil fuel to clean energy. To achieve this transition, innovative transitional frameworks are required from international organizations, governments and the private sector, including[15]

1. **Harnessing synergies between energy efficiency and renewable energy**. This should be among the top priorities of energy policy design because their combined effect can deliver the bulk of energy-related decarbonisation needs by 2050 in a cost-effective manner.
2. **Planning a power sector for which renewables provide a high share of the energy mix**. Transforming the global energy system will require a fundamental shift in the way energy systems are conceived and operated. This, in turn, requires long-term energy system planning and a shift to more holistic policy-making and more co-ordinated approaches across sectors and countries. This is critical in the power sector, where timely infrastructure deployment and the redesign of sector regulations are essential conditions for cost-effective integration of solar and wind generation on a large scale. These energy sources will become the backbone of power systems by 2050.
3. **Increasing the use of electricity in transport, building and industry**. Urban planning, building regulations, and other plans and policies must be integrated, particularly to enable deep and cost-effective decarbonisation of the transport and heat sectors through electrification. However, renewable electricity is only part of the solution for these sectors. Where energy services in transport, industry and buildings cannot be electrified, other renewable solutions will need to be deployed, including modern bioenergy, solar thermal, and geothermal. To accelerate deployment of these solutions, an enabling policy framework will be essential.
4. **Fostering system-wide innovation**. Just as the development of new technologies has played a key role in the progress of renewable energy in the past, continued technological innovation will be needed in the future to achieve a successful global energy transition. Efforts to innovate must cover a technology's full life-cycle, including demonstration,

[15]https://sustainabledevelopment.un.org/content/documents/21898IRENA_Global_Energy_Transformation_2018_summary_EN.pdf

deployment and commercialisation. But innovation is much broader than technology research and development (R&D). It should include new approaches to operating energy systems and markets, as well as new business models. Delivering the innovations needed for the energy transition will require increased, intensive, focused and co-ordinated action by national governments, international actors and the private sector.

5. **Aligning socio-economic structures and investment with the transition**. An integrated and holistic approach is needed by aligning the socio-economic system with the transition requirements. Implementing the energy transition requires significant investments, which adds to the investment required for adaptation to climate change already set to occur. The shorter the time to materialise the energy transition, the lower the climate change adaptation costs and the smaller the socio-economic disruption. The financial system should be aligned with broader sustainability and energy transition requirements. Investment decisions made today define the energy system of decades to come. Capital investment flows should be reallocated urgently to low-carbon solutions, to avoid locking economies into a carbon-intensive energy system and to minimise stranded assets. Regulatory and policy frameworks must be established quickly which give all relevant stakeholders a clear and firm long-term guarantee that energy systems will be transformed to meet climate goals, providing economic incentives that fully reflect the environmental and social costs of fossil fuels and removing barriers to accelerate deployment of low carbon solutions. The increased participation of institutional investors and community-based finance in the transition should be facilitated and incentivised. The specificities of distributed investment needs (energy efficiency and distributed generation) should be addressed.
6. **Ensuring that transition costs and benefits are fairly distributed**. The scope of the transition required is such that it can only be achieved by a collaborative process that involves the whole of society. To generate effective participation, the costs and benefits of the energy transition should be shared fairly, and the transition itself should be implemented justly. Universal energy access is a key component of a fair and just transition. Beyond energy access, huge disparities exist at present in the energy services available in different regions. The transition process will only be complete when energy services converge in all regions. Transition scenarios and planning should incorporate

access and convergence considerations. A social accounting framework that enables and visualises the transition contributions and obligations from individuals, communities, countries and regions should be promoted and facilitated. Advances should be made in the definition and implementation of a fair context to share the transition costs, while promoting and facilitating structures that allow a fair distribution of the transition benefits. Just transition considerations should be explicitly addressed from the onset, both at the micro and macro levels, creating the structures that provide alternatives allowing those individuals and regions that have been trapped into the fossil fuel dynamics to participate from the transition benefits.

2.4 The Just Transition Perspectives

Africa contributes the smallest share of GHGs, about 4 percent globally[16]. Yet, climate change has had some of the most devastating effects on the continent[17]. The conversation of energy transition among African countries goes beyond the energy sector and focuses on livelihoods, job creation and overall development outcomes. Consequently, transitioning from traditional fossil-based fuel to renewables has given traction to **Africa's conversation around a just and equitable energy transition.** A just energy transition (JET) entails fair, equitable and inclusive considerations in the global and local shifts from fossil fuel dependency to a renewable energy and non-fossil fuel driven economy, and further ensures that the historical environmental, economic and social impacts of fossil fuel production and utilisation are acknowledged. Further, JET aims at ensuring that resource-rich African countries, historically dependent on fossil fuel, do not become disadvantaged due to a decrease in fossil fuel investment. JET thus focuses on resolving challenges in the transition process such as, social inclusion, social benefits, transition finance, transparency and accountability, access and affordability of energy to address her energy security challenges[18].

The United Nations Framework Convention on Climate Change (UNFCCC) upholds the Just Transition concept. It insists that, no country should be left behind, and the decisions made to transition must benefit the most underprivileged. In this way, the benefits and burdens of the low carbon transition are allocated in accordance with the principle of social equity, and this applies

[16] https://www.statista.com/statistics/1287508/africa-share-in-global-co2-emissions/
[17] https://www.afdb.org/en/cop25/climate-change-africa
[18] https://www.bcg.com/publications/2023/exploring-challenges-of-just-transition

both at the international and intra-national levels, with emphasis on stakeholder vulnerability, and the required adjustment.

The World Future Council[19] has on its part, advocated that, for a transition to be just, fair, and inclusive, political decision makers are required to provide the necessary framework in terms of policies, incentives, as well as securities to guarantee continuity and sustainability by;

- Facilitating inclusive and participatory decision-making through Multi-Actor Partnerships;
- Assessing the needs and motivations of fossil fuel companies and other actors;
- Basing political decisions on science and setting clear, obligatory phase-out and phase-in targets;
- Providing assistance (political, conceptual, structural, and financial) to a 'just transition' of affected communities.

The Ghana Upstream Petroleum Chamber's position paper on Energy Transition cites the ongoing Russia – Ukraine war, and its geo-political and economic ramifications to stress the need for countries to approach their transition strategies with caution, even as they remain committed to progressing towards their set targets. The paper argues that, the threat of Europe's return to coal, in the light of severe gas supply constraint, occasioned by the war, along with the decision by the European Commission (EC) to adopt gas and nuclear energy as clean energy sources, point to the fact that, the speed at which nations will transition will largely depend on geo-political events, their effect on energy security, and their wider impact on the economy. The paper proceeds to argue that, for Ghana, and other frontier oil producers in the developing world, a 'just transition' should as a matter of importance, should situate the national strategy within the country's energy security imperative, and socio-economic impacts.

2.5 Regional Energy Transition Frameworks

Africa's energy transition is guided by the African Energy Transition Programme, AU Agenda 2063 (Africa's blueprint and master plan for transforming Africa into the global powerhouse of

[19] The World Future Council consists of 50 eminent global change-makers from governments, parliaments, civil society, academia, the arts, and businesses working to create a just world and to ensure environmental sustainability.

the future)[20], SDGs and Paris agreement on climate change. The African Energy transition programme focuses on 7 main objectives; [21]

- Building the energy infrastructure for economic and social development, starting with agriculture, which employs the largest share of the population but remains at a near subsistence level of production in most parts of the continent;
- Development of the renewable energy sector in alignment with the Paris Agreement, to exploit Africa's great potential for solar, wind, hydropower and other renewable sources, and build African capacity for developing these technologies;
- Energy efficiency programmes for buildings, industry and transport. Such a programme should include local manufacturing of efficient equipment, as well as regulatory and behavioural interventions;
- Careful consideration of the possible role of national, regional and inter-continental gas pipelines, where this can be justified from a long-term climate and economic perspective, with recognition of risks of stranded assets and the global need to rapidly move away from fossil fuels;
- Development of an integrated African electricity network, which would greatly decrease average electricity costs across the continent and increase energy sustainability and security;
- Decarbonisation of the energy and other sectors, to put countries firmly on a low- to zero-carbon energy trajectory as well as fulfil national commitments under the Paris Agreement;
- Implementation of a systematic, continent-wide approach to innovation to harness the research and development capacities required to meet all the above objectives.

The programme is structured around the following components:

- High level advisory support on strategy, policy, regulatory, financial and infrastructure improvements to enhance the deployment of renewable sources of energy in Africa.

[20] https://au.int/en/agenda2063/overview
[21] https://au-afrec.org/energy-transition-programme

- Provision of holistic support to governments to address financial and technical challenges
- Skills and capacity development of improve countries human capacity.
- Encouraging and facilitating collaboration between private sector and governments for the provision of small, medium and large-scale renewable energy projects.
- Support the Unlocking of the rural electrification and women empowerment.[22]

2.6 Energy Transition - Approaches to Reducing Emissions

In an effort to slow down global warming, there is a growing push for a faster and innovative energy transition model. For instance, in Norway, there is the promotion of the use of electric vehicles and incentives for people who buy EVs. The key barrier for Norwegians to buy EVs were the additional purchase cost and taxes, however, as part of efforts to reduce its emissions, Norway has removed import duties and taxes on EVs[23]. Similarly, the USA gives tax credit of up to 7,500 dollars per buyer for up to 200,000 units per manufacturer, increasing its per capita of electric vehicle.

As part of measures to reduce global emissions through oil production, the United Kingdom pledged to end investment in fossil fuel sectors overseas[24]. Also, the UK plans to ban new petrol and diesel cars in UK from 2030 under the green plan[25].Despite these climate pledges, UK companies are signing new mega fossil fuel contracts, as about 50 projects have been approved since Cop 26.[26]

In an attempt to reach a Net-Zero emission by 2030, France seeks to utilise nuclear power plant to produce 40 percent of its electricity by 2035[27]. Similarly, Italy seeks to use renewable energy sources to produce 65 percent of electricity by 2030 and cover 40 percent of energy demands[28].

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22 https://au-afrec.org/energy-transition-programme
23 https://toolsofchange.com/userfiles/Norway%20Electric%20Vehicles%20V2.pdf
24 https://www.gov.uk/government/news/pm-announces-the-uk-will-end-support-for-fossil-fuel-sector-overseas
25 https://www.bbc.com/news/science-environment-54981425
26 https://www.theguardian.com/environment/2022/may/19/uk-has-approved-several-fossil-fuel-projects-since-cop26-analysis-finds
27 https://www.theguardian.com/environment/2023/sep/24/how-germany-france-and-italy-compare-on-net-zero-emission-targets
28 https://www.theguardian.com/environment/2023/sep/24/how-germany-france-and-italy-compare-on-net-zero-emission-targets

In Africa, the Government of Ethiopia, in an attempt to avoid becoming a dumping ground for ICE vehicles from Europe, announced in February 2024, a total ban on the importation of Internal Combustion Engine (ICE) vehicles, making it Africa's first country to do so, and putting it ahead of the European Union, which has set a target date of 2035 to ban ICE cars. The move has been met with mixed reactions by some CSOs and climate change activists. While some see the Ethiopian ban as pre-emptive, and intended to prevent the likelihood of dumping, as Europe phases out ICE vehicles, others consider it ill-timed, arguing that, it will make vehicular transportation a luxury, as EVs are pricey and beyond the reach of the majority of the country's population, unless it is accompanied with massive public investments in mass transit transport modes that run on green energy. Following the above examples, the Government of Ghana, in its 2024 budget and economic policy statement, announced a waiver of import taxes on EVs, and imposed a vehicle emissions tax to discourage the importation and use of combustion engine vehicles in the country. The introduction of the levy faced strong public resistance, leading to its withdrawal for further consultations.

Many argue that, the emission levy should be imposed on newly imported combustion engine vehicles to prevent dumping, and leave out vehicles already in the country.

Others point out what they see as inconsistency in government's policy, citing recent commissioning of car assembly plants in Ghana to produce combustion engine vehicles, rather than EVs, for the Ghanaian market. This group would rather want government to compel or incentivise vehicle assembly plants in the country to consider assembling EVs at affordable prices for the Ghanaian market.

Some members of Ghana's Economic Governance Platform suggest that, the reason for the public resistance to the emissions levy was that, there was no clear indication of what the expected revenue from the levy was going to be used for, and how that will help Ghana's energy transition agenda. For such stakeholders, the emission levy was nothing short of a mere tax handle to help government bridge its revenue-expenditure gap.

3.0 The Energy Transition in the Context of Ghana

3.1 Ghana's Energy Transition – the Policy Context

Ghana's National Energy Transition Framework emphasizes government's plan to achieve a low carbon and climate-resilient energy sector in Ghana by 2070, in line with the country's national and international commitments and aspirations.. The specific objectives of the Framework include;

- Identify viable pathways for the country to transition towards carbon-neutrality within a secure and efficient energy sector;
- Harness the opportunity for a fair and equitable energy transition as the country relies on carbon-intensive industries for economic growth;
- Evaluate the impacts of energy transition on the economy (infrastructure, government revenue, jobs, and social development);
- Develop medium to long-term targets and policies for achieving a carbon-neutral economy; and
- Estimate the cost of implementing the framework and identify financing options for the realization of the stated objectives.

Achieving the specific objectives is based on the following key assumptions;

- GDP is projected to grow at an annual rate of 5% from USD 79.08 billion in 2021 to USD 863.69 billion by 2070.
- The population is projected to increase from 30.8 million in 2021 to 72.2 million by 2070 at an annual rate of 2%.
- The urban-rural share is expected to grow from 56% in 2021 to 85% by 2070 at an annual rate of 1%.

The key policies, strategies, and actions that the framework proposes for each sub-sector are as follows:

- **Electricity**: The framework aims to increase the generation capacity from 5,392 MW in 2020 to 84,308 MW in 2070, with natural gas-fuelled power plants playing a significant role in the electricity generation mix. It also plans to improve the transmission and distribution networks, reduce losses and outages, and expand access to electricity to 95% of households by 2030. The framework forecasts a decline in the use of natural gas by the mid-2050s due to optimal scaling up of nuclear power in the generation mix.
-
- **Upstream petroleum**: The framework aims to optimise the production and utilisation of oil and gas resources, while minimising the environmental and social impacts. It also plans to diversify the economy and reduce the dependence on fossil fuels. OPEC estimates that the global demand for crude will increase from 17.6 mb/d to 108.2 mb/d between 2020 and 2045. The OECD however estimates a peak in the demand for crude around 46.6 mb/d in 2023, and a long-term decline of crude to 34 mb/d by 2045. Ghana has the potential to supply crude to meet the global demand. Despite Ghana's potential to increase production to meet global demand, there is a risk in investment in upstream petroleum due to global shift to renewable energy.

  The framework however, does not emphasise nature-based carbon sequestration, which is the direction the upstream petroleum sector wishes to go with its net zero targets. Already, Tullow Oil has entered into an MoU with Ghana's Forestry Commission to regenerate the country's depleted forests and savannah belt to offset its emissions with the carbon credits to be gained from the programme. The company again, intends to use available eco-friendly technologies to reduce or capture emissions from any new oil and gas projects. These industry approaches do not gain adequate recognition in government's plans.

- **Downstream petroleum**: The framework aims to improve the efficiency and quality of petroleum products and services, while reducing the greenhouse gas emissions and air pollution. It also plans to promote the use of cleaner fuels and alternative modes of transport. Some of the specific actions include: upgrading and expanding refinery and storage facilities; enforcing fuel quality standards and regulations; introducing fuel efficiency and emission standards for vehicles; and promoting electric and hybrid vehicles, mass transit systems, and non-motorized transport.

The government's downstream plans suggest that, Ghana intends to rely on internal combustion engines for the long haul. This is evident in plans to upgrade and expand oil refinery and storage capacity. Indeed, a US$2 billion privately owned refinery, Sentuo Oil Refinery, was commissioned by the President of Ghana on 29 January, 2024, with the search for investors to help revamp the country's aging Tema Oil Refinery, currently in progress. This is partly the reason many see government's attempted introduction of a vehicle emission levy as ill-considered. Many industry watchers and civil society activists have suggested that the country focused some attention on working with the petroleum downstream companies to invest in vehicle charging points, as the country charts a path into the green energy future.

- **Transport**: The framework aims to reduce the energy demand and greenhouse gas emissions from the transport sector, which is the largest and fastest-growing source of emissions in Ghana. It also plans to improve the mobility and accessibility of people and goods, while enhancing the safety and affordability of transport services. Some of the specific actions include: developing and implementing a national transport policy and master plan; improving the road, rail, water, and air transport infrastructure and services; promoting modal shift and integration; and supporting urban planning and public transport.[29]

  While the introduction of mass transit buses that run on green energy such as solar, hydrogen, and liquified gas may help reduce the transport sector's carbon foot print, it is not known how much of GHG emissions are contributed by the transport sector. The Driver and Vehicle Licensing Authority incidentally does not register vehicles by their fuel types. It is therefore difficult to obtain data on diesel, petrol, and gas-powered vehicles. To the extent that natural gas is considered a relatively cleaner energy, current policy ought to encourage a shift to gas powered vehicles for those who cannot afford EVs.

[29] Ghana's Energy Transition Framework

- **Investment requirements**: The framework estimates that the energy transition would require a total investment of about 561.8 billion USD by 2070, of which about 266.1 billion USD would be for power generation, 148.2 billion USD for residential appliances and modern fuels, 14.5 billion USD for air conditioners and refrigeration services, 7.4 billion USD for electric motors, gas and electric boilers, 12.3 billion USD for the road transport, and 113.4 billion USD for infrastructures for power transmission and distributions, CCUS, electric charging stations, gas transmission, gas distribution, CNG stations, and storage . The investment needs for each sub-sector are based on the projected demand and supply scenarios, as well as the potential for renewable energy and energy efficiency[30].
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  The investment requirements appear to overlook investments in the exploitation of green minerals that will help the country transition into a green energy future. Currently some investments have come through to exploit lithium in the Central Region of Ghana, and graphite in northern Ghana. The exploitation of these minerals will come with its own environmental challenges, including deforestation, but will also generate returns that could be plough back into investments in renewable energy technology and infrastructure.

- **Financing sources**: The framework identifies four main sources of funding for the energy transition, namely: Government of Ghana, Development partners, Multilateral Development Banks (MDBs), and Private Financiers Beneficiaries.

The benefits and challenges of implementing the proposed measures are as follows:

- **Benefits**: The energy transition framework will have a positive impact on Ghana's economic, social and environmental indicators. Economically, revenue from the sale of electricity will increase to US$140 billion by 2070, representing about 16% of the country's GDP. The transition from fossil fuel will also be a catalyst for job creation, leading to 936,368 direct jobs and 468,234 indirect jobs. It is further estimated that

[30] Ghana's Energy Transition Framework

reducing the pollution caused by energy use might avoid 48,218 preventable deaths, while the change in energy source for daily activities such as cooking, and transportation will directly benefit people's health.

- **Challenges**: The framework acknowledges that the energy transition would require significant investments, estimated at about 56.8 billion USD by 2070, of which about 88 percent would come from the private sector and development partners. It would also face technical, institutional, and behavioural barriers, such as data availability and quality, technology readiness and transfer, policy coherence and coordination, regulatory and legal frameworks, capacity building and awareness, and stakeholder engagement and participation[32].

3.2 Ghana's Energy Transition - The Baseline, Prospects, and challenges

3.2.1 The Baseline

Historically, Ghana has contributed only 371.32 $MtCO_2$ (0.02%) to the global cumulative CO_2 emissions (from 1750 to 2020), the bulk of which can be attributed to oil and gas consumption, and lately production. These figures imply, Ghana currently has an almost insignificant contribution to the climate change crisis. However, policies being made on a global scale seem to lump all countries in the world together in considering the harm done to the environment (GUPC, 2021). Figure 9 depicts a comparison between Ghana's cumulative CO_2 contribution and those of other countries in the world.

[32] Ghana's Energy Transition Framework

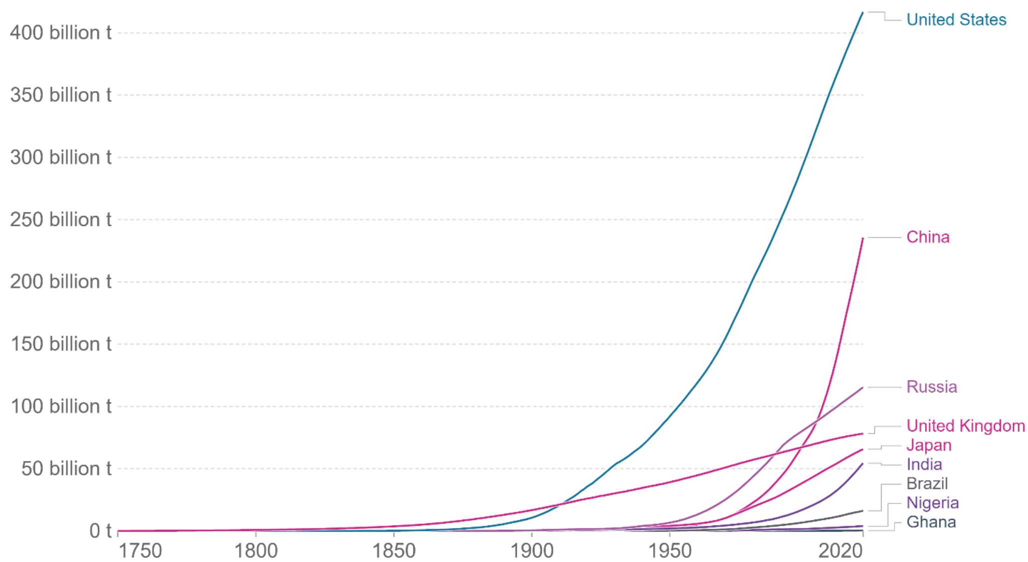

Figure 9: A graph comparing Ghana's cumulative CO_2 contribution to other countries in the world

Source: Ritchie & Roster, 2022a

Ghana's carbon footprint in terms of power generation is very low. Though the country's energy mix is dominated by thermal (68%), 99.4% of the thermal generation is from low carbon fuel source (natural gas). This is followed by hydro (31%) and renewables (0.82%). The carbon component of the country's energy mix is made up of just 0.34% of Heavy Fuel Oil (HFO) and 0.22% of Light Crude Oil (LCO) (Ackah, 2021). Coupled with its relatively low level of industrialization, Ghana kicks off its transition efforts on a good note. It's relatively low carbon footprints, means the country will not have to make heavy cuts to achieve a net zero outcome in power generation. The biggest challenge will be in the area of transport where combustion engines dominate.

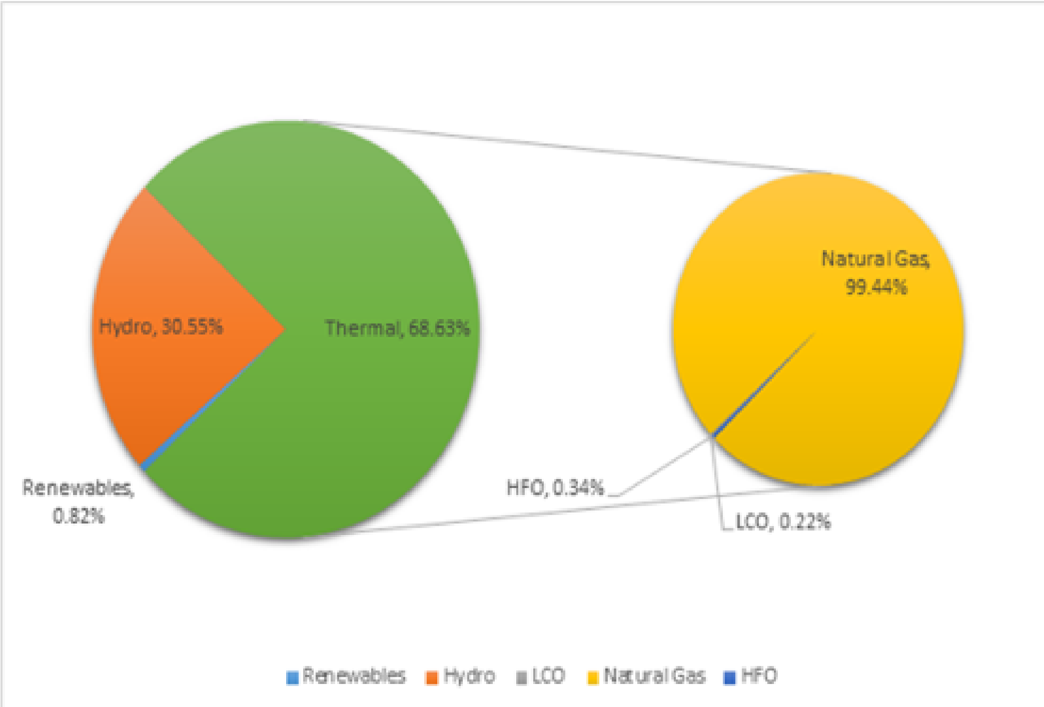

Figure 10: Ghana's installed power capacity mix as at 2019

Source: Ackah, 2021

3.2.2 Prospects

With its abundant sunshine, tidal waves and wind corridor potential, Ghana is in a privileged position to harvest renewable and carbon neutral energy all year round.

Furthermore, the recent discovery of Lithium at Awoyaa, near Mankessim, in the Central Region, coupled with the abundance of silica sand in the Western Region affords fossil fuel companies desiring to transform into fully fledged energy companies, wide ranging opportunities to do so. But this must be incentivized and actively promoted.

Unfortunately, the Ghana Energy Transition framework overlooks the urgent need to incentivize oil and gas companies currently operating in Ghana to begin to diversify their investments into renewable energy technology, taking advantage of the available green mineral resources. The suggestion is not to turn them into mining companies, but perhaps getting into beneficiation and value addition activities to keep Ghana competitive in the green energy race.

A study on Energy Transition and Critical Minerals. Commissioned by the Ghana EITI in collaboration with the EITI International Secretariat and supported by USAID suggest that energy transition could lead to intensification of mining, with a potential adverse impact on forestry and biodiversity, compounding in the process the very problem we strive to resolve. A major set-back in the country's efforts at containing the effects of global warming has been the rapid loss of forest cover in recent years. Not even a 10-year, World Bank-supported Natural Resource and Environmental Governance Programme (NREG)[34] could halt the decline.

The report identifies several critical (transitional) minerals that Ghana can latch on to catalyse its transition – these include manganese, bauxite/aluminium, iron ore, silica, and lithium. For example, Ghana has the second-largest reserves of bauxite deposits in Africa, next to Guinea and recently discovered lithium in commercial quantities. Ghana also has significant manganese reserves in the Western Region at Nsuta, which it has exploited since 1916. There are also significant occurrences in the Dixcove area, South Bole District in Northern Ghana, Axim Salman area and Wa. However, these ore bodies require further studies to delineate them to attract much-needed exploration and development investment. Manganese is a key ingredient for producing cathode materials for electrical conduction: lithium-ion, alkaline and zinc-manganese batteries. The medium-grade Nsuta deposit is one of the high-quality blends suitable for electrolytic manganese metals used in stainless steel and manganese dioxide battery raw materials. The report posits that, Ghana could capture more of the value chain by building an Electrolytic manganese dioxide facility in-country to reduce the global reliance of this material on South Africa and China. Europe's fast-growing battery market could be a potential market, and the government should consider commissioning a feasibility study.

The critical or green mineral sector, also presents an enormous opportunity for the National Oil

[34] The NREG was a 10-year effort by the government of Ghana and its development partners, including the World Bank, to address governance challenges in Ghana's Natural Resource and Environment (NRE) sector, and to promote sustainable resource extraction through policy and practice change. The programme provided targeted budgetary support to agencies in the natural resource and environment sector, to enable them implement a reform programme that will better regulate mining, forestry and environment. The End of Project Assessment report by the World Bank noted some progress but concluded that a lot more effort is required to stem illegalities in the mining and forestry sectors.

Company to diversify its operations into becoming a fully-fledged energy company, by investing in the processing of some of these strategic minerals.

Further to exploring the nexus between energy transition and critical minerals, the report argued that, new revenue sources will become available to the country as a result of increased mining activities, and this ought to be ploughed back to help the transition, and to mitigate the social and environmental cost of increased mining activities. This calls for a good balance between cost and benefits of green mineral exploitation.

Another opportunity that the Energy Transition presents, but which seems to have been overlooked by policy makers, is for Ghana to take advantage of the supply gap in the West Africa sub-regional power market, as well as the gas supply constraints in Europe, to position itself as a regional energy hub. While this is an opportunity, it is also a challenge, given that, it will require substantial investments in energy infrastructure, including gas transportation, and LNG facilities.

As a developing country, Ghana's eligibility to access the Global Climate Fund is also an opportunity in terms of reducing the financial burden imposed by the transition. Other complimentary opportunities exist within the private sector, and must be explored. As already observed, Ghana's need to halt the advancement of the Sahara Desert southwards, presents an opportunity for both industry and government to explore afforestation initiatives and carbon credit concepts.

3.2.3 Challenges to De-carbonization

The Civil Society Platform on Oil and Gas contends that even though hydrocarbon revenues do not dominate Ghana's national budget (usually between 6% and 12%), the loss of such revenue as a result of the transition could pose substantial fiscal disruption for the country. This view is supported by the Ghana Upstream Petroleum Chamber, which argues that, growing demand for power with population growth, rapid urbanization, and a very ambitious industrialization program ('One-District-One-Factory') will leave the country with a huge energy supply gap if it were to transition abruptly. The government's Integrated Bauxite-Aluminium, and integrated Iron-Steel industries will likely be derailed, as renewable sources alone cannot meet the required energy for these programmes. Gas as transition fuel will therefore remain important in the country's energy mix for some time.

The Ghana petroleum industry position paper on energy transition points out a challenge associated with renewable energy output levels in the country, largely as a result of unimpressive investment in renewables. For instance, for all the solar potential of countries in the Global South (Middle East, Africa and South America), they contributed only 2.4% (5.45 GW) of the global solar power installed capacity of 227 GW in 2015. In the particular case of Ghana, a country with good renewable energy potential, a respectable feed-in-tariff rate of US$0.15/kWh for solar PV to renewable electricity generators was assured in 2016. This incentive, along with access to transmission and distribution, and an assured market through Power Purchasing Agreements, could not ensure that the renewable electricity production goal was met by 2020 (Afful-Dadzie et al., 2020).

Another challenge arises out of EU and other global initiatives to discourage investments in fossil fuel projects. These are likely to constrain investment finance for such projects, leading to intense competition for FDI in fossil fuel exploitation in Africa and other developing regions. Even if the Government of Ghana decides to leverage on its gas resources in the transition period, to achieve energy sufficiency and to take advantage of Western Europe’s need for alternative sources of gas as a result of the Russian invasion of Ukraine and its related supply chain disruptions, it will be faced with the challenge of under-developed gas transportation infrastructure. The West Africa Gas Pipeline Project failed to connect the West Africa gas market, when it was designed to begin in Nigeria and terminate in Ghana. An extension of the pipeline along the West Coast, through Cote d’Ivoire, Liberia, Guinea, Sierra Leone to the North Western Coast, would have facilitated access to the European gas market. The local gas market also suffers substantial infrastructural gap. The transportation pipelines which used to serve the western power enclave, has recently seen some moderate expansion. It has now been extended to serve the Tarkwa, Prestea Huni Valley mining enclave, with plans to reach Kumasi and beyond. As at 2021, Genser, an Independent Power Producer (IPP) operating in the Western Region had begun laying a 20-inch pipe from Prestea to Nyinahin. It is apparent that it will take a while longer before the gas transportation infrastructure will reach the Northern part of the country. The local gas market has however, benefitted from the re-engineering of the West Africa Gas Pipeline to allow for reverse flow of gas, and by that, facilitated access to the Eastern power enclave in Tema.

The country also faces a major challenge in the transport sector. Vehicular transportation predominantly depends on petrol, diesel, and to a lesser extent, gas. The challenge for government will be, how to switch from fossil fuel dependent transport system to renewable energy-driven transportation. Given the rather high level of poverty among large sections of the population, and the high cost of EVs, the transition within the private road transport sector will constitute a bigger challenge.

3.3 Energy Transition and De-carbonization options for Ghana

Beyond the customary types of renewable energy technologies being relied upon to generate carbon-free power (hydro, solar and wind), new technological developments and processes are being discussed. Carbon Capture and Storage (CCS) is being considered strongly to help decrease the by-products of fossil-based power stations, as they generate a majority of the world's electrical energy. While hydrogen (green hydrogen) is being considered as a 'drop-in' fuel option in the transportation sector. These are options available to governments and fossil fuel companies to reduce their carbon footprints.

Nature-based carbon sequestration, which is mainly pursued through afforestation, is being considered in developing countries using UNFCCC's Reducing Emissions from Deforestation, and Forest Degradation (REDD+) framework. The purpose of this framework is "to guide activities in the forest sector that reduces emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries" (UNFCCC, 2020).

Recommendations made in Ghana's REDD+ investment plan – namely, to access the green bond market; establish a dedicated REDD+ fund; and engage with multinational and bilateral sources of climate financing – is likely to benefit from a government – industry collaboration, similar to the precedent set by the Ghana Cocoa Board and the Forestry Commission.

Currently, some viable options being pursued by some hydrocarbon companies to de-carbonize are:

i) Eliminating routine flaring, using value enhancing engineering activities, and

ii) Carbon Offsetting, using nature-based removal techniques.

There are other options that may not be feasible within the current industry context due to the age of the assets, but new projects will afford opportunities for the application of new viable technologies.

The carbon offsetting pathway being pursued by some industry players, involves the elimination of routine flaring, after which the residual volume of emissions would be catered for by nature-based removal techniques (afforestation). This (carbon sequestration) option is being targeted at the savannah and the cocoa belts and intended for exchange for carbon credits. Additionally, industry is committed to the design of new assets to be low carbon, going forward into the transition. In terms of exploration strategy, industry players are considering pulling back from frontier-led approaches and now looking at infrastructure-led exploration, which will ensure that, anything new that they find, has the capability of being tied into existing infrastructure. Table 2 shows de-carbonization options, the technologies required to undertake such strategies and how they can be carried out.

Table 2: De-carbonization Options and how they can be executed

Strategy	**Technology**	**Operations**
Establish National GHG roadmap and performance targets	Carbon free fossil fuel production equipment	Eliminate routine flaring
Prioritize and map out strategy with specific roadmaps for upstream, midstream and downstream	Carbon Capture, Storage and Removal (CCSR) systems	Carbon offsets
Expedite the exploration of unexplored blocks with a more	Retrofit options for infrastructure-led exploration and	Intensify Research & Development; Increase exploration activities

Strategy	Technology	Operations
attractive profit-sharing regime	production	within producing fields.
Adopt selective natural earth resources such as silica for the provision of solar panels and lithium for the production of batteries and accessories.	Mineral processing and beneficiation equipment.	Increase clean energy production as a component of investment portfolio.
Reduce burden on the national grid to free power for industrialization.	Decentralized off-grid renewable energy solutions	Promote universal access to affordable electricity by diversifying energy sources and increasing renewable component.
Accelerate access to clean cooking with cleaner fuels	LPG, Hydrogen	Reduce rate of deforestation
Leverage country's vast forests into obtaining carbon credits from other nations	Carbon sequestration	Undertake tree planting as part of corporate social investments
Industry assumes full responsibility for its emissions with established baselines, monitoring and mitigation plans	Database systems for monitoring and evaluation	Establish a multi-stakeholder framework for performance tracking
Industry and government work together towards win-win outcomes	Carbon sequestration	Industry generates credits which government can use in its carbon trading.

Source: Ghana Upstream Petroleum Industry Position paper, 2022

4.0 Political Economy Analysis and CSOs' Expectations of the Next Government on Energy Transition

4.1 Political Parties Energy Transition Positions and Perspectives

4.1.1 Ghana's Democratic Governance and Political Landscape

In 1957, modern day Ghana, previously known as The Gold Coast, became the first country in Sub-Sahara Africa to attain political independence. Democratic governance was however not achieved imminently as the 1960 constitutional amendments transformed Ghana into a one-party state, severely limiting political participation and fundamental human rights. The outcome of the post-independence authoritarian government was increased resentment and heightened internal opposition to the Nkrumah regime. The ensuing decades were characterized by unstable democratic governments and sporadic military take-overs.[35] Despite the turbulent decades post-independence, Ghana's democratic credentials has soared in the last three decades, its foundations, deeply rooted in the Fourth Republican 1992 Constitution, which established an independent electoral commission, impartial judiciary, and safeguarded multi-party democracy.[36]

Even though the constitution of the Republic establishes and safeguards multi-party democracy, Ghana has effectively become a two-party state, with the National Democratic Congress (NDC) and the New Patriotic Party (NPP) the only political parties to have won political power since the return to constitutional rule in 1992. The Conventions Peoples Party (CPP), the People's National Convention (PNC), the United Front Party (UFP), Ghana Union Movement (GUM), Ghana Freedom Party (GFP), National Democratic Party (NDP), the Great Consolidated Peoples Party (GCPP), All Peoples Congress (APC), Progressive People's Party (PPP) and the Liberal Party of Ghana (LPG) makes the full complement of political parties in Ghana. The activities of the political parties – recruitment, interest aggregation and electoral contestation – have strengthened and consolidated democratic governance in Ghana.[37]

4.1.2 Energy Transition Agenda of the Two Major Political Parties in Ghana

As shown above, the National Democratic Congress (NDC) and the New Patriotic Party (NPP) are the two dominant political parties in Ghana. With energy transition issues now gaining traction in the Ghanaian policy discourse, this section focuses on the renewable energy and climate change positioning of the two parties, as captured in their 2020 manifestoes.

- **New Patriotic Party (NPP)**

The governing New Patriotic Party is a **centre-right and liberal conservative party** established in 1992 to liberate the energies of Ghanaians for a property-owning democracy to enrich lives and protect the rights of every citizen.[38] Having returned to political power after the 2016 general

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[35] https://constitutionnet.org/country/ghana
[36] https://www.jstor.org/stable/4150169
[37] https://www.jstor.org/stable/4150169
[38] https://newpatrioticparty.org/about-us/

elections, the party's mandate was renewed by Ghanaians in the 2020 elections, maintaining the 2-term political cycle 'convention' in the fourth republic.

The party's commitment to energy transition through the introduction of alternative energy sources is firmly demonstrated under section 1.9 (energy and petroleum) of their 2020 manifesto. Specifically, under promise number 173, the party intends to 'increase proportion of renewable energy in the national generation mix' in Ghana's energy sector. The manifesto document also outlines ongoing initiatives in the renewable energy space, including the National Hybrid Power Projects at Bui and the Pwalugu Hydro Project. On the specific issue of climate change, the party is committed to collaborating with international actors to mitigate and manage the impacts of climate change on Ghanaian industries and households.[39]

- **National Democratic Congress (NDC)**

The National Democratic Congress (NDC) is a **social democratic party** established to promote participatory democracy and responsible government in Ghana to create conditions conducive to ensure national development.[40] The NDC was the first political party to win political power in the fourth republic. The party also won the 2008 and 2012 presidential elections with the late Former President Evans Atta Mills and John Dramani Mahama respectively.

The NDC's 2020 manifesto promised a golden age of renewables, by aggressively developing Ghana's renewable energy sector as a clean, climate-friendly, electricity solution for households, remote communities and light industries, ultimately surpassing the 10% of energy mix stipulated in the Renewable Energy Act 2011 (Act 832). This, according to the party's 2020 manifesto, will be achieved through the establishment of a Renewable Energy Commission, accelerating the development of grid-connected solar, wind and biomass plants, providing incentives for investment in the manufacture of solar panels and accessories (including removal of import duties on solar equipment and accessories), encouraging private businesses and public institutions to use solar power among other initiatives.[41]

[39] https://media.peacefmonline.com/docs/202008/519056491_291669.pdf
[40] https://ndcgh.org/aims-and-objectives
[41] https://ndcgh.org/wp-content/uploads/2020/09/The-NDCs-Peoples-Manifesto-2020_.pdf

On climate change, the party intended to establish a Youth in Climate Change and Afforestation Programme (YiCCAP) in partnership with the private sector, and collaborate with international institutions to address climate change and global warming.

4.2 CSOs Expectations of the Next Government on Energy Transition

Based on the analysis of relevant documents and the perspectives of the two dominant political parties on energy transition, this paper advocates for a pragmatic approach to the Energy Transition. At all cost, extreme shifts or positions should be avoided. Ghana needs a mix bag of tools and policies to ensure a smooth, and the most painless transition. Below is a list of specific demands the Civil Society Platform on Oil and Gas, and its other CSO partners would want the political parties contesting in the 2024 General Elections to address in their electoral manifestoes:

1. Accelerate investments in clean technologies to leverage and seize first mover opportunities to enhance socio-economic growth.
2. Develop sector-specific energy transition frameworks, based on the national energy transition framework
3. Develop policies that emphasise value maximization and retention in the exploitation of Ghana's transition minerals, achievable through enhanced fiscal terms for the extraction, local content and local participation in the industry value chain, and beneficiation.
4. Adopt a more ambitious energy transition timelines, and develop policies to attract investments into the renewable energy sector. For instance,, oil and gas companies operating in Ghana should be incentivized to consider investing in the downstream beneficiation activities in the green minerals sector. With its abundant silica, lithium and graphite deposits Ghana can easily become the renewable energy hub in West Africa. The Abosso Glass Factory should also be revived to produce solar panels, while discussions on setting up a lithium processing facility taken very seriously.
5. Develop a comprehensive, clear and transparent, fiscal regime to govern the green and critical minerals sector. This is critical to discouraging further investments in high carbon emission sectors and encouraging investments in low carbon and green sectors.
6. Leverage the country's vast forests into obtaining carbon credits from other nations or large emitting companies through carbon trading. This is key for raising additional finance to

invest in R&D in green technologies. Ghana's potential to sequester, including planned interventions by some oil companies operating in the country must be evaluated for this purpose.

7. Based on the Petroleum Revenue Management Act, 2015 (Act 815), leverage the country's current and future petroleum revenues to finance its transition, just like other developed countries and International Oil Companies (IOCs) are doing.
8. Develop relevant legislations to regulate and facilitate the manufacturing and assembling of EV vehicles in Ghana. The regulations must also be applicable to vehicle assembling plants in the country, based on agreed timelines.
9. Adopt longer-term investments in facilities and infrastructure for the disposal of lithium batteries when they are used up after their 6-year typical life span.
10. Invest significantly in geological data acquisition and exploration for other green minerals that contributes to the transition. For instance, identify and adopt selective natural earth resources such as silica sand for the production of solar panels, lithium and graphite for the production power storage batteries and accessories, and to promote these to investors who may be interested in beneficiation of these critical minerals.
11. Incentivize technological innovation to scale up renewable energy solutions, by rewarding novel inventions and providing tax waivers to companies who specialize in Research and Development of renewable energy, and energy efficiency technologies. This could be achieved through the collaborative engagements between R & D institutions, and industry and clear incentive schemes that facilitates product development and texting processes for renewable energy solutions. Industry must be incentivized to direct substantial portion of its Corporate Social Responsibility (CSR) expenditures into green climate technologies such as small town off-grid solutions, liquid biofuels, carbon capture and storage, hydrogen, offshore technologies (wind farms etc). Another relevant option is to consider providing incentives for oil and gas companies operating in Ghana, to invest part of their profits in downstream beneficiation of green minerals to make them diversified energy companies.

12. Establish baseline of current emission levels for specific projects or sectors, and develop a roadmap on how the emissions would be mitigated or abated.

13. Advocate for a united African front in the energy transition process to maximize the benefits of the transition to the continent

5.0 Study Conclusion

It is apparent from the foregoing facts and analysis, that, there is a new race in the world. It is the race to dominate the era of renewable energy technology, occasioned by global efforts to curb greenhouse gas emissions. Some countries, including the US, as part of their strategy, have passed laws to support their natural resource companies to challenge the Chinese global hegemony over green mineral resources, critically needed to facilitate the transition. Even if greenhouse gas emissions and their associated climate change phenomenon wasn't a problem, the race would have still been inevitable, as fossil fuels are bound to be depleted within 100 years according to some forecasts.

In 2019, the top 15 countries investing in renewables were all outside Africa, even though Africa has great renewables potential. This fact raises concerns as to how the continent is going to fare in this new race.

Amidst profound indignation from its European contemporaries, Norway announced to COP 26, that it was going to continue exploiting its hydrocarbon resources into the distant future. Yet, the country is on course to eliminating Internal Combustion Engine vehicles by 2025. This clearly speaks to an underpinning strategy for the transition. Indeed, Shell's President is on record to have argued that the company will need revenues from its fossil fuel projects to finance its transition. The African strategy is not very clear. In fact, it's disjointed, with many African countries yet to formulate their country strategies.

For Ghana, an abrupt end to fossil fuel exploitation is not an option worth considering, given its potential destructive effects on the national economy and poverty reduction efforts. Of the two pathways open to the country i.e., a) Business-as-usual, and; b) Pragmatic shift from fossil fuels, the pragmatic shift seems more plausible.

The business-as-usual pathway implies current operations in Ghana's oil and gas industry would proceed as it normally does while paying no attention to the Energy Transition. While the pathway involving a pragmatic shift from fossil fuels would require the country to continue with exploration and production and plough reasonable portions of the returns into renewable energy investments.

It is the hope of the Civil Society Platform on Oil and Gas and its CSO allies that, this paper will serve as a rallying force for civil society voices in Ghana’s energy sector, and to communicate clearly their energy transition policy preferences for the consideration of the political parties contesting the 2024 general elections.

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