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Master in Global Energy Transition and Governance

Energy Transition: A tool to address energy poverty in the Southern conflict Region in Cameroon

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Dedication

This Work is dedicated to the Lord Almighty for his ever-present love and demonstration of power that everything is possible with him, and what he cannot do does not exist.

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List of Acronyms

SND30- National Development Strategy plan (2020-2030)
WEF- World Economic Forum

WEC- World Energy Council
WETI- World Energy Trilemma Index

WET- World Energy Trilemma

IEA- International Energy Agency

GW- Giga Watts

MW- Mega Watts

GHG-Green House Gas

NDC-Nationally Determined Contribution

AFDB- African development Bank

BAD- African Development Bank

UA- Units of Account

PDSE- Electricity Sector Development Plan2030

FPIC- Free Prior Inform Concern

ECMG- External Compliance Monitoring Group

EITI-Extractive Industry Transparency Initiative

WB- World Bank

WBG- World Bank Group
SONEL- Societe National d'Electricite
AES-Alliance des Etats du Sahel

AES-SONEL- National Electricity Utility

SONATREL- Societe Nationale de L'ectricite or National Society of Transport Electricity

IPP- Independent Power Purchase

ARSEL- Electricity Sector Regulator

ENEO- Energy of Cameroon S,A., Power generation, transmission and distribution company.

UN- United Nations

Abstract

This study analyzes Cameroon's energy landscape, the updated electricity law (Electricity Law No 2011/022 of Dec 2011) and National Development Strategy plans (2020-2030) for energy through the dual lenses of the energy trilemma (security, equity, sustainability) and energy justice principles (distributional, procedural, recognition, and restorative). The analysis of the energy landscape through the lens of the framework is to understand the performance and challenges of the energy system, and the analysis of the electricity law through the lens of the framework to find out how the policies shape energy sector and to identify potential gaps or limitations contributing to the energy challenges in the Southern conflict region.

While the analyzes of the SND30 plans through the same lens is to find out whether the plans addresses the unique energy poverty concerns in the southern conflict region of Cameroon and if there are improvements with regards to the law. The analysis is important to inform policy reform and give recommendations that can help address the energy concerns of this region.

The analysis reveals that the policies lack targeted measures to restore energy access or address historical injustices that persist in southern conflict regions as their needs have not been recognized.

Additionally, it also reveals that this failure to recognize and address the unique energy challenges is demonstrated by gaps in policy which are underlain by some root causes. They include a path dependency approach resulting in a lack of political will, governance failures such as fragmented institutional mandates, weak coordination, and insufficient transparency. While the results emphasize the need to include historical and social context in energy policies to effectively address the unique energy needs of this region it also offers insights that can inform policy reform and development initiatives or strategies in similar setting. The research would contribute to the growing discourse on energy trilemma and energy justice highlighting the need for more deep understanding of energy systems, conflict and marginalization.

Key words: Southern conflict region, electricity law, SND30, energy trilemma, energy justice, energy poverty, policies.

Energy Transition: A tool to address energy poverty in the Southern conflict Region in Cameroon

Introduction

Securing access to sustainable and affordable energy remains a critical challenge in conflict-affected regions worldwide. While global energy transitions have spurred the adoption of renewable energy and policy reforms, energy poverty persists, particularly in sub-Saharan Africa. Initially defined in the United Kingdom as a household's inability to afford adequate heating, energy poverty now encompasses broader issues, including electricity access, dependence on inefficient fuels, and the socioeconomic impacts of energy deprivation. Despite energy being fundamental to economic growth and human development, 600 million people in sub-Saharan Africa still lack access to modern energy services[1]. This lack of access is not solely due to resource scarcity but is often exacerbated by political instability, weak governance, poor infrastructure, and ongoing conflicts. Southern Cameroon, a region experiencing ongoing conflict is faced with acute energy poverty. In these areas, energy poverty manifests as the absence of sustainable, equitable, and reliable access to modern services, as outlined by the World Economic Forum[6,11]. As a result, communities in the region experience deep energy injustice and are forced to rely on inefficient and polluting energy sources. Given the severity of energy poverty in these regions, this study aims to examine whether Cameroon's current energy policies address the unique challenges in the southern region using the energy trilemma: energy security, sustainability, affordability, and energy justice, which emphasizes fair and equitable access to energy for all. To understand how Cameroon's energy policies impact access disparities, it is essential to first examine the country's energy sector and the distribution of its resources.

Cameroon's Energy Sector and Access Disparities

Cameroon is endowed with significant energy resources, including petroleum reserves, hydropower, geothermal, solar, wind, and biomass. However, access to modern energy remains highly unequal across regions [3]. The country's energy consumption is still dominated by biomass, accounting for 74.22%, while electricity represents only 7.30% of total consumption, as illustrated in Figure 3 [2,4]. This highlights the overreliance on traditional fuels, particularly in rural areas. Figure 1 presents Cameroon's domestic energy production mix, highlighting the

dominance of biomass as the primary energy source, which reflects its widespread use for cooking, heating, and lighting [5]. Meanwhile, Figure 2 illustrates the electricity generation mix, showing that hydropower provides most of the country's electricity but is constrained by insufficient transmission infrastructure, leading to stark regional disparities in energy access.

Urban areas benefit from a high electricity access rate of 94%, whereas rural electrification lags at just ~24%, forcing communities to rely on inefficient and polluting energy sources like biomass and kerosene [2]. This gap is particularly pronounced in Southern Cameroon, where energy challenges are exacerbated by socio-political instability. Infrastructure development has been slow, leaving many rural communities dependent on biomass and kerosene due to limited electricity access.

Although Cameroon has made progress in increasing rural access from 17% in 2016 to ~24% in 2024, aiming for universal electricity access by 2035, efforts have been insufficient to meet this target [23]. Achieving this goal will require special efforts in underserved and conflict-affected regions, such as Southern Cameroon, where electrification initiatives have faced setbacks. Additionally, the government plans to boost renewable energy output to 1,500 MW by 2035, increasing its share to 25% of the electricity mix [24].

Addressing these disparities will require significant investment, particularly in expanding the grid, strengthening infrastructure, promoting decentralized energy systems, and ensuring equitable energy access in marginalized regions and conflict regions like Southern Cameroon. Cameroon's energy sector challenges are just one example of the country's broader path-dependent governance, where historical patterns shape policy decisions across multiple sectors.

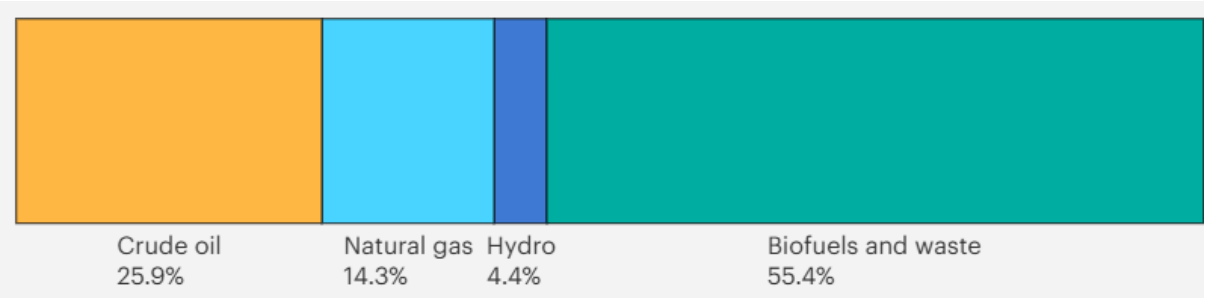

Figure 1. Energy mix of Domestic energy production, Cameroon[72]

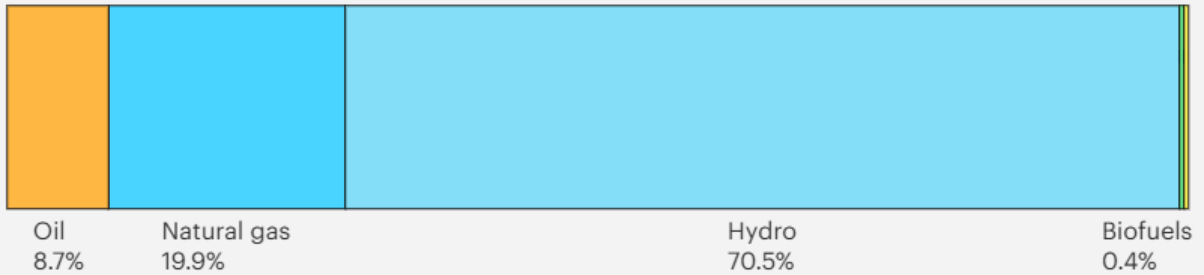

Figure 2. Electricity generation mix, Cameroon[72]

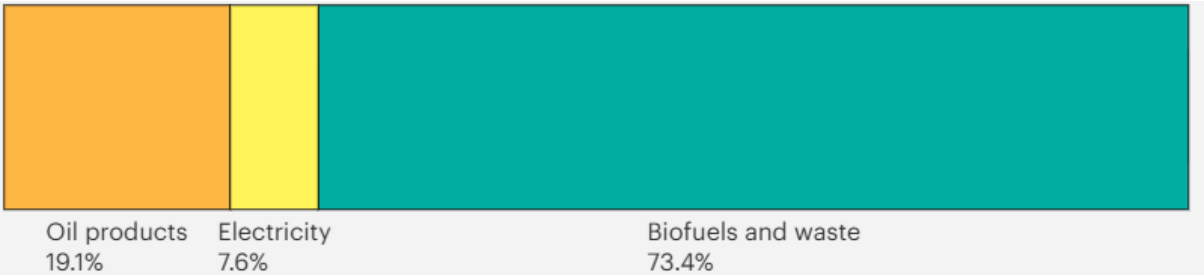

Figure 3.Total final consumption, Cameroon[72]

The conflict in Southern Cameroon: a path dependent approach

Path dependency helps explain the enduring influence of historical decisions on present-day challenges in Southern Cameroon. Scholars like Paul Pierson and Douglas North highlight how past choices create constraints that make institutional change difficult, reinforcing existing structures over time[149 154]. The region's socio-political and economic dynamics are shaped by Cameroon's colonial legacy.

Cameroon's colonial history plays a significant role in its current socio-political landscape. It was initially colonized by the Germans in 1884, and the country was later divided between Britain and France after World War I under the Versailles Treaty, with 80% administered as French Cameroun and 20% as British Southern Cameroons [12,13] Fig.4 below. In 1961, the British-administered Southern Cameroons joined the newly independent French Cameroon (which had gained independence in 1960) through a UN-organized plebiscite, forming the Federal Republic of Cameroon [12,14].

However, over time, the Anglophone regions (Northwest and Southwest) became increasingly marginalized under the centralized government established in 1972, which dismantled the federal system and assimilated Anglophone institutions into a Francophone-dominated unitary state [15,13,16]. By 2016, long-standing grievances over systemic discrimination including the appointment of Francophone judges and teachers in Anglophone regions, erasure of

bilingualism, and economic neglect escalated into an armed conflict known as the Anglophone Crisis [17,18,19]. The government's violent crackdown on peaceful protests by lawyers and teachers in 2016–2017, coupled with demands for federalism or independence (as Ambazonia), resulted in violence, displacing over 712,000 people and claiming over 4,000 lives by 2022 total population of 3.4M [17,18,20] and still ongoing. The energy situation of southern Cameroon reflects path-dependent inequalities that can be traced back to the colonial governance structure. French-dominated policies have historically centralized energy infrastructure, favoring urban industrial zones over rural electrification. Southern Cameroon, which has faced historical marginalization, continues to struggle with energy access disparities, further exacerbating socio-political instability.

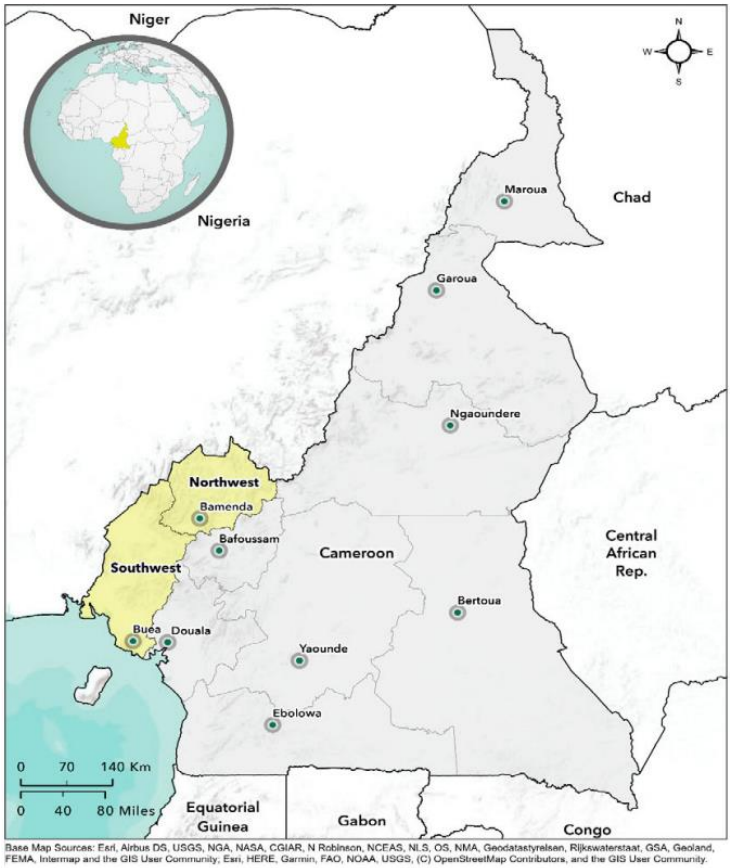

Figure 4.Map of Cameroon showing the French (Grey) and English (Yellow) Cameroon[211]

Conflict and Energy Poverty in Southern Cameroon

Since the onset of the Anglophone crisis in 2016 and its escalation into full-scale conflict by 2018, energy poverty in Southern Cameroon has worsened. The region, which already suffered

from limited electricity access, has experienced further deterioration due to the destruction of infrastructure, economic disruption, and mass displacement of communities. The conflict has not only stalled energy development projects such as Berkeley Energy's Hydropower Project that started feasibility study in 2018 but has also actively reversed progress in expanding electricity access, pushing many households and businesses into deeper reliance on inefficient and polluting energy sources such as kerosene and traditional biomass [21,23]. The project capacity was estimated at 95 MW. It could have increased electricity access in rural and urban areas, created employment opportunities during construction and operation, and infrastructure development [140,164].

One of the most immediate impacts of the conflict has been the destruction of critical energy infrastructure. Armed confrontations have resulted in the targeted destruction of transmission lines, substations, and power distribution networks. The inability to maintain and repair damaged infrastructure due to ongoing insecurity has left many areas without reliable electricity.

Reports estimate that 60% of the Northwest and Southwest regions are no longer serviced for electricity and 40% of telecommunications services are being disrupted [23]. While Cameroon's national electricity access rate stands at 65%, this figure masks deep disparities urban areas enjoy 94% access, while rural communities lag at 24% [2]. This ongoing damage to energy infrastructure, combined with the lack of investment in expansion projects, has severely weakened electricity security in Southern Cameroon. The disruption of transmission networks and lack of maintenance have made energy access increasingly unreliable, deepening socio-economic hardships in conflict-affected areas. However, there is a lack of data to assess the precise situation.

The conflict has severely disrupted key productive sectors, including agribusiness, forestry, food processing, and distribution, which are essential for local economic resilience. The total estimated value of infrastructure losses across various sectors exceeds $64 million [23], with the energy sector alone accounting for over $27 million in damages. The destruction of 258 km of roads and 14 bridges in the Northwest, and 315 km of roads and 26 bridges in the Southwest, has further isolated communities, limiting their access to basic services, including electricity supply [23]. This inaccessibility has made it difficult to transport fuel for power generation in off-grid areas and has hindered maintenance efforts for existing electricity infrastructure [82]. Many displaced populations, now residing in informal settlements or rural villages, have no access to electricity and must rely on biomass sources like firewood and charcoal for

cooking and lighting, increasing deforestation and health risks associated with indoor air pollution.

The consequences of prolonged energy poverty in Southern Cameroon extend beyond electricity access, it affects human capital development, economic opportunities, and overall quality of life. The crisis has already eroded past gains in poverty reduction and economic growth in the region, pushing many households deeper into energy insecurity. Without urgent interventions to restore infrastructure and promote resilient, decentralized energy solutions, the region's energy poverty has continued to intensify, with long-term consequences for economic recovery and sustainable development.

The cumulative effect of these disruptions has not only reversed years of progress in improving electricity access in the region, reinforcing cycles of poverty and underdevelopment, but also negatively impacting the security of electricity supply, sustainability and leaving people in a situation where they cannot afford electricity even if it is available. Considering the urgent need for energy access in Southern Cameroon, existing policies have yet to fully address the specific challenges faced by conflict-affected communities, raising critical questions about the effectiveness of Cameroon's national energy strategy.

Research Question

Cameroon has made significant commitments to extend and expand electricity access, with strategic plans such as the National Development Strategic Plan (SND30) 2020-2030, to increase electricity production and an ambitious goal of achieving universal access by 2035. The country also aims to increase the energy mix by 25%, incorporating more renewable sources into its grid. Despite these national efforts, the underdevelopment of centralized electricity infrastructure and governance structure continues to pose challenges for many underserved communities, particularly in remote areas and in conflict-affected regions.

One of the most pressing concerns is the situation in Southern Cameroon, where over 60% of communities have been without electricity since 2018. In addition to this severe energy poverty, weak telecommunication infrastructure further isolates residents, leaving them without reliable network access and critical information. This continued lack of essential services deepens their vulnerability, exacerbating socio-economic hardships. While broader electrification strategies exist, little effort has been made to tailor energy policies to the unique

challenges faced by the conflict-affected southern region. Against this, the central question guiding this research is:

Does Cameroon's current energy policies take into consideration the specific energy challenges of the Southern conflict in Cameroon?

Methodology

To answer this question, this study employs an analytical framework combining the Energy Trilemma and Energy Justice principles to assess energy policies in Cameroon. The Energy Trilemma provides a structured approach to evaluate policies based on energy security, affordability, and sustainability, ensuring a balance between these competing priorities. However, Energy Justice introduces a critical social perspective, highlighting fairness, inclusion, and equity in policymaking beyond technical and economic considerations. Since policies in Cameroon often reflect historical injustices and governance challenges, integrating both frameworks allows for a comprehensive analysis of whether current policies and plans contains features which can adequately address energy insecurity and inequalities in Southern Cameroon.

In order to assess the policies, chapter 1 based on a literature review is going to help build the analytical framework that is going to be applied in chapter 2 to observe how Cameroon obtains the score base on the framework. Furthermore, the framework is operationalized in chapter 3 to assess the electricity law which act as the energy policies for the entire energy sector and on the National Development Strategy 2020–2030 (SND30) plan that guides Cameroon's long-term development goals which was planned after the escalation of the conflict in southern Cameroon. These two chapters will lead to conclusion and recommendations drawn from good practices from other countries like Rwanda in chapter 4.

Limitation of the study

This study aims to provide a comprehensive evaluation of Cameroon's energy policies (electricity law and SND30 plan) using the trilemma and energy justice. Data availability in Cameroon and in conflict-affected regions remains a challenge. Limited access to field data and inconsistencies in reporting may impact the accuracy of findings, necessitating a cautious interpretation of results.

Chapter 1: Energy poverty at the crossroad of the energy trilemma and energy justice

1.1 Introduction

This chapter presents the literature review and develops the analytical framework that will be used to assess Cameroon's energy policies (electricity law and plans) in the following chapter. It draws on two interrelated concepts: the Energy Trilemma, which offers a structural and technical understanding of energy policy trade-offs, and Energy Justice, which introduces ethical, social, and participatory dimensions. Each framework is first reviewed from a general academic perspective and then contextualized for Cameroon. The chapter concludes with a combined framework that integrates the energy justice principles into the equity pillar of the trilemma. This combined model enables a holistic evaluation of energy policy performance in terms of energy security, sustainability, affordability, and justice.

1.2 The Energy Trilemma.

The Energy Trilemma, introduced by the World Energy Council (WEC) a global organization comprising energy leaders and practitioners from various nations, represents the challenge of balancing three key dimensions of energy policy: energy security, energy equity, and environmental sustainability. The energy trilemma specifically highlights the need to strike a balance between energy reliability, affordability, and sustainability [26]. These elements are interconnected and often in tension with one another. The ultimate goal is to achieve an equitable balance among these three dimensions to ensure an effective and sustainable energy system [26,27]. The energy trilemma also acts as a tool to accelerate energy transition, promote sustainable economic growth, and development through policy implementation [28]. Since 2010, the WEC has published the annual World Energy Trilemma Index(WETI), which evaluates and ranks countries based on their performance in these three dimensions, offering insights into their energy policies and practices [28,29].

The concept of the Energy Trilemma underscores the challenges that policymakers face in harmonizing these often-competing objectives [30]. Scholars such as Grubb [183] and Birol [184] have emphasized the importance of achieving this balance to ensure long-term energy resilience and climate goals. For instance, prioritizing environmental sustainability by rapidly transitioning to renewable energy sources might pose challenges to energy security if the infrastructure is not yet capable of ensuring a consistent supply. Conversely, focusing solely

on energy affordability could lead to increased reliance on cheaper, but more polluting, fossil fuels, thereby compromising environmental goals [30]. While energy security and economic development have historically been prioritized, sustainability has often been overlooked despite being at the core of long-term energy resilience [28].

Achieving an effective balance among these three dimensions is crucial, as focusing on one or two at the expense of the others can lead to economic, social, or environmental imbalances [27,30]. Therefore, highlighting these interconnected challenges, the Energy Trilemma framework serves as a valuable tool for governments, organizations, and stakeholders [27]. It aids in the development of comprehensive energy strategies that strive for a balanced approach, ensuring that progress in one area does not inadvertently hinder advancements in another [27,24]. The energy trilemma serves as a framework guiding policymakers in shaping energy strategies that ensure secure, affordable, and sustainable energy access. It highlights the complexities of energy production, consumption, and policy development, particularly in the face of climate change and global energy transitions [28,30]. Next sections are dedicated to defining in more detail the three dimensions of the trilemma that will be applied in the thesis.

1.2.1 Energy Security

According to World Energy Trilemma (WET) energy security is considered as the capacity to meet current and future energy demand consistently to withstand and bounce back swiftly from system shocks with minimal disruption to supplies, having a resilient and reliable energy infrastructure [31,32,33]. It also refers to the uninterrupted availability of energy at an affordable price while maintaining reliability and sustainability [9]. It plays a foundational role in economic stability, societal well-being, and the implementation of energy policies [34]. Without a secure energy supply, efforts to ensure energy equity and environmental sustainability may be undermined. Energy security involves both short-term responses to supply-demand imbalances and long-term strategies that align with economic and environmental goals (IEA) [35]. Although the Russia-Ukraine conflict has intensified global concerns about energy security, highlighting vulnerabilities in supply chains and the urgent need for diversified energy sources and resilient infrastructure to mitigate geopolitical risks while scholars have different thoughts and views depending on how they understand energy security.

Aleh Cherp and Jessica Jewell define energy security through three key perspectives. The sovereignty perspective views energy security as intrinsically linked to national sovereignty

and political stability, advocating for state control over resources to minimize reliance on foreign suppliers. The robustness perspective, rooted in engineering and natural sciences, focuses on ensuring technical reliability through infrastructure resilience, energy diversification, and technological advancements. Meanwhile, the resilience perspective, shaped by economic and systems analysis, emphasizes the ability to adapt to disruptions, prioritizing market flexibility, investment strategies, and economic policies to withstand energy crises [35]. Instead of considering these three dimensions Kalyan and Ao put a greater emphasis on the role of oil crisis in energy security, tracing the evolution of energy security concerns from the oil crisis in the 1970s, as an expansion beyond oil dependence, including natural gas, electricity, renewable and climate change [36].Mara et al added to that another connection between national security and geopolitical stability, emphasizing the need for long-term cross-state indices to measure its impact more effectively[37] while Carolyn Pumphrey went further by advocating for alternative energy development over military intervention to ensure stable energy supplies and mitigate global tensions as energy-security nexus, particularly in U.S. energy policy[38].

Jessica Jewell and Elina Brutschin viewed energy security as context-dependent, influenced by political and economic factors, and defined it as "low vulnerability of vital energy systems", highlighting the need for resilient energy governance [[40]. Their view aligns with Paula Kivimaa, who further expands on the multidimensional nature of energy security, shaped by governance, geopolitics, and societal factors. She emphasizes that it is not just a technical issue but is deeply linked to national security and defense strategies. Her research highlights the need for policy coherence to enable sustainable energy transitions while managing geopolitical risks and climate change challenges [41] an idea that connects to the perspective of Jacek et al**.** They argued energy security is not static but rather a dynamic and evolving concept influenced by technical, economic, and social transformations.

It is not just about ensuring stable supply but also about changing consumption patterns, improving energy efficiency, and integrating environmental standards into economic systems reinforcing the broader view that energy security must adapt to societal and environmental shifts [42]. Authors hold differing opinions on the theoretical framework and components of this concept. A majority of the discourse admit that energy security cannot be prioritized over the other dimensions but emphasize the need for a transition to cleaner energy sources to ensure long-term sustainability [36][47].For the purpose of this thesis, the initial definition by WET, the ability to consistently meet current and future energy demand while maintaining a resilient and

reliable infrastructure that can withstand and recover swiftly from system shocks with minimal supply disruptions will be considered.

1.2.2 Environmental Sustainability

Environmental sustainability within the Energy Trilemma focuses on meeting present energy needs without compromising the ability of future generations to do the same. It emphasizes the transition to clean energy sources to mitigate climate change, reduce resource depletion, and limit environmental degradation caused by energy production. Scholars argue that sustainability is foundational to a stable energy system, as environmental damage can undermine both energy security and equity. Studies from the Oxford Institute for Energy Studies highlight how sustainability has become a priority in energy policy, particularly since the Paris Agreement, reinforcing the need for low-carbon transitions to ensure future energy security[10] .

Grubb et al underscore the necessity of prioritizing environmental sustainability, noting that unchecked carbon emissions and ecological harm could destabilize long-term energy security [42]. Similarly, Birol stresses that reducing global emissions must be central to the energy transition, given the escalating climate crisis [43]. Institutional perspectives, such as those from the United Nations, reinforce this argument by linking clean energy growth to long-term economic stability, aligning with Sustainable Development Goal 7 (Affordable and Clean Energy) [44]. In response, industry players are integrating sustainability into their business models. For example, Chevron has invested in Advanced Clean Energy Storage, seeking to balance energy affordability with emissions reduction [45]. However, tensions persist between economic growth, affordability, and environmental imperatives. Developing nations, in particular, face challenges in scaling up renewable energy while maintaining economic competitiveness.

Addressing these challenges comprehensively, policymakers and industry leaders can build robust energy systems that support economic development while safeguarding the environment. It is also commonly used by governments and international organizations to guide comprehensive energy strategies. While debates continue regarding which dimension should be prioritized, there is a broad consensus on the need for holistic, long-term strategies that ensure resilience and inclusivity [46] despite efforts to balance all three dimensions, equity the

social aspect is often overlooked, leading to gaps in accessibility and affordability. This limitation has led scholars such as McCauley [39] to argue that equity within the trilemma must be expanded to include justice-based considerations. Therefore, in this study, energy equity serves as the bridge to incorporate Energy Justice Principles**,** which provide the ethical and human-centered lens necessary for a comprehensive evaluation.

1.2.3 Energy Equity

Energy equity ensures fair and affordable access to modern energy services, addressing disparities in energy access and supporting socio-economic development [33]. Energy equity focuses on universal access to affordable energy for domestic and commercial use. The WET Index measures energy equity through metrics like electricity access, clean cooking fuel availability, and affordability [38]. It is crucial in reducing energy poverty and ensuring a just energy transition, particularly in marginalized communities.

Weihang Ren et al. define energy equity as a foundational pillar of societal harmony, focusing on the quantification and resolution of inequities in energy access and distribution [139]. Building on this, Lina Volodzkiene & Dalia Streimikiene expand the discussion by framing energy equity as a multifaceted issue, shaped not only by economic conditions but also by technological and socio-political factors. They emphasize the disparities in access, affordability, and quality, providing a broader perspective on the structural inequalities within energy systems [137]. Taking the conversation further, the World Economic Forum (WEF) elevates energy equity to a social justice principle, arguing that affordable and reliable energy should be recognized as a fundamental human right. Unlike previous perspectives that focus on economic and governance aspects, WEF underscores the global challenges that stall progress toward equitable energy access, pointing to factors such as geopolitical instability, market volatility, and energy transition policies as barriers to fairness [131].

While existing definitions of energy equity provide valuable insights, they fall short in fully addressing the principles of justice. To fill this gap, this thesis integrates energy justice to better understand if all communities, including the communities affected by war, are recognized as having specific needs (justice by recognition), how unequal the resources are distributed (distributive justice) and how they can be involved in the design of energy solutions from which they could benefit (procedural justice) and how historical harm can be addresses(restorative justice) for a more comprehensive approach to fairness and inclusion. Scholars like McCauley

emphasize energy justice as a means to integrate equity into energy security and sustainability [39], while Sovacool argued that energy equity must be central to global energy transitions to prevent exclusion [181]. Institutions such as the IEA and the WEC advocate for policies that prioritize affordability and inclusivity, recognizing that equitable energy access is a fundamental pillar of sustainable development [40]. Industry players increasingly acknowledge energy equity, as seen in projects like the Okikendawt Hydro Project, where Indigenous communities actively participate in energy transitions [41]. However, while equity is widely recognized as essential, debates persist on whether it should take precedence over security and sustainability, given its dependence on stable and sustainable energy systems.

1.3 Introduction to energy Justice Principle

Energy justice has emerged as a vital framework in contemporary discourse, aiming to integrate principles of equity, fairness, and ethical considerations into the design, implementation, and decommissioning of energy systems [54]. Rooted in environmental and climate justice movements, energy justice seeks to address the ethical dimensions of energy production and consumption, emphasizing equitable access to energy, fair distribution of associated benefits and burdens, and inclusive participation in energy decision-making processes [55]. Notably, Jenkins [54] distinguishes energy justice from related frameworks by its exclusive focus on energy-related issues, setting it apart from broader environmental and climate justice literatures.

While the term "energy justice" gained prominence in policy discussions in the early 2000s [56], the concepts underpinning it such as equality and fairness in energy systems have deeper roots in civil and environmental justice movements [57]. Historically, energy justice aligns with social movements addressing the sitting of hazardous facilities and pivotal climate negotiations, highlighting longstanding concerns about equitable energy practices [58]. The versatility of the energy justice framework is evident in its application across various scales. At the household and community level, research has explored energy justice in the context of domestic energy access and affordability [59], emphasizing the need for equitable energy solutions at the grassroots level. At national and international levels, studies have examined how policies and agreements can incorporate energy justice principles to ensure fair energy transitions globally [60].

Additionally, the framework has been applied to contemporary challenges such as nuclear energy debates [61], energy regulation [62], and the spatial distribution of energy vulnerabilities [63], underscoring its broad applicability. Beyond its core tenets distributive (fair allocation of resources), recognition (acknowledge and value diversity), procedural (how decisions are made) and restorative (addressing past justice), energy justice encompasses evaluative and normative dimensions. The evaluative dimension serves as an analytical tool to assess existing energy policies and systems, identifying injustices and areas for improvement [64], aiding in understanding the root causes of energy inequities and informing the development of more just policies. The normative dimension provides ethical guidelines and principles to shape future energy policies and systems [65], establishing a moral framework for what ought to be done to achieve justice in energy transitions. Integrating the energy justice framework into policy assessments offers several benefits, policymakers can holistically assess the justice implications of energy policies and projects [66]. It's not only ensuring that a shift towards sustainable energy sources promotes fairness and inclusivity that is crucial for an equitable energy transition [67] but particularly important in contexts with systemic inequality or historical marginalization, such as conflict-affected or indigenous communities.

1.3.1 Distributive justice

Distributive justice concerns the equitable allocation of energy resources, benefits, and burdens, examining how energy policies and infrastructures distribute advantages and disadvantages across different societal groups [73,74]. It addresses geographic equity in the siting of energy infrastructure and resources [75], as well as disparities in access to clean energy projects and related opportunities across different regions [73]. Achieving distributive energy justice is crucial for meeting sustainability goals[76], as it directly addresses the social equity dimension of sustainability and ensures that the transition to sustainable energy systems does not exacerbate existing disparities or create new forms of injustice [74,77]. This means that distributive justice is ensuring equal access to energy, regardless of income, location, or social status [73]. [75,78]. They emphasize that energy services are prerequisites for other basic goods such as welfare, security, and education[75].

In addition, Diana R. Dorman & David Ciplet argue that energy finance should be allocated equitably, ensuring that marginalized communities receive adequate resources to improve their energy access and economic development [129] while Catherine Banet focuses on electricity network tariffs, highlighting the need for fair cost-sharing between consumers and providers

during the energy transition to prevent economic burdens on vulnerable groups [176]. Raphael J. Heffron connects energy justice to human rights, advocating for legal protections that prevent energy inequalities and ensure universal access to energy as a fundamental right [177]. Also, there are different school of thought, Sovacool argued for a cosmopolitan approach to distributive energy justice, positioning access to energy as a human right [181,182]. Each of which frames fairness within their expertise in economic allocation, infrastructure costs, and legal protections to address justice in energy distribution.

1.3.2 Recognition justice

Recognition justice emphasizes the importance of acknowledging and respecting the diverse identities, experiences, and needs of all communities in energy-related matters. It seeks to rectify the marginalization of vulnerable and historically oppressed groups, ensuring their perspectives are included in energy policies and decisions [87,89]. This dimension of energy justice seeks to address forms of misrecognition, such as cultural domination, non-recognition, and disrespect, which can lead to systemic inequalities in energy access and participation [87,91].

Scholars have explored recognition justice from various perspectives. Van Uffelen (2022) conducted a systematic literature study on recognition justice within the energy sector, revealing a wide array of interpretations that often obscure its precise meaning [87]. By delving into the philosophical foundations laid by Axel Honneth and Nancy Fraser, the study identified two main approaches to recognition justice and highlighted multiple forms of misrecognition self-realization [87,90], legal exclusion and cultural devaluation. Van Uffelen proposed a refined definition of recognition justice, focusing on the adequate acknowledgment of all actors through love, law, and status order [87]. Honneth's work emphasizes that social conflicts often arise from experiences of misrecognition, where individuals or groups feel undervalued or marginalized. He posits that struggles for recognition are fundamental to achieving justice, as they address the underlying issues of respect (legal rights) and esteem (cultural value) that contribute to social cohesion [90,94].

Fraser differentiates between two forms of injustice: maldistribution and misrecognition [92,94]. She argues that while economic disparities (maldistribution) are critical, cultural or symbolic injustices (misrecognition) are equally significant [88,90], advocating for combined redistribution and recognition to ensure "participatory parity" in energy systems [88,90]. In the context of energy justice, this perspective underscores the necessity of valuing diverse cultural identities

and ensuring that marginalized groups are not only included in decision-making processes but also respected and valued within those processes. Jenkins et al. highlight that recognition-based justice compels researchers to consider which sections of society are ignored or misrepresented. They note that production-oriented research has exposed the unfair location of power plants near ethnic minorities or indigenous(marginalized) [89,91] peoples, often excluded from decision-making processes. Similarly, consumption-based research has revealed the struggles of aging or disabled populations, emphasizing the emergence of recognition-based justice through addressing non-recognition and disrespect in energy policies [89,93] while some scholars argue recognition-focused approaches may overshadow material inequalities unless paired with distributive justice measures [88,90].

1.3.3 Procedural justice

Procedural justice is the third pillar of the energy justice framework that focuses on the fairness and inclusivity of decision-making processes within the energy sector, ensuring that all stakeholders, especially marginalized communities, have equitable opportunities to participate in and influence energy-related policies and actions. This dimension of energy justice emphasizes transparency, accountability, and the recognition of diverse voices in shaping energy systems and requires accessible information about energy projects (e.g., environmental impact assessments) in non-technical language [101], ensures mechanisms to address grievances when procedural fairness is violated [101,105]. Beyond ensuring fair decision-making and grievance mechanisms of representation in energy governance is equally critical. Energy regulatory boards in many countries show underrepresentation of women and minorities, undermining oversight legitimacy [101,104] and must allow for voices of the vulnerable groups to heard [101,102].

Scholars have explored procedural energy justice from various perspectives. Sovacool and Dworkin highlight that energy justice serves as a conceptual tool integrating distributive and procedural justice concerns, assisting in resolving common energy problems and guiding more informed energy choices while stressing the need for participatory energy transition [104,109]. Building on this, Bouzarovski and Simcock emphasize that procedural justice focuses on fair decision-making, specifically ensuring affected communities participate in energy policy development. They argued that inclusive stakeholder engagement is crucial for achieving equitable outcomes [106,108]. Expanding on participation, Walker and Day examine procedural

injustice in the context of energy poverty, noting how lack of information, participation and access to legal rights further marginalizes vulnerable groups [105]. Similarly, they advocate for the inclusion of local knowledge and stronger institutional representation to address this injustice. Taking a broader view, LaBelle considers procedural justice as a universal principle, reinforcing the need for equitable processes and inclusive governance in energy systems [104,109].

1.3.4 Restorative energy justice

In regions affected by long-lasting conflicts, it is important to consider restorative justice as a fourth pillar of energy justice. Restorative energy justice means repairing the harms caused by energy systems for equitable transitions while ensuring that justice focus on repairing historical injustice and that the affected communities are actively involved in the remediation process [178]. This approach goes beyond merely distributing fairness by acknowledging past injustices/harm, fostering inclusive participation, and implementing corrective actions to heal and empower communities impacted by energy-related activities [118].

Scholars have explored restorative energy justice from various perspectives. Wallsgrove discusses the application of restorative justice principles within the energy sector, highlighting the importance of addressing historical wrongs(damage) such as livelihood losses from hydropower projects and involving communities in decision-making processes to achieve equitable energy transitions [118]. Heffron and McCauley emphasize that restorative justice serves as the operative element of energy justice, compelling decision-makers to engage with justice concerns [116]. They argue that this approach facilitates the balancing of competing aims within the energy trilemma, ensuring that energy policies are both sustainable and equitable [116,121].

Ibrahim proposes a framework for restorative energy justice anchored on three concepts: respect, responsibility, and remediation [69,115,118]. Some critical cases involve the Kosovo's Hydropower Conflicts restorative approaches remedied consultation failures through participatory damage assessments and Benefit-sharing agreements [115], also the South Africa's IRP2023 civil society demands restorative measures for coal-phase out communities [120] and the policy tools use are legally mandated reparations such as Hawai'i's utility trust for Native Hawaiians [118],truth commissions for energy harms (modeled after environmental justice tribunals [118] and the Community-controlled remediation funds of the Kosovo's hydropower

revenue sharing. This model advocates for acknowledging social differences, ensuring accountability through participatory decision-making, and implementing corrective actions to mitigate harmful outcomes, thereby fostering equitable and just energy decisions.

From literature, justice issues underscore the limitations of assessing energy performance solely through technical metrics. That is why it is critical in the case of Cameroon to capture the full picture of energy development including who benefits and who bears the burdens. Hence, it is necessary to combine the trilemma and justice frameworks into a single analytical tool. Scholars such as Sovacool, Jenkins et al, Alice and Fraser [181,54,89,92] emphasize that energy justice is essential for equitable transitions, especially in settings with deep-rooted socio-political inequalities. These justice principles are not separate from energy performance; rather, they ensure that energy policies are not only technically effective but also socially inclusive and ethically grounded. Therefore, the next section will show how the thesis is going to combine energy trilemma and justice.

1.4 Introducing the Combined Analytical Framework: Energy Trilemma and Energy Justice

A holistic evaluation of Cameroon's energy system and policy is essential for a smooth energy transition that promotes access to sustainable development, reliable and affordable energy for all, and economic growth. This requires balancing energy diversification, system change, and renewable energy acceleration justly. Cameroon has continually focused either just on the economic perspective or energy security perspective neglecting the consequences of the presence or absence of other dimensions of the energy trilemma and justice which has led to imbalances in the country and delayed growth.

Although new projects and plans keeps emerging yet there has been no careful checked into the system to address the root causes of energy challenges, the same results will be archived such as delayed target, geographical disparity in energy access between urban vs rural. For instance, in conflict-affected southern regions, an estimated 60% of communities in the Northwest and Southwest are no longer serviced for electricity since 2018, meaning less than 40% have reliable access knowing that it is 40% out of the 24% rural energy access nationally, while urban centers like Douala and Yaoundé enjoy electrification rates exceeding 87% [23,189]. This stark disparity perpetuates cycles of marginalization and deepens regional energy poverty. Therefore this combine framework is particularly relevant for Cameroon, where historical

regional disparities, harms and historical marginalization in energy persists, highlights a need for both systemic and justice-oriented analysis.

While the Energy Trilemma provides a valuable structure to assess performance in terms of security, equity, and sustainability for assessing overall performance of energy system, it often overlooks the deeper social dynamics and historical injustices that shape energy access and use [157, 158, 160]. The Energy Justice framework fills this gap by providing the ethical, participatory, and historical dimensions needed for a full evaluation [157,158]. Against this backdrop, this study extends the equity dimension of the trilemma by embedding within it the justice framework advanced by Jenkins[54], which emphasizes the fair distribution of energy services (distributive), inclusion of marginalized voices (recognition), participation in energy decisions (procedural), and the redress of historical harms (restorative) this is also because these justice tenets are interdependent where advance in one area either participation can influence the outcomes in other like distribution[159] . Recent scholarship[157,158] demonstrates that integrating energy justice into the trilemma framework provides a more complete understanding of both systemic performance and social outcomes and Fig.6 shows the visual.

By applying this matrix, the analysis will examine:

- The reliability and resilience of the energy supply system (Energy Security),
- The affordability and access of energy(Equity)
- The country's commitment to environmentally sustainable practices (Sustainability),
- And the social dimensions of equity, analyzed through justice indicators:

    - Distributive Justice: Are energy resources fairly allocated?
    - Recognition Justice: Are marginalized communities acknowledged in planning?
    - Procedural Justice: Are stakeholders meaningfully involved in decisions?

- Restorative Justice: Are past injustices addressed and compensated?

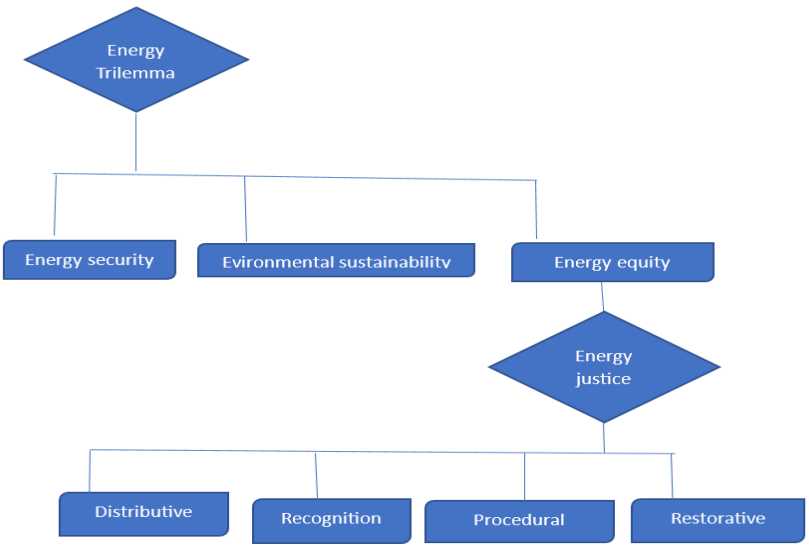

Figure 5. Schematic representation of the framework

This combined developed framework in this chapter, will be applied in Chapter 2 to assess Cameroon's energy landscape. This approach allows for evaluating both technical performance and justice outcomes, with particular attention to whether policies reflect a fair, inclusive, and environmentally responsible energy transition meanwhile the gaps will reflect areas for greater opportunities for improvements.

Chapter Two: The energy Trilemma and Justice in Cameroon; An integrated analysis.

This chapter provides an in-depth analysis of Cameroon's energy landscape through the lens of the Energy Trilemma and Energy Justice frameworks. This chapter examines the country's performance in energy security, environmental sustainability, and energy equity and justice in the next section, highlighting the challenges and opportunities in developing a stable and inclusive energy system.

2.1 The Energy Trilemma in Cameroon.

Cameroon, like many nations, faces the intricate challenge of the energy trilemma balancing energy security, environmental sustainability and energy equity to develop a stable and inclusive energy system. The country's energy landscape is marked by significant disparities across these dimensions. On the World Energy Council's Trilemma Index, Cameroon ranks 44.5 out of 85, with a moderate score of 51.1 in Energy Security, a critical 22.4 in Energy Equity, and a relatively strong 61.4 in Environmental Sustainability[136] as shown in Fig.5 below.

Again, Cameroon energy trilemma is further complicated by macroeconomic instability, governmental inefficacy, and limited innovation capacity [136]. Energy Security in Cameroon is influenced by its reliance on hydropower and fossil fuels, coupled with grid vulnerabilities. Hydropower contributes approximately 61.7% of electricity production [133], making the system susceptible to climatic variations such as rainfall variability, which can reduce hydropower output by up to 82% during dry periods [133].

Additionally, the aging infrastructure and grid inefficiencies lead to frequent power outages[138], undermining the reliability of energy supply. Energy Equity presents a significant challenge, highlighted by severe urban-rural disparities. Urban electrification rates stand at about 91%, while rural areas lag at approximately 21% [80], reflecting a critical gap in access to electricity. This disparity hampers socio-economic development in underserved regions and even worse in conflict affected regions, where limited access to reliable energy restricts opportunities for education, healthcare, and economic activities[138]. In terms of Environmental Sustainability, Cameroon's dominance in hydropower contributes to a relatively favorable score[136].

However, the slow adoption of other renewable energy sources and the impacts of climate change, such as altered rainfall patterns, pose challenges. The country's energy mix remains heavily dependent on biomass, accounting for 74.2% of final energy consumption in 2019, which raises concerns about deforestation and environmental degradation[141].

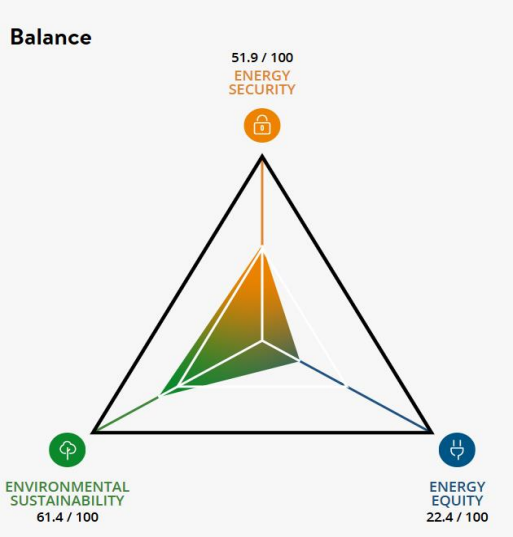

Figure 6. Representation of energy trilemma score for Cameroon[136].

Despite possessing vast energy potential including 12.6 GW of untapped hydropower[133,138], 171.7 billion cubic meters of natural gas reserves, and significant solar, wind, and geothermal resources Cameroon faces obstacles such as legislative bottlenecks, underinvestment, and weak rural electrification policies[138] including lack of security measures to ensure access in conflict affected regions of the country. The Growth and Employment Strategy Paper (GESP) targets a capacity of 5,000 MW by 2035[138], yet the current installed capacity remains at approximately 1,650 MW, exposing gaps between planning and execution. Climate vulnerabilities further compound the situation, with rainfall variability significantly impacting hydropower output [133]. Moreover, policy gaps have left renewable energy at just 1% of the energy mix, despite a 25% target for 2035[141].

2.1.1 Energy Security

Cameroon's energy security remains critically weak, reflected in its 51.1/100 score on the World Energy Council's Energy Security Index [136], signaling systemic fragility in resilience and reliability. The sector's inability to recover from disruptions termed "low bounce-back capacity" stems from some key factors. An overreliance on hydropower over 70% of generation

[143,153] exposes the grid to climate shocks making it highly susceptible to extreme weather events like droughts which have already caused significant capacity reductions in major hydropower plants, exemplified by the Memve'ele Dam's output collapsing to 16% capacity (35MW/211MW) during droughts, while Lom Pangar's reservoir levels dropped to 30% in 2023[144].

In addition, the decaying/poor grid infrastructure causes 23% transmission losses[146], with overloaded substations in Douala and Yaoundé triggering 6–8-hour daily outages[3] and other areas suffering from under capacity[48,49]. Also, a chronic underinvestment has left installed capacity at just 1,650MW against 1,950MW peak demand [138], forcing industries to rely on costly diesel backups which affect their productivity and economic growth of the country. Rural areas suffer disproportionately, with over 75% unconnected despite grid proximity[147] in some areas. While it is further exacerbated in the southern conflict region by the lack of infrastructure. This combination of climate vulnerability, infrastructural neglect, and policy inertia explains Cameroon's subpar security score, recurrent blackouts and energy poor society despite the countries abundant richness in energy sources as solar, wind, biomass and geothermal.

Also, initiatives like the Growth and Employment Strategy Paper (GESP) target 5,000 MW capacity by 2035, yet the current installed capacity remains at just 1,650 MW[3, 134 or 138], exposing gaps between planning and execution while there is no open policy on how energy diversification such as in renewable will be archived leaving renewable energy at just 1% of the mix despite a 25% target for 2035[3,134 or 138]. The limited development of alternative energy sources, such as natural gas and solar power, further exacerbates the risk of supply disruptions.

2.1.2 Environmental Sustainability

Cameroon's energy sector faces significant environmental sustainability challenges, primarily due to its overreliance on hydropower[143,151] which is highly vulnerable to climate change impacts with a score of 61.4/100. Studies show that the Lagdo Dam's hydropower potential has already decreased by 18-22% due to reduced river flows[138], while climate models project further 30% declines in hydropower output by 2035 in northern basins[138.152]. This dependence creates systemic risks, as demonstrated when droughts reduced Memve'ele Dam's capacity to 16% of its 211MW potential [151]. Large-scale hydro projects also cause ecological damage, including deforestation and river ecosystem disruption [153]. Despite abundant renewable

potential (5GW solar, untapped wind/biomass) [96,138], implementation lags behind targets. While Cameroon aims for 25% renewables by 2035[138], current non-hydro renewables contribute just 1% [151] of generation. The 25% renewable energy target (excluding large hydro) under its Nationally Determines Contributions(NDCs) appears unlikely, with only 250MW solar capacity projected by 2030 [138] versus the needed 1,200MW. Biomass dependence exacerbates sustainability challenges, with over 77% of rural households relying on firewood/charcoal [151,155], driving annual deforestation rates of 2.7% [155] and even worst in southern conflict regions. Though Cameroon pledged 32% GHG emission reductions by 2035 [155], current trends show 146% increase in power sector emissions since 2015[151], revealing gaps between climate commitments and implementation. While the country has committed to increasing renewable energy investments, the slow pace of implementation limits the transition to a greener energy mix. The government has identified several sites for future hydroelectric schemes to progressively reduce the country's current energy deficit by producing 5000 MW by 2035 [48 or 138]. However, this heavy reliance on hydropower makes the country vulnerable to drought, threatening energy security [49].

2.1.3 Energy Equity

Access to reliable and affordable energy remains a major challenge in Cameroon, with stark disparities between urban and rural areas with a score of 22.4/100. While urban electrification rates reached 87.6%, rural access stagnated at just 24% [138,148], leaving nearly 8 million people without reliable electricity[103]. The national electrification rate of 63.5% [138] masks severe regional imbalances, particularly in conflict-affected like the Northern with 11% access rate[96] and southern conflict regions with over 60% lack access where infrastructure damage has worsened energy poverty[23]. Approximately 77% of households rely on traditional biomass (firewood/charcoal) for cooking[96] with residential use accounting 96% [101], exposing families to respiratory illnesses and limiting economic opportunities. Even grid-connected communities face affordability barriers, with electricity tariffs consuming 15-20% of average household income [138] while irregular service further limit energy affordability, creating disparities between different regions and social groups [51,52]. The government's Growth and Employment Strategy Paper (GESP) aimed for 75% national access by 2020, but implementation gaps left a 330MW supply deficit[138]. Recent initiatives like Huawei's solar electrification of 1,000 villages[148] and the AfDB's UA 58.99 million grid extension project[150] show progress, yet

rural electrification grew only by 2.4% annually (2014-2021) [148,138]. Without accelerated investment, 40% of Cameroonians may remain without power by 2035[138].

Cameroon's performance on the World Energy Trilemma Index reflects imbalances. While sustainability appears moderate due to hydropower, low equity and insecure infrastructure lowers its overall energy resilience. The Energy Trilemma effectively highlights Cameroon's technical and infrastructural challenges, it does not fully explain the social, historical, and political dynamics that underlie these outcomes especially regarding who benefits from energy development and who is left behind like the case of southern conflict region. To address this, the next section explores the Energy Justice in Cameroon. While energy equity indicators reveal structural gaps, exploring their ethical and social dimensions through energy justice is crucial.

2.2. Energy Justice in Cameroon

The energy justice in Cameroon reveals multiple justice concerns that directly impact equitable access to energy resources[68], fair distribution of energy-related benefits and burdens[69], inclusive decision-making processes[70], and the recognition of historically marginalized communities[71,68]. The existing energy system in Cameroon perpetuates inequalities, exacerbating the struggles of rural communities and those affected by conflicts in Southern region. Applying the energy justice framework to Cameroon's energy system involves examining the dimensions of energy justice to understand and address existing injustices within the country's energy sector and allow the policy makers and energy leaders address energy injustice ensuring inclusive and equal access to energy for all including southern conflict region. The framework is anchored in the four primary tenets, each addressing distinct dimensions of justice. .

2.2.1 Distributive justice in Cameroon.

In Cameroon, there is a significant disparity in energy access between urban and rural areas. Urban centers like Yaoundé and Douala have relatively better access to electricity 95% and 90% respectively. While over 75% of the population in rural areas lack reliable energy infrastructure although some live near the grid network[79,80,81]. Injustice is perpetuated even more in conflict affected regions like the southern Cameroon where 60% of the communities lack access[23].

Additionally, the mixed privatization/public ownership of the electricity sector has led to increased tariffs, disproportionately affecting low-income households and exacerbating energy poverty[86,83] especially in the southern region.

The current energy system demonstrates clear distributive injustice by failing to equitably allocate resources between regions[79,81], imposing higher relative cost on poorer consumers[86,83],neglecting conflict zones in development plans[82] and maintaining technical losses of 25% in rural distribution networks[84]. Recent initiatives like the Rural Electrification Master Plan aim to address these gaps but face implementation challenges including funding shortages and technical constraints[85,82]. The Huawei solar electrification project (1,000 villages) represents progress, yet coverage remains limited relative to need[79] as both projects have not extended to the southern conflict regions.

2.2.2 Recognition justice in Cameroon

The dominant energy discourse in Cameroon often erases local knowledge and practices, prioritizing instead Western-based solutions that neglect the unique cultural and environmental contexts of local communities[95,96,98]. Indigenous groups in Cameroon such as Mbororo Pastoralists(semi-nomadic) and Baka community(forest dweller), have often been overlooked in energy development projects and even worst for the southern region. National energy documents (Electricity Sector Development Plan PDSE2030, NDC, Rapport Final Cameroun(for insights into hydropower, solar energy, and energy efficiency strategies in Cameroon), etc) are published in French for all, despite 20% of Cameroon's population are English-speaking [97,98]. This language barrier not only affects policy accessibility but also reflects broader issues of inclusion and recognition in energy governance. A similar lack of recognition extends traditional land rights and cultural practices has led to conflicts and marginalization such as solar/wind projects in areas like Bamenda and Bafoussam have been sited on Indigenous Baka and Mbororo lands without “Free, Prior, and Informed Consent” (FPIC) [99,97] which raises procedural concerns. Also, the Kilum-Ijim forest communities have documented how hydroelectric projects disrupted traditional agroforestry systems[100] . Recognition energy justice is vital for creating equitable and inclusive energy systems and addressing issues of misrecognition and ensuring that all stakeholders' identities and experiences are valued so that energy policies can better serve diverse communities.

2.2.3 Procedural justice of Cameroon

Energy policies and projects in Cameroon have historically been developed with limited public participation, particularly from marginalized communities like the southern region. For instance, the Chad–Cameroon Petroleum Development and Pipeline Project faced criticism for inadequate consultation with affected local populations, leading to unresolved social and environmental concerns including improper compensation and livelihood disruptions[110,111]. The pipeline-affected communities reported compensation disputes and environmental damage claims being dismissed without proper investigation[110] while the External Compliance Monitoring Group (ECMG) noted difficulties addressing generalized complaints due to vague participatory frameworks[111].

Also, energy decisions are often made by external actors, including governments, corporations, and international organizations, without adequate consultation or consent from communities(affected)[110] and a recent carbon pricing workshops showed improved stakeholder inclusion but still underrepresented rural voices[112]. This exclusion fosters distrust and can result in resistance to energy initiatives. Additionally, Cameroon's Extractive Industries Transparency Initiative (EITI) scores reveal weak stakeholder engagement (45/100), with civil society participation hampered by government-linked representatives[113] and the tripartite platforms for pipeline grievances failed to resolve 456 outstanding cases due to power asymmetries[110]. Procedural energy justice is integral to creating equitable and inclusive energy systems. Ensuring a fair and transparent decision-making processes that actively involve all stakeholders, especially those historically marginalized or conflict regions like the southern region, energy policies can better address the diverse needs of society. This approach not only enhances the legitimacy of energy initiatives but also fosters trust and cooperation among communities, policymakers, and industry players, paving the way for more just and sustainable energy futures. Research confirms that inclusive protocols in energy decision-making reduce conflicts and enhance project legitimacy[114].

The Chad-Cameroon case demonstrates how procedural failures can perpetuate injustices, while recent carbon pricing consultations suggest progress remains possible with institutional reforms[113,114]. Moreover, Southern Cameroonians have limited representation in energy commissions, agencies and ministries, and consultation on policies affecting them remains weak and inconsistent. While an Anglophone minister leads the Ministry of Mines, it is unclear whether this ensures meaningful participation for Southern Cameroonian communities. Energy

governance in Cameroon is highly centralized, with external actors and government-linked representatives making key decisions, often without adequate local consultation[126]. Low stakeholder engagement scores in Cameroon's (EITI) further highlight the marginalization of these communities[113].

2.2.4 Restorative Justice of Cameroon.

The energy system in Cameroon has historically perpetuated injustices, including displacement of communities for energy infrastructure projects like the Chad-Cameroon oil pipeline, which displaced populations without adequate consultation or compensation [122,123]. This project, initially framed as a development initiative, failed to deliver promised benefits such as schools or sustainable livelihoods, leaving villages like Mpango with unresolved grievances [123]. Similarly, the government and international actors have exploited natural resources—such as iron ore in Mbalam and mineral reserves in equatorial rainforests without equitable benefit-sharing, prioritizing industrial interests over local rights[122]. It is also seen in the critical transmission infrastructure, such as the Logbaba-Koumassi line in Douala, it was destroyed in 2024 and left unrepaired for months due to financial disputes between utilities, leaving communities without reliable electricity despite being near the grid [125]. This neglect reflects systemic issues: Cameroon's energy sector suffers from chronic underinvestment, mismanagement, and an electricity access rate of just 40%, disproportionately affecting rural and conflict-affected regions [124,48]. The destruction of energy infrastructure over the past seven years resulting from the conflicts has deprived communities of reliable electricity, hindering socio-economic development[23].

Restorative justice require acknowledging historical harms, such as the Chad-Cameroon pipeline's broken promises [122,123] and unaddressed energy poverty in the southern conflict region [124,23], rebuilding infrastructure like the Douala transmission line, which still uses outdated wooden poles despite repeated failures [125], and Prioritizing community rights through participatory approaches, as seen in the Bagyeli solar project [128] which contrasts with the exclusionary practices of large-scale projects [122,123]. The World Bank's 2024 Power Sector Reform Program aims to improve transparency and access [127], but its focus on privatized hydropower (e.g., Nachtigal Dam) risks repeating past injustices unless paired with reparations for displaced communities and inclusive decision-making Implementing restorative measures, such as rebuilding transmission lines and substations, and involving affected communities in

decision-making, is essential to address these injustices and promote social cohesion and ensure a smooth energy transition.

In conclusion, this analysis reveals that Cameroon faces significant energy challenges, including inadequate energy security, environmental sustainability and severe energy inequities concerns. The Energy Trilemma and Energy Justice in Cameroon highlight the need for a comprehensive approach to address these challenges, prioritizing inclusive decision-making, recognition of marginalized communities like the southern conflict region, and restorative justice. By understanding these complexities, policymakers and energy leaders can develop more effective strategies to ensure equitable access to energy for all Cameroonians. Building on the understanding of Cameroon's energy challenges through the application of the energy trilemma and justice on the energy landscape, the next chapter will operationalized these frameworks to analyze the country's energy policies, specifically the 2011 Electricity Law and the National Development Strategy Plan SND30, to assess their effectiveness in addressing energy needs and promoting energy justice in the conflict affected southern region.

Chapter Three: The Energy Equation: Trilemma, Justice, and the Path to Fair Policy

Cameroon's energy policies play a crucial role in shaping electricity access across the country. However, significant disparities persist, particularly in conflict-affected regions like Southern Cameroon, where infrastructure challenges and historical marginalization exacerbate energy poverty. This chapter critically examines whether existing policies recognize and address these disparities, using the Energy Trilemma and Energy Justice frameworks developed in the previous chapter to evaluate their effectiveness.

The analysis focuses on the two key policies: the updated 2011 electricity law(Law No. 2011/022 of 14 December 2011), enacted before the crisis, and the National Development Strategy Plan (SND30) 2020–2030, developed post-conflict. While the electricity law provides an overarching framework for the energy sector, its provisions may not directly account for challenges posed by the ongoing conflict. However, analyzing this law is crucial for understanding the existing policy environment and identifying gaps or limitations that may hinder the development of effective solutions for the southern region. Meanwhile, the SND30 plan offers an opportunity to assess the government's response to the energy crisis and whether it recognizes and addresses energy needs of the conflict southern region.

To fully understand and address these analysis, this analysis is done through the lens of the Energy Trilemma and Energy Justice Principles, which evaluate policy effectiveness based on energy security, sustainability, and equity, incorporating energy justice to assess whether national policies recognize the distinct challenges faced by Southern Cameroon (Recognition Justice), promote access by ensuring fair distribution of energy resources (Distributive Justice), and listen to the voices of affected southern region and implement compensatory measures to redress past neglect (Restorative Justice).

Also, in doing the analysis it will help identify policy gaps and opportunities for improvement, ensuring that energy strategies align with national goals of universal access by 2030 and economic emergence by 2035. To fully understand the analysis, understanding the foundational electricity law is key to this assessment, so the next section provides a brief history of the law, establishing the policy environment in which current energy strategies operate.

3.1 The 2011 Electricity Law (Law No. 2011/022 of 14 December 2011)

The 2011 Electricity Law (Law No. 2011/022 of 14 December 2011) marked a significant deepening of sector reform in Cameroon. Enacted as an upgrade from (Law No. 98/022 of 24 December 1998) to address persistent challenges in power transmission and better accommodate private producers, the law led to the creation of SONATREL (National Electricity Transmission Corporation), tasked with managing and upgrading the national grid. The transfer of transmission responsibilities from Energy of Cameroon(ENEO (formerly AES-SONEL)) to SONATREL was intended to attract new investment, improve grid reliability, and facilitate the integration of independent power producers (IPPs), thereby addressing chronic underinvestment and performance issues in the transmission subsector. SONATREL's mandate includes ensuring open, non-discriminatory access to the grid and enabling the integration of Independent Power Producers (IPPs) [174] .

While this reform represented a step toward partial unbundling and greater private sector involvement, it also reaffirmed the centralization of energy planning, as transmission remained under state control[162,174]. The law established the basis for fair competition, environmental protection, and consumer rights, with ARSEL assigned to regulate tariffs, approve concessions, and protect consumer interest.

The 2011 law is the first to explicitly promote renewable energy, rural electrification, and energy efficiency[162] key priorities for expanding access and fostering a more inclusive and sustainable energy system in Cameroon. Part IV of the law sets out broad objectives for the promotion of renewables and energy efficiency, as well as the use of renewable sources to support rural electrification.

However, these provisions remain largely aspirational, lacking detailed mechanisms for enforcement, investment incentives, or integration with broader energy justice goals[162,174]. Cameroon still lacks a standalone energy and renewable energy policy or a legally binding framework prioritizing decentralized, off-grid, or community-based solutions. Weak governance, administrative delays, and the absence of a dedicated management framework have further hampered the deployment of renewables[175] .

Furthermore, the implementation of the 2011 law has faced challenges, including slow asset transfer to SONATREL, overlapping institutional mandates, and persistent regulatory and investment bottlenecks. As of 2024, transmission upgrades and rural electrification targets remain behind schedule, and the sector continues to struggle with outages and access disparities[173,174,175] .

Despite these reforms and ongoing efforts to expand grid coverage and modernize infrastructure, Cameroon's electricity sector continues to face deep-seated issues: limited rural access, unreliable supply, and frequent blackouts. These ongoing challenges not only hinder economic growth and deter investment, particularly in energy-intensive sectors but exacerbated in the southern conflict region as most communities are out of electricity services. Against this backdrop, the 2011 Electricity Law provides a critical framework for understanding the complexities of Cameroon's energy sector and the challenges that lie ahead in the next section.

3.2 Cameroon's Energy Puzzle: Navigating Security, Sustainability, and Fairness.

Cameroon's Electricity Law, Part IV, represents an attempt to navigate the complex challenges of the energy trilemma while addressing energy sector inequities within. However, since the law predates the crisis, analyzing its provisions and implications is crucial for understanding the existing energy governance framework and identifying potential gaps or limitations that may have contributed to the current energy challenges in conflict-affected regions. The law prioritizes rural electrification, the development of renewable energy sources and energy efficiency[162], striving to enhance energy security and promote environmental sustainability. Although it does not always explicitly articulate goals of security, equity or justice, many of its provisions carry implications that can be assessed using the combined Energy Trilemma and Energy Justice frameworks. This section offers a deeper interpretation of the law's strategic provisions and their alignment with the principles of energy security, sustainability, and justice.

3.2.1 The Energy Trilemma dimension in law

3.2.2 Energy Security

From the energy perspective, the law demonstrates intent to enhance energy security by mandating the state's role in rural electrification (Section 58) and encouraging both grid extension and decentralized, distributed generation (Section 59). It prioritizes renewable sources for rural electrification and simplifies authorization for small-scale hydro and independent producers (Sections 59–61), aiming to diversify the energy mix and reduce vulnerability to centralized grid failures and climate-induced hydropower fluctuations[185]. The law supports decentralized rural electrification-referred to as "distributed generation" which encompasses activities similar to off-grid or mini-grid solutions, though these terms are not explicitly used in the legislation.

A robust mechanism to ensure grid reliability during extreme weather or conflicts is absent, and it does not adequately address backup systems or climate-resilient infrastructure[186]. Moreover, persistent issues such as electricity theft and technical losses, which undermine supply reliability and financial sustainability[175] are unaddressed. While the law sets out broad goals for rural electrification and renewable integration, its provisions remain largely aspirational, with limited enforcement mechanisms or concrete incentives for implementation[187]. As a result, although the law lays a foundation for improved energy security, significant gaps remain in its ability to deliver a resilient and reliable electricity supply across Cameroon especially in the conflict affected region.

3.2.3 Environmental sustainability

On environmental sustainability, the law takes positive steps by defining and promoting a wide range of renewable energy sources such wind, small hydro and solar (Section 63-68), section 59(2) gives priority to distributed generation from renewable sources in view of many factors including environmental protection [187,188] and requiring utilities to connect renewable generators to the grid (Section 66), while (Section 64) links renewable energy with environmental protection and securement of supply[162,166]. This provision implicitly addresses Cameroon's climate vulnerability by encouraging decentralized and diverse energy sources, which is important given the hydro-dominated grid's susceptibility to droughts and prioritizing solar or wind in rural areas can build climate resilience [162,189,190].

However, these provisions position the law as environmentally progressive in intent, but the operationalization of sustainability goals remains underdeveloped [188]. The law does not sufficiently address Cameroon's reliance on traditional biomass, which remains a major source of household energy in rural areas [188,190] particularly in the conflict affected region. A more thorough sustainability framework would include provisions for transitioning away from inefficient and polluting biomass use toward modern energy services. Moreover, the absence of incentives or subsidies for large-scale renewable energy uptake may constrain the effectiveness of these sustainability objectives, possibly leading to continued reliance on unreliable or fossil fuel sources [191,192]. While the sustainability dimension shows strong intent, it is weak in scope: there is no clear roadmap to transition from heavy biomass use, nor concrete incentives for large-scale renewable uptake or carbon reduction targets from fossil production.

3.2.4 Energy Equity of the law : Affordability and Access to Energy

Cameroon's electricity law supports renewable energy development, aiming to increase access and potentially lower costs through tax incentives (Section 65, 65(4)). These measures could enhance affordability and accessibility, particularly in underserved areas, by encouraging investment and expanding clean energy options (Section 65).

While the law aims to expand access to electricity both to rural areas, it does not explicitly mention or provide a framework for off-grid or mini-grid solutions, which are critical for reaching remote and underserved communities the terms nor the terms "equity," "affordability," or "accessibility." Instead, it relies on indirect measures such as tax benefits and regulatory frameworks for connection and energy purchase (Sections 66, 67). The requirement for applicants to pay connection fees (Section 66(1)) may still limit affordability for low-income and rural households. Furthermore, it does not provide for targeted subsidies, consumer protection mechanisms, or monitoring frameworks to ensure that affordability and accessibility objectives are achieved, particularly for the most vulnerable populations.

Overall, while the law creates an enabling environment for a more inclusive energy sector, the absence of explicit provisions or targeted support for vulnerable groups and conflict regions means that improvements in affordability and accessibility will depend on implementation details and supplementary policies (Sections 65–67).

3.3 The energy justice dimension in the electricity law

3.3.1 Distributive justice

Cameroon's Electricity Law makes its most explicit justice-related contribution by focusing on rural electrification. Sections 58 and 59 require the state to promote and develop rural electrification nationwide, either through grid extension or distributed generation, and give priority to distributed generation from renewable sources, reflecting an effort to address unequal access[162]. These provisions relate to distributive justice, as they acknowledge the significant disparity between rural and urban electrification rates 25% versus 94% as of 2023[189]. The law also allows surplus renewable energy to be sold to the grid, which can support local producers (Section 59(3))[162].

However, the law does not mandate targeted interventions for the most disadvantaged like the conflict affected southern, or remote nor does it set binding electrification targets or require equity-based planning [166]. Section 61(1) restricts decentralized systems to 1 MW or less, limiting scalability for larger villages (Section 61). There are no provisions for affordability, cross-subsidization, or specific support for low-income households, and tariff guarantees or subsidies for rural producers are absent [191]. Distributional equity is not explicitly enshrined as a guiding principle, and the absence of geospatial planning or monitoring indicators means interventions may remain market-driven or politically influenced, risking continued marginalization of underserved populations [166] in southern region. As a result, while the law advances distributive justice by expanding rural electrification and recognizing disparities, it falls short of ensuring equitable access for the poorest and most marginalized communities.

3.3.2 Recognition justice

The Electricity Law's only notable recognition justice provision is its bilingual publication, which ensures both official languages are available and facilitates legal understanding in Cameroon's multi-ethnic society [193]. However, the law is silent on recognition justice in substance. There are no references to marginalized populations, vulnerable communities, or conflict-affected regions such as the Anglophone Northwest and Southwest or the Far North. The legal framework does not acknowledge historical injustices or the lived experiences of groups persistently excluded from energy planning.

While the law promotes rural electrification and decentralized generation (Sections 58–59) [162,193], it does not include any clauses that recognize the distinct energy needs of minority groups, indigenous peoples, women in energy-poor households, or internally displaced persons (IDPs). Other key energy documents, such as the NDC and the Electricity Sector Development Plan, are available only in French, further limiting accessibility for non-Francophone communities. In Cameroon's diverse society, the lack of explicit recognition for the needs and identities of marginalized groups, especially in underserved, rural, or conflict-affected regions, contributes to persistent perceptions of exclusion[194,195]. The law also lacks requirements for community needs assessments, culturally inclusive engagement, or gender-sensitive planning. Without explicit recognition justice provisions, energy reforms risk reinforcing existing systems of exclusion and deepening distrust in regions already experiencing conflicts and marginalization.

3.3.3 Procedural justice

Procedural justice is only partially addressed in Cameroon's Electricity Law. Governance reforms, such as the establishment of the Electricity Sector Regulatory Board (ARSEL) and the Rural Electrification Agency (Sections 60, 61, 62, 67), aim to enhance transparency, accountability, and oversight through licensing, compliance monitoring, and enforcement (section 60–62, 67)[162]. These structures simplify authorization for independent power producers (IPPs) and support private sector participation, aligning with global liberalization trends. The effectiveness of these provisions depends on regulatory certainty, political stability, and institutional trust, which are not directly addressed in the law.

However, the law does not mandate community participation, stakeholder consultation, or transparent decision-making in project planning just like the Bagyéli or the Bakola Pygmies whoes land was directly in the path of the construction of the Cameroon Oil Transportation Company (COTCO) pipeline as the people were not consulted, poorly informed of the details of the construction which disrupted at their entire way of life[200] displacing them. In addition, there is limited mechanism or no platform for public information e.g the electricity law is not found at the original website it says "we do not have this document in our database. Contact us if you can help us find it here" or "down here" Additionally, participatory planning, benefit-sharing mechanisms, and environmental safeguards are not explicitly incorporated[196]. Section 66(2) allows the state to set renewable energy purchase prices, which may underpay producers and disincentivize decentralized projects, while Section 65(3) mentions R&D but excludes civil society input. This centralized, technocratic approach limits procedural justice, as affected communities have little influence over decisions that impact their livelihoods.

3.3.4 Restorative justice

Restorative justice, a core element of the energy justice, emphasizes acknowledging and repairing historical injustices that have resulted in unequal access and harm to specific communities like the Chad-Cameroon Pipeline project was marked by broken promises of jobs, inadequate compensation, displacement, and environmental harm, which became central disputes surrounding its development .The consortium initially promised affected communities employment opportunities, improved infrastructure (such as replacing a one-room schoolhouse), and compensation for land loss and environmental damage. However, these commitments were largely unfulfilled. Many residents were displaced, including Indigenous

groups such as the Bagyeli (Pygmies), and many farmlands were taken, fruit trees, and medicinal plants were destroyed. Compensation was minimal, with some villagers receiving small cash payments or being asked to select goods from glossy catalogs; no school was replaced, and with few men employed temporarily, 3 out of 20 men in one village, which they criticized as short-term relief rather than meaningful reparations.

While this project affected both conflict(South West) and non-conflict (South, litoral, etc) regions, the conflict region faced a higher degree of marginalization due to a lack of institutional support and exclusion that made it difficult for them to secure compensation. The government itself said it was a development project which turned out to be a business project[197,198,199,200]. This is demonstrated by the failed unresolved 456 grievances against the COTCO pipeline constructions[73]. In Cameroon, conflict-affected regions such as the Anglophone areas and communities displaced by projects like the Chad-Cameroon oil pipeline have experienced prolonged marginalization, inadequate consultation, and insufficient compensation for environmental and social harms. The Electricity Law, while forward-looking, contains no provisions to recognize past or ongoing disparities, nor does it establish mechanisms for compensation, targeted development, or prioritized electrification in historically underserved or conflict-prone areas[198,200].

There are also no requirements for social or environmental impact assessments that address the legacies of injustice, nor obligations for planners to consult or prioritize historically marginalized populations. This omission perpetuates a development model focused on infrastructure expansion and economic efficiency, while overlooking the ethical imperative of redress and reconciliation. A justice-oriented energy policy would include measures such as dedicated electrification funds for conflict-affected regions, legal provisions for inclusive community representation, targeted support for previously excluded households, and institutional mandates to monitor regional energy equity[198,200,201]. Without restorative provisions, communities that have suffered neglect or displacement may continue to experience structural exclusion, despite the law's modernization goals[197,198,200] .

Considering the missing elements in energy security, environmental sustainability and explicit justice provisions (see recap table 1 at the end of the next section). Let's explore the updated version of SND30 that was design after the escalation of the conflict through the same lens. To better evaluate the alignment of Cameroon's energy governance with the framework, it is

essential to analyze how its dimensions are reflected or integrated into the long-term strategic plan, particularly in the SND30 energy plans.

3.4. Introduction to the SND30 Analysis

Cameroon's Strategy for National Development 2020–2030 (SND30) is the country's flagship development policy, launched in 2020 as a second phase of the 2035 vision to guide progress toward emerging economy status by 2035. SND30 replaces the Growth and Employment Strategy Paper (GESP) but builds on lessons learned from GESP, setting new goals emphasizing inclusive growth, structural transformation, economic resilience, and improved governance. It is designed as a lessons-learned framework from GESP and contains the country's commitments across sectors like housing, health, agriculture, and energy, running from 2020 to 2030 in pursuit of Vision 2035[205] and to archive 16 sustainable development goals. The strategy was developed through a broad-based consultative process that included various development actors and grassroots populations, and it incorporates recommendations from the Major National Dialogue, particularly to address crises in the North-West and South-West regions[205] although nothing has been done yet. SND30 is guided by the principles of equity, balanced development, and social cohesion, aiming to ensure that all Cameroonians share the benefits of growth. It also aligns with the Sustainable Development Goals (SDGs) and the national commitment to "leave no one behind" on the path to emergence [205].

The analysis in the next section will focus on the energy component of SND30 through the lens of energy trilemma and justice, considering whether its approach aligns with universal access goals with recognition of the energy needs of the southern conflict region. Given that plan was made after many communities in the Southern conflict region had gone out of electricity services due to energy infrastructure damage on transmission lines and substations and also if progress had been made to improve on the earlier identified gaps.

3.4.1 Energy security

SND30 aims to strengthen Cameroon's energy security by prioritizing diversification of the energy mix, infrastructure development, and system resilience. The strategy targets 5,000 MW installed capacity by 2030, mainly through large hydropower projects like Nachtigal, while expanding natural gas, solar, and biomass to reduce dependence on a single source and enhance

resilience to supply shocks [205; 3.2.1–3.2.3]. SND30 calls for major upgrades to transmission and distribution infrastructure to reduce technical losses-which remain as high as 40%-and improve supply reliability, especially in urban centers that still experience frequent blackouts [205;3.2.4]. The strategy also emphasizes resilient infrastructure, recognizing the need to withstand climate-related risks such as floods, droughts, and landslides [205;4.1] . Importantly, SND30 promotes both centralized grid extension and decentralized energy solutions, including off-grid solar for rural and remote communities, as part of its commitment to universal access [205;3.2.5]. However, implementation lags persist: rural electrification remains at just 24.8%, and conflict-affected Southern region face even lower access due to insecurity and infrastructure damage (189). While SND30 articulates a comprehensive vision using the language of diversification, resilience, reliability, infrastructure development, and decentralization, it lacks targeted measures for the most southern conflict regions and does not specify mechanisms to address electricity theft and fraud major source of system losses [206]. As a result, energy access and system reliability remain uneven and even worst in the southern conflict region, and the strategy's ambitious goals have yet to translate into inclusive and sustainable outcomes on the ground.

3.4.2 Environmental Sustainability

SND30 positions environmental sustainability as a core pillar of Cameroon's development agenda, emphasizing the expansion of clean energy-particularly hydropower and solar to diversify the energy mix and reduce reliance on fossil fuels[205;3.2.1–3.2.3]. The strategy promotes the adoption of renewable energy technologies and encourages responsible biomass use, which currently supplies a significant share of household energy, especially for cooking and heating [206, 3.2.3]. SND30 also highlights the need for skills development and capacity building to support local manufacturing and deployment of renewable infrastructure, signaling a commitment to technology transfer and long-term sectoral efficiency[205;3.2.4].Also, the inclusion of natural gas as a transitional fuel reflects a pragmatic approach to decarbonization, aiming to provide grid stability and lower emissions compared to oil or coal[205;3.2.2]. However, the strategy's sustainability framework has clear limitations. While SND30 endorses renewables and energy diversification, it does not set explicit greenhouse gas emissions reduction targets or integrate its goals directly with Cameroon's NDCs or international climate commitments[96]. There is also no explicit mechanism for direct renewable energy price

reduction or consumer subsidies, with affordability instead addressed through system-level cost-effectiveness and investment promotion rather than targeted financial support for end users[205;3.2.1–3.2.3].

Moreover, SND30's reliance on large-scale hydropower projects raises concerns about ecosystem protection, as these developments can disrupt river systems, threaten biodiversity, climate change in water levels, and displace communities-risks that are not fully mitigated by the strategy's current environmental management provisions (205;4.1). The plan also lacks detailed safeguards for sustainable biomass sourcing, increasing the risk of deforestation and unsupervised wood harvesting, especially in rural areas with limited alternatives (205;3.2.3) and does not address continues use of polluted and unhealthy fuels in the conflict Southern region nor clear measure to address their need. While decentralization and local governance are recognized as important for inclusive development, SND30 does not provide strong frameworks for integrating local ecosystem protection or climate resilience into energy planning at the community level (205, Part One).

The, SND30 advances renewable energy, efficiency, and clean technology as sustainability priorities, but falls short on enforceable environmental safeguards, measurable decarbonization pathways, and direct affordability measures for renewables. Addressing these gaps is essential for Cameroon to fully align its energy sector with sustainable development, climate resilience goals and sustainable strategies to address the energy situation in the conflict regions of southern Cameroon.

3.4.3 Equity in SND30

The Cameroon SND30 demonstrates a strong commitment to improving energy equity by focusing on both affordability and accessibility [205;3.2.1–3.2.3]. The plan includes a subsidy program aimed at reducing connection costs for disadvantaged households, which could alleviate financial barriers and make electricity more affordable for low-income populations [205;3.2.3]. Additionally, the strategy prioritizes rural electrification through the extension of interconnected distribution networks and the promotion of decentralized renewable energy solutions, such as solar and small hydro projects, to reach communities underserved by the main grid [205;3.2.1,3.2.3]. It recognizes the importance of improving transmission and distribution infrastructure to reduce technical losses and enhance the reliability of supply, which are critical

for ensuring that energy is both affordable and accessible, particularly in rural and marginalized areas [205;3.2.3]. These efforts aim to bridge the persistent urban–rural divide in electricity access and improve service quality.

However, despite the SND30 commitments it falls short in providing detailed mechanisms to support southern conflict region, no clear targeting subsidies effectively or establishing clear affordability criteria of tariff regulation and detailed cost management frameworks. The strategy lacks explicit legal guarantees or enforceable rights to energy access, and there are limited provisions for monitoring and evaluating the equitable distribution of energy services [205;3.2.1–3.2.3]. Moreover, while decentralized renewables are mentioned, the plan does not explicitly address off-grid or mini-grid solutions, which are essential for reaching the most remote and conflict affected areas like southern Cameroon. Also, specific measures to restore or ensure access and affordability for populations in conflict-affected regions like Southern region who have lost electricity services due to the conflict is not addressed. This omission represents a significant equity gap, leaving internally displaced persons and conflict-affected communities without targeted support or clear pathways to regain reliable energy access.

Although the SND30 articulates ambitious goals to enhance affordability and accessibility of energy across Cameroon, the realization of these equity objectives will depend heavily on the development of concrete, enforceable policies, transparent subsidy targeting, and inclusive implementation strategies that explicitly address the needs of vulnerable and conflict-affected Southern region[205;3.2.1–3.2.3].

3.5. The energy justice dimension in SND30

3.5.1 Distributive Justice

SND30 explicitly recognizes energy equity as fundamental to inclusive national development and sets out to address long-standing disparities in electricity access [205;3.2.1–3.2.3]. The strategy pledges to expand access to all municipalities, prioritizing rural electrification and the deployment of mini-grids and off-grid solutions for remote and marginalized communities [205;3.2.3]. SND30 also proposes subsidized connections for disadvantaged households, aiming to reduce socio-economic barriers to energy inclusion and ensure that vulnerable populations are not left behind.

These commitments reflect distributive justice principles, emphasizing fair distribution of energy resources and targeted support to historically underserved rural areas with no prioritized

preference to southern conflict region. The strategy acknowledges the persistent urban–rural divide: while urban access rates exceed 94%, only about 24.8% of rural populations have electricity, highlighting entrenched geographic and socio-economic disparities[189,207]. SND30's approach to bridging this gap leverages on related the Rural Electrification Master Plan, that promote decentralized solutions like mini-grids and off-grid solar to grid extension although but grid extension remains the primary focus, and institutional, technical, fiscal barriers, including weak coordination among agencies and governance challenges continue to slow progress toward equitable access [189,205;3.2.1–3.2.3;207].

However, significant challenges remain in operationalizing these equity goals. Although SND30 mentions subsidies and rural electrification investments, it lacks detailed mechanisms for ensuring affordability, such as clear tariff structures or ongoing support for low-income households [205;3.2.3] or measure for energy provisions for those in the conflict affected southern region. The cost burden of electricity, especially for rural and informal settlement users, is not explicitly addressed, raising concerns about the economic sustainability of access for vulnerable groups like southern conflict region. Furthermore, there are no legal guarantees or enforceable rights to energy access within the policy framework, nor are there effective monitoring and evaluation tools to track the fair distribution of energy benefits [205;3.2.1–3.2.3]. Marginalized populations like in conflict-affected region continue to face inadequate service quality and reliance on traditional biomass and expensive alternatives like kerosene and diesel [207]. The absence of targeted financial support, participatory planning, clear frameworks for inter-institutional collaboration, accountability, and inclusive governance mechanisms plus the absence of targeted measures to allocate resources for the conflict affected southern region undermines the realization of distributive justice in practice.

While SND30 demonstrates ambitious distributive justice objectives, the inadequacy of concrete, enforceable mechanisms and monitoring frameworks means that deep-seated inequalities persist. Bridging this gap requires not only scaling up infrastructure investment in underserved and conflict affected southern region but also embedding legal guarantees, affordability measures, and participatory approaches to ensure energy access is truly fair and inclusive.

3.5.2 Recognition Justice.

Recognition justice focuses on whether marginalized groups are acknowledged, included, and valued in energy planning and policy. SND30 demonstrates some intent in this area by creating the documents for both French and English, acknowledging the needs of rural and vulnerable populations, setting broad goals to reduce regional disparities, and promoting private investment in decentralized mini-grid systems [205;3.2.1–3.2.3]. This reflects a sign of recognition and inclusion for rural and low-income households as beneficiaries of energy reforms.

However, while SND30 demonstrates some intent in acknowledging vulnerable populations, its approach to recognition remains limited and largely superficial as the needs of those in the conflict affected region is not acknowledged. The strategy references inclusion and non-discrimination as guiding principles [205, Part One]. Still, it does not explicitly identify the distinct energy challenges faced by conflict-affected southern region population. Despite the escalation of the Anglophone crisis and infrastructure destruction before the strategy's adoption, these communities are not specifically mentioned within the energy provisions of SND30 [206, 205;2.3]. Although the strategy outlines broad[205;4.3] initiatives, such as electrification of remote localities through solar energy and mini hydroelectric power stations, and sets up subsidy programs for disadvantaged households, it does not tailor these efforts to the unique circumstances of marginalized southern region in politically or geographically vulnerable regions. Without clearly recognizing their distinct needs of those in conflict affected southern region, the inclusion of underserved communities in the strategy remains broadly stated rather than meaningfully operationalized.

This lack of substantive recognition of the specific energy needs of the Southern conflict region not only perpetuates existing injustices but also weakens the resilience and effectiveness of Cameroon's national energy transition. Achieving true recognition justice requires institutionalized representation, community consultation, and policy instruments that prioritize the visibility and voice of marginalized Southern region communities. As it stands, SND30's limited approach to recognition justice constrains its potential to deliver a just and equitable energy system for all Cameroonians.

3.5.3 Procedural justice

Procedural justice centers on the meaningful involvement of all stakeholders-especially marginalized and directly affected communities-in energy decision-making. While SND30

highlights the importance of institutional communication and improved access to information as part of its broader development agenda, these commitments are not explicitly translated into the energy sector through concrete frameworks for civic engagement or participatory governance [189,205;3.2.1–3.2.3].

There is no clear, enforceable mechanism in SND30 to guarantee southern region participation, stakeholder consultation, or transparent processes in energy planning for the conflict affect southern Cameroon. The strategy's approach remains largely top-down, with decision-making concentrated among central authorities and limited opportunities for bottom-up input from local communities, particularly those in rural or conflict-affected areas [189;205;3.2.1–3.2.3]. Furthermore, while the strategy highlights inclusion and non-discrimination as guiding principles [205, Part One], it lacks effective institutional mechanisms to ensure that marginalized groups such as conflict-affected communities in Southern Cameroon are meaningfully represented in energy governance and project design [207;3.1]. Without tailored engagement strategies reflecting the cultural, social, and political contexts of these communities, SND30's approach to inclusion remains inadequate, lacking concrete frameworks for stakeholder participation and equitable representation. Although private investment and public-private partnerships are encouraged, this inclusion primarily benefits economic actors, not local populations [205;3.2.3]. Recent evaluations echo these shortcomings: Cameroon scores low on stakeholder engagement in extractive industries, with international bodies urging the government to strengthen civil society participation, ensure freedom of expression, and establish transparent, inclusive consultation processes [209]. The absence of formal structures such as community forums, participatory environmental impact assessments, or feedback mechanisms for project-affected populations further limits citizens' ability to influence or hold accountable those directing energy development [189,205;3.2.1–3.2.3].

This lack of participatory governance undermines trust, weakens policy legitimacy, and risks deepening social inequalities, especially among already disadvantaged groups like the southern conflict region. Advancing procedural justice in Cameroon's energy sector will require concrete institutional reforms: embedding stakeholder engagement throughout project lifecycles, creating inclusive consultation platforms, and ensuring transparency and accountability at all stages[209].

3.5.4 Restorative Justice

Restorative justice concerns acknowledging and addressing historical and ongoing injustices related to energy access and infrastructure development. The strategy does not explicitly mention compensatory mechanisms, resettlement support, or targeted redress for communities displaced by major hydroelectric projects such as Nachtigal or Grand Eweng, nor for those whose livelihoods or ecosystems have been disrupted by energy infrastructure [205;3.2.1–3.2.3]. This omission is notable given Cameroon's reliance on large-scale hydroelectric initiatives, which have historically resulted in displacement and social-environmental impacts [210,186,180;2.3].

While some recent transmission projects, like the Cameroon–Chad Power Interconnection, have included compensation and resettlement plans for affected residents, these interventions are project-specific and externally driven, not embedded within SND30's national energy policy framework [179,186,180;2.3]. SND30 does not single out historically underserved regions-such as the conflict-affected Southern regions for rectification or targeted electrification programs, nor does it frame infrastructure rehabilitation as justice-oriented redress for legacies of exclusion [205;3.2.1–3.2.3). The absence of institutional mechanisms for compensation, community development funds, or dedicated electrification for marginalized areas undermines the moral legitimacy and long-term sustainability of Cameroon's energy transition [205;3.2.1–3.2.3,180;2.3].

The SND30 falls short of restorative justice by not acknowledging past neglect, offering compensatory support, or embedding mechanisms to restore trust and redistribute energy benefits to affected communities like the southern conflict region. Addressing these gaps would require explicit commitments to redress, including resettlement packages, targeted development funds, and dedicated programs for historically marginalized populations.

In conclusion, both Cameroon's Electricity Law and SND30 set out to advance energy security and sustainability emphasizing rural electrification, renewable energy, and, to some extent, decentralization neither provides clear mechanisms or strong incentives for effective implementation in marginalized or conflict-affected areas. SND30 makes some progress by broadening the focus to include diversification and cleaner energy sources however, it fails to recognize or address the specific energy needs of the southern conflict region. Both the electricity law and SND30 lack explicit justice provisions and fail to address restorative

measures for communities most affected by conflict. As a result, persistent gaps as shown in table 1 below in security, environmental sustainability, equity, and justice remains, demonstrating the need for future reforms to embed technical, social and environmental justice at the core of Cameroon's energy transition. Addressing these gaps is essential to ensure that the benefits of energy development reach all communities fairly and contribute to lasting peace and sustainable growth.

Table 1. A recap table showing the gaps in both the electricity law and the SND30 energy plans plus some improvements made in the SND30 from the law

Dimension	Gaps in Electricity Law	Gaps in SND30	Improvements in SND30
Energy Security	- No resilience planning for climate/conflict - No mention of grid theft/fraud control - No emergency backup or recovery mechanisms - Provisions largely aspirational - Weak enforcement and accountability	- Implementation lags, especially in conflict zones - Still lacks clear enforcement or accountability. - Does not address electricity theft or grid fraud. - No targeted support for the Southern conflict region - Weak monitoring and coordination frameworks	Mentions diversification and system resilience - Targets 5,000 MW installed capacity - Expands scope to infrastructure upgrades - Acknowledges blackout problems and climate risk - Mentions decentralized/off-grid solutions

Environmental Sustainability	- No incentives for RE adoption - No targets for emissions reduction - Does not address biomass transition - Lacks safeguards for sustainable energy sourcing - Weak institutional enforcement	- No GHG emissions targets - No alignment with NDCs - Relies heavily on hydropower without full ecosystem safeguards - Biomass use and deforestation unaddressed - Fails to address polluting fuels in conflict zones - No strong affordability/subsidy mechanisms for R	- Supports diversification with hydro, solar, gas - Encourages local RE development and tech transfer - Integrates RE into long-term national planning - Recognizes biomass as a challenge and propose responsible biomass but lack details
Energy Equity	- No mention of affordability or access - No subsidy or support mechanisms for poor households - High connection fees limit access	- No detailed targeting for Southern conflict region - Affordability measures weak or absent - No legal right to energy access	- Mentions subsidies for poor households but lack details - Recognizes rural-urban divide - Promotes decentralized energy access (though not prioritized)

	- No framework for off-grid/mini-grid deployment - No focus on marginalized communities	- Doesn't address conflict-related infrastructure losses - No conflict-sensitive planning - Monitoring/evaluation tools missing	
Distributive Justice	- Rural electrification goals present but not binding - No mechanisms to ensure fairness - Limited scalability (≤1MW for distributed systems) - No affordability or tariff protections - No spatial equity planning	- Weak implementation in rural/conflict zones - Lacks affordability guarantees - No targeted programs for Southern conflict region -institution coordination, governance and capacity gaps persist - Monitoring and evaluation still weak -Grid extension dependence	- Promotes rural access and off-grid solutions(no details) - Subsidies introduced for disadvantaged households(no details) - Broader geographic coverage promised

Recognition Justice	- No mention of marginalized groups or regions - No reference to gender, culture, or ethnicity - No tools for inclusive energy planning -No provisions for community needs assessments	- Energy needs of Southern region not acknowledged - Principles of inclusion not operationalized - No tailored approach for displaced or indigenous groups	- Bilingual publication - Broadly mentions inclusion and social cohesion - Promotes decentralization in general terms - Encourages public-private partnerships
Procedural Justice	- No public consultation mechanisms - Technocratic and centralized governance - Civil society excluded - No participatory planning or forums - No transparency framework	- Excludes conflict-affected regions from participation -Still top-down with weak local governance -No enforceable stakeholder participation - No community-level energy governance - No civil society in decision-making	- Promotes PPPs and private sector inclusion - Mentions public communication and governance improvements (broad)

		- Poor coordination and information access	
Restorative Justice	Largely absent - No mention of past injustices or displacement (e.g., pipeline project, displacement) - No provisions for compensation or redress - No targeted electrification for historically excluded groups like southern conflict region - No development reparations	- No reference to prior harm or displacement - No redress for excluded/conflict-affected communities - No community recovery or energy reparations - No funding for historical correction - No infrastructure rehab framed as justice	- Mentions inclusive growth broadly

Chapter 4: Conclusion and recommendations

4.1 Conclusion

The comprehensive analysis of Cameroon's energy landscape through the lens of the Energy Trilemma and Energy Justice frameworks has revealed significant challenges in achieving a balanced energy system, that ensures access to sustainable reliable energy, while promoting justice and fairness for all communities[54,55]. The southern conflict region has been disproportionately affected due to the lack of measures to restore access as they continue to live in extreme energy poverty[146,96].

Moreover, the findings demonstrate that the challenges in Cameroon's energy landscape are multifaceted, encompassing energy Security, environmental sustainability, equity challenges, as well as justice concerns such as the lack of recognition of the specific energy needs of marginalized communities, limited participation in energy decision-making, and inadequate redress for historical energy-related injustices[54,113]. This is evident in the analysis of the Electricity Laws and SND30's failure to address the unique challenges of the southern conflict region. Hence it can be concluded that that the current energy polices does not effectively address the unique energy challenges of the southern conflict region in Cameroon

While the updated Electricity Law of 2011 and the National Development Strategy Plan (SND30) show progressive and forward-thinking towards expansion of renewable energy, increase capacity of energy production and grid extension to rural areas. Their analysis exposes substantial gaps in addressing the southern region's specific energy needs, perpetuating energy injustices and marginalization exacerbating high level of energy poverty in there. Some of the root causes underlying these persistent gaps in energy policies include path dependency, lack of political will, inadequate institutional frameworks, lack of transparency and accountability, fragile governance, lack of coordination, administrative inefficiencies and bureaucratic delays, Corruption and Favoritism, and misplaced priorities.

These causes collectively undermine all three pillars of the energy trilemma and perpetuate multiple forms of energy injustice. They also lead to compromise in energy security by creating an unstable resulting from poorly coordinated institutional landscape, incapable of ensuring reliable electricity delivery[130,146,]. While a lack of political will exacerbate energy inequity by reinforcing regional disparities, particularly in marginalized conflict-affected areas, where

access remains limited due to political neglect and biased resource allocation, reflecting distributive and recognition injustice[54]. At the same time, the lack of transparency, inclusive decision-making, and post-conflict recovery efforts signal procedural and restorative injustice, undermining policy effectiveness and public trust[146,172,]. Moreover, path-dependent planning continues to recycle marginalization, and weak regulatory enforcement impedes the shift toward sustainable energy solutions, thus constraining environmental sustainability[48].

All these interlinked governance failures contribute to a cycle of exclusion, inefficiency, and unaccountability that hinders the development of just, secure, and sustainable energy access in Cameroon especially in the southern conflict region. To address these root causes, it is essential to highlight a need for policy reform that ensures securing reliable access to a sustainable and inclusive, electricity sector that can meet the needs of all Cameroonians, especially those in conflict-affected and underserved regions[96].

4.2 Recommendation

The analysis reveals that Cameroon faces complexities in the energy landscape and the challenges posed by the conflict in the southern region; a comprehensive and unique approach to energy governance and policy reform is necessary. To effectively address the root causes of the gaps in the energy landscape and polices that affect access to sustainable and equitable energy, including path dependency, lack of political will, and inadequate institutional frameworks, Cameroon can learn from countries that have experienced similar challenges and have successfully implemented reforms.

One potential approach is to adopt a post-conflict reconstruction framework for the energy sector, similar to the one implemented in Rwanda after the 1994 genocide. Rwanda's experience in rebuilding its energy infrastructure and promoting sustainable energy development[117,119] can provide valuable insights for Cameroon. For example, Rwanda's focus on decentralized energy solutions, community participation, and renewable energy development can help Cameroon promote energy access and sustainability in the southern conflict region. They can go about it by establishing a special task ministry, force, or agency responsible for coordinating energy development plans in the southern conflict region, where they would work together with the local communities, stakeholders, and international organizations to identify areas of priority for energy development, developed a specific energy plan and implement projects that facilitate energy access and sustainability.

In addition to learning from Rwanda's experience, Cameroon can also benefit from adopting a more inclusive and participatory approach to energy planning and decision-making. This can involve engaging with local communities, stakeholders, and conflict-affected populations in the decision-making process[117,119]. It can be done through a round table discussion to ensure that their needs and priorities are taken into account in energy policy design for effective addressing and implementation. Progress can be measured by the level of community engagement and participation in energy decision-making, and checking the increase in energy access rates in the southern conflict region.

To address the challenges posed by path dependency and inadequate institutional frameworks, Cameroon can prioritize institutional strengthening and capacity building in the energy sector. This can involve establishing clear mandates and responsibilities for energy institutions, promoting transparency and accountability, and investing in capacity-building programs for energy officials and stakeholders.

Similarly, to overcome the silo approach and coordination challenges that hinders or delays energy development in Cameroon and the impact in the southern conflict region, Cameroon can establish an inter-ministerial coordination committee on energy development. This committee can call on representatives from various government ministries and agencies, local communities, and stakeholders to ensure a coordinated and integrated approach to energy planning and decision-making. Promoting collaboration and coordination among different stakeholders in Cameroon can ensure that energy policies and programs are designed and implemented in a way that addresses the unique challenges and needs of the southern conflict region. It would also help to avoid duplication of efforts among different government ministries and agencies, leading to effective resource allocation.

After considering the above suggested steps, the government should review and revise the Electricity Law making it to capture the gaps in the dimensions it lacks. To also ensure it is aligned with tools, mechanisms and measures to address the energy needs of the southern conflict region. Promoting access to sustainable energy development, and provides a framework for decentralized energy solutions and community participation

Ultimately adopting a post-conflict reconstruction framework, prioritize institutional strengthening, establish an inter-ministerial coordination force, policy reform, and prioritizing inclusive and sustainable energy development, Cameroon can promote equitable access to

sustainable energy in a just way, in the southern conflict region, and ensure that energy development contributes to the country's overall development and stability.

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Annex

1. Electricity Law No 2011/022 of 14 December 2022

Part of the electricity LAW N° 2011/022 OF 14 December 2011: Governing the electricity Sector in Cameroon that has been analyzed

PART IV RURAL ELECTRIFICATION, RENEWABLE ENERGY AND ENERGY EFFICIENCY

CHAPTER 1 RURAL ELECTRIFICATION

SECTION 58.-. (1) The State shall ensure the promotion and development of rural electrification nationwide. (2) Local authorities shall contribute, as and when necessary, towards the implementation of the rural electrification policy under conditions laid down by regulation of this law.

SECTION 59.- (1) Rural electrification shall be carried out through connection to the interconnected network, or by distributed generation. (3) They shall be bound to comply with the provisions (2) Within the framework of decentralized rural electrification and in view of constraints related to environmental protection, priority shall be given to distributed generation, from renewable energy sources, except in the event of scarcity, high cost or deficiency thereof. (3) The surplus electricity generated from renewable energy sources may be purchased by the transmission system operator or by any local distributor under the conditions laid down by regulation.

SECTION 60.- (1) Within the context of rural electrification and the limits stipulated by decree, the generation, especially of hydroelectric stations wit a capacity of 5 MW or less, the supply and sale of electricity shall be by virtue of a simple authorisation of the Electricity Sector Regulatory Board. No special requirements for tender notices or advertisement shall be imposed. Such activities shall be carried on in compliance whit the rules of safety and environmental protection. (2) The decree referred to in Subsection (1) above shall lay down the conditions under which independent producers may sell their surplus electricity to users in rural areas.

SECTION 61.- (1) Notwithstanding the provisions of Sections 11 and 24 of this law, the direct or indirect supply of electricity of 1 MW or less for use in rural areas shall be subject to an authorization granted by the Electricity Sector Regulatory Board, in accordance with conditions laid down by decree. (2) Such authorizations may in no case infringe on the acquired rights of concessionaires as stipulated in their concession contracts.

SECTION 62.- The missions, organization and functioning of the agency in charge of promoting rural electrification shall be defined by decree of the President of the Republic..

CHAPTER II RENEWABLE ENERGY AND ENERGY EFFICIENCY

I –RENEWABLEENERGY

SECTION 63.- The following shall be considered as renewable energy: - Solar, thermal and photovoltaic energy; - wind energy; - less than or equal to 5MW river hydroelectric energy; - biomass energy; - Geothermal energy; - Marine energy.

SECTION 64- Renewable energy shall help meet the energy requirements of consumers and contribute to environmental protection and securement of energy supply.

SECTION 65.- (1) The State shall ensure the promotion and development of renewable energy.

(2) The aim of the development of renewable energy shall be to introduce and promote renewable energy processing sub-sectors. (3) The terms; conditions and mechanisms for research, development, production of equipment at local level and financing projects shall be laid down by regulation. (4) The State shall fix the tax benefits for the products, good and services intended for renewable energy exploitation.

SECTION 66.- (1) any electricity utility operator shall be bound to connect to the network any operation generating electricity from renewable energy sources to who so demands, Connection fees shall be borne by the applicant. (2)The conditions, volume and price for the purchase of energy by a public utility operator shall be fixed by decree.

SECTION 67.- An agency responsible for the promotion and development of renewable energy may be established as and when necessary.

II- ELECTRIC ENERGY EFFICIENCY

SECTION 68.- The judicious use of electric power shall concern the optimisation of energy consumption at different levels of energy production and transformation and final consumption in industry, transportation, commercial and residential sectors.

SECTION 69.- The implementation of electric energy efficiency shall be based on obligations, conditions and resources, in particular the standards and requirements for energy efficiency, energy efficiency control, compulsory and periodic energy audits, incentives to improve the understanding of the energy system and user awareness.

SECTION 70.- (1) the organization of activities to control electric energy as well as the conditions for the implementation of the National Energy Control Programme shall be governed by regulation. They shall fall under the competence of the Ministry in charge of energy. (2) The Electricity Sector Regulatory Board shall be responsible for the implementation of the National Energy Control Programme.

2. SND30 analyzed sections

Energy industry.

The objective is to produce energy in abundant quantities to satisfy industrialization and to become an energy exporting country. Three orientations are retained: (i) develop the huge national hydroelectric potential; (ii) develop alternative energies to better meet specific needs such as cooking, transport, especially urban transport, urban electrification, manufacturing industries, etc.; (iii) strengthen and optimize the use of biomass

Part 2: PILLARS OF THE STRATEG

CHAPTER 3 STRUCTURAL TRANSFORMATION OF THE ECONOMY

3.3. DEVElOPMENT OF PRODUCTIVE INFRASTRUCTURES

Energy infrastructure. The objective is to increase installed power generation capacity to 5000Mw by 2030. To this end, the Government will pursue its policy of developing an energy mix based on: (i) hydroelectric power; (ii) photovoltaic power; (iii) gasbased thermal power; and (iv) energy from biomass. With regard specifically to hydroelectric power, the Government will continue to develop power generating facilities through the execution of projects, giving priority to the Public-Private Partnerships approach and independent production of electricity

Access to social amuniities: As concerns household access to electricity, the aim will be to electrify remote localities using solar energy and/or mini hydroelectric power stations; facilitating the mobilization of national private investors through attractive legal provisions for the purchase of energy, and to connect all councils to the electricity grid; set up a subsidy programme for the connection of disadvantaged households to the electricity grid and continue rural electrification programmes through the extension of interconnected distribution networks

DEVELOPING INDUSTRIES AND SERVICES

The strategic perimeter chosen by Government comprises 9 (nine) driving industrial sub-sectors: energy is one of them

1 Energy industry

97. Based on its robust and dense energy resource potential, Cameroon's goal is to produce abundant energy to improve the living conditions of its people, meet its industrialization needs, and become an energy exporting country. This ambition implies a restructuring of the national energy sector and harmonization of the main compartments of the organization of this sector with the stakes involved and the challenges to overcome in the short, medium and long term, from production to distribution through the critical node of current and future national and regional interconnected transport networks. 98. To this end, three guidelines have been selected: (i) develop the significant national hydroelectric potential; (ii) develop alternative energies to better meet specific needs such as cooking food, transport (particularly urban transport), urban electrification, manufacturing industries, etc.; (iii) strengthen and optimize the use of biomass.

3.1.4 Forest-Wood 105. In addition to the production of energy biomass, developing this sector will aim to rationally develop the exploitation and use wood and strengthen transparency in the management of council and community forests. 106. Thus, the actions planned for the development of this sector will focus on: (i) developing forest plantations; (ii) strengthening the wood processing industry up to the 3rd processing level for the manufacture of furniture, the construction of homes and buildings and industrial uses. To this end, Government will especially specify the orientation of public orders regarding the supply of furniture to government services and strengthen standards for the use of wood in construction. In addition, Government will set up a suitable framework for the emergence of wood technology parks.

3.3. DEVELOPMENT OF PRODUCTIVE INFRASTRUCTURES

149. Aware of the driving role of infrastructure in facilitating trade and promoting strong and sustainable growth, Government took the commitment, as part of implementation of the first phase of the Vision, to invest heavily in infrastructure to make Cameroon’s economy competitive. This included: (i) increasing energy production capacity; (ii) increasing the rate of access to electrical energy; (iii) improving access to drinking water; (iv) developing the digital economy; (v) controlling the development of cities; and (vi) developing transport infrastructure

150. Generally, despite the completion of several infrastructures over the past ten years, there

are still significant difficulties in accessing such infrastructures. This situation stems from several causes including: (i) weak project management capacity; (ii) delays noted in the freeing of rights-of-way and conditions of compensation and re-housing; (iii) absence of prior studies on infrastructure projects; (iv) weak implementation of urban development plans; (v) weak multimodal integration of projects; (v) inadequate consistency and poor coordination of actions in the various projects; (vii) inefficiency of the public procurement system; (viii) insufficient valuation of subcontracting; and (ix) inoperative research in the area.

151. To stay on the path of emergence by 2035, the shortcomings pointed out will have to be corrected while aiming at the Vision's targets. More specifically, this will entail: (i) finalizing, first and foremost, the implementation of major first-generation projects; (ii) ensuring the optimal functionality of existing infrastructures; (iii) rehabilitating public facilities destroyed or rendered obsolete by their inoperability; (iv) streamlining the start-up of new projects in accordance with project preparation standards; (v) formulating projects in an integrated manner to optimize their impact on the economy; (vi) systematizing counter-expertise for evaluation of the costs of major infrastructures; (vii) putting in place a cost baseline; and (viii) strengthening the project prioritization and selection process.

152. The main areas of infrastructure development are energy, transport, telecommunications, water and sanitation, urbanization and housing.

3.3.1. Energy infrastructure

153. During the first phase of Vision 2035, installed capacity increased from 933 MW to 1,650 MW with a capacity gap of 1,350 MW compared with the 2020 target of 3,000 MW. The electricity access rate reached 90% in urban areas and only 20% in rural areas. However, it is necessary to note the discontinuity of electricity service to subscribers because of numerous load shedding. This situation is compounded by the dilapidated transmission and distribution networks that cause losses of about 40% of the energy produced.

154. The reasons for the shortcomings in this sector include: (i) overall mismatch between supply and demand; (ii) obsolescence of production, transport and distribution infrastructures; and (iii) delay in the completion of new production facilities identified in the Electricity Sector Development Plan (PDSE 2030).

155. For the period 2020-2030, in order to meet the energy demand of the national economy and consider surplus exports to neighbouring countries, Government intends to increase

installed energy capacity to 5,000 MW. To this end, it will pursue its policy of developing an energy mix based on: (i) hydroelectric power; (ii) photovoltaic energy; (iii) gas-based thermal energy; and (iv) energy from biomass

156. Regarding hydroelectric energy, Government will continue developing production facilities through project execution with preference to the public-private partnership approach and independent productions of electricity, particularly the construction of hydroelectric dams in: Nachtigal-Upstream (420MW); Bini in Warak (75MW); Menchum (72MW); SongNdong (270MW); Grand Eweng (1800MW); Katsina-Ala (485MW); Makai (350MW); MouilaMogue (420MW); Kikot (450MW); Ndjock (200MW); Ngoila (84MW); and Cholet (600MW). Government also intends to rehabilitate some hydroelectric infrastructures. In addition, it will encourage the construction of mini hydroelectric power plants in localities to meet household demand in such localities. A piece of legislation aimed at stimulating domestic private investment in the construction of mini hydroelectric power plants and solar power plants will be adopted to allow access of the entire population to electricity by 2030.

157. With regard to photovoltaic energy, as part of the ongoing improvement of the energy mix, Government will put in place a renewable energy strategy with incentives for the extension and adoption of solar photovoltaics. To that end, emphasis will be on building local capacity in the maintenance of photovoltaic equipment and gradual ownership of the technology and production of the necessary material.

158. For the development of thermal energy, Government plans to carry out extension works at the Kribi gas plant, which consists in installing an additional capacity of 114 MW. It will continue to develop liquefied natural gas production and supply gas to industries.

159. For biomass energy, due to the size, diversity and density of its forest cover, as well as its abundant natural vegetation, Cameroon appears as a large reservoir of biomass energy. Biomass energy covers 70% of the current domestic energy demand. In addition, the high global demand for plant products destined for biomass energy processing is an excellent opportunity for Cameroon's food-energy exports. Accordingly, Government intends to ensure proper use of biomass and promote the production of biomassderived energy

160. Government however plans to modernize transport networks through the operationalization of the National Electric Power Transmission Company (SONATREl). More specifically, it will entail constructing of more than 460 km of 400 KV transmission line and 4 transformer stations; rehabilitating of 3 transformer stations and about twenty source stations.

This will entail notably the construction of the following lines: Ngaoundere-Tibati (225 Kv) and Tibati-Ngaoundal (30 Kv); BertouaGaroua-Boulai-Meiganga-Ngaoundere (225 Kv); Menchum-Bamenda (225 Kv); Memve'ele-Kribi (225 Kv); yaounde-Abong-Mbang; and NkongsambaBafoussam (225 Kv). Government will also pay particular attention to the modernization of the electricity distribution network by the national operator.

4.4 ACCESS TO BASIC SOCIAL AMENITIES

4.4.3. Access to electricity

322. In 2016, the rate of access to electricity was 62.1% though the target was 70%. This weak performance can be explained by: (1) underproduction, (ii) obsolescence of the electricity distribution network, untimely power cuts, poor maintenance of the infrastructure and equipment, (iv) sluggishness of electrical network maintenance teams; etc., thereby generating untimely cut and poor access to electric current

323. In order to guarantee access for all to affordable electric power, the Government is committed to: (i) electrify remote communities using solar energy and / or mini hydropower plants, by facilitating the mobilisation of national private investors for this purpose through legal energy purchasing provisions; (ii) connect all municipalities to the electricity network; (iii) set up a subsidy programme to connect under privileged households to the electricity grid; and (iv) increase the service density and quality of the distribution network and (v) continue rural electrification programmes through the expansion of interconnected distribution network.

General not for energy:

6.2.5. Improvement of institutional communication and access to public information 403. To facilitate the access of citizens to public information, authorities intend to: (i) improve the level of dissemination of information on the implementation of public policies; (ii) improve the mechanisms and performance of state information dissemination channels; (iii) strengthen local communication and intensify digital communication; (iv) optimize the management mechanisms of Governmental Communication; (v) develop a crisis communications mechanism; (vi) create an electronic database of legal texts and; (vii) develop a charter for using and disseminating documents.

Chapter 7

MACROECONOMIC AND BUDGET FRAMEWORK

Main assumptions on growth drivers

7.1.1.6.Energy

485. In order to strengthen electric power supply, the Government is committed to ensuring complete connection and commissioning of the various dams of the first generation major projects. Also, in addition to the rehabilitation of some hydroelectric infrastructure, including the lagdo dam, new energy infrastructure projects will be developed and put into use, with the objective of increasing installed capacity from 1,650 MW in 2019 to more than 5,000 MW by 2030.

486. To this end, the commissioning of the NachtigalAmont Hydroelectric Dam (420Mw) is envisaged in 2024, Bini à Warak (75Mw) in 2024, Menchum (72Mw) in 2026 and Song-Ndong (270Mw) in 2027. In addition to these dams, several transmission lines are planned to connect them to various interconnected networks. These initiatives make it possible to anticipate, over the 2021-2030 period, an improvement in energy supply to the tune of 6.2% on annual average.

Risk analysis

7.3.3. Delay in the execution of energy sector projects

554. The supply of electrical energy remains an important catalyst for the development of an industrial fabric and the expansion of private sector activities. In the Vision scenario, improving energy supply plays a key role. Therefore, failure to meet the energy schedule could jeopardize the overall and sectoral development prospects envisaged.

555. In this simulation, the effects of lower energy supply growth over the 2021-2030 period are highlighted. For this purpose, an average annual growth of 5.5% in the supply of electric energy is considered. This is nearly 2 points below the average growth rate set in the Vision scenario.

556. It emerges from the analysis of sectoral GDP evolutions that this evolution of energy supply should generate consequences in terms of underperformance in several sectors of activity. Thus, the primary sector is expected to record a decline of 0.9 point on average per year over the 2021-2030 period as compared to the Vision scenario. This decline would be primarily induced by the drop in demand from industries for agricultural products. In the secondary sector, lower growth in energy supply should also lead to a less favourable dynamic of manufacturing industries, as well as that of building and construction. The decline in growth

in the secondary sector is estimated at nearly 0.9 points on annual average as compared to the Vision scenario. In the tertiary sector, the decline in activity is estimated at -1.1 point on annual average over the period under consideration, in relation to the underperformance recorded in the trade, transport, catering and hotel branches, as well as in banks and financial institutions.

557. On the overall economic dynamics, the average annual GDP growth rate over the 2021-2030 period should be around 7% as against 8% in the Vision scenario, down by 1 percentage point. Over the entire period, the cumulative loss in growth is estimated at nearly 10 points.

ANNEX 3 : Flagship plans, programs and projects

Energy Plan This will involve, on the one hand, upgrading all the Transmission and Distribution networks and, on the other hand, increasing the Installed Capacity to 5000Mw by 2030 by executing the major projects of the PDSE in particular: Bini at Warak (75); Nachtigal (420); Ngoila (84); Song Dong (280); Grand Eweng (1800); Chollet (600); Kikot (720); Makay (350); Mouila Mougue (420); Njock (200). Amount : 5 855.0, time 2021-2030

ANNEX 4: Pre-identified Major Reforms 1. STRUCTURAL TRANSFORMATION OF THE ECONOMY 1.1 Review the legal and regulatory framework on the energy mix with a view to promoting renewable energies, particularly biomass energy Development of renewable energ: enewable energy production units are set up and operational. Baseline set is 0 and year 2026

Upgrading of the electricity transmission and distribution network: he electricity transmission network has been modernised and allows all production to be transported with few technical losses. _ _ _ Yes MINEE, SONATREL Rate of access to electrical energy 63.2 % (2016) 70% 80% 90% MINEE, SONATREL Transmission line of the electricity network. _ _ _ > 460 km of 400Kv MINEE Ngaoundere-Tibati line built _ _ _ 225 Kv MINEE Tibati-Ngaoundal line built

Electricity access rate in Cameroon stands at 65 percent with significant disparities between urban (94 percent) and rural (25 percent) areas. The National Development Strategy-30 elaborated by the Ministry of Economy Planning and Territorial Development (MINEPAT) sets an access target of 80 percent by 2025 with the aim of achieving universal electrification by 2030

With its current population growth rate and non-electrified population statistics, there is an

urgency for the country to develop an electric grid capable of meeting these and anticipating the future needs. While the estimated electricity access rate is 65.4%, it is worth pointing out that there is a disparity in electricity access between urban and rural/remote areas: the electricity access rate in urban (resp. rural/remote) areas is estimated at 94.7% (resp. 24.8%),