FROM CONSTITUTION TO COMMITMENT: TRACING ALGERIA'S JOURNEY TOWARDS GREEN ENERGY INTEGRATION AS ALTERNATIVE SOLUTIONS FOR ENVIRONMENTAL RISK PREVENTION

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Abstract *–Algeria's abundant hydrocarbon resources have positioned the nation prominently in the global energy sector, yet they have also fostered an economic dependence on this finite resource. However, this reliance has come at a cost, contributing to environmental degradation, global warming, and climate change. As energy, demands soar and fossil fuel reserves decline, Algeria confronts significant challenges. Urgent action is imperative to cultivate sustainable and dependable energy sources, highlighting the necessity for alternative pathways to ensure environmental sustainability and energy security. Our research objective is to assess the evolution of the legislative support for green energy within the framework of constitutional provisions on environmental protection and sustainable development in Algeria. This study employs interpretive content analysis to examine Algeria's legal framework concerning the transition to green energy, as an alternative advocated by Algeria legislation through Law 10/03, the Law on Environmental Protection within the Framework of Sustainable Development, as well as Law 20-04, the Law on the Prevention of Major Risks and Disaster Management within the Framework of Sustainable Development. The primary data source includes various legal documents related to renewable energy initiatives and environmental regulations in Algeria. The 2016 constitution acknowledged citizens' right to a healthy environment, emphasizing emission reduction and green energy. In 2020, environmental preservation was elevated to constitutional status. Renewable energies are central to preventing environmental risks harm from widespread use of fossil fuels, yet challenges persist in their implementation. Nonetheless, the shift towards explicit constitutional support for renewables is positively influencing political will and engagement. Additionally, it draws comparisons with legal experiences in the legislation of other countries.*

Keywords: *Environmental protection; environments risks; Preventive protection; sustainable development; Renewable energies; Algeria constitutions, Law 10/03; Law 20/04; Comparative law.*

INTRODUCTION

Energy is an indispensable catalyst for fostering economic growth and societal progress, standing as a paramount priority for governments worldwide. However, the irrational use of this energy leads to serious consequences that cannot be remedied, and their damage can be challenging to repair.

Most environmental risks, especially natural disasters, are unpredictable and occur suddenly, causing extensive damage leading to the destruction of many living organisms and ecosystems. Environmental security is undoubtedly closely linked to environmental protection and the achievement of sustainable development goals. This can only be achieved through enforcing rigorous legislation and measures that ensure environmental security to face the global challenges of climate change and global warming.

The recent trend towards the adoption of green energy has contributed to the growth of this strategic sector. However,. However, the transition from non-renewable or conventional energy sources to green energy sources is still facing multiple challenges at the economic, organizational, and technological levels, which has prompted governments and key players to promote strategic research and development, to overcome these challenges and develop solutions to ensure efficient use of green energy resources.

Algeria, like many countries, has been affected by these disasters, which have prompted the country to take preventive measures to preserve its fossil fuel reserves for the future and contribute to ecological security. This has stimulated the development of sustainable energy solutions by harnessing power from renewable energy resources.

In light of global environmental concerns and the imperative for sustainable development, this study aims to explore the evolution of legislative support for green energy within the context of Algeria's constitutional provisions on environmental protection and sustainable development. As a nation rich in hydrocarbon resources,Algeria faces significant challenges in balancing economic development with environmental sustainability. Therefore, understanding the legislative framework governing the promotion of green energy is essential for addressing these challenges and advancing Algeria's transition towards a more sustainable energy future. Through a comprehensive analysis of legislative developments and constitutional provisions, this research seeks to shed light on the progress made, identify areas for improvement, and offer insights into effective policy strategies for promoting green energy in Algeria. This study addresses key research questions concerning the evolution and effectiveness of legislative support for green energy within Algeria's constitutional framework:

- What are the key constitutional provisions related to green energy within the broader context of preventing environmental risks and achieving sustainable development in Algeria?
- How has the evolution of constitutional provisions relating to green energy unfolded over time?
- How do the green energy legislative initiatives align with constitutional provisions regarding green energy promotion in Algeria?

Our findings indicate that the 2016 constitution represented a significant recognition of citizens' entitlement to a healthy environment, emphasizing the importance of reducing emissions and adopting green energy practices. However, the 2020 constitution elevated the preservation of the environment to a constitutional value, empowering environmental advocates and organizations to assert environmental rights. This shift underscores the prioritization of environmental concerns across political, economic, and social agendas. Sustainable development relies on the principle of prevention, with renewable energies emerging as critical preventive measures against the risks associated with fossil fuel consumption. Despite legislative endeavors to promote renewable energies, challenges persist in implementation due to resource limitations and resistance from stakeholders. Overcoming these obstacles is essential for promoting sustainable energy projects and broader environmental objectives. The transition from implicit to explicit constitutional support for renewable energy has influenced political attitudes and involvement, reflecting an increasing acknowledgment of the necessity to shift away from fossil fuels for environmental conservation and economic advancement.

1. Hydrocarbons and environmental degradation

Hydrocarbons have historically served as the cornerstone of the global economy. Regrettably, the combustion of fossil fuels has had a profound impact on the environment, leading to global warming and accelerating climate change. Compounding this issue, the escalating global energy demands coincide with the gradual depletion of fossil fuel reserves. There is, therefore, an urgent need to foster the development of other sustainable and more reliable forms of energy.

Electric energy, since its inception, has stood as vital for social, industrial, and economic activities. The majority of power stations currently depend on continuous fossil fuel operations[1]. Traditional fuel products such as wood, charcoal, vegetable and animal oils have long been exploited. Other resources discovered at the start of the 21st century, such as petroleum (oil), natural gas and nuclear power, have played a prominent role in meeting the energy needs of humanity for decades.

[1]https://www.energy.gov.dz/, access 17/11/2021 at 18.30 p.m.

Most of these resources are non-renewable and forecasted to be depleted within the next 50 years. Additionally, concerns have escalated due to the emission of toxic gases and the accumulation of hazardous nuclear waste, posing serious threats to our planet.

Particularly pertinent to Algeria's context, where hydrocarbons have historically played a pivotal role in the economy, it becomes increasingly crucial to acknowledge the environmental toll exacted by their utilization. This study section aims to underscore the detrimental effects of hydrocarbons on the environment, focusing specifically on three critical phenomena: carbon dioxide (CO2) emissions, climate change, and the greenhouse effect.

2.1. Carbon dioxide (CO_2) emissions in Algeria:

In Algeria, carbon dioxide (CO2) constitutes the predominant greenhouse gas (GHG) emissions, comprising 76.1% of the total emissions. These CO2 emissions stem primarily from combustion processes, alongside process-related emissions originating from the mineral, chemical, and iron and steel industries. Methane (CH4) emissions represent 19.4% of the overall emissions in 2020. The principal sources of methane include oil and natural gas systems, contributing 51.6% to the country's total GHG emissions in the same year. Notably, the energy sector emerges as the primary contributor to GHG emissions in Algeria, attributable to fuel combustion activities and fugitive emissions from fuels as depicted in figure 1. This sector accounted for 70.3% of the total national GHG emissions in 1990, escalating to 81.5% by 2020. Further indirect emission can be linked to the burning of exported fossil fuels.

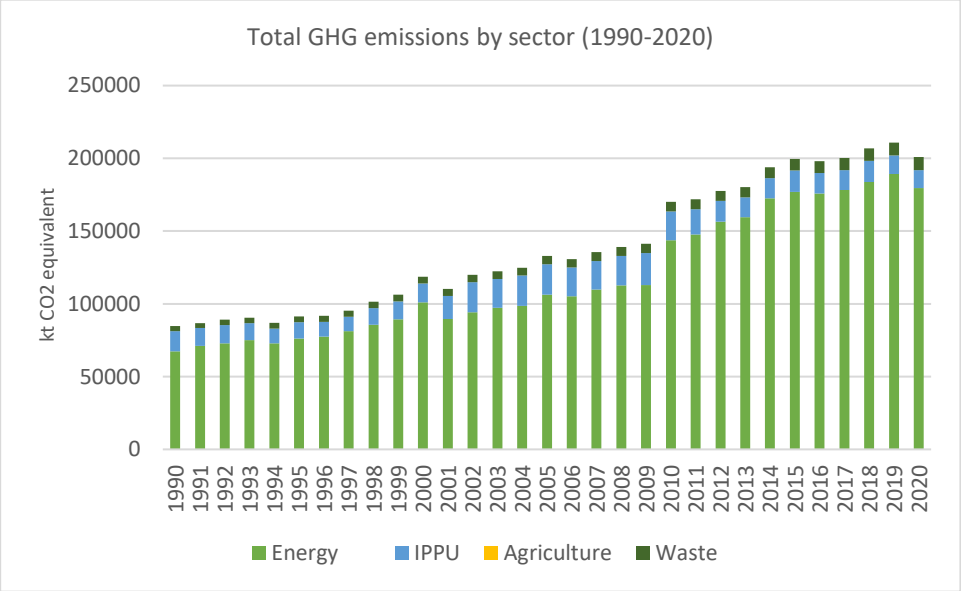

Figure 1: annual CO_2 emissions by sector in Algeria between 1990 and 2020 (own illustration from[2])

Algeria possesses a substantial and diversified reserve of conventional fossil fuels, comprising oil and natural gas, alongside a considerable potential for renewable energy resources such as solar and wind. Despite the availability and promise of renewable sources, hydrocarbons continue to hold significant prominence in the national economies of Algeria, South Africa, and Egypt. This persistence is underscored by their standing as three of Africa's foremost oil-producing nations[3,4,5].

[2]Ministry of Environment and Renewable Energy. (2023). National Inventory Report of Algeria (United Nations Framework Convention on Climate Change (UNFCCC)).

[3]Allegret, J.P., Benkhodja, M.T., 2015. External shocks and monetary policy in an oil exporting economy (Algeria). J. Policy Model. 37, 652e667. https://doi.org/ 10.1016/j.jpolmod.2015.03.017.

[4]Amri, F., 2017. The relationship amongst energy consumption (renewable and nonrenewable), and GDP in Algeria. Renew. Sustain. Energy Rev. https://doi.org/ 10.1016/j.rser.2017.03. 29.

[5]Ahmed Bouraiou and all, Status of renewable energy potential and utilization in Algeria, Journal of Cleaner Production 246 (2020), 2-16. https://doi.org/10.1016/j.jclepro.2019.

Figures 2 and 3 depict a consistent upward trend in oil consumption and CO2 emissions in Algeria from 1968 to 2022. The trend in CO2 emissions from 1990 to 2020 is an increase of 146.6%. The increasing oil consumption aligns with economic growth, reflecting a continued reliance on fossil fuels. This trend is mirrored by rising CO2 emissions, emphasizing the need for strategic measures to balance energy demands with environmental sustainability. The parallel ascent of both figures underscores the challenge of transitioning to cleaner energy sources to mitigate the environmental impact associated with fossil fuel usage.

2.

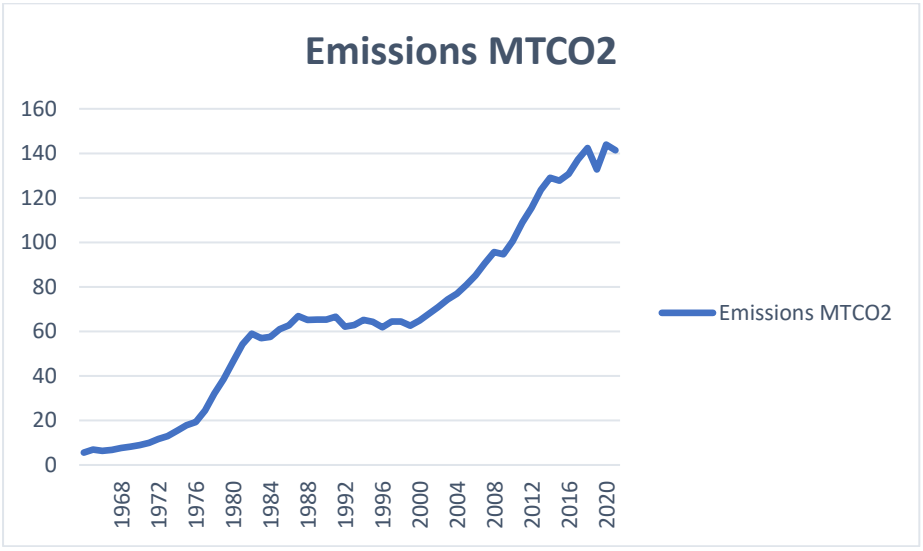

Figure 2: CO2 emissions in Algeria 1965-2022(own illustration from BP database)

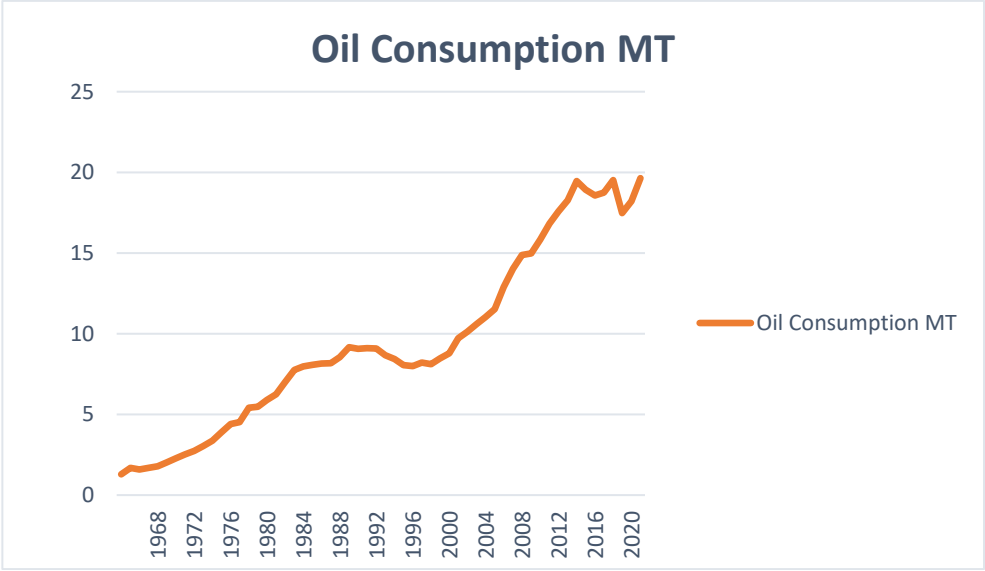

Figure 3: Oil consumption in Algeria 1965-2022(own illustration from BP data base)

Further emissions are associated with the combustion of exported fossil fuels from Algeria. This classification encompasses the environmental impacts stemming from the burning of fossil fuels beyond the national boundaries of Algeria. Understanding these indirect emissions is critical for a thorough examination of the global environmental ramifications tied to Algeria's energy exports. It underscores the intricate interplay between international trade, energy practices, and the consequential environmental effects.

Climate change in Algeria:

Climate change impacts are evident in Algeria, a country known for its arid and semi-arid climate. Over the past five decades, the nation has experienced a rise in extreme weather occurrences, exacerbating desertification and soil degradation. With the majority of its territory receiving less than 400 mm of rainfall annually, confined to a narrow coastal strip no more than 150 km wide, Algeria's Saharan region spans over 80% of its landmass, approximately 2 million km²[6]. These changes pose significant challenges for the population, potentially heightening food insecurity and impeding socio-economic progress.

1.2. The threat of irrational exploitation of hydrocarbons, sustainable development and the insufficiency of future generations

Oil is a fossil fuel with limited resources. The English geologist Colin Campbell prophesies that oil and gas production will soon decrease more and more. It was in the 1980s that humanity began to consume more oil than it discovered. Since then, despite the adoption of more sophisticated extraction technologies, the gap between supply and demand has widened. The peak production of conventional oil was exceeded in 2005, and that of all categories of oil was expected to occur around 2010.

We can see in Figure 9 that the oil depletion is estimated in the years 2125. Currently, coal resource energy beats its production record, particularly in the USA and takes a significant momentum in terms of service life.

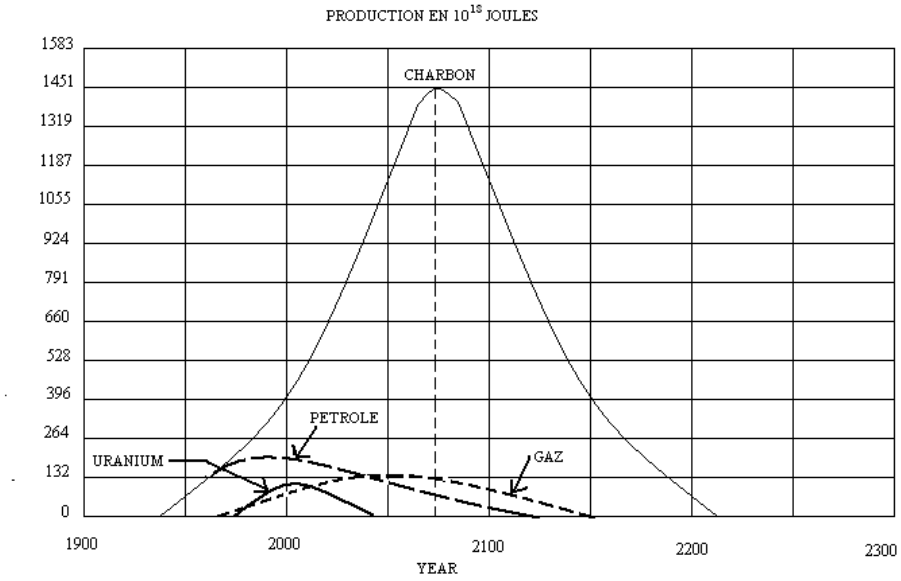

Figure .4. Global production and lifespan of fossil fuel and nuclear energy sources[7].

The development of energies must systematically adapt to demographic growth and, based on the current demand this is far from being the case. Figure 5 shows that renewable energy production is far from meeting global needs (21%).

[6]Ministry of Environment and Renewable Energy. (2023). National Inventory Report of Algeria (United Nations Framework Convention on Climate Change (UNFCCC)).

[7] Hannah Ritchie and Pablo Rosado (2020) - "Nuclear Energy" Published online at OurWorldInData.org.

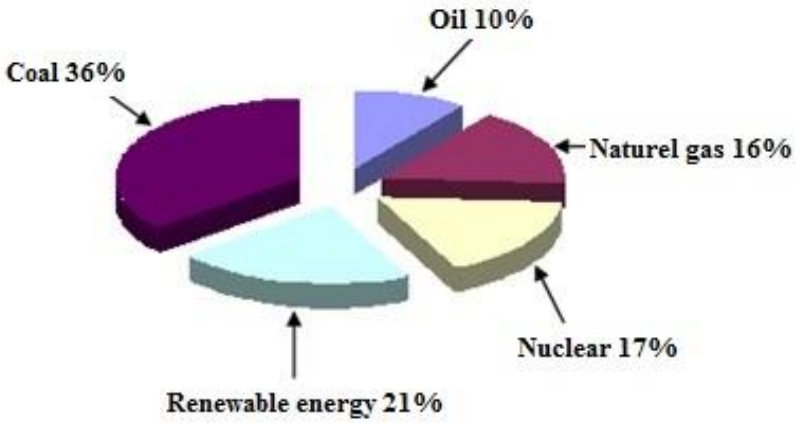

Figure .5.Total energy consumed in the world.

The International Energy Agency (IEA) has estimated that global energy demand could increase by 45% by 2030, due to demographic development and the industrialization of countries like China and India. Which alone has more than 2 billion inhabitants. Electricity consumption is expected to grow twice as fast as average energy consumption.

The reckless exploitation of fossil fuel resources, particularly hydrocarbons, has inflicted irreversible damage on our environment. Environmental degradation, exacerbated by CO2 emissions, has fueled global warming and climate change, posing significant threats to ecosystems and human well-being. Furthermore, the overconsumption of natural resources, driven by unsustainable economic growth, heightens the risk of depletion, jeopardizing our ability to meet the needs of future generations. The imperative for sustainable development has never been more pressing.

Fortunately, a solution lies in the utilization of renewable energy resources. Renewable energy sources offer a clean and sustainable alternative, mitigating environmental harm while ensuring the continued development of our current generation without compromising the needs of future ones. By harnessing solar, wind, hydro, and other renewable energies, we can transition towards a more sustainable energy paradigm, one that fosters economic prosperity while safeguarding our planet for generations to come.

2. METHODS

In order to answer our research questions, we have employed a qualitative research approach, specifically interpretive content analysis, to investigate the legal framework governing the green energy transition in Algeria. Given the complexity of legal texts and the need to delve into underlying meanings and discourses, interpretive content analysis offers a suitable methodological lens to uncover nuanced insights. The primary data source comprises legal documents, including legislation, policy documents, and governmental reports pertaining to renewable energy initiatives and environmental regulations in Algeria. Through a systematic and iterative process, we aim to identify recurrent themes, discursive patterns, and underlying ideologies embedded within these texts. Following the principles of qualitative content analysis outlined by[8] data will be coded and categorized to discern key concepts and ideological stances shaping the legal landscape of green energy transition in Algeria. The interpretive aspect of this analysis involves contextualizing legal provisions within broader socio-political and economic contexts, considering factors such as historical trajectories, political agendas, and international influences[9] on Algeria's renewable energy policies. Moreover, reflexivity will be maintained throughout the analysis, acknowledging the researcher's positionality and potential biases in interpreting legal texts. By adopting an interpretive content analysis approach, this study aims to provide a nuanced understanding of how

[8]Drisko, J. W., &Maschi, T. (2016). Content analysis. Oxford University Press.

[9]Graneheim, U. H., Lindgren, B.-M., &Lundman, B. (2017). Methodological challenges in qualitative content analysis : A discussion paper. Nurse Education Today, 56, 29-34. https://doi.org/10.1016/j.nedt.2017.06.002

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3 . THE CONSECRATION OF THE ENVIRONMENT IN THE PROVISIONS OF THE CONSTITUTION IS AN IMPLICIT CALL FOR THE USE OF GREEN ENERGY

The institutional embrace of environmental considerations within the framework of the Algerian constitution unfolded through two pivotal stages. The initial phase was characterized by the implicit acknowledgment of this theme[11], which continued with the constitutional amendments that Algeria experienced until 2016. Subsequently, the second phase manifested a blatant and direct devotion to the question of the right to the environment through the constitutional amendment of 2016 and 2020.

3.1. Consolidate the environment in the preamble of the 2016 constitutional amendment:

The constitutional amendment of 2016 signifies Algeria's commitment to reinforcing the principles of rights and freedoms, allocating them a more substantial role. Foremost among these rights is the pivotal right to the environment, serving as a foundational element for developmental pursuits. In consonance with this objective, the protection of the domain environment has been emphasized in the preamble to this amendment: "*The Algerian people remain committed to their choices in order to eliminate social differences and regional inequalities, and work to build a productive and competitive economy within the framework of development and environmental preservation*"[12] .

This statement clearly highlights a link between the preservation of the environment and sustainable development, which means reconciling sustainable social and economic development while protecting the environment. In essence, it promotes the incorporation of the environmental aspect into a developmental framework that accommodates the needs of both present and future generations. The interconnected association between "development and environment" is highlighted, where the development depends on the resources provided by the environmental sphere. Consequently, any violation of the environmental resources will impede the development process in terms of its scope and attainment of objectives. Furthermore, the imperative to refrain from depleting environmental resources necessitates contemplation of alternative renewable energies, thereby implicitly advocating a shift towards diverse forms of green energy[13].

The citizen's entitlement to reside in a healthy environment is clearly emphasized in Article 19, wherein it is stipulated that: "*The State guarantees the rational use of natural resources and their preservation for*

[10]Kohlbacher, F. (2006). The Use of Qualitative Content Analysis in Case Study Research. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, Vol 7, No 1 (2006): Learning About Risk. https://doi.org/10.17169/FQS-7.1.75

[11]Hassouna Abdel-Ghani - Ammar Al-Zoghbi, Constitution of the subject of the environment in Algeria, Journal of Legal and Political Sciences, El Wadi University, Algeria, Issue 14 October 2016, p. 111.

[12]Preamble to the Algerian constitutional amendment promulgated by Law 16-01 On 6 March 2016.

[13]El-Marakby, Legal Protection of the Environment from Pollution, Dar Al-Nahda Al-Arabiya, Egypt, 2010, p.17.

the benefit of future generations. The state protects agricultural land. The state also protects public property. The law defines the modalities for the implementation of this article "[14].

From an examination of the four paragraphs comprising this article, we note that the constitutional drafter, in the initial paragraph, dedicated attention to environment from in terms of the protection responsibilities entrusted to the state. Among the aspects of protection the rational use of natural resources is highlighted. Recognizing the strategic significance of these resources in achieving sustainable development goals, the constitutional founder explicitly emphasized, through the articulation of Article 19, the State's commitment to their preservation and not to jeopardize these resources. Furthermore, the founder articulated the need to formulate strategies ensuring the optimal utilization of these resources without compromising the rights of future generations. Preserving fossil resources, notably natural gas, which is environmentally less detrimental, through the adoption of renewable energies, is a key requirement for sustainable development. In the same vein, we can identify the implicit encouragement from the Algerian legislator to embrace alternative energies, evident in the incorporation of environmental considerations within Chapter four on rights and freedoms. Article 68 of the text reads as follows: " The citizen has the right to a healthy environment, The State works for the preservation of the environment, The law defines the duties of natural and legal persons to protect the environment".[15]

The provisions of this article indicate that the constitutional amendment acknowledges the citizen's entitlement to a healthful environment. This implicit call underscores the imperative to protect the environment from various forms of pollution, a goal achievable through the reduction of emissions and the adoption of green energy.

3.2. Consolidate sustainable development in the preamble of the 2020 constitutional amendment:

The recent constitutional amendment in 2020 has demonstrated an emphasis on environmental considerations, in contrast to the 2016 amendment and preceding constitutions. This amendment notably expanded the scope of rights and freedoms, explicitly incorporating the right to a healthful environment and decent living. This alignment with developmental requirements underscores a dedicated effort towards protecting the environment from potential hazards. A thorough analysis of the constitutional text reveals the incorporation of additional elements and principles, thereby providing the right to a healthy environment with a more comprehensive and nuanced dimension[16]. This contemporary framework intertwines various fields and rights, encompassing the right to health, access to safe drinking water, sustainable development, and the protection of key environmental sectors. The preamble to the 2020 constitutional amendment stated: "*The Algerian people adhere to their choices in order to reduce social disparities and eliminate regional inequalities, and work to build a productive and competitive economy within the framework of sustainable development. The people also remain preoccupied with the deterioration of the environment and the negative consequences of climate change, and are keen to ensure that protecting the natural environment and rational use of natural resources, as well as preserving them for the benefit of future generations. In acknowledgment of the enormous potential of the Algerian youth, their aspirations and insistence on raising the political, economic, social and cultural challenges of the country, it has become necessary to actively involve them in the process of building and preserving the interests of future generations, by guaranteeing them the formation of qualitative institutions and society''.*

[14]Article 19 of the Algerian constitutional amendment of 2016.

[15]Article 68 of the Algerian constitutional amendment of 2016.

[16]JalehSama'in, The Strategic Dimensions of the Constitution of the Right to a Sound Environment in the Framework of Sustainable Development, http://www.ech-chaab.com/ar Accessed on 9/19/2021 at 17:47.

Through a careful analysis of the first and second segments within this preamble, we see that a link has been established between preserving the environment and sustainable development. This linkage implies reconciling between sustainable social and economic development and environmental protection. In essence, it necessitates the incorporation of the environmental dimension within a developmental framework that accommodates the needs of both current and future generations—captured by the symbiotic interplay of "development and the environment". It is not possible to achieve development without relying on environmental resources, and it follows from this statement that any violation of environmental resources will have negative effects on the development process. In this context, the concept of sustainability is elucidated as the ability to satisfy present requirements without compromising the potential of future generations[17].There is no need to adopt legislation and regulations that seek to achieve a balance between development requirements, environmental protection, and building an alternative economy that goes beyond the economy that depends mainly on income from natural resources such as oil and gas.

It is imperative to enact legislative measures and regulatory frameworks aimed at achieving equilibrium among the imperatives of development, environmental conservation, and the establishment of an alternative economy divergent from the predominant reliance on revenue derived from natural resources, notably oil and gas. Algeria has already depleted half of its identified subterranean assets. This necessitates the 2020 amendment's introduction to ensure energy security and optimize the nation's resources by transitioning towards alternative energy sources[18].In Article 21 of the General Principles Governing Algerian Society Chapter Two, entitled The State, Constitution of 2020, states: "*The state ensures: the protection of agricultural lands, ensuring a sound environment in order to protect people and achieving their well-being, ensuring continuous awareness of environmental risks, rational use water, fossil energies and other natural resources, protect the environment in its land, sea and air dimensions, and take all appropriate measures to punish polluters*."

The evident implication within the clauses of this article is the acknowledgment, through the constitutional amendment, of the entitlement to a healthful environment. Simultaneously, the Algerian legislator is enjoined within the same article to streamline the utilization of fossil energies, which is an implicit call to preserve the environment from all pollutants, and this is only done by reducing emissions and gradually reducing the use of fossils and switching to renewables commonly referred to as green energy .Article 64 of Chapter One, entitled Fundamental Rights and Public Freedoms, Chapter Two of the 2020 Constitution, states: "Citizens have the right to a healthy environment within the framework of sustainable development. The law defines the duties of natural and legal persons to protect the environment"[19].

In light of the imperative to satisfy current needs without jeopardizing the resources and capacities available to future generations, the concept of sustainability necessitates a judicious equilibrium in legislative frameworks, regulations, and business models. This equilibrium is aimed at reconciling the demands of sustainable development and environmental safeguarding. Moreover, it entails the construction of an alternative economy designed to surpass the prevailing reliance on revenues derived from fossil fuel resources, notably oil and natural gas.

Algeria, having already depleted approximately 50% of its subterranean oil and gas reserves, underscores the pressing urgency for the enforcement of legislation conducive to sustainable practices. Such measures are indispensable to secure energy security and rationalize the country's resources by moving towards alternative energies.

[17] Article 04 of law n ° 03/10, relating to the protection of the environment within the framework of sustainable development.

[18] https://www.energy.gov.dz Accessed on, September 19, 2021, at 22:15.

[19] JalehSama'in, The Strategic Dimensions of the Constitution of the Right to a Sound Environment in the Framework of Sustainable Development, http://www.ech-chaab.com/ar Accessed on 9/19/2021 at 17:47.

Incorporation of the term "sustainable development" into the legislative framework, as articulated in Article 64, serves as a catalyst for the introduction of new legal measures. These measures are envisioned to delineate, among other aspects, guidelines for environmental protection within diverse policies, regulations and projects that advocate the transition from fossil fuels to renewable energies. This legislative impetus further facilitates the emergence of enterprises specializing in waste management, recycling, and environmental protection, along with the accreditation of organizations to provide financial support and national accolades for commendable research and technological innovations. In alignment with these environmental considerations and the collective engagement of various stakeholders, there exists an opportunity to foster the development and evaluation of applied and normative research in the realms of environmental science and agriculture. This initiative seeks to invigorate institutes dedicated to agricultural and environmental studies, as well as renewable energies, positioning them as strategic entities engaged in research endeavours pertinent to the country's food and energy sovereignty. Furthermore, a pivotal aspect of sustainable development entails bolstering educational programs and cultural activities that focus on crucial themes such as climate change, renewable energies, and environmental preservation. By doing so, a comprehensive and synergistic approach is undertaken to cultivate a sustainable and resilient trajectory for the nation.[20].

In addition to fostering awareness campaigns aimed at mitigating excessive energy consumption and reducing CO2 emissions, there is a pressing need to advocate for the utilization of alternative materials and environmentally friendly building materials. This approach serves the dual purpose of diminishing energy intensity and mitigating associated costs while concurrently curbing carbon emissions. The promotion of sustainable practices in construction and resource utilization becomes paramount in achieving a more environmentally conscious and energy-efficient paradigm. Henceforth, it can be asserted that the constitutional amendment of 2020, introducing the principle of "sustainable development," endeavours to propel and popularize the adoption of alternative energies as a means to attain energy security, recognizing that energy forms the cornerstone of economic development.

The constitutional provisions pertaining to environmental preservation have elevated its significance, establishing it as a constitutional value. This elevation reinforces the rights of environmental advocates, empowering associations and organizations to advocate for these rights on par with other fundamental human rights. Consequently, this dedication places environmental considerations at the forefront of constitutional concerns, mandating public authorities to acknowledge environmental factors as integral components of their political, economic, and social agendas.

3.3. An implicit call for the use of green energy in laws relating to the environment: Consecration of the principles of prevention and precaution

The formal acknowledgment of the prevention principle in international environmental law, as delineated in various international agreements and declarations, exerts a noteworthy influence on the evolution of national legislation. This influence is manifested through the encouragement of relevant public authorities engaged in environmental protection to proactively implement preventive measures.
The imperative is to establish the requisite mechanisms for safeguarding ecological resources before any harm materializes, or alternatively, to mitigate damage should it occur. This proactive approach aligns with the broader international environmental efforts and underscores the pivotal role of preventative

[20]JalehSama'in, The Strategic Dimensions of the Constitution of the Right to a Sound Environment in the Framework of Sustainable Development, http://www.ech-chaab.com/ar Accessed on 9/19/2021 at 17:47.

measures in preserving and sustaining the global ecological balance. The Algerian legislator[21], like counterparts in various legal systems, has embedded the principle of prevention as a pivotal strategy for preserving environmental resources and minimizing potential threats. This commitment is explicitly outlined in the recently enacted ecological law 10/03, the Law on Environmental Protection within the Framework of Sustainable Development, as well as in Law 20-04, the Law on the Prevention of Major Risks and Disaster Management within the Framework of Sustainable Development. Article 02/02 of law 10/03distinctly emphasizes the importance of the prevention principle in guiding efforts to preserve the environment: "*Prevention of all forms of pollution and damage to the environment, by ensuring the preservation of its components* "[22]**.**

We also find article 03/05 of the same law as mentioned above, which states: "*The principle of preventive action and the correction of environmental damage with priority at the source, by using the best techniques available at an acceptable economic cost. This is done using the best available technologies at an acceptable economic cost. Any activity that is likely to cause serious damage to the environment should take into account the interests of others before taking action*"[23] .

From the previously mentioned observations, we conclude that the Algerian legislator advocates for environmental protection and the combat against various forms of pollution through a preventative approach. This involves implementing suitable technological measures to address the inherent dangers. Implicit in this call is the encouragement to decrease reliance on fossil fuels and transition towards green energy, signifying the adoption of renewable energy sources.

In 2004, the Algerian legislator enacted an important law titled "Prevention of Major Risks and Disaster Management within the Framework of Sustainable Development." This law aims to establish a comprehensive framework for managing natural disasters and preventing them by implementing a set of preventive measures and organized procedures designed to reduce risks and protect society and the environment.

The law also stipulates in its article eight the principle of "Integrating New Technologies"[24]. It emphasizes the need for the disaster prevention system to keep up with modern technological developments in this field and to effectively incorporate these technologies whenever necessary. This principle reflects the law's commitment to updating prevention and response mechanisms, thereby enhancing the effectiveness of efforts to protect society and the environment from natural disasters and major risks

Inclusion of the environmental dimension in the development framework

Sustainable development is an imperative, emphasizing the necessity for development that satisfies the current generation's needs while preserving the capability of future generations to fulfill their own requirements. The essence of this concept lies in ensuring that the progress made by the present generation does not inflict hardship on future generations. Instead, it strives to provide them with similar conditions, ensuring equitable access to resources.[25]. This necessitates discontinuing all activities that contribute to the depletion of non-renewable resources.[26]. Achieving sustainable development requires

[21]The United Nations Framework Convention on Climate Change، approved by the United Nations General Assembly on May 09, 1992, ratified by Algeria by Presidential Decree No. 93/99 of April 10, 1993, The official journal No. 24 issued on April 21, 1993.

[22]Paragraph 02 of article 02 of law n ° 03/10, relating to the protection of the environment within the framework of sustainable development.

[23]Paragraph 03 of article 05 of law n ° 03/10, relating to the protection of the environment within the framework of sustainable development.

[24]Article 8 of Law 04/20, dated December 25, 2004, published in Official Gazette No. 84 on December 29, 2004.

[25]Karbali Baghdad and Hamdani Muhammad, Strategies and policies for sustainable development in light of economic and technological transformations in Algeria, Journal of Humanities, Faculty of Economics, No. 45, Oran University, ALGERIA, 2010, p. 10.

[26]Karbali Baghdad and Hamdani Muhammad, Strategies and policies for sustainable development in light of economic and technological transformations in Algeria, Journal of Humanities, Faculty of Economics, No. 45, Oran University, ALGERIA, 2010, p. 10.

an immediate focus on striking a balance between population growth rates and enhancing the productive potential of environmental elements.[27].

The Algerian legislator has addressed the matter of sustainable development through Law No. 10/3, specifically outlined in Article 04/04. This provision has been delineated as follows:"a concept which means reconciling between social and sustainable economic development and environmental protection, that is to say the inclusion of the environmental dimension in the framework of development guaranteeing the satisfaction of the needs of present and future generations."[28]

The relationship between the principle of prevention and sustainable development fundamentally rests on the idea that the primary aim of instituting preventive mechanisms and environmental protection measures is to realize sustainable development. This approach ensures that ecological resources are sustained to meet the needs of both current and future generations. As a result, the use of renewable energies stands out as one of the most crucial preventive measures to shield the environment from the hazards associated with the extraction and use of fossil fuels.

3.4. The legal framework and incentives directly linked to renewable energies*:*

The adoption of the legal framework favourable to the promotion of renewable energies and the construction of infrastructures relating to the production of electricity from renewable energy sources are defined mainly by executive decrees and ministerial orders[29]:

Legislation	Description
Law n° 02-01 of February 5, 2002	Liberalizes the public distribution of gas by pipeline, promotes electricity production from renewable energies, and integrates them into the electric power network
Law n° 04-09 of August 14, 2004	Promotes renewable energies within the framework of sustainable development, formulates a national program for their promotion, and establishes a national observatory.
Law n° 09-09 of December 30, 2009	Creates the National Fund for Renewable Energies and Cogeneration (FNER).
Law n° 11-11 of July 18, 2011	Amends Article 63 of Law NO. 09-09, complementing financing laws for 2011.
Law n° 14-10 of December 30, 2014	Merges the National Energy Management Fund (FNME) with the National Renewable Energies and Cogeneration Fund.
Executive Decree No. 11-423 of December 8, 2011	Sets the terms and conditions for the operation of the National Fund for Renewable Energies and Cogeneration.
Executive Decree No. 13-218 of June 18, 2013	Sets conditions for granting bonuses for diversification of electricity production.
Executive Decree No. 15-69 of February 11, 2015	Establishes procedures for certifying the origin of renewable energies and using certificates, regulated by the Electricity and Gas Regulatory Commission.
Executive Decree No. 15-319 of December 13, 2015	Sets operating procedures for the National Fund for Energy Efficiency and Renewable Energies and Cogeneration.
Executive Decree No. 16-121 of April 16, 2016	Amends and supplements Executive Decree No. 15-319 of December 13, 2015, regarding the terms of account No. 302-131.
Ministerial decree of February 21, 2008	Sets technical rules for connection to the electricity transmission network and the electrical system.
Inter-ministerial decree of April 19, 2008	Adopts regulation on "Photovoltaic module (PV) with crystalline silicon for terrestrial application."
Ministerial decree of October 28, 2012	Determines the Loire future project and expenses debited from the FNER.

[27]Abdullah Ramadan Abdullah Al-Kandari, Environment and Sustainable Development, Al-Mohanad Library, Kuwait, 1992, p. 165.

[28]Paragraph 04 of article 04 of law n ° 03/10, relating to the protection of the environment within the framework of sustainable development.

[29] https://www.energy.gov.dz/, Accessed 2018.

Ministerial decree of October 28, 2012	Specifies methods and conditions for monitoring and evaluating the FNER.
Ministerial decree of February 02, 2014	Sets guarantee of purchase prices and conditions for electricity produced from wind energy installations.
Ministerial decree of February 02, 2014	Sets guarantee of purchase prices and conditions for electricity produced from solar photovoltaic installations.
Ministerial decree of September 01, 2014	Sets purchase price guarantee and conditions for electricity produced from cogeneration installations.

Table 1: Chronological Overview of Renewable Energy Legislation in Algeria

Along with legislation outlining funding sources and procedures for monitoring, evaluating outcomes, and supervision, the operation of the fund is regulated by two approved inter-ministerial decrees in 2016. Until that date the fund had not received any deposits since its establishment in 2009 (my gas paper). In the realm of renewable energies and cogeneration, the fund is primarily funded by 1% of oil royalties. In terms of energy efficiency, the revenue is predominantly derived from state subsidies and proceeds from the national energy consumption tax, as well as taxes on energy-using devices[30].

In 2014, the feed-in tariff (FiT) program fixed 20-year contract to buy electricity from solar and wind power plants ranging from 1 to 10 MW. The lack of thorough planning for the FiT caused by resistance to change among key stakeholders, has prevented its implementation. Consequently, not a single investment proposal has been made under this initiative (CEREFE, 2020).

The feed-in tariffs set for renewable energies are based on the installed capacity and differ from phase I to phase II (phase I corresponds to the first 5 years of operation and the second phase to the remaining 15 years). The rates are determined based on the number of operating hours per year, thus, the maximum tariff corresponds to the lowest operating hours of a year and vice versa. Resistance to change among key stakeholders has led to inadequate planning for the FiT, resulting in its non-implementation. Consequently, there have been no investment proposals put forward as part of this initiative my gas paper.

In conclusion, the legal framework governing the promotion of renewable energies in this region is multifaceted, encompassing numerous laws, executive decrees, and ministerial orders over the years. These legislative measures have aimed to create a conducive environment for renewable energy projects, establishing funding mechanisms. Moreover, despite efforts to regulate funding and operations, challenges persist in the implementation of initiatives for renewable energy and cogeneration. Limited deposits and resistance to change among stakeholders have hampered progress, leading to the failure of key programs such as the feed-in tariff initiative. Addressing these hurdles is essential for advancing sustainable energy projects and achieving broader environmental goals.

3. Examples of countries that took the same path

Algeria was not the only country to transition to renewable energies and protect the environment. It followed the example of major countries around the world. Some of these countries include:

4.1 Qatar

Investment in green energy in Qatar

Qatar is considered one of the small countries that has been able to achieve remarkable economic success in a short period of time through its reliance on the energy sector. Because of the political strategy and statecraft that have supported its rapid growth and diversification, Qatar has exhibited the characteristics of a "late-stage petro-developmental state"[31]. But as we mentioned earlier, one of the most prominent

[30]Ministry of Energy and Mines، Renewable Energy Guide, ALGERIA, p. 36.

[31] Wright, S. (2021). Conceptualising Qatar's political economy as a developmental state. Springer

drawbacks of oil energy is that it is non-renewable and pollutes nature. Saudi Arabian Minister of Oil, Sheikh Ahmed Zaki Yamani said: 'The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil"[32] For this, Qatar had to find a solution to this and move to renewable energies. The transition towards renewable energy is also a systematic and fundamental change within the global system on environmental, political, cultural, and social levels. Let us keep in mind that switching to the use of renewable energies does not mean completely dispensing with oil energy, but rather reducing dependence on it. Qatar has been programmed to use solar energy to provide 20% of its electricity by 2030[33]. According to the 2016–2020 growth plan, Qatar has set aside $30 billion for infrastructure investment. Over the next five to seven years, more than 700 legacy projects involving technology, solar energy, and other cross-cutting infrastructure projects will be designed and completed[34]. Many solar projects in Qatar are under construction, these projects comprise a 200-megawatt solar farm.

Qatar legislation to protect the environment

Qatar is considered one of the countries that have paid attention to the environment, as its constitution contains several laws in this regard, including the following, in article 33 of 2003 the state 'endeavours to protect the environment and its natural balance, to achieve comprehensive and sustainable development for all generations'[35]. Additionally, in Qatar's law No 30 we find article 6 which mandates that all public and private entities include a clause about environmental protection and pollution control in any local or international agreements or contracts that may have an adverse effect on the environment. These agreements or contracts must also include the obligation to pay for the costs of fixing any environmental harm or degradation as well as any applicable penalties.

Considering that Islam is the religion of the State of Qatar, we also find in its constitution the teachings of this religion that call for caring for and preserving the environment, as an example of this, we mention from what we find in this constitution that: the khalifa is responsible for governing resources for the benefit of future generations[36]. Based on these core Islamic values, new green finance models have been established to help modernize almsgiving, or waqf and zakat, in Qatar in particular.

4.2 Germany

Investment in green energy in Germany

Germany is one of the major economic countries. It contributes a large percentage to the global economy, so we would like to provide a brief overview of its energy field. When it comes to the energy transition, Germany is usually regarded as a pioneer[37]. This country has established a comprehensive climate protection plan with the goal of reducing GHG emissions by 40% from 1990 levels by 2020 and then by 80–95% by 2050 0 to 95%[38]. Germany has significantly advanced the global technological development of wind power, photovoltaics, and the related cost depression with its government support program for

[32] Fagan, M. (2000). Sheikh Yamani predicts price crash as age of oil ends. The Telegraph.

[33] General Secretariat for Development Planning, 2008; Government of Qatar, 2011a

[34]Olawuyi, D. (2018b). Human Rights and the environment in Middle East and North African (MENA) Region: Trends, limitations and opportunities. In J. May & E. Daly (Eds.), Encyclopedia of Human Rights and the environment, indivisibility, dignity and legality (pp. 483–493). Edward Elgar.

[35]Olawuyi, D. (2018b). Human Rights and the environment in Middle East and North African (MENA) Region: Trends, limitations and opportunities. In J. May & E. Daly (Eds.), Encyclopedia of Human Rights and the environment, indivisibility, dignity and legality (pp. 483–493). Edward Elgar.

[36]Olawuyi, D. (2022c). Environmental law in Arab States. Oxford University Press.

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[38] BMU (Federal Ministry of the Environment Nature Conservation and Nuclear Safety), 2016. Climate Action Plan 2050: Principles and goals of the German government's climate policy 2016. Available online: https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutzplan_2050_en_bf.pdf, accessed on 10 2018.

renewable energies[39]. Moreover, the German government has a track record of promoting the global spread of renewable energy, and the Renewable Energy Act (German: Erneuerbare-Energien-Gesetz, abbreviated: EEG) serves as a model for other nations[40].

Germany established a strategy in 2010 to accomplish its energy transition, including short- and long-term goals for the years 2020, 2030, and 2040, as well as a goal to increase the share of renewable energy in power consumption by 80% by the year 2050. Currently referred to as the German energy transition (the so-called Energiewende), this policy is an integrated framework encompassing all areas of the economy and energy. On the other hand, this energy transformation was initiated much earlier with the establishment of set feed-in tariffs for renewable energy. The Energiewende in Germany exposes differing perspectives about objectives and ranking; the decrease of CO2 emissions, advancement of renewable energy, elimination of nuclear power, and enhancement of energy efficiency were essentially acknowledged as motivating factors and objectives[41]. The German government approved the Climate Action Plan 2050 in November 2016, making Germany one of the first nations to submit the long-term Climate Action Plan 2050 to the UN as required by the Paris Agreement. This marks Germany's achievement of low GHG emissions. To achieve its 2050 climate goals, it specifically set a target for lowering GHG emissions generally and across different economic sectors. In his maiden speech to parliament in March 2018, Germany's new Federal Minister for Economic Affairs and Energy, Peter Altmaier, stated succinctly that "the Energiewende will succeed if we make progress with the grid extension." The main achievement of the energy transition to far has been the quick rise in renewable power generation, which in early 2019 accounted for about 40% of Germany's electricity consumption, up from 3.2% in 1991[42].

[39] Lutz, L.M., Fischer, L.B., Newig, J., Lang, D.J., 2017. Driving factors for the regional implementation of renewable energy - A multiple case study on the German energy transition. Energy Policy 105, 136–147

[40]Quitzow, R., Roehrkasten, S., Jaenicke, M., 2016a. The German Energy Transition in International Perspective. IASS Studies Available online: https://www.iasspotsdam.de/, accessed on 10 20

[41] Gabriel, S., 2014. EEG-Reform-MitallenBeteiligtenreden und das Gemeinwohl in den Mittelpunktstellen. Available online: https://www.erneuerbareenergien.de/EE/Redaktion/DE/Videos/2014_01_21_rede_gabriel_ jahrestagung_handelsblatt.html, accessed on 10 Oct 2018.

[42] ZSW (ZentrumfürSonnenenergie- und Wasserstoff-ForschungBadenWürttemberg), 2017. Erneuerbaren-Anteilliegt 2017 beiüber 36 Prozent. Available online: https://www.bdew.de/, accessed on 10 2018

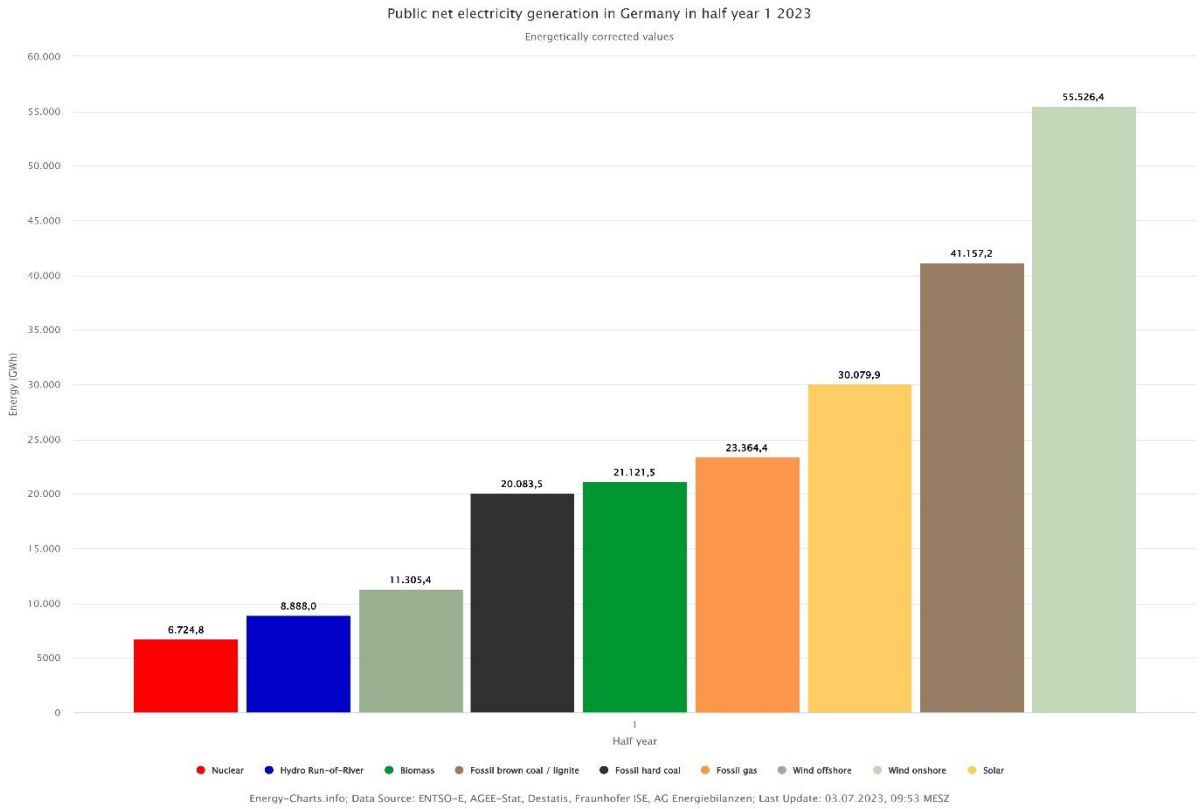

Figure .6. public net electricity generation in Germany in half year 1 2023

The previous figure shows the public net electricity generation in Germany in half year 1 2023, from this figure we can see that in this country wind energy represents the largest share of energy sources, followed by solar energy, and we find less reliance on hydro run-river and biomass energy.

Germany's legislation to protect the environment

Energy-related concerns gained center stage, but the new German administration was already committed to making significant progress toward climate and energy reforms before Russia launched its war against Ukraine. The war has prompted the Economy and Climate Ministry to present a wealth of amendments to existing laws and funding schemes even faster than planned. In what follows, we cite the major elements of the legislative packages proposed by the government and their status in the legislative process[43]:

- Relief for power consumers: abolishing the renewables levyAmong the first measures to be introduced, the federal parliament has already changed the Renewable Energy Act (EEG) and abolished the renewables surcharge that consumers pay on the power price.
- Building Code The government proposed rules that favour hydrogen production near wind parks, and would allow states to easily install renewables facilities on former open pit mines.
- New energy efficiency law The government is set to propose an energy efficiency law. Energy efficiency targets are set for 2030, 2040 and 2045 for primary and final energy, which correspond with the requirements of the current European Commission proposal for the amendment of the EU Energy Efficiency Directive.
- Industry The BMWK (Federal Ministry for Economic Affairs and Climate Action) is preparing a funding guideline that starts a program for Carbon Contracts for Difference (CCfD) for industry.

[43]https://www.cleanenergywire.org/factsheets/germanys-2022-renewables-and-energy-reforms Nouvember,2023

This is to facilitate the introduction of climate-friendly processes in primary industries, to reduce their risks and operating costs, and to improve efficiency.

4.3 China

Investment in Green Energy in China

China is considered one of the largest countries in terms of area and population, so we must give it importance in our research and be interested in studying its energy field and its use of renewable energies while talking about the strategies taken to protect the environment.

Hundreds of millions of people have been pulled out of poverty by China's spectacular economic growth over the past 40 years. The nation is now a global leader in many industries and contributes one-third of the world's carbon dioxide (CO2) emissions, making it the greatest emitter in the world. More than half of the world's steel and cement are produced in China, although the country's overall CO2 emissions are greater than those of the European Union.

China wants to become carbon neutral by 2060 and reach a peak in its CO2 emissions before 2030. Nearly 90% of China's greenhouse gas emissions originate from the energy sector, making energy policy a key component of the nation's move toward carbon neutrality. China's shift to sustainable energy has advanced substantially, but there are still major obstacles in the way. More than 60% of electricity is produced by coal, and China is still developing new coal-fired power plants on its own soil. China has surpassed all other nations in the addition of solar power capacity year after year. Although it is the world's second-largest oil consumer, 70% of the world's capacity for producing batteries for electric vehicles is located there.

China's renewable energy capacity in 2018 ranked first globally, at 404 GW, according to the "Renewable 2018 Global Status"[44]. Major renewable energy power generation in China has an installed capacity of 72,896 kw, up 12% from the previous year and making up 38.4% of the country's total installed capacity. Globally, hydropower and wind power had the highest installed capacities, while solar photovoltaic power had the second-highest installed capacities[45]. Figure 7 shows Installed renewable energy capacity in China in GW per year. We can notice that China relies in its electricity production to a high degree on hydro energy, and its reliance on wind energy comes in second place. We also note that in recent years, China has become dependent in its electricity production on wind and solar energy in similar proportions.

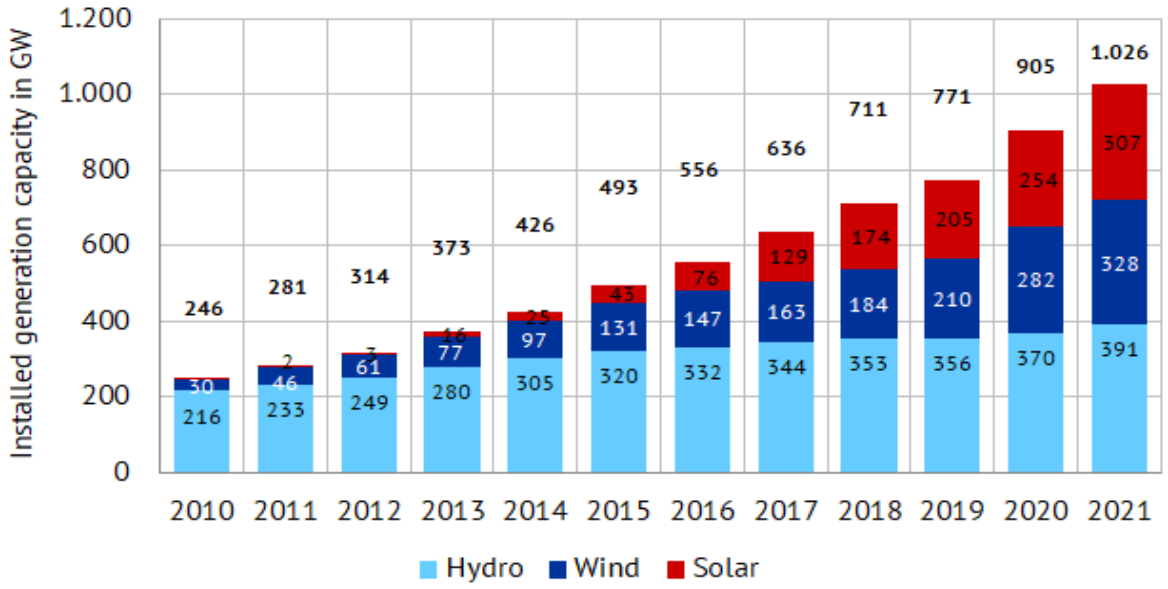

Figure .7. Installed renewable energy capacity in China in GW per year[46]

[44] RENEWABLE 2018 GLOBAL STATUS REPORT

[45] Jian Ying and Liu Wenbo 2020 IOP Conf. Ser.: Earth Environ. Sci. 510 032026

[46] Energy Brainpool

China's legislation to protect the environment

The Chinese government has enacted articles and laws with the aim of maintaining a clean environment and using renewable energy, and among these laws, we will mention the following

- The Law is enacted in order to promote the exploitation of renewable energy, increase energy supply, improve the energy structure, ensure energy safety, protect the environment, and attain the sustainable development of the economy and society.[47]
- In article 2 of the renewable energy law of the people's Republic of China we find that the application of this law to hydropower generation shall be subject to regulation by Energy Administration department under the State Council and approval by the State Council. This Law is not applicable to the utilization of straw, firewood, excrement, etc. through direct burning in low-efficiency stoves.
- In energy development, the State gives first priority to the exploitation of renewable energy and promotes the establishment and expansion of the market for renewable energy by setting objectives for the total volumes of the renewable energy to be exploited and taking appropriate measures[48].
- For drawing up a plan for the exploitation of renewable energy, opinions of the relevant units, specialists, and the public shall be solicited, and scientific demonstration is necessary[49].

5. **Discussion**

The evolution from implicit to explicit constitutional support for renewable energy, as seen in the transition from the 2016 to the 2020 constitution, has had a noticeable impact on political will and engagement in renewable energy projects in Algeria. The increased emphasis on renewable energy in the constitution reflects a growing recognition of the importance of transitioning away from fossil fuels and towards sustainable energy sources. This shift is motivated by the desire to preserve fossil fuels for future generations as mentioned in the constitution. In the short-term reducing the internal use of gas and save it for export is the motivation of Algerian energy policy deciders. Still, it's important to approach gas export opportunities with caution, recognizing that European demand may not be a long-term solution due to their commitment to carbon neutrality by 2050. It's essential to consider the implications for future generations and ensure that renewable energy initiatives are pursued with a long-term perspective in mind.

Ensuring public awareness of the entitlement to a healthy environment is paramount, necessitating a concerted shift away from fossil fuel reliance. Fundamental to this transition is the dissemination of knowledge concerning energy democracy principles, fostering an understanding among policymakers and citizens alike. Embracing bottom-up decision-making processes at the institutional level is imperative, acknowledging the inherent right of the populace to engage in energy-related discourse. Such inclusive practices not only uphold democratic values but also in still a sense of collective responsibility towards sustainable energy transitions.

The energy transition should be viewed not merely as an environmental necessity, but as a pivotal avenue to reconfigure economic development and diminish reliance on oil and gas revenues. Despite the presence of legal frameworks, their execution frequently encounters delays, underscoring the imperative for robust monitoring and enforcement mechanisms, particularly within investment spheres, while concurrently holding polluters accountable through punitive measures. Implementation of such measures holds the potential to foster trust among governmental entities, the populace, and both

[47] Article 4 Renewable Energy Law of the People's Republic of China Adopted at the 14th Meeting of the Standing Committee of the Tenth National People's Congress on February 28, 2005

[48] Article 1 Renewable Energy Law of the People's Republic of China Adopted at the 14th Meeting of the Standing Committee of the Tenth National People's Congress on February 28, 2005

[49] Article 9 Renewable Energy Law of the People's Republic of China Adopted at the 14th Meeting of the Standing Committee of the Tenth National People's Congress on February 28, 2005

national and international investors. By rigorously adhering to constitutional recommendations and regulations, trust can be restored, thereby ensuring the efficacy of the transition away from fossil fuels, both from environmental and economic standpoints.

Internationally, there is a growing demand for just transition funds to support oil and gas-dependent economies in their transition towards sustainable energy models. This acknowledgment reflects the global imperative for achieving sustainable energy transitions and combating climate change. Should Algeria demonstrate a genuine commitment to reducing emissions, it stands to benefit from access to international climate action funds. This incentivizes proactive efforts towards environmental stewardship, offering an opportunity for Algeria to contribute meaningfully to global sustainability initiatives while also addressing its own energy needs.

CONCLUSION AND POLICY RECOMMENDATION

The world is in general, and Algeria in particular, are facing serious significant and different climate challenges resulting from greenhouse gas emissions, which have led to dangerous phenomena and global warming, posing a danger to the planet, environment and living organisms. Algeria is among the largest contributors to CO2 emissions in the African continent because its economy is entirely reliant dependent on fossil fuels.

The provisions outlined in the 2016 constitution mark a pivotal acknowledgment of citizens' entitlement to a healthful environment. While implicit, this call underscores the imperative to safeguard the environment from various forms of pollution, an achievable goal through emission reduction and the adoption of green energy practices. However, it's in the 2020 constitution where environmental preservation is significantly elevated, now established as a constitutional value. This elevation not only reinforces the rights of environmental advocates but also empowers associations and organizations to advocate for these rights on par with other fundamental human rights. Consequently, this dedication places environmental considerations at the forefront of constitutional concerns, mandating public authorities to acknowledge environmental factors as integral components of their political, economic, and social agendas.

The relationship between the principle of prevention and sustainable development is fundamental, as it aims to realize sustainable development through the preservation of ecological resources for both current and future generations. Thus, the use of renewable energies emerges as one of the most crucial preventive measures to shield the environment from the hazards associated with fossil fuel extraction and use.

However, despite the legislative efforts to promote renewable energies, challenges persist in implementation. The legal framework governing renewable energy promotion aimed at creating a conducive environment for renewable energy projects and establishing funding mechanisms. Nonetheless, limited deposits and resistance to change among stakeholders have hindered progress. Addressing these hurdles is paramount for advancing sustainable energy projects and achieving broader environmental objectives.

The evolution from implicit to explicit constitutional support for renewable energy, evidenced by the transition from the 2016 to the 2020 constitution, has significantly influenced political will and engagement in renewable energy projects in Algeria. This shift reflects a growing recognition of the imperative to transition away from fossil fuels towards sustainable energy sources, motivated by the desire to preserve resources for future generations and capitalize on gas export opportunities. However, caution is warranted due to European commitments to carbon neutrality by 2050. Meanwhile, public awareness of environmental entitlements is crucial, necessitating a shift from fossil fuel reliance and fostering understanding of energy democracy principles. Embracing inclusive decision-making processes at the institutional level is vital, alongside robust monitoring and enforcement mechanisms to hold polluters accountable and restore trust among stakeholders. Internationally, demand for just transition funds highlights the global imperative for sustainable energy transitions, offering Algeria an opportunity

to demonstrate commitment to emissions reduction and access international climate action funds, thereby contributing to global sustainability efforts while addressing domestic energy needs.

Besides the efforts made to promote the development of renewable energies, Algeria requires additional reforms based on the following points:

• Convince Engineering businesses and technologists on the importance of developing and investing in renewable energies technologies.

• Improvement of the regulatory framework to facilitate the implementation of Algerian renewable energy programs.

• Promote and facilitate medium and long-term private investments in the field of renewable energies.

• Support and encourage initiatives such as the Mediterranean Solar Energy Plan (MSP) and DESERTEC to connect the Middle East and North Africa (MENA) to Europe and transport electricity from the south to the northern Mediterranean countries via HVDC links.

• Issue illustrative laws and regulations indicating the terms and conditions for connecting different sources of renewable energy to the electricity grid, especially those owned by individuals, to sell electrical energy. This initiative will undoubtedly attract foreign investment in such projects.

Finally, to conclude, preserving environmental safety from the numerous risks, particularly those associated with the use of fossil fuels, and ensuring the sustainability of natural resources require the strict application of measures and legal provisions. This is especially crucial for a country like Algeria, which has abundant and diverse renewable resources, enabling it to export electricity to European countries. However, the multiplicity and diversity of laws and prevention and protection systems are not sufficient if this intervention is not supported by a strict institutional framework.

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