

Algeria's Energy Transition in the Face of Climate Change: An Analysis of Legislative Dimensions and International Commitments

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Abstract:

This study aims to analyze Algeria's energy transition strategy in the context of climate change, examining both international legal frameworks—such as the 2015 Paris Agreement—and national ones, notably Law 04-09 on the promotion of renewable energies. The strategy faces significant challenges, most notably fragmented responsibilities, poor coordination, infrastructure deficiencies, funding shortages, a lack of skilled personnel, and a reliance on foreign technology.

To address the research problem, the study employs a descriptive methodology based on the analysis of legal texts. Key findings indicate the emergence of a promising framework and serious political will regarding structural projects; however, these are countered by a gap between ambition and reality, as well as the modest contribution of renewable energy to the national energy mix. The study recommends streamlining procedures, establishing an independent authority, and supporting university research to localize clean technology.

Keywords: Energy transition – Climate change – Legal framework – Institutional framework – Projects and programs.

Introduction:

Climate change has emerged as a paramount environmental and security challenge in recent decades, making the energy transition toward clean sources a mandatory pathway dictated by international instruments—foremost among them the 1992 UN Framework Convention on Climate Change and the 1997 Kyoto Protocol. This international trajectory culminated in the 2015 Paris Agreement, which Algeria ratified via Presidential Decree No. 16-262, committing to reduce its greenhouse gas emissions by 7% to 22% by 2030.

This strategy holds particular significance for Algeria; despite possessing vast fossil fuel resources and ranking among the world's top nations for natural gas reserves, the country faces the challenge of transitioning to alternative energy sources. The Algerian legislator has supported this shift through a national legislative framework that began historically with Law No. 04-09 on the promotion of renewable energies within the context of sustainable development and Law No. 03-10 on environmental protection within the context of sustainable development. This process ultimately led to the explicit constitutional recognition in the 2020 constitutional amendment—which enshrined renewable energy within the

Parliament's core legislative competencies—and was further bolstered by the incentives and guarantees established in the new Investment Law No. 22-18. This research paper highlights the responsiveness of the Algerian legislative system to climate change, specifically within the framework of Law 04-09 and the international obligations arising from the Paris Agreement. Its practical significance lies in analyzing the stark paradox and significant gap between the theoretical framework of these legal texts—such as the fiscal and real estate incentives in Investment Law 22-18 or the mandatory energy audit mechanisms in Law 99-09—and the reality of practical implementation regarding the adoption of renewable energy across Algeria's various development sectors and the need to overcome its currently low contribution to the energy mix.

Accordingly, the following research problem is posed:

To what extent does Algeria's energy transition strategy constitute an effective and comprehensive response to climate change, given the prevailing international obligations and national legislation?

This central problem gives rise to the following sub-questions:

1. What is the international legal framework for energy transition?
2. How is the energy transition in Algeria defined across legal frameworks, institutional structures, and implementation programs?

To address the dimensions of the research problem and explore its associated questions, the following study structure, comprising two main sections, has been adopted:

- Section One: The International Legal Framework for Energy Transition.
 - o Requirement 1: International obligations regarding climate change mitigation.
 - o Requirement 2: International principles governing energy transition.
- Section Two: Energy Transition in Algeria: Legal Frameworks, Institutional Structures, and Implementation Programs.
 - o Section One: The legal and institutional framework for energy transition in Algeria.
 - o Section Two: Implementation programs and field projects for energy transition in Algeria.

To address this issue and achieve the desired scientific findings, a descriptive-analytical approach was adopted, based on an analysis of international and national legal texts and regulatory decrees governing the renewable energy and energy efficiency sectors.

Chapter One: The international legal framework for energy transition

Various international actors have focused on the threats posed by climate change, viewing the use of renewable energy as the optimal solution to mitigate environmental impacts and achieve sustainable development.

Renewable energy is defined as natural resources possessing the characteristic of self-renewal—meaning their reserves are inexhaustible regardless of consumption levels and are permanently available. Key sources include solar energy, hydropower, wind energy, geothermal energy, biomass energy, and nuclear energy.

This international interest has been manifested through numerous global environmental conferences focused on climate change; the most significant of these will be discussed below.

Section One: International Obligations Regarding Combating Climate Change

International agreements serve as the fundamental reference point for energy transition policies in Algeria; the country was among the first to ratify numerous international environmental agreements concerning the climate, as well as international protocols defining its responsibilities in combating climate change. Below, we address the most significant of these agreements, along with the various monitoring and follow-up mechanisms.

Subsection One: Key International Agreements

Algeria has ratified numerous international environmental agreements—particularly those concerning climate change—the most important of which are:

First: The 1992 United Nations Framework Convention on Climate Change (UNFCCC)

1. Content of the 1992 United Nations Framework Convention on Climate Change:

The United Nations Framework Convention on Climate Change was adopted in 1992, having been negotiated at the Earth Summit in Rio de Janeiro that same year, and entered into force in 1994. Ratified by 197 countries, the Convention enjoys near-universal membership. Consequently, it serves as the parent agreement for the 2015 Paris Agreement, the 1997 Kyoto Protocol, and other climate-related accords. The Algerian legislator ensured its incorporation into domestic law through Law No. 03-10. The primary objective of this Convention is to stabilize greenhouse gas concentrations in the atmosphere at a level that

prevents dangerous or disruptive human interference with the climate system, thereby allowing ecosystems to adapt and regenerate naturally. Consequently, the Convention serves as an international framework for combating climate change through international cooperation aimed at reducing greenhouse gas emissions.

2. The role of the United Nations Framework Convention on Climate Change (UNFCCC) in achieving the energy transition:

The role of the UNFCCC can be outlined as follows:

- o The Convention's primary goal—stabilizing greenhouse gas concentrations—necessitates a fundamental transformation of global energy systems.

- o Establishing principles for a "just transition," such as the principle of "common but differentiated responsibilities," which mandates that developed nations lead the energy transition, and the principle of differentiating between countries based on their respective capabilities, national circumstances, and development goals.

- o Creating institutional frameworks, such as the Conference of the Parties (COP)—serving as a permanent platform to enhance energy-related ambition—as well as establishing financial and technological mechanisms to support the shift toward clean energy.

- o Laying the groundwork for reporting and monitoring by requiring nations to submit national reports on energy policies and emissions, and establishing a transparency system regarding climate change mitigation measures.

- o Paving the way for subsequent agreements by establishing the legal framework that led to the Kyoto Protocol and the Paris Agreement, and by positioning the energy transition as a central focus of international climate negotiations.

II: The 1997 Kyoto Protocol.

1. Content of the 1997 Kyoto Protocol:

The Kyoto Protocol is an agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC); it aims to commit industrialized nations to reducing greenhouse gas emissions by 5.2% below 1990 levels by 2012. The Protocol imposed legally binding obligations on developed countries to reduce their collective greenhouse gas emissions by 5.2% below 1990 levels during the first commitment period (2008–2012).

The 1997 Kyoto Protocol is considered the international community's first serious attempt to curb greenhouse gas emissions. Unlike the Framework Convention, the Protocol sought to establish specific obligations and commitments. It outlined two types of obligations—those applicable to all nations and those specific to developed nations—based on the principle of "common but differentiated responsibilities." It also introduced market-based economic mechanisms enabling joint action by states to reduce greenhouse gas emissions, serving as a complement to domestic measures taken to protect the environment from the impacts of climate change.

2. The Role of the Kyoto Protocol in Achieving Energy Transition

The Kyoto Protocol remains a milestone, as it laid the legal foundation for collective climate action and paved the way for market mechanisms that continue to shape global energy transition policies today. The Kyoto Protocol introduced additional, complementary measures to national programs to assist developed nations in meeting their obligations under the Protocol. It established three flexible mechanisms—Joint Implementation, the Clean Development Mechanism, and Emissions Trading—to help countries reduce their greenhouse gas emissions.

Third: The 2015 Paris Climate Agreement

1. Content of the 2015 Paris Climate Agreement:

Algeria ratified the agreement in 2016 and formalized it through Presidential Decree 16-262. Under this agreement, Algeria committed to reducing its greenhouse gas emissions by 7% by 2030; this figure could rise to 22% subject to the provision of international support.

2. The role of the 2015 Paris Climate Agreement in achieving energy transition:

The Paris Agreement serves as a key driver for the global energy sector transition by:

- o Aiming to limit the rise in global temperature to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C, thereby significantly reducing the risks and impacts of climate change.
- o The agreement operates on a five-year cycle of increasingly ambitious climate action, requiring each country to submit a specific national climate plan—known as a Nationally

Determined Contribution (NDC)—and to report on the measures it will take to reduce greenhouse gas emissions and adapt to the impacts of climate change.

- o To address global climate change, the 2015 Paris Agreement facilitates the provision of \$100 billion in annual climate finance from developed to developing nations to assist them in adapting to climate change and transitioning to renewable energy; it also establishes a framework for transparent monitoring and reporting on countries' targets and progress.

- o Directing investments toward clean energy through ambitious emission-reduction targets and regular review mechanisms; the agreement sends a clear signal to markets and governments regarding the necessity of shifting from fossil fuels to renewable energy sources, such as solar and wind power.

- o Activating national plans, as NDCs drive countries to formulate clear strategies and investment plans for the energy sector, thereby fostering the development of renewable energy infrastructure and accelerating the pace of the energy transition on the ground.

- o Working to accelerate the pace of phasing out fossil fuels; implementation assessments—such as the Global Stocktake—indicate a need to hasten action. This has led to explicit calls at subsequent climate conferences, such as COP28, for governments to accelerate the transition away from fossil fuels.

1. The Paris Climate Agreement and the Energy Transition in Algeria:

Although the Paris Agreement is a global framework, its national-level implementation presents numerous challenges, particularly for countries heavily reliant on oil and gas, such as Algeria. Nevertheless, Algeria has compelling reasons to pursue an energy transition, most notably:

- o Economic Drivers for Transition: For Algeria, the energy transition is a primary objective for breaking free from dependence on oil and hydrocarbons; oil and gas account for 93.6% of export revenues and 50% of the national budget.

- o A Multi-Front Challenge: Algeria faces a threefold challenge: economic reliance on hydrocarbons, rising domestic demand for electricity, and obligations under long-term export agreements. This highlights the practical complexities of achieving an energy transition while simultaneously adhering to the goals of the Paris Agreement.

- o Equity in Transition: A just energy transition must go beyond mere emissions reduction; it must safeguard people's rights to resources and strive for socio-economic equity across current and future generations, thereby achieving sustainable development.

Section Two: International Mechanisms for Monitoring and Tracking the Energy Transition. International climate agreements have established various monitoring and follow-up mechanisms to ensure their objectives are met; these mechanisms play a pivotal role in driving the global energy transition. Algeria is subject to the international oversight mechanisms stemming from the agreements it has ratified, submitting periodic reports on the progress made in implementing its Nationally Determined Contributions (NDCs). It also benefits from the mechanisms of the Green Climate Fund, which has allocated financing for climate change adaptation projects in Algeria—initiatives we will detail below:

First: Planning and Commitment Mechanisms

Nationally Determined Contributions (NDCs) are a fundamental component of the Paris Agreement, requiring each country to submit a detailed national plan every five years. These plans outline measures to reduce greenhouse gas emissions, set targets for adapting to climate impacts, and detail strategies for transitioning to renewable energy systems. Once finalized, these plans are officially submitted to the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), thereby becoming formal, public documents of commitment. This mechanism compels nations to formulate clear energy policies and stimulates both domestic and foreign investment in clean energy sectors.

Second: The Comprehensive Assessment Mechanism

The Global Stocktake serves as a mechanism for the collective and periodic assessment of progress toward achieving the goals of the Paris Agreement. Conducted every five years with the participation of all parties, this process reviews and evaluates collective progress in the areas of emissions mitigation and climate adaptation. It involves analyzing the effectiveness of Nationally Determined Contributions (NDCs)—including plans related to the energy transition—thereby highlighting the gap between current commitments and scientifically required action regarding renewable energy. This creates international and diplomatic pressure on nations to raise their ambitions in future rounds of NDCs.

Third: Scientific Monitoring and Assessment Mechanisms

The monitoring process relies on independent scientific reports issued by specialized UN bodies, including:

1. The Intergovernmental Panel on Climate Change (IPCC): It provides comprehensive assessment reports offering the latest scientific knowledge on renewable energy sources, their costs, and their effectiveness in reducing emissions. These reports form the scientific basis for decision-making in international negotiations.

2. The United Nations Environment Programme (UNEP): It issues two key periodic reports: the *Emissions Gap Report* and the *Adaptation Gap Report*. The first measures the disparity between countries' current commitments and scientifically required emissions pathways, highlighting the role of the energy sector transition. The second evaluates the effectiveness of national adaptation plans and underscores the need to finance resilient clean energy projects. 3. World Meteorological Organization (WMO): Global State of the Climate reports provide reliable, periodic data on atmospheric greenhouse gas concentrations, offering tangible evidence of the urgent need for an energy transition.

Fourth: Financial and Technical Support Mechanisms

Financing mechanisms serve as a practical oversight tool, as the provision of support is linked to adherence to energy transition standards. The Green Climate Fund (GCF), for instance, is a key mechanism of this kind. Its official website allows for the tracking of funding allocated to renewable energy and energy efficiency projects across various developing countries, thereby ensuring transparency regarding how international funds are translated into concrete actions on the ground.

Algeria benefits from the Clean Development Mechanism established under the Kyoto Protocol—having registered 15 projects by 2023—and also receives funding from the Global Environment Facility (GEF), which has allocated \$40 million to renewable energy projects in southern Algeria.

Fifth: Transparency and Knowledge-Sharing Tools

Open data platforms foster transparency and enable oversight by civil society and relevant stakeholders. Platforms such as climate tracking tools allow for comparisons between the energy goals and strategies of different nations. Furthermore, tools like the Global Coal Plant Tracker provide precise data on coal-fired power plants worldwide, aiding in the monitoring of progress toward transitioning away from this polluting energy source.

Requirement Two: International Principles Governing the Energy Transition

Energy transition policies are grounded in a set of international principles that form the legal framework for this transition. They also necessitate mechanisms for international renewable energy financing, which are discussed below.

Section One: International Environmental Law Principles Underpinning the Energy Transition

Algeria's energy transition is based on several environmental principles established at the 1992 Rio Earth Summit and enshrined in Law No. 03-10—specifically in Article 3. The most significant of these are:

First: The Principle of Biodiversity Conservation

The principle of biodiversity conservation and the energy transition are closely linked, as both rely on the principles of sustainable development. Transitioning to renewable energy reduces pollution caused by fossil fuels, thereby limiting the destruction of natural habitats and contributing to biodiversity conservation. Conversely, preserving biodiversity helps achieve sustainable development, including food security and human health. Achieving the energy transition positively impacts biodiversity by curbing pollution caused by burning fossil fuels—pollution that destroys natural habitats and harms living organisms. It also fosters a green, sustainable economy, thereby alleviating pressure on natural resources, and encourages the use of renewable energy, which is generally less environmentally destructive than traditional energy sources.

Second: The Principle of Non-Degradation of Natural Resources

The energy transition is a fundamental strategy for upholding the principle of non-degradation of natural resources. By reducing reliance on fossil fuels—which are finite, polluting resources—we can preserve other natural resources for future generations while securing a sustainable energy alternative.

Third: The Principle of Substitution

The relationship between the principle of substitution and the energy transition lies in the fact that shifting from fossil fuels to renewable energy constitutes a systematic process of substitution. This involves replacing the primary energy source (fossil fuels) with another (renewable energy)—a substitution essential for achieving sustainable development and mitigating negative environmental impacts.

Thus, the energy transition embodies the principle of substitution by replacing fossil fuels with renewable energy sources such as solar, wind, and hydroelectric power. This substitution aims to replace polluting, traditional energy sources with clean alternatives, thereby reducing harmful emissions like carbon dioxide.

Furthermore, substitution serves as a key tool for achieving sustainable development goals and contributing to global efforts to combat climate change. Fourth: The Principle of Integration

The principle of integration is closely linked to the energy transition; energy transition strategies aim to incorporate renewable energy sources into the existing energy mix to ensure sustainability and security. This is achieved by integrating solar and wind energy into electricity grids to replace fossil fuels, thereby fostering sustainable development and reducing carbon emissions. Integration also encompasses the development of modern infrastructure and innovative technologies to enhance energy efficiency, as well as the creation of renewable energy markets to lower costs and encourage investment in the sector.

It is worth noting the close interconnection and complex relationship between the principle of integration and the energy transition, characterized by several key aspects:

- o Technical Integration: This involves the gradual integration of renewable energy sources—such as solar and wind—into the existing electricity grid to ensure stability and resilience, alongside the development of smart grids capable of supporting these new sources.

- o Economic Integration: This entails integrating renewable energy into economic markets, thereby contributing to revenue diversification, reducing reliance on fossil fuels, and stimulating investment in the sector.

- o Environmental Integration: This refers to incorporating the energy transition into sustainable development strategies, helping to reduce carbon emissions, improve air and water quality, and contribute to the achievement of global environmental goals.
- o Technical and Scientific Integration: This involves establishing research and development centers to foster innovation in renewable energy and developing new technologies to enhance efficiency and reduce costs, thereby accelerating the pace of the energy transition.

- o Legislative and Policy Integration: This entails enacting laws, regulations, and policies that support the shift toward renewable energy and encourage citizens and institutions to adopt these technologies—such as through tax incentives or financial support for projects.

Fifth: The Principle of Preventive Action

This principle entails integrating advanced technologies into environmental activities while prioritizing options that yield the best results at the lowest economic cost. It establishes a framework that prioritizes prevention over remedial or corrective measures, as such technology can avert many environmental hazards and forms of damage.

The principle of prevention is closely linked to the energy transition and climate change. Since fossil fuel consumption is the primary driver of global warming, the shift toward renewable and clean energy serves as a fundamental preventive measure to combat climate change and avoid its worst impacts. In other words, transitioning to renewable energy acts as a preventive strategy to protect the environment and future generations from the consequences of relying on traditional energy sources.

Sixth: The Precautionary Principle

The precautionary principle is enshrined in Article 3, Paragraph 3 of the United Nations Framework Convention on Climate Change (UNFCCC), which calls for proactive measures to prevent environmental damage. This principle is closely tied to the energy transition and climate change; while reliance on fossil fuels drives climate change, the shift to clean energy helps reduce emissions. Furthermore, the precautionary approach offers an opportunity to assess risks and foster sustainable investments—such as in renewable energy—to ensure a sustainable future.

The relationship between the energy transition and climate change lies in the fact that fossil fuels contribute significantly to the greenhouse gas emissions that drive climate change. Furthermore, the transition to renewable energy sources plays a vital role in curbing greenhouse gas emissions and mitigating the impacts of climate change.

It also helps avert the point of no return—where the climate situation becomes irreversible and spirals out of control.

Seventh: The Principle of Common but Differentiated Responsibilities

This principle was enshrined in Article 3 of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Under this principle, developed nations bear the primary burden of combating climate change due to their historical responsibility for the high levels of greenhouse gases in the atmosphere.

The principle of common but differentiated responsibilities serves as a foundation for international cooperation on climate change; while acknowledging a shared responsibility among all nations, it

recognizes that developed countries—having historically contributed most to pollution—bear a greater responsibility. This principle is essential for the energy transition, as it guides international efforts and enables developing nations to receive the financial and technological support needed from developed countries to implement the transition in a fair and balanced manner.

The foregoing analysis leads to the conclusion that the international system has established a rigorous legislative and institutional framework mandating the energy transition as a preventive mechanism against the consequences of climate change. This evolution is evident in the progression of international instruments: from the framework-style approach of 1992 to the binding contractual obligations of the Kyoto Protocol, and finally to the mechanism of Nationally Determined Contributions (NDCs) under the 2015 Paris Agreement—a commitment enshrined domestically via Presidential Decree No. 16-262. From a legislative perspective, it is evident that the principles of international environmental law have evolved from global guiding principles into provisions supporting the energy transition. This is particularly true of the principle of "common but differentiated responsibilities," which grants developing nations—including Algeria—a legal status that links their energy-related commitments to the extent of international financial and technological support received.

Section Two: Energy Transition in Algeria—Legal and Institutional Frameworks and Implementation Programs.

The Algerian state has recognized that the success of this energy transition depends not merely on the availability of natural resources, but on establishing an integrated environment that facilitates such a shift. Accordingly, Algeria has worked to formulate modern legal and regulatory frameworks aimed at incentivizing investment, alongside the establishment of specialized institutional bodies and the coordination of efforts across various sectors. This vision has been translated into action through the launch of implementation programs and promising national projects designed to increase the share of renewable energy in the national energy mix and achieve energy efficiency.

Requirement One: The Legal and Institutional Framework for Energy Transition in Algeria.

Energy transition represents a strategic choice for the Algerian state to ensure resource sustainability and energy security. To realize this, the legislator has developed a comprehensive legal framework of incentives, complemented by institutional and executive structures that oversee the sector's financing.

Subsection One: The Legal and Incentive Framework for Energy Transition.

Algeria has developed an integrated legislative system to regulate the renewable energy sector and channel investment toward sustainable energy projects; these measures are outlined below. First: The Constitutional and Legislative Framework for Renewable Energy.

1. Primary Legislation (The Constitution):

Recent amendments to the Algerian Constitution have addressed environmental concerns—aiming to achieve sustainable development and facilitate a transition toward renewable energy—through both the 2016 and 2020 constitutional amendments.

a. Regarding the 2016 Constitutional Amendment:

Although it did not explicitly or directly use the terms "energy transition" or "renewable energy," a broad interpretation of the established environmental and economic provisions paved the way for the subsequent foundation of the energy transition. This was achieved by enshrining environmental protection and sustainable development within the Constitution; the 2016 amendment's preamble affirmed the State's commitment to building a productive and competitive economy within the framework of sustainable development and environmental preservation. Furthermore, Article 68 guaranteed citizens the right to a sound environment and obligated the State, public institutions, and individuals to protect it—a provision that laid the groundwork for the shift toward energy transition and the adoption of renewable energy.

The stipulation regarding the rational use of natural resources is also considered one of the most significant aspects of the 2016 amendment. By mandating the rationalization of oil and gas consumption and the pursuit of clean, renewable energy alternatives, this provision further facilitated the energy transition. This is reflected in Article 19 of the 2016 amendment, which stipulates that the State shall ensure the rational use and preservation of natural resources for the benefit of future generations.

b. Regarding the 2020 constitutional amendment:

The preamble to the 2020 constitutional amendment explicitly states that Algeria remains committed to addressing environmental degradation and the adverse effects of climate change by ensuring the rational use and preservation of natural resources for the benefit of future generations—a principle that lies at the heart of the energy transition.

Article 139, Paragraph 24, provides the legislative framework for renewable energies; it defines the matters on which Parliament legislates under the Constitution—designating them as core legislative competencies—and includes the regulatory regimes for mining, hydrocarbons, and renewable energies among these matters.

The content of this paragraph demonstrates that renewable energy has shifted from the realm of temporary sectoral initiatives to that of a mandatory legal framework. This grants the Algerian legislator full authority to enact various laws designed to accelerate the energy transition.

Consequently, while the 2016 amendment established the general framework for environmental protection and resource sustainability—thereby paving the way for the adoption of renewable energies—the 2020 constitutional amendment went further by explicitly enshrining environmental protection within the context of sustainable development across various sectors, including renewable energy. It incorporated this commitment into the country's supreme legislative system to guide the energy transition and secure the future for coming generations.

1. Ordinary Legislation (Laws):

Algeria has enacted a series of legislative texts to regulate the renewable energy sector and ensure the desired energy transition. Key examples of such ordinary legislation include:

a. Law No. 04-09:

Law No. 04-09 of August 14, 2004, regarding the promotion of renewable energies within the framework of sustainable development, represents the initial legislative core and the fundamental pillar upon which Algeria's energy transition policy was built. It elevated the alternative energy sector from the realm of temporary sectoral initiatives to the status of a mandatory and sustainable legal framework. Article 5 imposed an explicit obligation on the executive branch to formulate a national plan for renewable energy development and to mandatorily integrate it into the State's comprehensive development plans—a move that subsequently enabled the adoption of major structural programs. Furthermore, this law brought about a qualitative shift in the investment climate by introducing modern regulatory and investment mechanisms; most notably, it adopted a system of long-term power purchase agreements (PPAs). These agreements provide investors with incentives and financial guarantees regarding access to the national transmission grid and ensure the valuation of electricity generated from clean sources, such as solar and wind power. Consequently, the pivotal role of Law 04-09 extends beyond regulating technical aspects; it links the energy transition to the State's strategic development planning, thereby contributing to the rational use of depletable fossil resources, safeguarding the rights of future generations, and protecting the environment.

b. Law 03-10:

Law 03-10, concerning environmental protection within the framework of sustainable development, constitutes the fundamental legal framework from which environmental policies in Algeria—including the energy transition—derive. This law implicitly and indirectly incorporates the core principles of the energy transition, most notably:

- It establishes environmental sustainability, which provides the philosophical and ethical framework obliging states to safeguard the rights of future generations through the rational use of finite resources. This environmental and economic commitment directly steers decision-makers toward energy transition mechanisms—replacing polluting fossil fuels with clean, renewable sources like solar and wind power to curb carbon emissions and combat climate change—while establishing a framework for developing renewable energy as an alternative to conventional energy sources.
- It mandates the rationalization of energy consumption across various sectors.
- Law 03-10 also incorporates coordination mechanisms between the Ministry of Environment and the Ministry of Energy, involving the industrial sector in the implementation of energy efficiency standards and fostering cooperation with research centers to develop clean energy technologies.
- It mandates the adoption of clean mechanisms to reduce gas emissions.

Thus, the law on environmental protection within the framework of sustainable development supports Algeria's energy transition by adopting an integrated vision based on three main pillars. The first pillar entails developing the renewable energy sector through the implementation of solar and wind energy projects, alongside supporting scientific research and innovation and building the necessary infrastructure. The second pillar focuses on enhancing energy efficiency by implementing strict consumption standards for buildings, promoting energy conservation in industrial facilities, and optimizing fuel use in the transport sector. Ultimately, the law aligns this transition with the State's strategic development planning,

thereby contributing to the diversification of energy sources and the achievement of energy independence for Algeria.

Second: Legislative incentives and guarantees supporting investment in renewable energy

Algeria relies on a comprehensive legislative framework to attract domestic and foreign investment in the renewable energy sector, in line with its vision for the energy transition. These mechanisms are distributed across the new investment law, sector-specific energy legislation, and fiscal measures.

1. New Investment Law:

Law No. 22-18 on investment constitutes the latest legislative framework supporting energy transition projects through an incentive system that includes tax and customs exemptions. Specifically, Article 26 of Law No. 22-18 designates renewable energy as a strategic activity eligible for the sectoral incentive regime, while Articles 27 and 31 grant extensive exemptions during both the implementation and operational phases—ranging from 3 to 10 years depending on the nature of the region or the investment.

2. Tax Incentive Regime:

The tax incentive mechanism is based on a set of legal texts, most notably Law No. 16-09 on investment promotion. These texts provide various incentives—specifically exemptions outlined in the investment law and finance laws—including:

a. Exemption from customs duties on imported goods used directly in the implementation of investment projects.

b. Exemption from Value Added Tax (VAT) on imported goods and services.

c. Exemption from registration fees and real estate publicity fees for a period of ten years, as well as exemption from the property transfer fee.

d. Exemption from corporate profit tax and the tax on professional activity during the operational phase, alongside a 50% reduction in rates determined by the State Property authorities.

Consequently, the Algerian legislator has adopted a comprehensive tax support strategy designed to reduce capital and operational costs for investors and accelerate the recovery of invested capital.

3. Real Estate Concession System:

Key real estate and regulatory mechanisms include long-term concession contracts, which enable investors to secure concessions on state-owned land for major investment projects at nominal rates. Other regulatory mechanisms include simplified operational permits and the establishment of a "one-stop shop" via the Algerian Investment Promotion Agency to expedite the issuance of administrative and environmental permits. This also encompasses the provision of state-owned land for solar farms, the streamlining of procedures through the Algerian Investment Promotion Agency, and the integration of these processes with the investor's digital platform.

4. Capital Repatriation Guarantees:

Legal guarantees include legislative stability, which ensures legal certainty for investors and protects them against unexpected legal amendments, thereby safeguarding the continuity and stability of the business climate.

Foreign investors also enjoy the freedom to repatriate profits and invested capital, subject to monetary regulations.

Algeria relies on a comprehensive and incentive-driven legislative framework to support investment in the renewable energy sector, offering extensive tax exemptions and significant real estate facilitation. Furthermore, the state provides legal and monetary guarantees that ensure a stable business climate and the freedom to repatriate profits for both domestic and foreign investors.

Section Two: Institutional and Financing Structure of the Renewable Energy Sector

An integrated institutional structure has been established to oversee the implementation of the energy transition strategy, bringing together central bodies and specialized institutions. This structure has demonstrated clear organizational flexibility to ensure effectiveness; following the dissolution of the independent Ministry of Energy Transition, the sector was restructured and competencies were redistributed.

First: Government and Advisory Bodies

1. Ministry of Energy and Renewable Energies

The Ministry of Environment and Renewable Energies was created in 2017 pursuant to Presidential Decree No. 17-243, which appointed government members and established the Environment and Renewable Energies portfolio for the first time; it is considered the first ministry dedicated to renewable energies. Executive Decree No. 17-365 organized the central administration of the Ministry of

Environment and Renewable Energies and defined the powers of the Minister; it focused on encouraging investment and framing energy diversification plans in cooperation with industrial conglomerates.

Then, the Ministry of Energy Transition and Renewable Energies was established in 2020 pursuant to Presidential Decree No. 20-163 (regarding the appointment of government members), creating a completely new portfolio under that name.

Subsequently, the renewable energies sector was reintegrated with the environmental protection sector under Presidential Decree No. 22-305 (amending the government composition), which merged the portfolios once again under the title of Ministry of Environment and Renewable Energies.

Under Presidential Decree No. 25-241, dated September 14, 2025, a new organizational structure was established, completely separating the renewable energies sector from the environment sector and assigning it to the Ministry of Energy and Renewable Energies.

Other ministries also coordinate with the ministry in charge of renewable energies, given the overlap and proximity of their respective mandates; notably:

2. Ministry of Energy and Mines:

It handles the industrial and operational aspects of photovoltaics and oversees the executive coordination of major projects and green hydrogen development—through the Sonatrach and Sonelgaz conglomerates—in coordination with the Ministry of Environment and Renewable Energies.

3. Ministry of Environment and Quality of Life:
This ministry contributes to the energy transition process through the lens of ecological oversight and ecosystem protection. Its mandate is defined by Presidential Decree No. 24-374 (regarding the cabinet reshuffle), which removed the "Renewable Energies" portfolio from its remit, allowing it to focus on monitoring Algeria's international climate change commitments and curbing carbon emissions from major industrial facilities in cooperation with the energy sector.

The foregoing discussion reveals the fluidity—or rather, the instability and shifting nature—of the institutional structure governing renewable energies in Algeria. Responsibilities have been distributed across multiple ministries, creating instability in the execution of energy-related tasks and plans due to this lack of structural and institutional consistency.

4. National Commission for Renewable Energies:

The National Commission for Renewable Energies and Energy Efficiency was established under Executive Decree No. 19-280. It was subsequently dissolved and merged—alongside the APRUE agency—into a unified executive body known as the National Agency for Energy Management and Energy Efficiency, pursuant to Executive Decree No. 26-268.

5. National Committee for Energy Transition (2021):
The National Committee for Energy Transition was established by Executive Decree No. 21-170—which provided for the creation, organization, and functioning of the National Committee for Climate, Energy Transition, and Sustainable Development—and was placed under the authority of the Prime Minister. It served as a high-level coordination mechanism across various ministerial sectors, aiming to unify efforts in designing the energy transition and implementing energy efficiency strategies.

However, as part of the reform and governance of institutional structures intended to eliminate overlapping mandates, this Committee was dissolved. Its high-level coordination and strategic foresight functions were integrated into the mandate of the executive body established by Executive Decree No. 26-268: the National Agency for Energy Management and Efficiency. This agency has since assumed unified leadership to ensure the realization of strategic projects and to monitor their effectiveness.

It is evident from the foregoing that the Algerian legislator has shifted from an implicit environmental approach to an explicit, mandatory legislative framework for renewable energy. This transition is bolstered by the incentives provided under Investment Law No. 22-18 and the consolidation of administrative bodies into the National Agency for Energy Control and Efficiency. This framework complements executive programs, field projects, and international strategic partnerships that reinforce energy sovereignty and ensure a sustainable legislative dimension.

It is worth noting that the executive structure of Algeria's energy and environment sector has undergone a radical transformation to keep pace with modern economic developments. Previously merged entities and ministries were formally dissolved and reorganized into independent, specialized portfolios to establish more effective governance for major projects. In this context, the historic designation of the "Ministry of Energy and Mines"—established under the old Executive Decree No. 96-215—was completely abolished.

Pursuant to recent presidential decrees issued in 2025 and 2026, the sector was fully split into three independent sectors:

- Ministry of Hydrocarbons;
- Ministry of Energy and Renewable Energies; and
- Ministry of Mines and Mining Industries.

This administrative modernization also extended to the sustainability sector, separating renewable energy from the environment sector; the latter was subsequently reconstituted as the Ministry of Environment and Quality of Life under Presidential Decree No. 24-374. This structural reform went further, addressing the organizational fragmentation that had previously characterized advisory commissions and public institutions. The Commissariat for Renewable Energies and Energy Efficiency—established by Decree No. 19-280—was dissolved and fully merged with the National Agency. This merger created a unified, robust executive body of an industrial and commercial nature known as the National Agency for Energy Management and Energy Efficiency (under Executive Decree No. 26-268), positioning it as the primary legal instrument for driving the country's current energy transition strategy.

Second: Executive Bodies and Financial Support Mechanisms

The institutional framework for Algeria's energy transition is complemented by executive, research, and financing arms tasked with translating legal provisions from legislative texts into tangible implementation and financial support. These entities are categorized as follows:

1. The National Center for Renewable Energies

The National Center for Renewable Energies is responsible for research and development, serving as the core scientific and technological hub for developing alternative energy systems and innovative solutions in Algeria. Historically, the Center was established following the restructuring of the High Commission for Research—under Decree No. 88-51—as a public institution of a scientific and technological nature. The Center's academic and applied mandates have been reinforced by the provisions of Executive Decree No. 68-26, which establishes the standard statutes for this category of scientific institution. This decree represents an unprecedented legislative breakthrough within Algeria's scientific research and knowledge economy ecosystem; it legally tasks the Center with formulating and implementing research and technological development programs for eco-friendly energy systems—such as solar photovoltaics and green hydrogen—while also granting it the legal authority to register patents and valorize research findings (both scientifically and commercially) to support economic partners.

2. National Agency for the Promotion and Rationalization of Energy Consumption

The National Agency for the Promotion and Rationalization of Energy Consumption was established by Executive Decree No. 235-85 to serve as a reference body for approving energy efficiency programs and overseeing mandatory consumption rationalization plans and energy audits across the housing, transport, and industrial sectors. It is responsible for preparing and proposing medium- and long-term plans to enhance energy management and consumption efficiency. The Agency is legally mandated to provide technical oversight for mandatory, periodic energy audits of major industrial consumers and to monitor efficiency reports. Its operational scope also extends to regulating and managing energy consumption at the sectoral level.

3. National Fund for Renewable Energies and Sustainable Development

This fund constitutes a special allocation account (No. 302-131), established under successive finance laws to serve as the primary financing mechanism for addressing the high capital costs associated with alternative energy projects. It operates under the provisions of Executive Decree No. 22-98, which clearly regulates its financial management; its funding base is legally derived from environmental tax revenues, fiscal levies, and royalties imposed on hydrocarbon production and polluting industrial activities. The fund directs its financial resources exclusively toward covering and supporting sustainable investment projects, financing small-scale clean power generation plants for remote areas, and providing support to startups and innovative small and medium-sized enterprises (SMEs) specializing in clean energy solutions. The National Fund for Renewable Energies and Sustainable Development was established via Executive Decree No. 22-98 specifically to finance SMEs within the sector.

However, an analysis of the roles and responsibilities of the various institutional bodies reveals that Algeria's energy transition process faces a range of structural and institutional challenges that hinder the achievement of established goals. Consequently, the sector has faced criticism, as reports indicate that the contribution of renewable energies to the national energy mix did not exceed 2% in 2023—falling far short of the 27% target set for 2030.

The sector also suffers from a fragmentation of responsibilities among institutions and poor coordination among stakeholders. Algeria's energy transition also faces financial and technological challenges; the funding gap required to achieve the 2035 goals is estimated at approximately \$60 billion. Furthermore, the local content share in renewable energy projects does not exceed 20%, and the country faces additional challenges related to inadequate transport and storage infrastructure.

Thus, it can be said that the Algerian legislator has sought to establish an integrated institutional framework based on the principle of complementary roles to achieve the energy transition. The Ministry of Energy and Renewable Energies is responsible for formulating strategic policies in coordination with the environmental oversight functions of the Ministry of Environment and Quality of Life. Realizing these programs relies on two fundamental pillars: the first is technical and research-oriented, provided by the National Center for Renewable Energies through technology localization and the leveraging of patents; the second is financial, guaranteed by the National Fund for Renewable Energies and Sustainable Development—a sovereign, sustainable financing vehicle that covers the high investment costs of projects, thereby transforming legal provisions into genuine economic momentum.

Requirement Two: Executive Programs and Field Projects for Energy Transition in Algeria

The world, including Algeria, is facing a radical shift in the global energy landscape, driven by rapid climate change and the urgent need to secure sustainable, clean alternatives. Against this backdrop, Algeria is undertaking an ambitious transition toward a new energy model, leveraging its vast geographical assets and strategic location as an energy bridge between Africa and Europe. This energy transition has moved beyond the conceptual stage, taking concrete form through national strategies supported by structural programs and international partnerships aimed at technology transfer and local capacity building.

Branch One: The National Strategy for Renewable Energies and Energy Efficiency

Numerous practical programs and projects have been launched to implement the energy transition strategy on the ground. I. Structural Renewable Energy Projects

1. Solar and Wind Energy Projects

Algeria possesses immense renewable energy potential—particularly in solar energy—owing to its vast territory and strategic location; it holds some of the world's richest solar resources. A recent study by the German Aerospace Center (DLR) identified the Algerian Sahara as the world's largest reservoir of solar energy. The 2035 Renewable Energy Development Program stands as a key structural initiative, aiming to generate 22,000 megawatts (MW) of electricity from renewable sources, with 13,575 MW derived from solar power. Notable examples and pioneering field projects include:

a. Ghardaïa Pilot Plant: With a capacity of 3 MW, this facility marked the first practical step in testing the suitability of photovoltaic systems for the harsh desert environment. It enabled the collection of vital technical data regarding panel efficiency and the impact of dust and heat.

b. Hassi Delaa Mega-Project: With a production capacity of 362 MW, this project embodies the shift toward large-scale investments. Being executed by the Turkish company Ozgun, it serves as a model for localizing major projects through partnerships with international firms possessing extensive engineering and construction expertise.

c. Solar 1000 Project: In its initial phase, this project aims to deploy solar power plants across several southern provinces, thereby helping to alleviate pressure on the national electricity grid and secure sustainable energy for isolated areas.

2. Green Hydrogen Projects and Clean Technologies

Algeria launched the National Green Hydrogen Strategy in 2023, aiming to supply 40% of Europe's green hydrogen needs by 2040. As part of its efforts to keep pace with the global energy transition, Algeria adopted this strategy—a long-term vision seeking to position the country as a key regional player and a reliable supplier to Europe. The strategy targets meeting 40% of Europe's green hydrogen demand by 2040 by leveraging existing advanced trans-Mediterranean gas pipeline infrastructure, which can be partially adapted for hydrogen transport.

This strategy is being implemented through concrete international support and financing mechanisms, most notably:

- The "Taqati 2" (My Energy 2) project: Launched in partnership with the European Union with a budget of €28 million, this project focuses on funding innovative initiatives and supporting technical and economic studies for the establishment of pilot green hydrogen production units. It also aims to develop regulatory frameworks and standards for the production and distribution of clean energy.

II. Renewable Energy Programs and Plans

1. National Program for Renewable Energy Development (Horizon 2030):

The system for producing and developing alternative energy in Algeria operates within a specific legal and regulatory framework. The executive program is established in accordance with Law No. 04-09 on the promotion of renewable energy within the context of sustainable development—specifically Article 5, which mandates that the executive authority formulate a national plan for renewable energy development and mandatorily integrate it into the State's comprehensive development plans. This plan aims to introduce a total capacity of 15,000 megawatts into the energy mix by 2035, primarily through solar photovoltaic projects.

The process of opening the sector to investors for electricity generation from renewable sources is governed by Executive Decree No. 17-98 (as amended and supplemented by Executive Decree No. 21-158). This decree outlines the procedures for issuing calls for tenders for renewable energy or cogeneration-based energy production and their integration into the national electricity supply system, with Article 2 regulating the mechanisms for administrative oversight of the tender announcements. Implementation is realized through major projects such as "Solar 1000 MW," which are based on the conclusion of long-term power purchase agreements. The High Authority for Sectoral Coordination was established pursuant to Executive Decree No. 19-280—as amended and supplemented by Executive Decree No. 21-95—which provides for the creation, organization, and operation of the Commission for Renewable Energies and Energy Efficiency. This Commission is placed directly under the authority of the Prime Minister as a body responsible for designing and evaluating the national energy transition strategy; it operates in coordination with the Electricity and Gas Regulatory Authority to ensure compliance with technical specifications and to guarantee open access to the national transmission grid.

2. National Plan for Energy Efficiency and Consumption Rationalization in Sensitive Sectors:

It derives.

a. Housing and Urban Planning Sector:

o Mandatory Thermal Regulation and its Relation to Building Permits:

Modern buildings are subject to the provisions of Executive Decree No. 90-2000 regarding thermal regulation in new buildings. This decree imposes mandatory technical standards concerning thermal insulation for walls, roofs, and facades. Compliance of the technical design with these standards is a fundamental prerequisite for the issuance of a building permit and the acceptance of the certificate of conformity for housing and urban planning purposes.

o Appliance Labeling and Customs Restriction System:

This system is regulated by Executive Decree No. 149-04, which outlines procedures for implementing the national energy control program in conjunction with regulations defining technical standards for energy efficiency applicable to electrical and gas-powered appliances. This framework mandates that manufacturers and importers affix energy labels to appliances and legally prohibits the marketing of high-consumption equipment to protect the domestic market.

b. Transport and Communications Sector:

o Regulation of the Transition to Alternative Fuel (LPG-c):

Technical vehicle conversion operations are governed by Executive Decree No. 346-03, which specifies the conditions for vehicle design and conversion to use Liquefied Petroleum Gas (LPG) as fuel. These regulations aim to promote the local adoption of clean energy sources through incentive measures funded by special funds, while also regulating occupational safety standards for authorized conversion workshops.

o Environmental standards for manufactured and imported vehicles:

This is linked to Law No. 01-14 regarding road traffic regulation and safety, which mandates periodic technical inspections of the national vehicle fleet to ensure that toxic gas emissions do not exceed permissible limits. It is further supported by modern specifications for manufacturers and agents, which impose strict European and international standards to reduce carbon dioxide emissions.

c. Industrial sector:

o Mandatory energy audit system for major consumers:

This oversight mechanism is governed by the provisions of Executive Decree No. 05-495 regarding energy audits for large energy-consuming facilities, as amended and supplemented by Executive Decree No. 13-424.

Pursuant to Article 12 of Law No. 99-09, any industrial operator whose annual consumption exceeds the threshold of 2,000 tonnes of oil equivalent (toe) is required to conduct a periodic energy audit every three

years. This process is overseen by the National Agency for the Promotion and Rationalization of Energy Use (APRUE) and carried out by certified experts.

o Legal sanctions and penalties:

Article 24 and subsequent articles of Law No. 99-09 explicitly stipulate the imposition of financial penalties and deterrent administrative sanctions—ranging up to the closure of the facility or the revocation of operating licenses—should an industrial enterprise fail to conduct the mandatory energy audit or refuse to implement the corrective plan aimed at rationalizing its energy consumption.

It follows from the foregoing that Algeria's energy transition programs and plans are grounded in binding regulatory rules. Law No. 04-09 mandates the inclusion of renewable energy projects for large-scale electricity generation, a requirement supported by Executive Decree No. 17-98, which governs tenders and long-term procurement contracts—such as the "Solar 1000" project. Concurrently, the energy efficiency plan derives its enforcement mechanisms from Law No. 99-09 to rationalize consumption across three vital sectors: the housing sector, through mandatory thermal insulation for buildings as a prerequisite for obtaining a construction permit and the implementation of an energy labeling system for appliances; the transport sector, by regulating the shift to liquefied petroleum gas (LPG) and controlling vehicle emissions; and the industrial sector, by requiring major consumers to undergo periodic energy audits, subject to strict penalties and financial fines that may extend to the closure of the facility.

Section Two: Future Prospects for Energy Transition in Light of International Partnerships and Technology Transfer

Algeria relies on a strategy of international partnership to facilitate technology transfer and capacity building in the renewable energy sector. We will address this topic by dividing the study into two levels—international and African—while highlighting the practical impact of each partnership:

First: Bilateral and Regional Partnerships

1. Bilateral Partnerships:

Algeria concluded an agreement with Germany in 2022 to finance renewable energy projects worth €100 million and signed a memorandum of understanding with China in 2023 for the transfer of photovoltaic cell technology. At the regional level, Algeria participates in the European "Desertec" project, which aims to transport solar energy from the Sahara to Europe.

2. Partnerships at the African Level (Regional Integration and Energy Sovereignty):

a. The Trans-Saharan Gas Pipeline Project (Energy-Focused Development):

This trilateral strategic partnership project (involving Algeria, Niger, and Nigeria) is currently viewed within Algeria's strategy not merely as a conduit for conventional gas, but as a future-ready energy corridor. It is designed to be adaptable for transporting clean hydrogen and providing the infrastructure to link solar energy fields deep within the African Sahara to international markets.

b. Electricity Interconnection and Expertise Export Projects (South-South):

Expanding the activities of the Sonelgaz Group into the Sahel and neighboring countries—such as Tunisia, Libya, and Niger—combined with hosting the African Institute for Renewable Energy, positions Algeria to spearhead the energy transition across the African continent. This is achieved by providing technical support and constructing continental electricity interconnection networks capable of integrating and distributing renewable energy generated in the Sahara.

Second: International-Level Partnerships (Technological and Financial Drivers):

1. The Five-Party Strategic Partnership and the SouthH2 Corridor:

This project represents a major future energy partnership involving Algeria, Tunisia, Italy, Austria, and Germany. Spanning 3,300 kilometers with an estimated investment of four billion euros, the corridor aims to transport four million tons of green hydrogen annually from Algeria to European markets by repurposing the existing gas pipeline network.

Its impact on Algeria's energy transition lies in securing substantial foreign funding for clean energy projects and transforming the country from a traditional hydrocarbon exporter into a regional green energy hub.

2. The Algerian-German Partnership for Knowledge Localization and Equipment Manufacturing:

Strategic agreements have been concluded between the Sonatrach Group and major German companies such as Siemens Energy and Bosch. The impact on Algeria's energy transition is significant because the partnership goes beyond mere technology procurement; Algeria mandates technology transfer, the localization of electrolyzer manufacturing, and the local maintenance of solar energy equipment. This reduces national project costs and strengthens industrial independence.

Furthermore, Algeria established the Algerian-German Center for Renewable Energy in 2021 to train national personnel and launched the "Renewable Energy 2035" scholarship program. This program sends 500 students abroad annually to specialize in the field, aiming to build a skilled workforce capable of addressing the significant shortage of specialized human resources in the renewable energy sector. 3.

Technological partnerships with China and the United States:

Partnership contracts with Chinese consortia to establish photovoltaic power plants—specifically the "Solar 1000 MW" program and 3,000 MW projects—alongside cooperation with major US companies such as Chevron and ExxonMobil on energy storage technologies and digital solutions.

Ultimately, it is evident that Algeria's international and regional partnerships form the practical foundation for realizing its energy transition. International agreements—such as the Southern Hydrogen Corridor and technological partnerships with Germany and China—help overcome obstacles related to financing, technology transfer, and the localization of equipment manufacturing. Meanwhile, African projects like the Sahara pipeline and electrical interconnection initiatives position Algeria as a leading continental hub for clean energy. The direct impact of these partnerships is demonstrated by the transformation of legal and theoretical frameworks into sustainable, on-the-ground projects that bolster national energy security and open up new export markets.

Conclusion:

In conclusion, this study finds that Algeria's energy transition strategy represents an ambitious response—at both international and national legislative levels—to the challenges of climate change. However, it continues to face significant hurdles that prevent it from being considered a fully effective response, given the wide gap and stark contrast between legislative ambitions and actual outcomes. While Algeria has developed promising legal frameworks and investment incentives, tangible implementation remains limited due to structural, institutional, financial, and technological obstacles that have hindered the achievement of the targets set for the national energy mix.

Key findings of this study include:

1. International agreements have focused on establishing obligations and targets for emission reductions and the shift toward clean energy, yet they have failed to provide practical mechanisms ensuring a steady flow of financial and technological support to developing nations.
2. The Algerian legislator has embedded renewable energy at the core of the legal and legislative system—including at the constitutional level—but has failed to draft a unified framework law to consolidate relevant provisions; this has resulted in fragmentation and duplication within the legislation governing the sector.
3. Algeria has established various structures and institutions to oversee the management and planning of the energy transition, yet it has failed to address the lack of coordination among central, advisory, and executive stakeholders, leading to fragmented responsibilities and delays in project implementation.
4. The National Energy Efficiency Plan established legal regulations and penalties to rationalize consumption in critical sectors; however, it failed to ensure the strict and effective enforcement of deterrent mechanisms and statutory sanctions against certain major consumers.
5. National programs and plans relied on forging international and regional partnerships for technology and knowledge transfer but neglected to address the challenge of heavy reliance on foreign technology, resulting in a modest contribution of local technical components to the projects.
6. There is genuine political will to translate environmental commitments into practical measures, evidenced by the launch of structural programs (such as the 2035 Program) and flagship projects (e.g., Hassi Delaa, green hydrogen).
7. The energy transition contributes to diversifying the national economy by creating new investment opportunities in green technology sectors and opening export prospects, particularly in the field of green hydrogen.
8. A gap exists between ambitions and reality, as the contribution of renewable energy to the energy mix remains modest compared to established targets.
9. There is growing interest in the regional and international dimensions of the energy transition, pursued through regional partnerships and agreements with leading nations in the field.
10. Poor coordination among institutions involved in the energy transition leads to project implementation delays and a duplication of tasks. Based on the findings, we propose the following key recommendations:

1. Address the financial challenges of the energy transition by reviewing international financing avenues, developing national financing mechanisms, avoiding total reliance on external funding, and encouraging public-private partnerships in energy development projects.
2. Overcome the fragmentation of the current legal framework by reviewing and updating Law No. 04-09 to streamline administrative procedures and by enacting an integrated framework law for the energy transition.
3. Reform the governing institutional structure and eliminate overlapping mandates by establishing and activating an independent national body that consolidates dispersed powers and possesses the executive tools necessary to lead the energy strategy.
4. Activate oversight, monitoring, and regulatory mechanisms by establishing a national observatory for the energy transition, and propose the introduction of a carbon tax on polluting industrial facilities, with revenues earmarked directly for financing clean energy projects.
5. Build national capacity and localize clean technologies by bolstering scientific research, securing necessary budgets, and revitalizing research conducted at universities and research centers to ensure it serves the sector.
6. Enhance integration between energy and industrial policies by mandating that major projects utilize a certain percentage of local content and by establishing industrial zones specialized in manufacturing renewable energy equipment.
7. Activate oversight and monitoring mechanisms by establishing a national observatory for the energy transition and requiring all institutions to submit periodic reports on their environmental performance.
8. Strengthen and revitalize South-South cooperation in the renewable energy sector by establishing an African renewable energy agency—or a similar body—and launching an African fund to finance clean energy projects.
9. Addressing the aforementioned challenges requires the adoption of an integrated strategy that combines legislative reform, institutional development, and the mobilization of financial resources.
10. It is essential to revise Law 04-09 to streamline administrative procedures and to establish an independent national renewable energy authority that consolidates currently fragmented powers. It is also proposed to integrate a regional dimension into energy transition policies through the creation of regional renewable energy centers.
11. Funding can be mobilized by encouraging public-private partnerships in renewable energy projects. Additionally, the introduction of a carbon tax on polluting facilities is proposed, with the proceeds directed specifically toward financing clean energy projects.

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