Journal of Excellence for Economics and Management Research
ISSN 2572-0171
Vol 09, N°01 : (2025)
P 446 - 460

مجلة الامتياز لبحوث الاقتصاد والإدارة
ISSN 2572-0171
المجلد 09، العـدد: 01 (2025)،
ص 446- 460

Renewable energies as energetic alternatives to achieve environmental security in Algeria

Bederina Hadjer [1(*)]

[1]Doctorate, (University of Laghouat) (Algeria)
✉ h.bederina@lagh-univ.dz
https://orcid.org/0009-0003-9493-425X

Received: 4/15/2025 **Accepted**: 5/28/2025 **Published**: 05/06/2025.

Abstract:

This article aims to highlight the importance of renewable energies in achieving environmental and energy security by to addressing environmental security, its importance and strategies, this has become a major focus for human security in its present and future and the major title of its permanent development, and this is the goal that Algeria aims at in order to achieve sustainable development through the plans it has adopted to move towards a green economy to limit polluting gases , We have concluded through this analysis that Algeria is witnessing progress in this field by relying on renewable energies as they are more sustainable in preserving environmental security.

Key words: renewable energies; Environmental security; Green economy; Sustainable development.

JEL Classification Codes : Q42; Q58; O13; Q01

* *Corresponding Author.*

Doi: https://doi.org/10.34118/jeemr.v9i1.4232

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الطاقات المتجددة كبدائل طاقوية لتحقيق الأمن البيئي في الجزائر

هاجر بديرينة [1] (*)

[1] دكتوراه، (جامعة عمار ثليجي، الأغواط)، (الجزائر)
h.bederina@lagh-univ.dz
رابط ORCID: https://orcid.org/0009-0003-9493-425X

تاريخ الاستلام: 2025-04-15 **تاريخ القبول:** 2025-05-28 **تاريخ النشر:** 2025/06/05.

ملخص:

يهدف هذا المقال إلى إبراز أهمية الطاقات المتجددة في تحقيق الأمن البيئي والطاقوي من خلال التطرق إلى الأمن البيئي وأهميته وإستراتيجياته الذي أضحى محورا رئيسيا لأمن الإنسان في حاضره ومستقبله وعنوان تنميته الدائمة، وهو الهدف الذي تسعى الجزائر إلى بلوغه تحقيقا للتنمية المستدامة المرجوة من خلال الخطط التي تبنتها للتوجه نحو إقتصاد أخضر للحد من إنبعاث الغازات الملوثة للبيئة، وتوصلنا من خلال التحليل أن الجزائر تشهد تقدما في هذا المجال بالإعتماد على الطاقات المتجددة لكونها أكثر إستدامة في الحفاظ على الأمن البيئي.

الكلمات المفتاحية: طاقات متجددة؛ أمن بيئي؛ إقتصاد أخضر؛ تنمية مستدامة.

تصنيف JEL : Q42؛ Q58؛ O13؛ Q01

(*) المؤلف المرسل

المعرف الرقمي للمقال (doi): https://doi.org/10.34118/jeemr.v9i1.4232

11. INTRODUCTION

In light of the environmental changes that the world, as a whole, is witnessing from climate change, due to excessive consumption of fossil energy sources, which results in various forms of pollution of water, air and soil, Many countries seek to rationalize the resources of exploitation, by meeting the needs of current generations and preserving the right of future generations, That is why research in the energy field is moving towards the possibilities of employing renewable energies and reducing traditional energies technologies and techniques that facilitate and simplify the use of this alternative, At the same time achieving environmental security, is one of the thorny topics that constitute a wide space in the field of security studies, It is a global concern shared by academic, scientific and political circles. The debate about it dates back to the eighties, and specifically with the movement to expand security.

Because of its increasing importance, we they to Hed light on tackle the issue of renewable energies and their main role in preserving environmental security, In addition to the role that these energies play in promoting economic growth and achieving sustainable development.

Problematic:

From this introduction above, we can ask the problematic question as following:

How successful renewable energies in overcoming the environmental security dilemma in Algeria?

Sub-questions:

To answer this principal question, we can divide it into the following sub questions:

- is there a link between energy and sustainable development?
- what are the policies and strategies for adopting renewable energy economies, and what is their role in achieving environmental security in Algeria?
- What is the relationship between the green economy and sustainable development?

Hypothesis:

To answer the problematic principal question and the sub-questions, we formulate the hypothesis as following:

- There is a strong correlation between energy and achieving the dimensions of sustainable development, which necessitates paying attention to environmental protection;

- Rationalizing the use of renewable energy in Algeria is considered a shift towards a green economy to achieve environmental security, and is seen as a worthwhile investment;
- In light of recent trends that call for environmental protection, the green economy can help address environmental and economic challenges in order to achieve truly comprehensive sustainable development.

Study plan:

To answer the problematic question, we divided our research into three main parts:

Part 01: Environmental Security: Its Definition, Importance, and Strategies

Part 02: Renewable energies: their definition, their use advantages, and their goal to achieve environmental security

Part 03: Strategies likely to achieve environmental security in Algeria: Through the ambitious program of its renewable energies, to achieve a green economy with environmental benefits, and exploit solar energy to reach environmental security.

Study objectives:

The objectives of our study are:

- the main objective of the study is to examine the extent to which Renewable energies contribute effectively to meeting the requirements for transitioning to a green economy and achieving the goals of sustainable development;
- Clarify the importance of Renewable energies by presenting them as an alternative source to fossil energy in achieving environmental security, considering that their energy sources are clean and do not harm the environment, and they help reduce greenhouse gas emissions;
- Show the extent of the contribution of solar energy, which is abundant in Algeria and the greater Maghreb region, specifically in supporting sustainable development with a vision for future generations.

Study importance:

Research in the field of renewable energies is a highly relevant topic, especially since Algeria has the potential to move toward this field due to the availability of abundant alternative energy sources such as solar energy, this represents a vital step in achieving environmental security.

2. Environmental Security:

Most countries in the world seek to develop environmental policies to reduce environmental pollution, and each country has a legislative system to protect environment by setting special controls and effective procedures to protect living

organisms and preserve environment, By, legislative systems Must Be But In emphasis on individual and Industrial institutions and other industries, through adherence to environmental regulations, with special penalties for violators of these regulations.

2.1 Defining environmental security:

It is difficult to put a precise and specific definition of security, as the idea seems vague But we try and to suggest two definitions:

Environmental security is defined as: "an important and ruling method in the matter of sustainable environmental rights, which includes restoring the environment damaged by military operations, reducing resource scarcity, environmental degradation and biological threats that may lead to social unrest and regional conflicts. (kesra & taheri, 2014, p. 82)

Environmental security is defined as: "The person's reaching a state of peace of mind and his ability to exercise different options by living in appropriate environmental conditions." It includes three elements: (lattali , 2018, p. 540)

-The sustainable exploitation of renewable and non-renewable resources;

-To protect on of various elements of environment in anticipation from pollution before it creates difficulties for their natural regeneration;

reduction of the maximum threats related to industrial activities.

2.2 The importance of environmental security:

The importance of environmental security is represented in the following points: (lattali , 2018, p. 541)

- Security is an important link in peace, national security and human rights, and the world has taken care of it for the next 100 years. It is estimated that one third of the land area will be diverted, and it will be difficult to choose between consumption, ecosystem, conservation and management;
- The increase in the rate of environmental degradation has increased the importance and the need to adopt the concept of environmental security because man has neglected the foundations of life;
- The importance of environmental security is evident in preserving natural resources and moving away from the specter of scarcity by rationally, utilizing these resources according principle of equality between present generations and future generations;
- It contributes to creating a safe, healthy and nutritious environment and thus, expands the circle of the environment.

Through environmental security, all the provisions of the covenants related to the environment are fulfilled, which include reducing the effects of environmental degradation in its various forms, stopping attacks and conflicts around areas of transitional resources, introducing environment in educational curricula, and

international and regional cooperation in the field of environmental protection and development.

2.3 Environmental security promotion strategies:

Upgrading security requires the concerted efforts of all security actors, starting with individual, society and the state, and reaching private and public organizations and institutions, by involving them in developing plans and strategies, and then drawing the role that each side plays in their implementation.

Although the form of security promotion differs according to the nature of each country and its human composition, a sectoral approach must be put, each according to its specialization, and environmental policies, to fulfill these three basic strategies: (lattali , 2018, pp. 545-546)

- **Proactive strategy:** It depends on prior strategic planning, that is, before the danger occurs, and in the presence of a specific environmental threat, it resorts to developing plans that are ready to be implemented when needed;
- **Preventive strategy:** The prevention process takes place in two stages:

First stage: identifying the causes of environmental degradation and developing plans to eliminate them;

The second stage: reduce the severity of environmental risks and bringing them under control because in all cases they cannot be eliminated completely by virtue of their link to development;

- **Protection strategy:** Are a number of measures and steps and policies must be followed since the danger removed concerted efforts of all actors are required in this field, both inside or outside, For example: ***the programs assigned to protect the environment from an environmental security perspective is to resort to renewable and environmentally friendly energies and reduce the use of fossil fuels***.

3. renewable energies:

The serious environmental degradation that affects the globe in recent years has resulted in severe environmental damages affecting all fields and the emergence of global warming and climate change. The sources of pollution, which are mainly represented in traditional energies, had to be reduced, and create an environmentally friendly alternative.

3.1 Definition of renewable energies:

Renewable energy takes several terms:

It is expressed by sustainable non-traditional energy to distinguish it from fossil energy polluting environment and depleting to alternative energy from conventional energy, or sustainable energy to express its natural renewal, clean energy or safe energy, The term green energies is also used as an alternative to the term renewable

energies, and this term refers specifically to Energy produced from sources that do not create negative effects on environment. (mustafaoui, 2019, pp. 113-114)

It is also defined as: "Those energies that are repeated in nature automatically and periodically, meaning that they derive from natural resources that are renewed or that cannot be depleted".

It is also known as: "Alternative energy that is generated from an inexhaustible natural source. It is readily available and everywhere on the surface of the globe. It can be easily converted into energy and is distinguished by being eternal and environmentally friendly". (ben mahad, 2016, p. 111)

It is also known as: “It is a permanent and non-depleting natural resource that is available in nature, whether it is limited or unlimited, that is, its stock is inaccessible and it is constantly renewable as it is clean and does not result in relatively environmental pollution, but it needs a technological level, Within the reach of most countries of the world and the most important types, are :(solar energy, wind energy, biomass ... etc.). (cordy & sobhi, 2019, p. 84)

As for the Algerian legislator, he defined renewable energies as:

The forms of electric, kinetic, thermal or gas energies obtained from the conversion of solar radiation, wind force, geothermal, organic waste and water energy Techniques and the use of biomass total roads that allow considerable energy economy by resorting to bio-climate engineering techniques in the construction process.

What notes on the definition of the Algerian legislator he touches on the types of renewable energies and ways to get them. (mustafaoui, 2019, p. 114)

3.2 Advantages of using renewable energies:

The use of renewable energy sources brings many of the following advantages:

- **Diversification of energy sources :** Achieving abundance in traditional sources of energy, and providing energy needs of the various sectors, in addition to the possibility of achieving a surplus in the future of electric energy produced from renewable sources to be exported.
- **Environmental improvement:** Renewable energy sources are clean sources that do not affect the environment. Therefore, their use helps to reduce gases of emissions resulting from the production of electric energy using conventional and negative sources.
- **Saving electrical energy:** Many electric energy production projects can be established in remote and rural areas, where many renewable energy sources available exist, such as wind energy, solar heat and biomass, in order to boost the development of these areas factories and new residential cities and improving their standard of living by building residents of these areas.
- **Raise the standard of living:** The production of electricity from renewable sources in many remote and rural areas helps to improve the living standards of individuals, by providing the electricity needs at an appropriate cost, and

improving the quality of life as this provides better educational and health services to the residents of these areas.

- **Job opportunities :** It is based on providing job opportunities for local workers in these areas in the fields of manufacturing, installing and maintaining renewable energy equipment, electricity production plants and water desalination plants. (sheikh & alabsi, 2017, pp. 132-133)

3.3 The goal of renewable energies to achieve environmental security:

The issue of environmental security is one of the most important dangerous and complex contemporary issues. Environmental security is defined as a set of positive behaviors that do not lead to negative impacts on environment, which may cause pollution, deterioration or damage nature components, which leads to an imbalance in Local, regional or global ecosystem.

In order to set a solid environmental pillar, all aspects of its damage must be eliminated and all aspects of its promotion and preservation should be preserved, including limiting toxic gas emissions from factories, and then contributing to combating climate change, mitigating global warming, and aiming for sustainable development in this area. To reduce the global rate of increase in greenhouse gas emissions by greatly reducing the use of fuels and finding other sources of energy to supply industrial societies, as well as encouraging environmentally friendly industries and research in the field of the environment. Sustainable development here means shifting to cleaner, more efficient technologies and reducing energy and other natural resources to a minimum, this is what the national policy seeks to prepare by valuing renewable energy sources popularizing their use and achieving 10% of renewable energy in 2030 because energy resources are sustainable, which means that they will never harm the local or national environment. It also contributes to reducing the size of environmental impacts and costs, as renewable energy sources and their various applications are environmentally friendly and do not pollute these resources, like wind air, land or sea, while air pollution from the transport and energy sectors has turned many cities into a source of danger threatening our health. (mustafaoui, 2019, p. 116)

4. Strategies established to achieve environmental security in Algeria:

Renewable energies (solar energy, wind energy, hydropower and geothermal energy) are all types of energy that are given special attention by the Algerian state as a sensitive and vital sector for its large contribution to the national economy, Considering that Algeria has large energy resources, this makes it heading towards its exploitation as Suitable for protecting environment from pollution and boost growth by attractive investment in our time.

4.1 Ambitious Renewable Energies Program(2015-2030):

Algeria has launched an ambitious program to develop renewable energies, and adopted comprehensive and sustainable solutions to the challenges of nature or the obstacles it faces in preserving the fossil energy resources, as the capacity of this program has reached (2015-2030) about 22,000 megawatts Of which, 12,000 are directed to cover the national demand for electricity, and 10,000 megawatts are destined for exports, this program will be achieved through stages, namely:

- **The first phase (2015-2020):** achieving a production of 4,010 megawatts obtained through photovoltaic and wind energy by producing 515 megawatts of biomass and co-generation of energy and thermal energy;
- **The second phase (2021-2030):** to develop the electrical interconnection network between the North and the Saharan South (Adra), as this will allow the installation of large renewable energy stations in the following areas: Ain Saleh, Adrar, Tamanrasset. (djemaa, amrawi, & kaaouache, 2018, p. 03)

This program is broken down according to technological sectors, as shown in the table below:

Table 1. cumulative capacities of the renewable energy program by type and phase during the period (2015-2030)

Unit: Megawatts

	Phase 1 (2015-2020)	Phase 2 (2021-2030)	total
Photovoltaic cells	3000	10575	13575
Wind Energy	1010	4000	5010
Concentrated solar power	-	2000	2000
Biomass Energy	360	640	1000
Hybrid energy (diesel hybrid systems)	150	250	400
Geothermal Energy	5	10	15
total	4525	17475	22000

Source: Renewable Energies and Energy Efficiency Development Program in Algeria. Ministry Of Energy And Mining (Algeria). January 2016.p 09.

The capacity of the renewable energy program required to meet national market needs during the period 2015-2030 is estimated at 22000 MW, with only 411 MW actually achieved by 2020.

However, according to what was issued by the renewable energy development center (CDER) in Algeria, the implementation of the program on the ground since

2015, has faced a lack of financial resources, preventing progress, and only 4500 MW were achieved by 2020, Based on these figures Algeria remains far from the outlined program goals for 2030.

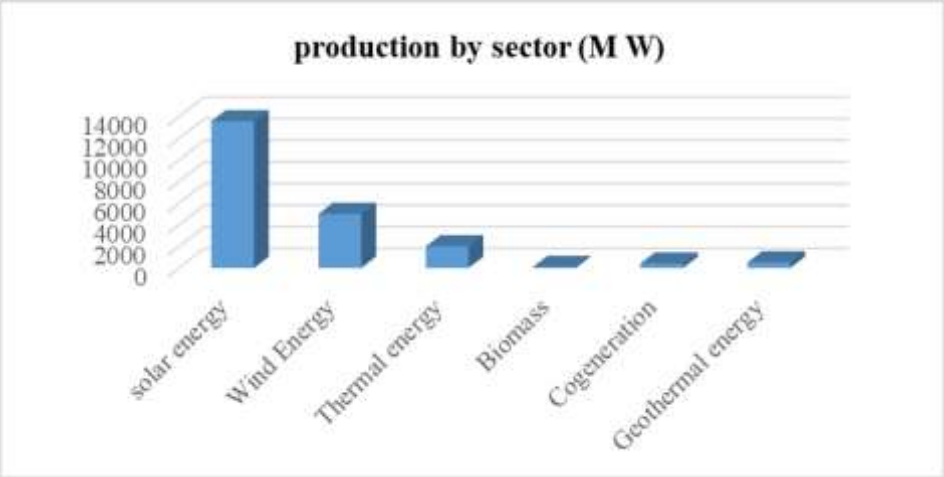
The Algerian ministry of energy confirmed in a report on this program issued in 2016, that the production of 22000 MW of renewable energy will occur in two phases as shown in the table above. Algeria imported in 2018 fossil energy worth 165.2 million tons, of which 65 million tons was for domestic consumption, It is worth noting that electricity production in Algeria currently relies 99% on fossil energy, as indicated in the report "energy efficiency" the program also helps reduce gas emissions from carbon accumulation by about 200 million tons. (Hicham, 2019)

The production of 22000 MW of renewable energy by 2030, would allow the country to save around 300 billion cubic meters of natural gas ,which is equivalent to 8 times the national consumption in 2014.

The Algerian policy direction toward integrating renewable energies into the national energy policy aimed not only at preserving fossil resources and reducing electricity production costs and environmental pollution, but also at supporting the national economy.

Hence, the national renewable energy development plan for 2015-20230, which aims to diversify energy sources, develop the sector, and reduce dependence on fossil fuel prices and their fluctuations in global markets, has become an essential component of national policies and Algeria's economic strategies. (Renewable energy projects in Algeria, 2018, p. 29)

Fig.1. production by sector



Source: based on Table No(01)

This program will allow in the horizons of 2030 to reach a rate of 27% of electricity production from renewable energies, i.e. producing about 22,000 megawatts of renewable energies and will allow saving 300 billion cubic meters of natural gas.

4.2 Moving towards a green economy to achieve environmental benefits:

The shift towards a green economy could lead to a significant reduction in greenhouse gas emissions. In the investment scenario, in which 2% of GDP is invested in key sectors of the green economy, more than half of that investment is allocated to increasing energy efficiency and expanding production. And the use of renewable energy resources, as a 36% reduction in the intensity of energy use at the global level, measured in millions of tons of oil equivalent per unit of GDP by 2030, and of the environmental benefits reaped from the green economy are what can come from the benefit In a sustainable way from so-called ecosystem services. (ayed, 2014, pp. 59-60)

4.3 Utilizing solar energy to achieve environmental security:

Due to its privileged location, Algeria is considered one of the countries that have been interested in renewable energies, among which is solar energy, which represents the most widespread source of energy, Its importance lies in its unlimited and free access to remote areas that other sources cannot be reached.

In any form of environmental pollution problems, solar energy capabilities will be installed according to the peculiarities of each region:

- **The southern region:** hybridization of existing centers, feeding scattered sites according to the availability of spaces and the importance of solar energy capabilities;
- **Highlands region:** according to its capabilities of sunlight, with the possibility of acquiring plots of land;
- **Coastal areas:** according to the possibility of the availability of real estate containers with the exploitation of all spaces such as roofs, balconies, buildings and other unused areas. (djemaa, amrawi, & kaaouache, 2018, p. 04)

And this is what the following table shows.

Table 2. Solar energy potentials in Algeria by regions (kWh per square meter per year)

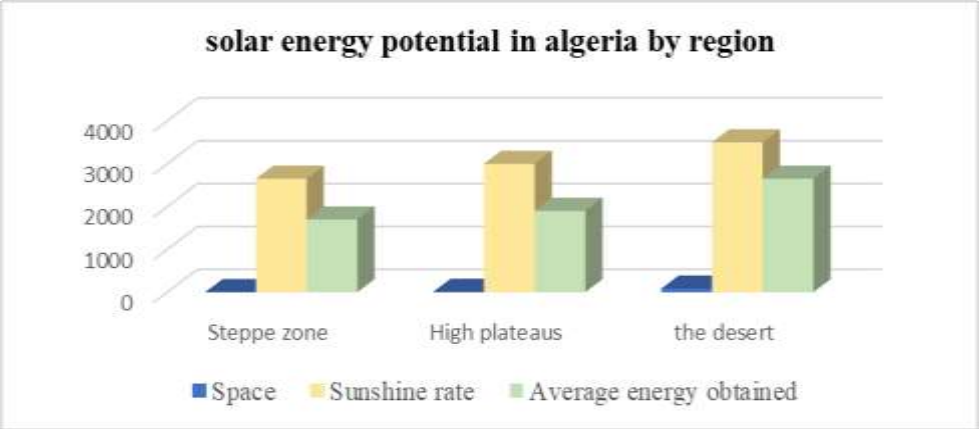
Regions	Coastal regions	High lands	Desert
Area (%)	04	10	86
Sunshine rate (hours / year)	2650	3000	3500
Average energy obtained (kWh m / year)	1700	1900	2650

Source: Mehidi Hassania and others, The reality and prospects of investing in renewable energies to achieve sustainable development - with reference to the case of Algeria -, Journal of Excellence for Economic and Management Research, Volume 03, Issue 02, 2020, page 100.

Through this table, we notice that the Algerian Sahara contains the largest area, and thus its capacity to provide solar energy is greater compared to the coastal areas and the high lands, as the desert occupies the first place in the average energy obtained

estimated at 2650 kilowatt hours / m / year as a result of its enjoyment The highest average brightness period is 3500 hours per year, followed by the high lands and then the coastal region, and this can be illustrated in the following figure:

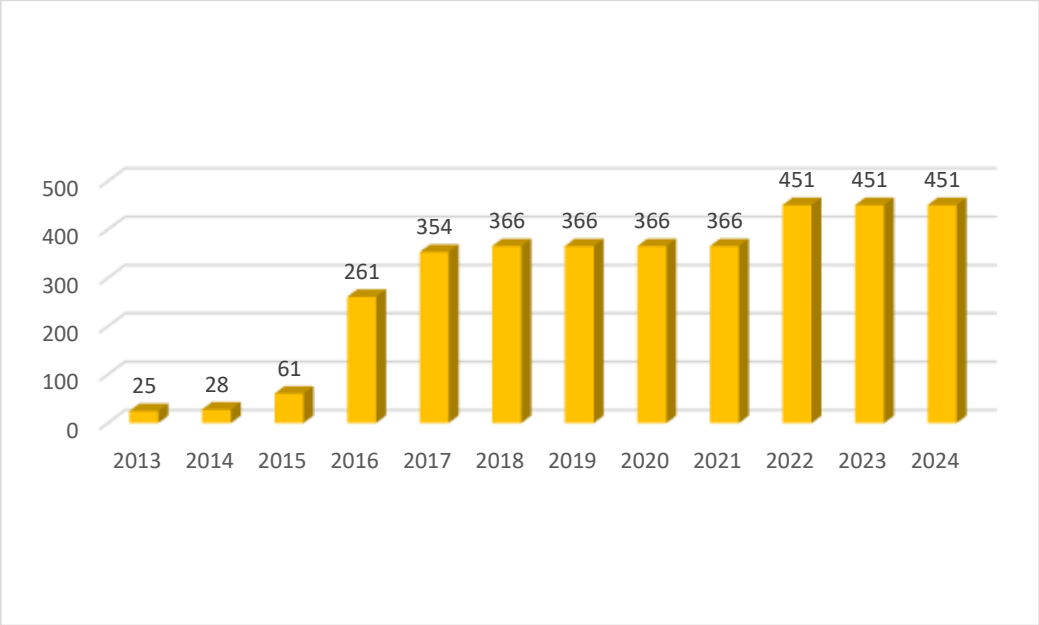
Fig.2. The potential of solar energy in Algeria



Source: based on Table No(02)

The production capacity of solar energy in Algeria from 2013 to 2023 can be illustrated as follows:

Fig.3. The production capacity of solar energy in Algeria from 2013 to 2024



Source: International Renewable Energy Agency (IRENA)

We notice through Figure No. (01), which shows the development of the production capacity of solar energy in Algeria, a remarkable improvement from the year 2013 to 2024, and from that, Algeria depends in its policy on investing in solar energy and its ability to achieve environmental security when exploiting this energy.

5. CONCLUSION

Through what we have mentioned above, it can be said that the renewable energy market Algeria is witnessing an improvement in this field thanks to the ambitious plans that the State has put in place to ensure the achievement of its energy and environmental security, Thanks to the strategic vision and the tireless steps towards transformation, Algeria player major role in the field of renewable energies, especially solar energy, with the aim of reducing dependence on Threatening fossil energies and limit polluting gases to the environment and thus making renewable energies an essential means security and sustainable growth.

Results:

Through the study, a number of results has been And we, summarize them as follows:

- Governments play a critical role in supporting the renewable energy sector by setting appropriate policies, regulatory frameworks and incentive mechanisms to develop and deploy renewable energy solutions;
- Implementation plans and mechanisms that encourage the use of renewable energy sources, necessary to help countries compete in the renewable energy market, reduce costs, and develop clean technologies;
- Algeria is actively interested in the field of renewable energy in order to achieve a set of benefits, the most important of which is expanding the role of renewable energy sources in diversifying the local economy and sources of income, in addition to being the actual and ideal solution to curbing the phenomena of climate change and global warming.

Recommendations:

A set of recommendations can be presented as follows:

- Work to set up programs to generalize the use of renewable energies, especially solar energy, which Algeria has a great deal of in the southern regions and the high lands;
- Allocate funds to develop research in the field of renewable energy;
- Carry out pioneering and rather large projects in the field of renewable energy and train human cadres on them;
- Encourage cooperation and scientific exchange with developed countries in this field and benefit from their experiences through holding regular seminars and meetings, provided that this is must be based on equality and mutual benefit;
- Re-publish policies in support of renewable energy and provide a base for exchanging views at the regional level on political and technological issues.

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