

Energy diversification in Algeria: the strategic challenge of electricity export in the Mediterranean (economic and political gains)

التنوع الطاقوي في الجزائر: التحدي الاستراتيجي لتصدير الكهرباء في البحر الأبيض المتوسط (المكتسبات الاقتصادية والسياسية)

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الملخص:

تراهن الجزائر على تنوع مصادر الطاقة خاصة خاصة الطاقة المتجددة منها، بتصدير الطاقة الكهربائية في السوق الإقليمية معتمدة على موقعها الجغرافي المتميز والقريب من أوروبا وعلى قدراتها الانتاجية الضخمة لهذا القطاع والذي وصل الى مستوى الاكتفاء الوطني ومرحلة التصدير الخارجي للكهرباء، واستنادا الى إمكانياتها الطاقية الكبيرة و لتجربتها المتميزة في توريد الغاز إلى الشركاء الأوروبيين، تبحث الجزائر في ظل المتغيرات التي يشهدها السوق الدولي للطاقة، التمتع كرقم صعب في معادلة الطاقة الكهربائية في منطقة البحر الأبيض المتوسط والتحول إلى مورد آمن وموثوق للكهرباء تعتمد الجزائر تكييف علاقاتها الثنائية السياسية والاقتصادية في خدمة طموحها وتحديها الاستراتيجي الجديد، وهذا بتعزيز علاقاتها الأوروبية الإيطالية ودعم التعاون في المجال الطاقوي والاقتصادي والسياسي، وجعل من دولة إيطاليا جسرا متوسطيا لتصدير الطاقة الكهربائية، و الإسهام في تحقيق الاستقرار الاقتصادي والاجتماعي في المنطقة بصفتها مصدر أساسيا للطاقة باتجاه أوروبا.

الكلمات مفتاحية: الطاقة الكهربائية، تصدير الكهرباء، البحر الأبيض المتوسط، العلاقات الجزائرية الإيطالية، أوروبا

Abstract:

Algeria is betting on the diversification of energy sources, especially renewable energy, including the production of electrical energy in the regional market, relying on its distinguished geographical location close to Europe, and on its huge production capabilities for this sector, which has reached the level of national sufficiency and the stage of external export of electricity, and based on its capabilities. Large energy sector, and due to its distinguished experience in supplying gas to European partners, Algeria is looking, in light of the changes taking place in the international energy market, to position itself as a difficult

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number in the electrical energy equation in the Mediterranean region. Mediterranean and becoming a safe and reliable supplier of electricity ,

Algeria is adopting to adapt its bilateral political and economic relations in the service of its ambition and new strategic challenge, by strengthening its European-Italian relations, supporting cooperation in the energy, economic and political fields, and making the State of Italy a Mediterranean bridge for the export of electrical energy, and contributing to achieving economic and social stability in the region as a primary source of energy towards Europe

Keywords: energy, electrical energy, electricity export, the Mediterranean, Algerian-Italian relations, Europe

Introduction:

Algeria is currently planning to expand and diversify the energy field, being the most important supplier of natural gas in the world, as well as the importance of the strategic position that Algeria occupies on the international economic map and in its global geopolitical affiliation, and that it is the trusted country in the Mediterranean basin, especially with regard to its economic and energy relations. With the countries of the European Union. Although Algeria has achieved self-sufficiency in national electricity production and considers the electrical sector one of the important sectors, as it is a vital resource for the industrial and service sectors that constitute a strong impetus for the development process in the country, and that it has now reached the stage of external export of electrical energy with its neighbors Tunisia and Libya, It is now seeking to embody its ambition and new challenge in expanding the scope of its exports to the Mediterranean countries, especially the European Union countries. This new embodiment of expansion in the field of energy shows the trend in exporting electricity to Europe, as part of the new Algerian leadership strategy that seeks to raise the level of Algeria's economic and political influence regionally and internationally in various sectors.

Justifications for choosing the topic:

The subject of the study was addressed, based on an attempt to clarify Algeria's pursuit of an ambitious strategic step other than the mechanisms adopted in its adopted energy policies. The ambition of electrical interconnection towards Europe is a strategic challenge and a sustainable energy development plan that enhances Algeria's energy position in the Mediterranean region, and makes Algeria a Diversification in its energy exports, especially renewable ones, and its foreign economic credits. The justifications for our study also focus on the Algerian bilateral relations with the Mediterranean countries, especially the economic, energy and political relations that serve Algeria's goals in the region, and highlight them as a primary source of energy in the Mediterranean, such as the Algerian-Italian relations, which are intended to exploit the good cooperation, and the Italian state's adoption of a bridge towards Europe to export electricity. And make Algeria an energy leader in the field of production and export of electrical energy in the Mediterranean.

Based on the above, the following problem has been raised:

The problem: How does Algeria enhance its role as a primary source of energy in the Mediterranean region?

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The following sub-questions fall within this main problem

Sub-questions:

- What are Algeria's levels and capabilities in the field of electricity production and export?
- To what extent is the electricity export project to Europe linked to Algeria's economic and political relations in the Mediterranean?
- How does strengthening the energy sector in Algeria contribute to achieving economic and social stability in the Mediterranean?

In order to attempt to research the subject of the study and answer the main problem and the sub-questions that were raised, the following main hypothesis was formulated:

Hypothesis: Algeria's energy role in the Mediterranean will be strengthened by diversifying its renewable energy capabilities, activating the challenge of producing and exporting electricity to Europe, and strengthening its bilateral economic and political relations with the Mediterranean countries (Italy).

In addition to the following **sub-hypotheses:**

- Algeria achieves self-sufficiency in electricity production and adopts a policy of exporting electrical energy to neighboring countries (Tunisia and Libya)
- Algeria's distinguished bilateral relationship with Italy contributes to supporting Algeria's strategic challenge to export electricity to Europe.

The economic and political stability of the Mediterranean is linked to the levels of energy production in Algeria and its export capabilities to Europe

Study objectives:

The study initially aims to:

- To highlight Algeria's expansion and diversification in the energy field, based on its energy capabilities at the continental and global levels (oil and gas), in addition to its strategic location that qualifies it to be a primary source of energy in the Mediterranean region.
- Explaining how Algeria achieves high levels in the field of the electricity sector and that the energy ratios show Algeria as a prominent producer that is nationally self-sufficient in the production of electricity and that it has reached the export stage, especially the neighboring countries (Tunisia and Libya), in addition to researching the levels of demand and consumption of the Algerian state for this energy and the sources of its generation as energy. Renewed in Algeria and diversification in these sources
- Research into the new strategic challenge launched by Algeria for electrical interconnection with Europe, within the framework of the development plans undertaken by the Algerian state aimed at creating the reality of diversifying energy and its sources, or even research into the projects that the Algerian state has begun to implement related to increasing the production of electrical energy (through several Additional stations) and their exploitation

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- Understanding Algeria's political, economic, and energy goals in the region, and how it relies on the strength of its bilateral relations with Mediterranean countries, such as Italy, with which it has economic and energy cooperation relations that match the political and security goals in the region, which makes Algeria tend to adapt its ambition to play the role of a reliable supplier. The basic energy level is on average with the level of economic cooperation with this country

Study method:

In this study, several scientific approaches were used to address the research topic, such as relying on the descriptive approach, which helps to accurately identify those completed projects or those that Algeria is trying to introduce into service and exploitation in the field of renewable energy, which relate to the electrical sector and the stages of production and export, or those related to With the proposed investment capabilities that can be developed in Algeria, in addition to the analytical approach that was adopted in the statistics presented in the research and related to the proportions of dogs and the development of electrical consumption in Algeria, as well as the capabilities Algeria exports electricity energy to the region

The use of the descriptive and analytical method was necessary to address the issue of bilateral economic and energy cooperation in the Mediterranean, such as the distinguished Algerian-Italian relationship, which Algeria is trying to gain from this cooperation option in developing its sustainable development plans, represented by energy diversification and exporting electricity to Europe, as well as gaining and strengthening its political and energy weight in the Mediterranean. Relying on its experience as a primary supplier of gas to European countries

According to what was presented, the study plan was approved according to the following division:

the plan:

- 1: The reality of the electrical sector in Algeria: levels of production and export
 - 1.1 Sources and power plants in Algeria
 - 1.2 Evolution of electricity demand and consumption in Algeria:
 - 1.3 Renewable energy: electricity investment capabilities in Algeria
 - 2: Algerian-European cooperation in the field of electric energy production: the strategic challenge
 - 2.1 Algerian-Italian agreement in the field of electrical energy
 - 2.2 Electrical connection between Algeria and Europe
 - 2.3 Algeria as a source of electricity in the Mediterranean: the political aspect
- Conclusion:

1- The reality of the electrical sector in Algeria: levels of production and export

Today, the electricity sector in Algeria takes a large share of the state's interests, by providing this vital resource to the family sector, the industrial sector, the service sector, and

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public facilities. The Algerian state also seeks to permanently adapt supply and demand for the electricity commodity, since it is a commodity that cannot be stored, and this is to face the steady and increasing demand for electrical energy. The electricity sector in Algeria, represented by the Sonelgaz complex, seeks to increase production, expand networks Transferring electrical energy, increasing generation stations, as well as ensuring a policy of rationalizing the use of electrical energy and attracting investments¹.

1.1- Sources and power plants in Algeria

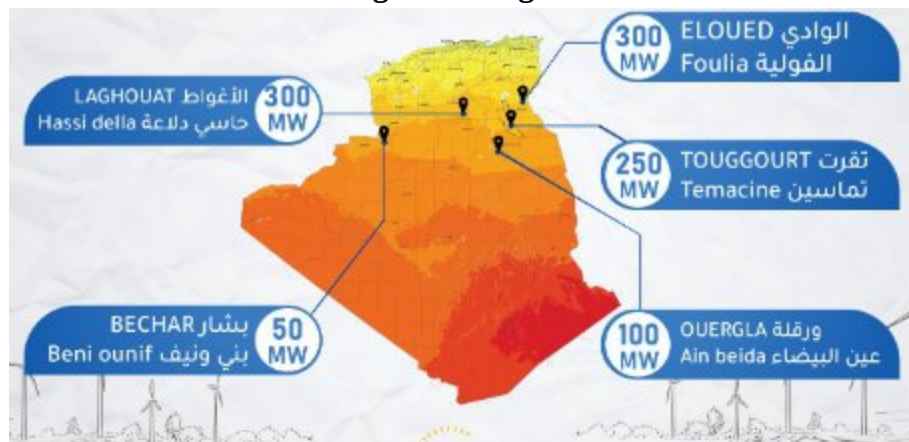
Algeria is characterized by a huge reserve of renewable energy, especially from the sun and wind. Electrical energy in Algeria is currently produced from three main sources: natural gas, which represents 2.00%, while hydropower represents about 5%, and solar energy represents 2.9%. The production capacity of electricity in Algeria amounts to more than 25 thousand megawatts, currently, which qualifies it to cover Its internal consumption amounts to 17 thousand megawatts at peak times, and it achieves a surplus that can be exported abroad

The total electricity production in Algeria reached about 77.53 terawatt-hours, according to the latest available data for the year 2021, and the electricity mix in Algeria depends almost entirely on gas, with its percentage ranging between levels of 96% and 98%. Thus, the electricity sector in Algeria depends on Gas contributes to 97% of electricity generation, as it consumes about 65% of its natural gas production.

The year 2019 witnessed the highest new addition to gas-fired electricity capacity in Algeria, amounting to 1,916 megawatts. In 2021, the contribution of solar energy to electricity production in Algeria reached about 1.05%, while the percentage of wind energy did not exceed 0.01%, according to what was monitored by the Energy Platform. Specialized, while hydropower represents 0.12% of the electricity production mix in Algeria, and the past decade witnessed a significant decline in its share.

Algeria aims to diversify its energy mix and reduce dependence on gas, by expanding the establishment of renewable energy projects, and increasing electricity production in Algeria from these sources, as the national program aims to obtain 15 gigawatts of electricity from renewable energy sources, by 2035. It also has Algeria has great potential in the solar energy sector, as the rate of solar radiation throughout the country ranges between 2000 and 3900 hours annually, while solar energy is expected to occupy a percentage ranging between 30 To 40% of the country's electricity, by 2030, according to a report by the World Energy Forum. In addition, there is the Solar 1000 project, which will be implemented by the Sonelgaz complex, which includes the implementation of solar photovoltaic stations with a total capacity of 1,000 megawatts, in the form of shares, with a capacity ranging between 50 and 300 megawatts for each station, and the project stations are distributed over 5 states. Different: Laghouat, Ouargla, Touggourt, El Oued, Bchar..²

Map No°. 01: Electricity production plants are distributed across several different regions of Algeria



Source: from the website:

<https://thesolast.com/%20Sonalg/%20THE%20SolaTe3https://thesolast>

Electricity production stations in Algeria are distributed across several different regions within the vast area of Algeria, and the regions of the states concerned with the project as well, as we degrade that the production centers are distributed between the east and west of Algeria, so the western excerpts benefited from the Motion of Bashar (Bani and Nayef), and the rest of the stations are distributed across the eastern desert, which covers the eastern areas of them in both the Valley (Ful.) And the state of Ouargla (Ain al -Bayda), provided that the Wilayat of Laghouat, which is interested in central Algeria, covers the Laghouat station (Hassi Deliona)

Algeria counts approximately 80 electrical power production stations throughout the country, while the national coverage rate reaches 99%, the length of the transmission network reaches 33,775 kilometers, and a distribution network of more than 383 thousand kilometers, as the Algerian state announced through its government company, “Sonelgaz.” About the partial start of operation of the largest electricity production station in Algeria in the coastal state of Mostaganem, west of the country, with a capacity of 450 megawatts, out of 1,450 is the total capacity of this facility. Algeria intends to produce 15,000 megawatts of electrical energy from clean sources by 2030, the majority of which are solar plants, within the framework of the “National Renewable Energy Plan” to reduce gas consumption and increase the quantities exported, especially to Europe. Months ago, the implementation of a project to build 20 solar photovoltaic stations, the largest in the country’s history, began, to produce 3,000 megawatts by the end of 2025, which falls within the framework of the same plan. Electricity production in Algeria depends primarily on stations that operate on natural gas, in addition to others that operate on diesel. especially in the southern desert states, and a limited number using steam and water ³

The government intends to produce 15,000 megawatts of electrical energy from clean sources by 2030, the majority of which are solar plants, within the framework of the “National Renewable Energy Plan” to reduce gas consumption and increase the quantities

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exported, especially to Europe. This is before the implementation of the project to build 20 solar photovoltaic stations, the largest in the country's history, to produce 3,000 megawatts by the end of 2025, which falls within the framework of the same plan, began. It monitors the five largest basic electricity generation stations in Algeria

- "Balara" industrial zone station:

The "Bellara" industrial zone station is located at the level of the municipality of Milia in the state of Jijel, and its production capacity is 1,400 megawatts. This station is considered one of the most important and largest stations located on the national territory. It plays a major role in enhancing the national needs in the field of energy because it is connected to the high voltage 400 kilovolts connected to the national grid, and this station plays a major role in supplying the Balara iron and steel complex located in the same state.

- Hajrat Al Nous Power Station:

The Hajrat El Noous power station is located in the state of Tipaza and is the first independent power generation station in Algeria. The Hajrat El Noous power station began commercial operations in 2009. It currently contributes to about 10 percent of the total power generation in Algeria. The production capacity of the Hajrat El Noous power station is 1,227 megawatts. Divided into three power lines. The capacity of each is 400 MW, and operates on a highly efficient combined cycle system. The station is designed to operate on natural gas with distilled petroleum as a backup fuel.

- Ras Janat Station:

The Ras Jannat power station is located in Ras Jannat, Boumerdes Province, and its production capacity reaches 1,200 megawatts. The project for this station was built by the South Korean Daewoo Engineering and Construction Company in late 2012. It entered production at full capacity in mid-2019.

- Targa station:

The Targa station is located in the city of Targa in the state of Ain Temouchent and has a production capacity of 1,200 megawatts. Construction work on this station began in February 2008 and ended in November 2012. It was officially inaugurated in December 2013, at an estimated cost of 1.9 billion US dollars.

- Kediye Al Darawish Station:

The Kadiyyat al-Darawish station for electricity production is located in the area called "Kidiyat al-Darawish" in the state of al-Tarfen. This station, with an estimated production capacity of about 1,200 megawatts, was built in 2012. Its value at that time was estimated at the equivalent of 7.2 billion dollars⁴

-Sonaktar power plant

The power generation station in the state of Mostaganem, which was launched in 2024. The area of the station itself is 40 hectares, while 1,500 workers currently work there. It is expected that the number of station workers will rise to about 2,500 by the year 2025. It is also expected that this energy project will contribute to supplying the neighboring states. The state of Mostaganem, similar to Oran and Maskar, has electrical power, and the station's production rate reaches 1,450 megawatts.

1.2 Evolution of electricity demand and consumption in Algeria

- Enter The development of demand for electrical energy in Algeria during the period 2008-2013:

The electricity sector in Algeria is characterized by its rapid and continuous growth. Although this indicates the development of the economic sectors and the rise in the standard of living, it also gives an indication of the existence of an imbalance in the pricing of electrical energy and its failure to reflect the real costs, which causes a large waste of consumption and imposes large burdens on electricity. The state must provide new capabilities every year. The growth of electricity from 2008-2013 was about 8.5%, while the growth rate of global electrical energy was 7.2%, meaning that electrical energy is growing at about two and a half times global growth rates. While the economic growth rate was weak and did not exceed global growth rates of 2.3% annually, and global population growth reached about 5.2% annually, or about twice the population rate, we conclude that the main reason for the acceleration in demand for electricity is support policies and practices. Usually, economic and electrical growth² grow in a balanced and almost equal manner, and economic growth is what leads the growth in demand for electricity³, except in Algeria, the growth in demand for electricity is three times the growth of the economy, and the reason for this is subsidies, that is, selling electricity at a price less than the cost. Production. This leads to waste, excessive consumption of electricity, and large, unjustified investments⁵

The table below shows the electrical energy produced in Algeria 2008-2013.

Table1: Electrical energy produced in Algeria for the years (2008-2013)

Unity (TWH)

YEAR	2008	2009	2010	2011	2012	2013	Growth rate
Electrical energy produced	39986	42770	45173	48872	54086	56148	5,8

Source : General Secretariat of the Arab Union, Statistical Bulletin for 2013, Issue22 , 2013

From the previous table, we note that the production of electrical energy in Algeria is constantly increasing at a rate of 8.5% on average, compared to about 3% annually at the global level. This is further evidence that electrical tariffs do not reflect the real costs, which encourages people to irresponsibly consume electricity without Directing, organizing or Effective oversight. It should be noted that the growth rate of electrical energy production is less than the growth rate of local demand for electrical energy, which amounts to 2.7%, as we mentioned previously.

-The following table shows the consumption of electrical energy in Algeria from 2008 to

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2013.

Table 2 : Electrical energy consumption in Algeria during 2008 – 2013

Unity (GWH)

YEAR	2008	2009	2010	2011	2012	2013	Growth rate
Electrical energy consumption	32584	33817	35803	38901	43150	45050	5,6

Source: General Secretariat of the Arab Union, Statistical Bulletin for 2013, Issue22 , 2013

The cost of completion was estimated at \$755 million. The station also includes 3 lines or combined cycle production units of gas and steam with a capacity of 400 megawatts per unit. The first line entered operation and production in July 2018, the second line in October 2018, and the third line entered production in mid-2019. From the previous figure, we note that electrical energy consumption is constantly increasing from 2008 to 2013 at an average annual rate of 6.5%, reaching consumption in 2008 AD. About 35,584 gigawatt hours and arrived in 2013 AD. About 45,050 gigawatt-hours. Electrical energy is consumed for many productive purposes (factories), service purposes (drinking water and sewage plants), and consumption (domestic, commercial, government and public buildings). Consequently, the electrical appliances and equipment for each sector vary, to the point that the home sector is considered one of the largest sectors consuming electrical energy. This is due to the steady and increasing urban expansion Continuous use of electrical appliances, especially air conditioners, due to high temperatures in the summer⁶

-The development of demand for electrical energy in Algeria during the period 2014 -2020

Natural gas is considered the main fuel used in generating electrical energy in Algeria, as it constitutes 98% of the total amount of fuel consumed in the electricity sector. This is due to the fact that Algeria is a natural gas producing country, so most of the installed electrical capacity operates on natural gas in In the form of steam, gas or composite turbines, The following table shows the rate of growth rates in demand for electrical loads and the electrical energy generated in Algeria during the period extending between 2014-2020.

Table 3: Evolution of demand for electrical energy 1 generated in Algeria 2014-2020

YEAR	2014	2015	2016	2017	2018	2019	2020	Growth rate
demand	63000	68000	71000	74000	77300	80100	84200	4.2

Source: Fawzi Kharit, Energy Consumption in the Electricity Sector. Arab Electricity Magazine, Issue Sixteen, p. 76.

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From the figure, we notice that there is an increase in demand for electrical energy until the year 2020, with a growth rate of 02.4% on average during the period mentioned above, as the year 2020 reached 84,200 gigawatt-hours.

-The development of demand for electrical energy in Algeria during the period 2020-2025:

The total electricity production in Algeria reached about 77.53 terawatt-hours, according to the latest available data for the year 2021, and the electricity mix in Algeria depends almost entirely on gas, with its percentage ranging between levels of 96% and 98%. According to the specialized Algerian energy platform, the electricity sector in Algeria depends on gas to generate electricity by 97%, as it consumes about 65% of its natural gas production. In 2021, the contribution of solar energy to electricity production in Algeria amounted to about 1.05%, while the percentage of wind energy did not exceed 0.01%. While hydropower represents 0.12% of the electricity production mix in Algeria, the past decade has witnessed a significant decline in its share⁷

Algeria aims to diversify its energy mix and reduce dependence on gas, by expanding the establishment of renewable energy projects, and increasing electricity production in Algeria from these sources, as the Algerian national program aims to obtain 15 gigawatts of electricity from renewable energy sources, by 2035. Algeria has great potential in the solar energy sector, as the rate of solar radiation throughout the country ranges between 2,000 and 3,900 hours annually, and it is expected that solar energy will occupy a percentage ranging from Between 30 and 40% of the country's electricity, by 2030, according to a report by the World Energy Forum. In March (2024), Algeria laid the foundation stone for the first station in the 2000 MW project, which includes the construction of 15 solar energy plants, distributed in 12 different states, with capacities ranging between 80 and 220 MW each. In addition, there is the Solar 1000 project, which will be implemented by the Sonelgaz complex, which includes the implementation of solar photovoltaic stations with a total capacity of 1,000 MW, in the form of shares, with a capacity ranging between 50 and 300 MW per station. The stations of this project are distributed in 5 different states: Laghouat, Ouargla, Tougourt, El Oued, and Béchar.⁸

Algerians pay a low cost for one kilowatt of electricity, given that the state bears the difference between its actual production cost and its marketing price to citizens. The price of a kilowatt of electricity in Algeria ranges between 1.77 dinars (\$0.013) and 5.47 dinars (\$0.04), and changes on the basis of segments, according to the volume of consumption. The Algerian government confirms that subsidizing electricity costs more than 20 billion dinars annually, which is approximately 150 million dollars.⁹

1.3 Renewable energy: electricity investment capabilities in Algeria

Given the enormous energy resources that Algeria abounds with, whether fossil fuel sources or renewable energy sources, it seeks to increase the volume of its investments and diversify them as part of an effort aimed at achieving sustainable development through greater integration of renewable energy into Algeria's energy balance. Thus, Algerian projects have

diversified in the field of valorization and exploitation. Renewable energy in electrical energy production

Renewable energy program to support electricity production in Algeria:

The National Program for Renewable Energies for the period 2015-2030: Algeria introduced a number of amendments in 2015 to the National Program for Renewable Energies that it adopted in 2011, with a special focus on solar, photovoltaic, and wind energy. The new plan provides for raising the expected energy produced from renewable energies from 12,000 megawatts to 22,000 MW by 2030 and aspires to cover 27% of The national consumption of electricity is 37% of the total installed energy, and it aims to reach more than a share of 4,500 megawatts by 2020 and is directed to the local market. The program aims to enhance the process of producing electricity from renewable energy sources (solar and wind), as it includes the completion of 60 solar photovoltaic stations. Solar thermal and wind fields

Energy efficiency and energy economy program: This policy was evident in the approval of an ambitious energy efficiency program covering all sectors of activity, especially construction, industry and transportation. After its implementation, the accumulated energy economy within 2030 will exceed 60 million barrels of oil equivalent. The prominent operations of this program are: thermal insulation of buildings. Developing the solar water heater, disseminating the use of lamps with low energy consumption, introducing energy efficiency in public lighting, improving efficiency. Energy in the industrial sector¹⁰

Industrial capabilities development program for the period 2015-2020:

The goal of the program is to increase the rate of integration of Algerian capabilities through partnership. It is expected to establish a network for the manufacture of current transformers, electric transformer batteries, cables and other equipment involved in the manufacture of photovoltaic power plants. Algeria will also be able to own The capabilities of preparation, supply and implementation by Algerian institutions, and if conditions are available, it is planned not only to export electricity produced with renewable energy, but also the skills and equipment in Production¹¹

Solar project for electricity production in 2025:

The “Solar” project, which includes 11 states, most of them in the south, at a total cost of 171.7 billion dinars (equivalent to 1.175 billion dollars), and aims to generate 15 thousand megawatts of clean electricity by the year 2035. With the expectation of producing more From 600 megawatts before the end of 2024, then moving to producing approximately two thousand megawatts by mid-2025. Considering the “Solar” project as an introduction for all customers to improve performance and achieve better results in the future, and. Just the beginning, with Algeria planning a larger project related to the green economy (Radio ·2023) On the other hand, Algeria has set a goal to produce no less than 22 thousand megawatts of electricity through renewable energy sources by 2030, including no less than 13.5 thousand megawatts of solar photovoltaic energy, i.e. more than half of the planned additional capacities, which will contribute to Total 27% of electrical energy capacity by 2030.¹²

2- Algerian-European cooperation in the field of electric energy production: a strategic challenge

Based on perceptions and starting points linked to its new energy strategy and taking advantage of the current international situation in the international system, Algeria intends a sustainable development plan through which it aims to diversify its energy exports. This is by investing in its capabilities through several projects, including two large projects, the first for electrical interconnection with Europe, which Algeria considered a strategic challenge. The second is a project to produce one thousand megawatts of electricity (Solar Project).

2.1- The Algerian-Italian agreement in the field of electrical energy

The Algerian state and the state of Italy had signed a joint declaration and four memorandums of understanding and cooperation covering several sectors, during the visit of the Prime Minister of Italy, Giorgia Meloni, to Algeria in 2023 on a working and friendship visit at the head of an important ministerial delegation. The agreements that were signed, in front of Algerian President Abdelmadjid Tebboune and Giorgia Meloni, included two memorandums of understanding between the "Sonatrach" group and the Italian "Eni" group, the first related to improving energy interconnection networks between Algeria and Italy for the sake of sustainable energy transition, while the second related to technological cooperation to reduce Gas flaring, valorization and other emissions reduction techniques.

The President of the Republic, Abdelmadjid Tebboune " **affirmed through this agreement Algeria's keenness to strengthen its position as a strategic partner of Italy in the energy field and its commitment to its role as a reliable supplier regionally and internationally, noting the level and quality of relations between the two countries, especially during recent years. Meanwhile**", Italian Prime Minister Giorgia Meloni explained that Algeria and Italy **"are studying for this purpose the completion of a new pipeline that would also allow the transfer of hydrogen and electricity, and that in light of the energy crisis that Europe is experiencing, Algeria can become a leader on the African and global levels, and Italy is the gateway to entry and supply of this. Energy towards Europe"**.

Thus, Sonatrach and Sonelgaz signed a protocol of understanding with the Italian company Eni, which includes conducting joint feasibility studies for an electrical interconnection project between the Algerian and Italian electrical networks, through the completion of a submarine cable, with the aim of exchanging and supplying electricity to the Italian and European markets. It will be This project, which has a very strategic dimension, is the first of its kind, and will allow the creation of an energy center linking Algeria to Europe, in a step that came to strengthen the existing cooperation between Algeria and Italy within the framework of The two protocols of strategic intentions signed in Algeria in January 2023. The two aforementioned protocols included a set of objectives, most notably identifying future joint projects related to energy supplies, energy transition, and decarbonization.

This Algerian-Italian cooperation confirms that the concluded bilateral protocol reflects Algeria's ambitions to strengthen its position as a major supplier to Europe in the field of energy, including electricity¹³

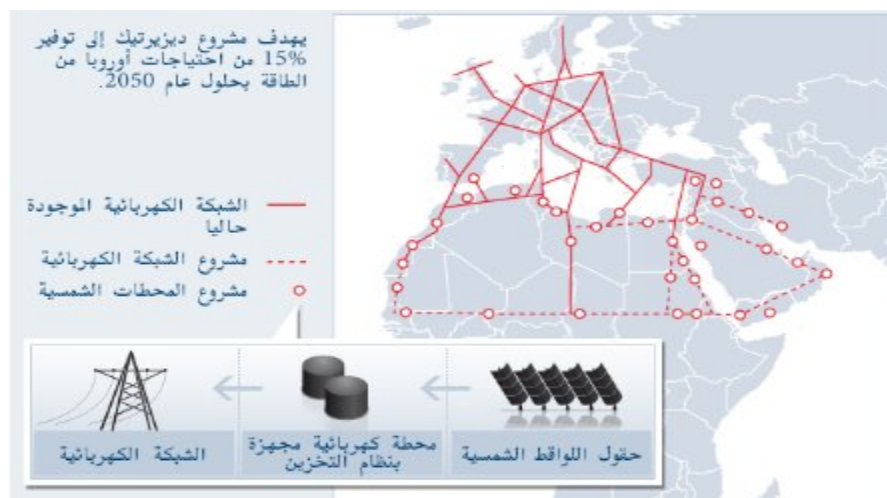
The Sonatrach complex had explained that this protocol would allow the three parties to conduct joint feasibility studies for an electrical interconnection project between the

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Algerian and Italian electrical networks, through the completion of a submarine cable, with the aim of exchanging or supplying the Italian and European markets with electricity. This project will have a very strategic dimension, the first of its kind, and will allow the creation of an energy center linking Algeria to Europe. In principle, this agreement aims to define the general framework and establish the foundations and principles according to which the concerned parties agree to conduct joint feasibility studies for the electrical interconnection project between the Algerian electricity networks. And the Italian, this is in order to exchange electricity or supply it to the Italian and European market, through the establishment of a submarine cable linking Algeria to Italy.

Map No°: 02: Electrical networks are distributed from different regions towards Europe



Source: from the website: <https://www.google.dz/imgres?imgurl=https>

Through the map in which the straight lines represent the electrical network embodied on the ground, while intermittent lines show future projects for electrical networks that currently aims to embody them realistic, we note that electrical networks are actually embodied in the country of Algeria and have the full capabilities of export towards Europe, through the lines that it possesses to export gas, Algeria seeks to exploit these capabilities in its future credits to challenge export Electricity towards Europe, especially the state of Italy, while sharing with several countries several future projects, such as adopting additional distribution networks or adopting energies

On the other hand, Sonelgaz also confirmed this strategic cooperation, which comes in implementation of the instructions of the Algerian government leadership led by the current President of the Algerian Republic, Mr. Abdelmadjid Tebboune. It confirmed that it is an additional step that strengthens Algeria's ambitions to position itself as a primary supplier of energy, especially green energy. Towards Europe, and this is in view of the surplus in electricity production, thanks to the large investments that have been pumped into this sector in recent years, which have made the country one of the largest producing countries. For electricity at the continental level, the Algerian company "Sonelgaz" also pointed out that this step coincides with the beginning of the implementation of a project to produce 15 thousand

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megawatts of electricity from renewable sources, most of which are from photovoltaic solar plants. Algeria has begun implementing two solar photovoltaic energy projects under the names “Solar 2000” and “Solar 1000”, to produce 3,000 megawatts of clean electrical energy within the national plan that aims to reach 15,000 megawatts by the year 2030. The Algerian authorities confirm that within the framework of these two projects 20 photovoltaic solar plants will enter production by the end of 2025, with a total capacity Estimated at 3 thousand megawatts

2.2- Electrical connection between Algeria and Europe

It is expected that the electrical interconnection project between Algeria and Italy, with an important strategic dimension, will be the first of its kind, which will allow the creation of an energy center, linking the Algerian state located in North Africa as a major supplier to Europe in the field of energy, including electricity, and the countries of the continent. European countries in the Mediterranean basin. The new charter also allows Algeria, represented by Sonatrach and Sonelgaz, and Italy, represented by Eni, to conduct joint feasibility studies for the electrical interconnection project between Algeria and Italy, which will be implemented by extending a marine electricity line, with the aim of exchanging electricity, or delivering it to the Italian and European markets ¹⁴

Algeria also placed the electrical interconnection project with Europe at the top of its priorities in its program to increase and diversify energy exports, in addition to oil and gas. It stressed that it is a safe and reliable supplier of gas, especially to Europe, and with the capabilities it possesses, it can be a reliable supplier of electricity tomorrow with high efficiency. Algeria has Currently, there is an electricity production capacity of more than 35 thousand megawatts, with an average need of 13 thousand megawatts, and a peak that does not exceed 17 thousand. megawatts, allowing it to offer a daily capacity of 10,000 megawatts in the regional market. It also considers that the electrical connection with Europe, especially the Gentile Bank, falls within the integration of the two shores of the Mediterranean, through the establishment of corridors from west to east.

Algeria has learned through its national company, “Sonelga”, that the challenge of Algeria’s electrical connection with Europe coincides with the beginning of the implementation of a project to produce 15,000 megawatts of electricity from renewable sources, most of which are from photovoltaic solar plants. In the year 2023, Algeria began implementing two solar photovoltaic energy projects under the names “Solar 2000” and “Solar 1000”, to produce 3,000 megawatts of clean electrical energy within the national plan that aims to reach 15,000 megawatts by the year 2030. The Algerian authorities confirm that within the framework of With these two projects, 20 solar photovoltaic plants will enter production by the end of the year 2025.

Algeria's current electricity production is estimated at 26 thousand megawatts, most of which is from natural gas stations, while consumption at peak times does not reach 20 thousand megawatts, which means that more than 6 thousand megawatts is surplus

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production. With all their proposals, the authorities in Algeria are racing against time to increase the country's production of renewable energies, especially solar ones, to curb the significant growth in internal consumption of natural gas, whether by the population or electricity production plants, and to provide gas burned internally for export abroad. Despite the intense heat wave, and domestic consumption reaching historic peaks in the year 2024, Algeria, the Arab country, maintained the same levels of electricity export to Tunisia, at a rate exceeding 500 megawatts per day.

The project, according to the Algerian vision, starts from the Chafia region in the state of El Tarf on the eastern coast of the country, and crosses the Mediterranean Sea to the island of Sardinia, with an initial annual transmission capacity estimated at 2,000 megawatts. The Algerian authorities confirm that the "huge" project needs funding from the European Commission, which finances strategic projects, such as energy, outside the borders of the European continent, if they are included in the list of projects of common interest to the countries of the Union.¹⁵

2.3 Algeria as a source of electricity in the Mediterranean: the political aspect

Algeria Algeria has placed the electrical connection with Europe at the top of its priorities at a time when several European reports indicated that Algeria is a candidate to become the electric battery for Europe, given that Algeria is a safe and reliable supplier of gas, especially to Europe. To implement the new trends, this will depend, according to Algerian experts, in particular on developing electricity production capabilities, diversifying the energy mix by increasing the use of renewable energy and hydrogen, encouraging national industrial integration, and making optimal use of the energy chain by reducing costs and relying on digitalization.

The Algeria Protocol was signed by four Mediterranean and Maghreb energy associations, of which the Sonelgaz group is a member, in Algeria, with the aim of strengthening regional cooperation and integration in the field of energy. This was signed by the Maghreb Electricity Commission (COMELEC), the Mediterranean Energy Observatory, and the Association of Electricity Transmission Network Managers. of the Mediterranean Sea and the Mediterranean Association of National Energy Control Agencies, and the signing ceremony took place during the joint conference held under the slogan "Electrical Interconnection in the Mediterranean Basin, A factor for regional integration and a catalyst for the energy transition." The process of exporting electricity to neighboring countries, such as Tunisia and Libya, which began years ago, takes place on a daily basis.

The huge project to interconnect northern Algeria and Europe via a submarine cable emerged in mid-2022, in the wake of the Russian-Ukrainian war, as Italy, along with the countries of the continent, sought to find an alternative to Russian energy supplies. The Algerian Ministry of Energy stated at the time that the State Electricity and Gas Company

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discussed with the Italian Ministry of Energy Transition, during a conference on the management and administration of electricity systems in the capital, Rome, opportunities to launch a submarine cable to transmit electricity to link the eastern coast of Algeria and the Italian island of Sardinia, and thus Algeria is preparing to begin the transition to the next stage. New in the energy field through the export of electricity, by connecting the countries of the Union with high-voltage power lines, at a time when reports indicate that Algeria is nominated to serve as the European continent's battery.

By signing the Algerian-Italian protocol to construct a submarine cable, it aims to exchange or supply electricity to the Italian and European market. This project, with a very strategic dimension, will be the first of its kind, which will allow the creation of an energy center linking Algeria to Europe and confirms Algeria's ambitions to strengthen its position as a major supplier to Europe in the field of energy, including electricity. Algeria appears to be targeting an ambitious package of plans to strengthen its role in the Mediterranean and globally. Especially since the state's qualifications and resources allow it to implement this. Especially since Algeria plans to fully meet domestic demand and expand exports at the same time. This requires working to diversify resources and develop energy fields in parallel, as it relies heavily on gas to generate electricity, and the increase in hydrocarbon production indicates a surplus in supplies sufficient to meet local demand, and the expansion of exports as well, and this is what led the energy sector to realize this equation in Algeria. In parallel with the diversification of sources (whether through fossil fuels or renewable sources), the state is focusing on starting a new trend and breaking into the European electricity market by linking with Italy.¹⁶

Algeria is betting on the diversification of energy sources, especially renewable ones, including the production of electric energy, based on its experience in supplying gas to European partners and its great energy potential. In light of the changes taking place in the international energy market, Algeria is looking to position itself as a difficult number in the "electric energy" equation in the Mediterranean region. And becoming a "safe and reliable supplier of electricity." With this economic ambition, Algeria has turned into a destination for the Europeans in order to embody long-term strategic partnerships, not only in the field of natural gas supply, but also in the areas of renewable energies, and this is due to the various offers and agreements signed with the Algerian side to benefit from the enormous energy potential that the country abounds with." This trend has become a strategic challenge and a priority for Algeria, because energy is a major catalyst for any development dynamism in the country."

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Map No° 03: The gas pipelines are distributed from Algeria towards Europe directed to exploitation within the electricity export project



Source: from the website: <https://www.google.dz/imgres?imgurl=httpsfattaqa>

The types of networks that link Algeria vary and distributed according to the partnerships concluded by Algeria with various European countries, the map shows the lines concerned with the export of Algerian gas for both the state of Italy and the state of Spain, this valuable experience in dealing with energy files with its economic and political aspects that Algeria can adopt it within another network of renewable energy that starts from the gas experience and expands other embodiment of initial sources such as solar energy And the wind energy, but Algeria, despite the start of its strategic challenge in exporting electricity towards Europe from an initial chest, is the Algerian gas, but it is trying to integrate its expertise and second

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relations in energy exchanges to expand towards renewable energies, especially what is attached to the photovoltaic energy, and hydrogen energy

On the political side, the European Union itself pays special attention to achieving political stability in Algeria, given its pivotal role in supporting energy security for the countries of the European continent, and that Algerian political stability is crucial to ensuring the continued flows of gas and electricity towards Europe, with the expectation of an increased role for renewable energy in Strengthen this partnership. In addition to the confirmation by the current President of the Republic, Mr. Abdelmadjid Tebboune, during his electoral campaign, that his current second term will be exceptionally economic, with a focus on diversifying the economy and energy sources.

Also, because energy diplomacy enhances national, regional and global energy security, and serves common interests, Algeria has become in a position of real power that enables it to practice active and effective energy diplomacy in the Mediterranean region. Also, Algeria seeks to build consensus with European partners within the framework of electricity diplomacy, by developing The national interconnection of the electricity network between the North and the South, and this strategic challenge will enhance local electricity supplies and open horizons for exporting clean electricity to Europe and Africa.¹⁷

Conclusion:

The electricity sector in Algeria is characterized by its rapid and continuous growth. Algeria aims to diversify its energy mix and reduce dependence on gas, by expanding the establishment of renewable energy projects, increasing electricity production in Algeria, expanding electrical energy transmission networks, increasing generation stations, and ensuring a policy of rationalizing the use of electricity. Electric power and bring Investments, and all of this is within an effort aimed at achieving sustainable development through greater integration of renewable energy and electrical energy into the energy balance of Algeria. Achieving the level of surplus in electricity production that occurs in Algeria is due to the same large investments that were pumped into this sector, which made it Algeria is currently one of the largest electricity producing countries on the continent

Within the framework of a new energy strategy and taking advantage of the changes taking place in the international system, Algeria is adopting a sustainable development plan through which it aims to diversify its energy exports and exploit its potential through several new development plans, including the ambition of electrical interconnection with Europe, which Algeria considers a strategic challenge, as well as through projects directly related to it. Or indirectly to produce electricity in Algeria and export it to neighboring countries and to the Mediterranean countries

Algeria is betting on the diversification of energy sources, especially renewable ones, including the production of electric energy, based on its experience in supplying gas to European partners and its great energy potential. In light of the changes taking place in the international energy market, Algeria is looking to position itself as a difficult number in the “electric energy” equation in the Mediterranean region. By becoming a safe and reliable

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supplier of electricity, Algeria, with this economic ambition, has become a destination for the Europeans in order to establish long-term strategic partnerships, not only in the field of supply. With natural gas, but it goes beyond it to the fields of renewable energies, and this trend has become a strategic challenge and a priority for Algeria, as energy is a major catalyst for the development dynamism in the country.

Algeria is currently keen, at the forefront of its Mediterranean interests, to strengthen its position as a strategic partner of the State of Italy in the energy field and its commitment to its role as a reliable supplier regionally and internationally. In light of the ongoing energy crisis taking place in Europe, Algeria can become a leader at the African and global levels in the field of energy (oil and gas). The state of Italy and Algeria's bilateral political and economic relations with it are a new opportunity and an entry door to supplying this energy to Europe with a new strategic challenge, which is a challenge. Exporting electricity to Europe

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