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Energy policy in the context of sustainable development: Case of Morocco and Algeria

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Abstract

At the dawn of the twenty-first century, one of the major problems of mankind is to combine the energy, the respect for environment. A problem of sustainable development has been clearly demonstrated in the Earth Summit in RIO (2012). Among the major battles to be fought in this century for the survival of the planet is to include energy efficiency as an international political priority, reduce emissions of greenhouse gases. Renewable energy, inexhaustible, clean, are needed in these conditions as a priority.

As part of its energy strategy, Morocco gives priority to the development of renewable energy and to the sustainable development.

The Moroccan Law on Renewable Energy aims to promote energy production from renewable sources, its marketing and its export by public or private entities.

The Law of Energy Efficiency aims to integrate energy efficiency techniques in a sustainable manner.

It is created under Law No. 57-09 "a Moroccan Agency for Solar Energy" aimed to achieve a development program of integrated projects for generating electricity from solar energy, with a minimum total capacity of 2000 MW.

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Morocco offers many investment opportunities in the sector of solar energy, thermal and photovoltaic energy with the launch of several programs. In addition, the government has developed a program of development of the Moroccan market for solar water heaters. Morocco is also involved in a wide wind program.

The Algerian energy strategy is decidedly towards sustainable development by integrating the promotion of renewable energy. The legislative and regulatory framework adopted in recent years testifies to this irreversible commitment.

Executive Decree n ° 13-218 of 18 June 2013 lays down the conditions for granting premiums for the costs of diversification of electricity production from renewable energies.

Two interministerial decrees of 28 October 2012 set out the procedures for monitoring the "National Fund for renewable energy and cogeneration" as well as the conditions for access to the fund, which is open to operators of public and private sectors.

A national program for development of new and renewable energy (NPRE) in Algeria includes the realization of 67 projects, 27 solar power plants, 27 diesel hybrid power plants and TG, six solar thermal power plants and seven wind farms which allow at the horizon 2030 the production from renewable energies of 40% of the needs of Algeria in electricity.

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1. Introduction

Today, large battles are to be undertaken during the century for the survival of the planet: include energy efficiency as a priority in international politics, reduce emissions of greenhouse gases, save energy for economic development and reducing inequalities, empower stakeholders, strengthen the global regulation [1].

Moroccan energy strategy gives priority to the development of renewable energy and sustainable development.

Morocco has an absolutely huge solar potential (a potential of 2600 kWh/m²/year) which gives him the means to meet its own needs in clean energy and also for export.

In Morocco, the goal for 2020 is to increase to 42% the share of renewable energies in the energy capacity installed in Morocco. Important initiatives have been launched such as the program for the development of solar water heaters and electricity production from solar energy.

Algeria is firmly committed to the promotion of renewable energy in order to provide comprehensive and sustainable solutions to environmental challenges and to the problems regarding the conservation of the energy resources of fossil origin. In addition, a favorable legal framework for renewable energy development has been adopted.

Algeria has one of the largest solar fields in the world. It is valued at more than 3,000 hours of sunshine per year and 5 KWh of daily energy received on a horizontal surface of 1 m² on most of the country [2].

The national program for development of new and renewable energy (NPRE) in Algeria includes the realization of 67 projects, which will allow by 2030 to produce, from renewable energies, 40% of the needs of Algeria in electricity.

Nomenclature

NPRE	National program for development of renewable energy
NOE	National office of electricity
CSP	Concentrated solar power
MASE	Moroccan Agency for Solar Energy
MW	Megawatt
GW	Gigawatt
GWh	Gigawatt-hour
TG	Gas turbine
APRUE	Agency for the promotion and rational use of energy

2. Moroccan energy policy in the context of sustainable development

The main laws that govern the field of renewable energy in Morocco are:

2.1. Law No. 13-09 on renewable energies of 11 February 2010

Moroccan law on renewable energy opens up this sector to competition by allowing public or private persons to exercise the activity of production of electrical energy from renewable sources.

The law introduced an authorization scheme, the realization, the exploitation, the extending of the capacity or the modification of the installations of production of electrical energy from renewable energy sources, whose installed power is greater than or equal to 2 megawatts.

Are subject to prior declaration, the realization, and the exploitation, the extending of the capacity or the modification of the installations of energy production:

- Electrical from renewable energy sources, when the installed power, per site or group of sites belonging to the same operator, is less than 2 megawatts and more than 20 kilowatts;
- Thermal from renewable energy sources when the installed power, per site or group of sites belonging to the same operator, is greater than or equal to 8 megawatts thermal.

The Installations of production of electrical energy from renewable energy sources can be connected only to the national electrical grid of medium voltage, high voltage or extra high voltage.

The electrical energy produced by the operator of one or more installations of production of electrical energy from renewable energy sources is destined at the national market and at exportation.

For the commercialization of electrical energy produced from renewable energy sources, the operator benefits of the right of access to the national electrical grid of medium voltage, high voltage and extra high voltage, in the limit of the technical capacity available of said network.

Finally, with regard to sanctions and modalities of application of the law, measures of control of installations of electrical energy production from renewable energy sources can lead to administrative and criminal sanctions in case of infringements [3].

2.2. Law No. 47-09 on energy efficiency of 17 November 2011

This law aims to increase energy efficiency in the use of energy sources, avoid the waste, reduce the burden of energy cost on the national economy and contribute to sustainable development.

It also tends to integrate to a sustainable manner the techniques of energy efficiency in all sectoral development programs, to encourage industrial companies to rationalize their energy consumption, to generalize energy audits, to implement codes of energy efficiency specific to different sectors, to promote the development of solar water heaters, to generalize the use of low consumption lamps and adapted equipments to the level of public lighting.

To improve energy efficiency in key sectors of the national economy, means and measures of incentives will be put in place.

Apparatus and equipments operating by renewable energy, offered for sale on the national territory must comply minimum energy performances laid down by regulation.

By complement of the urbanism legislation, «the general regulations of construction» must also set rules of energy performance of constructions to ensure a better energy balance of buildings per climatic zones by treating, in particular, of the orientation, of the lighting, of the insulation and thermal flows, and other intakes of renewable energy in order to strengthen levels of performance of constructions to edify or modify [4].

2.3. Law No. 57-09 bearing the establishment of the company «Moroccan Agency for Solar Energy. »

It is created under this law, a company called "Moroccan Agency for Solar Energy "(MASE).

The company aims to realize, in the context of a convention with the State designated hereafter by «Convention», a program of development of integrated projects of electricity generation from solar energy with a minimum total capacity of 2,000 MW, hereafter called 'program'.

The company is loaded of the conception of projects of integrated solar development, hereafter called « solar projects», in the zones of the national territory apt to host power plants of production of electricity from solar energy, as defined in the « Convention ».

The energy produced by the power plants of production of solar energy is intended with priority for the satisfaction of national needs.

The electricity produced is acquired in whole by the National Office of Electricity (NOE) or any other organization, public or private, under the conditions and according to modalities determined by convention between the State, the society and the NOE or the organisation above.

However, part of the electricity generated may be exported [5].

3. Some projects in the field of renewable energies

Morocco offers many investment opportunities in the sector of solar energy, thermal and photovoltaic, with the launch of several structuring programs, including the Moroccan Project of Solar Energy. This integrated development project seeks the establishment in 2020 of a capacity of electrical production from solar energy with a total capacity of 2,000 MW in five sites: Ouarzazate, AinBniMathar, Fom Al Oued, Boujdour and Sebkhatah. Two technologies, Concentrated Solar Power (CSP) and Photovoltaic are envisaged for these different stations. This program will increase the share of solar energy in the total electrical capacity to 14% by 2020 and will prevent the emission of 3.7 million of tonnes of CO₂ per year.

In addition, the government has developed a program of development of the Moroccan market for solar water heaters (Promasol). This program aims to install 440,000 m² of solar thermal collectors in 2012 and 1.7 million of m² in 2020. In terms of annual thermal energy, these figures correspond to 1,190 GWh by 2020. This program will prevent the emission of 920,000 tonnes of CO₂ per year and will create 920 permanent jobs.

As part of the same strategy, Morocco engages in a wide wind program to accompany the development of renewable energy and energy efficiency in the country. The Moroccan Integrated project of Wind Energy, spanning a period of 10 years for an investment total estimated at 31.5 billion dirhams, will enable the country to increase the installed electrical power, from wind energy, of 280 MW in 2010 to 2,000 MW for 2020.

The development of 1,720 MW of new wind farms for 2020 is provided in the context of the wind project: 720 MW under development in Tarfaya (300 MW), Akhfenir (200 MW), Bab El Oued (50 MW), Haouma (50 MW) and JbelKhalladi (120 MW). 1,000 MW are planned on five new sites chosen for their big potential: Tanger 2 (150 MW), El BaidaKoudiaTetouan (300 MW), Taza (150 MW), Tiskrad at Laayoune (300 MW) and Boujdour (100 MW).

Thus, this wind program aims to increase the share of wind energy in the total electrical capacity at 14% for 2020 in order to reach a capacity of production from wind energy of 2 GW and an capacity of annual production of 6,600 GWh, corresponding to 26% of the current production of electricity. This program also aims to save fuel (1.5 million of tonnes equivalent oil annually), or 750 MUSD, and prevent the emission of 5.6 million of tonnes of CO₂ per year [6].

4. Algerian energy strategy in the context of sustainable development

The main laws that govern the field of renewable energy and state incentives enjoyed by this sector are:

- The Law on energy management (1999);
- The Law on electricity and gas distribution by pipeline (2002);
- The Law on the promotion of renewable energies in the context of sustainable development(2004).

Already cited in « A. Ghezloun; S. Chergui; N. Oucher. "Algerian energy strategy in the context of sustainable development (Legal framework)". Energy Procedia 6, pp. 319-324, 2011 (Elsevier – Science Direct) ».

- The twointerministerial orders of 28 October 2012 on the "National Fund for renewable energy and cogeneration."
- The executive decree n ° 13-218 of 18 June 2013 laying down the conditions for granting premiums for the costs of diversification of electricity production.

4.1. Interministerial orders of 28 October 2012 on the "National Fund for renewable energy and cogeneration."

These interministerial orders set the access conditions to the Fund that is open to operators of sectors public and private and modalities of its monitoring. Under the nomenclature of receipts, it is indicated that these latest are constituted of 1% of oil royalties and all other resources or contributions.

Expenditures include a series of chapters on the contribution to the financing of actions and projects included in the context of the promotion of renewable energies and cogeneration. the projects are related on production of electricity from renewable energy sources and / or cogeneration systems, purchase of equipments for electricity production from renewable energy sources and / or cogeneration systems.

The texts state that the eligibility of actions and projects to aids given by the national fund for renewable energy and cogeneration." is subject to the prior approval of the Minister of Energy and that the aids granted should not be used for other purposes only for those initially mentioned. Also, the aids granted by the Fund are subject to state control. [7].

4.2. Executive Decree No. 13-218 of 18 June 2013 laying down the conditions for granting premiums for the costs of diversification of electricity production.

The producer of electricity, from installations cited below, may benefit premiums through the sale of its electricity at a guaranteed purchase rate. It is understood by premiums for diversification costs, of electricity production, the income which can cover the additional costs generated by the production of the renewable electricity or cogeneration, while ensuring a financial profitability of the installation of production, thanks of the guaranteed purchase rate which is applicable to this latter.

Is concerned by the provisions of this Decree, the electricity produced from :

every installation using the following dies :

- Solar photovoltaic and thermal ;
- Wind energy ;
- Geothermal ;
- Waste recovery ;
- Small hydrolic ;
- Biomass.
- Any existing hybrid installation on the date of publication of this decree in the Official Journal and whose the production annual of electricity from sources of renewable energy is at least 5% of its total annual production.
- Any cogeneration installation whose installed power at ISO conditions shall not exceed 50 MW.

To benefit of guaranteed purchase price under the special regime provided for in this Decree, the producer of electricity from facilities mentioned above, must connect the installation to the network of transport or to the network of distribution of electricity.

The producer wishing to benefit from the guaranteed purchase price must lodge a demand with the Regulatory Commission for electricity and gas. The demand is lodged by the electricity productur at the same time as the demand for authorization to exploit [8].

5. Some projects

Algeria has created a green momentum by launching an ambitious program to develop renewable energies. The program consists of installing up to 22 000 MW of power generating capacity from renewable sources between 2011 and 2030, of which 12 000 MW will be intended to meet the domestic electricity demand and 10 000 MW destined for export.

In this program, renewable energies are at the heart of Algeria's energy and economic policies: It is expected that about 40% of electricity produced for domestic consumption will be from renewable energy sources by 2030.

Solar should achieve by 2030 more than 37% of national electricity production. Despite its relatively low potential, wind energy is not excluded from the program as it constitutes the second axis of development with a share in electricity production expected to reach about 3% in 2030.

Algeria also plans to install some experimental size units to test the various technologies in renewable energies such as biomass, geothermal energy and desalination of brackish water [9].

The national program adopted by the government includes the realization of 27 photovoltaic power plants, 27 diesel hybrid power plants and TG, six solar thermal power plants and seven wind farms.

The larger power plants that Algeria will achieve will be solar thermal type and be installed in the southern regions. Three power plants with a capacity of 150 MW each will be built in El Oued and Bechar.

As for the 27 photovoltaic power plants they will be connected to the interconnected network north, the most important (48 MW) will be located in the Wilaya of Djelfa, followed by that of M'sila which will have a capacity of 44 MW. Other photovoltaic power plants will be realized in Ouargla, Tolga, El-Bayadh, Mghair, AinBeida, Naama and Saïda.

The diesel power plants and TG will supply the isolated southern networks. These are small power plants that will provide electricity to poorly supplied localities such Tin Alkoum, Tin Zaouatine, M'Guiden, Idless Deb-Deb. The more powerful will be located in Adrar (20MW). Finally, for the seven wind turbines included in the program, they will be with a capacity of 50 MW and 20 MW for each of them [10].

6. Conclusion

Morocco has a considerable potential in wind energy, but also the regulatory framework promotes the investment in this sector.

In order to reduce the electric deficit and the energy dependence, Morocco must engage itself in vast wind energy programs, for the provisioning of electricity, in order to accompany the development of renewable energies and the energy efficiency in the country.

A Study of the APRUE indicates that energy demand will explode in Algeria in 2020. The needs of the residential sector will be multiplied by 2.7 while the tertiary sector will increase its electricity consumption by 3.2, an increase of 40% compared to current consumption.

The rise of renewable energies in Algeria cannot be conceived without the completion of a phased program more important of projects to produce electricity.

Energy policy should encourage the introduction of hybrid possibilities and support other forms, including electricity generation by the private sector to share the heavy burden on her. This is the only condition that the energy mix of Algeria will grow potential of renewable energy.

Algeria intends to take position as a major player in the production of electricity from solar photovoltaic and solar thermal that will be the engines of a sustainable economic development.

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