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# THE REALITY OF RENEWABLE ENERGIES IN ALGERIA

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**Abstract:**

This research aims to highlight the reality of alternative energy programs in Algeria through the presentation of thinking backgrounds about renewable energies, their advantages, obstacles and the capacities of sustainable development in the creation of new jobs. The research will also present a set of international experiences in the field of renewable energies, including the Spanish experience and the extent of its contribution to reduce unemployment. As for Algeria, we will present the national policy for the development of renewable energies through the major features of the national program for developing them, in addition to the contribution of renewable energy projects as the project Dezertec to the creation of new jobs in Algeria through the projects realized by the Algerian competencies or in the framework of partnership projects.

**Keywords**: renewable energy, fossil resources, sustainable development, labor market, green jobs.
JEL: E.60

**ملخص:**

يهدف هذا البحث إلى تسليط الضوء على واقع برامج الطاقة البديلة في الجزائر من خلال عرض خلفيات نظرية حول الطاقات المتجددة، مزاياها، معيقاتها وقدراتها على تحقيق التنمية المستدامة وخلق فرص عمل جديدة. كما سيقدم البحث مجموعة من التجارب الدولية في مجال الطاقات المتجددة، بما في ذلك التجربة الإسبانية ومدى مساهمتها في الحد من البطالة. أما بالنسبة للجزائر فسوف نقدم السياسة الوطنية لتطوير الطاقات المتجددة من خلال السمات الرئيسية للبرنامج الوطني لتطويرها، بالإضافة إلى مساهمة مشاريع الطاقة المتجددة لخلق فرص عمل جديدة في الجزائر من خلال المشاريع التي تحققها الكفاءات الجزائرية أو في إطار مشاريع الشراكة.

**الكلمات المفتاحية:** الطاقة المتجددة ، الموارد الأحفورية ، التنمية المستدامة ، سوق العمل ، الوظائف الخضراء.

## Introduction:

Under climatic changes of the world, serious consideration should be given to reduce the greenhouse effect gases emissions resulting from the use of fossil energy resources, which have a close link to these climate changes. But all of this and because of the possibility of oil depletion after less than one century as it is confirmed by many researchers, it is imperative to go to clean alternative inexhaustible energy on its multiple forms.

Based on the experts warning about the depletion of oil reserves in Algeria within 50 years, the government has sought to find alternative ways to exploit the energy on post-oil era. It has revealed an ambitious plan to product 10 per cent of electricity from renewable resources by 2020.

Sonelgaz Company prepared also in the year 20110 some projects launched in 2011, which would be a solid foundation for the deployment of this ambitious program. It concerns the project of a factory for the production of photovoltaics whose capacity is 100-120 MW, the production of gas turbines spare parts and the launch of a project to generate electricity by wind of a capacity of 10 MW, as well as the launch of two other model projects for two solar thermal stations at the provinces of El Oued and Bechar of a capacity of 100 MW for each one.

The significance of this program is reflected in its relationship with all other economic sectors as research, education, water resources and others that require more energy, plus it will positively affect social development as the factory of the production of silicon, a matter used in the production of solar panels, in 2013. This program would create 200000 jobs (100000 in the national production and 100000 in the exportation).

Based on the above, the problem of this research is centered on the following fundamental question:

**What is the reality of renewable energy programs in Algeria?**

To answer to this problem, the research will be divided into three sections: The first section is about thinking backgrounds about renewable energies, their advantages and obstacles. The second section is about the capacities of sustainable development in the creation of jobs and green jobs. While the third section deals with the national policy for the development of renewable energies in Algeria, through the major features of the national program for developing them, in addition to the contribution of renewable energy projects in reducing the development of unemployment in Algeria, through the projects realized by national competencies or in the framework of partnership projects.

## First, renewable energies

We believe it is useful before dealing with the advantages and the obstacles of renewable energies, to present some thinking backgrounds about them, by taking the subject of climate change as a direct cause for thinking about renewable energies as a sustainable alternative.

### 1. Climate change as a cause for thinking about renewable energies

The agriculture in Africa, which represents 50% of total exports and 21% of gross domestic product, is exposed to the effects of climate change. According to expectations, it will be recorded a decline in agricultural yields of 50%, in addition to the low number of lands suitable for cultivation by 2080.

In the absence of effective interventions, the number of people suffering from malnutrition will increase by 50 million people.

In addition to the above, 250 million people in Africa will suffer from water pressure in 2020. This number will rise to 350-600 million in 2050, especially in North Africa. This water pressure has disastrous effects on agriculture and industry[1]

The Climate change will also contribute to increase health burden on Africa, as a result of the movement of people, where 90 million additional people would be at risk of malaria by 2030.

We can present the annual costs total of adaptation for all sectors, according to the region as an absolute value or as a percentage from the gross domestic product during the period of 2010-2050 in the following table:

**Table (01) annual costs total of adaptation for all sectors, according to the region as an absolute value or a percentage from the gross domestic product during the period of 2010-2050:**

| | 2010-2019 | 2020-2029 | 2030-2039 | 2040-2049 |
|---|---|---|---|---|
| **Annual costs total of adaptation (billions of dollars)** | | | | |
| East Asia and the Pacific | 22.7 | 26.7 | 23.3 | 27.3 |
| Europe and Central Asia | 6.5 | 7.8 | 10.8 | 12.7 |
| Latin America and Caribbean | 18.9 | 22.7 | 20.7 | 23.7 |
| Middle East and North Africa | 1.9 | 2 | 3 | 5 |
| South Asia | 10.1 | 12.7 | 13.5 | 14.3 |
| Sub-Saharan Africa | 12.8 | 17.2 | 19.2 | 23.2 |
| Total | 72.9 | 89.1 | 90.1 | 106.2 |
| **Annual costs total as a part of the gross domestic product** | | | | |
| East Asia and the Pacific | 0.19 | 0.15 | 0.09 | 0.08 |
| Europe and Central Asia | 0.11 | 0.11 | 0.12 | 0.11 |
| Latin America and Caribbean | 0.30 | 0.27 | 0.19 | 0.16 |
| Middle East and North Africa | 0.08 | 0.06 | 0.07 | 0.08 |
| South Asia | 0.20 | 0.16 | 0.12 | 0.09 |
| Sub-Saharan Africa | 0.70 | 0.68 | 0.55 | 0.49 |
| Total | 0.22 | 0.19 | 0.14 | 0.12 |

**Source: World Bank, 2009b.**

Observation: made according to the National Center for Atmospheric Research (NCAR, humid scenario).

**1. The benefits of renewable energy**

The benefits of renewable energy, energy efficiency and decentralized energy systems can be mentioned as below [2]

- These systems rely on domestic energy resources available in the different countries, which ensures the energy security.

- Energy resources are sustainable, which means they will never deplete or damage the local, national or global environment.
- They are reliable resources. The system distributor for energy generation from a variety of renewable resources provides systems which are more durable and less prone to interruption of power supply compared to the central systems; if one of them is crashes, the whole city or the entire State sometimes will not live a case of emergency.
- These resources do not pollute the air, the land or the sea, while the air pollution by the transport and energy sectors has transformed many cities into a source of threat to our health.
- They also save the economies of crises caused by fluctuations in conventional fuel prices. Reliance on local renewable energy resources can protect local economies of the manifestations of economic chaos that arise from fluctuations in world commodities markets because of guesses.
- The distributor system is a renewable energy generation system and it remains safe from any attack, in the sense that it will not constitute a likely military targets. But even if that happens, the result will be a slight environmental damage. On the other hand, the great decentralized factories of nuclear power and fossil fuel pose a significant problem in terms of national security.
- These systems are characterized by their existence close to the communities they use, which provides a sense of the value and the common collective ownership and promotes sustainable development.
- Renewable energy systems provide new, clean and technologically developed jobs. The sector is a fast growing provider of high-quality jobs; it beats from afar in this context on the traditional energy sector, which requires the availability of a large capital.

Effectively, renewable energies have already started offering worthwhile arrangement possibilities; they allow currently the production of many kinds of products and energy vectors. This diversity of applications and the integration between their resources (sun, wind, biomass or biological materials) in addition to the good geographical distribution can allow the decentralized use of these energies, especially since this decentralized production can be achieved by adopting traditional networks actually exist: electricity grid, gas network, thermal network and fuels transport network, in a context of integration between them. All this without taking into account the potential of South-South cooperation in this domain. It is also possible to provide greater amounts of energy by applying the rational and efficient use of renewable energies which contribute to find solutions for the problems associated with the triple interface: Energy - Environment - Development. This last component (development) cannot be achieved without balanced exploitation of the geographical area. In this regard, the role of government is central because it is the only guarantor for the homogeneous and harmonious cover of the domain, and making the electricity available to all of the population of rural areas in developing countries has always been and is still an important social and economic challenge and carrier of hope for a better life for future generations and guarantor of the desired balance between the few number of population in the rural regions and the increasingly densely-populated cities.

That means that the empowerment of the rural population of the source or sources of energy enables it to stimulate economic activity which will improve the living conditions in parallel with respect to the environment and resettlement of these people to their lands, it is an important bet on the decision-makers in developing countries.

Among the solutions of the decentralized electricity production, solar option (which depends on the sun as an energy resource) has achieved a state of maturity that justifies its great adoption to meet the needs of the population of the distant dispersive loose rural regions to the energy within a utile technical and economic variety framework.

This option is actually adopted in many developing countries, and offers a sustainable alternative to traditional electrification allowing local communities (municipalities and other local structures) and decision-makers to meet the needs of rural regions to energy in an equitable manner within a framework of integration between governmental intervention and local participation.

Most of the population of developing countries, especially Sub-Saharan Africa's population, depends on bio-energy (wood) for cooking and heating. This is due to the high cost of the electricity and gas services which are not accessible to the vast majority of impoverished inhabitants of this continent, and to the absence of an effective policy to encourage reliance on renewable energies in addition to the difficulty of access to many remote rugged nature are as which makes the provision of such services (especially electricity) for them very difficult[3].

2-**Obstacles**

Future potentials and prospects of renewable energy technologies are available to contribute to meet the basic energy needs, and to support poverty alleviation and sustainable development. Different renewable energy technologies has been innovated and developed during the past two decades, and some of them has been tested in the field and has been developed on the application level, especially in the field of small and medium capacities in remote places where renewable energy has demonstrated economic effectiveness, while others are still in the step of research and development. However, it is worth saying that these technologies have not been yet used on a large scale to provide the energy services; there is still a number of constraints and obstacles facing the expansion of their use, including the high cost. Despite the technical maturity reached by electricity generation systems using wind power and solar thermal systems of a few hundred megawatts capacities, they are still unable to compete on a commercial scale, as their economies are heavily dependent on the nature of the site. It is necessary now to consider the programs of the development of these technologies and to evaluate them carefully in the sites that have great available resources[4].

**Second: Sustainable Development Potentials in Creating Jobs**

Sustainable development plays a prominent role in creating jobs which can be presented as follows[5] :

- Macroeconomic policies and sectoral development policies can promote the emergence of new economic initiatives in line with sustainable development through incentives that promote more sustainable patterns of consumption and production at the national level. The promotion of new non-polluting sectors, especially the services and the production of environment-friendly products can contribute to transform the direction of economic activities towards jobs creation in environmentally sustainable sectors.

  A study carried out by the European Commission in 1998 about the development of green jobs in the UK, for example, reflected new job opportunities in some fields such as renewable energies, refining and organic farming.

  Such initiatives are more promising in the domains where the social partners are effective and supportive for sustainable behavior, particularly where these partners will be willing to invest time and money in new technologies and environmentally sound skills.

For developing countries, new profitable projects in the environmentally sustainable economic sectors could be less common. However, the research and development in eco-technologies, eco-tourism, natural resources management and organic farming, In addition to finding and maintaining infrastructures provide all real opportunities for decent work.

The facilities managed by local communities and supporting sustainable tourism prosper in many countries. This means for fifty-five communities in the "Ecuador" which were object of surveys in 2003 a significant increase in the number of jobs and incomes over four years. Countries as "Costa Rica" have established a successful tourism industry enjoyed a good reputation in terms of sustainable development care. The labor-intensive infrastructure can provide – for countries of all developmental levels - an economically viable means to create jobs that will protect and restore the environment. Brazil has succeeded in the early seventies in putting a great program to bring oil by "cane sugar ethanol". Recently, it launched a program of "bio-diesel" which heralds expansion on a large scale.

The ethanol, which is extracted from the cane sugar grown on 1.8 million hectares, represents currently more than 35 per cent of car fuel in the country. These possibilities of transition from non-renewable energy resources to renewable fuels based on labor-intensive agricultural production could have large positive impact on employment, particularly in rural regions, while ensuring a sustainable development path behavior.

**2- Green Jobs**

The twenty-first century faces two fundamental challenges: the first one is to ward off the dangers of climate change and natural resources degradation, which would threaten the quality of life for present and future generations. The second challenge is to provide social development and decent work for all.

The recognition that these two challenges could no longer be coped has led to increase the awareness of international agencies, governments, employers' organizations, workers' syndicates, environmental groups and civil society organizations, that work which is based on usual to the strategy "growth first and cleaning later" is not economically, socially and environmentally sustainable.

Green jobs initiative launched by the International Labor Organization aims to the merger between the goals of reducing poverty and those of reducing the level of greenhouse gas emissions through the creation of decent work opportunities. This initiative is a responsive strategy to the negative effects of climate change and of the work, and it intends at the same time to reduce the environmental impact of structures and economic sectors to reach sustainable levels or to include functions preserve or re-qualify the environment including, but not limited to, jobs that protect ecosystems and biodiversity, and reduce the consumption of energy, materials and water through the use of highly effective strategies, in addition to the functions that achieve an economy free of carbon and reduce the generation of all types of wastes or pollution to a minimum level or by completely avoiding them.

The green jobs program is currently active in several countries and sectors in Latin America, Africa and Asia. The green jobs initiatives range between supporting these functions in the domains of biofuels and social housing in Brazil and in sustainable agriculture and eco-tourism in Costa Rica; in addition to the creation of green jobs in the construction sector in South Africa and the promotion of green projects organization by young people in "Kenya", "Tanzania" and " Uganda "; supporting the creation of green jobs in the field of energy, heavy industry and recycling in China and the promotion of local development and renewable energy in India. The International Labor Organization conducts a worldwide study in which it uses cases studies of several countries to assess the required skills in the context of green jobs in different sectors, and to make recommendations about the policy of the development of skills and training strategies[6]

Green Jobs are working to reduce the effects of the economic institutions and sectors on the environment and to make influence rates in acceptable levels. There are green jobs in many economic sectors from energy supply to recycling, agriculture, construction and transport. Green jobs help to reduce energy consumption, raw materials and water, from the highly-yield strategies; they also allow reducing the carbon and harmful gas emissions. In addition to minimizing or avoiding all forms of waste and pollution, and preserving the biodiversity. It is expected that green jobs will create 14.3 million new jobs in the world[7]

## Third: the Algerian Experience in the Field of Renewable Energies and its Relationship to the Labor Market

This last part is about the national policies for the development of renewable energies and their reality, in addition to their contribution to reducing unemployment through the provision of new jobs which require, in turn, a new training and dependent functions.

### 1. National policies for the development of renewable energies in Algeria

The national policies for the development of renewable energies have been put within a regulatory framework and legal texts; the main texts are: Power Control Law, Renewable Energies Development Law in the framework of sustainable development as well as the Electricity and Public Distribution of Gas Law.

These policies are based on a set of economic bodies and institutions, so that all are interested, in the limits of their competences, in the development of renewable energies. There are three bodies, active since 1988[8]:

- Renewable Energies Development Center;
- Solar Equipment Development Unit;
- Silicon Technology Development Unit.

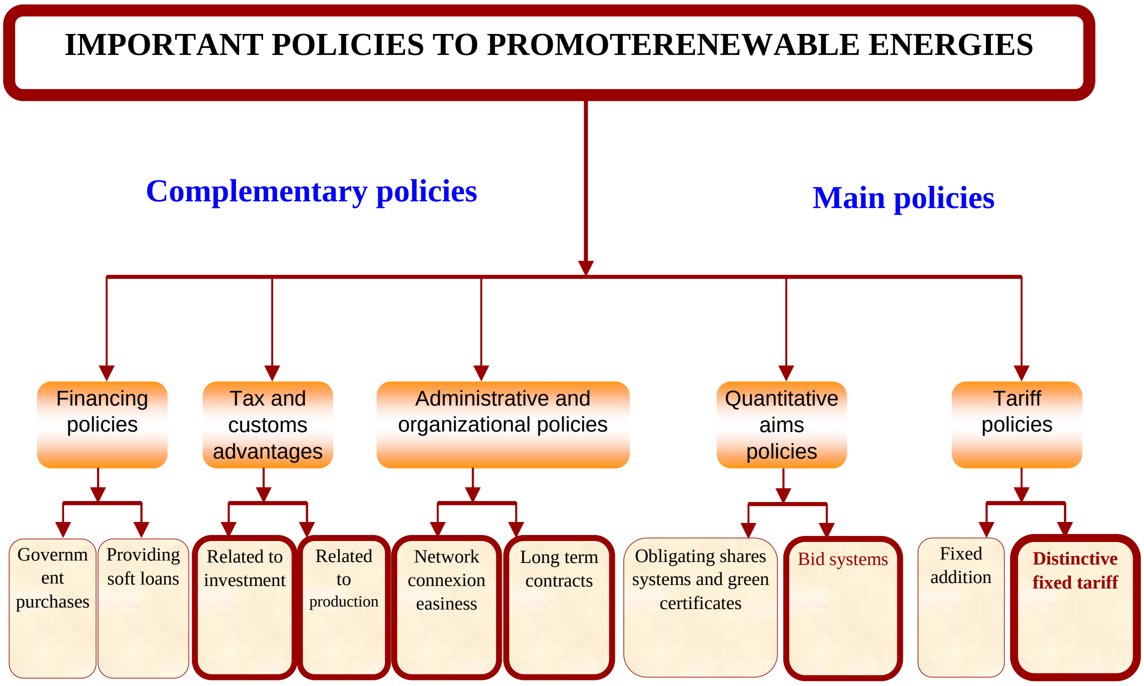
In the energy sector, the development of renewable energies activity is done by the Ministry of Energy and Mines, and the Agency of the Development and Rationalization of the Energy Use; on the other hand the Center of Research and Development of the Electricity and Gas is in charge of the completion and maintenance of the solar equipment that has been accomplished in the framework of the national program for rural lighting. In the agriculture sector, it should be noted that there is the Higher Commissionership for the Development of Steppes which carries out important programs in water pumping and electricity supply through the solar energy for the benefit of steppe areas. At the level of economic operators, there are several active companies in the field of renewable energies.

In order to put a framework in which all research efforts are valorized and to prepare an effective tool that allows to put a national policy on renewable energies, the Ministry of Energy and Mines has established a joint company "New Energy Algeria" between Sonatrach, Sonelgaz and SIM Group in 2002, whose mission is to develop renewable energies in Algeria at the industrial level. The main tasks of NEAL are:

- ❖ The development of renewable resources of energy;
- ❖ Completion of projects related to renewable energies whose the most important are:
    - ▪ Project of 150 MW solar hybridization in Hassi R'mal;
    - ▪ Project of aerial hangar with a capacity of 10 MW in Tindouf;
    - ▪ The use of solar energy in rural lighting in Tamanrasset and the South-West (the project of electricity delivery to 1500 rural houses)

The aim of the renewable energies development strategy in Algeria is to reach, by 2015, a share of 6 per cent of these energies (including cogeneration) in the national outcome of the electricity. The results of the introduction of renewable energies are:

- More exploitation of the available capacities;
- The best contribution to the reduction of the dioxide carbon emissions;
- Reducing the share of fossil energies in the national energetic outcome;
- The development of the national industry;
- Providing jobs.




## 2- The Reality of Renewable Energies in Algeria:

we present the reality of renewable energies in Algeria as follows:

### 2-1- The reality of solar energy in Algeria “Dezertec Project”

The extraordinary solar field that covers 2.381.745 square kilometers and more than 3000 hours of sun per year[9]. It is the most important in the whole Mediterranean Basin with an annual volume of 169 440 Terawatt / h. The annual rate of received solar energy is 1700 KW / h/m$^2$ per year in coastal and high plateaus areas, while it is 2650 in the desert[10]

The first efforts to exploit solar energy in Algeria has started with the creation of the first new energies commissionership in the eighties, the adoption of the South Plan in 1988, and the accommodation of major cities by equipments to develop solar energy. Though the approved legal arsenal between 1999 and 2001, the solar energy's share remains limited in Algeria and it is not used as required.

Algeria inaugurated in July 14th, 2011 the first station of hybrid energy (solar energy and gas). The production capacity of the electricity power station of Hassi R’mal in "Tighlmt" is 150 megawatts, of which 30 megawatts are of solar energy.

During the inauguration ceremony of the station supervised by the Minister of Energy and Mines Youcef Yousfi and his Spanish counterpart Miguel Sebastian, the Spanish official said that the completion of the project whose cost is 350 million euros is "a deep example of cooperation and leading experience for the Mediterranean region as a whole."
He added that the station which was built by the Algerian Company for New Energy (NEAL) and the Spanish Company “Obiener” is "a live model for power generation in rural and mountainous areas away from the traditional electric grids."

The Spanish minister stressed his country's desire to become a "strategic partner for Algeria" in the field of renewable energy.
The site of the station was chosen on 25 km North Hassi R’mal because it is near the gas facilities and thanks to the sunshine volume in the region, which is estimated at 3000 hours per year.

A group of Algerian state-owned banks contributed to 80 per cent of the project financing. The operation of the energy station will be supervised by a team of 70 people, including 65 Algerians and five Spaniards.
In addition to the energy production, the project will contribute to preserving environment because it will largely reduce dioxide carbon emissions and provide more than 7 million cubic meters of gas per year [11]

In this context, it should be noted the greatest renewable solar energy project which is “Dezertec”: a huge project that aims to connect several big solar thermal energy stations. It is also possible that it would include renewable energy fixing as wind farms, as the electricity distribution grid that supplies Africa, Eastern Europe and the Middle East.

Dezertec project is not limited to the production of energy, but it also contributes to the provision of jobs, in addition to its contribution to the training and collection of experiences and competencies and to the training of local labor that accepts to work in difficult desert conditions.

The major works have already begun despite the major challenges; more than 12 countries, especially Germany, are competing to put quickly their knowledge in the production of the first electrosolar current in North Africa including Algeria, in order to provide Europe with 15% of its energetic needs; during that, it is expected to establish more than 12 solar centers with a production volume of 5 MW each center in North Africa and the Middle East[12].

It should be noted that Algeria is also interesting in solar photovoltaic energy; the project of “photovoltaic station connected to the network whose generating set has been set up on the roof of the administrative building of the Renewable Energy Development Center” is a pilot project for the technology demonstration and for the study of the applicability of equipment and testing them. It is the first of its kind at the national level, i.e., the first photovoltaic station which allows pumping a part of the produced energy in the low pressure electricity distribution grid[13] .

**2-2-The reality of wind power in Algeria**

Wind resource changes in Algeria from one place to another as a result of climate and topographic diversity. Algeria is divided into two geographical areas:

The North, which is bordered by the Mediterranean Sea and is characterized by a coast of 1200 kilometers and mountainous terrain represented by the chains of Tell and Saharan Atlas between which high plateaus and plains characterized by the continental climate of moderate speed and it is not very high;

In the South, winds are rapider than those in the North, especially in the South-West (4 m/s and exceed 6 m / s in “Adrar” ). Thus, we can say the wind speed in Algeria is ranging between 2-6 m / s which is suitable energy to pump water especially in the high plains[14].

Mapping wind speed and capacity of the energy generated by the wind available in Algeria allows to identify eight areas of severe winds. They are able to embrace wind energy generation equipments, namely: Two areas on the coastal strip, three areas in the high plateaus and three other locations in the desert. Technical capacity of the energy generated from the winds has been estimated for these areas about 172 Terawatt / hour per year, 37 Terawatt/hour per year are exploitable from the economic angle; which is equivalent to 75% of the national needs for the year 2007[15] .

Through developments, it has been decided to construct the first winds farm in Algeria with a capacity of 10 MW in Adrar; the task has been temporarily entrusted to the joint complex between France and Algeria CEGELEC; as it suggested the best offer in the open tender regarding the project[16].

**2-3- The reality of the other renewable energies in Algeria**

There are other renewable energies in the process of exploitation in Algeria, but they are not produced in the same effectiveness as the solar and wind energies; in this area we will talk about: hydropower, geothermal power and biomass power.

For hydropower, the share of hydraulic capacities in the electricity production burn is 5% or about 286 GW. This capacity is due to the insufficient number of hydraulic sites and to the non-exploitation of the existing hydraulic sites. In this context, the hydroelectric station in Ziama Mansouria (Province of Jijel) has been the rehabilitated with a capacity of 100 MW.

With respect to geothermal energy in Algeria, Jurassic Lime in the North represents an important reserve of the ground Geothermics which led to the existence of more than 200 sources of mineral water located mainly in the northeast and northwest regions of the country. These sources are often at temperatures exceeding 40 ° C; the hotter source is the source of Almaskhotine (96 ° C); these natural sources, which are generally leaks of reservoirs in the underground, flow alone more than 2 $m^3$ of hot water, a small part of the reservoirs contents.

The great continental formation constitutes a huge reservoir of ground geothermics extending on thousands of square kilometers. This reservoir is called "alpine layer ", where the water temperature in this layer reaches 57°C. If the flow issued from the exploitation of this alpine layer is accumulated to the whole flow of hot mineral water sources, this will represent a capacity more than 700 MW.

Finally, Algeria is divided into two areas regarding biomass energy:

- Barren desert area which covers 90% of the surface of the country;
- Tropical forests area which covers a surface of 2.5 million hectares or about 10% of the country’s surface; forests cover about 1.8 million hectares, while gradient forest formations in the mountains represent 1.9 million hectares.

The maritime pine and eucalyptus are two important plants in the energetic use, but they represent only 5% of the Algerian forests.

It should be noted that the exploitation of wastes and organic residues, especially animal wastes for the production of natural gas can be considered as an economic solution that would lead to sustainable development, particularly in rural areas. These residues are:

- Household wastes;
- Muds of dirty urban or industrial water purification stations;
- Industrial organic wastes;
- Agriculture and livestock wastes (leathers, animal wastes etc).

## Conclusion:

To make economic growth and development which are compatible to climate balance scales; and to ensure a sustainable environment, it should be done a radical change and chosen clean development and green economies that emit less carbon ratios. In this context, we can take advantage of the clean development mechanism adopted by the "Kyoto Protocol" in renewable energy applications to reduce greenhouse gases and to achieve qualitative development which makes compatibility between economic efficiency, social justice and rational management of natural resources, by re-consider not only the patterns of production, but the consumption as well as .

Despite criticisms which claim that supporting alternative energy projects constitutes a burden on the taxpayers on the one hand, and may even raise the price of electricity on the other hand, the advantages offered by providing new jobs opportunities, contribute to reduce unemployment which has been deepened by the worldwide financial and economic crisis. Regarding the Algerian case, the following suggestions can be presented:

- In front of the limited capacities of the Algerian petroleum, the reserves currently available and consumption required by the economic and social development, an important part of the traditional energies should be substituted by renewable and environment friendly energies by adopting a green strategy based on sustainable standards that must be respected by everyone: government, institutions, companies and individuals, which will bring long-term gains to the Algerian economy (reducing unemployment and increasing economic efficiency) and also to the environment.
- Strengthening the Algerian capacities regarding renewable energy resources and making them more profitable.
- The State must give some help for the development of renewable energies market, in view of the Algerian qualifications in this domain compared to the Maghreb countries, which have preceded us away.
- Giving the critical importance to human resources through their professional training.
- The importance of supporting technology and scientific research, especially in the search for energetic alternatives and the development of renewable energies.
- Activating laws and legislations to encourage the use of renewable and clean energy, and to rationalize the use of fossil energy.

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