# *Green entrepreneurship in the Algerian renewable energy sector : opportunities and challenges*

# ريادة الأعمال الخضراء في قطاع الطاقات المتجددة الجزائري: الفرص والتحديات

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**Received: 13/06/2018**
**Accepted: 21/11/2018**

**Abstract:**
As a result of the role of entrepreneurship in achieving economic and social development, and under the increasing importance of environmental protection and the emergence of sustainable development, the importance of Green entrepreneurship increased in achieving sustainable development since the 1990s. This study aims to highlight the role of this latter in achieving sustainable development in the energy sector, particularly in Algeria through its orientation to responsible investment in renewable energies which are available in large stocks. The descriptive/analytical method has been adopted in this study through the analysis of the status of green entrepreneurship in the energy sector in Algeria using data from OCDE, World Bank and British Petroleum Company. It was proved that Algeria attempts to escape its oil and gas dependent economy ; thus,it is striving to expand its smes; this latter have known a remarkable development during the last 15 years (2001-2015) both in terms of number and its contribution in employment. Finaly, despite the efforts made by Algeria to promote green entrepreneurship in the energy sector, its contribution remains weak compared to the available possibilities.

**Keywords:** green entrepreneurship; green economy; sustainable development; renewable energy; Algeria
**JEL Classification Codes** : H310, H220, Q580

**ملخص:**
نتيجة الدور الذي تضطلع به المقاولاتية في تحقيق التنمية الاقتصادية والاجتماعية، وفي ظل زيادة أهمية حماية البيئة وظهور التنمية المستدامة، زادت أهمية المقاولاتية الخضراء في تحقيق التنمية المستدامة منذ تسعينيات القرن العشرين. وتهدف هذه الدراسة الى ابراز دور هذه الأخيرة في تحقيق التنمية المستدامة في قطاع الطاقة لاسيما في الجزائر، وذلك من خلال توجهها للاستثمار المسؤول بيئيا في الطاقات المتجددة والتي تزخر الجزائر بمخزونات كبيرة منها. وقد تم اعتماد المنهج الوصفي التحليلي في هذه الدراسة من خلال تحليل واقع المقاولاتية الخضراء في قطاع الطاقة في الجزائر باستخدام بيانات مأخوذة من منظمة التعاون والتنمية الاقتصادية، البنك الدولي وشركة النفط البريطانية –بريتش بتروليوم–. وقد تم التوصل الى أن الجزائر تحاول تقليل التبعية لقطاع النفط والغاز وبالتالي فانها تسعى إلى توسيع نشاط المؤسسات الصغيرة والمتوسطة ؛ هذة الأخيرة عرفت تطورا ملحوظا خلال الفترة (2001–2015) من حيث العدد ومساهمتها في التوظيف. وبالرغم من الجهود التي تبذلها الجزائر لتشجيع المقاولاتية الخضراء في قطاع الطاقة، الا أن مساهمتها تبقى ضعيفة مقارنة مع الإمكانيات المتاحة.

**كلمات مفتاحية:** مقاولاتية خضراء؛ اقتصاد أخضر ؛ تنمية مستدامة؛ طاقة متجددة؛ الجزائر
**تصنيف JEL:** H310, H220, Q580

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## *Introduction:*

Energy plays a vital and crucial role in moving the wheel of development in many countries, and with the increasing problem of global climate change in recent decades and the run-down of energy fossil stocks, particularly oil, the shift towards renewable energies has become an urgent necessity.

Algeria is one of the countries that has a significant potential of renewable energies, particularly solar and wind energy. As other countries, Algeria is making many efforts to involve energy transition especially with the reduction of oil stocks. It, also, tries to lower oil prices since the summer of 2014. For this transition, Algeria has developed an arsenal of laws and many programs to encourage investment in renewable energies.

Hence, the Green entrepreneurship appears as one of the solutions to expand investment in renewable energies and to achieve sustainable development objectives like providing jobs and cope with the climate change, etc. So this emerging concept, which is called sustainable entrepreneurship, provides an informative lens for uncovering insights about how renewable energy development can create a win-win for both entrepreneurs and local communities.

In this essence, this paper examines the importance of Green Entrepreneurship and tries to answer the following question: what is the role of green entrepreneurship in achieving renewable energies transition in Algeria ?

- **Purpose:** The importance of this research derives from itself; thus, the purpose of the present paper is to explore more in-depth the concept of Sustainable Entrepreneurship. Moreover, it tends to shed light on the importance, opportunities and barriers of Green Entrepreneurship in changing energy economics in Algeria by promoting green and responsible investment in renewable energy sector.
- **Methodology:** this research is purly based on the descriptive and analytical method, and it relied on data from OCDE, World Bank and British Petroleum Company.
- **Previous studies :** we used some previous studies which are available and closer to our study :
- Christopher Ball, **Green Entrepreneurship in Energy in France, Germany and the UK: New Ventures and Entry Barriers**, ICSB World Conference Proceedings, International Council for Small Business (ICSB), Washington,2014.

This paper sets out the general structural barriers constraining environmental entrepreneurs. It, then, relates this theory to the energy industry and discusses the obstacles specific to this sector .It focuses on the energy industries in three countries : the UK, France and Germany.

- Sanjeet Choudhary and Nilam Patil, **Green Entrepreneurship : Role of Entrepreneurs in Energy Economics in Nepal**, Annual Research Journal of SCMS, Vol. 3, April 2015, Pune.

This study helps us to know more about the concept of Green Entrepreneurship and its role in enhancing renewable energy economics in Nepal. It reveals that there is a mounting scope for Ecopreneurs or Environmental entrepreneurs in Nepal to lead its sustainable development in the coming years. Few government initiatives are helping to trigger the growth of entrepreneurs in this field, but there are few policies which should be made to boost the growth.

Both studies help us to understand the role of green entrepreneurship in involving the investement in reneawble energy sector and achieving the sustainable energy transition, but in our study we focus on the Algerian energy sectors especially with its enormous stocks of renewable energy, yet at the same time the role of green entrepreneurship in this latter is still small.

## An overview of green entrepreneurship in Algeria :

### 1. Definition of Green entrepreneurship :

### 1.1 Green economy :

The ICC (International Chamber of Commerce) representing global business defines green economy as "an economy in which economic growth and environmental responsibility work together in a mutually reinforcing fashion while supporting progress on social development". The 2011 UNEP Green Economy Report argues "that to be green, an economy must not only be efficient, but also fair. Fairness implies recognising global and country level equity dimensions, particularly in assuring a just transition to an economy that is low-carbon, resource efficient, and socially inclusive[1].

### 1.2 Green entrepreneurship :

The concept of the entrepreneurship is being the main moving force of the economy appeared almost two hundred years ago and it is even more popular nowadays. The "green entrepreneurship", known as the futureorientated entrepreneurial branch, is also a phenomenon without concrete description[2].

Berle (1991) first adopted the notion "Green Entrepreneurship" in his book "The Green Entrepreneur: Business opportunities that can save the earth and make you money"[3].

It is not easy to define green entrepreneurship. Relatively, new interest in green entrepreneurship is manifested by the growing number of documents on the subject and by the abundance of the terms used to designate this concept[4].

We observe that the terms "green entrepreneurship", "eco entrepreneurship" and "sustainable entrepreneurship" are used interchangeably very often. However, there might be some differences between the three.

The growing number of literary resources on the matter does not focus on the "green" idea itself, but on creating a wide-accepted definition of it. Thus, itdilutes its main purpose, which is saving the environment. Isaak defines the "green entrepreneurship" as a system which transforms the socially and environmentally engaged business by means of significant innovations. Dean and McMullen ,on the other hand, describe it as : "a process of defining and discovering economic possibilities in order to fix the failures in theecological aspect ". Shaltegger thinks of the green entrepreneurship as : "creating a value throughout ecological innovations and products". According to his opinion, the aforementioned need to be market-orientated and to express the entrepreneur's motivation to stay "eco".

The Australian scientist Michael Schaper summarizes a wide range of aspects to form a whole concept for the "green entrepreneurship". According to his point of view, there are certain similarities between the "green" and the traditional entrepreneurship such as risk, innovation and profit. Yet, there are considerable differences. For example, a green entrepreneur should aim at achievable goals as well as at carefully deliberated business plans. Schaper equalizes the importance of both positive effect on the environment and the profit from business activity[5].

### 1.3 Green entrepreneur :

Green Entrepreneurs are the entrepreneurs making use of opportunities and starting business for sustainable development[6].

Isaak (2002) differentiates between green business (moving an existing firm towards environmental responsibility) and green-green businesses (a business designed in process and product to be green as a start-up)[7]. It means a green entrepreneur can green his/her activity or simply start a green activity.

The definitions below illustrate the multiplicity of interpretations of the concept[8]:

- **Isaak (2005) :** an ecopreneurs is a person who seeks to evolve a sector of the economy towards sustainability by launching an activity that is designed in a green manner, using green processes and is committed in long term to encourage sustainability in everything that will be said and done in this sector.
- **Volery (2002) :** there are two types of ecopreneurs :
    - **Entrepreneurs aware of the environment:** who are developing any kind of innovation (product, service, process). They try to reduce the resources used and the impact on the environment or improve the cost-effectiveness all by setting a goal of zero waste.

- **Green entrepreneurs :** who are aware of issues related to the environment and operating an environmental market. They are looking for the environment-based opportunities that present interesting prospects of profits.

- **Anderson (1998) :** entrepreneurship and environmentalism is based on a perception of value. Attitudes arising from environmental concerns create areas of value that is possible to operate from an entrepreneurial point of view. "Environmental entrepreneurs" are aware of this possibility and implement in real organizations to enter and fix these changes in society.

  So a green entrepreneur is an entrepreneur who is able to :

  - Integrate environmental, economic & social axis in core business;
  - Provide innovative solutions to the way goods and services are produced & consumed;
  - Propose a business model whose scaling-up contributes to the greening of the economy;

## 2. Algeria's efforts to promote green entrepreneurship :

### 2.1 Algerian economic and the Dutch disease :

In economics theory, exports of raw materials have often been considered as a factor of dependence, and cannot be considered a promising avenue for development. One of the most surprising aspects of economic growth in today's world is that countries with the largest supplies of natural resources have a lower growth rate than the others. Rentier states tend to develop policies based on state-allocated income rather than the creation of new production-driven wealth[9].

Moreover, Algeria was subjected to what economists call the Dutch Disease: blockage of the industrialisation process due to hikes in the price of raw materials. Growth in profitability in the natural resource sector affects an economy in three ways[10]:

- a shift in the labour force towards the expanding sector and increased salaries in this sector;
- growth in revenue which leads to general inflation;
- a rise in the exchange rate, which handicaps the domestic industry subjected to international competition.

Algeria's economy is largely based on the secondary sector (industry), which accounts for 62% of gross domestic product (GDP) and employs 33.1% of the labour force. The oil and gas sector alone accounts for 30% of GDP. The government,

therefore,faces the enormous challenge of diversifying the Algerian industry as the economy's heavy reliance on hydrocarbons is a potential handicap for sustainable development in the country[11].

## 2.2 Algerian business environment :

Algeria's business environment has undergone profound changes since the 1990s. The country's commitment to the market economy attributes great importance to the private sector. Algeria recorded a sustained growth rate, particularly during the 2000s. In 1994, the value added by the private sector was only 46.5% of the national total, but this proportion has been rising. In 1998, the added value created by the private sector contributed over half of the national total. Although unemployment dropped from a rate of nearly 30% in 2000 to 10% in 2012, it still disproportionately affects young people (21.5%) and women (19.1%).

Algeria ranks 153rd out of 189 economies in the IFC-World Bank's 2014 Doing Business. However, the MENA (Medeteranean and North Africa) region, on average, ranks 107th. In addition to Insolvency Regulation (60th), the main challenges Algeria still face are Registering Property (176th), Paying Taxes (174th), and Starting a Business (164th). The World Economic Forum lists inefficient government bureaucracy, access to financing, and corruption as the three most common problem areas for doing business. Overall, Algeria ranks 100th out of 148 economies in the 2013-2014 Global Competitiveness Index compared to 87th out of 142 in 2011-12[12].

## 2.3 The state of SMEs and Green Economy in Algeria :

As one of the measures to escape the country's oil and gas dependent economy, Algeria is striving to expand its SMEs (Small and Mid-sized Enterprises) while making them eco-friendly and sustainable in the long run. During this attempt to renovate the country's economic structure, the government expects green SMEs to be a driver for reducing high hydrocarbon energy dependency and to draw a virtuous circle of green job creation and economic growth[13].

SMEs in Algeria have known a remarkable development during the last 15 years (2001-2015) both in terms of number and its contribution in employment. The number of these enterprises reached 934569 in 2015with an increase estimated by 9.7% compared to the year 2014, and multiplied by 3 compared to 2001. Concerning its contribution to the employment, it reached 20% of total employment in 2015 compared to 2001(10%) (Table 1):

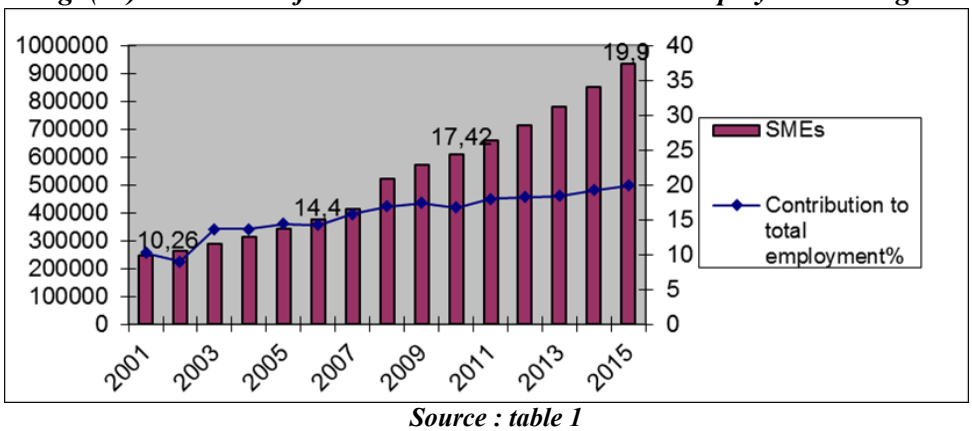
***Table (01) : evolution of SMEs and its Contribution to Employment in Algeria***

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of SMEs | 245348 | 261853 | 288587 | 312959 | 342788 | 376767 | 410959 | 519526 | 570838 | 607297 | 659309 | 711832 | 777816 | 852053 | 934569 |
| SMEs Growth Rate | - | 6.73 | 10.2 | 8.45 | 9.53 | 9.91 | 9.08 | 26.41 | 9.88 | 6.4 | 6 | 7.97 | 5.08 | 9.54 | 9.7 |
| Contribution to total employment% | 10.26 | 8.94 | 13.66 | 13.64 | 14.4 | 14.2 | 15.77 | 16.85 | 17.42 | 16.7 | 18 | 18.2 | 18.4 | 19.2 | 19.9 |

***Source :***

- *Asma Benzazoua Bouazza,* ***small and medium enterprises as an effective sector for economic development and employment creation in algeria*** *International Journal of Economics, Commerce and Management Vol. III, Issue 2, United Kingdom, Feb 2015, p 8.*
- *Bulletin d'Information statistique des PME 2012, n 22, avril 2013.*
- *Bulletin d'Information statistique des PME 2014, n 26, avril 2015.*
- *Bulletin d'Information statistique des PME 2015, n 28, mai 2016.*

***Fig. (01) : evolution of SMEs and its Contribution to Employment in Algeria***




***Source : table 1***

In terms of sectors, about 50% of SMEs fall into the services sector, and more than 30% in the construction and public works sector. The remaining is distributed between agriculture and energy sector which represents the smallest percentage (approximately 0.5%) during 2011-2015 (table 2):

*Table (02) : Algerian SMEs by sector 2011-2015*

| Sector \ Year | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| **Agriculture** | 4 006 | 4 277 | 4 616 | 5 625 | 5 038 |
| **Oil and gas, energy, Mines and related services** | 1 956 | 2 052 | 2 259 | 2 439 | 2 639 |
| **building and public works** | 135 752 | 142 222 | 15 0910 | 159 775 | 168 557 |
| **manufacturing Industries** | 63 890 | 67 517 | 73 037 | 78 108 | 83 701 |
| **Services** | 186 157 | 204 049 | 228 592 | 251 629 | 277 379 |

***Source :***
- *Bulletin d'Information statistique des PME 2012, n 22, avril 2013.*
- *Bulletin d'Information statistique des PME 2014, n 26, avril 2015.*
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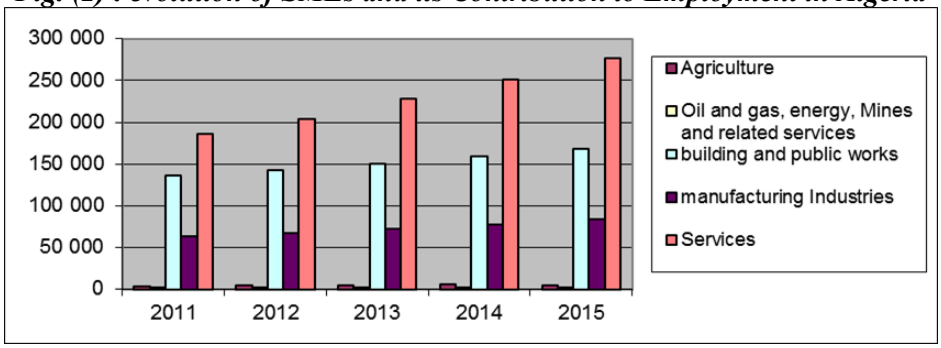


***Source : table 2***

This evolution is the result of public policies to support the creation and sustainability of SMEs. It is allowed to exceed the 100.000 SMEs objective defined by the 2005-2009 program and 200.000 small businesses for the 2010-2014 program. The five-year development plan 2015/2019, which follows 2005-2009 and 2010-2014 plans will be designed to strengthen the resistance of the Algerian economy to the effects of the financial crisis world and achieve an annual growth rate of 7% in order to develop a competitive economy and diversity[14].

While SMEs are gaining increasing importance in the national economy, it is hard to measure the accurate size of green SMEs and their economic and environmental effects because only a small number of SMEs have been certified or adopted a standardized environmental management system.

## 2.4 Approaches to involve Green entrepreneurship in Algeria :

Algeria considers the green economy as a means of achieving the objectives of sustainable development, creating jobs, sustaining economic growth (diversifying the production base and increasing value-added), strengthening innovation and reducing poverty. The country wants to transit gradually to a green economy in keeping with its national priorities, particularly the crucial issue of energy transition.

Thus, Algeria has made many efforts to encourage green entrepreneurship to fulfil sustainable developement eventhough they are not enough, we summarize them as follow :

- **The greening of strategies :**

- **Environmental legislation :** Algeria has introduced several laws to protect the environment and to promote sustainable development and renewable energy.

- **National action plans for the environment and sustainable development :** Algeria has made progress in developing an institutional framework to support sustainable growth and green business. The national action plan for the environment and sustainable development published by the Ministry of Territorial Planning and Environment in 2002 is a good example due to its involvement of industry. It provides the basis for public policies to address negative environmental effects related to economic growth. Also, it obliges enterprises to adopt environmental protection, including EMSs (Environmental Management Systems). In addition, the programme for 2010-14 provides a budget of 500 million DA to environmental development, focusing on the preservation and sustainable use of biodiversity, soil degradation, water management and the stabilisation of greenhouse gas emissions[15].

Also the new five-year growth plan 2015-2019 considers the green economy as a fulcrum for development and technological progress. It enhances investment in key sectors of the green economy (agriculture, water, waste recycling and recovery, industry and tourism) and the development of SMEs. According to the study on youth and women's employability and entrepreneurship in the green economy, the job creation potential is huge but little known.Indeed,itishardtoconducta comprehensive assessment of the potential number of green jobs in the absence of a nomenclature ofsuchjobs.Thesectorisreportedtohaveprovidedabout450000jobsin2012andcould generate a little over 1.4 million jobs by 2025, especially in five sectors: renewable energy, energy efficiency, water management, waste treatment and recycling, environment-related services and management of green zones[16].

- **Public institutions :** Several public institutions such as the IARD (Algerian Institute of Renewable Energy and Energy Efficiency), NCCTP (the National Centre for Cleaner Technologies Production) and the IRDD (Research Institute for Sustainable Development) focus on sustainable enterprise development – some of them provide expertise and training to SMEs to improve their environmental performance. In addition, more than 100 research projects on renewable energy are ongoing[17].

The efforts made, also, include research and training for environmental sectors, particularly through the establish men to f the CNFE (National Conservatory for Environment Training). This latter provides training, environmental

education and awareness. Moreover, it aims to creat a college for water resources management. Several specialized institutes such as the Renewable Energy Development Centre, the Centre for Scientific and Technical Research on Arid Regions and the National Biotechnology Centre are also available. A Sustainable Development Institute of Africa under the jurisdiction of the United Nations University (UNU-IRADDA) was created at the end of 2013[18].

- **The availability of environmental expertise to SMEs :**

In Algeria, there are several public institutions such as the IARD (Algerian Institute of Renewable Energy, Energy Efficiency) and the IRDD (Research Institute for Sustainable Development), which provide SMEs with expertise and training in areas such as energy auditing and security. Furthermore, 110 national research projects on renewable energy were launched in 2011, but toned to be further developed and evaluated. The engagement of chambers of commerce, NGOs and private service providers is limited[19].

- **The promotion of environmental management systems and standards :**

EMSs and standards provide businesses with a means to systematically improve their environmental performance and advertise their environmental efforts to stakeholders and society. ISO 14001 and the EU EMAS (The EU Eco-Management and Audit Scheme) – which have recently been extended to organisations outside of the EU – are the most commonly used EMS (Environmental Management Systems) standards. Governments can support the adoption of EMSs and standards through awareness-raising activities, direct financial support and incentives.

In Algeria the application of EMS is at a relative early stage. 75 enterprises were certified in 2012 by the National Centre of Cleaner Production Technologies. Further certification and standardisation measures are planned within its SME upgrading programme[20].

- **Green Investment and Financial Schemes :**

The Algerian government is adopting financial tools and instruments such as grants, taxes, loans and guarantees ; a feed-in tariff for photovoltaic solar power is a good example. However, green financial policies often fail to provide SME-targeting and sector-specific solutions, causing green SMEs difficulty in accessing available resources. As financing is one of the most critical issues during business creation, the government does its best to provide support with the following public funds that widely apply to all SMEs in Algeria.

- Society of Venture Capital;

- Guarantee Fund of Investment Loans;
- Guarantee Fund of SME Loans;

Although none of these funds are tailored for green SMEs, they can be widely applied to all SMEs. Additionally, the government is operating a number of environment-related funds to support greening actions in Algeria, such as the Environment and Pollution Control Fund, Energy Management Fund, Renewable Energy Fund, Desertification Control Fund, etc[21].

- **Seeking Synergies with Private Sectors :**

Since 2013, Algerian ministries and public institutions have partnered with GIZ (German Corporation for International Cooperation) to promote green SMEs and employment. During this time, SME promotion policies were drafted, four innovation networks were established and green business trainings were made available. " young green entrepreneurs" ,which was commenced in 2015, is another good example of a public-private partnership program that financially supports young green entrepreneurs after reviewing their business plans[22].

## 3. Sustainable energy and Green entrepreneurship in Algeria:

### 3.1 Status of renewable energy in Algeria :

In 2015 Algeria was Africa's third-biggest producer of oil after Nigeria and Angola, and ranked eighth worldwide for natural gas. However its known oil and gas reserves could be exhausted within 21 and 53 years respectively[23].

Like Morocco and Tunisia, Algeria is diversifying its energy mix. Moreover, it began this transition before Brent crude prices began tumbling in mid-2014.

Algeria has created a green momentum by launching an ambitious program to develop renewable energies and promote energy efficiency. This program leans on a strategy focussed on developing and expanding the use of inexhaustible resources, such as solar energy in order to diversify energy sources and prepare Algeria of tomorrow. Through combining initiatives and the acquisition of knowledge, Algeria is engaged in a new age of sustainable energy use.

The projects for the domestic production of electricity from renewable energy sources will be carried out in three phases: The first phase(2011-2013) was devoted to the achievement of pilot projects to test the different available technologies. The second phase (2014–2015) marks the beginning of the deployment of the program. The last phase (2016-2020) will be devoted to the large-scale deployment of the program[24].

Since 2011, 60 solar and wind projects have been approved within Algeria's Renewable Energy and Efficiency programme, which plan to raise the share of renewables to 40% of the energy mix by 2030. In 2013, Algeria signed a Memorandum

of Understanding with the European Union for technology transfer to Algeria in fossil fuels and renewable energy[25].

Recent studies suggest that about 5% of the country's electricity comes from small hydropower plants; however, only 0.5% to 1% comes from wind and solar energy. This dire status of renewable energy in Algeria exists despite a favourable geographical location which offers one of the highest solar potentials in the world – Algeria resides within the solar belt of the world where it is estimated that 6 hours of solar energy from the world deserts can meet the annual global energy demands[26].

Energy usage in Algeria is split between four sectors : industrial 15.53%, transport 41.49%, residential services and agriculture32.45%, and almost no use of energy 10.52%[27].

The renewable energy mix of solar, wind, geothermal and biomass energy as well as effective engineering applications can potentially contribute towards energy provision for these sectors and help move the country towards a more sustainable position in terms of energy provision and consumption.

### 3.2 The importance of green entrepreneurship in Algerian energy economic :

Green economies require green energy generation based on renewable energy to replace fossil fuels as well as energy conservation and efficient energy uses. There is justification for market failure to respond to environmental protection and climate protection needs with the excuse that high external costs and high initial costs for research, development, and marketing of green energy sources and green products prevents firms from voluntarily reducing their ecological footprints[28].

To complement such weakness, Algeria has continued to provide more detailed action plans. For instance, energy, waste, forestry, water, agriculture and tourism are highlighted as main sectors to be emphasized in the green economy. In 2015, during the preparation for COP21, Algeria's INDC (Intended Nationally Determined Contribution) specified its mitigation strategies in the energy, waste and forestry sectors to be achieved by 2030. In addition, the new five-year growth plan encourages investments in agriculture, water, waste and tourism. Especially among these sectors, renewable energy investments will be gradually enhanced. For example, a large number of photovoltaic solar power plants and wind turbines are under construction. Fourteen photovoltaic plants started operation in 2015. In these ways, renewable energies are expected to become alternative sources of energy supply for both domestic and foreign use in the long term, thereby stabilizing Algerian energy trade balances. In addition to these investments, the government is planning large-scale social and economic infrastructure investments to improve the country's unfriendly business environment, including green assembly and maintenance plants for intercity trains and their networks.

Despite the efforts made by Algeria in diversifying its energetic mix and transition towards renewable energies, their efforts remain substandard compared to other States in view of the potential of renewable energies. Statistics from OCDE and the World Bank showthat the production of renewable energies in Algeria knew fluctuated developement during the period 2001-2014. In recent years the growth ratiodecreasedfrom 0.20% in 2009 to 0.05% in 2014, as well as for consumption that decreased in recent years andreached 0.19% of total energy consumption in 2012 after it was 0.31% in 2009. This situation can also be translated by the increasing of carbon dioxide emissions (table 3). Given the lack of entrepreneurshipactive in the energy sector accounting for 0.5% as the lowest rate among other sectors (table 2), it can be said that the contribution of the latter to shift towards renewable energies remains very modest.

***Table (3) : renewable energy indicators in Algeria (2001-2014)***

| Variable | Unit | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Production-based $CO_2$ emissions | Millions Tonnes | 63.00 | 68.13 | 71.96 | 73.35 | 77.45 | 80.73 | 84.85 | 88.10 | 94.41 | 95.77 | 102.11 | 110.67 | 113.88 | 122.93 |
| Total primary energy supply | Millions Tonnes of oil equivalent | 27.05 | 28.93 | 30.75 | 31.13 | 32.42 | 34.71 | 36.84 | 37.27 | 40.76 | 40.09 | 41.82 | 45.97 | 47.58 | 51.67 |
| Renewable energy supply, % | Percentage | 0.22 | 0.27 | 0.27 | 0.26 | 0.37 | 0.24 | 0.25 | 0.19 | 0.20 | 0.17 | 0.14 | 0.15 | 0.11 | 0.05 |
| Renewable energy comsumption, % | Percentage | 0.43 | 0.51 | 0.47 | 0.44 | 0.58 | 0.40 | 0.41 | 0.30 | 0.31 | 0.27 | 0.18 | 0.19 | - | - |

***Source :-*** *17/03/2017, OCDE,* ***green growth indicators****, Algeria, http://stats.oecd.org/Index.aspx?QueryId=58196*

- *20/03/2017, World Bank,* ***Algeria Data****, http://data.worldbank.org/country/algeria*

Finally, thousands of jobs for Algerian scientists, engineers as well other supporting domains can be created in parallel to commercial developments of solar and wind farms, especially in the South. This, in turn, would enrich local economies and contribute to promoting national expertise to ensure technical independence in the long

term. Algeria cannot afford to be always dependent on foreign skills for exploitation of its energy potential.

Renewable energy development will encourage international investment and collaboration, thereby securing funding for projects. But it is also important to encourage investment from Algeria's private sector and young entrepreneurs to help reduce reliance on state funding. Investment in renewable technology would give Algerian scientists and inventors the opportunity to develop patents for renewable systems.

The potential of renewable energy development in Algeria, particularly from solar and wind resources and to a lesser extent geothermal and biomass is a great one. These technologies offer a number of simple, feasible, and economically viable applications that can be implemented both in the short and long terms. The ability to generate heating or electricity from renewables can greatly enhance the quality of life in Algeria, create jobs, develop technical skills, and reduce the country's dependence on oil and gas while meeting obligations of reduced greenhouse effects and global warming. Increased renewable energy production will also enable better management of fuel based reserves.

Algeria is very well placed to be a major player in the lucrative market of renewable energy. However, transition to more renewable energy use will need to start

Immediately, at least using hybrid technologies. Genuine political will and favourable policies are essential if we are to fully embrace the renewable energy age[29].

## Conclusion:

Algeria is considered one of the states that possesses great potential of renewable energy, but it remains substandard of exploitation compared to other countries in spite ofthe environmental, economic and social challenges experienced by Algeria. With the emergence of sustainable entrpreneurship which was supposed to be a boost to the development of investment in many sectors including renewable energies, the results, however, remain modest despite the great potential of renewable energies. This is due to many factors, including the rising cost of the start-up and other challenges which hinder its path towards the development of renewable energies and sustainable development.

Through this paper we reached a set of findings which can be summarized as follows:

- Green entrepreneurship has positive effect on both the environment and the profit from business activity;
- Green Entrepreneurs are the entrepreneurs making use of opportunities and starting business for sustainable development ;

- Algeria attempts to escape its oil and gas dependent economy ; thus,it is striving to expand its SMEs;
- SMEs in Algeria have known a remarkable development during the last 15 years (2001-2015) both in terms of number and its contribution in employment ;
- Algeria has made many efforts to encourage green entrepreneurship as : greening of strategies, Green Investment and Financial Schemes, The promotion of environmental management system, etc;
- Although the great potentiel of reneawble energy in Algeria, it remains substandard of exploitation;
- Despite the efforts made by Algeria to promote green entrepreneurship especialy in energy sector, its contribution to shift towards renewable energies remains very modest.

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