

CLEAN TECHNOLOGY TRANSFER FOR CLIMATE CHANGE MITIGATION: MECHANISMS AND BARRIERS -WITH REFERENCE TO ALGERIA-

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Received: 30/10/2020/ Accepted: 02/11/2022 / Published: 14/01/2024

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Abstract

The main objective of this paper is to analyze the challenges of transferring clean technology and emerging opportunities under the new climate system, Economic growth in developing countries causes an increase in greenhouse gas emissions, which requires enabling these countries to use climate-friendly technologies. This paper reviews the economic literature on clean technology, related barriers and supportive transfer mechanisms; with a focus on the various types of barriers that prevent the transfer of clean technologies to Algeria, based on both the descriptive and the deductive research methodologies. The study concluded that Algeria must develop a comprehensive strategy to overcome these barriers. Technology transfer is not a one-time activity; It is a continuous process with sequential activities, therefore , as a recipient entity, it must sponsor the process; it requires a domestic technological capacity, a program of training, promotion, research and development to keep clean technology alive and make it grow in its new land because it is vulnerable to fast fading.

KEY WORDS: Climate Change, Technology Transfer, Clean Technology, Green Technology, Green Economy.

JELCLASSIFICATION: O30, O33, Q55, Q56.

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نقل التكنولوجيا النظيفة للتخفيف من تغير المناخ: الميكانيزمات والحواجز -مع الإشارة لحالة الجزائر-

ملخص

الهدف الرئيسي من هذه الورقة هو تحليل تحديات نقل التكنولوجيا النظيفة والفرص الناشئة في ظل النظام المناخي الجديد، فالنمو الاقتصادي في البلدان النامية يؤدي إلى زيادة انبعاثات غازات الاحتباس الحراري، الأمر الذي يتطلب تمكين هذه البلدان من استخدام التقنيات الصديقة للمناخ. تستعرض هذه الورقة الأدبيات الاقتصادية حول التكنولوجيا النظيفة والحواجز ذات الصلة وآليات النقل الداعمة؛ مع التركيز على مختلف أنواع الحواجز التي تحول دون نقل التقنيات النظيفة الى الجزائر، وذلك بالاعتماد على منهج البحث الوصفي ومنهج البحث الاستنتاجي. وقد توصلت الدراسة الى أنه يجب على الجزائر وضع استراتيجية شاملة للتغلب على تلك الحواجز، فنقل التكنولوجيا ليس نشاطا لمرة واحدة؛ إنما عملية مستمرة مع أنشطة متتابعة، لذلك، يجب عليها ككيان متلقي، رعاية العملية؛ فهي تتطلب قدرة تكنولوجية محلية، وبرنامج للتدريب والترويج والبحث والتطوير للحفاظ على التكنولوجيا النظيفة حية وجعلها تنمو في أرضها الجديدة لأنها عرضة للتلاشي بسرعة.

كلمات مفتاحية: تغير المناخ، نقل التكنولوجيا، التكنولوجيا النظيفة، التكنولوجيا الخضراء، الاقتصاد الأخضر.

**TRANSFERT DE TECHNOLOGIES PROPRES POUR
L'ATTÉNUATION DU CHANGEMENT CLIMATIQUE :
MÉCANISMES ET OBSTACLES
- AVEC RÉFÉRENCE À L'ALGÉRIE-**

RÉSUMÉ

L'objectif principal de cet article est d'analyser les défis du transfert de technologies propres et les opportunités émergentes dans le cadre du nouveau système climatique. La croissance économique dans les pays en voie de développement entraîne une augmentation d'émissions de gaz à effet de serre, ce qui nécessite de permettre à ces pays d'utiliser des technologies qui respectent le climat. Cet article passe en revue la littérature économique sur les technologies propres, les obstacles connexes et les mécanismes de transfert de soutien ; avec un focus sur les différents types de barrières qui empêchent le transfert de technologies propres à l'Algérie, en se basant sur la méthodologie de recherche descriptive et de la méthodologie de recherche déductive. L'étude a conclu que l'Algérie doit développer une stratégie globale pour surmonter ces obstacles. Le transfert de technologie n'est pas une activité ponctuelle; Il s'agit d'un processus continu avec des activités séquentielles, par conséquent, en tant qu'entité récipiendaire, elle doit parrainer le processus ; il faut une capacité technologique locale, un programme de formation, de promotion, de recherche et de développement pour maintenir la technologie propre en vie et la faire croître dans son nouveau territoire car elle est vulnérable à un déclin rapide.

MOTS CLÉS: Changement Climatique, Transfert de Technologie, Technologie Propre, Technologie Verte, Economie Verte.

INTRODUCTION

The adoption by 195 countries of the Paris Agreement on December 12, 2015, is a major turning point in the global struggle against climate change. So far, 190 governments have committed to taking specific actions to reduce their national greenhouse gas emissions, which cover more than 95% of total global emissions. These national pledges have looked at ways to provide a strong foundation on which all parties can target a single goal that serves the intersection of technology and climate. And environmental sustainability, and therefore the Commission on Sustainable Development and many other countries and international organizations have focused their efforts on identifying industries and economic sectors to which alternative technology can be transferred and identifying the technology to be transferred.

In climate change negotiations, encouraging developed countries to accelerate the transfer of clean technology is critical to mitigating greenhouse gas emissions, but it is difficult to do so because developed countries still pursue an equilibrium strategy called Cold War mindset and considerations of national interest, they are very cautious about exports, including all new energy technologies, and developing countries have already expressed in many international forums, since the 1970s, their desire for better access to foreign technologies and improved and clean technological capabilities. In this context, Algeria is among the countries that showed interest in this type of technology, and it is trying hard to acquire these technologies through information, education and financing.

In light of the foregoing, we can raise the following problem: what are the mechanisms and barriers of clean technology transfer for climate change mitigation in Algeria?

Based on the assumption that the transfer of clean technology has a major role in mitigating climate change, as it affects the various sectors of the country, the study will attempt to clarify the contributions of developed countries in the transfer of clean technology, in addition to identifying the extent of Algeria's response to the transfer of this type of technology.

The study consists of theoretical and practical issues. The first part of the study describes the relationships between the environment, climate change and the transfer of clean technology with a focus on the mechanisms used to promote the transfer of this type of technology, and the second part deals with various global and national efforts practices to accelerate, facilitate and benefit from the transfer process, we will analyze it based on the various sustainable development goals.

1- BACKGROUND AND HYPOTHESIS DEVELOPMENT

In this section, we will present a literature review to the subject of the study, the hypotheses and the theoretical model of the study.

It is recognized that technology is one of the critical elements to confront the challenge of climate change. In addition, technological innovation is a critical accelerator and enhancer of the efforts to implement national climate actions and achieve the global objectives. The Paris Agreement explicitly refers to innovation in its Article 10, paragraph 5. In the 2030 Agenda for Sustainable Development, technological innovation is referred to in connection with various sustainable development goals, particularly goals 7 (affordable clean energy), 8 (decent work and economic growth), 9 (industry, innovation and infrastructure) and 17 (partnerships for the goals)(Technology Executive Committee, 2017).

In 1992, when countries established the UNFCCC, they included specific provisions on technology with the aim of achieving the ultimate objective of the Convention. The Convention notes that all parties shall promote and cooperate in the development and transfer of technologies that reduce emissions of GHGs, particularly to developing countries (United Nations, 2020), therefore parties share a long-term vision on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions (Lewik, 2018), already The Earth has warmed by an average of 1°C in the last century, and its temperature continues to rise, is caused by burning fossil fuels like oil and coal, farming, and destroying forests. The changing climate makes our weather more extreme and unpredictable. As temperatures rise, some

areas are getting wetter and others drier (Islamic Relief Worldwide, 2015).

Two international agreements, both signed in 2015, make the point with abundant clarity. The Paris Agreement marks the first time that the international community has accepted a binding commitment under international law to keep global warming significantly below two degrees Celsius. Unlike the Kyoto Protocol, which obliged only industrialized nations to take steps to protect the climate, the Paris Agreement also applies to emerging nations. Starting in 2020 (Berger, Henzelmann, Büchele, Andrae, & Wiedemann, 2018), It is in this context 'clean technology' has emerged as a positive embodiment of the need for greater environmental protection. Rather than struggling to reduce the adverse environmental impact of existing technologies (Irwin, D., & Hooper, 1992). The Third Group of the United Nations Intergovernmental Panel on Climate Change (IPCC) defined the clean technology transfer process as follows:

“... A broad set of processes covering flows of know-how, expertise, and equipment used to mitigate and adapt to the effects of climate change among the countries or the various real stakeholders, such as governments, private sector institutions, financial institutions, non-governmental organizations, and research institutions and education” (Hosier, et al., 2008).

Under the Paris Agreement, countries have developed nationally determined contributions (NDCs), national adaptation plans and mid-century strategies. Now, countries and the international community are focused on implementing them (Technology Executive Committee, 2017). The purpose of Technology framework under Article 10, paragraph 4, of the Paris Agreement is to provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer (United Nations, 2017). The UN's 2030 Agenda for Sustainable Development subsumes the social, environmental and economic dimensions of sustainability under 17 defined goals. Environmental technology and resource efficiency products, processes and services are needed to achieve these goals – examples include clean water and sanitation for

all, affordable and sustainable energy for all, and sustainable production – and to implement the Paris Agreement. By consequence, innovations and new markets will emerge and the international lead markets for green technology will experience expansive growth (Hosier, et al., 2008).

In 2017, atmospheric CO₂ concentrations reached 405.5 parts per million (ppm) (up from 400.1 ppm in 2015), representing 146 per cent of pre-industrial levels. To limit global warming to 1.5°C means that emissions will need to peak as soon as possible, followed by rapid reductions (the Department of Economic and Social Affairs, 2019).

Wherefore, climate change mitigation efforts seek to reduce greenhouse gas emissions, use new effective technologies and promote low-carbon renewable energy sources, as well as improve energy resource management and enhance consumer awareness. These actions can be further supported through mitigation policies that help countries reduce carbon emissions, and the transfer of clean technologies is an essential component of the public action needed to deal with adaptation and mitigation of climate change through the development, diffusion and innovation of clean technologies in developing countries (Committee on Development and Intellectual Property, 2011). The final document of the United Nations Conference on Sustainable Development, which was adopted on June 22, 2012, contained 12 paragraphs that focus on harnessing science and technology for the purposes of sustainable development. It deals with the transfer and diffusion of clean technology (paras. 269 and 273, 270) (General Assembly, 2012). It is considered a commitment to a treaty that developed countries parties to the United Nations Framework Convention on Climate Change (UNFCCC) have undertaken to fully and effectively comply with.

Innovation has a central role to play in tackling climate change, as affirmed in the Paris Agreement on Climate Change (Article 10), which states, “accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development.” as The IP system fosters innovation, as well as the transfer and dissemination of

technology – including climate-friendly technology-. While IP rights provide economic incentives to develop new solutions, they can also help in diffusing innovation to the places of greatest need (Dietterich, 2020).

Before explaining the importance of clean technology transfer, an understanding of the broad channels of technology transfer is necessary. This will help identify the benefits of transfer through different channels (Goldar, Sharma, Sawant, & Jain, 2019). Technology transfer is a process of providing the technology developed from one organization to other, potentially useful purposes. Technology transfer can be divided into : International technology transfer or Regional; Cross Industry or cross sector; Inter firm technology transfer; Intra firm technology transfer (Rani, Rao, Ramarao, & Kumar, 2018). Therefore, clean technology transfer generally includes the following features, not necessarily shared with technology transfer programs in other areas (Kline, Vimmerstedt, & Benioff, 2003):

- A focus on technologies that are applicable to the global response to potential climate change,
- Explicit prioritization process in which relevant stakeholders select the climate change technologies of greatest economic and social benefit to the recipient country,
- A focus on building the capacity of developing country partners to adapt, promote, and use the designated technologies,
- ‘Market conditioning’ activities such as public awareness and education efforts. IPCC, although somewhat dated in this fast-moving area, provides a useful description of the methods and issues of climate change technology transfer from a very broad perspective.

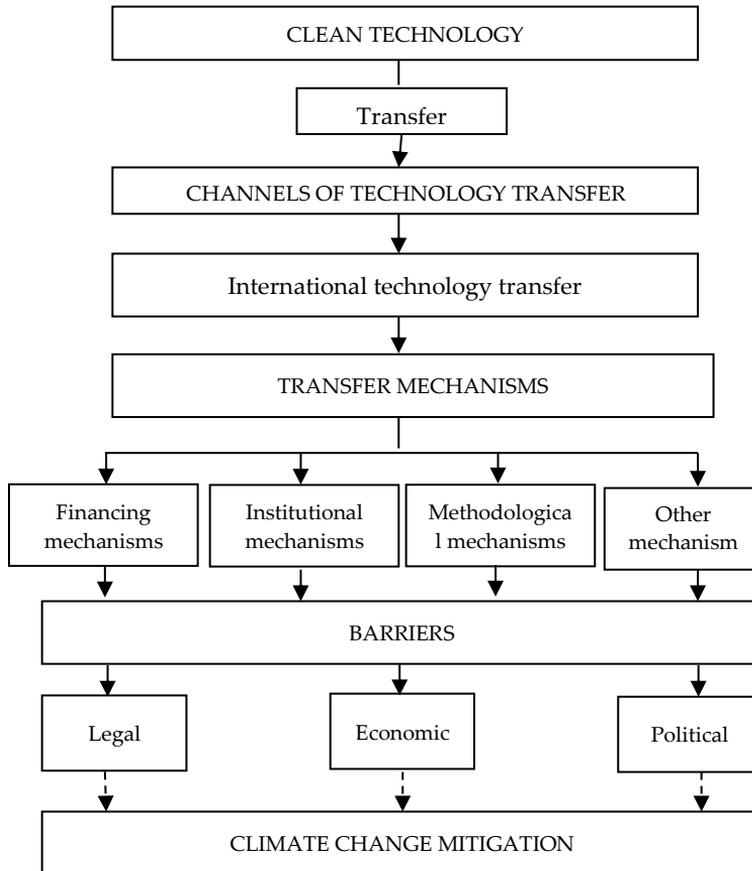
Clean technology could significantly increase efficiency across all sectors of the economy and deliver CO₂ emission savings of 15% of the total of “Business As Usual” emissions in 2020 (Faucheux & Nicolăi, 2018).

Based on the above, we formulate the following hypothesis:

H1: Legal, economic and political barriers in Algeria can prevent the clean technology transfer for climate change mitigation.

Figure (1) shows the theoretical model of the study.

Figure 1. Theoretical model of the study



Source: Prepared by the researchers.

2- RESULTS

2.1- RESEARCH METHODOLOGY

In this study, we will discuss the evidence of clean technology transfer and its role in mitigating climate change, by explaining the mechanisms and barriers. The study adopted the descriptive research methodology, its major purpose is a description of the state of affairs as it exists at present (Kothari, 2004). By listing the economic literature and

theoretical background of the importance of clean technology and the transfer mechanisms supporting it, and the efforts made to transfer these clean technologies by the countries' governments. In addition to using the deductive research method, to analyze a set of specific indicators for the transfer of clean technologies, to reveal the main challenges and barriers, and ways to address them by benefiting from the experiences of countries and projecting them on the case of Algeria.

2.2- MECHANISMS FOR ENHACING CLEAN TECHNOLOGY TRANSFER

The Technology Transfer activity promotes the transfer and/or exchange of technology with industry, academia, and government agencies, or distribution from one enterprise, institution or country to another, so currently operational mechanisms for the development and transfer of environmentally sound technologies can be classified into:

2.2.1. Financing mechanisms

The Parties to the Convention have assigned operation of the financing mechanism to the GEF on an on-going basis subject to review every four years. The Kyoto Protocol also recognizes, in Article 11, the need for a financing mechanism to fund activities by developing country Parties (United nations, 2008). One such mechanism under the Kyoto Protocol is:

A. The global environment facility

The Global Environment Fund has assumed and continues to be the operator of the financial mechanism of the Convention. It responds to financing related to the transfer of environmentally sound technologies (Hosier, et al., 2008). Since its creation, a specific program for the transfer of technologies has been set up under the SCCF, which follows a technology- or sector-specific approach. Moreover, the GEF was requested by the COP at its thirteenth session to elaborate a strategic program to scale up the level of investment for technology transfer to help developing countries address their needs for environmentally sound technologies (United nations, 2008).

B. The clean development mechanism (CDM)

It is one of the provisions of the Kyoto Protocol that was originally created as a bilateral mechanism through which entities in industrialized countries could obtain approved emissions reductions by investing in clean technologies in developing countries (Ashwani, Kapil , Kaushik, Satyawati , & Saroj , 2010). The CDM is intended not to promote technology innovation, but the deployment (including international transfer) of existing low-carbon technologies.

2.2.2. Institutional mechanisms: Expert group on technology transfer (EGTT)

The Conference of the Parties established the Expert Group on Technology Transfer (EGTT) within the framework of the Subsidiary Body on Scientific and Technological Advice (SBSTA)(Hosier, et al., 2008).As an institutional arrangement to facilitate the implementation of the technology transfer framework provided by the Marrakesh Accords. The EGTT informs Parties on the status and progress of its work in annual reports and, over the years, has produced targeted and instructive products that Parties can use in formulating specific climate change mitigation and adaptation technology strategies(United nations, 2008).

2.2.3. Methodological mechanisms: Performance indicators system

The COP16 requested the EGTT to develop, as part of its future program of work, a set of performance indicators that could be used by the Subsidiary Body for Implementation to regularly monitor and evaluate the effectiveness of implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4.5 of the UNFCCC. The work is divided into three tasks: developing a set of candidate performance indicators, testing the set of performance indicators, and preparing recommendations for their use. The performance indicator system will serve as a methodological mechanism for evaluating and monitoring the development and transfer of environmentally sound technologies (United nations, 2008).

2.2.4. Other mechanisms being implemented by international organizations and partnerships

Environmentally sound technologies are also recognized as crucial elements for addressing the climate change challenge by other multilateral international cooperation mechanisms such as the World Bank's technology funds, the Asia and Pacific Partnership on Clean Development and Climate Change (APP), and the IEA's energy technology agreements and initiatives. Other important partnerships include the International Partnership for a Hydrogen Economy, the Carbon Sequestration Leadership Forum and the Renewable Energy and Energy Efficiency Partnership(United nations, 2008).

2.3- Global trends in clean technology for sustainable development

Innovation has a central role to play in tackling climate change, as affirmed in the Paris Agreement on Climate Change (Article 10), which states, "accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development." as The IP system fosters innovation, as well as the transfer and dissemination of technology – including climate-friendly technology-. While IP rights provide economic incentives to develop new solutions, they can also help in diffusing innovation to the places of greatest need (Dietterich, 2020).

Technological entrepreneurship has been widely acknowledged as a key driver of modern industrial economies, and more recently, a panacea for environmental and social problems(Hall , Matos, & Bachor, 2019). Hence, the importance of transferring clean technology between countries has increased. Widely known includes ceramic cooking stoves, biogas digesters, cement sheets, bio-jatropha fuels, and a host of Chinese and Indian foreign direct investment activities in Africa, and many developing countries are leading the world like;Brazil by Ethanol (from sugar cane), India by Biodiesel (from jatropha), China by Heat pumps). However, the majority of developing countries still face significant technology gaps and barriers to access in some markets.(Thomas & Brewer, 2011)

The transfer of environmentally sound technology occurs mainly in developed countries, but the difference between developed and developing countries is that developed countries believe that IP is an incentive rather than an obstacle to the transfer of environmentally sound technologies, and that the current IP system is essential for technological development and innovation. Indeed, the significant increase in patents for environmentally sound technologies around the world does not mean that the IP system is not an obstacle to technology transfer. The problems that developing countries face in technology transfer still need to be analyzed and resolved. Therefore, the principle of 'Common but Differentiated Responsibilities' enshrined in Article 4 of the UNFCCC places the immediate responsibility for mitigating and adapting to climate change on developed nations, the GHG emissions associated with economic development since the times of the industrial revolution have been made by the developed nations (Sullivan, 2011).

Based on this background, it appears that there is a need to expand and reform cooperation and financing at the international level in order to achieve the global technological revolution, in addition to taking concerted measures to push the wheel of change in the direction of creating clean technology. For an environmentally friendly economy at the global level, which is more widespread and can be achieved within a time frame that is much shorter than it was in the past.

In 2016, there are about 2.84 billion people still using solid fuel for cooking, in contrast, there are about 4.35 billion people who use clean fuels (the Department of Economic and Social Affairs, 2018), which is a significant size, but it did not achieve a sufficient increase compared to the year 2010, because there are many problems in Funding such investments: CP investment capital may not be raised for the following reasons, either because people are not fully aware of the return and are ignorant of the benefits of clean cooking or because the country cannot obtain the necessary financing and the public benefits are not reflected in its income.

Figure 2. Green technology growth outlook (in billion euro)



Source:(Berger, Henzelmann, Büchele, Andrae, & Wiedemann, 2018)

Also, by the year 2025, green technology is expected to grow by a value of 5.902 billion, compared to 3.314 billion in 2016, In other words, this cross-sector industry will expand at an average annual rate of 6.9 percent in the period from 2016 through 2025., and (figure 2) also shows that the most sectors that achieve a significant increase over the years are energy efficiency, whether in 2016, a value of 937, or in 2025, a value 1.491 billion, which reflects some of the progress made by climate change negotiations in the field of clean technology transfer, as improving energy and fuel efficiency leads to a 47% reduction in energy-related carbon dioxide emissions by 2030. However, the current international order should be improved, relevant regulations revised and clarified, and multi-level cooperation strengthened between developed and developing countries to promote the transfer of clean technologies.

2.4- Barriers to clean technology transfer and climate change in Algeria

In 1993, Algeria ratified the United Nations Framework Convention on Climate Change (UNFCCC) and in 2005 the country signed the Kyoto Protocol. Since then, all of the country’s socioeconomic plans have included climate change mitigation and adaptation measures, an analysis of trends in the sustainable development goals in Algeria reveals whether it is progressing sufficiently to achieve the sustainable development goals by 2030, as Algeria's presence within the Arab Maghreb Union (AMU) bloc makes it among the most economically developed countries, and it ranks third (SDG Center for Africa and Sustainable Development Solutions Network, 2019). Algeria faces main challenges, of which Goal 13 related to climate change is still a challenge that still exists, as carbon dioxide emissions have increased Per dollar of industry added value at constant prices for the year 2010, from 0.9 kg in 2000 to 1.0 kg in 2017, this coincided with a decrease in

the share of renewable energy in total final energy consumption from 0.4% in 2000, to 0.1% in 2017.

The transfer of clean technology requires a proactive approach that combines the involvement of researchers across universities and experts and encouraging potential industrial partners to use clean technology. Thus, Algeria has a long-term vision on the importance of fully investigating the development and transfer of clean technology in order to improve resilience to climate change and reduce emissions of gases.

So, to stimulate the transfer of clean technologies to Algeria, and to achieve results at the right time, place, and cost. Certain policy measures should be taken today to improve the necessary deployment of low-carbon technologies in Algeria and to avoid the risk of falling into high-carbon technology must overcome some barriers, including the following:

2.4.1. Legal Barriers

There are many ways in which the law can limit the transfer of clean technologies, which mainly result from actions taken by the government in implementing laws that would impede the transfer of clean technology. Among the legal barriers that can be identified, some governments fail to provide adequate protection for property intellectual. Other legal barriers include tariffs and taxes in addition to non-tariff barriers, such as imports and certificate approval, testing requirements, and issuance of certification (Bernard, 2016). The laws of intellectual property protection differ from one country to another.

Transparency and the exchange of information in the investment rules is an important indicator of the more comprehensive concept of "good investment management", the existence of a non-transparent business environment in Algeria increases the cost of information and disperses the effectiveness of companies, in addition to the difficulty of procedures related to preferential access to the Algerian market due to customs and third-party trade barriers Customs duties, and what is required here is to increase the degree of trade openness, which is one of the truest indicators of the attractiveness of a site for foreign investment. and the Algerian government must work to develop

flexible regulations, consistent with the perspective of the World Trade Organization, to protect intellectual property for clean technology exported by developed countries.

2.4.2. Economic Barriers

The competitiveness of new technology compared to existing technologies is in general one of the most important economic barriers to the market diffusion of new technology. It is most important to compare the costs of goods and services provided by the new technology compared to those of incumbent technologies (Ivan & Ulrich Elmer, 2015). Accordingly, the challenge constituted by cleaner technologies in developing countries is economic (Schembri & Petit, 2009).

Algeria and many other countries lack the necessary financial resources to finance the transfer and development of clean technology projects in all sectors. Because the cost of transferring clean technology is high, and that is the result of the scientific superiority of the industrialized countries that impose prices. In addition, lack of connection between the technological infrastructure structures and the economic sectors, in the sense of not embodying the role and work of the scientific and technological centres as technological units that have a more reliable connection with the academic activities emerging from them with the local economic and social needs; Thus, to overcome these obstacles, the Algerian government must establish partnerships with developed countries, especially Western European countries that possess clean technology through the strategic relations it has with it, especially those to which it exports gas.

2.4.3. Political Barriers

Political barriers often include the potential for political instability in developing countries or perceived weaknesses in enforcing policy. This is of particular importance for low-carbon technologies because the development of low-carbon technologies is often incentivized by strong environmental policy. There are also political barriers to the transfer of specific technologies, such as one of the most important low-carbon technology nuclear technologies, which is perceived as posing a threat to international security (Shujing, 2012). It is also considered,

Political will is considered as one of the most important obstacles impeding the transfer of clean technology to developing countries, as a result of the lack of interest in climate change issues on the part of most developing country governments.

Therefore, Algeria is one of these countries that does not attach importance to the transfer of clean technology in the general policies of the government, In contrast to its historical experience with oil and gas technologies; Algeria lacks expertise in green technologies. This is mostly due to the lack of political interest that has been shown in green technologies in recent years, and the lack of political stability, which is one of the most important factors for attracting foreign technology investments, as foreign capital cannot invest in an atmosphere of crisis. That is why actors must pressure the participating parties in government to integrate a strategy of clean technology transfer into public policy and to map out a roadmap for its implementation.

CONCLUSION

We can emphasize the importance of clean and environmentally sound technologies in facing pressing environmental challenges such as climate change. However, developing countries and least-developed ones are facing a state of stalemate over the transfer of intellectual property rights and technologies beneficial to the climate, which has become more and more complex, due to the intensity of conflicts of interest on a global scale. Some developed countries believe that exports of low-carbon technology will lead to improved production efficiency in importing countries, The technological gap between exporting and importing countries will be narrowed, and, therefore, they must realize that mitigating the effects of climate change is a high priority and a major challenge at the global level. Therefore, the industrialized West must pay its fair share in aiding poorer countries that are less responsible for climate change, and that is often more vulnerable, with their adaptation plans and green transitions. On the other hand, developing countries should strengthen financial and policy support for research and development in the field of green technologies, and implement major scientific and technological

programs on green development, in addition to coordinating current research and development projects on energy conservation, environmental protection and low carbon growth.

The study concluded that the hypothesis that legal, economic and political barriers in Algeria can prevent the clean technology transfer for climate change mitigation is validated. However, for a greener environment and sustainable development, there should be the development of a comprehensive strategy based on overcoming these barriers that remain the most important challenges that Algeria faces to enable it to benefit from clean technology progress. Indeed, there is not yet a suitable climate for it in Algeria, because it is required to consider some things when we want to transfer and apply clean technology, and these considerations are the basis for a successful investment and sales of clean technologies, like:

- Rules and regulations for the protection of property intellectual economic and financial incentives to bridge the gap between low-carbon solutions and their commercial viability, and Incentives for energy efficiency by removing barriers such as anomalous subsidies, Providing political will, in addition to the availability of accurate and applicable information related to the clean technologies.
- Since the Algerian government currently plans to reduce its emissions by 7 percent unconditionally, or by 22 percent with support from the international community, by 2030, so, developing a strategic plan for action to tackle global climate change and to promote sustainable development of the country can mobilize international financial support for Algeria. Despite the falling cost of solar and wind technologies, renewable energy projects remain capital-intensive. Financing the transition is thus a huge challenge for Algeria. Three national funding options seem to be available: public funds, domestic private funds, and foreign direct investment.
- There is a need for more applied research and practical training. Algeria needs to receive technology transfers and managerial

expertise from nations that have managed the transition effectively. Such cooperation should aim to achieve human and material capacity building in Algeria.

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