

Chapter 1

Sustainable Development and Environmental Policy to Restrict Hydrocarbon Production^{*}

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Abstract: This chapter examines, from a hermeneutic-interpretive approach, the implications of the unilateral restriction of hydrocarbon production to fight global warming. In the Latin American context, restricting the exploration and exploitation activities of such energy sources does not solve environmental degradation. However, it does affect government policies and the population's quality of life and welfare.

Keywords: Colombia; sustainable development; alternative energies; hydrocarbon policy; environmental protection; energy resources

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Introduction

Sustainable development is a term that took hold mainly due to the actions of several movements and the work of international organizations. From this, we can ensure the means that, derived from the use of natural resources, satisfy their own needs without sacrificing those of future generations (Asamblea General de las Naciones Unidas, n.d.), considering the viability of alternatives through which this specific goal can be achieved. However, given the problems facing contemporary global society, the crisis caused by the coronavirus, the intensification of poverty, economic instability, and other circumstances that affect social development, the purpose and effectiveness of sustainable development can be called into question.

In 2015, the United Nations (UN), a key organization promoting sustainable development, established 17 goals. These goals primarily focus on reducing poverty, ensuring the right to health, improving well-being, and enhancing the quality of life through education, clean water, and employment opportunities. They also aim to promote economic development, address existing inequalities, work toward gender equality, achieve sustainable and social development, and strengthen environmental conservation efforts. Moreover, they seek to promote peacebuilding and institutional consolidation within member countries (Programa de las Naciones Unidas para el Desarrollo [PNUD], 2019).

These goals aim to address underlying issues that have persisted over the years and have been exacerbated by factors such as violence, conflicts, and the emergence of multidimensional threats. These issues do not just stem from poverty, the economy, or healthcare. They also involve new variables that could lead to increased needs for the population in the future. For instance, the rise in ecosystems affected by crimes like illegal mining and indiscriminate felling of trees

results in deforestation, negatively impacting wildlife, flora, and the well-being and quality of life of communities in those areas.

According to the UNDP, as part of the efforts made in favor of vulnerable communities identified worldwide and the fulfillment of the Sustainable Development Goals (SDGs), the 2030 Agenda is promoting programs that aim to strengthen the environment to provide opportunities to vulnerable communities in member countries. Thus, it lays the foundations for economic, social, and environmental development, which at first glance shows that it is considering the present and projecting society into the future through donations and investments such as the one made in 810 environmental projects in 143 countries (Asamblea General de las Naciones Unidas, n.d.). This is directly consolidating sustainable development in the nations benefited. However, several doubts arise around this initiative; one is whether it will be possible to keep these projects afloat after the COVID-19 pandemic.

As mentioned, several SDGs pursued by the United Nations aim to improve individuals' quality of life. Still, with the onset of the coronavirus, many of these purposes and the strategies designed for each will have to be rethought or, otherwise, strengthened. For example, some of the purposes that must change their perspective of sustainable development are related to no poverty, zero hunger, quality of education, decent work and economic growth, industry, innovation and infrastructure, and sustainable cities and communities.

The above is seen as a consequence of the crisis unfolding around the economic slowdown that has affected countries, which, until the beginning of 2020, did not anticipate such high unemployment rates and, therefore, an increase in poverty levels. Among European countries, Spain showed discouraging figures regarding the migrant population, as stated by Oxfam Intermón—a non-governmental organization that works on reducing poverty despite global inequalities.

After the coronavirus pandemic and due to the economic crisis it caused, levels of poverty and unemployment never considered became a reality, revealing that in 2020 alone, according to RTVE estimates, up to 10.8 million human beings were in poverty. Due to the coronavirus, countries deemed “strong” now have needs other than those considered when proposing the SDGs, which could require rethinking the strategies devised so far for their achievement.

The outlook for South America is no different from Europe. It is one of the regions hardest hit by the virus, with high numbers of infections and deaths in countries like Brazil, which until September 23 had reported 426,996 cases and

139,000 deaths (Organización Mundial de la Salud [OMS], 2020) and Colombia, with 784,268 cases and 24,746 deaths, according to Ministerio de Salud y Protección Social (2020).

The emergence of the coronavirus represented more than a prolonged quarantine for around five months and a slow economic reactivation, at least for Colombia. It was the profound manifestation of poverty and other economic, educational, and healthcare problems, adding to the closure of several business sectors. This indicates that the pandemic's effects are unfavorable and are increasing the needs of the Colombian population.

Unemployment rates reached 20.2 % in July (DANE, 2020), indicating increased poverty as families had no purchasing power to supply themselves with food and essential items. Besides, a decrease in the quality of life was reflected in the increasing demands of the population that would gradually face the consequences of an economy with a downward trend.

Colombia, like other countries at global and regional levels, presented to public opinion the consequences of the pandemic and the transformation in the population's basic needs. The efforts governments make to meet these needs and stop other phenomena, such as insecurity, which has considerably increased in a group of cities headed by Bogotá, seem insufficient. Thus, we must consider whether the current objectives and strategies suggested are sufficient.

Economic crisis, underdevelopment, problems caused by natural disasters, and risks associated with climate change are also drivers of poverty¹. To provide successful solutions to the crisis, satisfy people's basic needs, and guarantee their well-being, it is important to achieve equanimity between the economy and ecology.

The environment is a *res communis* interest or heritage of humanity. Clearly, production mechanisms, technologies, and forms of economic growth compatible with the environment must be incorporated. Nonetheless, facing crises and precarious social situations in developing countries with environmentally compatible elements is a current dilemma when we are rising from a pandemic.

Research Problem

Governments, both globally and regionally, face the pressure exerted by the imbalance left by COVID-19 and its effects and the aftermath of global warming.

¹ Swelling of rivers, floods, heat and cold waves, extreme storms, droughts, fires, pests and forest loss, among others.

They must respond promptly, striving to improve well-being and meet the population's basic needs so that compliance with the SDGs does not harm the quality of life of society at large and the environment itself.

Latin American countries such as Colombia find their primary source of energy subsistence in subsoil natural resources, and the population's quality of life depends on them. Then, referring to subsoil resources, especially hydrocarbons, is to refer to the energy sources most used on a planetary scale: natural gas (21.4 %), coal (28.9 %), and oil (31.1 %) (Anglés, 2019, p. 297).

The paradox lies in the materialization of a balance between environmental protection, environmental peace, and the rational use of natural resources, helping minimize climate change's adverse impact and not criminalizing poverty as a binding factor in the cause-effect relationship of environmental degradation² (Martínez Alíer, 1992). Therefore, adequate and balanced prevention alternatives must be sought so that they do not negatively influence the environment or human well-being, an issue where developing countries have been most affected, with the highest poverty and unemployment rates.

Policies aimed at achieving better conditions for populations dependent on natural resources to survive should be understood as environmental policies; for example, the person who heats their home using technological mechanisms. The applicability of an environmental policy, which seems to be an effective mechanism for environmental conservation, could be regressive as the individual should not have to look for coal or firewood to meet the urgent need for providing warmth for their family.

For a person, being unable to solve house problems is a condition of poverty.³ Then, it is about offering options to leave poverty aside, allowing people to access better living conditions and adequately satisfy basic needs. Development is sustainable if it improves the level and quality of human life while guaranteeing and conserving the planet's natural resources (Vergara & Ortiz, 2016, p. 37).

Therefore, it is possible to consider that the strategies implemented up to this point by the UN in the search for sustainability are undeniably challenging for nations and international organizations after the pandemic. The concept of sustainable

² In 1987, the Brundtland Report, prepared at the request of the UN, argued that poverty was a major factor in environmental degradation. It is worth noting that for the first time, this document brings to the fore the concept of sustainable development, defined as it appears in the introductory part by the United Nations General Assembly, on the basis of meeting present needs without compromising those of future generations.

³ If an individual cannot pay the costs of electricity, for example, they are poor; if a person requires subsidies for their education, there is a condition of poverty.

development should be oriented toward a broader group of needs that could previously be deemed low scope but today have loomed large in a transitioning global scenario. It will be necessary to rethink the goals, the 2030 Agenda, and even how sustainable development is being achieved as its effectiveness is questioned in a world that, due to a pandemic, needs new ways to survive.

There is an apparent contradiction between the urgency of minimizing climate change and the growing need for energy resources that ensure the continuity of modern life, translated into well-being and quality of life as social and economic rights that define life today, with the possibility of involving fundamental rights, given the strong connection with them.

This chapter, therefore, aims to delve into the effects of this approach and the viability of an environmental policy restricting the production of hydrocarbons. So, the question is: What is the convenience of limiting the production of hydrocarbons by Governments to confront global warming and achieve environmental peace?

This approach to the problem requires addressing the hypothesis of its inconvenience. Two elements are explored: the impact of the restriction on hydrocarbon production as a unilateral government policy on the respective state's public finance versus its effect on climate change and the population's energy needs concerning hydrocarbon production. Following this line of analysis, we conclude this chapter by exploring the alternatives and their relationship with the restriction on hydrocarbon production as a government policy.

Working Hypothesis

Among the challenges involved in building and consolidating environmental peace infrastructure, the existence of a strategic advantage to counteract the ecological crisis can be questioned, as there is a marked dependence on hydrocarbon derivatives throughout Latin America for the social well-being and subsistence of communities. Executively suppressing its usefulness in developing countries with few resources and where the costs of alternative measures exceed the State's capabilities for their implementation could be detrimental to the environment and the population's quality of life and well-being. This is a real challenge. It will not be easy to contribute to the joint global effort, which is also costly when dealing with alternative energies.

Theoretical Framework

Negative Environmental Peace and Ecological Imbalance

Multiple socio-environmental factors shape the notion of environmental peace in the post-agreement to end the conflict and future post-conflict scenarios. For instance, environmental policies, the enactment of laws, and citizen participation in environmental decision-making may affect an individual's humanity, welfare, or even relationships with economic growth.

Notably, addressing opportunities to contribute to peace is incumbent upon everyone. There is not only the co-responsibility of the State and its institutions but also of key stakeholders, including civil society and those who participate directly or indirectly in these dynamics of conflict within a territory (Martín, 2020).

Building environmental peace is often associated with antagonistic interests, inequality, and exclusion in these circumstances. Ide (2021) states that the negative impact of building environmental peace is predominant. While it is not greater, it may result in inequality or discrimination as there are probable contexts for the appearance of the so-called *dark side* and the worsening of conflicts when building the structure of a peaceful environment. In agreement with Ide, it is not inappropriate to affirm that using strategic natural resources such as oil, natural gas, or other minerals paves the way for peace and the creation of sustainable livelihoods.

The above is a paradox in building environmental peace since it will be somehow marked by adverse effects, as noted in the conduct of this research. Understanding points of balance between dependence on natural resources and environmental management helps counteract ecological crises and build peace. Appropriate strategies must be sought to review the effects of the hydrocarbon restriction policies in Colombia. The possibilities of tackling the issue of peaceful environmental management in the best way must be pondered, thus avoiding adverse effects that violate human rights and serve as a smokescreen for antagonistic interests of the dark side.

According to the theoretical approach to the damaging impact of environmental peace and the enhanced governance of natural resources associated with environmental protection, peacebuilding, and welfare, a potential scenario could favor international commercial interests without improving people's quality of life.

For example, an obstacle to solving or addressing the non-international armed conflict (NIAC) in the country has been illicit crops, its most important method of financing. Food assistance, production projects, technical support, and even financial aid from the State were considered to attack this center of gravity after the peace accords. Consequently, the Comprehensive National Program for the Substitution of Crops for Illicit Use (PNIS, by its Spanish acronym), which became a cornerstone for undermining illicit economies, especially the illegal cultivation of coca plants and other crops, and providing the peasant population with more sustainable livelihoods in the face of rural poverty, was not entirely practical (Vélez & Lugo, 2021, as cited in Ide, 2021). Greater coca production, increased felling of forests for planting, and continuous environmental pollution in those territories due to the use of chemicals were observed.

The October 2022 report from the United Nations Office on Drugs and Crime (UNODC), which summarizes the results of coca cultivation in 2021, states:

In 2021, coca cultivation reached a historical high level in Colombia, breaking the downward trend of the last three years. Also the potential cocaine production reached a historical record high, following the upward trend since 2014. (UNODC, 2022, p. 15)

The findings have yet to show consensus between environmental peace, ecological balance, and welfare since these achievements have been limited and insufficient. Ide (2021) distinguishes six potential adverse effects of environmental peacebuilding management: 1) putting the political problems implicit in (armed) conflicts in the background; 2) involuntary displacements that lead to the destruction of social fabric and poverty; 3) escalation of the conflict; 4) discrimination; 5) loss of confidence in state institutions and the legitimacy of their actions, and 6) looting of natural resources.

Methods

The hermeneutic approach adopted for this research—located in the understanding of the reality studied and the perspectives and experiences of the social actors involved—becomes the basis of the interpretive paradigm and qualitative epistemology to achieve the stated objective. It is understood that everything must start from the contextualization of reality, a reality marked by behaviors,

knowledge, and attitudes shared by individuals in specific spatial and temporal contexts (Bonilla & Sehk, 2005).

The study of human and sustainable development, such as the recognition of and respect for environmental rights, socioeconomic sustainability, and, of course, the social balance necessary to get out of the current situation (poverty) and improve the well-being of the population, is a unique matter subject to interpretation and analysis. Therefore, the method used throughout this academic work has been a simple case study. According to Stake (1999), it involves the study of the particular and complex nature of a specific and singular issue, going beyond the understanding of such a reality in important circumstances.

We used document analysis techniques, taking into account official documentation from international organizations and studies and research published nationally and internationally, to understand the context and assess the existing relationship between environmental peace, environmental protection, and the population's well-being in a region where conditions of underdevelopment prevail, such as Latin America. The implications regarding environmental policies of restriction on the production of hydrocarbons at the regional and local levels should be established by contrasting environmental peacebuilding, ecological balance, and human well-being.

The semi-structured and group interview with academic experts on the subject, such as teachers and other educational actors, was also employed to investigate their opinions, experiences, and knowledge. Convergent conceptions are extracted in two senses: a) environmental governance and management and b) peace and the population's well-being.

Results

Disadvantages of Restrictions on Hydrocarbon Production as an Environmental Policy

Multiple trends have defined the 21st century. One poses important challenges regarding humanity's future and climate change's acceleration. This phenomenon can be described as the worsening of environmental conditions as a result of global

warming, being indisputable both its existence and the efforts of the Intergovernmental Panel on Climate Change (IPCC) to prevent it, let alone the intervention of climate law, also known as *Klimaschutzrecht* (Oschmann & Rostankowski, 2010, p. 60).

In turn, global warming refers to the increase in the planet's temperature, which can modify weather patterns and cause more intense and unpredictable winters and summers. Such conditions are associated with the rise in environmental catastrophes that are disruptive to social life. The destruction of towns and crops and the alteration of climate predictability worry governments and institutions at the national and international levels.

Many efforts have been made to modify this sequence of events. There has been a particular interest in reducing people's impact on climate change associated with their consumption of products that generate greenhouse gases in the atmosphere, favoring the reduction of hydrocarbon consumption within the statements of various political institutions.

Our world is also deeply addicted to goods that use enormous amounts of energy. Thus, humanity's growth is accompanied by the need to generate this energy. There is also a growing demand for these products today since petroleum derivatives are a substantial energy source for humanity.

The 21st-century world is experiencing an important contradiction between the need to reduce climate change and the growing need for energy resources that allow the continuity of modern life and the comforts that define it. Various governments are concerned about solving these problems, and some have chosen to take measures to reduce the production of fossil fuels.

Any advance in the creation of possible energy sources constitutes hope that can resolve the contradiction toward environmentally friendly and sustainable development. However, alternative energy sources are expensive since the manufacture of these artifacts usually requires challenging materials. Furthermore, they may require inputs whose mining extraction is also polluting, and recycling their materials is currently expensive.

This depiction has not been enough to dissuade some governments from adopting policies to reduce hydrocarbon production. Many consider that this path could be the most convenient to defeat climate change, adding to the environmental dilemmas of peacebuilding. Still, the associated risk requires exploring the matter, considering the complexity of the scenario described.

Relationship between the Theoretical Assumption of Economic-Environmental Sustainability and Sustainable Development

Paradoxically, society is never limited exclusively to sociocultural relationships between individuals as social groups but rather systematically interacts with the natural world, whose inputs become part of the broad productive chain in the same economic process for social satisfaction of needs and desires for well-being (Schandl, 2002).

The theoretical-conceptual approach of economic-environmental sustainability from a comparative perspective allows us to fulfill the purpose of the research, provided that the discussion on the notion of sustainable development, in the sense of the environment as a rights-holder, is compatible with the theories of economic growth and productivity predominant in modern history.

Accordingly, inclusive and sustained economic growth can drive progress, create decent jobs for all, and improve living standards (Varela, 2021, p. 108) so that natural wealth, the environment, and welfare are not jeopardized. This does not mean that we depend uncontrollably on subsoil resources, but that we no longer will. This would have serious repercussions for countries in poverty susceptible to dependency, such as Colombia, since it does not solve the environmental problem unilaterally but can be regressive when such alternatives may be too costly and inviable for a dependent and poor population, moving away from the probabilities of the lasting use of natural resources.

It should be noted that addressing such a notion of sustainable development must clarify the perspective of the transformation process. Following Pujol (2003), resource stewardship, investment direction, and channeling of technological development and institutional transformations are determining factors for improving economic potential and, of course, satisfying human needs in present and future times.

Societies establish differential relationships with their environment in a particular way. This results from the alternation in the varied styles of development, modes of production, and forms of appropriation, use, and utility of livelihoods derived from the natural ecosystem to meet needs. Nonetheless, catering to needs would represent a dichotomy between the concept of growth and the meaning of development.

Then, it is necessary to differentiate the notions of *growth* and *development*. The first concept involves physical expansion (increased production, gross domestic

product [GDP]); the second, improvement capacities regarding the quality of life and the satisfaction of socio-personal needs in healthcare, education, culture, housing, and other social aspects (Meadows, 1993). This conceptualization shows a broader, more qualitative meaning of development, focused on the perception of individuals' well-being and quality of life. In contrast, the notion of growth is a rather quantitative measure.

Societies can sometimes experience significant economic growth but not noticeable development. Conversely, development does not mean substantial increases in capital accumulation or greater financial availability. On that account, convergence for the balance between growth and development revolves around the notion of sustainable development, seeking the integration of these two dimensions. Sustainable development inclusively promotes economic growth in harmony with the duty of protecting the environment and contributing to improving human well-being.

Griffin (1973) called the significant changes in the conception of development “the rude awakening.” Indeed, he referred to the world requiring a broader view of development to reach an international, global, and even planetary dimension—a view that sponsors economic equity and the investment of resources in society to attain a quality of life for humanity and the earth (Griffin, 1973).

Understood as a synthesis of qualitative approaches in economic, environmental, and sociocultural dimensions (Calatrava, 1998), *development* must be characterized by comprehensiveness. Of these dimensions, one of the most outstanding is caring for the environment, which comes together with a burning issue: the need to progressively change years of extractivist economies based on hydrocarbon exploitation to sustainable economies as a qualifying and defining determinant of “development.” This dimension initially had a clear environmentalist sense that, of course, it still possesses, to such an extent that two meanings of sustainability have been proposed:

- *Strong sustainability*, which defends development as long as the stock of natural capital is maintained and secured.
- *Weak sustainability*, which considers it sufficient to preserve the global capital stock (Calatrava, 1995, pp. 309–310).

As Chesney (1993) argues, sustainability can be regarded as an ecological concept and even as the capacity of an ecosystem to maintain the vitality of its components and operating processes over time (p. 81).

In Colombia, with a new administration since August 7, 2022, a strategy has been set out through the approval of several reforms in the first year of government to change the unsustainable extractivist economic model to sustainable entrepreneurship and equity. Overarching land and tax reforms and the continuity of the peace agreement are sought. The bill also creates an agrarian and rural jurisdiction (Ramos & Vázquez, 2022).

Domínguez (2022) points to a lack of financial sufficiency in Colombia's tax system. It creates a gap in taxation, with a GDP that does not cover the social spending necessary to maintain equity levels. This situation must be rectified if the country expects to stop depending on extractive economies such as mining and oil. The tax reform is thus justified, which, together with the land reform, will address the "structural heterogeneity" of the Colombian economy.

In short, the country's economic and social context will indeed change, but it will take longer than planned and possibly be chaotic for its growth needs. External and internal factors divert the attention of regional and local authorities, which undoubtedly play an indispensable role in introducing the reforms pushed through by all levels of government.

Discussion

Restriction on Hydrocarbon Production as a Unilateral Government Policy

During the United Nations Climate Summit in 2019, a young Greta Tunberg delivered a speech in which she called for reducing hydrocarbon production to zero to mitigate global warming and save the world from the coming environmental catastrophes. The teenager's words made a great impression, and her video went viral. Over time, the prevailing discourse has revolved around the need to diminish the environmental footprint, decrease the consumption of oil and derivatives, and take measures to produce these fuels. Its explicit purpose is to reduce emissions to points where the planet's natural capacity allows the stability of the biosphere to be recovered.

Following these recommendations, it is unsurprising that some governments have suggested oil exploration and extraction restrictions. Pressure from NGOs, added to campaigns announcing the need for a change in production dynamics, has been present for decades in the popular sphere.

Therefore, it is advisable to discuss the proposal from the environmental and budgetary perspective of a State that can implement this idea. Firstly, we must mention the size of the problem. The world actually consumes large quantities of oil and coal. In Colombia alone, oil production has substantially impacted the GDP and the country's high tax revenues and exchange market (López et al., 2013).

Petroleum refining generates various derivative products, such as lubricating oil, asphalt, sulfur, pitch, petroleum coke, rubber, wax, polyvinyl chloride, detergents, diesel, solvents, fertilizers, kerosene, carbon black, paraffin, plastic, and polyethylene. Coal can be divided into four categories: anthracite, bituminous, subbituminous, and lignite.

Replacing oil and coal in the consumer product line takes work. These elements are involved in multiple products and are particularly necessary for energy generation. Recycling can help extend the use of products made from oil and coal. Still, it represents a level of global commitment and requires a substantial investment in processing plants for recoverable waste.

Coal energy use is equivalent to more than a quarter of the world's power generation, second only to oil and closely followed by natural gas. These three energy sources provide more than ninety percent of global energy. Hence, the policy of ending hydrocarbon production becomes difficult to implement, given the size of the generation gap that it would create in global needs. At the same time, the manufacture of products that use alternative forms of energy entails generation risks that do not facilitate the process of a political decision in this direction. The energy shortage that the exclusion of hydrocarbons would cause must be thought of realistically, under penalty of suffering tight restrictions on the productive capacity of humanity, with the undesirable economic effects that not resolving the issue in time would bring.

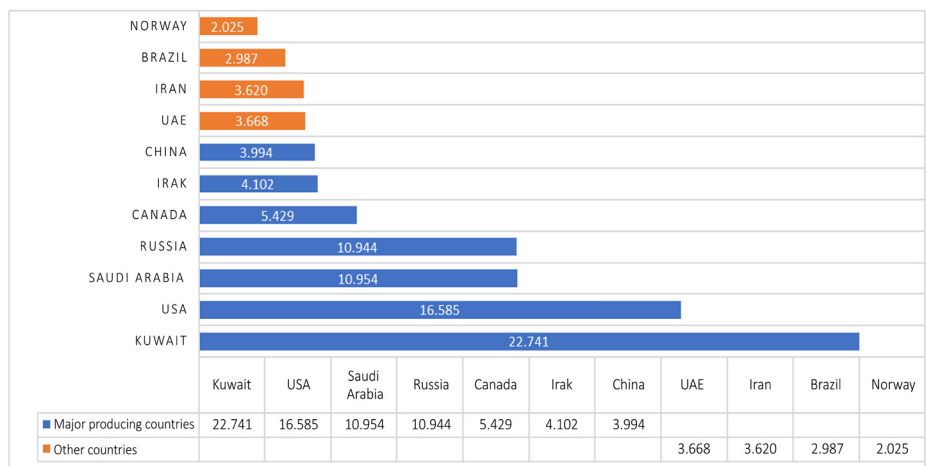
Substitution by renewable energy sources is a bigger problem for a global society and more complex from a national perspective. An issue added to this consideration is the actual impact of unilateral decision-making since a country's reduced production would have a negligible effect compared to the dimensions of the global hydrocarbon market.

Countries positioned as globally important oil producers, such as the USA, Russia, or Canada (Figure 1), would need a significant enough share to unilaterally decide to reduce their production and make a visible impact on climate change.⁴

⁴ The current members of OPEC led by Saudi Arabia are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, United Arab Emirates, and Venezuela.

That being the case, effectively addressing this situation requires concerted actions on the part of producer and consumer countries, working together to reduce greenhouse gas emissions and promote clean and sustainable energy sources.

Figure 1. World Ranking of the Leading Oil-producing Countries in 2021 (in thousands of barrels per day)

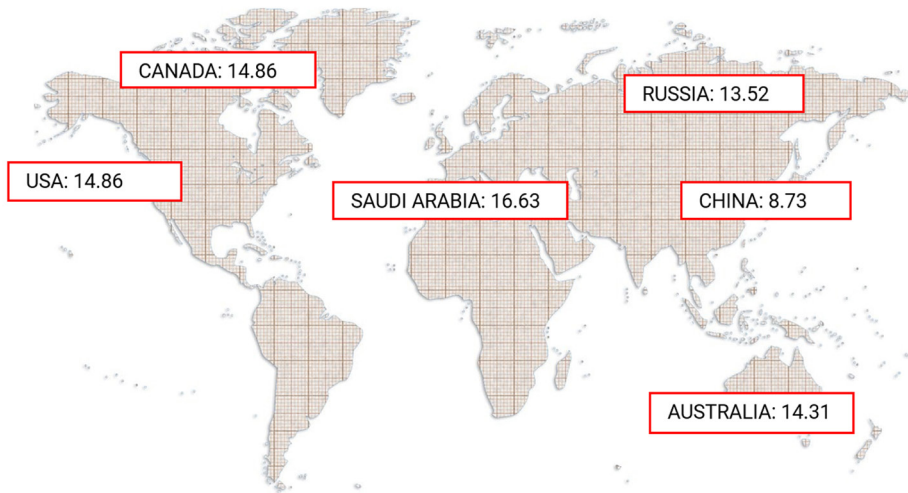


Source: Own elaboration based on Fernández (2022).

Notably, if any of the leading producers (countries in blue) suddenly ceased production, the international impact on the prices of crude oil derivatives would increase substantially. Good evidence of this effect is the invasion of Iraq by a US-led coalition from March 20 to May 1, 2003, with the consequent increase in the price of oil. It went from USD 25.50 per barrel of Brent oil to an estimated increase of 74 % between June 2003 and March 2005, as established by the International Monetary Fund (IMF), compared to an actual price increase of 185 % during 1974 and 158 % between June 1978 and November 1979 (Isbell, 2005).

The relative weight of the pollution caused by hydrocarbons from developing countries is minimal, such that the suspension of production by a single country constitutes an incipient effect at a global environmental level. Industrialized countries are the main emitters of CO₂. For example, the USA, China, and Russia are among the top polluting countries that emit CO₂, as are India and Japan. In this ranking, developed countries are the most polluting globally (Figure 2).

Figure 2. *Tons of CO₂ Emissions Per Capita 2021*



Source: Authors' elaboration based on Muntean et al. (2024).

Although such impacts related to climate change are perceived globally and locally, local solutions do not imply local effects due to the interaction of climate systems from all regions around the world. Therefore, a unilateral effort against climate change is insufficient, and a global endeavor is required to produce significant effects if the measure is appropriate. However, from an economic point of view, the unilateral cessation of hydrocarbon production profoundly impacts the society that makes such a decision. Firstly, the fact that the triad of oil, coal, and natural gas are the primary sources of energy worldwide gives them a strategic position for the development of society. The national budget relies upon the state's income from these elements. In such circumstances:

The mining production of hydrocarbons and power generation at the national level has implications for foreign investment flows, exports, income, and taxes such as royalties, income tax, and wealth tax. Locally, such production gives rise to production chains, creates jobs, transforms the dynamic use of territory and other local resources, and collects taxes and subnational contributions that are important for the finances of territorial authorities. (Ministerio de Minas y Energía, 2018, p. 5)

Stopping the exploration and exploitation of these resources will significantly reduce an economy's tax revenues. Ergo, the government's ability to promote various policies, development, social plans, and peace would be interrupted.

Indeed, the outlook does not have to be pessimistic. At a global level, any initiative aimed at energy substitution would be a favorable option. Nevertheless, the proposal's viability imposes two requirements: the involvement of a significant part of the international community and the promotion of a low-cost substitute system to allow its economic sustainability. In these circumstances, the first requirement is tied to the banality of local implementation to face a global problem. The second comes from the high prices of alternative systems and the environmental cost incurred in extracting the required materials.

Locally, implementing alternatives to hydrocarbons can bring industrialization and reduced fuel prices. These measures could be helpful in the development of remote areas where fuel is too expensive for their residents, i.e., places that are so distant and abandoned that they are ideal for illicit activities or public order disturbances, where the same population would defend itself or adapt to the context (Kaplan, 2022). Reducing energy costs can improve living conditions in such places, making it more difficult to obtain fuel as a precursor for illicit activities. This last consideration is speculative about the dynamics of illegal fuel markets or the extent of its use for processing illicit drugs.

Finally, it is about understanding that the unilateral restriction of hydrocarbon production involves undesired effects and that the good intentions that may be had for its implementation will not necessarily attain the goals pursued. Besides, it has an undesirable impact on a sovereign state. Cutting oil production may imply energy dependence on other economies, resulting in the loss of independence. The population's living conditions could only be met by turning to foreign governments that, when negotiating energy transfers, would gain leverage to demand strong conditions from the government of the requesting country.

For this reason, the loss of energy independence may imply the loss of political autonomy, that is, less sovereignty for the State, even though energy independence is not always a synonym for energy security (MINEM, 2016, p. 10).

Energy Needs of the Population Regarding Hydrocarbons and the Urgency of Environmental Peace

We live in a world with limited resources and a growing need for inputs. Therefore, energy needs are a clear imposition of modern life (Calabrese et al., 2022). In such

circumstances, the growing dependence on everyday items that require electrical energy for their operation forecasts greater energy resource consumption in the immediate future.

Now, the use of means of transport, more friendly habitats for human life, and improved access to information are growing needs in a population eager for efficient energy services. Depriving the population of sufficient stable energy becomes a formidable obstacle to their life plans. In the medium term, it can imply a substantial deterioration of living conditions and the environment, leading to aggravated precarious situations (Segura et al., 2018). Although efforts to provide a stable mechanism to serve energy to the population are desirable, like environmental peace, they are difficult targets.

As mentioned, hydrocarbons are humanity's primary energy source, and due to their environmental effects, replacing them in the power generation chain is sensible. Still, the dimensions of the hydrocarbon share constitute an enormous problem within energy generation policies (Domínguez, 2022).

It is consistent to point out that mechanisms that transfer the need for hydrocarbons to the end consumer can be implemented. This is particularly simple, although it can be costly when standards are set that reduce the consumption of fossil fuels or derivatives and prohibit combustion engines. While effective in reducing consumption, these measures transfer the problem to power generation systems (Garrido, 2020).

A country can produce energy in different ways, including nuclear power plants, hydropower plants, wind farms, and photovoltaic power stations. Of these, thermal power plants require special attention in the energy-consuming production line.

A policy restricting combustion consumption is of little use when the population's power generation is provided by a set of thermal power plants. If these plants produce energy by consuming vast quantities of coal, oil, or gas, is the population's effort not to use electric vehicles or electric heating worthy? The substitution must be oriented at the different links of the energy chain, a structural change aimed at decarbonization (Hernández & Céspedes, 2020).

Meanwhile, imposing restrictions on the use of vehicles with combustion engines on the population can be contradictory if there are no efficient alternative mechanisms for their transportation needs. Ignoring the individual's reservations regarding their view and standard of living is arbitrary (Lotero et al., 2019). If it is a matter of changing the personal transportation system for a collective mechanism, such as public transport, talking about efficiency implies divergent levels of

analysis: predictability, safety, comfort, health, and price. These considerations can be weighed concerning citizens but respecting their condition as fundamental public policy targets.

It is not about ignoring the importance of the environment but understanding that decisions must be based on consensus building and the design of appropriate responses regarding policy-making and government programs for environmental peace, well-being, satisfaction of needs, and the population's quality of life.

Citizens must be seduced by proposals that make allowances for their approach since they have different considerations to meet their needs, build trust among related parties, and highlight advances in environmental cooperation and natural resource management. Consumers' substitution of hydrocarbons involves offering efficient and reliable systems that make the energy transition more friendly, being coherent and efficient in the policies for modifying generation systems so that it is not a transfer of pollution but a complete structure that helps create a healthy environment and guarantees the population's well-being and quality of life.

Along with the above comes the process of building environmental peace, understood as the motivation to promote peaceful and sustainable relationships between all living beings. This means going beyond the human/nature division, establishing cooperative relationships around natural resources, and understanding that if the environment is related to the conflict, so is peacebuilding (Alvarado et al., 2022, p. 1904).

Thus, accepting the governance of natural resources in a manner that is transparent, balanced with the demands of the population and the urgency of a healthy environment, and egalitarian among the stakeholders involved in building the infrastructure of environmental peace is to offer sustainable management that is more obvious to conflicts in order to rebuild emotional and community bonds. The evidence examined from the *dark side* shows the unfeasibility of a policy of reducing hydrocarbon production by assuming that care for the environment is guaranteed and conditions of well-being and quality of life are provided to communities. This approach must be much more careful and consensual in a way that aims to rebuild emotional bonds in the individual and within communities, armed groups, and the State itself.

The consensus must exist, as it "reinforces rebels' perception of the credibility of the government's commitment to the peace process" (Keels & Mason, 2019, p. 46). Alleviating tensions that may arise between the needs of the post-agreement to end the conflict, the environment, and the population's well-being in Colombia,

where a development model firmly based on a mainly extractive economy persists, is imperative at present. Virtually, the roles of each actor committed to building environmental peace must be deeply addressed to know their degree of involvement in the process.

Comprehending the climate-conflict link, especially concerning armed groups, opens the possibility for measures that even improve peace (Abrahams, 2020). A proactive approach to climate and conflict in all its contexts allows us to guide the relationship between natural resources, conflict actors, environmental peace, and welfare.

Alternative Energy Sources and Difficulties in Replacing Hydrocarbons for the Population's Well-Being

As noted, the global warming crisis points to the convenience of replacing hydrocarbon production in power generation with sustainable alternative sources that provide a reliable, environmentally friendly, and financially accessible service for users.

Firstly, reliability means that the service can be provided stably and not be subject to outage risks. So, the service must be sustainable and constantly flowing. The provision of systems that depend on the intensity of sunlight, the strength of the wind, or the accumulation of water raises serious doubts. The intensity of sunlight is variable, causing interruptions in power generation. As a result, the system requires accumulating mechanisms that increase costs.

If the intensity is reduced due to environmental factors or any other cause, power outages are a very likely consequence. The same applies to systems that depend on wind energy since wind patterns may vary and are, to some extent, unpredictable. Concerning hydropower plants, rainfall patterns can be variable, as shown by the El Niño or La Niña phenomena. That is why having various forms and alternative generation plants can help solve the problem to the extent that the deficiencies of one system can be remedied by another, which requires reliable and safe interconnection systems.

Secondly, environmentally friendly refers to the cost-benefit analysis when using the system. The environmental cost can be understood as *pollution*, and the benefit as *the required power generation*. Exploiting minerals such as lithium used in solar or wind energy generation facilities to manufacture accumulators and other components is particularly worrying (Vidal, 2019).

It is not environmentally friendly to discard hydrocarbons as an energy source and replace them with sources that pollute during extraction. In addition, solar and wind devices have a limited useful life, and recycling for reuse is currently so expensive that disposing of such elements primarily results in the accumulation of garbage and consequent pollution (Vidal, 2019). Therefore, it is advisable to conduct studies to investigate and develop new forms of recycling these elements.

In this context, the main objective is to make mineral processing cheaper and more efficient. Regarding hydropower generation in rivers, the environmental cost comes from selecting the place for its establishment. Dam construction is the most frequent form and requires flooding areas constituting fragile and valuable ecosystems. The consideration is finding places where such systems' damage is minimal (Vargas & Piñeros, 2020).

Lastly, being financially accessible is a requirement consistent with the costs of the substitution. An important consideration is the market prices of goods aimed at energy substitution. An electric vehicle can currently be purchased for USD 4,500, compared to a conventional car costing USD 1,000, even though the technical features are very similar. Moreover, the cost of changing electric vehicle batteries continues to be a significant expense for the owner of this type of vehicle.

Replacing a city's mass transportation may imply more expenses for its tax system, and its implementation may take time. A metro may be desirable, but its operation is subject to fiscal efforts, and its use depends mainly on the favorability of its fare for users. Similarly, mass transportation between cities can be carried out using electric trains, but constructing its infrastructure demands significant budgetary efforts from a State (Naranjo, 2019).

The only way to determine substitution difficulties is to explore some substitution systems in terms of consumption and production and the relationship between fossil fuel sources and alternative sources. Such solutions should be taken seriously and require a consensus that turns them into state policies rather than government policies so that they are not influenced by political changes and allow the continuity of these programs.

Conclusions

The political decision to restrict hydrocarbon production generally seeks to mitigate climate change and consequently favor the environment. This effort, however laudable it may seem at first, requires a much more careful approach. A process to

build environmental peace can be marked by adverse effects if there is no balance between the interests and needs of the stakeholders involved.

Although environmental peace tends to avoid violence and promote bonds of trust, the existing tensions between human dependence on hydrocarbons for their well-being and the dimensions of the climate issue lead to unilateral decision-making, producing unwanted adverse effects on that cooperative relationship between environment, conflict, and peacebuilding.

In principle, a measure to restrict hydrocarbon production negatively affects the development of a country like Colombia because it diminishes fiscal capacity by reducing royalty income from hydrocarbons. It also risks energy stability because replacing power generation sources is costly for the state and individuals; after all, there are few ways to reliably generate power for society. More importantly, it affects society's political autonomy by making it dependent on the energy availability of other states.

At the same time, a unilateral restriction on the production of fossil fuels does not have significant implications for climate change, so it is not the best solution to the problem without substantial international support.

These policies must be taken from a much more global standpoint. They must be accompanied by measures aimed at energy substitution in consumption, without forgetting that doing so executively can be deemed authoritarian by denying the democratic logic of inter-party dialogue.

Finally, replacing the hydrocarbon energy and production system is a program that must be considered along with the viability of alternative systems and the idea of reducing environmental damage, and some alternative systems have their ecological costs.

The path to confronting climate change is complex and involves not only one society but all of them. Local solutions are insufficient, and global efforts must be convened and studied, taking into account the complexities of the problem and emphasizing the implications of alternatives, under penalty of producing more destructive effects on our planet.

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