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Article

Global Energy Policy: A Legal Perspective on Renewable Energy Initiatives

Yasin Çağlar Kaya *,†,‡ **and Hasret Kaya** ‡

Karadeniz Technical University

* Correspondence: y.caglarkaya@ktu.edu.tr; Tel.: +90 536 697 62 87

† Current address: Affiliation.

‡ These authors contributed equally to this work.

Abstract: This paper examines the challenges and dynamics of a possible renewable energy law. Despite widespread awareness of the global climate crisis and the international community's recognition of the importance of transitioning from fossil fuels to renewable energy, renewable energy law can only be described as soft law in legal framework. Through a critical assessment of various international agreements, such as the UNFCCC, the Kyoto Protocol, and the Paris Agreement, the study evaluates their role in shaping norms for renewable energy, while also highlighting their limitations in creating enforceable legal obligations. This study contributes to the ongoing debate on developing international legal structures to address the pressing needs of climate change and energy security in the 21st Century by highlighting the complexities created by economic dependence on fossil fuels, resistance from oil rich countries, and internal pressures from the fossil fuel industry, it examines the interplay between national energy policies and international cooperation. The findings suggest that a binding universal renewable energy law is unlikely to emerge in the short to medium term, as the transition to renewable energy would run counter to the economic and political interests of states and large corporations. In the long term, however, a universal renewable energy law is likely to emerge as dependence on fossil fuels declines.

Keywords: renewable energy law, climate change, international agreements

1. Introduction

In an era of rapid technological advancement and heightened environmental concerns, renewable energy law and international cooperation are more important than ever. The global transition from fossil fuels to renewable energy is more than a change in resource use; it represents a fundamental rethinking of how countries approach energy security, economic stability, and environmental sustainability. Historically, energy policy has been driven by national interests focused on maintaining control over natural resources. However, the accelerating impacts of climate change are pushing countries toward a more cooperative approach and necessitating a shift in the global energy framework.

A major turning point in international energy governance was the creation of the International Energy Agency (IEA) in 1974 to promote cooperation among oil-producing countries and ensure energy security. Since then, agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement have played a key role in addressing climate change. These initiatives underscore the urgency of reducing dependence on fossil fuels while promoting sustainable energy alternatives. Beyond environmental concerns, they also position energy policy as a fundamental component of international law.

Despite these efforts, the development of a universal international energy law remains a major challenge. Existing legal frameworks are often vague and operate as "soft law"-guidelines that encourage action rather than binding obligations. While a growing body of norms and principles is guiding nations toward sustainability, renewable energy law is still closely intertwined with environmental

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law, human rights law, and international trade law. This overlap often leads to the misconception that renewable energy law exists.

Another obstacle is economic dependence on fossil fuels, which continues to shape both national policies and international negotiations. The fossil fuel industry wields considerable influence and often resists stronger regulation, which can be economically destabilizing. As countries seek to balance sustainability goals with economic realities, the prospect of establishing a universally accepted framework for international renewable energy law remains complex.

This study examines these dynamics by exploring the interplay between national energy policies and international cooperation. By analyzing existing agreements and their structural limitations, this study aims to contribute to the ongoing debate on why renewable energy law is limited. Ultimately, the findings will highlight potential avenues for strengthening international legal frameworks in response to the challenges of climate change and energy security in the 21st century.

2. Renewable Energy Law as a Part of International Law

With the Industrial Revolution, energy became one of the primary concerns of states both nationally and internationally during the 18th and 19th centuries. In this period, coal, the main source of energy production, became a crucial element of competition in both production and trade among powerful countries of the time, such as the United Kingdom, the United States, France, and Germany. The strategic importance of energy resources also affected political and military tensions; for example, the Alsace-Lorraine region became the center of competition between France and Germany in World War I due to its rich coal and iron reserves [1].

Although coal continued its importance in energy production throughout the 20th century, with the development of internal combustion engines, oil became the most strategic resource in terms of energy security. The widespread use of tanks and airplanes during World War II further increased the demand for oil, and many countries made the seizing of oil-rich regions a strategic goal during the war. In this context, Germany's inability to access sufficient oil resources was a significant factor in its defeat in World War II [2].

After the end of World War II, natural gas became more widely used in energy production alongside oil. In particular, the decision of Arab countries to reduce oil production to raise prices and use oil as an economic and political tool against the West led developed countries to reduce their dependence on oil and shift towards natural gas [3]. This process led industrialized states to aim at reducing their dependency on oil and natural gas for energy security and to make significant investments in energy diversification and renewable energy [4].

However, these initiatives and energy-related regulations have typically taken place within the framework of national legislation and regulations, with international cooperation and regulation remaining quite limited. Until the establishment of the IEA in 1974, aimed at ensuring oil supply security, enhancing cooperation with energy-producing countries, and regulating global energy trade, international cooperation in energy was largely confined to the Organization of the Petroleum Exporting Countries (OPEC). With the formation of the IEA, the reduction of dependence on oil and natural gas and the growing importance of renewable energy have made energy and energy security some of the most critical issues on a global scale. As a result, a wide range of international initiatives and cooperation mechanisms have been developed in the energy sector.

Although international cooperation in energy has significantly increased, it is generally accepted that energy resources have primarily been considered under national legal frameworks for many years. This approach reflects principles such as "permanent sovereignty over natural resources," which requires the control of energy resources to be addressed within the context of regional sovereignty. However, especially in the late 1970s, the growing importance of environmental threats and climate change discussions made it increasingly clear that energy policies could no longer be addressed solely at the national level. This shift has led to the need to approach these issues from a broader international perspective [5].

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The mere increase in international discussions and cooperation on energy does not necessarily guarantee the existence of a comprehensive international energy law. From the perspective of classical international law, considering the sources of law outlined in Article 38 of the International Court of Justice, it appears that there is no independent and systematic international energy law in existence today [36].

One of the fundamental reasons for the lack of development of international energy law is that it is a relatively new area compared to other branches of international law [7]. Furthermore, the concerns of states that international energy regulations might harm their economic interests complicate the creation of a binding legal framework in this area. The existing regulations are therefore not seen as part of an independent energy law, but rather as provisions of general international law that reflect the energy sector.

Indeed, the principles within environmental law, such as the idea that "environmental damage should, as a matter of priority, be remedied at source" and the "principle of prevention," are applied in the processes of resource extraction and utilization [8]. Similarly, in human rights law, the principle of "access to energy" informs regulations related to energy distribution [9], while international trade law outlines the rules for energy trade [10].

However, all these regulations do not establish an independent international energy law but instead represent the projections of various fields of international law onto the energy sector. This is because different branches of international law are intertwined, and energy continues to be regulated within the framework of various international legal principles. Consequently, the current legal structure should be viewed not as an independent international energy law but as the reflections of international law principles applied to the energy sector. This reflects the complexity and interdependence of legal domains in addressing energy-related issues in the global arena. Therefore, while international energy law may not be explicitly established, renewable energy law as an area of international law can be discussed due to the presence of numerous international regulations on the subject.

Climate change started to accelerate at the end of the 20th century [11] [12], and in order to combat this issue both states and international organizations have engaged in various global initiatives. Today, even though the transition process from fossil fuels to renewable energy sources is still implemented by national regulations of states [10], international initiatives has led to key agreements, such as the adoption of the UNFCCC in 1992, Kyoto Protocol in 1997 and Paris Agreement in 2015.

The aim of these international agreements is reducing greenhouse gas emissions, promoting renewable energy, and addressing climate change on a global scale. Although the main focus of these agreements is tackling climate change, they also have significant implications for energy policy, particularly global shift from fossil fuels to sustainable energy sources. These efforts are foundational in shaping the international legal framework for climate change and promoting renewable energy sources.

The main goal of the aforementioned international agreements is reducing the use of fossil fuels, encouraging the use of renewable energy sources, and limiting greenhouse gas emissions. Additionally, these agreements differ from other international initiatives or negotiations as they aim to regulate and mandate policies for combating climate change and try establish binding international rules for states. Therefore, while a comprehensive international energy law may not yet exist, it can be argued that a renewable energy law is emerging within the framework of these international agreements.

In order to assess whether renewable energy law truly exists, it is essential to consider the legal nature of these agreements and whether they are binding or not. Norms established by non-binding international agreements can only be regarded as "soft law," which does not create statutory obligations and does not create an independent area of international law [13]. Therefore, in order to determine whether these agreements have constituted renewable energy law, it is necessary to examine the nature and the binding status of the articles included in the texts of the agreements.

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3. UNFCCC, Kyoto Protocol and Paris Agreement as Legal Instruments

With the growing awareness of climate change and the increasing recognition by states of renewable energy sources as an alternative to fossil fuels, various initiatives aimed at promoting renewable energy sources have emerged on the international stage. However, the majority of these initiatives primarily aim to accelerate the transition to renewable energy, reduce fossil fuel subsidies, promote inter-country cooperation and technology transfer, support commitments to reduce greenhouse gas emissions, and facilitate more transparent coordination among states.

Nevertheless, these initiatives are mostly characterized by good-will declarations from states regarding climate change mitigation, often based on hopes and trust, rather than binding legal obligations. However, the 1992 UNFCCC, the 1997 Kyoto Protocol and the 2015 Paris Agreement differ from other initiatives in terms of the legal framework they establish and the obligations they bring. These agreements have contributed to the development of international legal mechanisms to combat climate change by imposing specific commitments on states and laying the foundation for the institutionalization of renewable energy policies on a global scale.

3.1. the UNFCCC

With the increasing awareness of climate change, the first conference, took place in Rio de Janerio in 1992. During the conference, the idea of battling the climate change has been discussed thoroughly. Most of the attendant states make contributions to sustainable development and environmental protection issues [14]. As a result of the conference, UNFCCC whose main goal is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system was signed and today 196 states are parties to the convention [15].

The UNFCCC was created as a framework convention with the idea of establishing a structure and guide aiming to pave a way for future agreements. The provisions and regulations of the convention were designed to change over time adopting the social, technological and political developments. To this end, the UNFCCC took a Convention-Protocol approach, creating an institutional foundation, then aiming to introduce specific commitments to battle climate change via new protocols. The provisions of the UNFCCC were designed to be adopted by unanimously, meaning that they are mostly aligned with the ideas of the most hesitant parties. This provision adoption method allowed the USA, which was skeptical about the convention, to prevent the adoption of binding emission targets. As a result, the UNFCCC only set forth non-binding provisions aiming to stabilize emissions at 1990 levels by 2000 [16].

UNFCCC has brought up many issues stating that the climate change is a fact, greenhouse gas emissions are originated from human activities, battling the climate change necessities cooperation of all states, national regulations to battle climate change must be aligned with international legislations, and states must establish effective regulations on the environmental issues. However, since the provisions of the UNFCCC were not binding, it could not compel states to take effective measures in battling climate change, as it does not go any further than stating the responsibilities and duties of states. The main reasons that the provisions of the UNFCCC were non-binding was to keep the participation high and the dynamic nature of climate change policies. However, another reason was to please developed countries which stated that UNFCCC was placing a heavier burden on developed countries. The UNFCCC imposes all states “Common but Differentiated Responsibilities”, meaning that the responsibilities of the states differ according to states’ development level. This principle was intensely criticized by developed states such as the USA and Canada, stating that putting a heavier burden on developed countries would lead to unfair competition with developing countries such as China and India [17] [18] [19]. In conclusion, even though the UNFCCC was a Pioneer agreement on battling climate change, inherently it is not binding on states.

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3.2. the Kyoto Protocol

The non-binding nature of the UNFCCC and its inefficiency in battling the climate change, revealed the need of a binding agreement to diminish the greenhouse gas emissions. For this purpose, after 2.5 years of negotiations, a binding agreement to battle climate change has emerged in 11 December 1997 [20]. This agreement, known as the Kyoto Protocol, was greeted with great enthusiasm in the international arena. The binding provisions aimed to establish market-based mechanisms to reduce greenhouse gas emissions and create comprehensive international structures to combat climate change [21] [22].

Similar to the UNFCCC, the Kyoto Protocol is based on the principle of "common but differentiated responsibilities", classifying rich and developed countries as Annex I countries and developing countries as Annex II countries, and setting different responsibilities for each group. In addition, although the responsibilities of Annex I countries are generally similar, each country has been assigned different emission reduction targets as seen in Table 1 [23]. Developed countries were assigned more responsibilities primarily because they can more easily afford the cost of emission reductions and because of the historical contribution of per capita greenhouse gas emissions to global warming [22].

Table 1. Emission Reduction Targets for Annex-I Countries.

Country	Emission Reduction Commitment
Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portagual, Spain, Sweden, UK of Great Britain and Northern Ireland, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8
United States	-7
Canada, Hungary, Japan, Poland	-6
Croatia	-5
New Zealand, Russian Federation, Ukraine	0
Norway	+1
Australia	+8
Iceland	+10

Under the Kyoto Protocol, developed countries were given individual emission reduction targets to reduce their total greenhouse gas emissions by an average of 5.2 percent below 1990 levels during the commitment period from 2008 to 2012 [24]. On the other hand, for developing countries, it was accepted that emissions could even increase depending on the country's economic situation. While the protocol included binding provisions for developed countries, there were no binding provisions for developing countries. The political approval of the protocol by countries that accepted the emission reduction commitments took a long time, and it only came into force on February 16, 2005, after it was ratified by countries accounting for 55% of global greenhouse gas emissions.

The main reason for the prolonged acceptance process of the protocol was that it included binding provisions for developed countries, while there were no binding provisions for developing countries. This led to concerns that the protocol would create unfair competition, particularly with developing countries such as China and India. Additionally, the United States, the country that contributed the most to global climate change over the years, signed the protocol but did not ratify it, and later withdrew from the protocol in 2001 [25] [26] [27]. Russia, on the other hand, stated that it would sign the protocol only if it was accepted into the World Trade Organization (WTO) and did so after joining the WTO [28] [29]. Australia signed the protocol in 2007 after it was allowed to increase its greenhouse gas emissions by 8% [30]. Moreover, Canada withdrew from the protocol in 2011, citing the United States' refusal to be a party to it and the lack of emission reduction obligations for China [31].

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Despite the withdrawal of high greenhouse gas-emitting countries such as the United States and Canada from the protocol, global greenhouse gas emissions had decreased by 24% by 2014. However, it became evident that even this reduction, which exceeded the targets set by the protocol, was insufficient to keep the global temperature rise below 2 degrees. Moreover, an assessment of the protocol's implementation reveals that many parties failed to meet their emission reduction commitments. Most countries, excluding Western European nations like Belgium, Denmark, Germany, Italy, Luxembourg, Sweden, and the United Kingdom, did not meet the Kyoto targets. For instance, countries such as Austria, Finland, France, Greece, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Switzerland, Canada, Japan, Australia, and New Zealand saw increases in greenhouse gas emissions, surpassing the 1990 levels [22]. As a result, the apparent success of the Kyoto Protocol on paper can be attributed to the high emission reduction rates of a few countries, which helped to lower the average. Furthermore, it has become clear that the measures implemented have been insufficient in the fight against climate change.

3.3. the Paris Agreement

The UNFCCC, adopted in 1992, and the Kyoto Protocol, adopted in 1997, were unable to deliver the expected results in the fight against climate change. Particularly, the refusal of countries like the United States and Canada to become parties to the Kyoto Protocol made it necessary to negotiate a new agreement for addressing climate change. Following negotiations attended by over 100 heads of state, the Paris Climate Agreement was signed in 2015, with 195 countries and the EU as parties, and entered into force in 2016 [32].

The primary goal of the Paris Climate Agreement is to limit the global temperature increase to well below 2°C above pre-industrial levels, and to pursue efforts to limit it to 1.5°C. For this purpose, each country shall develop its own national plans, regarding the commitment of greenhouse gas emission reduction, how to increase renewable energy production, how to enhance energy efficiency, and how to harmonize social, economic and environmental targets. Paris Agreement, differing from Kyoto Protocol which only set forth regulations for Annex-I countries, demanded each state to create their own Nationally Determined Contribution (NDC) to determine their greenhouse gas reduction targets and the methods to achieve it. In this manner, while the Paris Agreement still embrace "Common but Differentiated Responsibilities", it differs in imposing responsibilities and duties to all countries in the battle against climate change.

The main reason for this situation is the differentiated demands of countries based on their own interests. For instance, China demanded strong legal binding commitments for general obligations but sought to weaken the international transparency of national policies [33]. The European Union, on the other hand, demanded inclusion of binding provisions on emission targets in the agreement (Falkner, 2016), while the United States implied that it might not ratify the agreement if the provisions on emission targets were to be binding [34]. As a result, the absence of the United States from the Paris Climate Agreement significantly limited its global power and prevented many of its provisions from being legally binding.

An examination of the agreement text reveals that while there are many binding provisions, these provisions are not directly related to combating climate change but are limited to procedural matters. Therefore, while there is no issue in considering the Paris Climate Agreement as a binding treaty under the framework of the Vienna Convention on the Law of Treaties [35], it is clear that the agreement does not contain content aimed at establishing a binding renewable energy law.

4. Do the UNFCCC, the Kyoto Protocol and the Paris Agreement Make a Universal Renewable Energy Law?

International agreements such as the UNFCCC, the Kyoto Protocol, and the Paris Climate Agreement stand out as significant steps in the fight against climate change and the creation of renewable energy law. From a legal perspective, these agreements meet the requirements outlined in the Vienna Convention on the Law of Treaties, including "being between states," "written", and "governed by

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international law," and are therefore accepted as international treaties. However, when examining the content and impact of these agreements, it becomes evident that many initiatives have remained quite vague and ineffective. Therefore, whether these agreements can create a renewable energy law is directly related not just to the existence of the treaty, but to its content and binding nature.

When examining the texts of the agreements, it becomes evident that the provisions on renewable energy is limited. The agreements generally ask for international cooperation, implementation of market mechanisms, and taking variety of actions to battle climate change. While the UNFCCC indicates the duties and responsibilities of state on battling climate change, Paris Agreement demanded states to set their own targets on dealing with the issue. Kyoto Protocol, on the other hand, put forward legally binding emission reduction target for developed countries and specified market mechanism to this end.

In terms of the agreements binding nature, it becomes evident that the UNFCCC is entirely based on voluntary commitments. In other words, it does not contain any binding regulations or actions for the parties involved. In the Paris Agreement, the binding provisions are limited to control mechanisms. Thus, there is no binding regulation on renewable energy in these two agreements. The Kyoto Protocol, in contrast to the other two agreements, includes some binding regulations in the field of renewable energy. However, these regulations primarily focus on market mechanisms and the limitation of greenhouse gas emissions. Moreover, the binding provisions of the Kyoto Protocol apply only to developed countries that are parties to the agreement. Therefore, in order to determine whether the existing agreements establish renewable energy law, it is necessary to first clarify what is considered law.

First, by international law we mean 'hard law' which refers to the principles enshrined in traditional sources of international law, such as treaties and customary international law. In other words, to speak of hard international law, one must refer to binding treaties or inherently binding customary international law. Since the UNFCCC and the Paris Agreement do not contain binding provisions related to renewable energy, they do not constitute hard law. However, the Kyoto Protocol does create hard law. Nevertheless, the hard law established by the Kyoto Protocol is insufficient to form a general international law, as its binding provisions apply only to a limited number of countries, thus creating particular international law. Furthermore, since renewable energy law is a relatively new area of international law, it has not yet produced a customary international law that binds all states. However, despite being primarily based on voluntary commitments rather than binding regulations, the existence of these agreements, the widespread subsidies provided by many states for the transition to renewable energy, and the work of numerous international organizations promoting renewable energy suggest the existence of a general renewable energy law, albeit in the form of soft law [36].

The existence of renewable energy law as soft law, while not sufficient to be recognized as a general legal framework, plays a crucial role in the eventual formation of a hard law. Certain internationally acknowledged documents in the realm of human rights, for instance, the resolutions of the United Nations General Assembly and the Universal Declaration of Human Rights, do not meet the strict criteria of international law for treaties or custom [37]. But, the presence of soft law as seen in is of great importance for the eventual establishment of hard law. However, for these rules to evolve into hard law, they must be widely accepted by states on a large scale.

It is seen that developed countries, particularly the United States, are reluctant to climate change agreements, which set forth binding provision on emission target reduction, and prefer soft law in the matter. But it is not only developed countries which are against the emergence of binding provisions on renewable energy law. Due to various reasons both developed and developing countries do not intent to take necessary step to establish universally binding rules regarding renewable energy.

There are a lot of challenges to the emergence of international renewable energy law. Financial dependence on fossil fuels, economic stability, potential cost of transition to renewable energy and pressure from the fossil fuel companies' constraint countries to take the necessary steps in establishing universally accepted renewable energy law.

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5. Challenges for International Renewable Energy Law

The main cause of climate change is the greenhouse gasses released into atmosphere by the conduct of humans. According to Intergovernmental Panel on Climate Change (IPCC, 2014), the use of fossil fuels causes almost 65% of global greenhouse gas emission, and the ratio is expected to be 78% in 2040 [38]. This fact summarizes the significance of fossil fuels in climate change, and shows that the first step to battle climate change is to reduce greenhouse gasses by minimizing the use of fossil fuels.

International agreements such as the UNFCCC, the Kyoto Protocol and Paris Agreements propounds the reduction in fossil fuel usage and promote renewable energy sources as replacements. These agreements encourage countries to increase energy production via renewable energy sources in order to decrease greenhouse gas emissions. The transition to renewable energy not only helps to reduce greenhouse gas emissions but also prevents the dependency on fossil fuels as the primary energy source. The increase in renewable energy production is crucial for minimizing environmental impacts and ensuring diversity in energy production.

On the other hand, one of the main reasons preventing countries from taking strong and binding steps in climate change is the pressure of fossil fuel sector on economy and politics of the countries. The economical contribution of this sector and the deep dependency on fossil fuels complicate this transition process. These economic and political pressures confine countries to only make non-binding commitments in international area. This situation as a result created important barriers and delay the transition from fossil fuels to renewable energy.

Energy is a vital and strategic component for countries' economic power, independency and national security. Therefore, it is utmost important for governments to provide uninterrupted, efficient and sustainable energy supply [39]. Even though, the rapid development of renewable energy Technologies today, %80.9 of the total energy supply of the World is provided by fossil fuels [40]. This shows the fossil fuels in energy sector still dominant and it is almost impossible to end this dependency in short term.

To not jeopardize energy security, countries adopt cautious approach to this transition process. Countries with large share of fossil fuel in energy production consider a rapid transition process from fossil fuels to renewable energy risky and economically challenging. Therefore, these countries are often reluctant to include binding provisions in international agreements aimed at combating climate change or avoid becoming parties to such agreements.

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Table 2. Total energy supply of G20 countries.

Country	Fossil Fuels	Renewable Sources	Bio and Waste	Nuclear
United States	79.7%	4%	6.9%	9.4%
Canada	75.4%	12.7%	4.7%	7.2%
China	85.7%	7.1%	2.4%	0%
Australia	90.4%	5.8%	3.8%	0%
Russia	89.1%	2.2%	1.5%	7.2%
Saudi Arabia	99.9%	0.01%	0%	0%
India	74.1%	3.3%	21.4%	1.2%
Brazil	46%	14.3%	38.6%	1.1%
France	49.7%	5.1%	8.8%	36.4%
Indonesia	70.4%	12.5%	17.1%	0%
United Kingdom	76.8%	5.6%	9.6%	7.9%
Germany	78.5%	6%	12.2%	3.3%
Italy	78.7%	11.1%	10.2%	0%
Korea	80.1%	1.1%	3.3%	15.5%
Turkey	81.9%	14.8%	3.3%	0%
Argentina	85.2%	4.2%	7.9%	2.7%
Japan	86.3%	4.6%	5.1%	3.9%
Mexico	89.3%	4.3%	1.9%	4.5%
South Africa	91.2%	1.6%	2.5%	4.7%
TOTAL	79.39%	6.33%	8.48%	5.53%

The data presented in Table 2 [41] reveal that the share of renewable energy in the total energy supply of G20 countries is quite low. This situation explains why these countries, despite their awareness and some initiatives on combating climate change, tend to avoid binding and radical agreements that could risk their energy security. Reducing fossil fuel use would result in a significant energy supply gap, which would have to be filled by renewable energy sources. However, in the current scenario, fossil fuels account for 80.9% of energy supply, which raises concerns for many countries about the potential long-term negative impacts on their economies and energy policies due to the transition to renewable energy.

Considering that fossil fuel-based energy production is of significant importance for the economic growth, employment, and development of many developed and developing countries, the transition to renewable energy directly conflicts with the interests of these countries. This transition will require the transformation of the infrastructures and economic systems built around fossil fuel use, and it will create high costs and uncertainties in energy supply. Especially for countries that continue to rely on fossil fuels for energy security, the shift to renewable energy presents a significant strategic challenge.

Therefore, while G20 countries make commitments at the international level to combat climate change, they consider the transition to renewable energy as a gradual process in order to protect their ability to ensure energy supply and safeguard their economic interests. They adopt a more cautious approach in phasing out fossil fuels. This situation represents a significant barrier to the global energy transition and is one of the main factors limiting the speed of the shift from fossil fuels to renewable energy.

The transition process to renewable energy and limitation of use of fossil fuels particularly present significant economic difficulties for oil producing countries. Oil, being one of the cornerstone of their economy, makes up a significant portion of their export income. Policies regarding the reducing the use of fossil fuels will cheapen the oil prices in the long turn and this situation will have a negative effect on countries depending on oil export income.

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Table 3. Top 10 Oil Producer Countries (2023).

Country	Million Barrels per Day	Share of World Total
United States	21.91	22%
Saudi Arabia	11.13	11%
Russia	10.75	11%
Canada	5.76	6%
China	5.26	5%
Iraq	4.42	4%
Brazil	4.28	4%
United Arab Emirates	4.16	4%
Iran	3.99	4%
Kuwait	2.91	3%
Total Top 10	74.59	73%
World Total	101.81	100%

According to Table 3 [42], the United States, which accounts for approximately 22% of global oil production, is a key player in the global oil market. In addition to the United States, Saudi Arabia, Russia and other major oil producing countries may have to reduce their oil production due to the widespread use of renewable energy. Looking at the amount of the export of fossil fuels shown in Table 4 [43] shows that the decrease in demand and oversupply of oil will cause fluctuations in oil prices, which would have a negative impact on the economies of these countries. In addition, many of the economies of oil producing countries are solely dependent on oil export revenues. Many countries in the Middle East, Africa and Latin America would face many disadvantages with the decline of oil prices. The transition process from fossil fuels to renewable energy would put these countries, which have not sufficiently invested in diversified economic sectors, in a dire situation.

Table 4. Oil, Natural Gas, and Coal Exports by top Countries.

Country	2018 Oil Export (Million m^3)	2020 Natural Gas Export (Billion m^3)	2020 Coal Export (Million ton)
Saudi Arabia	426.30	0	0
Russia	301.70	256.30	219.60
Iraq	230.90	0	0
Canada	184.50	76.10	31.95
UAE	140.90	0	0
Iran	129.60	0	0
USA	118.90	131.90	62.66

Also, large energy companies due to their enormous profit from fossil fuels cause pressure on governments to undermine the transition to renewable energy. These companies engage in lobbying activities to influence the decision making process, provide financial support to decision makers, and attempt to shape government policies in favor of fossil fuels. To sustain their advantages of the energy market, these companies influence governments to reduce the incentives given to renewable energy production and continue subsidies given to fossil fuel sector [44].

Additionally, these companies generate strategies to influence public opinion through the media, consolidating the perception that fossil fuels are essential for economic stability and energy security. These strategies aim to create the perception that renewable energy is insufficient and unreliable, hence impeding the transition process [45]. As a result of these activities, policies and initiatives regarding the decrease of fossil fuel usage are throttled, ant the energy market stays dependent of fossil fuels.

As seen in Table 5 [46], the majority of large energy companies have increased their profits in 2024 compared to the previous year. This indicates that fossil fuels still hold a dominant position in the global energy market and that these large companies continue to maintain their investments in

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this sector. Although large energy companies are investing in renewable energy, given the size of the fossil fuel market, it does not seem realistic for these companies to completely abandon fossil fuels in the short term. Therefore, in order to accelerate the global energy transition, it is essential to reduce incentives for the fossil fuel sector, increase investments in renewable energy technologies, and direct public policies toward sustainable energy systems.

Table 5. Leading Oil and Gas Companies Worldwide based on Revenue.

Company	Origin	2023 revenue (Billion $)	2024 revenue (Billion $)
Sinopec	China	441.79	372.52
PetroChina	China	425.26	357.01
ExxonMobil	US	331.46	313.90
Shell	UK	302.18	305.57
TotalEnergies	France	212.55	204.96
BP	UK	202.86	197.56
Chevron	US	194.65	184.75
Philips 66	US	148.81	133.81
Marathon Petroleum	US	148.21	139.66
Valero	US	140.09	138.64

Another reason why many governments prefer fossil fuels over renewable energy sources is largely due to the differences in energy production costs. During the period of UNFCCC, signed in 1992, many countries viewed renewable energy systems as a more expensive option compared to fossil fuels due to the insufficient technological maturity of renewable energy technologies. At that time, renewable energy production technologies were not yet at a level where they could compete with fossil fuels in terms of efficiency and cost. However, recent technological advancements have significantly reduced the production costs of renewable energy, bringing them to a level where they can now compete with fossil fuels.

As of 2019, the average cost of hydroelectric energy production was $0.05 per kilowatt-hour (kWh), while biomass and geothermal energy production generally remained below $0.10 per kWh. Offshore wind energy, on the other hand, had an average cost of around $0.13 per kWh. In contrast, the cost of traditional energy sources such as fossil fuels typically ranges between $0.05 and $0.15 per kWh [47]. However, even though the cost of producing the energy from fossil fuels and renewable sources are close, necessary infrastructure and installment cost of renewable energy, which are costly at initial stages, emerge as a significant problem, especially for developing countries.

Table 6. Fossil Fuel Consumption and Renewable Energy Capacity of leading Countries.

Country	Fossil Fuel Consumption (tWh)	Renewable Energy Capacity (tWh)
China	38,678	1.450
USA	23,461	0.388
Brasil	1,878	0.194
India	9,667	0.176
Germany	2,378	0.167
Japan	4,033	0.127
Canada	2,519	0.109
Spain	1,039	0.080
France	1,156	0.069
Italy	1,333	0.065
TOTAL	86,142	2.825

When examining Table 6 [48] [49], it becomes evident that even if the production costs were the same, the energy derived from fossil fuels is 30,000 times greater than the installed renewable energy capacity. This indicates that in order to completely replace fossil fuel-based energy with renewable

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energy, a significant increase in renewable energy capacity is required. The initial investment needed for governments worldwide to meet all of their energy needs from renewable sources is estimated to be $62 trillion [50]. This substantial cost is one of the primary barriers to the transition to renewable energy. Although it is projected that renewable energy systems will pay for themselves in the long run and reduce dependence on fossil fuels, the existence of current fossil resources that do not require additional investment leads many governments to delay the transition to renewable energy or prefer continuing with fossil fuel-based energy production. This situation perpetuates the dominance of fossil fuels in energy production and makes it more challenging to increase investments in renewable energy.

In this context, it is evident that transitioning to renewable energy poses a significant risk of economic losses for governments in the short and medium term. As rational actors, it is well known that states do not consent to situations that are contrary to their own interests, or at the very least, do not want to approve such situations. At this point, it is necessary to question whether states will consent to the formation of a universal renewable energy law that requires a legally binding change process, one that contradicts their interests. In seeking an answer to this question, it is essential to examine how and why international legal rules emerge.

6. What Constitutes International Law and the Future of Renewable Energy Law

Historically, modern international law emerged with the Peace of Westphalia, which ended the Thirty Years' War. During this period, international law was primarily shaped around the conditions of war and peace and the relations between sovereign states [51]. By the late 19th century, international law was largely concerned with how European powers would divide colonial territories, particularly in Africa, as a result of conflicts among these powers. This period saw the establishment of numerous international legal rules regarding colonialism [52]. Until the end of World War II, international law, shaped by European powers within this narrow framework, considered only states as its subjects. However, with the establishment of the United Nations (UN), the scope of international law expanded. While sovereign states remained its central subject, international organizations and individuals also became subjects of international law. Post-UN, international law not only incorporated non-state actors but also began to regulate various areas such as health, education, and labor, considered as "low politics." Today, international law includes regulations that concern states, organizations, and individuals across countless fields, and many of these regulations are binding for all subjects of international law.

It is clear that the scope of international law has expanded over time, and understanding the reasons behind this expansion is of great importance. The beginning of modern international law is often considered to be marked by the Peace of Westphalia, signed between the Holy Roman Empire, German princes, Spain, France, Sweden, and the Netherlands. This agreement allowed European powers to free themselves from the influence of Rome and recognized the sovereign equality of European states, along with the principle that states would not interfere in each other's domestic affairs [53] [54]. Therefore, the international legal rules established by this treaty can be seen as having emerged from the desire of states to protect their own interests. In the 19th century, many international legal rules related to colonialism were formed, primarily concerning the recognition of the rights of European powers over their colonies by other European states and the non-interference in these rights [55].

The post-World War II expansion of international law and the inclusion of organizations and individuals into the international legal system are also closely tied to the interests of nation-states. The failure to establish a stable international legal system after World War I, despite the power system remaining in Europe, contributed to the outbreak of World War II and the failure of the existing system. Following World War II, with the inclusion of the United States into the power system and the desire to prevent another war in Europe while promoting American values globally, international law underwent an evolution. It expanded to cover all countries worldwide and began to regulate various

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fields. Therefore, it would not be inaccurate to say that international law is a system of rules shaped or created by the desires of the powerful states and therefore political [56].

One of the best examples that demonstrates how the emergence of international legal fields is based on the states' "demand" for these rules is maritime law. Today, international maritime law holds significant importance for states, yet it remains behind other areas of international law in terms of development. As the seas began to be used for commercial and military purposes, politicians, merchants, and scholars were embroiled in disputes about who would control and use the seas. The principle of the freedom of the seas has been interpreted in various ways for centuries [57]. However, in the 17th century, with the emergence of claims by Portugal regarding the sovereignty over vast maritime territories along its coasts [58], Hugo Grotius, in his work Mare Liberum, argued that maritime areas could not be assigned to states because, in order to assign something, sovereignty must be established over it. In response to this view, John Selden, in his work Mare Clausum, stated that certain maritime areas could be seized and occupied by coastal states.

By the end of the 17th century, Cornelius van Binkershoek found a middle ground between the two views with the "cannon-shot" rule, arguing that the territorial waters of coastal states should extend to the distance that a cannon shot could travel from the coastline [59]. In the 17th and 18th centuries, while some scholars claimed that territorial waters should extend to the cannon-shot distance, others argued that any visible area should be considered territorial waters [60]. The question of the extent of territorial waters was also addressed in the Geneva Conventions; however, no consensus could be reached on the maximum limit for this distance, and many states continued to implement different territorial sea limits based on their own political interests. Between 1948 and 1950, during negotiations, 28 countries claimed territorial waters ranging from 3 to 4 nautical miles, 14 countries claimed territorial waters ranging from 6 to 12 nautical miles, and 14 countries claimed territorial waters of 12 nautical miles or more. After the implementation of the convention, states were unwilling to reach any agreement on the breadth of territorial waters, and by 1964, 19 states had claimed territorial waters of 3 nautical miles, 20 states had claimed territorial waters of 6 to 12 nautical miles, and 25 states had claimed territorial waters of 12 nautical miles or more [61]. It was not until the 1982 United Nations Convention on the Law of the Sea that the width of territorial waters was defined as 12 nautical miles.

In the early 20th century, the discovery of reserves on the seabed and the development of the necessary technology to extract these reserves led states to seek ownership of these resources. In particular, the concept of the Continental Shelf (CS) introduced by the United States in 1945 through the Truman Proclamation was quickly accepted by many states, prompting them to declare their own Continental Shelves. However, due to the geographical nature of the Continental Shelf and the inability of many coastal states with narrow continental shelves to benefit from vast marine areas, the concept of the Exclusive Economic Zone (EEZ) emerged in the late 1970s. Much like the Continental Shelf, the EEZ was rapidly accepted by many countries. In fact, the "material element" and "opinio juris" elements, typically required for the formation of customary international law, were not applied to these two concepts, and they were recognized as "instant customs" in international law, a rare phenomenon in customary law.

It is clear that the general acceptance of the concepts of width territorial waters, CS, and EEZ as international legal rules has been driven by the interests and political desires of states. The determination of the width of the territorial waters took nearly 300 years due to the numerous conflicting interests surrounding this issue. In contrast, the concepts of CS and EEZ were introduced and quickly became established as international legal rules, as they served the common interests of all states. Therefore, international legal rules are formed around the political interests of states, and practices that do not serve the general interests of states cannot create international legal norms.

In a context where the interests and of states are so crucial in the formation of universal international legal rules, the creation of a renewable energy law that contradicts the political interests of many states seems unlikely. Both economic challenges and internal pressures from private companies constrain states' actions in this area. Moreover, it is essential to acknowledge that for universal interna-

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tional legal rules to be adopted, the approval of powerful states is required, as demonstrated in the case of the Gulf of Sitra, where the United States objected to the bay being classified as a historical bay and succeeded in its stance [62]. This example highlights how the interests of powerful states can significantly influence the formation of international legal rules and the outcomes of disputes, often overriding the positions of other states or broader international consensus. One of the main reasons for the failure of the Kyoto Protocol can be attributed to the United States not being a party and Canada withdrawing from the protocol. Furthermore, in the Paris Agreement, the country most opposed to making the provisions more binding was the United States. Other states, recognizing that an agreement without the U.S. would not achieve global success, removed many of the provisions from being legally binding. Therefore, the main obstacle to the formation of a universal renewable energy law is the economic burden it imposes on countries. Without the means to reduce this burden, the emergence of a renewable energy law seems unlikely in the short and medium term, but with technological progress, the depletion of fossil fuel resources, increased international pressure, and the decreasing cost of renewable energy production, the formation of a renewable energy law will be possible in the long term.

7. Conclusion

This study has highlighted the complex nature of international energy law, in particular the problems in the emergence of renewable energy law as an important component of the global response to climate change. While important steps have been taken through treaties such as the UNFCCC, the Kyoto Protocol and the Paris Agreement, it is clear that renewable energy law in its current form remains largely a form of soft law. While these agreements have been instrumental in advancing the international discourse on sustainable energy, they lack the binding provisions necessary to create enforceable obligations for states.

The current soft law status of renewable energy law reflects the complexity of balancing national interests with global imperatives. States often prioritize their economic stability and their interests in fossil fuels, making them reluctant to adopt more stringent and binding regulations. As a result, the principles and norms expressed in existing international agreements are often advisory rather than binding, limiting their effectiveness in promoting harmonization and transformation in the energy sector.

However, the changing nature of international relations and the growing recognition of climate change as an existential threat suggest a possible path forward. As technology advances and the cost of renewable energy infrastructure declines, coupled with the growing urgency to address environmental degradation, there is an opportunity for renewable energy law to move from soft law to a more robust, universally binding framework. This transition will require concerted international cooperation, the development of financial mechanisms to assist developing countries, and a collective commitment to reducing dependence on fossil fuels.

In the longer term, the creation of a binding international renewable energy law could build on the foundations laid by existing agreements and initiatives. Such a framework would need to include binding commitments and implementation mechanisms, while addressing the differences between developed and developing countries. By fostering cooperation and addressing key economic concerns that impede progress, the global community has the opportunity to shape a future in which renewable energy law is not just a collection of voluntary commitments, but a recognized and binding norm of international law.

In conclusion, while renewable energy law is currently soft law, it has the potential to evolve into a comprehensive and universally recognized legal framework. This transformation is essential as the world faces unprecedented challenges related to climate change and the transition to sustainable energy sources is critical to ensuring a secure and prosperous future for future generations.

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Abbreviations

The following abbreviations are used in this manuscript:

IEA	International Energy Agency
EIA	U.S. Energy Information Administration
NDC	Nationally Determined Contribution
UNFCC	the United Nations Framework Convention on Climate Change
WTO	World Trade Organization
UN	United Nations
EEZ	Exclusive Economic Zone
CS	Continental Shelf

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