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**IMPLICATIONS OF RENEWABLE ENERGY REGULATIONS IN THE EU ON
SUSTAINABLE ROAD TRANSPORT
YÜKSEK LİSANS TEZİ**

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İSTANBUL - 2023

ÖZET

YENİLENEBİLİR ENERJİ KAYNAKLARINA İLİŞKİN AVRUPA BİRLİĞİ'NDE GETİRİLEN HUKUKİ DÜZENLEMELERİN SÜRDÜRÜLEBİLİR KARA TAŞIMACILIĞINA ETKİSİ

Avrupa Birliği Yeşil Mutabakatı, iklim değişikliğini ve çevre üzerindeki zararlı etkilerini azaltmak için 2050 yılına kadar AB iklimini nötr hale getirmek için bir plan ortaya koyuyor. Yenilenebilir enerji kullanımının teşvik edilmesi, fosil yakıt emisyonlarını azaltmak için gerekli olduğundan, bu hedefin anahtar noktalarından birini, kara ulaşımında kullanılan fosil yakıtların ve buna bağlı olarak karbon emisyonunun azaltılması oluşturuyor.

Bu kapsamda tez, Avrupa Birliği iklim hedefleri kapsamında getirilen yeni hukuki düzenlemelerin, Avrupa Birliği Yeşil Mutabakatı ve sair mevzuat ekseninde hedeflenen yeşil dönüşüme ulaşma arzusuna etkisini açıklamayı amaçlamaktadır.

Ayrıca tez, AB yasa koyucularının atacağı ileri adımları açıklayarak karayolu taşımacılığında yeşil dönüşümün adımlarını göstermeyi amaçlamaktadır. Elektrikli araçlar, mobilite, sürdürülebilir karayolu taşımacılığı, biyoyakıt kullanımı ve AB araçlarının AB Yeşil Mutabakatı çerçevesindeki diğer etkileri karayolu ulaşımı ve taşımacılık ile bağlantılı olarak ele alınacaktır.

Anahtar Kelimeler: yenilebilir enerji, iklim, karayolu taşımacılığı, karayolu ulaşımı, sürdürülebilirlik, AB Yeşil Mutabakatı, biyoyakıt, elektrikli araç, elektrifikasyon, şarj istasyonları

ABSTRACT

IMPLICATIONS OF RENEWABLE ENERGY REGULATIONS IN THE EU ON SUSTAINABLE ROAD TRANSPORT

The European Green Deal lays out a plan to make the EU climate neutral by 2050 to mitigate climate change and its harmful effects on the environment. Since promoting the use of renewable energy is necessary to reduce fossil fuel emissions, one of the key points of this goal is the reduction of fossil fuels used in road transportation and, by extension, carbon emissions.

In this context, the thesis study aims to explain the implications of the new legal regulations brought within the scope of the European Union climate targets on the desire to achieve the green transformation targeted in the axis of the European Green Deal and other legislation.

In addition, the thesis study aims to show the steps of green transformation in road transport by explaining the further steps to be taken by EU legislators. Electric vehicles, mobility, sustainable road transport, use of biofuels and other impacts of EU vehicles within the framework of the EU Green Deal will be addressed in connection with road and freight transport.

Keywords: renewable energy, climate, road transport, road transport, sustainability, European Green Deal, biofuel, electric vehicle, electrification, charging stations

ÖNSÖZ

Bu çalışmanın gerçekleştirilmesinde, değerli bilgilerini benimle paylaşan, her danıştığım da sabırla yol gösteren ve gelecekteki mesleki hayatımda da bana kattığı değerli bilgilerden faydalanacağım kıymetli hocam Prof. Dr. Mustafa Tayyar Karayığit'e sonsuz teşekkürlerimi sunarım.

Yüksek lisans ve tez sürecimde değerli desteklerini benden esirgemeyen sevgili eşim Gökay Özberber'e, çalışma sürecince bana her konuda yol gösteren ve beni destekleyen kıymetli annem Prof. Dr. Yonca Deniz Gürol'a, her zaman arkamda duran kıymetli babam Mehmet Cengiz Gürol'a ve manevi desteğini her zaman hissettiğim kıymetli kardeşim Psk. Deniz Mısra Gürol'a teşekkürlerimi sunarım.

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ABBREVIATIONS

AFID	Alternative Fuels Infrastructure Directive
BEV	Battery Electric Vehicle
CBAM	Carbon Border Adjustment Mechanism
CFREU	Charter of Fundamental Rights of the European Union
CNG	Compressed Natural Gas
CO₂	Carbon Dioxide
EC	European Community
EEC	European Economic Community
ETD	Energy Taxation Directive
ETS	Emission Trading System
EU	European Union
FQD	Fuel Quality Directive
GHG	Greenhouse Gas
NDC	Nationally Determined Contribution
RED	Renewable Energy Directive
RFNBO	Renewable Liquid and Gaseous Fuels Of Non-Biological Origin
SDG	Sustainable Development Goals
TFEU	Treaty on the Functioning of the European Union
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
PHEV	Plug-In Hybrid Electric Vehicle

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1. INTRODUCTION

Since the 18th century's industrial revolution, the world's usage of fossil fuels has steadily increased. Between 1990 and 2018, fossil CO₂ emissions from road transport in EU Member States increased by 24% and by 4% between 2000 and 2018. From 2000 to 2018, transportation activity increased by 27%¹. In 2021, coal consumption hit record heights not seen since 2014, despite a 5.8% growth in the global demand for primary energy. After the pandemic, when the worldwide economic activity resumed, it resulted in an increase in the demand for and use of energy that pushed it well beyond the levels predicted for 2019.

Starting with the United Nations Framework Convention on Climate Change² and continuing with the debates at the 27th UN Climate Change Conference of the Parties that took place in Sharm El Sheik, the EU became a protagonist in the of climate law. The firsts efforts were made in Single European Act, which established the first set of environmental legislation, that led to the establishment of the Emission Trading System in 2005. Transportation had a significant negative influence on climate neutrality, as it exacerbates Europe's pollution problem by creating greenhouse gas emissions, pollutant emissions, noise and congestion. Transport emissions currently account more than for 25% of total greenhouse gas emissions in the EU.³

In this regard, the EU adopted legal acts and made initiatives to reduce net greenhouse gas emissions through its climate, energy, transportation and tax policies. It is simple to draw strategies for sustainable road transport from the broader concept of sustainability. In general, a sustainable road transport strategy adds to the use of economic mechanism incentives to seek environmental, social and economic development objectives, including transport mode patterns, emission reductions, and air and water quality. Nonetheless, this broad strategy must be refined in the

¹ Gabriel David Oreggioni, Fabio Monforti Ferraio, Monica Crippa, Marilena Muntean, Edwin Schaaf, Diego Guizzardi, Efisio Solazzo, Marlene Duerr, Miles Perry, Elisabetta Vignati, "Climate change in a changing world: Socio-economic and technological transitions, regulatory frameworks and trends on global greenhouse gas emissions", EDGAR, Volume 70, 2021

² United Nations General Assembly (UNGA) United Nations Framework Convention on Climate Change Resolution Doc. A/RES/48/189

³ <https://www.eea.europa.eu/ims/use-of-renewable-energy-for> (last visited 10.09.2022)

transportation sector and tailored to the unique requirements of developing nations. In addition to include a long-term perspective, a sustainable mobility strategy must incorporate a comprehensive and well-balanced collection of actions to address a variety of aims. These objectives could be classified as ecological, economic and social objectives.⁴

As regards the instruments, the regulatory approach establishes norms, prohibitions and administrative procedures, whereas cooperation agreements foster conversation and negotiation on a voluntary basis. The objective is to reach an agreement on policy objectives and to develop voluntary initiatives to achieve these objectives. There are numerous forms of cooperative solutions, including all types of discussions involving nations and/or private entities. Moreover, incentives like carbon pricing serve as a mechanism for policy enforcement. By altering the price of private transit supply and demand, customers and providers might be persuaded to make more advantageous decisions.

Considering that reaching sustainable road transportation requires three main instruments of regulation, cooperation and economic incentives, the thesis will examine the EU's legislative actions, cooperation agreements and economic incentives adopted to reach the ultimate goal of transport transition.

Within the context of first dimension which is the regulations, the European Green Deal⁵ was established as a legislative initiative towards reaching the goal of lowering greenhouse gas emissions by 90% by 2050 through a green transition.⁶ In this regard, the Green Deal foresees policy making and bringing new measures to reduce the emission and to ensure independence on fossil fuels. Fit for 55 Package was adopted in this regard, as a package of proposals of amending regulations and directives to enhance just transition, and adopting new rules to take action towards

⁴ Jan A. Schwaab, Sascha Thielmann, "Economic and Social Commission for Asia and the Pacific United Nations New York", 2002

⁵ Communication COM/2019/640 on the European Green Deal

⁶ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en (last visited 24.11.2022)

improving sustainable transport models, clean mobility and well established connections between the transport modes in light of the principles of “polluter pays”⁷ and “user pays”^{8,9}.

The 2030 Climate Target Plan, is also standing as part of the Green Deal, and aims to demonstrate the purpose is to undertake a review of all relevant policy instruments and to make recommendations for their revision. Following the target plan, the Council passed the new European Climate Law. Together, the EU Green Deal, the Climate Target Plan and the European Climate Law¹⁰ became the primary drivers of transport decarbonization, determining demand for alternative fuels and powertrains, as well as the accompanying infrastructure. Besides, the ambition towards reaching carbon neutrality resulted in adjustments and significant amendments to the Alternative Fuels Infrastructure Directive,¹¹ the TEN-T rules, as well as the Renewable Energy Directive¹² and many other legislative acts related to the transports, infrastructure and energy.

The second dimension of reaching sustainable road transportation is establishing a cooperation between the states. In order to reach an oriented practice between the states, agreements were established as the first step. However, it should be noted that the first actions taken by the EU was actually encouraged by international cooperation at first with the ratification of Kyoto Protocol in 1997 which served as the first international agreement to reduce greenhouse gas emissions and carbon dioxide gas emissions. Furthermore, with the ratification of Paris Agreement in 2015, and the EU had to align its policies and encourage unified practices between the Member States.

⁷ Dieter Schmidtchen, Christian Koboldt, Jenny Monheim Helstroffer, “Regulatory failure and the polluter pays principle: why regulatory impact assessment dominates the polluter pays principle”, *Environ Econ Policy Studies*, Volume 23, 2021, p.109–144

⁸ Tim Zajontz, “The Chinese infrastructural fix in Africa: lessons from the Sino-Zambian ‘road bonanza’”, *Oxford Development Studies*, Volume 50:1, 2022

⁹ <https://euagenda.eu/news/568798> (last visited 24.11.2022)

¹⁰ Proposal, 2018/1999 COM/2020/80 on a regulation Of The European Parliament And Of The Council establishing the framework for achieving climate neutrality and amending Regulation

¹¹ Directive 2014/94/EU on the deployment of alternative fuels infrastructure, OJ L 307, 2014, p. 1–20

¹² Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ L 140, 5.6.2009

Moreover, in the third dimension, the EU has established incentives to support Member States in their practices to reach climate goals.

At the heart, however, of the EU's internal policy is the reality that ambition had to be balanced, at every turn, with the quest of acceptance of the EU's policy, particularly among Member States. Due to fluctuations of economic circumstances, diverse attitudes towards the issues of climate change have been established by several Member States. Aside from that, differences have grown because of the several EU expansions that have occurred throughout the process of developing the EU's climate policy. Because of these disparities, it has been difficult to reach consensus on the EU policies while simultaneously implementing internal reforms. Since 1990, the EU has reduced its emissions by around 23 percent. The EU and the Member States shall work in coordination and implement the measures implied by the EU in a unified manner.

The EU, as a leading player in the climate change mitigation has adopted new policies, regulations, directives and incentives together with monetary supports to keep its position at the same place as the first runner in the fight against climate change. After the ratification of Paris Agreement, more than 180 nations have pledged to make nationally determined contributions toward the objectives of the agreement. The 27 EU Member States together with the UK have made legally enforceable promises to become carbon neutral by 2050. This revolution was also accompanied by technological changes on a worldwide scale, which were influenced in part by legislation meant to curb climate change and air pollution in addition to market considerations. Globally, there has been a significant adoption of renewable energy.

Regarding these facts and the impacts of the measures adopted by the EU will be reviewed in order to determine how much the legislative measures have influenced the usage of renewable energy in the transportation sector in the EU. Hence, the effect of implementation of policies will be analyzed and evaluated.

In consideration of the above-mentioned facts, this thesis aims to scrutinize how EU's renewable energy policies and legislative actions could create an impact on road transportation and how they can contribute to sustainability in road transportation. In this regard, implications of legislative actions taken within the context of renewable energy are scrutinized in relation to EU's environmental targets. Moreover, the thesis also examines how the greenhouse gas emission reduction objective can be accomplished. Thirdly, the thesis tries to find an answer to the question of whether the implications of renewable energy regulations will deliver the goal of reaching sustainable road transportation.

In order to ensure sustainability in road transportation, sustainable road transportation should be defined. Then, the questions of what policy options are available within a sustainable strategy and how economic incentives open the way to sustainable road transportation should be answered. In light of this, firstly, sustainable road transportation will be scrutinized to bring a definition. Moreover, the steps taken towards reaching sustainable road transportation will be explained in the following sections. To be precise, in the first section of this study, historical development of climate law will be scrutinized. As the study focuses on the renewable energy usage in sustainable road transport, historical development will be analyzed from the perspective of EU energy policies. This section will provide a brief information about the proceedings since early 1950s and give information about how and why the climate issues became the top priority for the EU.

In the second section, competence delimitation will be scrutinized to explain the legal background of the development of energy policies. The scope of competencies has grown significantly due to revisions in Treaty provisions and the inclusion of energy sector to the EU's total competences. The role of EU Treaties together with the secondary legislation in adopting uniform energy policies and defining the challenges and issues about the environmental effects of the use of energy will be scrutinized and measures taken will be classified in this section.

In the third section, the implications of legislation will be examined at their own dimensions. The implications of legislative documents which regulate subject related to renewable energy will be explained as they contribute to climate mitigation, reducing greenhouse gas emission and improving sustainability in road transportation.

In the fourth section, implications of the legislation will be explained at the external dimension. Externally, the EU aims to develop a unified approach against energy suppliers and to reach climate change mitigation through climate diplomacy. In this context, the EU has given global efforts to cut fossil fuel consumption through adoption of measures. In addition, this section will touch upon the energy crisis increased with the Russian invasion.

In the fifth section, incentives that may contribute to the uptake of renewable energy in the EU will be examined. Market obstacles and the absence of incentives impede the further penetration of renewables.

In the sixth section, an overall evaluation of the implications of renewable energy regulations on road transportation will be made. In this regard, graphics for overall energy usage in the transportation sector and the emissions levels will be evaluated to understand how much the Member States have accepted the measures taken and how much progress they have achieved in implementation. The level of implementation of climate policies are to be analyzed and evaluated through graphics about the transportation emissions and the levels of renewable energy usage in transportation sector by Member States.

2. SUSTAINABILITY IN ROAD TRANSPORTATION

2.1. Sustainable Road Transportation

The road transport sector is critical to achieving a sustainable development especially within the framework of environmental sustainability. Fossil fuels are considered as the primary source of greenhouse gases and the criterion pollutant of 18 emissions globally¹³ by many academics in the literature.¹⁴ A key part of transformation necessitates a transition of energy and transportation away from fossil fuels to renewables.¹⁵

Road transportation is a sector that is critical to the overall economy around the world. The International Energy Agency reports that the energy consumed by trucks and buses, as well as their emissions of carbon dioxide, have increased by 2.2% annually.¹⁶ The need for fossil fuels is the primary factor driving the industry as a whole, and diesel fuel is still the energy carrier that is most frequently used in heavy-duty vehicles that operate on the road.¹⁷ Due to the nature of long-distance travel and the fact that vehicles using this mode of transportation are fueled by fossil fuels, this industry is a substantial contributor to environmental degradation and the release of greenhouse gases.¹⁸

¹³ Ashish Sharma, Vladimir Strezov, “Life cycle environmental and economic impact assessment of alternative transport fuels and power-train technologies” *Energy* 2017, 133, p. 1132–1141.

¹⁴ Collaço, Flávia Teixeira, Ana Carolina Machado, Pedro Borges, Raquel Brito, Thiago Mouette, Dominique, “Road Freight Transport Literature and the Achievements of the Sustainable Development Goals—A Systematic Review”, *Sustainability*, Volume 14, 2022

¹⁵ Kyla Tienhaara, Joanna Robinson, “Routledge Handbook on the Green New Deal” Routledge, August 26, 2022

¹⁶ International Energy Agency, “Tracking Transport”, 2019

¹⁷ Yi Qu, Tolga Bektaş, Julia Bennell, “Sustainability SI: Multimode Multicommodity Network Design Model for Intermodal Freight Transportation with Transfer and Emission Costs”. *Netw. Spat. Econ.*, Volume 16, 2016, p. 303–329.

¹⁸ Flávia Mendes de Almeida Collaço, Ana Carolina Rodrigues Teixeira, Pedro Gerber Machado, Raquel Rocha Borges, Thiago Luis Felipe Brito, Dominique Mouette, “Road Freight Transport Literature and the Achievements of the Sustainable Development Goals—A Systematic Review” *Sustainability*, Volume 14, 2022

To achieve the SDGs countries have developed various policies in the transportation sector. In a similar vein, the scientific community has been doing research and analysis on the application of a wide variety of fuel technologies for use in road transportation, with the goal of enhancing performance while simultaneously reducing costs and emissions. For road transport to become sustainable, the transition to zero-emission vehicles, infrastructure, the use of renewable & low-carbon fuels, shift to sustainable alternatives and ensuring the connection between the networks and different modes of transport shall be improved.¹⁹ For the past twenty years, in an effort to make transportation more ecologically friendly, the European Union has encouraged environmentally responsible modes of transportation, in particular multimodal transport.²⁰ Intermodal transportation through rail and water has been proposed as an ideal solution to improve environmental sustainability.²¹

2.2. Sustainable Development and The Concept of Sustainability

Sustainable development is firstly defined in the Brundtland Report by the United Nations World Commission on Environment and Development in 1987 as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”²². In the years that followed the publication of the Report, "sustainable development" emerged as a concept of environmental movement. The process started with the Earth Summit. While some view development as an oxymoron and necessarily unsustainable, others reflected their dissatisfaction with the lack of progress made thus far²³.

¹⁹ Anu Bask, Mervi Rajahonka, “The role of environmental sustainability in the freight transport mode choice” International Journal of Physical Distribution & Logistics Management; Bradford Vol. 47, 2017, 560-602

²⁰ Vasco Reis, “Analysis of mode choice variables in short-distance intermodal freight transport using an agent-based model, Transportation Research Part A: Policy and Practice”, Volume 61, 2014, 100-120

²¹ Catrin Lammgård, “Intermodal train services: A business challenge and a measure for decarbonisation for logistics service providers”, Research in Transportation Business & Management, Volume 5, 2017, 48–56

²² Gro Harlem Brundtland, “Our Common Future: Report of the World Commission on Environment and Development”, 1987, p.8

²³ James H. Brown "The Oxymoron of Sustainable Development". BioScience, Volume 10, 2015, p. 1027–1029

In addition to the criticism on the concept, The Rio Declaration and the Brundtland Report were criticized by many academics with their “consensus-building through compromise method”.²⁴ For instance, in the categorization of environmental discourses, the United Nation's "business-as-usual" approach to "sustainable development" has opened another brand new discussion. Besides, some academics also argued that the concept of sustainability is “sufficiently vague”²⁵ and “ambiguous enough to allow for consensus formation but lacks substance”²⁶. Despite the ongoing criticism and discussions about the concept, the concepts of sustainable development and sustainability had found their place in literature and became popular in academic and political agendas throughout the world in 1990s.²⁷

3. HISTORICAL EVOLUTION OF ENVIRONMENTAL LAW

3.1. Development Of Global Environmental Law

According to the categorization proposed by Sands, Peel Fabra and MacKenzie, there have been four distinct phases in international environmental law. These phases reflect developments in the practice, shifts in political awareness, and shifts in the structure of international legal order and institutions.²⁸

In 1972, The United Nations Conference on the Human Environment marked the beginning of the second phase. During this time-period, a variety of international organizations with expertise in environmental issues were established and legal instruments were enacted at domestic and international levels, addressing particular sources of pollution. These developments can be broken

²⁴ Ben Purvis, Yong Mao, Darren Robinson, “Three pillars of sustainability: in search of conceptual origins”, *Sustain Sci*, Volume 14, 2019, p.681–695

²⁵ Robert Goodland R, Herman Daly, “Environmental sustainability: universal and non-negotiable”, *Ecol*, Volume 6, 1996, p. 1002–1017

²⁶ Ibid.

²⁷ Marino Gatto, “Sustainability: Is it a well-defined concept?” *Ecol*, Volume 5, 1995, p. 1181–1183

²⁸ Philippe Sands, Jacqueline Peel,; Adriana Fabra, Ruth MacKenzie, “Principles of international environmental law” Fourth edition, Cambridge University Press, 2018

down into two categories: regional and global. The Earth Summit marked the beginning of the third era. The fourth period started with the adoption of the Kyoto Protocol and can be characterized as a period of integration. This has also been the time-period in which more emphasis has been paid to complying with international environmental duties, which has resulted in the establishment of a body of international law that has further been developed.

The first period started with the signing of bilateral fisheries treaties in the 19th century and terminated with the establishment of new organizations in 1945²⁹. This period can be broken up into two parts. During this time-period, people and nations started to come to the realization that the process of industrialization and progress required certain requirements³⁰.

The first decision to hold a global conference on the issue of environmental challenges was given by the General Assembly in 1968. In this regard, the Stockholm Conference was organized in 1972 "to serve as a practical means to encourage, and to provide guidelines, to protect and improve the human environment and to remedy and prevent its impairment"³¹. The conference is largely regarded as the first genuine conference to concentrate attention on the environmental challenges. Much of the focus of this conference was on the need to establish organizations for reducing pollution, as well as to advocate for the implementation of environmental impact assessments. States were pressed to implement measures to limit air, water, and soil pollution, as well as to monitor environmental conditions and assess progress.³²

The outcome of the conference was to draft a "Universal Declaration on the Protection and Preservation of the Human Environment" which aimed to serve as a "document of basic principles". However, the states could not reach a consensus on the degree of specificity of the declaration's principles and guidelines, regarding whether the declaration would "recognize the

²⁹ Ibid.

³⁰ Ibid.

³¹ United Nations General Assembly (UNGA) United Nations Conference on the Human Environment Resolution Doc A/RES/27/2994

³² Miranda Schreurs, "20th Anniversary of the Rio Summit Taking a Look Back and at the Road Ahead", *Ecological Perspectives for Science and Society*, Volume 21, 2012, p. 13-16

fundamental need of the individual for a satisfactory environment”³³ or regarding whether and how it would list general principles elaborating States' obligations under the declaration. In this regard, progress on the declaration was rather slow.³⁴

The Stockholm Declaration, which was established as a result of the conference, may be said to be the first worldwide effort to address sustainability problems and have this represented in an internationally approved statement. The Stockholm Declaration highlighted the evolving extent of the international environmental challenge and the consequential shifts in policy response parameters. The declaration could not have expressed these remarks in legal terms at the time, but it identified the major features of the changes in international environmental law and policy since 1972.³⁵ The concept of sustainable development is encompassed in Stockholm Declaration in numerous ways. The declaration asserts that natural resources must be used sustainably and that environmental conservation and development must be integrated. Environmental governance capacities were strengthened through the establishment of specific national administrations, framework laws, and numerous international organisations. Furthermore, the number and variety of climate change fighters - international, national, and local organizations, tackling these essential issues, and green-leaning political parties - have continuously increased by the time of Declaration.³⁶ However, despite the fact that significant progress had been achieved in improving air quality, lowering water pollution, prohibiting or restricting the use of numerous harmful chemicals, there were still a vast of fundamental sustainability challenges that must yet be addressed at the incoming conferences.

Brundtland Report was published fifteen years after the Stockholm Declaration.³⁷ Unlike the Stockholm Declaration, the study built a bridge between economic and environmental challenges

³³ United Nations (UN) Report of the United Nations Conference on the Human Environment Doc. A/CONF.48/14/Rev.1

³⁴ United Nations (UN) The Stockholm Convention on Persistent Organic Pollutants Doc. UNEP/POPS/CONF/4 (2001)

³⁵ Brunnée Jutta, “The Stockholm Declaration and the Structure and Processes of International Environmental Law”, Kluwer Law, 2008, p. 41-62

³⁶ Miranda Schreurs, “20th Anniversary of the Rio Summit Taking a Look Back and at the Road Ahead”, Ecological Perspectives for Science and Society, Volume 21, 2012, p. 13-16

³⁷ Gro Harlem Brundtland, “Our Common Future: Report of the World Commission on Environment and Development”, 1987, p.8

by stating that economic progress and the eradication of poverty may be achieved in an ecologically responsible and sustainable manner. In this regard, the study brought the idea of sustainable development by suggesting that economic progress is achievable within the constraints of ecological integrity. This idea served as the basis for the incoming Rio Declaration which is the UNCED's principal declaration of principles.³⁸

Furthermore, UN began to discuss potential steps to solve environmental challenges and enacted a series of resolutions that established the UNCED held in Rio de Janeiro.³⁹ The standards outlined in the resolution constitute criteria for evaluating the Earth Summit since they outline the agenda that the summit was intended to point out. In this context, UN declared that states are very worried about the environmental degradation and life cycle supplies.⁴⁰ As a result, the conference was concluded with the establishment of the UNFCCC and the Rio Declaration⁴¹.

Unfortunately, the Rio Declaration was a very weak legal document, regarding that it was not meant to be a legally binding convention. Nations preferred to agree to soft paper that do not force them to take concrete actions in the future. However, despite the fact that it is a soft law instrument the Rio Declaration provides a series of mission statements such as sustainable development, which would be of great benefit for all. Virtually, every aspect of the Rio Declaration refers to the necessity of adopting sustainable development policies.

With the the adoption of the Kyoto Protocol⁴² in 1997, climate change and consequently energy issues gained prominence on the global agenda, with the purpose of creating a more favorable environment for the achievement of objectives. In recent years, many lawmakers have agreed on

³⁸ William K. Stevens, "Earth Summit Finds the Years of Optimism Are a Fading Memor" N.Y. Times, 1992

³⁹ United Nations General Assembly (UNGA) Report Of The United Nations Conference On Environment And Development Doc. A/CONF.151/26 (Vol. I)

⁴⁰ Ibid

⁴¹ Ibid.

⁴² UNFCCC (1997) Kyoto Protocol to the United Nations Framework Convention on Climate Change adopted at COP3 in Kyoto, Japan, on 11 December 1997

the fact that the energy and climate challenges are of such a magnitude that solutions cannot be found at the level of Member States.

The Kyoto Protocol lays out the initial steps toward accomplishing this objective through lowering emissions from fossil fuels as well as net emissions from certain terrestrial ecosystems in industrialized countries. The most significant contributors to greenhouse gas emissions are cataloged in the Protocol's Annex I. The list includes nations that are members of the Organization for Economic Cooperation and Development as well as countries that had economies that were transitioning at the time the list was compiled.⁴³ As a direct consequence of this, Annex I parties were given a significantly greater share of the responsibility for meeting globally bound targets for emission reductions.⁴⁴ In addition, the Kyoto Protocol establishes three market-based measures to assist nations in successfully accomplishing their emission reduction goals⁴⁵. One of these market-based mechanisms is the International Emissions Trading System⁴⁶.

In the Rio Summit that took place in June 2012, the UN emphasized the goals of securing a renewed political commitment for sustainable development and underlined the importance of a gap analysis for the implementation of the outcomes. Rio+20 Summit referred to institutional improvements that must be ensured by the governments. In addition, participants at the Rio+20 Summit agreed to implement Sustainable Development Goals. These objectives were adopted to expand the previously adopted Millennium Development Goals and to align with the UN post-2015 development strategy.

⁴³ Yoomi Kim ,Katsuya Tanaka,Shunji Matsuoka, “Environmental and economic effectiveness of the Kyoto Protocol”, Plos ONE Volume 15(7)

⁴⁴ Kuriyama Akihisa, Abe Naoya “Ex-post assessment of the Kyoto Protocol–quantification of CO2 mitigation impact in both Annex B and non-Annex B countries”. Applied Energy, Volume 220, 2018, p.286–295.

⁴⁵ Sáez, Paola Tam, Vivian del Río Merino, Mercedes Viñas, Carmen Wang Xiangyu, “Effectiveness of Greenhouse-Gas Emission Trading Schemes Implementation: A Review on Legislations”, Journal of Cleaner Production, Volume 127, 2016

⁴⁶ Dennis Baldocchi, Phillipe Ciais, Wolfgang Cramer, James Ehleringer, Graham Farquhar, “The terrestrial carbon cycle: Implications for the Kyoto Protocol”, American Association for the Advancement of Science, Volume 280, 1998, p.1393-1394

The Paris Agreement which is the first legally enforceable international climate change treaty was adopted by 196 Parties at the 21st Conference of the Parties in Paris on December 12, 2015. Paris Agreement was an important step following the actions taken, as it established a long-term target that is consistent with the goal of keeping global temperature increases well below 2 degrees Celsius above pre-industrial levels and pursuing measures to reduce them to 1.5 degrees Celsius above pre-industrial levels.

In that sense, 21st Conference of the Parties was a significant step forward in terms of displaying actual progress that can be built upon in the years running up to the United Nations Climate Conferences in 2018 and 2020. It provided a chance to enhance the strategy to increasing the coherence and effectiveness of diverse climate initiatives. Parties have demonstrated their determination to act through the communication of Nationally Determined Contributions, the overwhelming number of signatures to the Paris Agreement, the astonishing speed with which it has entered into force, and the progress made on major initiatives announced at the United Nations Climate Conference⁴⁷.

3.2 Development of Environmental Law in the EU

With the adoption of the Kyoto Protocol⁴⁸ in 1997, climate change and consequently energy issues gained prominence on the global agenda, with the purpose of creating a more favorable environment for the achievement of objectives. However, in the early years of integration, many lawmakers have agreed that energy security was an important aspect throughout the years of integration. By that time, it was agreed that the energy and climate challenges are of such a magnitude that solutions cannot be found at the level of Member States. Therefore, the progress started within the EU by the efforts of creating an energy union, furthermore it moved to a scope that encompass environmental challenges from a broader sense. The steps taken and the actions

⁴⁷https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/reflections_on_the_way_forward_final.pdf (last visited 24.11.2022)

⁴⁸ United Nations, Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997

foreseen by the Commission were shaped up and structured in accordance with the global progress. The Commission and the Member States were obliged to make progress in the area of environment and climate since they became a part of the summits and conferences concluded and they became parties to legally binding agreements such as Paris Agreement which encourages them to take action to mitigate climate change.

3.2.1. Progress in the early years of integration

In the early years of integration, there has been no real progress towards structuring a legal framework on the issues related to the protection of the environment. The first solid steps taken within the EU were mainly in the area of energy. Treaty establishing the European Coal and Steel Community was signed in 1951 to gain collective ownership over two commodities that were critical for both wartime and rebuilding.. Following the establishment of the Treaty, European Atomic Energy Community⁴⁹ was founded in 1957. The negotiations barely took place due to the disparities in national energy policies that had already emerged in 1956⁵⁰ and this led the EU to perform more efforts and to establish initiatives to formalize European energy strategy. Despite the efforts made, many of the ambitious initiatives to establish a unified strategy have frequently failed due to resistance from Member States. Disparities in energy mixes, transport routes, or energy market systems resulted in Member States' diverging interests, and impeded energy policy unification. Energy policy at the EU level, as well as an integrated internal energy market, would. Despite these benefits, such as improving energy security and lowering costs owing to increased competition, the EU's ability to act was restricted in the early stages of integration due to aforementioned reasons.

⁴⁹ Treaty establishing the European Atomic Energy Community of 25 March 1957

⁵⁰ Pamela Barnes "Security of Energy Supply in the New Europe: A Role for the European Atomic Energy Community in the European Union's Neighbourhood Policy?", *Journal of Contemporary European Research*, Volume 4, 2008

3.2.2. Period of 1960-1990s

The EEC Treaty made it possible for the Council to enact environmental measures, but, during the 1960s and early 1970s, it was still early to think of a unified set of environmental standards for the EU. Academics even used the words "incidental" "responsive" and "unarticulated"⁵¹ to describe the European Union's current stance on environmental protection.⁵² However, increased public concern about the environment, as well as developments on the international level, have acted as crucial drivers in the environmental sector. Building on these early advances, the EU's environmental policy began to evolve in a more coherent manner during the 1980s. The Single European Act established an explicit legal framework for European environmental regulation, marking a vital step towards consolidation of environmental policy. It introduced "polluter pays" principle and the preventive action principle with the idea that environmental damage should be restored at the source as a matter of priority.

3.2.3. Progress in 2000s

Since 2007, there was enormous expectation for progress toward a European energy and climate strategy. In 2007 the first EU "Energy Action Plan"⁵³ was agreed by the Member States. "An energy policy for Europe"⁵⁴, represented the starting point of a more integrated EU within the field of energy. The action plan outlined the three major issues of "sustainability, supply security, and competitiveness."⁵⁵ And these challenges have remained at the heart of the common energy policy since then. Many of the Commission's suggestions, which have come to characterize European energy policy in recent years, were reflected by the Council in the Energy Action Plan adopted in 2007.

⁵¹ Laurens Jan Brinkhorst, "The Road to Maastricht", Ecology Law Quarterly, Volume 20, No. 1, 1993, p. 7-23.

⁵² Christine Bakker, Francesco Francioni, "The EU, the US and global climate governance", Dorchester: Ashgate, 2014

⁵³ https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/93135.pdf (last visited 24.11.2022)

⁵⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:l27067&from=EN> (last visited 24.11.2022)

⁵⁵ https://ec.europa.eu/regional_policy/sources/activity/statistics/2007_energy.pdf (last visited 24.11.2022)

Following the implementation of the Energy Action Plan, changes in EU legislation were implemented. In 2008, Lisbon Treaty contained a section devoted to energy which contains Article 176/A under the title of “Energy”. The article refers to the “functioning of the internal market”, but then goes on to list various innovations such as “ensuring the security of energy supply in the Union”, “promoting energy efficiency and energy saving and the development of new and renewable forms of energy”; and “promote the interconnection of energy networks”.

The article further stipulated that Member States would retain authority over their energy mix, foreign policy in the field of energy, and the terms under which they might use their own energy resources under the agreement. As far as energy policy is concerned, aside from a new energy title, the Lisbon Treaty does not alter the status quo in terms of the internal market and environmental rules as sources of information and guidance. A direct result of the Council's repeated requests for an action plan, the Commission developed a list of ideas, which culminated in the third “Internal Energy Market Package,”⁵⁶ which was adopted by the European Parliament in 2007.

In this regard, the Commission presented the “Roadmap for transitioning to a competitive low carbon economy in 2050”, the “Energy Roadmap 2050”, and the “Roadmap to a Single European Transport Area”. These initiatives outlined essential features of the transition to a low carbon economy, cost-effective greenhouse gas emission reduction milestones for 2030. However, pursuant to after several actions taken such as publishing of the Energy Roadmap, the Commission acknowledged that this strategy is unlikely to meet the 2020 objectives, let alone the longer-term problems, such as reducing emissions by up to 95 percent by 2050.

In order to convey contributions for the aim of achieving the goals provided by Paris Agreement, the EU had to enact an ambitious, binding, legislative framework to limit the overall temperature increase to 1.5°C. Building on the EU’s international commitments, the Commission firstly established the Clean Energy for all Europeans package⁵⁷ and set tasks to bring EU energy legislation in line with the new 2030 climate and energy targets stressing the ‘Energy efficiency

⁵⁶ Eu Internal Energy Market Factsheet https://www.europarl.europa.eu/ftu/pdf/en/FTU_2.1.9.pdf (last visited 24.11.2022)

⁵⁷ Communication COM(2016) 860 on Communication Clean Energy For All Europeans

first’ as one of the key principles of the Energy Union. With the Clean Energy for All Europeans package, the EU has committed to achieving greenhouse gas emission reductions of at least 40% by 2030, with the goal of reaching 50% by 2050. Following this decision, legally enforceable objectives were established to increase the percentage of renewable energy in total energy consumption to at least 32 percent and to enhance energy efficiency to at least 32.5 percent during the next five years. Therefore, the EU overhauled its energy policy framework. The legislative acts significantly addressed issues such as energy efficiency, renewable energy, electricity market design, electricity supply security, and a governance system for the Energy Union.

Finally, in 2019, European Green Deal was established, following it, European Climate Law⁵⁸ was established in 2021 that sets the ground for a succession of legislative efforts that will help to achieve the goals outlined above. Overall, this newly adopted legislative framework focuses on transformation in various subjects such as climate, environment, water, industry, energy and transport to reach a reduction in the global temperature; considering that these sectors are interconnected to each other to enable them make contributions in their own fields. Firstly, the greenhouse gas emissions and carbon emissions are aimed to be reduced in all sectors to slow down global warming, regarding the fact that the operations shall be initiated in an energy efficient manner, to reduce emissions. Secondly, in transportation sector which accounts for a significant share of both greenhouse gas emissions and energy consumption mainly, renewable energy sources shall become common in use to provide a progressive contribution. Thirdly, carbon market should be regulated clearly to define the limits of carbon emissions occurred due to transport and energy operations. Lastly, mechanisms such as EU ETS and Carbon Border Adjustment shall be revised in this regard.

⁵⁸ Council Regulation (EU) 2021/1119 on establishing the framework for achieving climate neutrality and amending Regulations

4. SOURCES OF EU ENVIRONMENTAL LAW

Regulations, directives, and decisions are the most common legal forms disposed in the EU. Legal norms determine EU policy in any given field. A basic regulation can be supplemented with further regulations, directives, or decisions. The foundational rule could be a directive, which can be supplemented by secondary norms.⁵⁹ Furthermore, soft law will supplement these formal legal rules.

4.1. EU Treaties

When analyzing the hierarchy of norms, it is typical to focus primarily on legislative, delegated, and implementing acts, as well as the hierarchy between them. The constituent Treaties, the TEU and TFEU, are at the top of the EU's normative hierarchy.⁶⁰

Considering the time that The Treaty Establishing the European Coal and Steel Community was established, Europe was not experiencing a dependency problem on third country energy sources. In the following years, dependence on foreign nations and the level of concerns had increased due to depleted energy supplies and the abandoning of coal. That is why it can be suggested that the challenges related to the energy sector were not acknowledged within the period of 1950s and legislation was not adapted to these challenges. With the increasing level of concern about energy, Europe started to focus on the idea of adopting uniform energy policies and establishing more explicit terms to define the challenges and issues about the environmental effects of the use of energy and the security of energy sources.

In this regard, neither this Treaty nor the Euratom Treaty made any reference to the prudent use of renewable resources as an obligation. EEC Article 103 allowed for the possibility of the Council acting by a qualified majority, upon a proposal from the Commission to issue a directive. This

⁵⁹ Paul Craig, Gran de Búrca, “EU Law: Text, Cases, and Materials”, Oxford: Oxford University Press, 2020

⁶⁰ Ibid.

clause can alternatively be interpreted as permitting the institutions to participate in the adoption of measures to assure energy security when required. This interpretation would be valid if there were a shortfall of energy supply. In contrast, Euratom Treaty may be seen to be one of the primary hurdles that has been preventing Europe from developing an effective security strategy about conventional energy sources for a significant amount of time. This is because Europe was keen on utilization of nuclear energy, as it renders concerns for other sources.

Continuously, the succeeding treaties followed the same pattern and avoided to propose new mechanisms through which oil and gas supply should be sustained. The first change was firstly brought by the Lisbon Treaty which included energy as an area of shared competences. According to Article 194 TFEU, the energy strategy is intended to improve not only the free movement of energy between Member States. This has a bearing on the second objective of the energy strategy, which is to encourage connections between energy networks. The third purpose of EU is to guarantee the reliability of the supply of electricity. In the context, supply security refers to the consistent availability of energy that can be purchased at a reasonable price while incurring low social and environmental consequences. Last but not least, one of the goals outlined is the development of new and renewable types of energy, together with the promotion of energy efficiency and energy savings. This last objective is connected to Article 11 of the TFEU as well as sustainable development outlined in Article 191 of the TFEU. The interconnectedness of the energy policies and activities of the Member States is emphasized that the energy policy must be designed in a spirit of solidarity.

Finally, TFEU avoided the inclusion of any explicit clause regarding energy. Nonetheless, several measures referring to joint actions have clauses related to energy as a field of activity. In this regard, it has the potential of limiting the Member States' ability to import energy from third countries by bringing restrictions to improve the quality of the environment.

4.2. International Conventions Concluded by the Member States Forming General Principles of EU Law

Sustainable development is one of the core general principles, firstly defined in Brutland Report, however it became a part of EU Law with Article 3(5) TEU. The article defined the global role of the EU in promoting sustainable development. In *Plantanol GmbH & Co KG v Hauptzollamt Darmstadt*⁶¹ it was stated that “By treating the parts of fuel blends composed of biofuels equally with the parts composed of fossil fuels, Germany is no longer in a position to achieve the objective of a reduction in greenhouse gas emissions in transport”⁶².

The precautionary principle enables the public authorities to intervene in private action when there is no certain proof of possible environmental damage. The UNCED and the Rio Declaration explained the principle as "where there are threats of serious harm, lack of complete scientific certainty shall not be a reason to delay cost-effective safeguards".⁶³ Finally, *Artegodan*⁶⁴ case, accepted the precautionary principle as a concept of EU law and hold that the binding nature is enshrined in Article 174(2) EC.⁶⁵

4. 3. Principles of International Law Binding For the EU

Principle 21 of the Stockholm Declaration refers to “liability and compensation” for environmental damage, and it was opposed by the term of responsibility.⁶⁶ In this regard, Principle 21, continues to serve as a useful guideline for international environmental relations. Principle 21 strikes a balance between opposing modern interests, but underdeveloped countries are having hardships in applying it in practice. Consequently, there are obstacles to applying Principle 21 to global issues such as ozone depletion, climate change, and biodiversity extinction.

⁶¹ Case C-201/08, *Plantanol GmbH & Co KG v Hauptzollamt Darmstadt*, 10 September 2009, ECLI:EU:C:2009:539.

⁶² Ibid.

⁶³ United Nations (UN) Report of the United Nations Conference on the Human Environment Doc. A/CONF.48/14/Rev.1

⁶⁴ *Artegodan GmbH and others v Commission*, ECLI:EU:T:2002:283.

⁶⁵ Ibid.

⁶⁶ Akiho Shibata, “International Liability Regime for Biodiversity Damage: The Nagoya-Kuala Lumpur Supplementary Protocol”, Routledge Research in International Environmental Law, 2014

In addition to Principle 21, the notion of "common but differentiated duties responsibilities" is also closely related to that of "common concern" and expresses the connections between global environmental preservation and the need for equity. States have overlapping but distinct obligations. The industrialized nations recognize their role in the international pursuit of sustainable development in light of the demands the society. There are also other agreements, on this area, such as the Biodiversity Convention. Existing mechanisms and practice imply that governments realize that answers to global concerns must consider both a state's contribution to a particular problem and its capacity to address it. Common but differentiated responsibilities thus reflect an additional set of key conceptual developments in international environmental law.

The UN Human Rights Council in a decision on October 8, 2021, recognized the right to a clean, healthy, and sustainable environment as a new fundamental right.⁶⁷ Following the resolution, on 28 July 2022, the UN made a declaration that everyone has the right to a healthy environment. These proceedings have significant consequences for worldwide efforts to promote and safeguard the full enjoyment of human rights.

4.4. EU Secondary Law

Secondary legislation plays a significant role in adopting uniform energy policies and defining the challenges and issues about the environmental effects of the use of energy. Various measures are implemented for different sectors to implement the objectives provided in Article 194 of TFEU. These measures may be classified in groups regarding the objectives they contribute to and the sectors they are related.

⁶⁷ Marc Limon, "United Nations recognition of the universal right to a clean, healthy and sustainable environment: An eyewitness account", 2022

The first distinction was made by Timmermans,⁶⁸ which classifies the legal measures implemented according to their target. According to this classification, the first category incorporates international accords into EU legislation, namely those authorizing the completion of the Kyoto Protocol, subsequently, the Paris Agreement, including those executing these international obligations. The other category contains tools that have affected European policy, either to seek international objectives or to develop a European climate policy, or both in an interconnected manner. These two categories are supplemented by a third, which comprises any instruments that, without deliberately establishing explicit duties, have integrated climate change mitigation as a general goal.

A. Classification of Secondary Sources in Accordance with International Obligations

Model A: Classification of Secondary Legislation

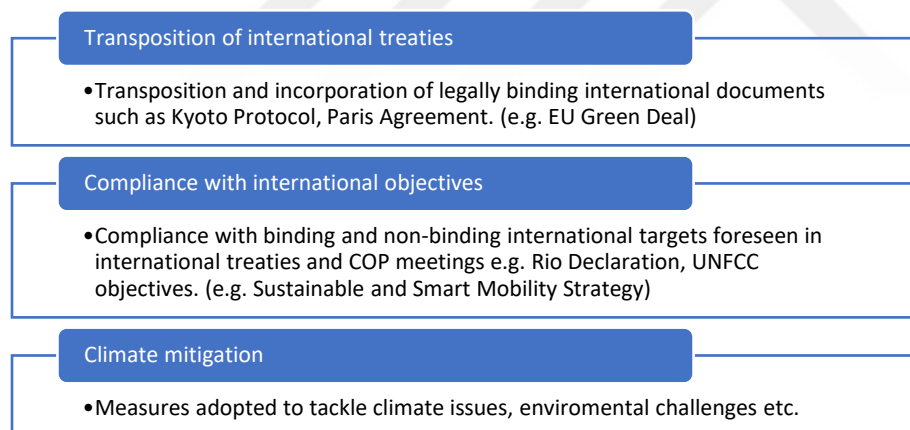


Figure 1: Classification of Secondary Legislation

EU adopted EU legislation to implement international rules, namely those authorizing the completion of the Kyoto Protocol and, subsequently, the Paris Agreement, including those executing these international obligations. The other category contains tools that have affected

⁶⁸ Association of Southeast Asian Nations, “Multilevel Governance of Global Climate Change - Problems, Policies, and Politics Case Studies of the EU”, National Climate Laws GLOBE, 822654 H2020-SC6-GOVERNANCE-2018 Collaboration Project

European policy, either to seek international objectives or to develop a climate policy, or both in an interconnected manner.

i. European Green Deal

EU Green Deal is the first legal communication established to achieve an EU economy that is both environmentally and economically viable. Given this viewpoint, the EU Green Deal aims to achieve carbon neutrality and underlines the goal of “transforming the EU into a healthier, sustainable, fair, just and prosperous society with net-zero emissions of greenhouse gases.”⁶⁹

In order to achieve an eco-friendlier and more sustainable Europe, the EU Green Deal highlights a number of key concerns and how to address their root causes at both the Union and national levels. The agreement emphasizes the significance of transitioning to a decarbonized energy system in order to achieve net-zero greenhouse gas emissions particularly in the energy and transportation sectors. EU Green Deal highlights the significance of measures in tackling climate change and aims to fulfill the objectives provided under the Paris Agreement⁷⁰. Furthermore, the energy efficiency first was also emphasized within the scope of the Deal for both the transportation and energy sectors. By enforcing the concept, not only will the emissions generated by energy production be minimized, but also the reliance on fossil fuels will be eliminated on a large scale.

ii. The Sustainable and Smart Mobility Strategy

Concerning the transition to sustainable and smart mobility, it was emphasized that a strategy will be developed to contribute to the decarbonization of the transportation sector in order to achieve climate neutrality. The sustainable and smart mobility strategy gave a path for more sustainable

⁶⁹ https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3541 (last visited 02.09.2022)

⁷⁰ United Nations (UN) Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

transportation, as well as an action plan aimed at achieving a 90 percent reduction in emissions from the transportation sector by 2050. In light of this goal, the EU Sustainable and Smart Mobility Strategy, which includes 82 projects aimed at establishing a contemporary, greener, and more resilient EU transportation system, was unveiled in December 2020.

The Sustainable and Smart Mobility Strategy⁷¹ states that “greening mobility must be the new license for the transport sector to grow”⁷². This indicates that an efficient and linked multimodal transportation system should be bolstered by ample charging and refueling infrastructure for zero-emission cars, as well as the provision of renewable and low-carbon fuels. Given that transportation now accounts for about a quarter of the EU's greenhouse gas emissions, the Commission seeks to boost the use of clean cars and alternative fuels in order to achieve more sustainable transportation in general.

Therefore, the strategy is designed to achieve the above-mentioned objective and to play a role as a guideline. Throughout the strategy, 10 flagship areas consisting of various initiatives are explained and the further actions are drawn towards reaching 2030 climate goals. According to the Commission, the strategy combined with a set of policies described within has the potential of reducing the transport sector emission up to 90 percent by 2050.⁷³ Therefore, various milestones were set out to draw the European roadmap in consideration of the objectives of a sustainable, smart and resilient mobility. By 2050, the Strategy states that at least 30 million zero-emission cars will be on European roads.

iii. Fit For 55 Package

The EU has set a target of carbon neutrality by 2050. Legislation is being amended to facilitate the green transition and the EU has suggested a "Fit for 55" package to accomplish an interim goal

⁷¹Communication COM(2020) 301

⁷² Ibid

⁷³ Ibid.

of cutting greenhouse gas emissions by at least 55% by 2030, which entails adjustments and amendments in the legislation. The proposed regulatory framework includes provisions for the energy industry, road transport, and energy taxes.

The legislation enacted under Fit For 55 Package will be elaborated in the further chapters.

B. Classification of Legislative Acts and Secondary Sources Related to Sustainable Road Transportation and Use of Renewable Energy

Another classification may be suggested in consideration of EU law sources. In this case, TFEU objectives shall be taken as a variable to make a distinction between the measures adopted. According to Article 194 TFEU, the EU energy policy shall ensure the functioning of the energy market, promotion of interconnection between energy network, security of energy supply and promotion of energy efficiency, energy saving and development of new and renewable forms of energy. In this regard, the EU has adopted various regulations to ensure that the above-mentioned purposes are executed. For instance, the Taxonomy Regulation establishes “the basis for the EU taxonomy by setting out conditions that an economic activity has to meet in order to qualify as environmentally sustainable.”⁷⁴ In this regard, while imposing an economic measure for the functioning of internal market, it ensures that the effects of climate change are mitigated and the environmental conditions are sustained. Furthermore, in order to enhance the interconnection between the energy network, Trans-European Transport Network Regulation is proposed by the Commission to remove the gaps and the bottlenecks in the energy infrastructure of roads. Therefore, the regulation aims to improve both the connections between the networks and the sustainable mobility within the EU.

⁷⁴ https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en (last visited 24.11.2022)

Model B: Classification of Secondary Legislation in Related to Sustainable Road Transportation and Use of Renewable Energy



Figure 2: Classification of Secondary Legislation in Related to Sustainable Road Transportation and Use of Renewable Energy

C. Classification of EU Secondary Law in Accordance with the Climate Goals

Finally, considering the diverse measures taken in various sectors, a classification can be made through identifying which elements of legislation address which environmental challenges. As outlined in the EU Green Deal, reaching fresh air, maintaining biodiversity, using cleaner energy, having an energy efficient and resilient industry are some of the focus areas of the EU in relation to its environmental objectives. Since ratification of the Paris Agreement, the EU has enlarged its environmental policies and adopted regulations, directives, and communiqués:

Model C: Classification of Secondary Legislation in Accordance with the Climate Goals

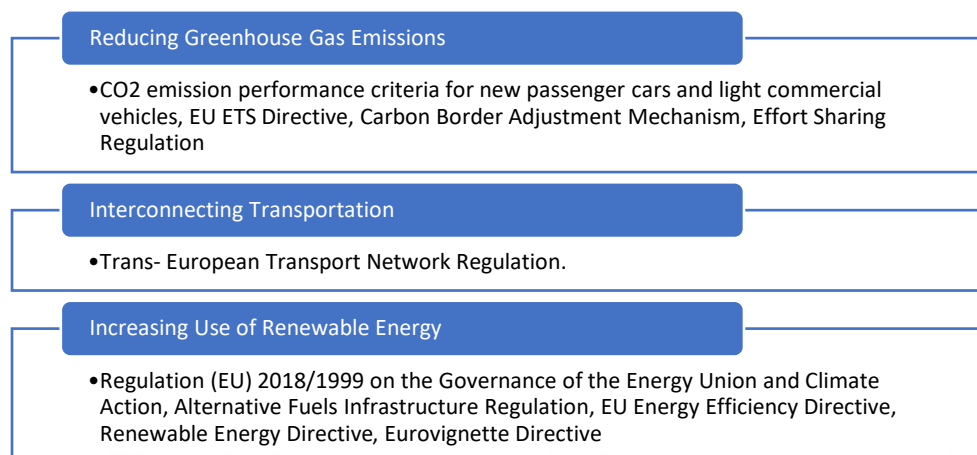


Figure 3: Classification of Secondary Legislation in Accordance with the Climate Goals

i. Directives

According to the EU policies, it is aimed that by 2050 nearly all cars, vans, buses and heavy-duty vehicles shall become zero emission vehicles. Continuously, fuel suppliers shall change their practices to become carbon-neutral in order to put sustainable renewable and low-carbon fuels in common use. The first action taken in this regard was to revise the **Renewable Energy Directive** and the quotas provided within.

Furthermore, EU is also addressing the continued fragmentation and widespread absence of interoperable recharging/refueling systems throughout the continent for all modes. In this context, in order to provide additional measures and to ensure full interoperability of infrastructure a revision of the **Alternative Fuels Infrastructure Directive**⁷⁵ has been introduced as a common framework that establishes minimal conditions for building alternative fuel infrastructure, such as charge stations for electric cars and refueling terminals for natural gas and hydrogen, to be implemented through non-binding national policy frameworks in Member States.

⁷⁵ Council Directive 2014/94/EU on the deployment of alternative fuels infrastructure

In addition, the original proposal for the **Eurovignette Directive**⁷⁶ included alternative measures to accelerate the manufacture and deployment of sustainable alternative transportation fuels. The proposed action includes the Commission's assistance for the deployment of public recharging and refueling facilities where persistent gaps exist, particularly for long-distance travel and in less densely inhabited areas, to supplement Member States' initiatives.

ii. Regulations

Regulations such as Regulation No. 2019/631 in order to tighten CO2 emission performance criteria for new passenger cars and light commercial vehicles have been enacted to diminish transportation's reliance on fossil fuels.⁷⁷

Furthermore, TEN-T Regulation was proposed to enhance the development of trustworthy TEN-T network that provides sustainable connectivity throughout the EU, without “physical gaps, bottlenecks or missing links.”⁷⁸ Within the scope of the recast proposal, one of the objectives was to make “transport greener to reduce greenhouse gas emissions by making each mode of transport more efficient and by promoting the use of more sustainable modes of transport.”⁷⁹ The recast imposed the development of a high-speed network, as well as the creation of “a fully interoperable rail freight network”.⁸⁰ Briefly, the regulation aims to promote low-carbon transportation. It calls for the creation of infrastructure that will facilitate the transmission of energy to alternative propulsion systems to accomplish this aim. The law establishes regulations that will have a significant impact on road transport's electrical supply systems. In that regard, AFID was passed ten months following the TEN-T Regulation to specify specific conditions for the outfitting of TEN-T infrastructure that member nations must adopt.

⁷⁶ Council Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures

⁷⁷ https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_2330 (last visited 02.10.2022)

⁷⁸ https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_6725 (last visited 02.10.2022)

⁷⁹ Lucas Bosser, Guillaume Moreno, “The Ten-T Review: A Welcome But Perfectible Proposal”, 2022

⁸⁰ Ibid.

5.COMPETENCE DELIMITATION IN THE AREA OF ENVIRONMENTAL LAW

5.1. General Outlook

Energy policy is one of the most critical political challenges of our day regarding the issues brought by the climate change. Environmental law is together shaped within the sphere of energy law as the global concerns are closely related to the energy sector.

Historically, energy policies were mostly determined at the national level as there were controversies about Member States' energy mix and financial approaches towards future energy investment. There is growing recognition that the member state level is not the primary arena for energy policy and that frequently, energy concerns may be addressed more effectively at the EU level.

The delimitation of the EU and national competencies poses significant challenges when seen from this angle as the Founding Treaties give no direction about the allocation of competences. This challenge is caused by the implementation of Treaty provisions or secondary legislation which might limit the applicability and effect of national law.⁸¹

However, as time has passed, the scope of competences has grown significantly due to revisions in the Treaty provisions and the inclusion of energy sector to the EU's total competences.⁸² This progression implies that, in every event, an EU action should be justified based on a legal basis provided neither directly in the Treaties or implicitly from those provisions or secondary EU law based on those provisions.⁸³

⁸¹ Leigh Hancher, "Delimitation of Energy Law Jurisdiction: the EU and its Member States: From Organisational to Regulatory Conflicts", *Journal of Energy & Natural Resources Law*, Volume 16:1, 1998, p. 42-67.

⁸² Sanam S. Haghighi, "Energy Security and the Division of Competences between the European Community and its Member States", *European Law Journal*, Vol. 14, No. 4, July 2008, p. 461-482

⁸³ Ibid.

For cases where an adopted measure refers to multiple purposes, the Court implies center of gravity test to determine the predominant purpose and the legal basis in accordance with the predominant purpose⁸⁴. *Huber*⁸⁵ may be given as an example in this regard, the Court ruled that the predominant purpose of the measure adopted was to regulate the production of agricultural products. Therefore, Article 43 EC was deemed as the proper legal basis for the measure adopted. Until now, the Court rejected effects-based factors and found them “in no way objective factors amenable to judicial review.”⁸⁶ For instance, Poland objected to the application for Art. 192(1) “TFEU as a legal basis” to establish market stability reserve in the EU ETS⁸⁷ and claimed that the potential effects on the Polish energy policy are speculative. However, the Court ruled that “the assessment of the effect of an EU measure on a Member State’s energy policy was not a factor that must be assessed in addition to the aim and content of that act.”⁸⁸ The comparison was made between Article 192(1) and 192(2) “TFEU as a legal basis” and ended as Article 192(2) being an exception and being subject to a restricted interpretation. Therefore, in Court’s view, what truly matters is an objective analysis of the genuine content of the legal act and its connections to the purposes pursued under Article 192(1) TFEU⁸⁹.

In the realm of transport policy Art. 90 of TFEU may serve as a legal basis for environmental measures accordingly with the principle of integration. It is also possible for environmental transport measures to be approved under Article 114 TFEU particularly if they do not clearly fit within the scope of Article 90 and if full or comprehensive harmonization is pursued.

⁸⁴ De Baere, G., Van den Sanden, T. “Interinstitutional Gravity and Pirates of the Parliament on Stranger Tides: The Continued Constitutional Significance of the Choice of Legal Basis in Post-Lisbon External Action”, *European Constitutional Law Review*, Volume 12(1), p. 85-113

⁸⁵ *C-336/00 Republik Österreich v Martin Huber*, *ECLI:EU:C:2002:509*

⁸⁶ *Ibid.*

⁸⁷ Council Decision (EU) 2015/1814 on establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC, [2015] OJ L 264/1

⁸⁸ *Ibid.*

⁸⁹ Marjan Peeters, Mariolina Elia Antonio, “Research Handbook on EU Environmental Law” ELGAR, 2020

In the realm of energy policy, Article 308 of the EC Treaty served as the legal justification for extending EU legislation into new sectors and providing harmonization measures for issues that lack a clear legal basis. The rationale for such widespread application of this Article in the sphere of energy was because the Community already had an energy strategy in respect to nuclear, coal and other energy sources such as oil, gas, and electricity deemed to be governed by the clauses of the EC Treaty. Thus, the adoption of Article 308 creates an EU competence in the sphere of energy sector whenever it is deemed as essential.

Article 194(2) TFEU is part of EU primary law, which also comprises broad principles of EU law and, most pertinently for the purposes of this paragraph, international law.⁹⁰ According to Article 194(2), delimitation of EU competences in relation to energy is “without prejudice to Article 192(2)(c)”⁹¹. Therefore, if a specific EU action is prohibited by competences provided in this article, establishing that action through the special legislative procedure outlined in Article 192 would be possible, if scope was related EU environmental policy goals as outlined in Article 191 where legal basis for EU environmental action was primarily found together with Article 192 TFEU. Even if they had immediate and significant consequences on the energy sector, legal measures that address climate change as defined by Article 191 would nevertheless be within the legal framework of Article 192 TFEU. However, it would be necessary to establish legal measures using Article 194 as their legal justification if they were to actively pursue the goals of that article.

According to Article 194(2) TFEU “measures shall not affect a Member State’s right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply, without prejudice to Article 192(2)(c).” As a result, rules cannot limit the options that are available for the Member States in terms of energy sources. However, in order to achieve the targets for the generation of renewable energy, Renewable Energy Directive has established obligatory national targets and demanded that the Members States create national action plans to meet their specific targets. The practice does not entirely abide by the law in this regard.

⁹⁰ Kaisa Huhta, “The Scope Of State Sovereignty Under Article 194(2) TFEU And The Evolution Of Eu Competences In The Energy Sector”, *International and Comparative Law Quarterly*, Volume 70(4), 2021, p. 991-1010

5.2. International Agreements

5.2.1 Direct Effect of International Agreements

International agreements executed by the EU are given a prominent position in the legal order. They “are binding upon the institutions of the Union and on its Member States”⁹². The Court has also ruled that international agreements have the potential to serve as a legal base for assessing the constitutionality of EU legislative acts⁹³.

According to the Article 216 TFEU, international agreements within the field of environment are deemed as part of the EU legal order, direct effect may also be conferred to these agreements. In spite of the fact that in *Van Gend en Loos*⁹⁴ EU legislation was distinguished as "new legal order of international law" uniquely capable of direct effect, the Court accepted in *International Fruit*⁹⁵ that “provisions of old international law could also have direct effect in the EU.”⁹⁶

Furthermore, in *Haegeman*⁹⁷, the Court ruled that “the provisions of an international agreement, from the coming into force thereof, form an integral part of Community law”.⁹⁸ However, the case has developed into an outlier, and it appears that direct effect is necessary to rely on international law to invalidate EU laws in actions brought under Article 267 of the TFEU.⁹⁹ It was also

⁹² *Lesoochránárske zoskupenie*, C-240/09, EU:C:2011:125

⁹³ Marin-Duran, Gracia, Morgera, Elisa, “Commentary on Article 37 of the EU Charter of Fundamental Rights - Environmental Protection” Edinburgh School of Law Research Paper No. 2013/20

⁹⁴ C-26/62 - *Van Gend en Loos v Administratie der Belastingen* [1962] ECLI:EU:C:1963:1.

⁹⁵ *Case C-21-24/72 International Fruit Company NV et al v Productschap voor Groenten en Fruit* ECLI:EU:C:1972:115

⁹⁶ *Ibid.*

⁹⁷ *R. & V. Haegeman v Belgian State* ECLI:EU:C:1974:41

⁹⁸ *Ibid.*

⁹⁹ *Ibid.*

discovered that Member States, are unable to challenge EU legislative action by relying on international agreements unless the provision in question is directly effective.

In the case of *International Fruit*, the Court ruled that in order for a provision of international law to be declared invalid in front of a national court, it must first be capable of giving rights on citizens. Furthermore, the Court stated that it is necessary to take into account both the spirit and the general scheme of the agreement. The words "spirit" and "nature" give potentially elusive standards, and as a result, "the Court's discretion in applying criteria is high and involves subjectivity."¹⁰⁰ Since then, the Court has frequently utilized formulations that are conceptually similar. For example, GATT and WTO agreements led to the blanket exclusion of the direct effect of these agreements due to the wide reach of these agreements.¹⁰¹ Because of GATT's "flexible nature"¹⁰², the Court rejected giving it direct effect to the agreement.¹⁰³

5.2.2. Implied Powers Doctrine

The content of the international agreements falls under the review of the Court's jurisdiction. In cases where an EU institution violates the Treaty norms on competence, the Court has the authority to invalidate the act that resulted in the international agreement. The EU can only conclude an international agreement if the Treaties confer authorization. Therefore, before entering into an international agreement, the EU shall determine its external competence on the subject matter.

¹⁰⁰ Case C-21-24/72 *International Fruit Company NV et al v Produktschap voor Groenten en Fruit* ECLI:EU:C:1972:115

¹⁰¹ Rob Dunbar, "The Application of International Law in the Court of Justice of the European Union: Proportionality Rising", German Law Journal, Volume 22, 2021, p. 557–592

¹⁰² Rachel Harris, Gillian Moon, "GATT Article XX And Human Rights: What Do We Know From The First 20 Years? Gatt Article XX And Human Rights" Melbourne Journal of International Law Volume 16

¹⁰³ Rob Dunbar, "The Application of International Law in the Court of Justice of the European Union: Proportionality Rising", German Law Journal, Volume 22, 2021, p. 557–592

The TFEU primarily governs the EU's external competence. The TFEU expressly grants the EU external competence on some subjects, and this competence can be used even if the EU has not adopted any laws on the subject. Nevertheless, even if there is no express TFEU provision conferring the authority, the EU can conclude an international agreement on the matter.¹⁰⁴

*The Open Skies*¹⁰⁵ emphasized that the doctrine of implied powers can be arisen out of an internal treaty provision based on which secondary rules have been developed, or where these internal rules are only implemented in the context of the conclusion and execution of an international agreement. This was firstly seen in *ERTA*¹⁰⁶, where EU secondary law allowed the the EU to negotiate with non-member states. In this regard, *ERTA* addressed the organization of common policies among Member States without reference to a specific competence for the EU to execute international treaties. However, the Court stated that the structure, rationale and the nature of the agreement do not exclude such a direct effect application. For instance, WTO provisions, as the EU's primary trade partners do not provide such a direct effect either.

5.2.3. Direct Effect of International Agreements in the Relevant Field

Direct effect does not only mean that there is a certain clause within the agreement that explicitly grant rights to individuals. According to the Court's famous ruling in *Van Gend En Loos*, firstly the agreement's nature, spirit and structure then secondly the wording should be intended to confer rights upon individuals.¹⁰⁷ This test was named as “double test” in the literature¹⁰⁸.

¹⁰⁴ Ulaş Gündüzler, “United Nations Convention On Law Of Sea As A Mixed Treaty Of Eu: A Headache For Turkey?” *Journal Of Ankara Avrupa Çalışmaları*, Volume 2 , 2013

¹⁰⁵ *C-466/98, ECLI:EU:C:2002:624*

¹⁰⁶ *Case 22/70 Commission v Council ECLI:EU:C:1971:32*

¹⁰⁷ *C-26/62 - Van Gend en Loos v Administratie der Belastingen [1962] ECLI:EU:C:1963:1*

¹⁰⁸ Francesca Martines, “Direct Effect of International Agreements of the European Union. *International Journal of Constitutional Law*”, 2014

The direct effect case law dealt with international agreements have been used by private parties as a basis for their argument that they are entitled to certain subjective right that is provided for by the agreements. In *Brown Bear*¹⁰⁹, the Supreme Court was required to decide whether or not a certain article of the Aarhus Convention has a direct effect¹¹⁰. The goal of this agreement was to point out that people are entitled to access to justice related to issues involving the environment.

Following the preliminary reference, the Court aimed to answer the question on the direct effect of Article 9(3) of the Aarhus Convention¹¹¹ that obliges the parties to ensure that the individuals have access to “administrative or judicial procedures to challenge acts that contravene provisions of its national law relating to the environment.”¹¹² The Court upheld the double test in this case and ruled that the said article cannot have direct effect in consideration of its wording.

5.2.4. Direct Effect of Paris Agreement

Paris Agreement was enacted on the legal ground of Article 192 TFEU. Following the view of objective legal basis determination provided in *Poland v Commission*, Article 194(2) TFEU may solely be applied to challenge measures based on Article 194. Therefore, acts enacted on the basis of Article 192 could be subject to the competence constraints outlined in Article 192 but not to those outlined in different legal bases. Henceforth, Article 194(2) could not be effectively used to challenge actions adopted for the implementation of Paris Agreement's objectives and Member States are unlikely to successfully challenge EU measures adopted to be aligned with international

¹⁰⁹ C-240/09, *Lesoochránárske zoskupenie VLK (Brown Bear)*, [2011] ECR I-1255 ECLI:EU:C:2011:125

¹¹⁰ Ibid.

¹¹¹ United Nations (UN) Aarhus Convention 447, 38 ILM 517 (1999)

¹¹² Francesca Martines, “Direct Effect of International Agreements of the European Union. International Journal of Constitutional Law”, 2014

commitments under the Paris Agreement under Article 194(2) TFEU.¹¹³ Therefore, it does not seem possible to confer direct effect to Paris Agreement, in accordance with the double test.

On the other hand, there are a vast of climate-related lawsuits seen in recent years, which focus on the commitments made by governments in respect of Paris Agreement. In *Urgenda*¹¹⁴, the Dutch courts ordered the government to increase the goal of reduction of emissions in 2020. 13 Furthermore, The Supreme Court of Ireland issued a decision in July 2020, finding that the national climate plan lacked the necessary level of specificity to cover the period from 2020 to 2050¹¹⁵.

Therefore, it is highly likely that the new commitment made by the EU in accordance with the Paris Agreement's clauses will be challenged at the EU Courts and be subject to judicial review. These kinds of issues will be potentially brought up in relation to the responsibility that states have to respect, safeguard, and fulfill particular human rights, considering that it has only provisions about reporting which are legally binding. The focus of the agreement is more on procedural requirements. As a result, the Paris Agreement does not establish a legal obligation to meet national mitigation targets. Rather, it simply states that the parties will work together to achieve this goal.

5.2.5. Direct Effect of Kyoto Protocol

In *Air Transport Association of America*¹¹⁶ judgement, a claim was brought against the Directive that brought aviation sector within the scope of EU Emission Trading Scheme. According to the Directive, in certain cases, EU Emission Trading Scheme could be applied for non-EU airlines. The Directive was contested on the grounds that it breached a number of international law

¹¹³ Kaisa Huhta, "The Scope Of State Sovereignty Under Article 194(2) Tfeu And The Evolution Of Eu Competences In The Energy Sector", *International and Comparative Law Quarterly*, Volume 70(4), 2021, p. 991-1010

¹¹⁴ *Urgenda v. Government of the Netherlands* ECLI:NL: RBDHA:2015:7145

¹¹⁵ *Friends of the Irish Environment v The Government of Ireland* [2020] IESC 49 Docket Number Appeal No: 205/19 31 July 2020

¹¹⁶ *Air Transport Association of America v. Secretary of State for Energy and Climate Change* Reporter Info: [2011] No. C-366/10 ECLI:EU:C:2011:864

norms that were outlined in the Kyoto Protocol, given that it was drafted with the intention of carrying out the European Union's responsibilities outlined in the Protocol.

The Court first analyzed Kyoto Protocol and other agreements in the scope in order to determine if they imposed legal obligations or not. The Court made this analysis to understand if the Protocol and other agreements in scope could serve as the basis for the judicial review of EU activities. The Court found that Kyoto Protocol other agreements in scope could not be used to challenge EU legislation because of their "nature and the broad logic."¹¹⁷ Regarding the Kyoto Protocol, the Court concluded that it could not be characterized as unconditional and specific enough to grant individuals the power to rely on it in order to question the validity of the ETS Directive. This was because Kyoto permits "a certain degree of flexibility."¹¹⁸

5.2.6. Energy Charter Treaty

In order for the international agreements to be binding within the EU legal order, they should be validly concluded in accordance with the EU primary legislation. From the perspective of Union law, this is the same as the situation for all domestic legal orders. In this regard, the Court's Opinion 1/17¹¹⁹ in *CETA* underlined those international agreements need to be compliant with both the EU Charter of Fundamental Rights and with the Founding Treaties. In its Opinion 1/17, the Court emphasized the legal safeguards that were included in the Comprehensive Economic and Trade Agreement to protect the autonomy of the EU and the ability of EU institutions to regulate in the public interest. The Court came to the conclusion that, in light of these safeguards, CETA adequately protected the autonomy of jurisdictional and regulatory autonomy. In contrary, the ECT, does not have any safeguards and it is a unique kind of multilateral investment agreement that allows for arbitration in a variety of different contexts. In Opinion 1/17, the Court stressed that

¹¹⁷ Francesca Martines, "Direct Effect of International Agreements of the European Union. International Journal of Constitutional Law", 2014

¹¹⁸ Ibid.

¹¹⁹ *Opinion 1/17 ECLI:EU:C:2019:341*

Article 47 of the EU Charter of Fundamental Rights pertains to bodies who exercise judiciary powers and that it is applicable to those bodies. In contrast, investment tribunals that are established on the basis of the ECT may not be considered by the Court to be entities that perform judiciary powers and, as a result, are excluded from the purview of the said article. In particular, the character of these tribunals is not permanent but rather ad hoc and these courts that were constituted on the basis of the ECT do not have compulsory jurisdiction. Given that the agreement itself is incompatible with EU law, it is highly unlikely that the Court will issue a ruling on the question of whether or not the ECT has direct effect.¹²⁰

¹²⁰ Christina Eckes, Laurens Ankersmit, “The compatibility of the Energy Charter Treaty with EU law” Clientearth, 2022

6. IMPLICATIONS OF LEGISLATION WITHIN THE EU: FIT FOR 55

In this section, the implications of legislation will be scrutinized under their own subject-matter.

6.1. Changes in Emissions Trading (EU ETS)

Following the EC's accession to the United Nations Framework Convention on Climate Change, the Commission proposed the EU ETS Directive for the first time to realize commitments made under the Kyoto Protocol. A total of 12,000 installations were included in the first EU ETS trading period, which began on January 1, 2005. The Directive establishes a cap-and-trade system and brings an annual maximum on the total amount of specific greenhouse gases that the system's participants can release. This limit gradually reduces overall emissions. As of 2005, emissions from electricity and heat generation, as well as energy-intensive industrial facilities, had fallen by 42.8%.¹²¹

The EU ETS allows regulated enterprises to purchase or sell emissions permits and exchange them as needed. Every year regulated organizations must give up enough allowances to cover their whole emissions. If a regulated organization decreases emissions, it can keep the "saved" permits or sell them to another installation in need.¹²²

The present EU ETS covers electricity and heat generation, energy-intensive industries, and European aviation.¹²³ The Commission recommended using carbon pricing to encourage greener road transport and heating fuels to achieve net emission reductions.

Suppliers will have to track and report their sales, and surrender emission permits every year based on the fuel's carbon intensity. As a result, fuel providers are encouraged to decarbonize their products to comply with the emissions trading system.

¹²¹ https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3542 (last visited 02.10.2022)

¹²² Ibid.

¹²³ Ibid.

The issue concerns the compatibility of the ETS Directive¹²⁴ Regulation on Effort Sharing on Land Use¹²⁵ with basic rights and international law. A response was filed to the complaint, restricting themselves to the issue of admission, to which the applicants answered. The claim was rejected by the General Court in May 2019 on the grounds that the petitioners did not fulfill the criteria of individual concern as defined by accepted case law.¹²⁶

Furthermore, the application states that greenhouse gas actions with a reduction aim of 40% will fall well short of the target of 80%. In other words, the 60 percent they allow well exceeds the 20 percent that would be allowed in accordance with the Paris Agreement. According to the defendants, the approach would have been investigated by all sectors. Instead, the 40% reduction goal compared to 1990 levels was imposed abruptly, without implying scientific research. The General Court dismissed the applicants claims, by finding the claims of the partial annulment of ETS Directive, Regulation on Effort Sharing on Land Use enacted within the scope of 2030 climate and energy framework as inadmissible. Furthermore, the Court also rejected the compensation in the form of an injunction for the alleged damage suffered by the applicants.

6.2. Promotion of the Use of Renewable Energy

The adoption of the sub-target on renewable fuels of non-biological origin is required to stimulate demand along with industry, together with the Hydrogen Strategy's unveiled in July 2020. In addition to the measures taken to deploy renewable energy, the Hydrogen Strategy was established to decarbonize the transportation sector by using green hydrogen. The Recovery and Resilience Facility, which has been given a total of 672.5 billion euros, is also a critical tool in this transition.¹²⁷ The Strategy aims to build local hydrogen networks near to production areas to reduce the requirement for long-distance hydrogen delivery together with the revising of Trans-European

¹²⁴ Directive (EU) 2018/410

¹²⁵ Regulation (EU) 2018/842 on Effort Sharing

¹²⁶ *Case C-565/19 P Armando Carvalho and Others v. The European Parliament and the Council*, EU:C:2021:252.

¹²⁷ María-Dolores Guillamón & Ana-María Ríos & Bernardino Benito, "An Assessment of Post-COVID-19 EU Recovery Funds and the Distribution of Them among Member States," JRFM, MDPI, Volume 14(11), 2021, p. 1-11

Energy Networks. The measures taken in both strategies should be integrated with the roll-out of refueling stations, which is now underway in line with the recast of AFID and TEN-T Directives.

6.3. Renewable Energy Directive Recast

The upgrade of the RED was carried out within the package of European Union's Clean Energy for All. The package sought to reduce greenhouse gas emissions by 40% to assist the EU in meeting ambitious European Green Deal objectives, such as a 40% reduction in greenhouse gas emissions and a 32% share of renewable energy in power generation by 2050. The RED I proposal aims to augment the 2030 climate and energy framework goals by establishing a target of 32% renewable energy in the EU by that year. Besides, Regulation on the Governance of the Energy Union¹²⁸ is being revised to allow for a more integrated reporting and monitoring system in line with EU goals as well as national climate and energy policies. Compared with the previously mentioned rule requires national energy and climate policies to be developed over a ten-year period, national renewable energy action plans and progress reports were required to be submitted to the European Commission under the REDII. Furthermore, the recast includes new mechanisms to assure the effectiveness of RES and contains regulations for expediting permits for RES installations. RED II has additional sub-targets for increasing the amount of renewable energy in transportation and phasing out subsidies for biofuels deemed environmentally unsustainable. As a result, it is quite clear that the RED II has more stringent sustainability and greenhouse gas emission reduction objectives for biofuels.

6.4. Enhancing Energy Efficiency

In order to raise the current EU-level energy efficiency objective for final energy consumption from 32.5 percent to 36 percent and for primary energy consumption to 39 percent, the Commission has suggested revising the present Energy Efficiency Directive. The recast of the

directive introduced measures aimed at accelerating Member States' energy efficiency efforts, including increased yearly energy savings commitments and new provisions aimed at reducing energy usage in public sector buildings, as well as targeted consumer protection measures.

Energy efficiency has several benefits, beginning with economic benefits. First of all, it has the potential of lowering consumer energy costs or the serving new jobs in the energy industry. Additionally, within the scope of energy efficiency, energy security may be improved by reducing reliance on imported energy as conserving energy minimizes greenhouse gas emissions.

The Directive establishes rules to eliminate obstacles in the energy market and to address market failures that hinder energy supply and usage efficiency, as well as to create indicative national energy efficiency objectives for 2020. The version of the Directive, which was enacted in 2012, provided the groundwork for future efforts to bring the EU back on track. As required by the Directive, the first strategies were published by the Member States in 2014.

The Commission assigned responsibilities to the Member States to bring EU energy law into line with the new 2030 climate and energy targets, emphasizing 'Energy efficiency first' as one of the Energy Union's guiding principles. The 2012 Directive, in particular, is a comprehensive directive in this regard, as it established a variety of measures, policy criteria, and instruments to allow the EU to meet its 20% energy efficiency objective by 2020.

6.5. Establishment of Emission Standards

Road transportation is the cornerstone of trade and business on the continent of Europe. Approximately, “70 % of EU freight is transported by road.”¹²⁹ Considering that there are “around 7 million trucks operating in the EU”,¹³⁰ the Commission aimed to establish stricter CO2 emission standards for passenger cars and vans that will enhance the shift to zero-emission smart mobility.

¹²⁹ Gregor Erbach, Parliament Briefing, “CO2 emission standards for heavy-duty vehicles” European Parliamentary Research, PE 628.268

¹³⁰ Ibid

Yearly registers of new trucks in the EU climbed by 45 percent from 2010 to 2016, to over 380.000 trucks¹³¹ and about 3.4 percent of these new trucks sold in the EU are powered by battery electric or alternative fuels, or they are plug-in hybrid and hybrid vehicles. Despite the fact that the use of alternative vehicles are increasing, currently they solely represent 0.7 percent of all trucks in road transportation.¹³²

As a result, trucks continue to account for 27 percent of CO2 emissions from road transportation and over 5 percent of greenhouse gas emissions within the EU. Since 1990, heavy-duty vehicle emissions have climbed by 25%, because of the increase in road traffic. Unless no measures are implemented, these emissions are expected to continue to rise. The EU's transportation sector is significantly reliant on oil, which accounted for over 94 percent of the energy utilized by the sector in 2015, with 89 percent of the energy coming from imports.

In consideration of these facts, the Commission proposed the regulation setting the first CO2 emission standards for trucks in the EU in May 2018.¹³³ In addition, the proposal is part of a broader package of measures to decrease greenhouse gas emissions in the transportation sector, with the goal of achieving a 30% reduction in emissions by 2030 in the sectors covered by the Effort-Sharing Regulation. According to the Commission's research, in order to accomplish this goal, emissions emanating from road transportation would need to be reduced by 25 percent by 2030 compared to 2005 levels. According to the Commission's baseline scenario, emissions reductions would be roughly 17 percent, and around 21 percent if the proposed post-2020 emission rules for cars and vans were implemented. With the adoption of the proposed CO2 measures for trucks, the difference might be gradually decreased by around one percentage point every year. The remaining gap would be closed by the implementation of other measures that have an influence on CO2 emissions from road transportation.

¹³¹ https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628268/EPRS_BRI%282018%29628268_EN.pdf (last visited 02.10.2022)

¹³² Ibid.

¹³³ Ibid.

The proposal updates the previously adopted version of the regulation¹³⁴ by establishing more stringent criteria for decreasing the CO₂ emissions of new vehicles and vans. The Commission believes that the emissions of new passenger cars registered in the EU would have to be 55 percent lower than the CO₂ emissions objectives in effect in 2021, and the emissions of new vans registered in the EU would have to be 50 percent lower than the CO₂ emissions targets in effect in 2020. As a result, all new vehicles would be zero emission vehicles by 2035.

Besides, in order to avoid weakening of CO₂ objectives, a manufacturer's average emissions can be reduced by no more than 3 percent based on super-credits acquired. Furthermore, in order to encourage innovation, zero-emission buses, coaches, and compact trucks may also be eligible for super-credits; however, the average emissions of a manufacturer cannot be reduced by more than 1.5% in order to prevent market distortions. These incentives are designed to assist the private sector and governmental authorities in establishing a market for these vehicles in the European Union, since they encourage innovation and the necessary investment in clean transportation technology. The incentive is valid until 2030; however, if the proportion of zero- and low-emissions cars in a Member State's new car fleet hits 5 percent in any year between 2025 and 2030, that Member State will no longer be eligible for the incentive in following years.

¹³⁴ Council Regulation (EU) 2019/631 on CO₂ emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011 OJ L 111, 25.4.2019, p. 13–53

6.6. Deployment of Alternative Fuels

In 2019, a number of current mandates were tightened. In 2019, France increased the minimum biofuel blend to 7.9%, with an increase to 8.2% in 2020.¹³⁵ Finland has passed legislation that would progressively increase the percentage of biofuels in road transport to 30% by 2029, and the share of advanced biofuels to 10%.¹³⁶

However, since the Directive did not provide binding rules for Member States, the measures taken by Member States varied at a huge extent. Each member state implemented its own

policies and measures regarding its own targets. Besides, the obstacles could not reach to a solution regarding the travelling with electric vehicles across the EU due to the remaining problems in the deployment of recharging infrastructure. Following the policy ambition set out by the European Green Deal, the proposal to revise the Directive became in subject. Electrification has lately been a strategic priority for a number of automakers. Volkswagen, BMW, and Daimler, Germany's three major carmakers, have made a consensus on battery electric mobility. Despite recent sales growth, alternatively powered passenger cars still account for only 5.3 percent of the total EU vehicle fleet. Diesel fuels 96.3 percent of all trucks in the European Union, whereas petrol fuels less than 1% of the fleet. Only 0.4 percent of EU vehicles are battery electric, with diesel accounting for 91.2 percent of the total. Diesel buses make for 93.5 percent of the EU fleet, with battery electric and hybrid electric buses accounting for only 0.9 percent and 1.4 percent, respectively. Currently, hybrid electric vehicles account for 1.2 percent of the EU passenger car

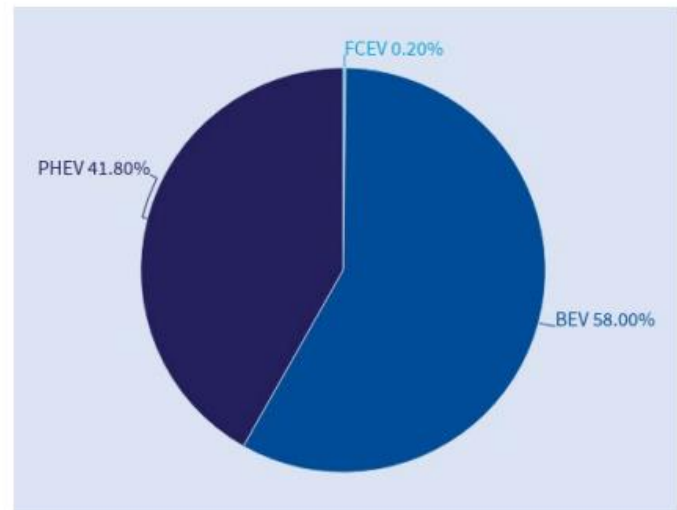


Figure 4: Forecasted European production of EV per type in 2025 (Source: IHS Markit)

¹³⁵ The Association Quality Management Biodiesel, E.V. Biodiesel Quality Report 2021, 03.08.2021 <https://www.agqm-biodiesel.de/en/news/news/france-raises-biofuel-blending-mandate> (last visited 10.09.2022)

¹³⁶ Neste Corporation Press Release 6 February 2019 <https://www.neste.com/releases-and-news/share-biofuels-road-traffic-increase-30-finland> (last visited 10.09.2022)

fleet. The percentage of battery electric vehicles and plug-in hybrids on the road has risen from 0.4 percent in 2019 to 1.1 percent in 2020.¹³⁷

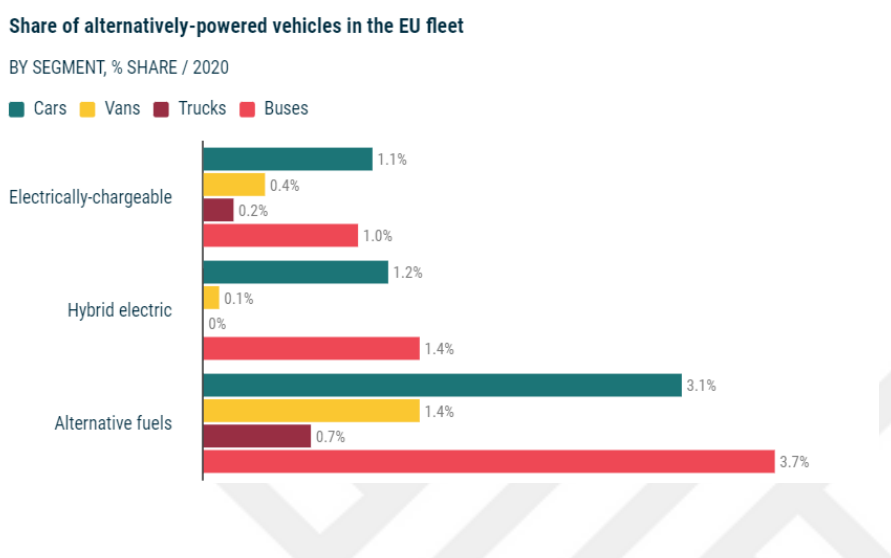


Figure 4: Share of alternative fuel vehicles in the EU

6.7. Energy Taxation

The revision within the legal framework of taxation of energy products and electricity aims to “align the taxation of energy products and electricity with the EU's energy, environment and climate policies.”¹³⁸ The casting of ETD was intended to replace the present, volume-based method to determining minimum energy taxation levels for motor and heating fuels, as well as electricity, with a new system that prioritizes energy content and environmental effect.¹³⁹ In this regard, the Commission intends to guarantee that the most polluting energy products are taxed the highest. For example, fossil fuels would be taxed at a greater rate than sustainable biofuels. All minimum rates will be expressed in euros per gigajoule to allow direct comparisons between more and less

¹³⁷ REN21 Secretariat, Renewables 2020 Global Status Report, 2021

¹³⁸ Council Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity OJ L 283, 31.10.2003, p. 51–70

¹³⁹ Gerhard Huemer, Revision Of The Energy Taxation Directive, SME United, 2022

polluting fuels, as well as new electrical applications such as electric automobiles for mobility or heat pumps for heating.¹⁴⁰

Furthermore, in order to include various types of fuels, a widening tax base is proposed. The proposed tax base is consisting of kerosene and heavy oil used in the maritime sector. Previously, these fuels were exempt from the scope of intra-EU travel taxes.¹⁴¹ Moreover, the recast includes new types of energy products and regulates the taxability of these new sources. For instance, hydrogen is considered as an energy product in the revised ETD, and it is stated that it should be taxed in parallel to natural gas and on its energy impact.¹⁴² Moreover, the EU has proposed the Eurovignette in order to recoup construction, maintenance, repair, and environmental expenses, as well as to ensure fair competition and avoid discrimination.¹⁴³

The word Eurovignette is used to describe the toll that large trucks over 3.5 tons must now pay to travel on the European road network in countries such as Luxembourg and Sweden.¹⁴⁴ This price is intended to mitigate external expenses associated with the usage of transportation infrastructure. This includes costs associated with road wear, network traffic, and accidents, as well as costs associated with the environment and public health, such as pollution.¹⁴⁵ Within eight years of the directive's implementation, time-based vignettes will be phased out for heavy-duty trucks operating on the main TEN-T network. Member States that use a common vignette system will have a further two years to modify the system.¹⁴⁶

¹⁴⁰ https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3662 (last visited 10.09.2022)

¹⁴¹ Ibid.

¹⁴² Ibid.

¹⁴³ Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures OJ L 187, 20.7.1999, p. 42–50

¹⁴⁴ <https://www.bilogistik.com/en/blog/europe-changes-the-eurovignette-extending-it-to-all-kinds-of-vehicles/> (last visited 10.09.2022)

¹⁴⁵ <https://www.bmvi.de/SharedDocs/EN/Articles/StV/Roadtraffic/revison-eurovignette-directive.html> (last visited 10.09.2022)

¹⁴⁶ <https://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-jd-eurovignette-directive-revision> (last visited 10.09.2022)

Besides the above-mentioned revisions, a new EU-wide instrument will be established to allow for the differentiation of infrastructure and user costs for heavy-duty vehicles depending on CO₂ emissions.¹⁴⁷ The adjustment will be made in accordance with existing CO₂ guidelines.

6.8. Establishment of Carbon Border Adjustment Mechanism

EU aims to achieve its climate-neutral vision and the realization of its European Green Deal goals of carbon neutrality. Using CBAM¹⁴⁸, the EU's carbon pricing may be applied to items such as energy and gasoline imported from non-EU nations, therefore broadening the geographic reach of the carbon price. The EU hopes that through implementing CBAM, it would be able to ensure that the price of imports more properly reflects their carbon content, so contributing to the reduction of long-standing worries about carbon leakage in the economy.

Although several political initiatives in support of CBA have been launched, the Commission has maintained its concerns about the WTO-compliance of a carbon tax applied to imports in the context of a domestic ETS system. However, political views have shifted in 2019 when Ursula von der Leyen, stated that she “will introduce a Carbon Border Tax to avoid carbon leakage that is fully compliant with WTO rules. Furthermore, in March 2020, the topic of “carbon tax on selected imported and domestic products, the extension of EU ETS to imports, a new carbon customs duty or tax on imports.” was launched to public consultation.

If the Act is passed, there will be a transition period of three-years commencing on January 1, 2023, with the CBAM being fully operational on January 1, 2026. The CBAM would force importers to pay carbon emissions certificates for imports that the EU believes are not manufactured in accordance with EU emissions regulations. The goal is to impose a carbon price on imported goods that is equal to the carbon price imposed on EU-made goods. Although the

¹⁴⁷ <https://www.consilium.europa.eu/en/press/press-releases/2021/06/16/eu-road-charging-rules-eurovignette-presidency-reaches-informal-deal-with-the-parliament/> (last visited 10.09.2022)

¹⁴⁸ Council Proposal COM/2021/564 establishing a carbon border adjustment mechanism

CBAM may not be implemented for some years, simply suggesting it has opened a whole new front for trade conflicts.

The certificates' pricing would be tied to the cost of emissions allowances under the ETS. Only "approved" importers would be entitled to import items covered by the CBAM. Importers would be required to report on the embedded emissions in their imported items on a yearly basis to be approved, as well as forfeit a comparable quantity of CBAM certificates that they would have acquired in advance. Importers that do not have a carbon-audited supply chain after the transition period ends will be obliged to purchase CBAM certificates with default carbon content values equivalent to the average emissions of similar items in the EU during the transition period.

7. IMPLICATIONS OF ENERGY POLICIES IN THE EXTERNAL SPHERE

The EU has adopted wide range of legislative measures related to energy which have both internal and external dimensions. Internally, the EU promotes renewable energy, energy efficiency and sustainability; externally, the EU aims to develop a unified approach towards energy suppliers and also to reach climate change mitigation through climate diplomacy. In this context, the EU has gave global efforts to cut fossil fuel consumption through adoption of measures.

7.1. Ensuring Energy Security in the EU External Relations

Due to the fact that the EU has a limited amount of resources of its own and relies on imports for its energy needs, it is especially unsafe to disruptions in the supply of energy. In 2017, imports covered more over half of the need for energy. The EU obtains around 87 percent of its crude oil, 70 percent of its natural gas, 40 percent of its coal, and 40 percent of its nuclear fuels from outside sources. From a dependency rate of 44% in 1990 to the current record high level of 75%, the trend over the previous two decades has been one of increasing dependence. Russia as the largest supplier of energy, was responsible for thirty percent, thirty-nine percent, and fifteen percent of all EU imports of gas, oil, and coal, respectively. Importantly, it also supplied forty percent of the country's imported gas, which is difficult to replace with gas from other sources. Not only do energy corporations in Russia export their wares to Europe, but they also control vital components of the continent's energy infrastructure¹⁴⁹.

Dependence to Russia was always standing as a risk for the EU and Member States considering the historical issues. In 1990, the Soviet Union halted oil and gas deliveries to the Baltic States to suppress independence ambitions. In 2014, Russia dramatically raised gas prices for Ukraine

¹⁴⁹ Martin Russel, "Energy security in the EU's external policy", European Parliamentary Research Service, 2020

before cutting off supplies. Bulgaria and Lithuania are especially vulnerable due to their near-total reliance on the company's gas and lack of other suppliers¹⁵⁰.

With the Russian invasion of Ukraine, the EU made public an overview of a strategy to wean Europe off of its reliance on fossil fuels produced in Russia far before the year 2030.¹⁵¹ In addition, the Commission detailed actions that would be taken to address the growing cost of energy in Europe and to refill gas inventories in preparation for the next winter. According to the Commission, this may cut the demand for Russian gas by the European Union by two thirds before the end of the year. A number of the Member States have put up the idea of putting a stop to the importation of energy from Russia.

In consideration of these, the leaders of the EU have come to an agreement to eliminate dependence on Russian imports of gas, oil, and coal as quickly as they can. Accelerating the reduction of overall reliance on fossil fuels would be required for this, "taking into consideration national circumstances and Member States' choices of their energy mix"¹⁵² as the phrase puts it. Amongst other things, the development of renewable sources of energy would be sped up, and further effort would be done to improve energy efficiency and the control of energy usage. In order to accomplish these goals, the Commission was requested to come up with a solution that would eliminate the country's reliance on Russia for its supply of energy by the end of May 2022.

In this respect, the Commission has disclosed the general outlines of REPowerEU strategy, which aims to wean Europe off its reliance on fossil fuels produced in Russia by the year 2030, beginning with gas. In addition, the Commission detailed actions that would be taken to address the growing cost of energy in Europe and to refill gas inventories in preparation for the next winter. The proposal would strive to replace gas in the heating and power production industries, as well as diversify gas suppliers, speed up the deployment of renewable gases, and speed up the rollout of renewable gases. According to the Commission, this might result in a two-thirds reduction in the

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

¹⁵² Ibid.

EU's need for gas imported from Russia before the end of the year. When the steps that have been done are taken into consideration, the potential long-term influence on energy policy and emissions of greenhouse gases in Europe might be an opportunity.

7.2. Fight Against Climate Change Mitigation in External Relations

CBAM is a classic example of EU climate unilateralism, defined here as unilateral actions with external implications that set emission reduction goals.¹⁵³ While the majority of leadership literature has focused on the EU's participation in international discussions, climate unilateralism is an important component of EU external climate policy.¹⁵⁴ The 2008 Aviation Directive, for instance, intended to price the carbon emissions of foreign flights entering or departing from EU airports.

Under the CBAM, a tax would be imposed on carbon-emitting products that are imported into the EU. The proposed legislation would force importers of certain items into the EU to purchase “CBAM certificates” which are equivalent to the price that the EU sets for the embedded emissions of the products. This would replace the direct imposition of a carbon tax.¹⁵⁵

Given their problematic status under international law, it is hardly surprising that carbon border controls have not yet been implemented. This dispute involves three primary arguments. First, the CBAM's jurisdictional reach over non-EU emissions can give rise to allegations that it infringes the sovereignty of third countries. Second, the CBAM is deemed incompatible with the bottom-up approach of the Paris Agreement, which allows for implementation discretion. In addition, many members of WTO believe that the CBAM violates WTO legislation. These arguments raise a number of unanswered questions. In customary international law, for instance, it is still debatable

¹⁵³ Joanne Scott, Lavanya Rajamani, “EU Climate Change Unilateralism”, *European Journal of International Law*, Volume 23, Issue 2, May 2012, Pages 469–494

¹⁵⁴ Eva Pander Maat, “Leading by Example, Ideas or Coercion? The Carbon Border Adjustment Mechanism as a Case of Hybrid EU Climate Leadership”, *European Papers*, Volume 7, 2022, No 1, p. 55-67

¹⁵⁵ Venzke Ingo, Geraldo Vidigal, “Are Trade Measures to Tackle the Climate Crisis the End of Differentiated Responsibilities? The Case of the EU Carbon Border Adjustment Mechanism (CBAM)”, *Netherlands Yearbook of International Law*, 2020, p. 187

whether extraterritorial jurisdiction over climate change might be supported by the effects-based doctrine or the universality principle. Moreover, despite the fact that the Paris Agreement requires Parties to design ambitious NDCs, it does not define the extent to which these NDCs must be aggressive in fighting carbon leakage.

A BCA would be challenged under general international law as an extraterritorial measure that violates the principle of non-interference in the internal affairs of other states. There is a decentralized strategy to promoting adherence to science-based targets within the international climate change framework established by the Paris Agreement. By delegating the formulation of NDCs to the parties in accordance with the idea of common but differentiated duties and respective capabilities, the Paris Agreement decentralizes the leadership on concrete climate action. Thus, parties to the Paris Agreement could contest a BCA on the grounds that it "violates the decentralized spirit of the Paris Agreement."¹⁵⁶

8. PUBLIC INCENTIVES FOR THE USE OF RENEWABLE ENERGY IN ROAD TRANSPORTATION

To reach climate neutrality, renewable energy has great promise. Market barriers and a lack of incentives prevent renewables from being electrified or used as low-carbon fuels like advanced biofuels. New subsidies and enhanced RED II policies may increase renewable energy use in the EU. In an unfortunate matter, based on the principles of the Kyoto Protocol, the existing policy poses a possible mismatch between individuals personally managing property and state-level duty and interests. For the latter, rather weak definitions of global level laws and governance give only a limited mandate to act, whilst for the former, only very direct incentives are evident, either through price or specialized legislative – and typically nationally-focused – frameworks.

¹⁵⁶ Martin Dietrich Brauch, Jack Arnold, Elena Klonsky, Fanny Everard, "Event Highlights: Carbon Border Adjustments in the EU, the U.S., and Beyond", 2021

Alternatively, a better fit between the actors and the incentives, such as grants, exemptions, taxes, and levies, may be indicated. While some of them are necessary to fix the market and achieve the renewable energy goals, they must be meticulously managed to prevent future market distortions. The rising proportion of renewable energy in the sectors has led to undesirable distortions in energy production, trade, and investment in renewable energy. This raises the cost of promoting renewable energy and the possibility of future stifling of renewable energy development and completion of the internal power market.

Different instruments such as feed-in tariffs, feed-in premiums, quota obligations, tax exemptions, tenders, and investment aid can be used to support renewables production in the EU.

Quota system may be observed in many countries within the EU. For instance, energy distributors in Denmark shall comply with the biofuel blending percentage that must account for 5.8%, of which at least 0.9% must be advanced biofuel¹⁵⁷.

In addition to direct incentives, market-based incentives leads to a reduction in revenues through the narrowing of tax bases. They make it possible for regulators to incur less costs, require less reporting, offer incentives for innovation and cost-effectiveness, create revenues, and may even help promote employment if they are implemented as part of environmental tax changes.

In addition to the incentives that are offered at the EU level, over half of the Member States have implemented some kind of tax on carbon emissions. The term "transport taxes" refers to both one-time and ongoing levies, and despite the fact that the "reported environmental and resource taxes" only make up a minor portion of the total, they encompass a diverse group of levies. These include taxes on products, taxes on landfills, taxes on water or air pollution, and taxes on producer responsibility schemes, recycling fees, and product taxes. One example is the growing popularity of resource taxes, which are often implemented at the regional level. Only a few of nations impose taxes on pesticides and fertilizers. The feed in tariffs systems are the types of incentives that are most frequently seen. These tariffs relate to the purchasing of electricity at a defined and guaranteed price for each unit of energy for a certain amount of time.

¹⁵⁷ Manjola Banja, Richard Sikkema, Martin Jégard, Vincenzo Motola, Jean-François Dallemand, "Biomass for energy in the EU – The support framework", *Energy Policy*, Volume 131, 2019, p. 215-228

Finally, environmental tax and carbon policies, anti-dumping, value-added tax (VAT) reduction, green public procurement¹⁵⁸ are used as incentives to reach reductions. Because fossil fuels and nuclear sources of energy have a great deal of unfavorable effects, governments have determined that it is a reasonable solution to impose environmental taxes, as a form of discouraging policy, on energies produced from the very origins in order to curb the growing energy consumption of these sources and to adjust the energy market in favor of sources of energy that do not pollute the environment.¹⁵⁹

In fact, numerous Member States have amended their renewable energy policies in recent years to reduce the number of incentives formerly offered. Investors challenged the legality of such restrictions not only before national courts, but also before international tribunals. Consequently, several rulings have been made on the legality of incentive-cutting clauses under both national and international law.

In *Federazione nazionale delle imprese elettrotecniche ed elettroniche and Others*¹⁶⁰ the Court ruled its preliminary ruling in on the questions submitted by the TAR Latium in 2021. The requests for a preliminary ruling was about the interpretation of Article 216 of TFEU in conjunction with the Energy Charter Treaty, Articles 16 and 17 of the Charter of Fundamental Rights of the European Union, and Directive on the promotion of the use of energy from renewable sources,¹⁶¹ in the light of the principles of the protection of legitimate expectations, legal certainty, legal effectiveness and sincere cooperation.

On 28 September 2018, the TAR Latium issued orders and requested a preliminary ruling in order to assess the compatibility of the Spalma-incentivi Decree, “which provided for a reduction of the incentives previously granted for electricity production by photovoltaic installations and the

¹⁵⁸ Cansino, Jose, Pablo Romero, Maria Román-Collado, Rocio Yñiguez, Rocío, “Tax incentives to promote green electricity: An overview of EU27 countries”, Energy Policy, 2010

¹⁵⁹ Ibid.

¹⁶⁰ *Joined Cases 798/18 and 799/18 Federazione nazionale delle imprese elettrotecniche ed elettroniche (Anie) and Others* EU:C:2021:280.

¹⁶¹ Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ L 140, 5.6.2009

related payment arrangements”¹⁶², with the principles of legal certainty and the protection of legitimate expectations, also the compatibility of the decree with Articles 16 and 17 of the Charter of Fundamental Rights of the European Union, and the Directive. The Court rendered its preliminary ruling and “addressed extensively the principles of legal certainty and protection of legitimate expectations, ultimately finding that the incentive-cutting provisions enacted in Italy are not incompatible with those principles.”¹⁶³ On this basis, “the Court dismissed the alleged violations raised by the applicants in the main proceedings before the TAR Latium, namely, the infringement of their right to property under Article 17 of the CFREU due to the reduction of the incentives rates, which allegedly deprived the operators of their “possessions”, and the unlawful restriction of their freedom to conduct a business under Article 16 of the CFREU due to the limitations imposed on their freedom of contract and right to dispose of their economic and financial resources freely as a result of the alteration of the incentive schemes.”¹⁶⁴

In this context, the Court’s judgment reflected that the incentive cutting legislations shall be foreseeable. The Court issued “prudent and circumspect economic operator” criteria and denied “the legitimacy of investors’ expectation to receive fixed incentives for twenty years notwithstanding the law so providing.”¹⁶⁵ Hence, within its ruling, the Court accepted that the constitutional legitimacy of the incentive-cutting provisions shall be upheld in accordance with the principles of EU law and of ECHR, especially, the “principles of legal certainty and protection of legitimate expectations, and the right to property.”¹⁶⁶ In doing so, the Court established a limited interpretation of the investors' assumption that future advantages would not be affected by national law.

¹⁶² Lorenzo Squintani, “Case Law of the Court of Justice of the European Union and the General Court”, *Journal for European Environmental & Planning Law*, 2021

¹⁶³ Giovanni Dall’Agnola, “Italy’s Reduction of Existing Renewable Energy Incentives: The Ruling of the CJEU on the Compatibility of the Spalma-Incentivi Decree with EU Law”, *Diritto del Commercio Internazionale*, Volume 3, 2021, p. 783-805

¹⁶⁴ *Ibid.*

¹⁶⁵ *Joined Cases 798/18 and 799/18 Federazione nazionale delle imprese elettrotecniche ed elettroniche (Anie) and Others* EU:C:2021:280.

¹⁶⁶ *Ibid.*

In fact, following this judgment, several EU Member States, primarily Spain and the Czech Republic, have amended their renewable energy policies to reduce the amount of subsidies formerly awarded. Investors challenged the legality of such measures in both national and international tribunals. Consequently, a number of rulings have been made on the legality of incentive-cutting measures under both national and international law. Thus, the Court's ruling on the conformity of the Italian incentive-cutting rules with EU law became part of a larger dispute on the legality of measures enacted by other EU Member States restricting previously awarded benefits. The ramifications are significant for the capacity of these nations to promote investments in the renewable energy industry, which is crucial for combating climate change and protecting the environment.

9. AN ASSESSMENT OF THE IMPLICATIONS OF RENEWABLE ENERGY REGULATIONS ON ROAD TRANSPORTATION

This dissertation aims to analyze how EU's renewable energy policies and legislative actions could create an impact on road transportation and could contribute to sustainability in road transportation. In this regard, implications of legislative actions taken within the context of renewable energy are scrutinized in relation to EU's environmental targets. The EU, as a leading player in the climate change mitigation has adopted new policies, regulations, directives and incentives together with monetary supports to keep its position at the same place as the first runner in the fight against climate change. The EU aimed to create transition through law in consideration of its undertakings in relation to international treaties such as Paris Agreement. Therefore, the EU has taken action towards reducing greenhouse gas emissions and reaching net zero emissions. Together with this goal, the EU also aimed to reduce use of fossil fuels and to ensure energy transition in sectors such as transportation. Transportation was one the most significant sectors in this regard, as it was responsible for 25% of the EU's overall greenhouse gas emission and also it is a sector which utilizes the fossil fuels at the maximum level. Therefore, in order to reach the goals, the EU had to transform its transportation modes, improve connections between transportation lines and persuade Member States and the individuals to decrease use of fossil fuels and use more of clean energy such as hydrogen or electric to fuel up the vehicles. In this regard, the EU had to carry transportation sector to a more sustainable degree which ensures clean air and clean energy usage.

The EEA report 'Trends and Projections in Europe 2021' estimates that the EU achieved its three 2020 climate and energy targets of reducing greenhouse gas emissions by 20% compared to 1990 levels, increasing the share of renewable energy use to 20%, and improving energy efficiency by 20 %. The EU's greenhouse gas emissions have been below the reduction target set for 2020 for

the last seven years, with the year 2017 being the only exception.¹⁶⁷ The fast fall in emissions that has been witnessed in the last two years has contributed considerably to this overshoot.¹⁶⁸

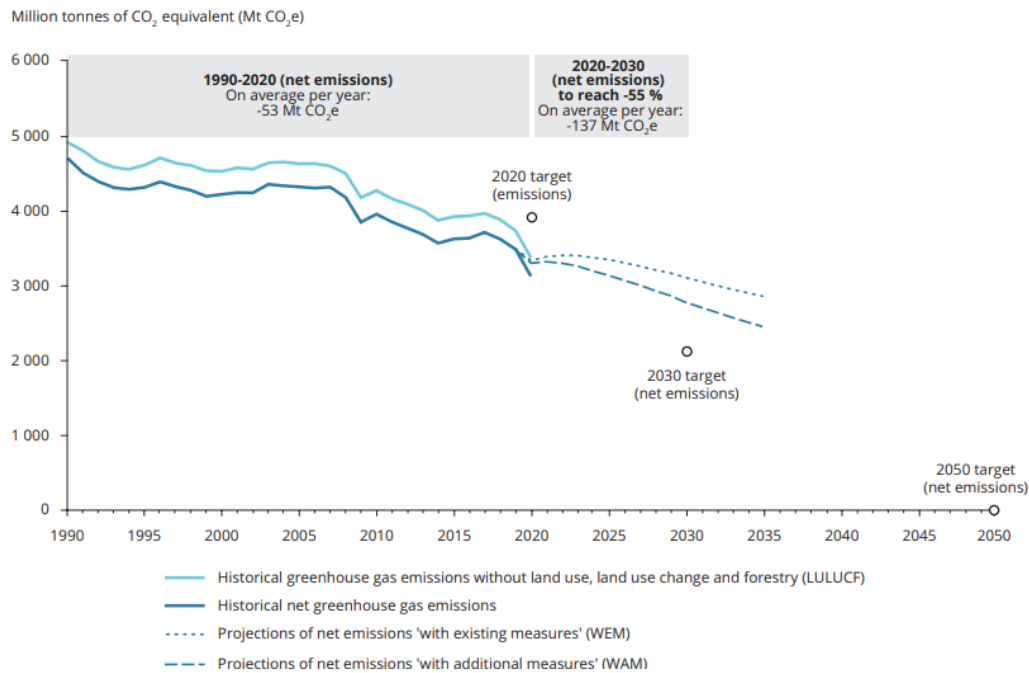


Figure 5: Historical trends and projections of greenhouse gas emissions (Source: European Energy Agency, 2021)

The first aim for 2020 was to increase the proportion of energy coming from renewable sources. According to the data provided above, a renewables share of 21.3% was obtained in 2020, which is even above the goal level for that year.

However, while renewable energy accounted for a greater proportion of the energy utilized for electricity, heating, and cooling, the consumption of energy for transportation increased more slowly. According to data, the renewable energy goal of 10% in the transportation sector was met in 2020, albeit by a very narrow margin of 0.1 percentage point.

¹⁶⁷ Giovanni Dall'Agnola, “Italy’s Reduction of Existing Renewable Energy Incentives: The Ruling of the CJEU on the Compatibility of the Spalma-Incentivi Decree with EU Law”, *Diritto del Commercio Internazionale*, Volume 3, 2021, p. 783-805

¹⁶⁸ *Ibid.*

The second aim for 2020 addressed overall energy usage as a result of advances in energy efficiency. The fulfillment of this objective did not seem possible at the first sight. However, widespread lockdowns in 2020 appear to have had a significant impact on Europe's energy consumption, reversing the increase in energy consumption by the transportation sector for the first time since 2013 and reducing industrial production. Ultimately, this resulted in a massive change. When looking at trends over a longer period of time, we can see that the percentage of renewable energy sources more than doubled between 2005 and 2020. This was driven by policies and support schemes that were specifically designed for them, as well as greater economic competitiveness. Over the course of the 15-year period, this was equivalent to an annual growth of 0.8 percentage points on average. The increase that was observed in 2020 was the most significant one witnessed across the entire time series.

As explained in detail throughout this study, environment became the top priority gradually in the EU; as a result, the Commission introduced the European Green Deal, where the Commission suggested increasing the target for the European Union for 2030 to at least 50 percent, and 55 percent if it was feasible to do so. The new European Union aim of at least 55% reduction in greenhouse gas emissions by 2030 was introduced in 2021 as part of the Fit For 55 package, which was an extension of the European Green Deal.¹⁶⁹

For road transport to become sustainable, in practice this means:

1. Improving the transition to zero-emission vehicles;
2. Improving infrastructure;
3. Increasing the use of renewable & low-carbon fuels;
4. Making sustainable alternatives more available and ensuring the connection between the networks and different modes of transport;
5. Ensuring that urban mobility is more sustainable;
6. Making freight transport more sustainable.

¹⁶⁹ Nadia Vinck, “The Fit for 55 Package and the European Climate Ambitions An Assessment of Their Impacts on the European Metallurgical Silicon Industry” Proceedings of the Silicon for the Chemical & Solar Industry, 2022

9. 1. Improving the transition to zero-emission vehicles

Increasing the EU's 2030 objectives to 55 percent would bring possibilities such as decreased energy reliance, better air, and more jobs; yet it would also present a challenge on a scale never before seen. Because transportation is the only industry that has seen a rise in emissions since 1990, meeting a target reduction of 55 percent would need a drastic and immediate reduction in those emissions. In addition, there is a large gap between the introduction of environmentally friendly automobiles into the market and an observed improvement in fleet emissions.

With the establishment of new legislation that mandates a reduction in emissions from cars and vans of 55 percent by the year 2030 and a reduction of 100 percent by the year 2035, the European Union will restructure its automotive sector and mobility more generally.¹⁷⁰

Switching to battery electric vehicles is a straightforward strategy to reduce carbon emissions from road transportation, which includes automobiles, buses, and vans. For heavy-duty vehicles, battery electric, and hydrogen fuel cells in transportation hubs.¹⁷¹

However, considering the latest fall in the vehicle production, the development of electric vehicles in the EU being slow. The downturn comes after a small drop in output between 2017 and 2019, as manufacturers began to adjust to a general decrease in demand. While commercial vehicle sales climbed from 2017 to 2019, the pandemic had an impact on the industry, with sales declining by 9% in 2020. Following the coronavirus outbreak, demand in this industry declined dramatically.¹⁷² China, the world's largest producer of automobiles and commercial vehicles, was the first to experience this situation, as it had the steepest year-over-year drop in February. In April 2020, other major vehicle markets also had their worst drops.¹⁷³ They fell by 60 percent in Germany and

¹⁷⁰ <https://climatechampions.unfccc.int/5-ways-the-eus-new-climate-target-will-transform-global-electric-transportation/> -
(last visited 01.02.2023)

¹⁷¹ Ibid.

¹⁷² Ibid..

¹⁷³ Ibid..

over 90 percent in France. In addition to Member States, sales in the United Kingdom fell by 98 percent, signaling a total meltdown of the market.¹⁷⁴

This situation was remarkable for all markets. In addition to the effects of covid-19 pandemic outbreak, the Society of Motor Manufacturers and Traders was one of many associations to claim that the drop was also caused by a global microchip shortage. For instance, around 860,000 new automobiles were produced in the UK last year which is even lower than in 2020, when the initial wave of Covid has happened.¹⁷⁵ According to the Gartner’s forecast, “The ongoing shortage of chips will impact the production of EVs in 2022, and while shipments of vans and trucks are currently small, their shipments will grow rapidly as commercial owners see the financial and environmental benefit of electrifying their fleets.”¹⁷⁶

Gartner’s forecast reflects that “electric cars will represent 95% of total EV shipments in 2022 and the remainder will be split between buses, vans and heavy trucks.”¹⁷⁷

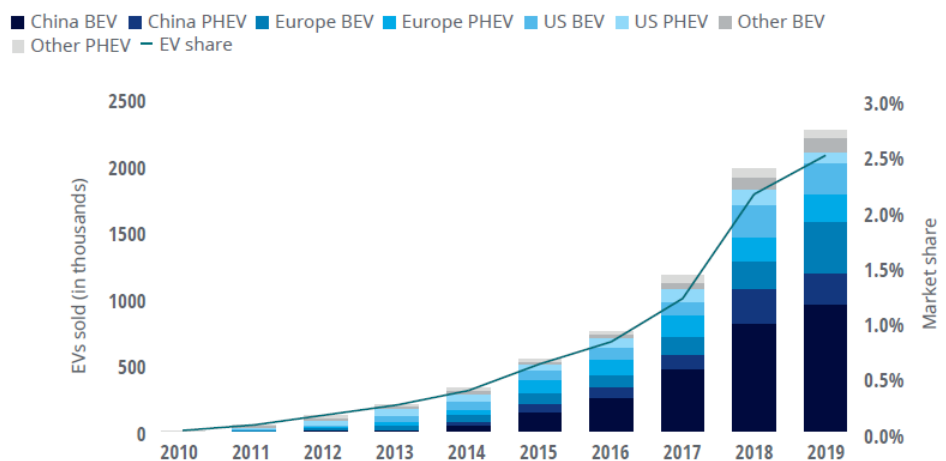


Figure 6: EV annual passenger car and light duty vehicle sales in major regions (Source: Deloitte, IHS Markit)

¹⁷⁴ International Energy Agency, World Energy Outlook 2021, 2021

¹⁷⁵ <https://www.bbc.com/news/business-60135835>(last visited 02.10.2022)

¹⁷⁶ <https://www.gartner.com/en/newsroom/press-releases/2022-01-26-gartner-forecasts-6-million-electric-cars-will-be-shipped-in-2022>(last visited 02.10.2022)

¹⁷⁷ <https://www.gartner.com/en/newsroom/press-releases/2022-01-26-gartner-forecasts-6-million-electric-cars-will-be-shipped-in-2022>(last visited 02.10.2022)

Despite the short-term impact of the pandemic, a pattern of ongoing growth is expected to continue in the upcoming period in the electric vehicle markets. As per data obtained by Gartner in 2022, “Six million electric cars (battery electric and plug-in hybrid) will be shipped in 2022, up from 4 million in 2021.”¹⁷⁸ Due to the fact that BEV and PHEV sales exceeded two million cars in 2019, EVs claimed a 2.5 percent share of total new car sales last year. BEVs accounted for 74% of global EV sales in 2019, up six percentage points from 2018.

EU automakers are investing capital on electrification. Almost all EVs manufactured in the EU are likely to be sold in the EU, since European automakers. Additionally, EVs are difficult to export to nations that lack the essential charging infrastructure.

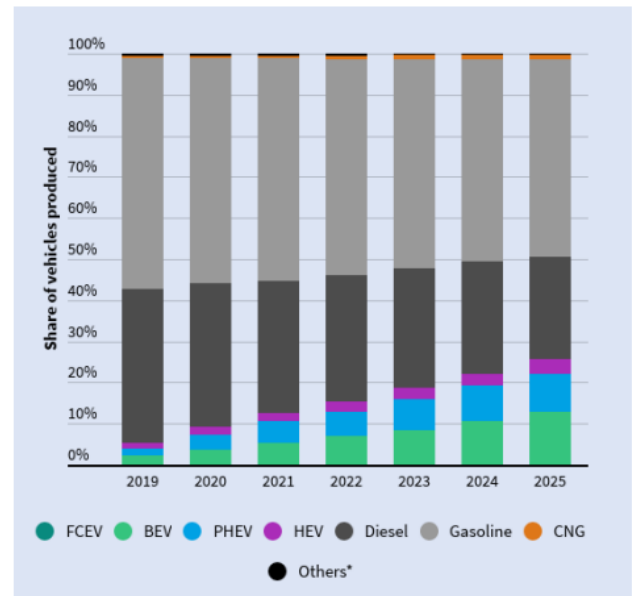


Figure 8: EU production of vehicles per type in 2025 (Source: IHS Markit)

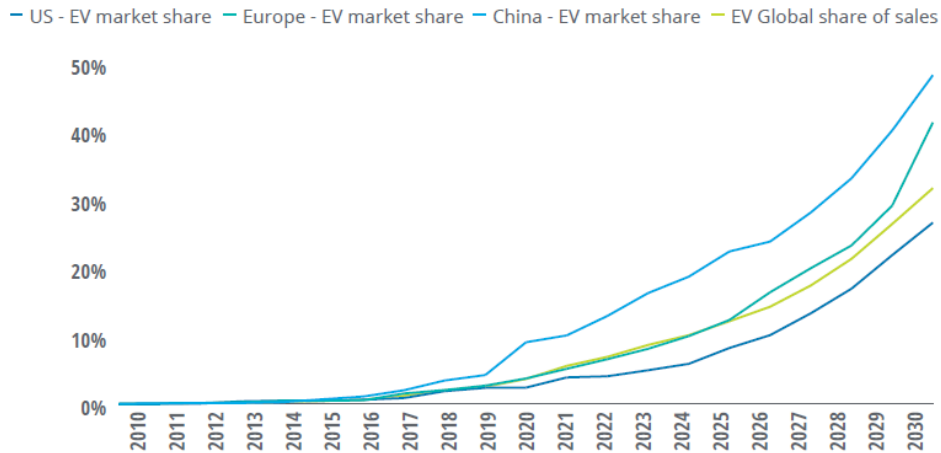
The number of electric vehicles manufactured in Europe is predicted to more than double.

Production of PHEVs is expected to increase approximately 300,000 units up to almost 1.8 million in 2025¹⁷⁹. This trend is expected to continue, with BEVs accounting for a growing percentage of overall EV output. Direct electrification is unmistakably the chosen clean technology option for automakers. The production of CNG automobiles, FCEVs, and LPG vehicles is negligible: CNG vehicle manufacturing reaches 200,000 units in 2025, while FCEV production remains below 10,000 units. On the other hand, both gasoline and diesel automobiles' market share and overall manufacturing volume are declining.

¹⁷⁸ <https://www.gartner.com/en/newsroom/press-releases/2022-01-26-gartner-forecasts-6-million-electric-cars-will-be-shipped-in-2022> (last visited 02.10.2022)

¹⁷⁹ Ibid.

Outlook for EV market share by major region



Source: Deloitte analysis, IHS Markit, EV-Volumes.com¹⁷

Figure 7: Outlook for EV market share by major region (Source: Deloitte, IHS Markit)

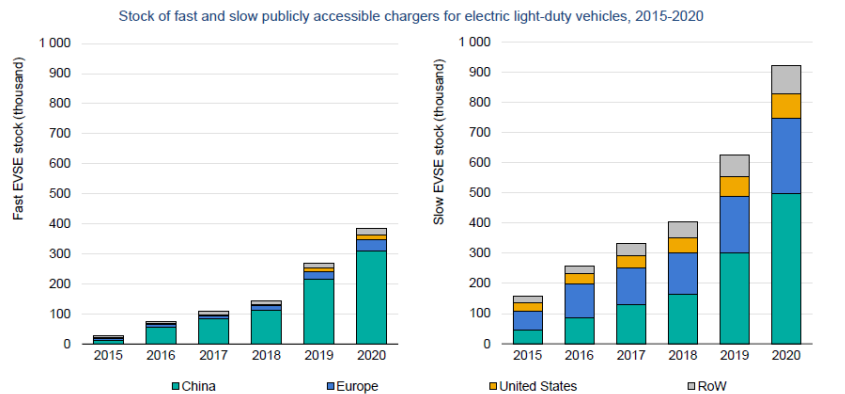
Electric car registrations for the year were close to 1,325,000 units, up from 550,000 units in 2019.”¹⁸⁰ This shows that there has been an increase from 3.5 percent to 11 percent of total new registrations. “Battery electric vehicles, rather than plug-in hybrids, accounted for the majority of electric vehicle registrations in 2020 for cars and vans.”¹⁸¹

¹⁸⁰ European Environment Agency, “New registrations of electric vehicles in Europe”, 18 November 2021 <https://www.eea.europa.eu/ims/new-registrations-of-electric-vehicles> (last visited 02.10.2022)

¹⁸¹ Ibid.

9. 2. Improving Infrastructure

Publicly accessible slow and fast chargers increased to 1.3 million in 2020



Notes: EVSE = electric vehicle supply equipment. RoW = rest of the world. Slow chargers have a charging power below 22 kW, while fast chargers provide more than 22 kW. For additional details about charger classification by rated power refer to [Global EV Outlook 2019](#). Regional slow and fast publicly accessible charger data can be interactively explored via the [Global EV Data Explorer](#).
Sources: IEA analysis based on country submissions, complemented by [AFDC \(2021\)](#) and [EAFO \(2021\)](#).
IEA. All rights reserved.

Figure 8: Share of publicly accessible chargers (Source: IEA analysis)

The construction of charging infrastructure is critical to achieving the transition to alternate fuels. The construction of charging infrastructure in lockstep with the use of electric vehicles is critical to achieving the transition to alternate fuels and a mostly zero-emission vehicle fleet by 2050. The ultimate policy goal is to make charging electric vehicles as simple as filling a conventional vehicle's tank, so that electric vehicles may move freely throughout the EU.¹⁸² The ultimate legislative aim is to make EV charging as simple as filling the gas tank of a conventional car, so that EVs may drive throughout the EU without obstruction. Unlike conventional automobiles, the majority of EV charging occurs at home or at work, necessitating the establishment of public charging stations to assist drivers without access to private charging and those traveling longer distances.

Expanding public charging infrastructure will be crucial. “In 2020, there will be 1.3 million publicly accessible chargers”. Furthermore, “installation of publicly accessible chargers increased

¹⁸² European Court of Auditors, “Special Report Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated”, Volume 5, 2021

by 45 percent, slower than the 85 percent” increase in 2019, possibly related to interruptions in important markets caused by the Covid-19 crisis.¹⁸³

9.3. Increasing the use of renewable & low-carbon fuels

The Commission carries the actual responsibility of managing the EU's alternative fuels strategy. In this regard, the regulation on infrastructure for alternative fuels is a crucial policy instrument within the wider EU agenda to promote publicly accessible electrical charging infrastructure. The implementation of charging infrastructure in tandem with EV adoption rates is a crucial component of the transition to alternate fuels. In the figure below, EU policy instruments on alternative fuel infrastructure adopted since 2011 is found.

Despite the fact that biofuels account for more than 90% of renewable energy in the transport sector, it is quite clear that “electricity is at the forefront of the deployment of alternative fuels in road transport, particularly for passenger cars and light-duty vehicles.”¹⁸⁴ European Automobile Manufacturers Association claimed that “89.4 % of all new vehicles registered in the EU in 2019 ran on petrol or diesel, while hybrid electric vehicles accounted for 6 %, electrically chargeable vehicles for 3 %, and all other non-electric (e.g. gas or hydrogen) alternatively fueled vehicles for just 1.6 %.”¹⁸⁵ In 2020, electric vehicles constituted 10.5 percent of the new registrations. This meant “that every tenth passenger car sold in the EU in 2020 was an electric vehicle.”¹⁸⁶

¹⁸⁴ European Court of Auditors, “Special Report Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated”, Volume 5, 2021

¹⁸⁵ <https://www.acea.auto/figure/share-of-alternatively-powered-vehicles-in-the-eu-fleet-per-segment/> (last visited 02.10.2022)

¹⁸⁶ Ibid.

9.4. Ensuring the connection between the networks and different modes of transport

Meeting the European Green Deal target for reducing greenhouse gas emissions from transport requires complete connectivity and a streamlined use of low- and zero-emission mobility along transport network.

9.5. Ensuring that urban mobility is more sustainable

Other forms of transportation must become more available to maintain sustainability. High-speed rail services may help to the decarbonization of road transportation, making rail a significant method of transport in this regard. Harmonized EU-wide vehicle clearance will help cut the cost of international train travel. By completing the TEN-T, connections along the main corridors will be improved. Improving passenger rights and assuring nondiscriminatory transmission of travel information will increase the appeal of train travel to customers.



9.6. Ensuring carbon pricing

EU ETS is the most crucial carbon pricing device for internalizing the cost of CO₂ emissions. The Commission suggested expanding the EU Emission Trading System to different systems of transportation. The Commission intends to integrate energy taxation and EU energy policy when updating the Energy Taxation Directive. Significant development is required in the area of effective infrastructure usage fees, particularly for road transportation.

10. CONCLUSION

The EU's goal of achieving climate neutrality by 2050 requires a future emissions route that is both realistic and resilient. The agreement, implementation of EU regulations, and application of economic incentives can pave the path for climate neutrality. As described in previous sections, the primary drivers of change are policies, legislation and economic incentives. Several sectors, including energy, needed to be regulated within the sphere of road transportation. In this regard, to make transportation more sustainable, the EU has not only implemented measures and taken legal actions within its transportation policies, but also imposed new rules within the scope of its energy policies and suggested new taxonomy measures, particularly in the area of carbon pricing. Diverse sectors, including road transportation and aviation, are proposed to be included in the scope of the carbon border adjustment system, and directives that impose taxes, such as the Eurovignette Directive, are proposed to be changed in accordance with EU climate objectives.

According to current data regarding the EU's climate targets, the EU has met its preliminary objective of a 20% reduction in greenhouse gas emissions. However, this information is insufficient to make a prediction regarding the ultimate objective of becoming a continent with net zero emissions by 2050. In addition to the newly established rules and laws, variables such as the consequences of the pandemic and the escalating energy crisis following the Russian invasion of Ukraine shall also be examined.

By April 2020, emissions from vehicle transport had decreased by 36% across 69 countries, representing roughly half of the overall emissions change caused by the pandemic. According to the findings of another study, vehicle emissions declined at a faster rate than traffic demand¹⁸⁷ (e.g., a 55% decrease in traffic demand can result in a 65% decrease in emissions).

¹⁸⁷ Jianhe Du , Hesham Rakha, “Preliminary Investigation of COVID-19 Impact on Transportation System Delay, Energy Consumption and Emission Levels”, Virginia Tech Transportation Institute

As global economic activity resumed, annual global greenhouse gas emissions increased by 6.4% surpassing the pre-pandemic level.¹⁸⁸ Even though total emissions have risen significantly above pre-pandemic levels, rises from transportation and households were moderated by the pandemic last year. Therefore, the reduction seen in emission rates does not reflect the actual situation. The EU shall continue its efforts to reduce greenhouse gas emission by 2025, considering that the emission rates are increasing with the reopening from the pandemic restrictions.¹⁸⁹

As a result of Russia's invasion of Ukraine, gas and energy prices soared to all-time highs. Since the second half of 2021, energy prices in the EU and globally have increased significantly. As a result of Russian invasion of Ukraine, energy prices have risen further, and there are also fears about the EU's energy supply security. The decision by Russia to restrict gas deliveries to some EU Member States has exacerbated the situation. The possible long-term impact on Europe's energy strategy and greenhouse gas emissions could represent an opportunity when the actions performed thus far are considered. Due to the inclusion of the energy sector in the EU ETS, a temporary increase in coal power, for instance, should cause the price of carbon credits to rise and encourage other sectors to reduce their emissions.

As another aspect of this thesis topic, minimizing the usage of fossil fuels is a crucial objective, particularly for road transportation. Between 1990 and 2018, fossil CO₂ emissions from road transport in the EU Member States and United Kingdom climbed by 24%, while energy efficiency increased by 16%. This is a result of the establishment of rules concentrating on fuel economy and establishing procedures for the measurement, quantification, and labeling of newly manufactured units depending on their fuel consumption per mile traveled. However, the repercussions of the Russian invasion remain unknown, as it might potentially impede the switch to renewable energy

¹⁸⁸ <https://www.imf.org/en/Blogs/Articles/2022/06/30/greenhouse-emissions-rise-to-record-erasing-drop-during-pandemic> (last visited 02.10.2022)

¹⁸⁹ James DeWeese, Léa Ravensbergen, Ahmed El-Geneidy, Travel behaviour and greenhouse gas emissions during the COVID-19 pandemic: A case study in a university setting”, *Transportation Research Interdisciplinary Perspectives*, Volume 13, 2022

sources. If the EU succeeds in dominating the international market for liquefied natural gas, Southeast Asia in particular may go back to using coal¹⁹⁰.

In view of the objective to increase the use of renewables in road transportation, direct electrification is preferred wherever possible due to its higher efficiency and, consequently, its ability to reduce the overall amount of renewable electricity consumed. Electrolysis-produced hydrogen can also be used directly as an energy carrier, displacing fossil fuels and unsustainable biofuels of the first generation, which are now the primary energy sources in the transportation industry. Additional environmental protections will be required to guarantee that the production of these fuels is as environmentally friendly as feasible. In order for these energy carriers to be considered clean, they must be produced using additional renewable energy.

In light of these outcomes of the study, it could be stated that the EU's legal framework makes it possible to achieve carbon-neutral transportation by 2050, however implementation of the regulations must be reinforced. The regulations and policies adopted draw a framework and determine the limits of use of fossil fuels in the transportation sector. However, steps taken in practice are not sufficient to reach the objectives behind the regulations adopted. When the adopted regulations are observed, it is seen that mostly, the focus was on improving the transition to zero-emission vehicles and improving infrastructure, together with increasing the use of renewable & low-carbon fuels. However, making sustainable alternatives more available and ensuring the connection between the networks and different modes of transport is also critical to ensure that urban mobility is more sustainable. If the EU can achieve a well-connected network between all kinds of transport modes, it can reach to its aim of reducing the use of fossil fuels and reducing the rates of greenhouse gas emission within the road transportation. In order to foster implementation in this area, carbon pricing may play a crucial role. High road transport expenses would restrict travel and increase the attractiveness of train and other modes of transport such as walking and biking. Similarly, high taxes and carbon costs on airlines could move transportation towards more trains. Considering that the majority of rails are electrified, high-speed rail and night trains have the ability to restrain demand growth in road and air transportation. Policymakers may take

¹⁹⁰ Ibid.

advantage of these facts and foster implementation of the regulations adopted to ensure the use of renewable energy throughout the transportation sector.



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