MARIA LEONOR MASCARENHAS GALIS SUSTELO

EXAMINING THE FEASIBILITY OF ATTAINING CARBON NEUTRALITY BY 2050 AND ENSURING A JUST TRANSITION: THE EUROPEAN GREEN DEAL IN THE CONTEXT OF EU LAW

The Significance of the Energy Sector and Renewable Energy Sources within the European Green Deal Framework: An Analytical Exploration

Dissertation pursuing the completion of the Master of Laws degree with a specialisation in International and European Law

Supervisor:

Dr Tiago de Melo Cartaxo, Senior Lecturer in Environmental Law, University of Exeter, Invited Professor in Environmental Law and Administrative Law, Nova School of Law

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LIST OF ABBREVIATIONS

AGT – Average Global Temperature

CBAM – Carbon Border Adjustment Mechanism

CH_4 – Methane

CFC – Chlorofluorocarbons

CER – Certified Emission Reduction

CO_2 – Carbon Dioxide

COP – Conference of the Parties

ECSC – European Coal and Steel Community

ECJ – European Court of Justice

EEC – European Economic Community

EGD – European Green Deal

EGDIP – European Green Deal Investment Plan

EIB – European Investment Bank

ERDF – European Regional Development Fund

ESF+ – European Social Fund Plus

ETS – Emissions Trading System

EU – European Union

Euratom – European Atomic Energy Community

GHG – Greenhouse Gas

HFC – Hydrofluorocarbons

HCFC – Hydrochlorofluorocarbons

H_2O – Water Vapor

EAP – Environmental Action Programme

IEA – International Energy Agency

ILO – International Labour Organisation

IPCC – Intergovernmental Panel on Climate Change

IRENA – International Renewable Energy Agency

JTF – Just Transition Fund

JTM – Just Transition Mechanism

JTTP – Just Transition Territorial Plan

NDC – National Determined Contributions

NECP – National Energy and Climate Plan

NGEU – Next Generation EU

N_2O – Nitrous Oxide

OECD – Organisation for Economic Co-operation and Development

PFC – Perfluorocarbons

TFEU – Treaty on the Functioning of the European Union

SDG – Sustainable Development Goal

SEA – Single European Act

SEIP – Investment Plan for a Sustainable Europe

SF_6 – Sulfur Hexafluoride

UN – United Nations

UNFCCC – United Nations Framework Convention on Climate Change

UNGA – United Nations General Assembly

ABSTRACT

This dissertation delves into the complex relationship between Earth's environment and the escalating climate crisis, emphasising the critical need for action. The delicate equilibrium between natural and human-driven processes underscores the urgency of managing greenhouse gas emissions, which sustain life but also trigger climate disruptions. Human activities, particularly fossil fuel combustion and industrial practices, have ushered in unprecedented challenges with mounting GHG emissions. Supported by scientific research and international agreements like the Paris Agreement, the responsibility to mitigate climate change's dire consequences falls upon nations and individuals alike. The resulting impacts, spanning extreme weather events, biodiversity loss, and rising sea levels, reverberate across the globe. Taking the forefront is the European Green Deal, a comprehensive initiative led by the European Commission. Encompassing energy, transportation, and agriculture, the EGD strives to significantly reduce emissions by 2030 and achieve carbon neutrality by 2050. Anchored by a robust Investment Plan, it accelerates the transition to a sustainable future by uniting public and private sectors while ensuring fairness for affected stakeholders. Integrated into the legal framework through global agreements, the EU's commitment highlights climate goals at the core of governance. The journey, beginning in the 1970s, witnessed pivotal milestones and legal advances, including principles like the polluter-pays concept. The role of the European Court of Justice has been central, strengthening the EU's environmental policies through impactful interpretations. Landmark cases set global standards by holding governments accountable for climate actions. Carbon neutrality by 2050 becomes paramount, involving various sectors and strategies to reduce emissions by at least 55% by 2030. Supported by the Investment Plan and Just Transition Mechanism, the EGD signifies a governance and cooperation paradigm shift. The EU's recognition of socio-economic complexities offers aid to disproportionately affected regions. Renewable energy sources align with sustainability and equity principles, necessitating integration of human rights and societal considerations. Amidst global events like the conflict in Ukraine and consequently energy security concerns, the urgency to diversify energy sources and adopt nuclear power becomes pronounced, balancing benefits, proliferation concerns, safety, and waste management challenges. The pursuit of carbon neutrality by 2050 demands holistic strategies, uniting renewable energy, innovation, economic adaptability, and global collaboration. The EU's proactive stance solidifies its role as aa

leader, inspiring others to follow suit. The commitment to international collaboration, environmental integration, and climate leadership underscores a global duty. Despite challenges, the EGD remains a symbol of optimism, reflecting the transformative impact of policy, technology, and global partnerships. The EGD transcends policy – it embodies a transformative force driven by environmental stewardship, visionary leadership, and international unity. Balancing progress and preservation, it unites stakeholders toward a greener and fairer future. In a critical era, the EGD signifies shared dedication to sustainability. Navigating protection, legal changes, geopolitics, and energy transitions, it shines as a beacon of hope, necessitating collective efforts for a sustainable world. The EU's commitment to carbon neutrality illustrates dedication to environmental protection and sustainable progress.

Keywords:

Carbon dioxide; Climate change; Climate neutrality; Decarbonisation; Energy law; European Green Deal; European Commission; European environmental law; European environmental policy; European Union; Green transition; Greenhouse gases; Just transition; Just Transition Mechanism; Mitigation; Renewable energies.

RESUMO

Esta dissertação analisa a relação complexa entre o ambiente terrestre e a intensificação da crise climática, sublinhando a necessidade crítica de ação. O equilíbrio delicado entre os processos naturais e os provocados pelo homem sublinha a urgência de gerir as emissões de gases com efeito de estufa, que permitem a existência de vida, ao mesmo tempo que provocam disrupções climáticas. O aumento das emissões de gases com efeito de estufa provocado pelas atividades humanas, em particular a queima de combustíveis fósseis e as práticas industriais, desencadearam desafios sem precedentes. De acordo com investigação científica e acordos internacionais como o Acordo de Paris, a responsabilidade de mitigar as nefastas consequências das alterações climáticas recai sobre os Estados e os cidadãos. Os impactos decorrentes, incluindo fenómenos meteorológicos extremos, perda de biodiversidade e subida do nível do mar, ecoam por todo o mundo. Na linha da frente está o Pacto Ecológico Europeu, uma iniciativa abrangente liderada pela Comissão Europeia. Compreendendo a energia, os transportes e a agricultura, o Pacto Ecológico Europeu procura reduzir significativamente as emissões até 2030 e alcançar a neutralidade carbónica até 2050. Ancorado por um sólido Plano de Investimento, acelera a transição para um futuro sustentável, unindo os sectores público e privado e assegurando simultaneamente a equidade para as partes afetadas. O percurso, que teve início na década de 1970, testemunhou marcos fundamentais e progressos jurídicos, incluindo princípios como o conceito do poluidor-pagador. O papel do Tribunal de Justiça Europeu tem sido fundamental, reforçando as políticas ambientais da UE através de interpretações com impacto. Casos emblemáticos estabelecem normas globais, responsabilizando os governos pelas ações climáticas. A neutralidade carbónica até 2050 torna-se fundamental, envolvendo vários sectores e estratégias para reduzir as emissões em, pelo menos, 55% até 2030. Sustentado no Plano de Investimento e no Mecanismo para uma Transição Justa, o Pacto Ecológico Europeu representa uma mudança de paradigma na governação e na cooperação. O reconhecimento, por parte da UE, das complexidades socioeconómicas permite prestar assistência às regiões desproporcionalmente afetadas. As fontes de energia renováveis estão alinhadas com os princípios da sustentabilidade e da equidade, exigindo a integração dos direitos humanos e de considerações de carácter social. Perante eventos internacionais como o conflito na Ucrânia e as consequentes preocupações com a segurança energética, torna-se urgente diversificar as fontes de energia e recorrer à energia nuclear, equilibrando os benefícios,

as preocupações com a proliferação, a segurança e os desafios da gestão dos resíduos. A prossecução da neutralidade carbónica até 2050 exige estratégias holísticas, unindo as energias renováveis, a inovação, a adaptabilidade económica e a colaboração global. A postura proactiva da UE solidifica o seu papel de líder, inspirando outros a seguir o seu exemplo. O compromisso de colaboração internacional, integração ambiental e liderança climática sublinha um dever global. Apesar dos desafios, o Pacto Ecológico Europeu continua a ser um símbolo de otimismo, refletindo o impacto transformador da política, da tecnologia e das parcerias globais. O Pacto Ecológico Europeu transcende a política - incorpora uma força transformativa impulsionada pela proteção ambiental, liderança visionária e unidade internacional. Ao equilibrar desenvolvimento e preservação, une as partes interessadas em direção a um futuro mais verde e mais justo. Em tempos críticos, o Pacto Ecológico Europeu significa uma partilha do compromisso de sustentabilidade.

Palavras-chave:

Alterações climáticas; Comissão Europeia; Descarbonização; Dióxido de carbono; Direito ambiental europeu; Direito da energia; Energias renováveis; Gases com efeito de estufa; Mecanismo de Transição Justa; Mitigação; Neutralidade climática; Pacto Ecológico Europeu; Política ambiental europeia; Transição justa; União Europeia.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

I. OBJECT OF STUDY 1

II. METHODOLOGY 3

III. SHORT EXPLANATION OF THE FOLLOWING CHAPTERS 3

CHAPTER 2: DEFINITION OF EXISTING CONCEPTS, POLICIES, AND LEGISLATION 5

I. CLIMATE CHANGE 5

II. RENEWABLE ENERGY 7

III. CARBON NEUTRALITY 11

IV. RELEVANT EXISTING POLICIES AND LEGISLATION 12

i. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE 12

ii. KYOTO PROTOCOL 13

iii. PARIS AGREEMENT 15

iv. UN SUSTAINABLE DEVELOPMENT GOALS 17

V. CONCLUDING REMARKS 19

CHAPTER 3: THE EUROPEAN GREEN DEAL 21

I. THE EUROPEAN GREEN DEAL 21

II. FINANCING THE EUROPEAN GREEN DEAL 26

III. A CLEAN ENERGY TRANSITION 28

IV. JUST TRANSITION MECHANISM 31

V. CONCLUDING REMARKS 37

CHAPTER 4: CRITICAL ANALYSIS 39

I. CHALLENGES TO THE SUCCESS OF THE EUROPEAN GREEN DEAL 39

i. EUROPEAN GREEN DEAL AND EUROPEAN ENVIRONMENTAL LAW 39

ii. SAFE, CLEAN AND AFFORDABLE ENERGY 46

iii. A GREEN AND JUST TRANSITION 54

II. WAR IN UKRAINE 65
III. CARBON NEUTRALITY BY 2050 68
IV. EU AS A GLOBAL LEADER 72
V. CONCLUDING REMARKS 74

CHAPTER 5: CONCLUSION 77

BIBLIOGRAPHY 81

Chapter 1: Introduction

I. Object of study

The environmental problem holds significant importance and has increasingly become a more prominent subject of discussion in public debate. The escalating emissions of Greenhouse Gases (GHGs), such as carbon dioxide (CO_2), from human activities are causing significant changes in the planet's climate.[1] Consequently, the emission-induced global warming is leading to severe extreme weather events, disturbances in ecosystems, and endangerment of biodiversity.[2] Understanding the urgency of these issues spurred the creation of international agreements and global initiatives aimed at mitigating the adverse effects of climate change. The United Nations Framework Convention on Climate Change (UNFCCC) and the historic Paris Agreement represent important milestones in this collective endeavour to curtail the rise in global temperature and reduce GHG emissions.[3]

Within this context, the energy sector emerges as one of the main contributors to environmental degradation and the exacerbation of climate change effects.[4] Continued dependence on non-renewable energy sources, like fossil fuels, has created a cycle of pollution and planetary warming. Thus, transitioning to clean and renewable energy sources, such as solar and wind, emerges as a pivotal strategy to mitigate environmental harm.[5] While challenges related to the intermittent nature of solar and wind power generation and initial costs exist, technological advances have enabled the integration of these sources into the global energy mix.[6]

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[1] Filipe Duarte Santos, "A ciência das alterações climáticas", in *Alterações Climáticas*, edited by Filipe Duarte Santos, (Lisboa: Fundação Francisco Manuel dos Santos, 2021), p. 12.
[2] *Ibid*, p. 39.
[3] "What is Climate Change?", *United Nations*, n.d., accessed May 2022, https://www.un.org/en/climatechange/what-is-climate-change.
[4] "For a Livable Climate: Net-Zero Commitments Must Be Backed by Credible Action", *United Nations*, n.d., accessed July 2022, https://www.un.org/en/climatechange/net-zero-coalition.
[5] Katherine Leitzell, "Climate Change Widespread, Rapid, and Intensifying", *IPCC*, last modified August 2021, https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/.
[6] Filipe Duarte Santos, "Como responder ao desafio das alterações climáticas", in *Alterações Climáticas*, edited by Filipe Duarte Santos, (Lisboa: Fundação Francisco Manuel dos Santos, 2021), p. 50.

Achieving meaningful outcomes requires international cooperation and the commitment of every nation.[7] The UNFCCC and the United Nations (UN) Sustainable Development Goals (SDGs) encourage synchronised efforts to limit emissions and protect the environment.[8] The European Union (EU) stands as an active leader in this regard, spearheading ambitious environmental policies. The European Green Deal (EGD), introduced in 2019 under Ursula von der Leyen's leadership, represents a critical landmark in the pursuit of holistic climate solutions.[9] With bold emission reduction targets and aspirations for carbon neutrality, the EGD guides the EU towards a more sustainable economy.[10] By fostering citizen participation, stimulating investments in environmentally friendly projects, and embracing fairness through the Just Transition Mechanism (JTM), the EGD underscores the connection between environmental considerations and socio-economic factors.[11] The EU's commitment to leading the energy transition and encouraging technological innovation emphasises its global influence and drives worldwide actions against climate change.[12]

The mounting need for resolute action and the profound overhaul of economic and energy systems reveal the urgency of united and coordinated actions to safeguard a liveable future for upcoming generations.[13] Solutions to climate change extend beyond technology

[7] Javier Sanchez-Reaza, Diego Ambasz and Predrag Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", Washington DC: The World Bank Group, 2023, p. 2, http://hdl.handle.net/10986/39729.
[8] Katrina Kuh, "The Law of Climate Change Mitigation: An Overview", in *Encyclopedia of the Anthropocene*, edited by Dominick A. Dellasala and Michael I. Goldstein, 2: (New York: Elsevier, 2018), p. 506, https://doi.org/10.1016/B978-0-12-809665-9.10027-8.
[9] Sarah Wolf, Jonas Teitge, Jahel Mielke, Franziska Schütze, and Carlo Jaeger, "The European Green Deal - More Than Climate Neutrality", *Intereconomics* 56, no. 2 (March 2021), p. 100, https://doi.org/10.1007/s10272-021-0963-z.
[10] Mark Leonard, Jean Pisani-Ferry, Jeremy Shapiro, Simone Tagliapietra, and Guntram Wolff, "The Geopolitics of the European Green Deal", *European Council on Foreign Relations*, (February 2021), p. 29, https://www.bruegel.org/sites/default/files/wp_attachments/PC-04-GrenDeal-2021-1.pdf.
[11] Sebastiano Sabato and Boris Fronteddu, "A Socially Just Transition through the European Green Deal?", *European Trade Union Institute Research Paper Series*, (September 2020), p. 10, https://dx.doi.org/10.2139/ssrn.3699367.
[12] Alex Clark, Susi Dennison and Mats Engström, "Climate of cooperation: How the EU can help deliver a green grand bargain", *European Council of Foreign Relations*, October 2021, https://ecfr.eu/publication/climate-of-cooperation-how-the-eu-can-help-deliver-a-green-grand-bargain/.
[13] Sanja Filipović, Noam Lior, and Mirjana Radovanović, "The green deal – just transition and sustainable development goals Nexus", *Renewable and Sustainable Energy Reviews* 168, (October 2022), p. 10, https://doi.org/10.1016/j.rser.2022.112759.

and encompass shifts in mindset, international cooperation, and the adoption of sustainable practices.[14]

II. Methodology

The methodology employed in this dissertation followed an inductive analytical method, which involved a comprehensive examination of legislation and legal precedents. This encompassed a review of international court decisions, including those of the European Court of Justice (ECJ) such as the *Danish Bottle case*, as well as national court rulings like the *Urgenda v State of the Netherlands case*, in addition to international agreements and treaties. Additionally, a comprehensive analysis of scholarly articles, pertinent books, and reports from prominent international bodies including the UN, the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) was undertaken. By employing this approach, the objective was to derive overarching conclusions from specific instances, thereby fostering a robust and well-founded comprehension of the subject matter under investigation.

III. Short explanation of the following chapters

This thesis is structured into five chapters: the first chapter serves as the introduction, setting the stage for the dissertation's exploration. The second chapter delves into relevant legislation and concepts, providing a foundation by defining key terms like "climate change", "renewable energies" and "carbon neutrality". This chapter also examines significant international agreements such as the Kyoto Protocol and the Paris Agreement, and international frameworks like the Sustainable Development Goals (SDGs), which are essential for understanding the background against which the EGD emerged.

The third chapter is dedicated to portraying the EGD, with a specific focus on the energy sector and the inclusion of the JTM. This chapter highlights the financing plan devised by the European Commission for the practical implementation of the EGD.

[14] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 2.

In the fourth chapter, a comprehensive analysis of the EGD within the context of EU law is conducted. This includes a scrutiny of potential obstacles to its implementation, particularly in relation to the energy sector and the integration of renewable energy sources. The exploration encompasses an investigation into the concept of just transition and energy justice, assessing how the just transition mechanism aligns with these principles. Furthermore, the sufficiency of planned funding for EGD implementation is addressed, taking into consideration novel funding sources such as those established post the Covid-19 pandemic. This chapter also examines the EGD in light of recent geopolitical developments, like the War in Ukraine, and assesses its potential impact on the EGDt's success.

The final chapter concludes this dissertation by summarising the key arguments and elucidating the author's standpoint. It also aims to provide a response to the initial question that was posed at the outset of this study: "Will the European Commission, through the EGD, achieve an energy transition towards climate neutrality by 2050, which leaves no one behind?".

Chapter 2: Definition of existing concepts, policies, and legislation

I. Climate change

The Earth's atmosphere consists of a mix of gases, including both "normal" gases that occur naturally, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), and gases originating from human activities.[15] Beyond the naturally occurring CO_2, CH_4, and N_2O emissions, human actions release additional amounts of these gases as well as others not naturally found in the atmosphere, like chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).[16] These gases collectively fall under the category of greenhouse gases (GHG) because they have the property of absorbing some of the solar energy that the Earth reflects into the atmosphere, releasing the rest in the form of infrared radiation into space.[17]

The greenhouse effect, which is attributed to GHGs in the atmosphere, was crucial for life to develop on Earth.[18] This effect, caused by the GHGs, enabled an energy equilibrium that maintained a temperature suitable for the emergence of life.[19] However, the concentration of GHGs in the atmosphere has increased significantly in recent years, leading to a rise in the average global temperature (AGT) and endangering countless living organisms.[20] Fossil fuels (extraction, production, and consumption), land use changes like agriculture, deforestation, and intensive livestock practices, as well as industrial activities, are the primary culprits behind the surge in GHG emissions.[21]

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[15] Santos, "A ciência das alterações climáticas", p. 12.
[16] "Global Warming and Climate Change", *Opposing Viewpoints Online Collection, Gale*, last modified 2018, https://www.gale.com/intl/databases-explored/social-issues/global-warming.
[17] Santos, "A ciência das alterações climáticas", p.12.
[18] Tobias Jonas Klee, "The European Green Deal: An Analysis of How the European Commission Promises to Manage Climate Change", (Diss. University of Barcelona, 2020), p. 8, http://diposit.ub.edu/dspace/bitstream/2445/171646/1/TFM%20Tobias%20Klee.pdf.
[19] "A Base Científica das Alterações Climáticas", *RNC2050*, n.d., accessed June 2022, https://descarbonizar2050.apambiente.pt/descarbonizar2050/base-cientifica/.
[20] "Global Warming and Climate Change".
[21] D.J. Wuebbles, et al., "Our Globally Changing Climate", in Climate *Science Special Report: Fourth National Climate Assessment*, edited by D.J. Wuebbles, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock, 1 (Washington DC: U.S Global Change Research Program, 2017), p. 36, https://doi.org/http://doi.org/10.7930/J08S4N35.

Research, including the 2017 Climate Science Special Report, has revealed that the upwelling in GHG emissions since the late 20th century is predominantly due to human activities.[22] The Intergovernmental Panel on Climate Change (IPCC) stresses that the observed patterns of climate change events can be plausibly explained by human actions – "there is no evidence that natural temperature variation can explain the amount and pattern of global warming observed during the industrial age".[23] Moreover, the IPCC concludes that "there is no evidence that natural temperature variation can explain the amount and pattern of global warming observed during the industrial age".[24] In essence, the increase in GHG concentration and the subsequent exacerbation of climate change and global warming are anthropogenic rather than naturally occurring.[25]

Global warming relates to the rise in the Earth's surface AGT, resulting from elevated GHG concentrations that trap excess solar radiation. This concept diverges from climate change, which encompasses significant shifts in meteorological variables characterising climate – humidity, air pressure, wind, clouds, and precipitation patterns – usually over several decades. Climate changes can stem from natural factors, for instance, shifts in ocean patterns or volcanic activity (naturogenic climate change), or from human activities (anthropogenic climate change).[26]

Climate change is a present reality with a trajectory towards increasingly severe effects. Over the last decade, the record for the hottest year has been broken eight times.[27] Unprecedented extreme weather events, including heatwaves, droughts, intense short-term precipitation, extratropical storms, and tropical cyclones, have become more frequent.[28] As a consequence we have witnessed various catastrophes: wildfires, infrastructure destruction, floods, landslides, and more.[29] Simultaneously, phenomena such as biodiversity loss, rising sea levels, soil desertification, ocean acidification, and

[22] Wuebbles, et al., "Our Globally Changing Climate", p. 36.
[23] *Ibid*.
[24] *Ibid*.
[25] IPCC, Fifth Assessment Report of the Intergovernmental Panel on Climate Change, WGI, WGII e WGIII, (Cambridge and New York: Cambridge University Press, 2013). in Santos, "A ciência das alterações climáticas", p.12.
[26] "What is Climate Change?".
[27] "Building a Climate-Resilient Future - A New EU Strategy on Adaptation to Climate Change", *European Commission*, last modified February 2021, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_663.
[28] Santos, "A ciência das alterações climáticas", p. 39.
[29] *Ibid*., p. 40.

ecosystem destruction, while not as palpable as temperature increases, are equally destructive.[30] According to the 2021 IPCC report, many of these occurrences are unprecedented in millennia, and some might even be irreversible without urgent intervention.[31]

Against this backdrop, it is imperative for nations to take firm political stances and collaborate. In recent times, international frameworks, and agreements such as the 2030 Agenda for Sustainable Development, the SDGs, and the Paris Agreement have been developed. More recently, the European Green Deal, a regional agreement seen as exceptionally ambitious, was introduced. These initiatives aim to reduce GHG emissions, allowing the Earth's systems to absorb them rather than accumulating them in the atmosphere. As a result, numerous countries are committing to substantial GHG reductions by 2030 and even climate neutrality by 2050. To achieve these goals, measures like transitioning from fossil fuel-dependent energy systems to renewables are highlighted, alongside the urgency of initiating climate action without delay.[32]

II. Renewable energy

The energy sector accounts for approximately 75% of GHG emissions.[33] As such, one way to mitigate the effects of climate change will be to reduce CO_2 emissions. This implies that reducing CO_2 emissions is a vital strategy to mitigate the impacts of climate change.[34] The latest report from the IPCC emphasises that while several GHGs contribute to environmental harm, there is clear evidence that CO_2 is the primary driver of worsening climate change.[35] Consequently, one effective approach to curbing anthropogenic CO_2 emissions is to replace fossil fuel-dependent energy systems with renewable energy sources.[36] Unlike fossil fuels, most renewables do not emit CO_2 or other GHGs, making them indispensable in combating climate change.[37]

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[30] "Building a Climate-Resilient Future - A New EU Strategy on Adaptation to Climate Change".
[31] Leitzell, "Climate Change Widespread, Rapid, and Intensifying".
[32] "What is Climate Change?".
[33] "For a Livable Climate: Net-Zero Commitments Must Be Backed by Credible Action".
[34] *Ibid*.
[35] Leitzell, "Climate Change Widespread, Rapid, and Intensifying".
[36] *Ibid*.
[37] Martjin Wilder AM, and Lauren Drake, "International Law and the Renewable Energy Sector", in *The Oxford Handbook of International Climate Change Law*, edited by Cinnamon P. Carlarne, Kevin R. Gray,

Renewable energies commonly occupy a prominent position in the list of solutions to mitigate the severe effects of rising temperatures.[38] This stems from their eco-friendliness and numerous benefits. They play a key role in job creation, bolstering local and international economies, and enhancing power grid resilience to meet growing demands and unforeseen challenges. Furthermore, renewable energies, especially in developing countries, extend energy accessibility, fostering sustainable development and elevating living standards.[39]

Renewables are fundamental in reducing GHG emissions, which sets them apart from conventional fossil fuels.[40] Solar, wind, hydroelectric, and geothermal sources generate electricity without emitting harmful pollutants, making them indispensable in tackling global warming and its consequences.[41] In turn, transitioning from polluting sources to renewables not only reduces CO_2 emissions, but also ensures a reliable, abundant energy source, essential for diminishing the carbon footprint of electricity production.[42]

Advanced technology and efficient framework management optimise the integration of variable renewables like solar and wind, guaranteeing a steady energy supply and decreasing the need for fossil fuel power plants. Additionally, renewables facilitate the electrification of sectors beyond power generation, such as transportation and heating, through electric vehicles and heat pumps.[43] Energy independence is another advantage, allowing countries to generate clean, reliable energy domestically, lessening dependence on fossil fuel imports, and contributing to energy security and economic stability.[44] The transition to renewables creates employment opportunities in manufacturing, installation, maintenance and research sectors, driving both the economy and the shift to a more sustainable energy model.[45] Continued investment in renewable technologies spurs

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and Richard Tarasofsky, 1st ed., (New York: Oxford University Press, 2016), p. 359, https://doi.org/10.1093/law/9780199684601.001.0001.

[38] Leitzell, "Climate Change Widespread, Rapid, and Intensifying".

[39] AM and Drake, "International Law and the Renewable Energy Sector", p. 359.

[40] Christina Nunez, "As Energias Renováveis, Explicadas", *National Geographic*, n.d., accessed April 2022, https://www.natgeo.pt/meio-ambiente/as-energias-renovaveis-explicadas.

[41] Lora Shinn, "Renewable Energy: The Clean Facts", *NRDC - Natural Resources Defense Council*, last modified June 2022, https://www.nrdc.org/stories/renewable-energy-clean-facts.

[42] Nunez, "As Energias Renováveis, Explicadas".

[43] *Ibid*.

[44] "Chefe da ONU destaca energia renovável para evitar catástrofe climática", *ONU News*, last modified January 2023, https://news.un.org/pt/story/2023/01/1808107.

[45] Nunez, "As Energias Renováveis, Explicadas".

innovation and cost reduction, enhancing their competitiveness with fossil fuels, which is critical for a global passage to a cleaner, more resilient energy mix.[46] This progress puts countries at the forefront for achieving international climate goals outlined in agreements like the Paris Agreement.[47]

Expanding renewable energy infrastructure not only aids climate change mitigation, but also reinforces climate resilience by decentralising energy production and enhancing community preparedness for extreme weather events. Moreover, replacing fossil fuels with renewables produces immediate public health benefits, enhancing air quality and population's wellbeing.[48]

While often referred to as "clean" energy, renewable energy has distinct characteristics. Renewable energy is infinite, sourced from continuously replenishing natural sources and is mostly non-polluting.[49] Clean energy derives from processes that emit no GHG emissions, yet it is finite.[50] Consequently, renewable energy may not necessarily be clean, as seen in cases like hydroelectric power and biomass, which are renewable, but emit GHGs.[51] Clean and non-renewable examples include nuclear power, which does not emit GHG, but is finite. Or it can be renewable and clean, as in the case of wind, solar and geothermal energy, which renew themselves naturally and do not emit GHG. Both renewable and clean energies have downsides, necessitating challenges to be addressed for effective adoption and optimisation.[52]

Challenges include the intermittency of sources like solar and wind due to weather-related fluctuations, which can be mitigated through energy storage technologies like batteries. However, such solutions face cost and capacity limitations.[53] Nuclear energy raises concerns about radioactive waste storage safety.[54] High initial costs of infrastructure, such

[46] "Clean Energy", *Iberdrola*, n.d., accessed June 2023, https://www.iberdrola.com/sustainability/clean-energy.
[47] Nunez, "As Energias Renováveis, Explicadas".
[48] *Ibid*.
[49] Shinn, "Renewable Energy: The Clean Facts".
[50] "Clean Energy", *Collins Dictionary*, accessed May 2022, https://www.collinsdictionary.com/pt/dictionary/english/clean-energy.
[51] Shinn, "Renewable Energy: The Clean Facts".
[52] *Ibid*.
[53] Alexandra Wawryk, "International Energy Law: An Emerging Academic Discipline", in *Law as Change: Engaging with the Life and Scholarship of Adrian Bradbrook*, edited by Paul Babie and Paul Leadbeter, (University of Adelaide Press, 2014), p. 226, https://doi.org/10.20851/j.ctt1sq5xcn.14.
[54] "Advantages and Challenges of Nuclear Energy", *Office of Nuclear Energy*, last modified March 2021, https://www.energy.gov/ne/articles/advantages-and-challenges-nuclear-energy.

as solar panels and wind turbines. Certain renewables like hydroelectric and geothermal have geographical constraints.[55] Large-scale deployment of renewable can lead to conflicts over land use and resources, especially in densely populated areas.[56] For example, hydroelectric power, which is the largest source of renewable energy in the world, has disadvantages such as interference with river ecosystems and wildlife, and the construction of dams that forces communities to be displaced. Another example is the visual and noise pollution caused by turbines and solar panels, which concern local communities.[57] Socio-economic impacts, such as job displacement in traditional industries, and equitable approaches to guarantee a just transition also need consideration.[58]

Despite these challenges, ongoing research, technological advancements, and public policies are working to overcome obstacles and more effectively integrate renewable energy into the global energy landscape.[59]

Energy constitutes a vital aspect of a State's independence and development. Numerous international instruments and mechanisms hold importance in governing renewable energy, with notable ones including the UNFCCC, the Kyoto Protocol, the Paris Agreement.[60] However, there is no specific legislation on renewable energy at the international level.[61] Instead, there exists a fragmented legal structure consisting of binding regulations.[62] While these regulations contribute to shaping and evolving energy policies, they do not provide a comprehensive legal framework for developing energy systems or supply networks. International law emerges and advances through interactions among various international actors, such as States, international organisations, and individuals.[63] Given that States are the main protagonists in the international system, they are primarily responsible for shaping international law. In this sense, considering the importance of energy in a State independence and sovereignty, it is comprehensible that nations often address energy matters within their borders rather than on the international

[55] Wawryk, "International Energy Law: An Emerging Academic Discipline", p. 226.
[56] Nunez, "As Energias Renováveis, Explicadas".
[57] *Ibid*.
[58] Santos, "Como responder ao desafio das alterações climáticas", p. 49.
[59] *Ibid*., p. 50.
[60] AM, and Drake, "International Law and the Renewable Energy Sector", p. 362.
[61] Wawryk "International Energy Law", p. 230.
[62] AM, and Drake, "International Law and the Renewable Energy Sector", p. 362.
[63] *Ibid*., p. 358.

stage. Consequently, renewable energy, including its production and distribution, is frequently regarded as a domestic concern, subject to national laws.[64]

III. Carbon Neutrality

Carbon neutrality or climate neutrality, involves upholding a balance between the CO_2 emissions released into the atmosphere and the CO_2 that is taken out and stored, a process known as carbon sequestration.[65] To achieve net-zero emissions, all global GHG emissions must be counteracted by efforts to sequester CO_2.[66] Climate neutrality primarily focuses on eliminating any net CO_2 emissions into the atmosphere. In some cases, it encompasses the totality of GHG emissions.[67] Net zero, more precisely, refers to a state where the amount of CO_2 emissions released into the atmosphere equals the rate of CO_2 removal from it.[68]

Natural carbon sinks, such as soil, forests, and oceans, play a critical role in absorbing more CO_2 than they release. They are estimated to remove approximately 9.5 to 11 Gt of CO_2 annually. Notwithstanding, global CO_2 emissions reached 37.8 Gt in 2021.[69] Currently, there are no artificial carbon sequestration methods capable of effectively removing CO_2 from the atmosphere at the necessary scale to combat global warming.[70] Additionally, CO_2 stored in natural sinks, such as forests, can be released into the atmosphere due to factors such as forest fires and land-use changes.[71]

The concept of climate neutrality extends beyond just CO_2 emissions and focuses on reducing net GHG emissions to zero through actions aimed at addressing climate change.

[64] AM, and Drake, "International Law and the Renewable Energy Sector", p. 358.
[65] "What is carbon neutrality and how can it be achieved by 2050?", *European Parliament*, last modified April 2023, https://www.europarl.europa.eu/news/en/headlines/society/20190926STO62270/what-is-carbon-neutrality-and-how-can-it-be-achieved-by-2050.
[66] *Ibid*.
[67] *Ibid*.
[68] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 1.
[69] "What is carbon neutrality and how can it be achieved by 2050?".
[70] *Ibid*.
[71] *Ibid*.

This broader perspective recognises that various GHGs contribute to climate change, and achieving carbon neutrality requires addressing all of them.[72]

IV. Relevant existing policies and legislation

i. United Nations Framework Convention on Climate Change

The UNFCCC is an international treaty aimed at addressing climate change. It was established during the UN Conference on Environment and Development, in June 1992.[73] Its primary goal, as outlined in Article 2, is to facilitate international cooperation in combating climate change by achieving the "stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system".[74] This stabilisation should occur within a timeframe that allows ecosystems to naturally adapt to climate changes, ensuring food security and sustainable economic development.[75] As such, the UNFCCC emphasises the importance of stabilising anthropogenic-induced GHG emissions and implementing measures for both mitigation and adaptation to counteract the adverse impacts of climate change, being the first international treaty to acknowledge that the rising presence of GHGs in the atmosphere is primarily due to human activities.[76]

Within this framework, a distinction is made between industrialised nations (listed in Annex I), which generally encompass the Organisation for Economic Co-operation and Development (OECD) countries, and developing nations.[77] Accordingly, industrialised countries are expected to lead the charge in addressing climate change through adopting mitigation strategies and assisting developing countries in emission reduction and adaptation efforts.[78] However, when it comes to energy, the UNFCCC does not lay out specific obligations nor explicitly mention the term "renewable energy". Only in Article

[72] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 1.
[73] "What Is the United Nations Framework Convention on Climate Change?", *United Nations Climate Change*, n.d., accessed June 2022, https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change.
[74] Santos, "Como responder ao desafio das alterações climáticas", p. 53.
[75] *Ibid*.
[76] AM and Drake, "International Law and the Renewable Energy Sector", p. 364.
[77] "What Is the United Nations Framework Convention on Climate Change?".
[78] AM and Drake, "International Law and the Renewable Energy Sector", p. 364.

4(1)(c) do we find an allusion to the need for cooperative efforts to promote "technologies, practices and processes to control, reduce or prevent GHG emissions [...], including energy [...]".[79]

ii. Kyoto Protocol

The Kyoto Protocol to the UNFCCC was adopted during the third Conference of the Parties (COP 3), in 1997.[80] Its principal objective, enshrined in Article 2, is to advance sustainable development.[81] As the first international treaty to formulate measures for constraining and lessening anthropogenic GHG emissions, it operationalises the UNFCCC by binding signatory States to fulfil the Convention's goals and provisions.[82] The Kyoto Protocol has been ratified by 192 States and its implementation has been divided into two commitment periods: the first spanning from 2008 to 2012, and the second from 2013 to 2020.[83]

This agreement was especially ground-breaking for introducing legally binding emission reduction targets and creating a blueprint for forthcoming international climate change treaties.[84] Additionally, it was the first to acknowledge the potential use of market economy mechanisms to achieve agreed-upon targets.[85] In alignment with the principles of the UNFCCC, the Protocol employs the concept of "common but differentiated responsibilities", acknowledging that countries with more developed economies bear a historical responsibility for climate change, given their greater historical contribution to GHG emissions. Moreover, these countries possess the capacity to address the issue more effectively than emerging or developing economies.[86] As a result, the Protocol endorses that those with advanced economies should assume a greater burden in responding to climate change.[87] Therefore, consistent with the principles of the UNFCCC, the Protocol

[79] AM and Drake, "International Law and the Renewable Energy Sector", p. 364.
[80] "What Is the Kyoto Protocol?", *United Nations Climate Change*, n.d., accessed June 2022, https://unfccc.int/kyoto_protocol.
[81] Kyoto Protocol, 1998, https://unfccc.int/resource/docs/convkp/kpeng.pdf.
[82] "What Is the Kyoto Protocol?".
[83] "History of the Convention".
[84] Santos, "Como responder ao desafio das alterações climáticas", p. 53.
[85] "What Is the Kyoto Protocol?".
[86] *Ibid*.
[87] Santos, "Como responder ao desafio das alterações climáticas", p. 50.

categorises States into developed countries (listed in Annex I of the UNFCCC and Annex B of the Protocol) and developing countries.[88]

In the first commitment period, countries agreed to formulate national policies and strategies tailored to their circumstances for reducing emissions to around 5.2% compared to 1990 levels.[89] This target was achieved in 2012.[90] The Doha Amendment was adopted in 2012, aiming to set new targets for the period of 2013-2020.[91] During this second period, countries agreed to reduce emissions by at least 18% compared to 1990.[92] Three flexibility mechanisms were introduced to enable States to achieve their objectives.[93] Namely, the International Emissions Trading, the Clean Development Mechanism and the Joint Implementation Mechanism.[94]

The International Emissions Trading was designed to assist countries holding surplus GHG emission units to sell them to nations that had surpassed their emission limits. This trading system provided a mechanism for emission units to be transferred between countries, allowing for a more flexible approach to achieving emission reduction targets.[95] The Clean Development Mechanism (Article 12[3][b]) granted Annex B countries the opportunity to establish emission reduction projects in non-Annex countries.[96] This enabled industrialised nations to produce Certified Emission Reduction (CER) through such projects, which could then be counted towards fulfilling the Kyoto Protocol's emission reduction objectives.[97] The Joint Implementation Mechanism, specified in Article 6, allowed any Party within Annex I to transfer or acquire emission reduction units from other Annex I Parties as a result of projects aimed at reducing anthropogenic

[88] "What Is the Kyoto Protocol?".
[89] *Ibid*.
[90] Santos, "Como responder ao desafio das alterações climáticas", p. 53.
[91] Stavros G. Poupopoulos,"Atmospheric Environment", in *Environment and Development*, edited by Stavros G. Poupopoulos and Vassilis J. Inglezakis, (Elsevier, 2016), p. 107, https://doi.org/https://doi.org/10.1016/B978-0-444-62733-9.00002-2.
[92] *Ibid*.
[93] "What Is the Kyoto Protocol?".
[94] Poupopoulos, "Atmospheric Environment", p. 107.
[95] *Ibid*.
[96] Kyoto Protocol.
[97] Santos, "Como responder ao desafio das alterações climáticas", p. 53.

emissions or enhancing anthropogenic removals.[98] This mechanism fostered cooperation between developed nations to achieve emission reduction goals.[99]

The Protocol also introduced a system of supervision, review and enforcement, along with a compliance mechanism.[100] This framework aimed to ensure transparency and accountability among States. Accordingly, countries were obliged to monitor their GHG emissions and maintain records of transactions carried out under the Clean Development and Joint Implementation mechanisms.[101] These documents underwent verification by the UN Climate Change Secretariat. Consequently, in instances where the trading of emission units did not align with Protocol guidelines, States could face penalties through the compliance mechanism.[102] Furthermore, to assist nations in adapting to the impacts of climate change, the Protocol established the Adaptation Fund. This fund was intended to support States in enhancing their resilience and capacity to manage the effects of a changing climate.[103]

However, the Kyoto Protocol fell short of its targets due to factors like tight deadlines for mitigation measures, non-ratification by significant emitters like the United States, and challenges to emission limits by countries such as Russia and Canada. Additionally, developing countries were not bound by the Protocol's objective.[104] Nevertheless, the Kyoto Protocol remains of paramount importance, representing a crucial initial stride in the global battle against climate change.[105]

iii. Paris Agreement

The Paris Agreement, adopted in 2015 during COP 21, represents the latest major effort by the UN to address climate change. With participation from 196 countries, the Agreement builds upon the groundwork laid by the UNFCCC and seeks to enhance the resilience of nations and their citizens in the face of climate change impacts. Additionally, it strives to promote essential actions and investments for a sustainable, low-GHG

[98] Kyoto Protocol.
[99] Poupopoulos, "Atmospheric Environment", p. 107.
[100] "What Is the Kyoto Protocol?".
[101] *Ibid*.
[102] Poupopoulos, "Atmospheric Environment", p. 107.
[103] *Ibid*.
[104] Klee, "The European Green Deal", p. 17.
[105] *Ibid*.

emissions future.[106] A core objective of the Agreement is to encourage multilateralism and international collaboration in fighting climate change, signalling a shift in perspective that highlights the need for collective contributions and a comprehensive economic and social transformation.[107]

Central to the Paris Agreement is the overarching goal of decarbonising global economies in the long term. Its primary purpose is to keep the AGT rise below 2°C compared to pre-industrial levels, while aiming for a more ambitious limit of 1.5°C.[108] To achieve this, the Parties are required to prepare and communicate their National Determined Contributions (NDCs), outlining how they intend to reduce emissions, including the adoption of domestic policies supporting renewable energy.[109] These contributions must be progressive and reflect the ambition of each nation.[110] The Paris Agreement preserves the sovereignty of States in crafting their NDCs, while also prompting them to share updates on the progress of their emission reduction efforts. This is accomplished through a transparency-based monitoring system.[111] NDCs are subjected to a review every five years, culminating in an overall assessment of advancements. Consequently, countries encounter an equilibrium between preserving their autonomy and responding to normative expectations established by the Agreement.[112] While the principle of self-determination remains, this monitoring framework introduces constraints and expectations concerning their actions.[113]

Beyond the pursuit of mitigating GHG emissions, the Paris Agreement requires that States devise and execute strategies for climate change adaptation. Moreover, it establishes a framework for providing financial, technical, and capacity-building assistance to nations that require it.[114] Within this context, States shall allocate resources to fulfil the terms of

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[106] "Key Aspects of the Paris Agreement", *United Nations Climate Change*, n.d., accessed June 2022, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/key-aspects-of-the-paris-agreement.
[107] *Ibis*.
[108] Kuh, "The Law of Climate Change Mitigation: An Overview", p. 506.
[109] Lavanya Rajamani, "Understanding the 2015 Paris Agreement", in *India in a Warming World: Integrating Climate Change and Development*, edited by Navroz K. Dubash, (Oxford University Press, 2019), p. 213, https://doi.org/10.1093/oso/9780199498734.003.0012.
[110] Kuh, "The Law of Climate Change Mitigation", p. 506.
[111] Rajamani, "Understanding the 2015 Paris Agreement", p. 213.
[112] "Key Aspects of the Paris Agreement".
[113] Rajamani, "Understanding the 2015 Paris Agreement", p. 213.
[114] "The Paris Agreement", *United Nations Climate Change*, n.d., accessed June 2022, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

the Agreement, which includes extending financial support, capacity building, and facilitating the transfer of technology.[115] Reflecting a principle similar to the Kyoto Protocol, industrialised States are tasked with financially assisting the most vulnerable nations while also encouraging voluntary contributions from other countries. Such financial provisions are aimed at assisting countries in not only reducing their emissions, but also adapting to and mitigating the adverse effects of climate change.[116]

In contrast to the Kyoto the Paris Agreement's obligations apply to all countries, both developed and developing.[117] While grounded in the principle of common, but differentiated responsibility (Article 2), it states that all nations shall work to reduce emissions.[118] Developed countries are expected to substantially cut emissions and transition to low-carbon economies, while developing countries are encouraged to intensify their mitigation efforts and, over time, establish economy-wide emission reduction targets.[119] Unlike the Protocol, the Paris Agreement does not set legally binding emission targets. Instead, it relies on voluntary contributions from countries, including significant emitters like the United States, China, and India.[120] The Agreement emphasises equity, common but differentiated responsibility, and respective capabilities in consideration of diverse national circumstances.[121]

Nonetheless, the Paris Agreement's success hinges largely on the commitment of individual States. Although the UNFCCC underlines the binding nature of the Agreement, it lacks specific penalties for non-compliance.[122] The achievement of the Paris Agreement's goals requires substantial societal change prioritising the wellbeing of people, the planet, and sustainable prosperity beyond mere economic considerations.[123]

iv. UN Sustainable Development Goals

The 17 Sustainable Development Goals (SDGs), adopted in 2015, were conceived by the UN General Assembly (UNGA) as part of the 2030 Agenda. The SDGs aim to create a

[115] "Key Aspects of the Paris Agreement".
[116] "The Paris Agreement".
[117] Kuh, "The Law of Climate Change Mitigation", p. 506.
[118] Paris Agreement, 2015, https://unfccc.int/sites/default/files/english_paris_agreement.pdf.
[119] Kuh, "The Law of Climate Change Mitigation", p. 507.
[120] Klee, "The European Green Deal", p. 17.
[121] Paris Agreement.
[122] "The Paris Agreement".
[123] Santos, "Como responder ao desafio das alterações climáticas", p. 59.

universal framework to eradicate poverty, promote prosperity, ensure welfare for all, protect the environment, and combat climate change.[124] They are interconnected, meaning that actions taken in one area can influence progress in others. Thus, a balance between social, economic, and environmental sustainability is crucial.[125] The SDGs are designed to achieve various objectives by 2030, including the eradication of poverty and hunger (goals 1 and 2); promoting quality health and education (goals 3 and 4); ensuring gender equality (goal 5); providing clean water and sanitation (goal 6); achieving renewable and affordable energy (goal 7); fostering decent work and economic growth (goal 8); promoting industry, innovation and infrastructure (goal 9); reducing inequalities (goal 10); building sustainable cities and communities (goal 11); encouraging sustainable production and consumption (goal 12); addressing climate change (goal 13); protecting marine and terrestrial life (goals 14 and 15); ensuring peace, justice and effective institutions (goal 16); and fostering partnerships for goal implementation (goal 17).[126]

SDG 7 focuses on achieving universal access to renewable energy sources by addressing two key challenges.[127] The first challenge is to meet the growing demand for energy from renewable sources in a fair manner, particularly for the approximately 80% of the global population living in countries with less developed economies. It also aims to provide electricity to those who currently lack it, thus reducing dependence on fossil fuels.[128] The second challenge involves combating energy poverty, which arises in advanced economies due to increasing socio-economic inequalities over the past few decades.[129] It occurs when segments of the population cannot afford the costs necessary for sufficient access to energy, whether for household use, transportation, or other essential needs. SDG 7 aims to tackle this issue and ensure equal access to sustainable energy sources for all.[130]

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[124] The SDGs in Action: What Are the Sustainable Development Goals?", *UNDP*, n.d., accessed June 2022, https://www.undp.org/sustainable-development-goals.
[125] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[126] "The 17 Goals", *United Nations: Department of Economic and Social Affairs*, n.d., accessed June 2022, https://sdgs.un.org/goals.
[127] Filipe Duarte Santos, "Alterações Climáticas e os Objetivos de Desenvolvimento Sustentável", in *Alterações Climáticas*, edited by Filipe Duarte Santos, (Lisboa: Fundação Francisco Manuel dos Santos, 2021), p. 94.
[128] *Ibid*.
[129] *Ibid*.
[130] Brenda Boardmann, Fuel *Poverty: From Cold Homes to Affordable Warmth*, (London, Belhaven Press, 1991), quoted in Santos, "Alterações Climáticas e os Objetivos de Desenvolvimento Sustentável", p. 94.

The SDGs were created through a UNGA resolution and are part of international law.[131] However, they are not legally binding, and States are not legally obliged to transcribe them into their domestic legal frameworks. Nonetheless, this does not equate to their failure to be implemented. Described as a form of "bottom-up" governance, the SDGCs address States and stakeholders who recognise them as a fundamental component in shaping public policies and private investments aligned with an ambitious sustainability agenda.[132]

V. Concluding Remarks

The Earth's atmosphere contains a mixture of natural and anthropogenic gases, referred to as GHG, that play a critical role in maintaining the planet's temperature through the greenhouse effect.[133] While the greenhouse effect was essential for life to develop, the increase in GHG concentrations due to human activities has led to an unprecedented rise in global temperatures and climate change.[134] Fossil fuels, land use changes, and industrial practices are the primary drivers of these emissions.[135]

Scientific research, including reports from the IPCC, confirms that the surge in GHG emissions is predominantly due to human activities.[136] This human-induced climate change is causing a range of severe impacts, from extreme weather events to biodiversity loss, rising sea levels, and more. International frameworks and agreements such as the UNFCCC, the Kyoto Protocol, and the Paris Agreement have been established to combat climate change and promote sustainable development.[137] The Paris Agreement, in particular, sets a global goal to limit temperature rise and encourages nations to submit their emission reduction plans.[138]

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[131] Frank Biermann, Norichika Kanie, and Rakhyun E. Kim, "Global Governance by Goal-Setting: The Novel Approach of the UN Sustainable Development Goals", *Current Opinion in Environmental Sustainability* 26–27 (Elsevier B.V., 2017), p. 26, https://doi.org/10.1016/j.cosust.2017.01.010.
[132] Biermann, Kanie, and Kim, "Global Governance by Goal-Setting: The Novel Approach of the UN Sustainable Development Goals", p. 27.
[133] Santos, "A ciência das alterações climáticas", p. 12.
[134] "A Base Científica das Alterações Climáticas".
[135] Wuebbles, et al., "Our Globally Changing Climate", p. 36.
[136] *Ibid*.
[137] "What is Climate Change?".
[138] Kuh, "The Law of Climate Change Mitigation: An Overview", p. 506.

Renewable energy sources play a crucial role in mitigating the effects of climate change by reducing CO_2 emissions.[139] These sources, such as solar, wind, hydroelectric, and geothermal energy, are clean and abundant, offering solutions to the challenges posed by fossil fuels.[140] Despite obstacles like intermittency and infrastructure costs, advancements in technology and policy are facilitating their integration into the energy landscape.[141]

The SDGs further underline the importance of renewable energy and sustainable development.[142] SDG 7 aims to achieve universal access to renewable energy, addressing energy poverty and promoting equitable access.[143]

As the climate crisis intensifies, it becomes evident that international cooperation and decisive actions are essential.[144] The EU's ambitious EGD stands as a testament to proactive efforts in combating climate change. However, individual, and collective commitment is paramount in achieving the necessary transformation towards a sustainable and resilient future.[145]

Anthropogenic climate change demands a paradigm shift in attitudes and behaviours, transcending national borders and emphasising global responsibility. It is an issue that requires immediate action and collaboration at all levels of society, from individuals to governments and international organisations.[146]

[139] Leitzell, "Climate Change Widespread, Rapid, and Intensifying".
[140] Shinn, "Renewable Energy: The Clean Facts".
[141] Wawryk, "International Energy Law: An Emerging Academic Discipline", p. 226.
[142] "The 17 Goals".
[143] Boardmann, *Fuel Poverty: From Cold Homes to Affordable Warmth*, quoted in Santos, "Alterações Climáticas e os Objetivos de Desenvolvimento Sustentável", p. 94.
[144] Clark, Dennison and Engström, "Climate of cooperation: How the EU can help deliver a green grand bargain".
[145] Constanze Fetting, "The European Green Deal", (Vienna: ESDN Office, December 2020), p. 9, https://www.esdn.eu/fileadmin/ESDN_Reports/ESDN_Report_2_2020.pdf.
[146] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 2.

Chapter 3: The European Green Deal

I. The European Green Deal

Confronted with the increasing severity of climate change's effects, Ursula von der Leyen introduced the European Green Deal in December 2019.[147] The EGD is regarded as the most ambitious climate agreement to date, often likened to a landmark achievement similar to "Europe's moon landing moment".[148] According to the European Commission's communication, this Deal reaffirms the EU's commitment to addressing the climate and environmental challenges of our time.[149] Its primary objective is to decarbonise the European economy, making it more sustainable, competitive, and efficient in its resource use, while ensuring a just and inclusive transition for all.[150] This vision in in harmony with practically all EU policies and is aligned with the overarching objective of the Paris Agreement, which seek to cap the global temperature increase to below 2°C, with a more ambitious goal of limiting it to 1.5°C.[151] To this end, specific targets have been set, including a minimum 55% reduction in GHG emissions by 2030 and achieving carbon neutrality by 2050. Simultaneously, strategies have been proposed to safeguard Europe's natural resources, citizens' health, and wellbeing.[152]

The EGD serves as a comprehensive plan, outlining a range of policies, strategies, and measures across various sectors, including climate action, clean energy, agriculture, biodiversity, sustainable industry, pollution reduction, environmental conservation, oceans, sustainable mobility, tourism, regional development, research, and innovation.[153]

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[147] Lorna Hutchinson, "'Europe's Man on the Moon Moment': Von Der Leyen Unveils EU Green Deal", *The Parliament Magazine*, last modified December 2019, https://www.theparliamentmagazine.eu/news/article/europes-man-on-the-moon-moment-von-der-leyen-unveils-eu-green-deal.
[148] *Ibid*.
[149] European Green Deal [COM(2019) 640 final], p. 2, https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF.
[150] "A European Green Deal: Striving to be the first climate-neutral continent", *European Commission*, n.d., accessed November 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.
[151] Javier Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", *Air Quality, Atmosphere & Health* 15, (January 2022), p. 1335, https://doi.org/10.1007/s11869-022-01156-5.p.1335.
[152] European Green Deal [COM(2019) 640 final], p. 2.
[153] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.

Within this holistic approach, the EGD encompasses multiple policy objectives, such as elevating climate ambitions, ensuring accessible and clean energy, promoting circular and eco-friendly economies, emphasising energy and resource-efficient construction, expediting the shift to sustainable and intelligent transportation, establishing equitable and environmentally conscious food systems, conserving and rehabilitating ecosystems and biodiversity, and striving for a pollution-free environment.[154] Successfully achieving its objectives, depends on the Commission's reliance on broad societal involvement, trust, and access to substantial financial resources.[155] It is essential to involve citizens in the policymaking process and addressing their concerns, particularly regarding employment and residential heating during the transition phase. It is also important to ensure coherent utilisation of policy instruments, including elements such as regulations, standardisation, investments, innovative approaches, national reforms, dialogues with social partners, and international cooperation.[156] Guided by the European Pillar of Social Rights, these actions aim to prevent the exclusion of any individuals or groups, emphasising inclusivity and social equity as core principles.[157]

To address these needs, the European Climate Pact was launched in December 2019. This pact intends to empower individuals to actively participate in climate actions, encouraging them to become advocates, commit to eco-friendly practices, and engage in related events.[158] Its primary objective is to foster dialogue and knowledge exchange across society, promoting understanding of climate change's threats, challenges, and solutions. Simultaneously, it aims to establish physical and virtual platforms for people to express their ideas and creativity, collaborating on ambitious endeavours both individually and collectively. In addition, the pact seeks to amplify civic initiatives related to climate change and environmental preservation through information dissemination, guidance, and educational modules. This initiative adheres to values such as scientific rigour, accountability, transparency, ambition, urgency, contextually relevant actions, diversity, and inclusivity.[159] Therefore, the European Climate Pact holds immense

[154] European Green Deal [COM(2019) 640 final], p. 4.
[155] *Ibid*., p. 2.
[156] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[157] European Green Deal [COM(2019) 640 final], p. 2.
[158] "European Climate Pact" *European Commission*, n.d., accessed November 2021, https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-pact_en.
[159] European Green Deal [COM(2019) 640 final], p. 26.

significance because the success of the EGD hinges on its acceptance and endorsement by the entire European community.[160]

The 2030 Climate Target Plan presented by the Commission, has the objective of meeting GHG emissions reduction targets, with a primary focus on reducing CO_2 emissions.[161] This plan involves several key actions, including the revision of the EU Emissions Trading System (ETS), strengthening policies related to energy efficiency and renewable energy, re-evaluating CO_2 emission standards for transportation, and establishing a Social Climate Fund.[162]

To meet these ambitious goals, the European Commission conducted a thorough assessment of various climate-related policy methods.[163] In response, they unveiled the "Fit for 55" package on July 14, 2021, which comprises a series of regulations designed to establish more stringent environmental standards.[164] Key elements of this package include the revised Renewable Energy Directive, which raises the target for renewable energy in overall energy production from 32% to an even more ambitious 40% by 2030.[165] Additionally, the revised Energy Efficiency Directive mandates that the public sector must annually renovate 3% of its buildings, with the aim of enhancing energy efficiency.[166] Furthermore, the revision of the Energy Taxation Directive proposes a new taxation framework for energy products, aligning it with the updated climate targets.[167]

An essential mechanism for achieving climate neutrality is the EU ETS, which covers large power plants, industrial facilities, and aviation, accounting for about 40% of the EU's total emissions.[168] The revised ETS incorporates lower overall emissions controls, an accelerated annual rate of emissions reduction, the elimination of free emission

[160] "European Climate Pact".
[161] "2030 Climate Target Plan", *European Commission*, n.d., accessed November 2021, https://ec.europa.eu/clima/eu-action/european-green-deal/2030-climate-target-plan_en.
[162] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[163] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[164] "2030 Climate Target Plan".
[165] Directive on the promotion of the use of energy from renewable sources (recast) [2018/2001/EU], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001.
[166] Directive on Energy Efficiency (recast) [COM/2021/558 final]. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0558.
[167] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[168] *Ibid*.

allowances for aviation, and the inclusion of shipping emissions within the EU ETS for the first time.[169]

The European Climate Law was proposed to establish a legislative framework aimed at achieving specific goals: reducing emissions by at least 55% by 2030 and attaining climate neutrality by 2050.[170] It also seeks to guarantee that all policies within the EU are aligned with and contribute to these overarching strategic objectives.[171] This entails the implementation of guiding and monitoring measures, including the governance process for national energy and climate plans in Member States, regular reports by the European Environment Agency, and the utilisation of scientific data to understand and address the impacts climate change.[172] While this law represents a significant step towards combating climate change, it is clear that additional laws and actions, alongside raising public awareness, will be necessary to effectively address this issue.[173] One of the proposed solutions is to encourage the adoption of a circular economy model in all nations.[174]

In addition to the European Climate Law, a new set of regulations has been introduced in the EU to address climate change and work towards climate neutrality. These regulations include higher emissions standards for cars and vans, along with the revised Alternative Fuels Infrastructure Regulation, which mandates the expansion of electricity-charging stations.[175] Additionally, regulations focused on land use, forestry, and agriculture have been adopted to accelerate EU's efforts to remove CO_2 from the atmosphere through natural sinks.[176]

To further address climate challenges, the Commission has proposed the Carbon Border Adjustment Mechanism (CBAM). This measure is designed to mitigate the risk of carbon

[169] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[170] European Climate Law [Regulation (EU) 2021/1119], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1119&from=EN.
[171] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[172] "State of the Union: Commission Raises Climate Ambition and Proposes 55% Cut in Emissions by 2030", *European Commission*, last modified September 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1599.
[173] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1337.
[174] *Ibid*.
[175] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[176] *Ibid*.

leakage, which occurs when EU companies move their carbon-intensive production to countries with less stringent emission targets or when imported products with higher carbon footprint replace EU-produced goods.[177]

Recognising that CO_2 emissions are a universal problem that transcends national borders, the EU acknowledges that its level of ambition alone cannot fully address the issue. Consequently, it needs to engage in effective environmental diplomacy by leveraging its bilateral relations and financial resources.[178] Through these efforts, the EU seeks to encourage neighbouring countries and their partners to adopt sustainable development practices and contribute to global climate action.[179]

In meeting the 2030 Agenda and the SDGs, the Commission intends to reorient the macroeconomic coordination process of the European Semester to prioritise and integrate these goals during policymaking and adoption process. This involves shifting economic policy toward sustainability and citizens' wellbeing. As such, it is crucial to transition the European economy towards a greener future, re-examining policies related to clean energy supply and investing in digital transformation.[180]

However, it is worth noting that the European policy of carbon neutrality may potentially clash with the SDGs. High energy prices can have significant impacts on citizens' welfare, particularly for lower-income households that allocate a larger share of their income to energy expenses.[181] According to the 'Europe Sustainable Development Report for 2021', the average EU SDGs Index slightly declined from 71.4 points in 2019 to 70.7 points in 2020.[182] This was primarily due to the Covid-19 crisis and its impact on life expectancy, poverty and unemployment levels.[183] The most significant declines were observed in SDG 8 (Decent work and economic growth) and SDG 1 (No poverty) due to increased

[177] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[178] Juan Antonio Samper, Amanda Schockling, and Mine Islar, "Climate Politics in Green Deals: Exposing the Political Frontiers of the European Green Deal", *Politics and Governance* 9, no. 2 (April 2021), p. 13, https://doi.org/10.17645/pag.v9i2.3853.
[179] European Green Deal [COM(2019) 640 final], p. 3.
[180] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[181] *Ibid.*
[182] Guillaume Lafortune, et al., "Europe Sustainable Development Report 2021: Transforming the European Union to achieve the Sustainable Development Goals", Paris: SDSN, December 2021, p. 2, https://www.sdgindex.org/reports/europe-sustainable-development-report-2021/.
[183] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.

unemployment and poverty.[184] Drops were also noticeable in certain indicators related to living conditions and access to electricity and energy, such as in SDG 11 (Sustainable cities and communities) and SDG 7 (Affordable and clean energy).[185] Notably, countries with higher SDGs Index scores tended to perform better in the "Leave no one behind" Index.[186]

II. Financing the European Green Deal

To achieve the goals of the EGD, the Commission has established the European Green Deal Investment Plan (EGDIP), also known as the Investment Plan for a Sustainable Europe (SEIP), which constitutes the investment pillar of the EGD.[187] Through this initiative, the Commission aims to allocate at least €1 trillion over the next decade to support sustainable investments.[188] This involves fostering both public and private investments in environmentally friendly projects and assisting sustainable project promoters. Given the transition to a carbon neutral economy's high financial demands, notable investments will be required.[189] For instance, around €260 billion in additional annual investments are necessary to meet the 2030 targets.[190]

To secure the necessary funding for the EGD's success, a combination of resources from the EU budget, related programs, and other public and private investments will be essential.[191] Between 2021 and 2030, approximately €503 billion from the EU budget will be made available, which is projected to attract an additional co-financing of around €114 billion from Member States.[192] Additionally, several programs are proposed to strengthen the European budget between 2021 and 2027. These include the Cohesion Fund and the

[184] Lafortune, et al., "Europe Sustainable Development Report 2021", p. 2.
[185] *Ibid*.
[186] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[187] "The European Green Deal Investment Plan and Just Transition Mechanism Explained", *European Commission*, last modified January 2020, https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24.
[188] European Green Deal Investment Plan [COM(2020) 21) final], p. 2, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0021.
[189] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[190] European Green Deal Investment Plan [COM(2020) 21) final], p. 2.
[191] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[192] European Green Deal Investment Plan [COM(2020) 21) final], p. 6.

European Regional Development Fund, with a total mobilisation of at least €108 billion; the Common Agricultural Policy allocating 40% of its total budget; a minimum of 35% of the Horizon Europe budget; increased funding of up to €5.4 billion for the LIFE program; targeting 60% of the Connecting Europe Facility; and support from the European Social Fund Plus (ESF+) for professional development and retraining of around 5 million individuals.[193] This initiative means to enable them to take on roles within the green economy sector and actively promote sustainable practices.[194]

Attracting private investment will be facilitated through the InvestEU Fund, designed to incentivise sustainable investments, and promote sustainable practices among public and private sector investors.[195] This fund is anticipated to mobilise around €279 billion and will be subject to a climate action monitoring methodology to assess the impact of financing and investment operations on programme climate and environmental goals.[196] A "sustainability assessment" will be introduced, requiring project initiators to evaluate the environmental, climate, and social impacts of their proposals.[197]

Innovation and modernisation funds, derived from the ETS revenues, will secure at least €25 billion.[198] The Innovation Fund will support investments in low-CO_2 technologies and processes in renewable energy and energy-intensive sectors, while the Modernisation Fund will encourage investments in modernising electricity production and energy systems, especially in the Member States with lower incomes.[199]

The European Investment Bank (EIB) will progressively increase its financing share directed at climate action and environmental sustainability.[200] Within the energy sector, the EIB's lending policy will prioritise several key areas, including energy efficiency, renewable energy, the development of new green technologies, and innovative energy

[193] European Green Deal Investment Plan [COM(2020) 21) final], p. 6.
[194] *Ibid*.
[195] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[196] European Green Deal Investment Plan [COM(2020) 21) final], p. 8.
[197] *Ibid*.
[198] *Ibid*., p. 6.
[199] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[200] European Green Deal Investment Plan [COM(2020) 21) final], p. 9.

infrastructure. These priorities are geared towards facilitating the establishment of a low-emission energy system for the future.[201]

To ensure a just transition and avoid leaving anyone behind, the JTM will be established, with approximately €100 billion funded through the EU budget, Member States, and contributions from the InvestEU Fund and the EIB.[202]

To guide these investments, EGD strategies will employ a mix of regulations and incentives, applying the polluter-pays principle to address externalities.[203] Private business and households are expected to play a significant role in sustainable development, prompting the use of frameworks that guide funding towards sustainable investments.[204] Specifically, the Union taxonomy, the financial sector sharing information about sustainability, and the use of climate benchmarks. The Union taxonomy will classify sustainable activities that are environmentally friendly.[205] The concept of sustainability will also be better integrated into the way companies are governed. Additionally, there will be active communication between companies and their employees to effectively manage the process of change.[206]

Simultaneously, the European Semester will offer a framework for coordinating economic and employment policies, helping to identify investment priorities and challenges in each Member State.[207]

III. A Clean Energy Transition

More than 75% of EU's GHG emissions originate from energy production and consumption.[208] Given this, achieving the targets for 2030 and 2050 requires the

[201] Ruven C. Fleming and Romain Mayer, "Green and Just? An Update on the 'European Green Deal'", *Journal for European Environmental & Planning Law* 18, (February 2021), p. 173, https://doi.org/10.1163/18760104-18010010.
[202] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[203] European Green Deal Investment Plan [COM(2020) 21) final], p. 10.
[204] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[205] European Green Deal Investment Plan [COM(2020) 21) final], p. 11.
[206] European Green Deal [COM(2019) 640 final], p. 19.
[207] European Green Deal Investment Plan [COM(2020) 21) final], p. 12.
[208] European Green Deal [COM(2019) 640 final], p. 6.

decarbonisation of EU's energy system.[209] This transformation will be achieved, among other ways, through the adoption of cleaner energy sources.[210] However, for this transition to be successful, it must incorporate and prioritise consumers' needs. In light of this, the Commission has outlined various strategies, including those focused on energy system integration, hydrogen usage, maritime renewable energy, methane management, building renovation, and trans-European energy networks.[211]

The energy system integration strategy, highlighted in the EGD, calls for investments in a more interconnected and circular European energy system.[212] The objective is to safeguard the sustainability of EU's economy while also protecting the environment and biodiversity.[213] In this sense, rather than decarbonising each sector independently, the strategy aims to achieve efficiency gains, maximise energy services, and prioritise energy efficiency. It will also emphasise the electrification of end-use sectors such as buildings and transportation.[214]

Renovating buildings is a key initiative to achieve energy efficiency and EGD objectives, given that buildings account for approximately 40% of total energy consumption and 36% of the EU's energy related GHG emissions.[215] The focus will be on energy poverty, underperforming buildings, public infrastructure, and the decarbonisation of cooling.[216] Where electrification is not feasible or efficient, renewable, and low-carbon fuels like hydrogen will be employed.[217]

In the transport sector, the Commission acknowledges that the goal is to increase its share to around 24% by 2030 through the further development and deployment of electric vehicles, advanced biofuels, and other renewable and low-carbon fuels as part of a comprehensive and integrated approach.[218] The EU aims to impose stricter regulations on

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[209] "A Clean Energy Transition", *European Commission*, n.d., accessed January 2022, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/energy-and-green-deal_en.
[210] European Green Deal [COM(2019) 640 final], p. 7.
[211] "A Clean Energy Transition".
[212] "EU Strategy on Offshore Renewable Energy", *European Commission*, n.d., accessed January 2022, https://energy.ec.europa.eu/topics/renewable-energy/eu-strategy-offshore-renewable-energy_en.
[213] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 168.
[214] EU Strategy for Energy System Integration [COM(2020) 299 final], p. 4, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN.
[215] "Renovation Wave", *European Commission*, n.d., accessed January 2022, https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en.
[216] *Ibid*.
[217] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 168.
[218] *Ibid*.

ships and airplanes under the EU ETS despite recognising certain technical challenges.[219] To achieve this, the Commission plans to propose decreasing the free allocation of allowances for aviation, enhancing the effectiveness of the carbon price signal in this sector.[220]

The hydrogen strategy highlights hydrogen's potential as an emission-free energy source that can be employed for energy transportation, storage, and as raw material or fuel. This makes it a valuable solution for decarbonising industrial processes, as well as sectors like transportation, energy, and buildings.[221]

Marine renewable energy is another essential component of this new energy landscape. Sourced from abundant, natural, and clean resources like wind, waves, and tides, marine energy is not subject to the constraints faced by onshore renewables.[222] This strategy envisions the production of clean electricity at competitive prices or even lower than those from fossil fuel-dependent technologies.[223] Consequently, harnessed through modern technologies that do not emit GHG, marine energy could significantly contribute to EU's transition to clean energy, much like the buildings' renovation strategy.[224] Pursuing this objective, the proposal aims to elevate EU's offshore wind power production capacity from the current 12 GW to a minimum of 60 GW by 2030 and a remarkable 300 GW by 2050. Moreover, this capacity will be augmented with an additional 40 GW from ocean energy and emerging technologies, including floating wind and photovoltaic platforms, wave and tidal energy, and the utilisation of algae for biofuel production, all by 2050.[225]

The strategy for trans-European energy networks aims to interconnect energy infrastructures across EU countries and connect European energy markets with those in

[219] "Net Zero by 2050: A Roadmap for the Global Energy Sector", Paris: IEA, 2021, p. 4, https://www.iea.org/reports/net-zero-by-2050.
[220] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[221] Hydrogen Strategy for a Climate Neutral Europe [COM(2020) 301 final], p. 1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0301&from=EN.
[222] Samper, Schockling and Islar, "Climate Politics in Green Deals: Exposing the Political Frontiers of the European Green Deal", p. 12.
[223] *Ibid*.
[224] "Boosting Offshore Renewable Energy for a Climate Neutral Europe", *European Commission*, last modified November 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2096.
[225] "EU Strategy on Offshore Renewable Energy".

untapped territories.[226] This strategy seeks to foster cross-border relations, facilitate cooperation with partner countries, and promote the integration of renewable energies into EU's energy system.[227]

The EGD also stresses the importance of addressing methane emissions. Methane is the second most important GHG for worsening climate change, after CO_2.[228] Despite its shorter atmospheric lifespan compared to CO_2, CH_4 has a substantial climate impact, contributing to ground-level ozone formation related health problems.[229] Current policies target a 29% reduction in methane emissions in the EU by 2030, compared to 2005 levels.[230]

In compliance with these strategies, EU Member States must establish an integrated National Energy and Climate Plans (NECP) spanning from 2021 to 2030.[231] These plans serve as essential instruments of national energy and climate policy, outlining the envisioned energy and climate aspirations during this decade.[232] NECPs shall detail how Member States intend to address energy efficiency, renewable energy, GHG emission reduction, energy system integration, and research and innovation.[233]

IV. Just Transition Mechanism

The transition to a climate neutral society entails a significant transformation, affecting industries reliant on fossil resources and high-emission sectors.[234] Consequently, regions heavily dependent on these activities will experience substantial socio-economic

[226] "Trans-European Networks for Energy", *European Commission*, n.d., accessed January 2022, https://energy.ec.europa.eu/topics/infrastructure/trans-european-networks-energy_en.
[227] *Ibid*.
[228] "Methane Emissions", *European Commission*, n.d., accessed January 2022, https://energy.ec.europa.eu/topics/oil-gas-and-coal/methane-emissions_en.
[229] *Ibid*.
[230] EU Strategy to Reduce Methane Emissions [COM(2020) 663 final], p. 1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0663&from=EN.
[231] "A Clean Energy Transition".
[232] "Planos Nacionais Para o Setor Energético", *Direção-Geral de Energia e Geologia: Política Energética*, n.d., accessed July 2022, https://www.dgeg.gov.pt/pt/areas-transversais/relacoes-internacionais/politica-energetica/planos-nacionais-para-o-setor-energetico/.
[233] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[234] European Green Deal Investment Plan [COM(2020) 21) final], p. 19.

repercussions, necessitating a redesign of their economies and support for the workforce transitioning into new roles.[235]

The shift towards a greener and environmentally conscious economy demands substantial investment and robust policy measures from the EU.[236] While financial support is required for all countries to implement the EGD policies, some States and some regions face more challenging transitions than others.[237] To address this disparity and ensure a fair and feasible transition, the European Commission introduced the proposal for a regulation establishing the Just Transition Mechanism in January 2020.[238]

The JTM serves to ensure that the transition towards a sustainable economy occurs fairly, leaving no region or individual behind.[239] It strives to create opportunities for all sectors of society, focusing on supporting vulnerable citizens, addressing inequalities, mitigating energy poverty, and levelling the playing field for businesses.[240] This approach is vital for the triumph of the EGD, as it aims to get the support of European citizens, particularly those who will face the greatest difficulties during the transition.[241] The JTM comprises three funding pillars: the Just Transition Fund (JTF), the Just Transition Mechanism under the InvestEU programme, and the Public Sector Credit Mechanism via the EIB. These pillars encompass a range of investment tools and subsidies tailored to the specific needs of each region.[242]

To ensure synergy among the three pillars, the JTF will primarily handle grant allocations, the JTM under the InvestEU Programme will attract private investments, and the Public Sector Credit Mechanism will mobilise public funds. Together, these pillars will have the potential to attract a combined total of €100 billion between 2021 and 2027, to the regions most impacted.[243] Additionally, there is the Modernisation Fund which will distribute

[235] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[236] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 167.
[237] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[238] European Green Deal Investment Plan [COM(2020) 21) final], p. 19.
[239] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[240] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 170.
[241] Fetting, "The European Green Deal", p. 9.
[242] European Green Deal Investment Plan [COM(2020) 21) final], p. 19.
[243] *Ibid*., p. 20.

approximately €14 billion (through carbon pricing) to Member States with industries heavily dependent on coal, including Romania, Bulgaria, Hungary, Latvia, Lithuania, Estonia, the Czech Republic, Poland, Slovakia and Croatia. The goal is to aid these States in executing their energy and climate aspirations for 2030 by modernising their energy systems.[244]

The JTF, as the main investment fund of the JTM, bridges disparities within and between Member States.[245] It aligns with the cohesion policy, the cornerstone of European investment policy, correcting inequalities among regions and facilitating the necessary structural transformations. Managed collaboratively by the Commission and relevant bodies of Member States, the JTF receives €7.5 billion from the EU budget for 2021-2027, supplemented by national co-financing according to the cohesion policy rules. [246]

Additionally, Member States can voluntarily allocate part of their funds from the European Regional Development Fund (ERDF) and the ESF+ to the JTF. This concerted effort is designed to generate public investments ranging from €30 to €50 billion between 2021 and 2027, distributed based on the challenges faced by different territories.[247] The distribution of these funds will be based on the various challenges faced by different territories, including factors such as high levels of unemployment in transitioning sectors, the need for reskilling of affected workers, the financial capacity of the States, and their economic growth rates.[248]

The JTF will moreover extend support for investments in SMEs – including start-ups – seeking to diversify and transition their operations.[249] This comprises initiatives in technologies and infrastructure based on green energy sources, as well as digitalisation efforts – considering the essential role of a digitised Europe in achieving carbon neutrality.[250] The JTF will also promote circular economy initiatives.[251]

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[244] European Green Deal Investment Plan [COM(2020) 21) final], p. 21.
[245] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[246] European Green Deal Investment Plan [COM(2020) 21) final], p. 21
[247] *Ibid*., p.22.
[248] *Ibid*.
[249] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 172.
[250] Guayo, Íñigo del and Álvaro Cuesta, "Towards a Just Energy Transition: A Critical Analysis of the Existing Policies and Regulations in Europe", *Journal of World Energy Law & Business* 15, no. 3 (June 2022), p. 5, https://doi.org/10.1093/jwelb/jwac010.
[251] European Green Deal Investment Plan [COM(2020) 21) final], p. 22.

For Member States to access the support provided by the JTF, they must develop territorial transition plans in line with the European Semester and aligned with their NECPs. These plans should outline the regions most impacted by the transition and detail the economic and social challenges they will confront.[252]

Furthermore, as a complementary measure to the JTF, the Next Generation EU programme – established to aid Member States and their populations in recovering from the repercussions of the Covid-19 pandemic – plans to allocate 37% of its Recovery and Resilience Mechanism budget to address the challenges posed by the green transition.[253]

The JTM under the InvestEU Programme operates within the broader framework of the InvestEU, stimulating investment, innovation, and job creation throughout Europe from 2021 to 2027.[254] Compared to the JTF, this instrument encompasses wider scope of projects, extending support to initiatives that address low-GHG and enhance climate-resilience.[255] These projects include endeavours such as renewable energy development and energy optimisation programmes.[256]

As a complementary counterpart to the JTF, the JTM under the InvestEU Programme injects an additional €650 billion into the efforts to achieve EU's objectives. Within this allocation, it is estimated that up to €45 billion in investments could be realised between 2021 and 2027, with a primary focus on regions that experience the most significant impacts from the transition.[257]

The JTM under the InvestEU functions through a comprehensive approach. It extends support not only to those who directly finance projects in territories covered by the Just Transition Territorial Plan (JTTP), but also to indirect financiers.[258] This comprehends project promoters located within the targeted regions as well as financiers located elsewhere who are dedicated to addressing the challenges brought about by the economic

[252] European Green Deal Investment Plan [COM(2020) 21) final], p. 22.
[253] Fetting, "The European Green Deal", p. 6.
[254] European Green Deal Investment Plan [COM(2020) 21) final], p. 23.
[255] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 170.
[256] European Green Deal Investment Plan [COM(2020) 21) final], p. 23.
[257] *Ibid*.
[258] "Just Transition Funding Sources", *European Commission*, n.d., accessed December 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism/just-transition-funding-sources_en.

restructuring, as outlined in the JTTP.[259] This approach acknowledges that various stakeholders have a role to play in facilitating the transition, whether they are physically located within the affected regions or not.[260] For instance, financiers supporting the development of green energy and transportation infrastructure, even if not situated in the transition-affected regions, are eligible to benefit from this mechanism.[261]

The Public Sector Credit Mechanism, advanced through the EIB, bolsters public sector investments within the regions that are most affected by the transition.[262] This mechanism offers favourable credit terms and supports investments through interest reductions or direct financial backing.[263] In collaboration with the loans sanctioned by the EIB for municipal, regional, and other public authorities, the EU has the capacity to offer interest reductions and investment support, using funds from the EU budget.[264] To this end, this instrument is projected to bring together a total of €25 to €30 billion between 2021 and 2027. Within this amount, €1.5 million will be attributed to the EU budget's involvement, while the remaining funds, totalling €10 billion, will be derived from lending carried out by the EIB, with its associated account and associated risk.[265]

The geographical coverage of this third pillar aligns with that of the JTM under the InvestEU Programme. The support provided by this pillar is designed to complement the assistance offered through the InvestEU.[266] Both mechanisms incorporate advisory services to facilitate the development of a robust project pipeline.[267] Through these measures, the Public Sector Credit Mechanism aims to enhance public sector investments in areas most impacted by the transition while collaborating with the EIB to offer financial support and mitigate risks.[268]

In essence, the JTM aims to comprehensively address the triad of transition challenges: individuals, businesses and industries, and States and regions.[269] It strives to forge

[259] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 173.
[260] *Ibid*.
[261] "Just Transition Funding Sources".
[262] European Green Deal Investment Plan [COM(2020) 21) final], p. 24.
[263] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 173.
[264] European Green Deal Investment Plan [COM(2020) 21) final], p. 24.
[265] *Ibid*.
[266] *Ibid*.
[267] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 174.
[268] European Green Deal Investment Plan [COM(2020) 21) final], p. 24.
[269] "The European Green Deal Investment Plan and Just Transition Mechanism Explained", *European Commission*, last modified January 2020, https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24.

pathways for employment within the green sectors, equip transitioning workers with essential skills, bolster energy efficiency in households, combat energy poverty, and promote accessible and cost-effective clean energy utilisation.[270] For businesses, the JTM aids in transitioning towards low-carbon technologies, facilitates financial mobilisation, fosters entrepreneurial ventures, and nurtures research and innovation.[271] Moreover, it extends support to States and regions in their economic overhaul by facilitating job creation, sustainable investments, and affordable loans aimed at sustaining the transition process.[272]

Beyond its financial support, the JTM goes further. Administered through the Platform for a Just Transition by the Commission, it also offers technical and advisory guidance to Member States, regions, and investors engaged in formulating territorial transition plans.[273] This all-encompassing approach aims to ensure active participation from affected communities, local authorities, social partners, and non-governmental organisations.[274] In this way, the JTM is accessible to all EU Member States but is particularly attuned to regions and territories most dependent on carbon-intensive activities or heavily engaged in fossil fuel-dependent sectors.[275]

The strategy adopts a multifaceted approach, targeting the wellbeing of populations, the adaptation and success of businesses and industries, and the resilience of States and regions during the transition.[276] By extending employment opportunities, enabling skill adaptation, enhancing energy efficiency, and facilitating clean energy access, the JTM safeguards the interests of individuals. It encourages business transformation through support for low-carbon technologies, financial mobilisation, enterprise creation, and innovation.[277] Concurrently, it assists States and regions in navigating the transition,

[270] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[271] *Ibid*.
[272] *Ibid*.
[273] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 174.
[274] European Green Deal Investment Plan [COM(2020) 21) final], p. 25.
[275] *Ibid*.
[276] "The Just Transition Mechanism: Making Sure No One Is Left Behind", *European Commission*, n.d., accessed December 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en.
[277] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 386.

boosting job creation, sustainable investments, and affordable loans aimed at advancing renewable energy projects, public transportation, and economic diversification.[278]

V. Concluding Remarks

The EGD represents a holistic approach to making the EU's economy sustainable and carbon neutral. Covering various sectors like energy, transportation, and agriculture, the EGD aims to achieve a 55% reduction in emissions by 2030 and carbon neutrality by 2050.[279] Recognising the complexity of this historic transition, detailed planning all the way to 2050 may not be feasible, making it imperative to delineate initial steps and continually assess key developments by 2030.[280] This approach allows for learning and adaptation as the journey toward sustainability and carbon neutrality unfolds.[281]

According to the IEA, policymakers will be confronting challenges in crafting energy transition policies that maintain macroeconomic stability and social wellbeing.[282] Reducing fossil fuel consumption can lead to reduced public and export revenues in some countries. Moreover, transitioning away from fossil fuels in the short term may result in unemployment in the energy sector and additional budgetary pressures for job creation, reskilling, and other social measures subsidised by the State.[283] To navigate these challenges and ensure the success of the EGD, a key component will be the EGDIP, supported by a substantial fund of €1 trillion. This plan serves as a catalyst for sustainable investments, catering to both public and private sectors, and is poised to accelerate the transition towards a carbon neutral economy.[284] Anchored by key pillars such as energy system transformation, renewable energy expansion, and a commitment to a just transition for all stakeholders, the EGDIP embodies the aspiration for a greener, more equitable future.[285]

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[278] "The Just Transition Mechanism: Making Sure No One Is Left Behind".
[279] European Green Deal [COM(2019) 640 final], p. 2.
[280] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 100.
[281] *Ibid*.
[282] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 2.
[283] *Ibid*.
[284] "The Just Transition Mechanism: Making Sure No One Is Left Behind".
[285] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".

Critics of the EGD have raised valid concerns about its general consideration of critical elements such as resource availability, implementation tools, policies, and social fairness. These concerns emphasise the need to acknowledge the different socio-economic structures and energy resources between and within Member States, highlighting the importance of tailoring strategies to individual circumstances.[286]

The EGD, however, acknowledges the socio-economic complexities and disparities that may arise during this transformative journey. To address these challenges, the JTM was established, offering targeted support to regions heavily impacted by the transition.[287] With its three pillars – the JTF, InvestEU, and the Public Sector Credit – the JTM fosters financial assistance, private investment, and public sector credits to facilitate a smooth transition process.[288]

Engaging citizens as active participants is paramount, and the European Climate Pact plays a pivotal role in nurturing this involvement. By fostering responsible values and encouraging grassroots initiatives, the Pact aligns citizens with the broader goals of the EGD, reinforcing the collaborative and community-driven spirit that is essential for success.[289]

In essence, the EGD signifies not just an environmental endeavour, but a visionary proposal for a sustainable, inclusive, and equitable future.[290] Its multidimensional approach, underpinned by the EDGIP and the JTM, emphasises the EU's commitment to leading the fight against climate change. As we collectively embark on this transformative journey, the EGD's principles of sustainability and carbon neutrality stand as beacons guiding us toward a brighter, more environmentally responsible tomorrow.[291]

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[286] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 100.
[287] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[288] European Green Deal Investment Plan [COM(2020) 21) final], p. 19.
[289] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p. 10.
[290] "Delivering the European Green Deal", *European Commission*, n.d., accessed July 2022, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en.
[291] *Ibid*.

Chapter 4: Critical Analysis

I. Challenges to the success of the European Green Deal

i. European Green Deal and European Environmental Law

In the wake of significant events in the field of international law, such as the Paris Agreement signing and the establishment of the 2030 Agenda for Sustainable Development along with the UN SGDs, a series of legislative advancements and political agreements within the EU have enabled the integration of climate-related regulations into its legal framework.[292] In this context, the European Green Deal, a political commitment comprising a set of measures and strategies designed to address the worsening effects of climate change and safeguard the environment, was seen as an opportunity to reshape EU's regulatory landscape.[293] Notwithstanding, this is not the first time the Commission emphasises the deteriorating climate situation and the need for environmental protection policies. Back in 1971, the Commission issued its initial communication on the environment, defining it as the intricate elements shaping our world, highlighting the principles of integration and sustainable development, which were subsequently incorporated into EU's Treaties and influenced its laws.[294]

In the 1970s, environmental concerns gained traction in European legislative governance. Between 1970 and the mid-1990s, an environmental framework was established within the European Community, marked by the tension between the internal market and environmental preservation.[295] While EU's primary goal was to create a unified market fostering trade among Member States, environmental considerations gradually grew in significance among its political and economic priorities.[296] A turning point arrived in 1972, with the Paris Conference of Heads of State and Government, where economic development was positioned not as an end in itself, but as a means to enhance quality of

[292] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1333.
[293] Alicja Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", *ERA Forum* 21 (November 2020), p. 683, https://doi.org/10.1007/s12027-020-00637-3.
[294] *Ibid*., p. 684.
[295] *Ibid*., p. 685.
[296] Martin Hedmann-Robinson, *Enforcement of European Union Environmental Law: Legal Issues and Challenges*, 2nd ed., (New York: Routledge, 2015), p. 1, https://doi.org/https://doi.org/10.4324/9780203074848.

life.[297] The Stockholm Declaration on the Human Environment conveyed that same year, led to the conception of the first Environmental Action Programme (EAP).[298] The EAPs, set forth in Article 192(3) of the Treaty on the Functioning of the European Union (TFEU), outline environmental goals and strategies to achieve them, binding Member States to implement them during each programme's validity.[299] According to Orlando (2014), these steps marked the beginning of European environmental policy.[300]

The Single European Act (SEA) of 1986 introduced a significant change by amending the EU's founding Treaties to include objectives of environmental preservation, public health protection, and sustainable use of natural resources.[301] The SEA laid the foundation for explicit legal jurisdiction in environmental matters under Article 130 r-t (today Articles 191-193 TFEU), granting the Council specific powers in environmental policy.[302] It also introduced key principles like the preventive action and the polluter-pays principles.[303] With the Maastricht Treaty ratification, international-level measures to tackle environmental problems were added to the EU's objectives.[304] The sustainable development concept took root with the Treaty of Amsterdam in 1998, while climate change's prominence led to strategies integrating GHG emission reduction concerns across sectors including industry, transport, energy and construction, within the framework of EU environmental legislation and strategy.[305] This integration culminated in the establishment of the Directorate-General for Climate Action, stressing EU's strong stance in this domain. A pivotal development during this period was the development of the 20-20-20 Agreement, which aimed at cutting GHG emissions, enhancing energy efficiency, and increasing the use of renewable energy sources.[306] The Treaty of Lisbon's

[297] David Langlet, and Said Mahmoudi, *EU Environmental Law and Policy*, 1st ed., (New York: Oxford University Press, 2016), p. 33, https://doi.org/10.1093/acprof:oso/9780198753926.002.0003.
[298] Emanuela Orlando, "The Evolution of EU Policy and Law in the Environmental Field: Achievements and Current Challenges", in *The EU, the US and Global Climate Governance*, edited by Christine Bakker and Francesco Francioni, (Ashgate, 2014), p. 3, https://www.researchgate.net/publication/281205163_The_Evolution_of_EU_Policy_and_Law_in_the_Environmental_Field.
[299] Hedmann-Robinson, *Enforcement of European Union Environmental Law*, p. 18.
[300] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 3.
[301] Langlet and Mahmoudi, *EU Environmental Law and Policy*, p. 33.
[302] Ana Maria Guerra Martins, "Da criação das Comunidades Europeias até ao Ato Único Europeu", in *Manual de Direito da União Europeia*, edited by Ana Maria Guerra Martins, 2nd ed., (Lisboa: Edições Almedina, S.A., 2019), p. 96.
[303] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 4.
[304] Langlet and Mahmoudi, *EU Environmental Law and Policy*, p. 33.
[305] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 685.
[306] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 9.

ratification in 2009 further solidified EU's commitment to combatting climate change and advancing sustainability in its international relations. These objectives gained explicit recognition as paramount policy goals within EU's overall framework.[307]

The European Court of Justice (ECJ) played a crucial role in shaping and strengthening environmental policy by filling the void left by the nonexistence of specific treaties endorsing EU institutions' environmental actions. The ECJ's approach was to leverage Article 114 TFEU when EU's actions aligned with the internal market's objectives,[308] and Article 352 TFEU when necessary to achieve EU's objectives related to environmental protection and quality of life.[309] These provisions were not originally dedicated to the environment, instead, the ECJ interpreted them in a way that allowed EU institutions to enact environmental measures under the pretext of serving the internal market objectives and the broader aims of enhancing quality of life and environmental protection.[310]

This innovative approach heralded a transformation in the evolution of EU environmental policy.[311] Furthermore, the ECJ also contributed to clarifying the connection between environmental protection and other climate-related objectives.[312] Through its legal decisions, the ECJ established a balance between environmental protection and market integration. It was among the first institutions to apply the principle of environmental integration, asserting that in specific contexts, environmental protection could warrant the imposition of trade embargoes on goods from Member States.[313] For instance, in the *Danish Bottle case*,[314] the Court applied the principle of environmental integration, asserting that, as outlined in the *Cassis de Dijon case*,[315] environmental protection could justify trade restrictions on goods from other Member States under specific

[307] Christian Kurrer, "Environment Policy: General Principles and Basic Framework", *European Parliament: Fact Sheets on the European Union*, last modified October 2021, https://www.europarl.europa.eu/factsheets/en/sheet/71/politica-ambiental-principios-gerais-e-quadro-de-base.
[308] ECJ 1980, *Commission v. Italy*, C-92/79, ECR 1115, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61979CJ0092.
[309] ECJ 1982, *Commission v. Belgium*, C- 68-73/81, ECR 1981.
[310] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 5.
[311] *Ibid*., p. 6.
[312] *Ibid*.
[313] *Ibid*.
[314] ECJ 1988, *Commission v Denmark*, Case 302/86, ECR 4607, https://eur-lex.europa.eu/resource.html?uri=cellar:672ac3d2-ebcc-4078-8282-8e14e241c073.0002.03/DOC_1&format=PDF.
[315] ECJ 1979, *Rewe-Zentral AG v Bundesmonopolverwaltung fur Branntwein*, C-120/78, ECR 1979, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61978CJ0120.

circumstances.[316] One notable case involved the validity of certain provisions of the Commission's Directive on waste oil disposal, where the ECJ affirmed that "environmental protection is one of the Community's essential objectives".[317] To support this assertion, the ECJ highlighted that "the principle of freedom of trade is not absolute but is subject to certain limits justified by the objectives of the general interest pursued by the Community".[318]

In the years succeeding the implementation of the SEA, conflicts arose regarding the appropriate legal basis for EU measures addressing both internal market and environmental objectives. These disputes were partly due to differences in decision-making procedures and voting requirements for legislative measures related to these two areas.[319] The *Titanium Dioxide case* exemplified this tension.[320] It concerned the annulment of Directive 89/428,[321] aimed at harmonising national rules to reduce pollution from the Titanium Dioxide industry.[322] The ECJ ruled that the Directive could be based on Article 100a SEA, which required qualified majority voting in the Council, rather than Article 130s, which demanded unanimity.[323] This case underscored the ongoing institutional struggle between the intergovernmental stance of the Council and the more supranational approach of the Commission. The ECJ's decision was pivotal in shaping the treaty framework for environmental policymaking, indicating a potential shift toward extending qualified majority voting in environmental matters and emphasising the ECJ's role as a significant driver of political change.[324]

A striking illustration of the growing importance of environmental quality in Europe is the *Urgenda v State of the Netherlands case*.[325] This legal dispute stands out as one of the

[316] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 8.
[317] ECJ 1983, *Procureur de la République v. Association de Défense des Bruleurs d'Huiles Usagées*, C-240/83, ECR 1985, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61983CJ0240.
[318] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 8.
[319] *Ibid*.
[320] ECJ 1991, *Commission v. Council* (Titanium Dioxide), C-300/89, ECR I-2867, https://eur-lex.europa.eu/resource.html?uri=cellar:8355eeb7-8899-414d-a2e9-f8e26705a37d.0002.06/DOC_2&format=PDF.
[321] Directive on Procedures for Harmonizing the Programmes for the Reduction and Eventual Elimination of Pollution Caused by Waste from the Titanium Dioxide Industry (89/428/EEC), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31989L0428.
[322] *Ibid*.
[323] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 8.
[324] *Ibid*., p. 9.
[325] *Urgenda Foundation v. State of the Netherlands*, [(2015) HAZA C/09/00456689], https://climatecasechart.com/non-us-case/urgenda-foundation-v-kingdom-of-the-netherlands/.

first legal cases to address climate change and attribute environmental liability to a government.[326] In 2015, the Hague District Court, guided by the precautionary principle, rendered a judgement declaring that the Dutch government was under a legal obligation to implement more stringent measures aimed at reducing GHG emissions.[327] This case is remarkable due to its ground-breaking nature – it marked the first occasion where a court issued specific directives to a government, instructing it to take concrete actions to combat climate change in accordance with legal principles. Despite the Dutch State lodging an appeal with the Court of Appeals, the initial ruling was upheld in 2018.[328] This reaffirmed the government's duty to safeguard its citizens and address the pressing urgency of climate change mitigation.[329] Moreover, *Urgenda v State of the Netherlands* carries substantial importance beyond its local implications. It has inspired similar legal actions in numerous countries, including Germany, Australia, Belgium, Canada, and Ireland, among others.[330] This trend demonstrates how the case can be perceived as an instrument for promoting climate action.[331]

Considering the aforementioned, we observe that the EU has gradually established jurisdiction in addressing various aspects of environmental policy over time. This competence is firmly rooted in Articles 11, 191-193 TFEU.[332] The guiding principles of precaution, prevention, addressing pollution at its source, and the polluter-pays principle form the foundation of European environmental policy.[333] However, it is important to recognise that this authority is limited by the principle of subsidiarity, which ensures decisions are made at the appropriate level, and by the requirement of unanimous agreement in the Council for certain matters such as spatial planning, land use, water resource management, energy source selection, and energy supply structure.[334] The EU's climate targets, which are outlined in various documents and agreements, reflect a holistic

[326] "Landmark Decision by Dutch Supreme Court", *Urgenda*, accessed September 2022, https://www.urgenda.nl/en/themas/climate-case/.
[327] "Climate Case Explained", *Urgenda*, https://www.urgenda.nl/en/themas/climate-case/climate-case-explained/.
[328] Joana Setzer and Dennis van Berkel, "Urgenda v State of the Netherlands: Lessons for international law and climate change litigants", *The London School of Economics and Political Science*, n.d., last modified December 2019, https://www.lse.ac.uk/granthaminstitute/news/urgenda-v-state-of-the-netherlands-lessons-for-international-law-and-climate-change-litigants/.
[329] "Climate Case Explained".
[330] Setzer and Berkel, "Urgenda v State of the Netherlands".
[331] *Ibid*.
[332] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1333.
[333] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 6.
[334] *Ibid*.

approach.[335] Key elements include sustainability, a robust level of environmental protection, and the enhancement of environmental quality. These principles are interwoven throughout European legislation and are underpinned by Article 3 of the Treaty on European Union (TEU), Article 191(2) TFEU, and Article 37 of the Charter of Fundamental Rights of the EU.[336] In essence, the EU's authority in environmental matters is clearly delineated by legal articles, while its actions are guided by core principles that ensure environmental responsibility, protection, and quality improvement. These principles are deeply embedded in the EU's legal and ethical framework, contributing to a comprehensive and unified approach to environmental policy.[337]

In the context of this legal juncture, the EDG comes into play. The EGD does not constitute a law in itself; rather, it serves as a comprehensive policy strategy designed to accomplish significant objectives like enhancing energy efficiency, achieving decarbonisation, facilitating a just transition to a sustainable economy, and promoting effective environmental diplomacy.[338] From a legal point of view, the EGD is the Commission's communication, making it an EU policy instrument classified as soft law. As such, it lacks binding force.[339] However, legal precedent indicates that it might still generate certain legal consequences. Furthermore, the provisions of soft law must be respected by Member State authorities in accordance with the principle of sincere cooperation outlined in Article 4(3) TEU. This principle mandates that Member States must take appropriate measures to fulfil obligations arising from EU Treaties or institution acts while refraining from actions that could undermine Union objectives.[340] Additionally, strategies and goals within the EGD, such as the European Climate Law, the Fit for 55 Package, the Circular Economy, and biodiversity strategies, shall be implemented through amendments to EU legislation and regulations, as well as the introduction of new legislative proposals.[341]

When analysing the EGD in light of classical sources of EU environmental law, particular emphasis should be placed on two sources: EAPs and environmental principles derived

[335] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 686.
[336] *Ibid*.
[337] *Ibid*.
[338] "Delivering the European Green Deal".
[339] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 687.
[340] *Ibid*., p. 688.
[341] "Delivering the European Green Deal".

from Article 191(2).[342] EAPs, enshrined in line with Article 192(3) TFEU, refer to "general action programmes adopted by the European Parliament and the Council through an ordinary legislative procedure".[343] These programmes lay out a general policy framework for European environmental policy and provide a roadmap for action, specifying main priorities and, where necessary, particular measures.[344] Given their establishment through an ordinary legislative procedure, these programs hold legal force and impose obligations on both EU institutions and Member States. As such, EAPs do not fall under the category of soft law; instead, they are considered hard law, carrying legal weight that can lead to sanctions if not adhered to.[345]

The general principles guiding EU environmental legislation and policy, including the precautionary principle, preventive action, correction at source and polluter-pays, shall also be observed by the EU institutions when drawing up environmental policy and by the Member States in implementing EU law.[346] These principles, outlined in Article 191(2) TFEU, were established to rectify disparities in the execution of environmental policies among diverse EU regions and to ensure robust environmental protection.[347] Although they do not create immediate legal rights, courts have drawn on them in interpreting and applying EU environmental law, reinforcing the notion of a legal responsibility for environmental protection and sustainability.[348]

According to Sikora's (2020) analysis, the decision not to structure the EGD as an EAP gives rise to questions about the reasoning behind this particular choice. This leads us to wonder why this specific approach was not taken, especially when considering the immense significance of the Green Deal in confronting climate change and achieving carbon neutrality by 2050 to prevent a crucial "point of no return".[349]

Moreover, Sikora observes that the Commission's communication regarding the EGD does not explicitly mention the fundamental principles that guide EU environmental

[342] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 688.
[343] *Ibid*.
[344] "Environment Action Programmes", *Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection*, n.d., accessed July 2022, https://www.bmuv.de/en/topics/europe-international/europe/environment-action-programmes.
[345] *Ibid*.
[346] Kurrer, "Environment Policy: General Principles and Basic Framework".
[347] *Ibid*.
[348] Anna Lavelle, and Jonathan Wentworth, "EU Environmental Principles", *UK Parliament*, last modified November 2018, https://post.parliament.uk/research-briefings/post-pn-0590/.
[349] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 688.

legislation and policy.[350] Instead, it solely focuses on the economic aspects of sustainable development. Nevertheless, taking into account the EGD's role as a political tool, there is a sense of optimism that as its objectives become formally established in legal terms, they will comprehensively incorporate and uphold the fundamental principles that serve as the bedrock of European environmental policy.[351]

Furthermore, it is worth mentioning the absence of any reference to the principle of environmental integration stipulated in Article 11 TFEU.[352] This principle acknowledges the interconnected nature of the environment and emphasises the requirement to consider it in the implementation of all policies, plans, programmes, or activities that could lead to detrimental effects on the natural environment.[353]

Ultimately, the EGD represents a valuable opportunity for the EU to bolster its leadership in addressing climate change and promoting sustainability. However, to guarantee the success of this initiative, it is vital to thoughtfully integrate the principles and guidelines already entrenched in EU environmental legislation.[354]

ii. Safe, clean and affordable energy

The EGD encompasses a comprehensive set of policies to ensure carbon neutrality in EU economy by 2050.[355] Nevertheless, within this broader context, this subchapter will focus on the policy related to the provision of clean, affordable, and secure energy. The significance of this policy stems from the fact that the energy sector contributes to a substantial proportion of global GHG emissions, with a similar trend observed in the EU where energy production and usage are major contributors to GHG emissions.[356]

[350] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 689.
[351] *Ibid*.
[352] Rafael Lima Daudt d'Oliveira, "O Princípio da Integração Ambiental e as Energias Renováveis", (diss., Faculdade de Direito da Universidade de Coimbra, 2016), p. 3, https://eg.uc.pt/bitstream/10316/40141/2/Rafael%20Oliveira.pdf.
[353] *Ibid*.
[354] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 689.
[355] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[356] European Green Deal Investment Plan [COM(2020) 21) final], p. 6.

According to the UN' net-zero coalition, approximately three-quarters of worldwide GHG emissions emanate from the energy sector.[357]

As the EU works to becoming climate neutral by 2050 and has set ambitious targets for 2030, decarbonisation becomes a critical objective.[358] This involves transitioning to a renewable energy-based sector, phasing out coal, and decarbonising the gas sector. To this end, Member States must align their climate and energy ambitions with those of the EU, and ensure that the transition to clean energy remains economically viable for consumers.[359] Equally important is the widespread endorsement and successful implementation of this policy by society. This entails ensuring that the use of clean energy offers advantages to consumers, particularly by not incurring higher costs compared to the traditional fossil fuel-based energy systems. Moreover, the policy must guarantee energy security, assuring citizens of a consistent energy supply.[360] To fulfil these goals, the "Clean Energy for All Europeans" package, specifically Regulation (EU) 2019/941, requires cooperation, solidarity and transparency among Member States.[361] This regulation calls for collaboration among the States, demonstrating mutual support and shared responsibility. This collective effort strengthens the transition's effectiveness and engenders trust among stakeholders, including citizens, in the transition to cleaner energy sources.[362]

Recognising energy as a fundamental and cross-cutting service essential for various sectors including agriculture, services, industry, environment, transport, innovation, and foreign policy, the EU's energy policies have evolved over distinct phases.[363] As such, it has always played a very important role in Europe's geopolitics and geostrategy. This significance has endured from EU's inception and retains a critical role in its ongoing process of integration.[364] According to Hafner & Raimondi (2020), the evolution of the

[357] "For a Livable Climate: Net-Zero Commitments Must Be Backed by Credible Action".
[358] European Green Deal [COM(2019) 640 final], p. 4.
[359] *Ibid*.
[360] "A Clean Energy Transition".
[361] Risk-preparedness in the Electricity Sector [Regulation (UE) 2019/941], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0941&from=PT.
[362] "A Clean Energy Transition".
[363] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[364] *Ibid*.

European project can be categorised into three distinct phases that mirror the EU's varying approaches to energy.[365]

The initial phase emerged in the aftermath of World War II, marked by a pressing need to safeguard energy security. During this period, the founders of the European Economic Community (EEC) took strategic measures to put the "means of war at the service of peace".[366] This was achieved by establishing the foundations of the first two European Treaties: the European Coal and Steel Community (ECSC) and the European Atomic Energy Community (Euratom). This era marked the establishment of coal, steel, and nuclear energy as cornerstones of the EU's energy landscape.[367] The subsequent phase, commencing in the 1980s, was characterised by increased internal market competition and the absence of a broad legal basis and cohesive energy policy.[368] The contemporary and concluding phase is marked by persistent endeavours to uphold European energy competitiveness and ensure energy supply security. However, the predominant hallmark of this phase lies in the pressing environmental imperatives. Consequently, this era is witnessing the widespread adoption of environmental policies and an imperative to foster sustainable development. Throughout these phases, energy's pivotal role in shaping the geopolitical and geostrategic landscape of Europe has remained consistently relevant.[369] This dynamic evolution of energy policies has mirrored the broader shifts in the European project and its aspirations, ranging from security concerns to market competitiveness and, more recently, environmental sustainability.[370]

Against this background, the establishment of an ambitious energy and climate policy emerges as a paramount goal for the EU, intending to provide its citizens with energy that is secure, sustainable, competitive, and economically feasible. This aspiration has

[365] Manfred Hafner and Pier Paolo Raimondi, "Priorities and Challenges of the EU Energy Transition: From the European Green Package to the New Green Deal", *Russian Journal of Economics* 6 (December 2020), p. 376, https://doi.org/10.32609/J.RUJE.6.55375.
[366] *Ibid*.
[367] *Ibid*.
[368] *Ibid*.
[369] *Ibid*.
[370] *Ibid*.

prompted the emergence of initial strategies aimed at reshaping the European energy landscape.[371]

In 2015, a significant political initiative was introduced, envisioning the creation of an Energy Union grounded in principles of energy integration and liberalisation of the energy market.[372] This union is founded upon notions of competition, efficient resource usage, and reinforced market regulation, all with the overarching objective of contributing to the establishment of a European economy characterised by sustainability, low GHG emissions, and environmental compatibility.[373] This strategy envisions Europe as a leader in renewable energy production and the fight against global warming, simultaneously seeking to foster economic growth. These goals are rooted in the three energy policy objectives: ensuring supply security, fostering sustainability, and enhancing competitiveness. This strategy's pivotal priorities include fortifying energy security, harmonising the internal energy market, advancing energy efficiency, driving economic decarbonisation, and catalysing research, innovation, and competitiveness in the realm of energy.[374]

In 2016, the European Commission introduced a comprehensive package of proposals aimed at achieving the objectives laid out in the Energy Union strategy.[375] This legislative package, titled "Clean energy for all Europeans", comprises a number of initiatives, including the Directive on Energy Efficiency,[376] the Directive on Renewable Energy,[377] the Directive on Electricity Market,[378] and Regulation,[379] as well as the Regulation on governance rules for the Energy Union.[380] Within this package, measures were included

[371] Luís Gil, "Política Energética no Contexto da União Europeia", (Lisboa: INGENIUM, 2021), p. 95, https://comum.rcaap.pt/bitstream/10400.26/38046/1/Politica%20energética%20no%20contexto%20da%20União%20Europeia.pdf.
[372] *Ibid*.
[373] *Ibid*.
[374] *Ibid*.
[375] Matteo Ciucci, "Energy Policy: General Principles", *European Parliament: Fact Sheets on the European Union*, last modified October 2021, https://www.europarl.europa.eu/factsheets/en/sheet/68/energy-policy-general-principles.
[376] Directive on Energy Efficiency [(UE) 2018/2002)], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2002&from=PT.
[377] Directive on the Promotion of the Use of Energy from Renewable Sources [(UE) 2018/2001], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=PT.
[378] Directive on Common Rules for the Internal Market for Electricity [(UE) 2019/944], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0944&from=PT.
[379] Regulation on the Internal Market for Electricity [(UE) 2019/943], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=PT.
[380] Ciucci, "Energy Policy: General Principles".

to invigorate innovation in the sphere of renewable energy, revitalise Europe's buildings, foster both public and private investment, bolster competitiveness, and mitigate the adverse impacts of transitioning towards a greener economy.[381]

In 2018, the enactment of the Renewable Energy Directive (also known as RED II), represented a notable achievement. This directive, which updates its predecessor RED I adopted in 2009, is intended to uphold Europe's leadership in the energy transition and ensure fulfilment of the GHG emission reduction commitments under the Paris Agreement.[382] Binding targets were set to achieve a 40% reduction in GHG emissions compared to 1990 levels, augment European energy efficiency by no less than 32.5%, and establish a 32% contribution of renewable energy sources in the final energy consumption.[383] Furthermore, the Commission's Energy Roadmap 2050 emphasised the necessity to achieve at least an 85-90% reduction in GHG emissions compared to 1990 levels, recognising that ambitious reductions are imperative for the successful decarbonisation of the economy.[384]

In 2019, a significant milestone was reached with the introduction of the EGD.[385] Subsequently, in July 2021, the Commission unveiled the comprehensive "Delivering the European Green Deal" package, which stands as the most ambitious effort to date.[386] This initiative commits both the EU and its Member States to a momentous endeavour: reducing GHG emissions by no less than 55% by the year 2030, in comparison to the levels recorded in 1990. Furthermore, the overarching goal is to achieve climate neutrality by the year 2050.[387] To execute these objectives, an extensive reassessment of existing climate and energy policies has been initiated – Energy Efficiency Directive.[388] Within this framework, several strategies have been proposed to reshape the energy landscape.[389]

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[381] Ciucci, "Energy Policy: General Principles".
[382] Matteo Ciucci, "Renewable Energy", *European Parliament: Fact Sheets on the European Union*, last modified October 2021, https://www.europarl.europa.eu/factsheets/en/sheet/70/energia-renovavel.
[383] Directive on the promotion of the use of energy from renewable sources (recast) [2018/2001/EU].
[384] Ciucci, "Renewable Energy".
[385] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1334.
[386] Fetting, "The European Green Deal", (Vienna: ESDN Office, December 2020), p. 9.
[387] European Green Deal [COM(2019) 640 final], p. 2.
[388] Directive on the promotion of the use of energy from renewable sources (recast) [2018/2001/EU], https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001.
[389] Ciucci, "Renewable Energy".

One pivotal proposal seeks to elevate the proportion of renewable energy within the energy mix to 40%.[390] This endeavour is supplemented by a commitment to foster the use of renewable fuels, such as hydrogen, within sectors such as industry and transportation.[391] Additionally, a strategic effort is put forth to reduce overall energy consumption, recognising its crucial role in mitigating emissions and curtailing energy expenses for both citizens and industries.[392] Complementing these efforts is a proposal to elevate energy efficiency targets to the range of 36–39%by the year 2030.[393]

These far-reaching objectives and proposals have been enshrined in the first European Climate Law.[394] This legal framework mandates European institutions and Member States to undertake necessary measures, spanning both community and national levels, to ensure the fulfilment of these objectives. Furthermore, it underlines the importance of fostering justice and collaboration among Member States in the pursuit of these goals.[395] To monitor compliance with these actions and the consequential advancements, Member States are required to present, at five-year intervals, their NECPs.[396] Importantly, these plans are to be developed in collaboration with relevant local authorities, meaning that local governments shall have a say in shaping these plans, rather than them being solely crafted by the national government.[397] The selected regions will be those that experience the most adverse economic and social impacts as a result of the transition, particularly concerning projected job losses in the production and use of fossil fuels, as well as the required changes in the production processes of industrial facilities that have the highest levels of GHG emissions.[398] To evaluate the progress in line with the tenets of the Paris Agreement, the Commission is vested with the responsibility of assessing these plans, thereby ensuring the alignment of results with the ambitious aspirations outlined.[399] This

[390] Josephine van Zeben, Lucila de Almeida and Mirta Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", *EU Law Live Weekend Edition*, no. 106 (July 2022), p. 6, https://issuu.com/eulawlive/docs/weekend_edition_106.
[391] "Delivering the European Green Deal".
[392] *Ibid*.
[393] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[394] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[395] "State of the Union: Commission Raises Climate Ambition and Proposes 55% Cut in Emissions by 2030.
[396] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[397] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 173.
[398] *Ibid*.
[399] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1337.

implies that if a Member State is not genuinely committed to achieving climate neutrality, its plan will not receive validation from the Commission, and consequently, no projects will be financed through any of the three pillars of the JTM.[400]

Energy holds a fundamental significance not only in shaping the geopolitics and geostrategy of Europe as a collective entity but also in moulding the stance of individual Member States as key international actors, each with distinct characteristics that set them apart.[401] The notion of safeguarding energy supply security assumes paramount importance in the economies of these States, underpinning self-sufficiency and prompting them to safeguard control over energy policies as a central facet of their sovereignty.[402] This stance is accentuated by the recognition that energy was designated as a "shared competence" between EU institutions and Member States upon the ratification of the Treaty of Lisbon. This classification signifies that both the EU and the Member States possess legislative authority in the energy domain.[403]

According to Article 194(1) TFEU, Member States, guided by a spirit of solidarity, are tasked with pursuing the "objectives of EU's energy policy", encompassing the assurance of energy market functionality and security, the promotion of energy efficiency, the advancement of new and renewable energy sources, and the enhancement of energy network interconnections.[404] Concurrently, Article 194(2) affirms the entitlement of Member States to "determine the conditions under which they will exploit their energy resources, choose between different energy sources, and structure their energy supply".[405] Therefore, in line with the principle of subsidiarity, it is important to understand that the scope of EU's authority is bounded by the principle itself.[406]

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[400] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 174.
[401] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 7.
[402] Volker Oschmann, "Renewable Energy Sources in European Law: An Overview", *Journal for European Environmental & Planning Law* 3 (January 2006), p. 479, https://doi.org/10.1163/187601006X00137.
[403] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 382.
[404] Treaty on the Functioning of the European Union, 2012, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=PT.
[405] *Ibid*.
[406] Ana Maria Guerra Martins, "Da criação da União Europeia ao Tratado de Nice", in *Manual de Direito da União Europeia*, edited by Ana Maria Guerra Martins, 2nd ed., (Lisboa: Edições Almedina, S.A., 2019), p. 108.

The principle of subsidiarity, as delineated in the TFEU, establishes that the European Community should step in solely when matters beyond its exclusive jurisdiction cannot be adequately managed by individual Member States. Only if the scale or effects of an action indicate that it would be more effectively addressed at the EU level, intervention becomes justified.[407]

This principle recognises the diversity of energy needs, resources, and economic capacities among EU regions.[408] Implementing the EGD's energy goals must consider these regional differences, avoiding a one-size-fits-all approach that could lead to inconsistencies between policies and regional realities.[409] Subsidiarity emphasises local decision-making, requiring a balance between standardised strategies from the EGD and allowing flexibility for regions to tailor solutions.[410] Not all regions have equal resources for renewable energy transitions, necessitating fair access to support.[411] Aligning national policies with EU-wide goals while respecting subsidiarity requires harmonisation efforts. Effective implementation demands coordination among different governance levels, ensuring regional and local authorities are aligned with EGD objectives.[412] Accurate data collection and monitoring are crucial for progress evaluation, but the diversity of regional contexts can complicate this.[413] To overcome challenges, the EU should empower regions, provide targeted support, facilitate knowledge exchange, and establish clear monitoring guidelines, upholding the subsidiarity principle and promoting collaboration.[414]

Given this legal framework, it is evident that States constitute indispensable actors in the attainment of the EGD and its objectives within the sphere of energy and climate.[415]

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[407] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[408] Eeva Pavy, "The Principle of Subsidiarity", *Fact Sheets on the European Union*, last modified April 2023, https://www.europarl.europa.eu/factsheets/en/sheet/7/the-principle-of-subsidiarity.
[409] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[410] The Principle of Subsidiarity, https://eur-lex.europa.eu/EN/legal-content/glossary/principle-of-subsidiarity.html.
[411] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[412] Pavy, "The Principle of Subsidiarity".
[413] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[414] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[415] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 385.

However, recognising that the EU is composed of 27 Member States, each marked by distinctive characteristics, socio-economic developmental trajectories, and energy systems, it is only natural that the pursuit of EGD targets would unfold at variable paces and with divergent ambitions.[416] Consequently, as the decarbonisation of EU's economy emerges as the linchpin to the success of the EGD, examples of strong resistance, such as in Poland where coal remains a crucial energy source intertwined with job creation, emphasise the challenges faced in executing the multifaceted proposals embedded within the EGD.[417]

To navigate these challenges and ensure alignment among diverse stakeholders, a just and inclusive transition is imperative.[418] This aspiration is exemplified by the JTM, an instrumental facet of the EGD strategy. This mechanism requires that the EU budget be directed toward safeguarding the social wellbeing of the most vulnerable sectors, thus guaranteeing that no individual or region are left behind in the transition.[419] This inclusive approach holds particular significance in mitigating opposition, averting conflicts arising from potential disparities, and fostering cohesion within the realm of energy transition and climate action.[420]

iii. A green and just transition

a. Energy Justice

When discussing the concept of energy justice, two main interpretations come to light. The first, which emerged in 2013, defines energy justice based on three core principles known as the triumvirate of distributive, procedural, and recognition justice.[421] These principles are applied within the energy system. The second approach, introduced in 2014, employs an energy justice methodology structured around eight principles: availability,

[416] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[417] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 386.
[418] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 7.
[419] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[420] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 386.
[421] Raphael J. Heffron, "The Concept of Energy Justice Across the Disciplines", in *The Challenge for Energy Justice: Correcting Human Rights Abuses*, edited by Raphael J. Heffron, 1st ed., (Palgrave Macmillan Cham, 2021), p. 16, https://doi.org/10.1007/978-3-030-80097-0_2.

accessibility, due process, transparency, accountability, sustainability, intra-generational equity, and intergenerational equity.[422] These two frameworks have since been central to defining energy justice as a concept. Another perspective views energy justice within the context of the energy system's stages: extraction, production, operation and supply, consumption, and waste management.[423]

The principles emerging from the 2013 definition have become dominant in literature, according to Bommel & Höffken (2021).[424] Therefore, to better grasp the concept, it is important to understand these three forms of justice. Distributive justice pertains to an even distribution of benefits and drawbacks to all members of society. It aims to prevent the most disadvantaged from disproportionately bearing the brunt of energy project location issues, requiring governments and territorial planning bodies to carefully scrutinise such challenges.[425] Procedural justice demands fair and impartial procedures in energy decision-making. This implies equal participation capacity for all social groups in determining proposed energy projects.[426] Recognition justice underscores recognising individuals affected by energy injustices and considering diverse opinions and viewpoints on energy within various social, cultural, ethnic, and gender groups. It aims to level the playing field for all decision-makers in energy development, ensuring their interests are represented, protecting them from threats, and guaranteeing equal political rights.[427]

Energy justice centres on fairly distributing costs and benefits within the global energy system and fostering a balanced and unbiased decision-making process. The concept arises from the growing recognition of the connection between social justice and energy, attempting to apply justice principles to energy policy, production, systems, security, climate change, etc.[428] Raphael J. Heffron (2021) highlights that energy justice aims to uphold human rights throughout the energy life cycle, aiming for a better, more equitable, and sustainable world.[429] He asserts that academics specialising in energy justice target

[422] Heffron, "The Concept of Energy Justice Across the Disciplines", p. 17.
[423] *Ibid*.
[424] Natascha van Bommel, and Johanna I. Höffken, "Energy Justice within, between and beyond European Community Energy Initiatives: A Review", *Energy Research and Social Science* 79 (Elsevier, September 2021), p. 3, https://doi.org/10.1016/j.erss.2021.102157.
[425] Raphael J. Heffron, et al., "A Treatise for Energy Law", *Journal of World Energy Law and Business* 11 (Oxford Academic, March 2018), p. 42, https://doi.org/10.1093/jwelb/jwx039.
[426] *Ibid*.
[427] *Ibid*.
[428] Kirsten Jenkins, et al., "Energy Justice: A Conceptual Review", *Energy Research and Social Science* 11 (January 2016), p. 175, https://doi.org/10.1016/j.erss.2015.10.004.
[429] Heffron, "The Concept of Energy Justice Across the Disciplines", p. 17.

to safeguard human rights as diverse energy-related activities unfold.[430] However, a limitation emerges in the three outlined approaches mentioned earlier: they offer little to no guidance on practical implementation and fulfilment. In addressing this challenge, Heffron suggests turning to the arguments put forth by Kuhn (1962) and Popper (1963), particularly in the context of knowledge development from a common foundation.[431]

In practical analysis, the framework of energy justice serves as a reference point. It involves several steps: first, assessing whether the three central principles of energy justice are present in a given situation. Subsequently, the situation's alignment with the energy life cycle (or energy system) is explored within the framework of a cosmopolitical perspective. This involves determining whether the situation's effects, considering our shared global citizenship, have cross-border implications. Finally, attention turns to how challenges arising from the situation can be addressed using the eight principles for practicing energy justice: availability, accessibility, due process, transparency, accountability, sustainability, intra-generational equity, intergenerational equity, and responsibility.[432]

Overall, there are three decision-making phases in the application of energy justice from theory to practice. At each phase, those responsible are tasked with addressing justice concerns and considering a wide array of factors to determine whether any injustices have arisen due to energy-related activities.[433] If injustices are identified, the principle of restorative justice comes into play, calling for corrective action to rectify any wrongs arising from the energy sector. This approach emphasises the importance of aligning energy activities with principles of justice and equity, ensuring a more balanced and ethical energy transition.[434]

Incorporating energy justice concepts into the EGD reveals a significant alignment between the EGD's goals and the concerns of energy justice. The EGD's emphasis on achieving sustainability and mitigating environmental impacts resonates harmoniously

[430] Heffron, "The Concept of Energy Justice Across the Disciplines", p. 17.
[431] *Ibid*.
[432] *Ibid*.
[433] *Ibid*.
[434] *Ibid*.

with the fundamental principles of energy justice.[435] However, translating these principles into practical action is a complex challenge. The process of transitioning energy systems involves intricate decisions that can result in unequal impacts on different societal groups.[436] Therefore, ensuring that the policies, regulations, and measures derived from the EGD are finely attuned to energy justice concerns becomes of utmost importance. This entails a thorough understanding of the diverse socio-economic, cultural, and geographical contexts within which these actions unfold.[437]

Furthermore, the analysis underscores the paramount significance of encompassing the entire energy life cycle and considering the potential global repercussions as part of the pursuit of energy justice. The application of justice principles across all stages of the energy life cycle and the careful assessment of global consequences are critical for achieving a transition that is both equitable and sustainable.[438]

The EGD represents a decisive step towards a greener and more sustainable future for Europe. By aligning its objectives with the core principles of energy justice, the EU demonstrates its commitment to addressing not only environmental challenges, but also the social and equity concerns inherent in the energy transition. However, the fulfilment of these principles requires continuous and dedicated efforts to guarantee that actions effectively match intentions.[439]

b. Just Transition

The concept of "just transition" refers to the shift towards a more sustainable and environmentally friendly development model, while ensuring social justice and equity.[440] In essence, successful sustainable development requires a fair and just transition from carbon-intensive economies to greener alternatives.[441] This transition seeks to promote

[435] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[436] Bommel and Höffken, "Energy Justice within, between and beyond European Community Energy Initiatives: A Review", p. 3.
[437] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[438] Jenkins, et al., "Energy Justice: A Conceptual Review", p. 175.
[439] Bommel and Höffken, "Energy Justice within, between and beyond European Community Energy Initiatives: A Review", p. 3.
[440] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p. 7.
[441] Darren McCauley and Raphael Heffron, "Just transition: Integrating climate, energy and environmental justice", *Energy Policy*, (Elsevier, August 2018), p. 1, https://doi.org/10.1016/j.enpol.2018.04.014.

justice and equality across various dimensions such as gender, ethnicity, nationality, and income, both in developed and developing countries.[442] Central to the notion of a just transition is the creation of employment opportunities and the welfare of communities. The overarching goal is to foster an economy that is inclusive and fair.[443] Therefore, a just transition strives to maximise the economic and social benefits of climate action while carefully managing any adverse consequences.[444]

The International Labour Organisation (ILO) published the "Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All" in 2015.[445] These guidelines align the just transition framework closely with the principles of sustainable development, encompassing economic, social, and environmental dimensions.[446] Sustainable development implies meeting present-day needs without compromising the ability of future generations to fulfil their own necessities.[447] A just transition aims to create decent work, promote social inclusion, and eradicate poverty, contributing to the achievement of NDCs and SDGs.[448]

To effectively implement the ILO framework, Sabato & Fronteddu (2020) emphasise the importance of distributive and procedural justice principles.[449] This entails sharing both opportunities and costs equitably and fairly among all stakeholders (distributive justice) and ensuring inclusive participation in decision-making processes policy implementation (procedural justice).[450] Moreover, specific considerations include tailoring policies to individual country contexts, (e.g., the country's level of socio-economic development or its susceptibility to climate change-related risks).[451] A successful implementation also hinges on the creation of a comprehensive policy framework that integrates economic, environmental, and social dimensions. This comprehensive approach ensures that policies

[442] McCauley and Heffron, "Just transition: Integrating climate, energy and environmental justice", p. 2.
[443] "Frequently Asked Questions on Just Transition", *International Labour Organization*, n.d., accessed July 2022, https://www.ilo.org/global/topics/green-jobs/WCMS_824102/lang--en/index.htm.
[444] *Ibid*.
[445] Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All, (Geneva, ILO, 2015), www.ilo.org/publns.
[446] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p. 9.
[447] ILO Guidelines p. 4 (2).
[448] Dirk Arne Heyen, et al., "Just Transition in the Context of EU Environmental Policy and the European Green Deal", (Öko-Institut, 2020), p.10, https://www.oeko.de/fileadmin/oekodoc/Just-Transition-Issue-Paper.pdf.
[449] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p.10.
[450] *Ibid*.
[451] ILO Guidelines p. 4 (6).

address multiple dimensions of sustainability.[452] Furthermore, closely monitoring key areas such as macroeconomics, industry, labour markets, and social protection is essential.[453] This monitoring facilitates the identification of potential challenges and enables timely adjustments to policies as needed.[454]

From the perspective of investment and social intervention, it is of utmost importance to guarantee that workers have the chance to acquire the skills needed for their engagement in a greener economy, and to safeguard the individuals and communities most affected by the transition. Additionally, safeguarding individuals and communities that are most impacted by the transition is crucial. Moreover, all participants involved in the transition shall have access to capacity-building opportunities to enhance their capabilities. It is also essential that the foundation of the transition ret upon social consensus.[455] To achieve this, initiating a process of social dialogue is imperative throughout all stages of the transition, spanning from the formulation of strategies and policies to their decision-making and implementation.[456] Lastly, ensuring an ample supply of financial resources is an essential prerequisite. Adequate funding is indispensable to support the various facets of the transition and to address any challenges that may arise along the way.[457]

In light of this, there is a prominent congruence between the core principles of the just transition and the goals set forth by the EGD. The EGD's central objective of transitioning towards a sustainable and ecological economy seamlessly aligns with the principle that this transformation must occur in a socially equitable and just manner.[458] Both frameworks prioritise the imperatives of climate change and sustainability, while integrating key principles of the just transition. These include social inclusivity, participatory decision-making, addressing societal disparities, and actively pursuing green economic opportunities.[459] The EGD's recognition of the importance of adapting

[452] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p.10.
[453] ILO Guidelines p. 7 (14).
[454] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal?", p.10.
[455] *Ibid*., p. 11.
[456] *Ibid*.
[457] *Ibid*.
[458] *Ibid*.
[459] Heyen, et al., "Just Transition in the Context of EU Environmental Policy and the European Green Deal", p.10.

strategies to suit distinct national contexts and ensuring the availability of sufficient financial resources further reinforces its alignment with the principles of just transition.[460]

The ambition for a just transition extends beyond environmental concerns; it represents a social and ethical responsibility.[461] Through the infusion of principles like distributive justice, procedural justice, and capacity development, the EGD stresses its commitment to a balance between environmental imperatives and the needs of society. Yet, translating these principles into action demands sustained commitment and tangible efforts to ensure an all-encompassing and advantageous transition.[462]

While the JTM means to support the regions most affected by the transition, it is acknowledged that vulnerable households and enterprises may still bear a significant burden.[463] Some may not benefit from JTM due to their location not meeting the significant criteria.[464] Additionally, non-EU countries, like those in the Western Balkans, face difficulties related to funds and potential taxation through the CBAM. Furthermore, implementing such ambitious climate goals should involve comprehensive monitoring and evaluation mechanisms, covering socio-economic and environmental aspects. Without clear assessment and quantifiable indicators, there may be uncertainty surrounding the implementation of the EGD, potentially affecting EU countries, global stability, and sustainability.[465]

The transition towards climate neutrality can only be sustainable if most participating countries perceive significant shared benefits and agree to the process.[466] Given the evolving global landscape and inevitable challenges within each Member State and at the EU level, advocating for the implementation of the EGD without assessing its socio-economic effects, could potentially jeopardise EU's sustainable development, financial stability, social equity and quality of life for current and future generations.[467] It could also affect the unity of the EU and global stability. A long-lasting transition to climate

[460] "The Just Transition Mechanism: Making Sure No One Is Left Behind".
[461] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 174.
[462] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal", p.11.
[463] *Ibid*.
[464] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[465] *Ibid*., p. 10.
[466] "European Climate Pact".
[467] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 10.

neutrality can only be sustainable if most participating countries find strong common benefits in this process and collectively support it.[468]

The alignment between the EGD and the vision of a just transition highlights the importance of creating a sustainable society that prioritises ecological considerations and upholds principles of social justice. Achieving the objectives outlined in the EGD requires coordinated collaboration between governments, the private sector, civil society, and citizens, all while promoting equity and inclusiveness.[469]

c. Adequate funding?

Addressing the financial aspects of a just transition is a crucial aspect of climate and environmental policies.[470] As outlined in the preceding chapter, when Ursula von der Leyen unveiled the EGD, the European Commission put forth intentions to earmark approximately €100 billion from the €1 trillion allocated for the EGD's implementation through the JTM.[471]

After the pandemic hit the world and the EU, a substantial economic collapse was on the horizon.[472] In May 2020, the Commission proposed an economic recovery package that significantly increased the budget for the JTF. This proposal sought to boost the JTF's budget to €40 billion, with €10 billion coming from the EU budget (up to €7.5 billion previously) and €30 billion directly from the economic recovery instrument Next Generation EU. With various co-financing options, including the ERDF, the ESF+, and contributions from Member States, the total expected investment mobilisation ranged from to €89 to €107 billion. This would have significantly expanded the JTM, providing at least €150 billion to the just transition.[473]

However, in July 2020, the European Council decided to drastically reduce the JTF's budget, scaling it down to €17.5 billion, with €7.5 billion from the EU budget and €10 billion from Next Generation EU.[474] The European Parliament, voting in September 2020

[468] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 10.
[469] Sabato and Fronteddu, "A Socially Just Transition through the European Green Deal", p.11.
[470] European Green Deal [COM(2019) 640 final], p. 2.
[471] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[472] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 175.
[473] *Ibid*., p. 176.
[474] *Ibid*.

proposed a budget, setting it at €25 billion. Ultimately, after the negotiations an agreement was reached in December 2020, setting the JTF' budget at €17.5 billion, as proposed by the Council, with the co-financing from other funds being voluntary, rather than mandatory.[475]

The adequacy of funding allocated to the EGD, and the Next Generation EU package depends on various factors, including the scope of the transition, specific goals, implementation pace, and evolving economic and political contexts.[476] Therefore, it is key to consider fundamental aspects, such as ensuring that the just transition is fair and inclusive, leaving no communities or workers behind. Considering the substantial impacts this entails, securing sufficient funding is imperative.[477]

The EGD and the JTM face various challenges.[478] Potential complications could hinder the effectiveness of these mechanisms, leading to unintended outcomes.[479] Equitable distribution of funds is essential; clear and transparent criteria should dictate which regions are eligible, based on criteria such as economic impact, employment dependence, and the potential for sustainable alternatives.[480] Different priorities among Member States pose challenges, as various economic, social, and political contexts might lead to conflicts between regions advocating for different strategies.[481] Striking a balance among these priorities requires careful negotiation and coordination.[482]

The complexities of administrative processes are a valid concern; involving multiple mechanisms like the JTF could result in delays. Simplifying procedures and supporting regions with limited project management capabilities is essential.[483] Accountability and transparency are significant, as monitoring projects funded by the JTM helps maintain

[475] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 177.
[476] "New funding available – the Just Transition Mechanism and the Next Generation EU", *Central Europe Energy Partners*, last modified June 2020, https://www.ceep.be/new-funding-available-the-just-transition-mechanism-and-the-next-generation-eu/.
[477] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 7.
[478] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[479] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[480] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[481] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 177.
[482] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[483] *Ibid*.

public trust. The lack of accountability could lead to misallocation of resources and corruption, making clearly defined reporting requirements and independent oversight essential.[484] Inclusivity is pivotal, and marginalised communities should have a say in shaping transition strategies and accessing financial support.[485]

Addressing regional disparities is also relevant, as regions and industries dependent on fossil fuels will require substantial financial support to facilitate worker reskilling, nurture emerging industries, and foster sustainable opportunities.[486] As such, the allocation of funds must be customised to accommodate the distinct needs of each region.[487] While the shift to sustainable industries may lead to cost reductions for producers and consumers, these savings may not be equally distributed.[488] In the same way, sustainable sectors will generate new employment, but these opportunities will not be uniform across all regions and individuals. Additionally, the working conditions, including wages, job security, occupational safety, labour rights, in these new sectors may not necessarily be better. Some workers might experience permanent job loss, which can have repercussions on tax revenues and contribute to social inequalities. Carbon taxes and higher prices for high-carbon products and services could excessively impact lower-income households and vulnerable populations, including migrants who rely on family travel.[489]

While new employment opportunities will emerge, they will be located in different areas and sectors, with new educational backgrounds and skill sets. These substantial structural changes require reforms in fiscal and budgetary matters to stimulate private investments and identify novel sources of income.[490] Employment and training play a crucial role. A just transition requires not only funding, but also investments in education, training, and skill development to enable sustainable employment. Adequate funding is thus essential to facilitate this transformative process.[491]

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[484] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[485] *Ibid*.
[486] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[487] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 7.
[488] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[489] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[490] *Ibid*., p. 2.
[491] "Net Zero by 2050: A Roadmap for the Global Energy Sector", p. 4.

Furthermore, infrastructure investment assumes a paramount role. The transition to a sustainable economy often demands significant investments in renewable energy infrastructure, public transportation, and other sustainable ventures.[492] Private sector involvement is instrumental. Beyond public funding, private sector's investments and adoption of sustainable practices can significantly contribute to the overall financing of the just transition.[493]

Financial support for research and innovation holds equal importance in fostering the development and application of novel technologies and solutions that accelerate the transition to a green economy.[494] Simultaneously, international cooperation emerges as a critical dimension. Considering the global nature of climate change, global collaboration and financing are fundamental, particularly to aid developing countries in their journey towards a sustainable economy.[495]

The consideration of nuclear and gas power plants as sustainable investments presents another challenge. Despite the promotion of investments to expedite the transition from fossil fuels, the European Commission decided in February 2022 to classify investments in nuclear and gas power plants as sustainable.[496] This decision appears to have been influenced by the desire to provide short-term investor security and to accelerate investments in these areas in response to the current energy crisis affecting Europe.[497] However, this pronouncement has sparked a disagreement among the Member States due to its associated significant risks.[498] These risks include GHG emissions resulting from the development and use of fossil fuels, as well as concerns related to the production of highly hazardous radioactive waste, nuclear proliferation, and safety issues associated

[492] Proposal for a Regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013 [COM(2020) 824 final], p. 2, https://eur-lex.europa.eu/resource.html?uri=cellar:cc5ea219-3ec7-11eb-b27b-01aa75ed71a1.0002.02/DOC_1&format=PDF.
[493] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[494] Clark, Dennison and Engström, "Climate of cooperation: How the EU can help deliver a green grand bargain".
[495] *Ibid*.
[496] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 6.
[497] *Ibid*.
[498] Susi Dennison, "Green peace: How Europe's climate policy can survive the war in Ukraine", *European Council on Foreign Relations*, June 2022, p. 4, https://ecfr.eu/publication/green-peace-how-europes-climate-policy-can-survive-the-war-in-ukraine/.

with nuclear power.[499] Furthermore, there is a concern about the funds allocated for advancing renewable energy development being redirected towards these specific sources, thereby delaying the progress of the green transition.[500]

Recognising that the transition can also result in adverse effects, the creation of the JTM became imperative. It is essential to acknowledge that discussions regarding funding for the just transition are ongoing and may evolve over time.[501] The EU and its Member States are actively working to allocate resources and establish mechanisms to support a just transition. However, the efficacy of these endeavours depends on multi-layered variables that encompass economic, political, and environmental dynamics.[502]

II. War in Ukraine

The conflict in Ukraine has brought to light the crucial role of the energy sector in securing States' independence. This is especially pertinent for the development of renewable energy sources, considering the significant dependence on Russian gas by countries like Germany.[503] The aftermath of Russia's invasion of Ukraine has triggered significant changes in the global energy landscape. Escalating prices have impacted consumers worldwide, intensifying concerns about energy and food security. Disruptions in supply chains and substantial hikes in energy and food costs have significant repercussions for EU industries, businesses, and citizens.[504] This scenario has prompted public discussion and political attention to the world's dependence on fossil fuels, marked by their price volatility and resource uncertainty.[505]

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[499] Steven Mufson and Claire Parker, "War in Ukraine generates interest in nuclear energy, despite danger", *The Washington Post*, (April 2022), https://www.washingtonpost.com/climate-environment/2022/04/15/nuclear-energy-europe-ukraine-war/.
[500] *Ibid*.
[501] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 6.
[502] *Ibid*.
[503] "Russia's War on Ukraine", IEA, n.d., accessed April 2023, https://www.iea.org/topics/russias-war-on-ukraine.
[504] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[505] Gabriela Ileana Iacobuţă and Alexia Faus Onbargi, "The European Green Deal and the war in Ukraine: Addressing crises in the short and long term", *European Think Tanks Group*, (July 2022), p. 10, https://ettg.eu/wp-content/uploads/2022/07/The-European-Green-Deal-and-the-war-in-Ukraine.pdf.

In 2021, over 40% of EU's gas consumption came from Russia, along with 46% of coal and 27% of oil.[506] This heavy reliance on fossil fuels, particularly Russian gas, has driven a reorientation of European energy policy priorities towards renewable energy sources such as solar and wind.[507] In May 2022, EU introduced the REPowerEU to reduce its dependence on Russian fossil fuels.[508] The plan encompasses various strategies, including enhancing energy efficiency, diversifying energy sources and trading partners, and accelerating the transition to renewables across sectors.[509] The successful execution of this plan requires a substantial financial investment of approximately €210 billion by 2027. Multiple funding sources, including the Recovery and Resilience Mechanism, EU ETS funds, cohesion funds, the Common Agricultural Policy, and the Innovation Fund, are predicted to support these efforts.[510]

Effectively addressing this situation requires a firm and concerted response. Like the broader goal of achieving climate neutrality by 2050, this challenge extends beyond EU's borders, emphasising the centrality of international cooperation.[511] EU can take this opportunity to demonstrate that greener and more sustainable strategies can contribute to addressing these complex issues.[512] However, amidst the consequences of the conflict, fractures within Member States have begun to surface, eroding European unity in the midst of the war. Disagreements have emerged due to rising energy and commodity prices, leading to discord regarding the role of sanctions on Russia and the pace of reducing dependence on Russian energy.[513]

The conflict has brought nuclear energy into the political dialogue as a potential solution for achieving climate neutrality by 2050. Despite its potential for generating low-carbon electricity, nuclear energy faces noteworthy hesitations amidst ongoing international tensions. A key concern is the geopolitical instability arising from the conflict. Relying on nuclear resources and technology from politically unstable regions could disrupt

[506] Iacobuță and Onbargi, "The European Green Deal and the war in Ukraine", p. 7.
[507] *Ibid.*, p. 19.
[508] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 7.
[509] "REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition", European Commission, last modified may 2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131.
[510] *Ibid*.
[511] Iacobuță and Onbargi, "The European Green Deal and the war in Ukraine", p. 23.
[512] *Ibid*.
[513] Dennison, "Green peace: How Europe's climate policy can survive the war in Ukraine", p. 4.

energy supply chains, accentuating the vulnerability of geopolitically sensitive energy sources.[514] Additionally, the expansion of nuclear programs raises concerns about nuclear proliferation, as the technology and materials required for nuclear energy production can also be used for developing nuclear weapons.[515] The safety implications of nuclear energy are substantial, influenced by catastrophic accidents like Fukushima and Chernobyl, which have meaningfully shaped public perceptions of nuclear power.[516] Furthermore, managing nuclear waste presents a significant challenge. Radioactive waste generated by nuclear energy requires secure, long-term storage solutions. Incorporating nuclear energy into climate strategies requires addressing complex waste management, disposal, and ensuring safeguards against environmental and health hazards.[517] Moreover, the high costs and extended timelines associated with establishing and operating nuclear power plants pose practical obstacles.[518]

Given the urgency of the climate crisis, the significant financial and temporal commitments required for nuclear energy projects could divert resources and attention from more swiftly implementable renewable energy initiatives. As such acknowledging the proven capabilities of alternative technologies such as wind, solar, and hydroelectric power to meet climate goals is central.[519]

These challenges present divergent narratives within the EU, requiring a cohesive and united European approach to effectively tackle them. While international cooperation remains imperative, resolving internal disparities and nurturing unity within the EU is pivotal for navigating this complex landscape and achieving the objectives of energy security and sustainability.[520] Integrating nuclear energy into the EGD's strategy for climate neutrality demands a comprehensive and delicate approach. The EU must meticulously evaluate the potential benefits of low-carbon emissions vis-à-vis the geopolitical risks, concerns about nuclear proliferation, waste management challenges, public perceptions, and alternative technology choices.[521] A successful energy strategy should comprehend a diverse spectrum of renewable sources, energy efficiency measures,

[514] Mufson and Parker, "War in Ukraine generates interest in nuclear energy, despite danger".
[515] "Advantages and Challenges of Nuclear Energy".
[516] Mufson and Parker, "War in Ukraine generates interest in nuclear energy, despite danger".
[517] *Ibid*.
[518] *Ibid*.
[519] Iacobuță and Onbargi, "The European Green Deal and the war in Ukraine", p. 9.
[520] *Ibid*., p. 23.
[521] Mufson and Parker, "War in Ukraine generates interest in nuclear energy, despite danger".

and strategic partnerships to ensure a resilient, sustainable, and secure transition towards a carbon neutral future.[522]

III. Carbon neutrality by 2050

The EGD sets the ambitious target of achieving climate neutrality by 2050. However, reaching this goal depends on several factors, including effective policies, technological advancements, international cooperation, and shifts in society's behaviour. The EGD aims to completely decarbonise all sectors of the economy and make Europe the world's first carbon neutral continent by 2050, while fostering unity among European countries.[523] Although these goals come with significant challenges, they also present opportunities for environmental, social, and economic transformation. As Ursula von der Leyen stated, these challenges can be turned into opportunities that encompass not just environmental benefits, but also social and economic advantages.[524]

Reshaping the energy production and consumption landscape is central to achieving the EGD's objectives.[525] Advancements in renewable energy technologies, digitalisation, and innovative solutions like batteries, heat pumps, electric vehicles, and hydrogen offer the potential to dramatically transform the European energy system in the coming decades.[526] However, the current compartmentalised structure of the energy system, with specific energy resources linked to specific consumption sectors, impedes the transition to a climate neutral economy. For example, petroleum dominates transportation, coal and natural gas are the most used for electricity and heating, and grids and market rules are sector-specific.[527] This segmented approach to the energy system is inefficient both from a technical and economic perspective, leading to substantial energy waste and

[522] Iacobuță and Onbargi, "The European Green Deal and the war in Ukraine", p. 9.
[523] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 99.
[524] *Ibid*.
[525] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[526] Wawryk, "International Energy Law: An Emerging Academic Discipline", p. 226.
[527] Leonard, Pisani-Ferry, Shapiro, Tagliapietra, and Wolff, "The Geopolitics of the European Green Deal", p. 4.

inefficiency. Consequently, integrating the energy system is crucial to effectively, economically, and efficiently decarbonise the European economy.[528]

Renewable energy sources play an essential role in achieving carbon neutrality by significantly reducing GHG emissions and permitting the transition from fossil fuels. According to IRENA, a combination of energy efficiency measures and widespread renewable energy adoption could contribute up to 90% of the necessary CO_2 emissions reduction.[529] However, it is imperative to consider human rights and social aspects when pursuing renewable energy solutions. While renewables offer environmental benefits, their production and deployment can sometimes lead to land-related issues, displacement, and harm to local communities and ecosystems.[530] Therefore, governments and industries must address this challenge and opportunity by integrating respect for human rights into their energy transition efforts. This holistic approach involves actively engaging with local communities, indigenous groups, and stakeholders to ensure that their rights are upheld, their concerns are addressed, and potential negative impacts are mitigated.[531]

The conclusion of events like the COP26 highlights the increasing recognition of the intersection between environmental action and human rights. As the world works towards ambitious energy transition goals, the focus on ensuring that these transitions are equitable, just, and respectful of human rights becomes more critical than ever.[532] In this context, achieving carbon neutrality should be pursued in a manner that considers the broader wellbeing of people, communities, and ecosystems. This approach not only aligns with ethical principles but also enhances the overall sustainability and effectiveness of the energy transition.[533]

Pursuing climate neutrality offers multiple benefits across various areas, including the environment, economy, society, and international cooperation. It plays a central role in reducing GHG emissions, mitigating climate change impacts, protecting ecosystems, and

[528] European Green Deal [COM(2019) 640 final], p. 1.
[529] "Climate Change", *IRENA - International Renewable Energy Agency*, n.d., accessed July 2022, https://www.irena.org/climatechange.
[530] Yadaira Orsini, "Human Rights at the Center of the Energy Transition", *The Sustainability Institute by ERM*, last modified December 2021, https://www.sustainability.com/thinking/human-rights-at-the-center-of-the-energy-transition/.
[531] *Ibid*.
[532] *Ibid*.
[533] *Ibid*.

improving air and water quality.[534] Additionally, it drives innovation, job creation, and economic growth, particularly in renewable energy, energy efficiency, and sustainable agriculture sectors.[535] Achieving climate neutrality enhances energy independence and security by reducing reliance on fossil fuels. Consequently, this reduces vulnerability to disruptions in energy supply and fluctuations in energy prices, enhancing countries' resilience.[536] The creation of jobs in fields like renewable energy, energy efficiency, electric vehicles, and sustainable agriculture further contributes to economic expansion and diversification.[537]

Beyond these direct advantages, attaining climate neutrality signifies an assertion of international leadership and an unwavering commitment to tackling one of the most critical global challenges. This, in turn, can motivate other nations to adopt similar objectives and cooperate on a worldwide scale to address climate-related concerns.[538] Additionally, the pursuit of carbon neutrality has a vital dimension in minimising the repercussions of extreme weather events, sea level rise, and related hazards, relieving the financial pressures associated with responding to and recovering from such disasters. Furthermore, the commitment to climate neutrality contributes to fostering a foundation of long-term economic stability.[539] This is achieved by smoothing the transition towards a more sustainable and low-carbon economy, making industries and communities less susceptible to the impacts of climate change and the eventual depletion of finite fossil fuel resources, thereby significantly enhancing their resilience and adaptability.[540]

Nonetheless, the commitment to carbon neutrality by 2050 is not without its share of challenges and potential pitfalls that require careful consideration. One of the most significant difficulties is the evident economic impact.[541] Moving towards a climate

[534]Qiyong Liu and Jinghong Gao, "Public Health Co-benefits of Reducing Greenhouse Gas Emissions", in *Health of People, Health of Planet and our Responsibility*, Edited by Wael K. Al-Delaimy, Veerabhadran Ramanathan and Marcelo Sánchez Sorondo, (Springer, Cham: May 2020), p. 299, https://doi.org/10.1007/978-3-030-31125-4_23.
[535] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 99.
[536] Liu and Gao, "Public Health Co-benefits of Reducing Greenhouse Gas Emissions", p. 299.
[537] "Net Zero by 2050: A Roadmap for the Global Energy Sector", p. 153.
[538] "Taking the lead on climate change", *European Council / Council of the European Union*, last modified April 2021, https://www.consilium.europa.eu/en/eu-climate-change/.
[539] *Ibid*.
[540] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People", p. 25.
[541] *Ibid*.

neutral economy requires significant investments in renewable energy, infrastructure upgrades, and technological advancements.[542] While these investments are vital to the planet's wellbeing, they can also exert pressure on economies, particularly those in developing countries. Additionally, the upfront costs may lead to economic disparities and potentially impede global growth.[543] Another critical concern revolves around shifts in employment landscapes. The scaling down of industries heavily reliant on fossil fuels, such as coal and oil, may result in job losses within these sectors. Although new opportunities are emerging in the realm of renewable energy and its related industries, this transition poses challenges for workers who must adapt to new skill sets or even transition into unfamiliar fields.[544]

Energy security constitutes a significant consideration as well. While renewable energy sources contribute to reducing dependence on imported fossil fuels, enhancing energy self-sufficiency and security against supply disruptions and energy price fluctuations, the migration from fossil fuels to renewables can paradoxically undermine this security.[545] This stems from the intermittent nature of sources like solar and wind, leading to possible interruptions in power supply during periods of limited energy production.[546] Additionally, the development and deployment of carbon capture and storage technologies adds another layer of complexity. Although these technologies are in their embryonic stages, their large-scale implementation can be financially burdensome.[547]

Furthermore, adapting infrastructure is equally indispensable. Overhauling existing infrastructure, such as modernising transportation and augmenting the energy efficiency of buildings, is imperative for achieving climate neutrality. However, these transformative changes often require substantial resources and can face resistance from certain communities.[548]

[542] Proposal for a Regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013 [COM(2020) 824 final], p. 2.
[543] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People", p. 24.
[544] *Ibid*.
[545] "Net Zero by 2050: A Roadmap for the Global Energy Sector", p. 175.
[546] van Zeben, Almeida and Alessandrini, "Stress testing the European Green Deal: the 'securitisation' of energy, food and climate", p. 4.
[547] *Ibid*., p. 79.
[548] Proposal for a Regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013 [COM(2020) 824 final], p. 2.

Climate policies, while indispensable in addressing the challenges of climate change, can sometimes have unintended consequences on marginalised and low-income communities. For instance, rising energy costs may disproportionately affect those with more limited financial resources.[549] The challenge of international cooperation looms large as well. Addressing climate change is a global endeavour that needs harmonised action among nations.[550] However, dissonance over the distribution of responsibilities or strategies to tackle the issue can impede progress.[551] Technological constraints pose further hurdles. In certain sectors, like aviation and heavy industry, viable low-emission alternatives are currently lacking.[552] Additionally, changing behaviours represents a significant obstacle. Achieving climate neutrality requires considerable adjustments in consumption patterns, which can be a daunting task, especially when it comes to persuading individuals and companies to embrace more sustainable practices.[553]

While the EGD is a comprehensive commitment in the fight against climate change, its achievement will require ongoing efforts, cooperation among EU Member States, and a global perspective to address the intricate and interconnected challenges of climate neutrality.[554] The success of this endeavour centres on coordinated action between governments, businesses, and individuals, as well as the effective implementation of policies, technologies, and behavioural changes.[555]

IV. EU as a global leader

EU's share of global GHG emissions is less than 10%.[556] This reality implies that addressing the adverse effects of climate change requires extending the green transition beyond EU's borders.[557] The EGD positions EU as a frontrunner in sustainability and

[549] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People", p. 3.
[550] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 382.
[551] *Ibid.*
[552] "Net Zero by 2050: A Roadmap for the Global Energy Sector", p. 19.
[553] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 2.
[554] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[555] *Ibid.*
[556] Leonard, Pisani-Ferry, Shapiro, Tagliapietra, and Wolff, "The Geopolitics of the European Green Deal", p. 28.
[557] *Ibid*.

climate action, establishing explicit objectives for achieving carbon neutrality by 2050 and significant emissions reductions by 2030.[558]

Recognising the economic advantages of fostering innovation, growth, and employment through a green economy, EU acknowledges that aligning environmental priorities with economic advancement strengthens its global standing.[559] On a diplomatic front, meeting ambitious targets enhances influence, encourages international climate commitments, and cooperating with international partners fosters joint efforts and climate resilience.[560] Consequently, EU recognises that fighting climate change cannot be an isolated effort, as CO_2 emissions are a worldwide predicament that transcends national boundaries.[561] Thus, an effective diplomatic approach through bilateral relations and financial resources becomes necessary, seeking to motivate neighbouring States and partners to emulate its sustainable development model.[562]

The implementation of the EGD goes beyond showcasing the EU's commitment; it should galvanise international climate endeavours, resulting in collaboration, knowledge exchange, and collective actions to counter climate change and enhance resilience.[563] By presenting a comprehensive roadmap to achieve climate neutrality by 2050, spearheading emissions reductions in critical sectors, and encouraging other nations to follow suit, the EGD assumes the role of a trailblazer. Simultaneously, it seeks to amplify the use of renewables, playing a fundamental part through initiatives like the Renewable Energy Directive.[564] With a particular emphasis on innovation, research, and investments in green technologies, EU leads the charge in formulating and implementing innovative solutions, propelling sustainable technologies on a global scale.[565]

Furthermore, the promotion of a circular economy within the EGD underscores EU's unwavering commitment to sustainable consumption and production, setting an example for other countries to optimise resources and curtail waste.[566] Leveraging its diplomatic

[558] European Green Deal [COM(2019) 640 final], p. 19.
[559] "A European Green Deal: Striving to be the first climate-neutral continent".
[560] Clark, Dennison and Engström, "Climate of cooperation: How the EU can help deliver a green grand bargain".
[561] "Taking the lead on climate change".
[562] European Green Deal [COM(2019) 640 final], p. 20.
[563] *Ibid*., p. 22.
[564] "A European Green Deal: Striving to be the first climate-neutral continent".
[565] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 99.
[566] "Delivering the European Green Deal".

and economic influence, the EU is poised to bolster international climate cooperation, fostering consensus on objectives and strategies.[567] The EGD shall also advance sustainable trade by incorporating environmental and social concerns in trade agreements, influencing international trade norms, and encouraging responsible economic growth.[568] Lastly, EU's financial dedication to supporting climate change adaptation and mitigation projects in developing nations solidifies its role in seeking worldwide solutions, reinforcing global climate resilience, and positioning itself at the vanguard of the climate response.[569]

While challenges such as maintaining political unity, overcoming technological obstacles, and ensuring sufficient funding persist, EU's proactive stance cements its position as a global leader in the battle against climate change. The EGD not only guides EU's trajectory, as it serves as a model for collective endeavours towards a sustainable future.[570] Nonetheless, the efficacy of EU's global leadership, as embodied by the EGD, hinges on effective implementation, sustained engagement, and international collaboration.[571]

V. Concluding Remarks

EU's pursuit of the ambitious goals outlined in the EGD stands as a pivotal endeavour in the global fight against climate change and the journey towards carbon neutrality by 2050. EU's acknowledgment of the energy sector's substantial role in GHG emissions has spurred the evolution of comprehensive energy policies, reflecting an ongoing commitment to sustainable transformation.[572]

EU's energy strategy has traversed distinct phases, with the Energy Union strategy prioritising integration, liberalisation, and sustainability as fundamental pillars.[573] This transition has been marked by legislative advancements, such as the Renewable Energy Directive, and the European Climate Law setting binding targets for emissions reduction,

[567] "Taking the lead on climate change".
[568] *Ibid*.
[569] Fleming and Mayer, "Green and Just? An Update on the 'European Green Deal'", p. 173.
[570] "Taking the lead on climate change".
[571] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[572] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 683.
[573] Ciucci, "Energy Policy: General Principles".

energy efficiency, and the integration of renewable energy sources.[574] These measures demonstrate EU's recognition of the diverse energy landscapes within its Member States and its commitment to achieving an equilibrium EU's aims and regional disparities.[575]

Energy justice, incorporating the principles of distributive, procedural, and recognition justice, adds an essential dimension to the transition. While the EGD emphasises environmental sustainability, it also recognises social justice concerns.[576] Integrating energy justice principles is a complex undertaking that requires careful consideration of socio-economic and cultural factors to ensure that the transition to a carbon neutral future is equitable and inclusive.[577]

The concept of just transition highlights the necessity of maintaining economic stability while advancing sustainability and inclusivity.[578] Adequate funding, skills development, social dialogue, and international cooperation are indispensable to this transition.[579] The ongoing discussions about funding underline the dynamic nature of these efforts, shaped by economic, political, and environmental fields.[580]

The recent conflict in Ukraine has thrust new dimensions into the discussion surrounding the path to climate neutrality. It has underscored the pivotal role of energy security and the diversification of energy sources and has prompted discussions on the inclusion of nuclear energy as a potential solution.[581] In this context, it is paramount to emphasise the renewable energy's centrality to the EGD's objectives. It stands as a cornerstone for reducing GHG emissions, mitigating dependence on fossil fuels, and fostering a sustainable, low-carbon energy framework.[582]

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[574] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[575] Hafner and Raimondi, "Priorities and Challenges of the EU Energy Transition", p. 386.
[576] Bommel and Höffken, "Energy Justice within, between and beyond European Community Energy Initiatives: A Review", p. 3.
[577] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.
[578] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 7.
[579] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[580] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[581] Mufson and Parker, "War in Ukraine generates interest in nuclear energy, despite danger".
[582] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.

In the pursuit of a sustainable future, EU's proactive stance strengthens its position as a global leader. The EGD not only charts a pathway for the EU, but also serves as a model for international efforts toward a climate neutral world.[583] As the EU navigates the intricacies of implementation, maintains engagement, and fosters international cooperation, it plays a vital role in shaping a more equitable, resilient, and sustainable global landscape.[584]

[583] "Taking the lead on climate change".
[584] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 9.

Chapter 5: Conclusion

The intricate tapestry of our planet's environment and the urgent need to address the escalating climate crisis have brought to the forefront a series of interrelated actions and strategies. The balance of natural and human-driven processes that govern Earth's delicate equilibrium underscores the paramount importance of managing GHG emissions, the very agents that both sustain life and trigger climate upheavals.[585] The surge in emissions caused by human activity, particularly the burning of fossil fuels, land use changes, and industrial practices, has ushered in an era of unparalleled challenges.[586] The undeniable increase in GHG emissions, confirmed by scientific research and reinforced by global agreements like the Paris Agreement, accentuates the responsibility that nations and individuals alike share in mitigating the dire consequences of climate change.[587] From extreme weather events to biodiversity loss and rising sea levels, the impacts echo across the planet, transcending geographical and political boundaries.[588]

Presented by Ursula von der Leyen, in December 2019, the European Green Deal is an ambitious, multi-faceted initiative spearheaded by the European Commission. This visionary strategy, encapsulating diverse sectors like energy, transportation, and agriculture, not only strives to reduce emissions significantly by 2030 but also charts an audacious path toward carbon neutrality by 2050.[589] Anchored by the EGDIP, this blueprint for change hastens the transition to a sustainable, equitable future by uniting public and private sectors, all while fostering a just transition for affected stakeholders.[590] The EGD represents a transformative strategy within a broader landscape of legal advancements and international agreements. Emerging from the Paris Agreement and the 2030 Agenda for Sustainable Development, the EU has seamlessly integrated climate-related regulations into its legal framework, embedding climate goals into the heart of governance.[591]

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[585] "A Base Científica das Alterações Climáticas".
[586] Wuebbles, et al., "Our Globally Changing Climate", p. 36.
[587] "What is Climate Change?".
[588] Santos, "A ciência das alterações climáticas", p. 39.
[589] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 100.
[590] "The European Green Deal Investment Plan and Just Transition Mechanism Explained".
[591] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1333.

The journey, which began in the 1970s with a growing recognition of environmental concerns alongside economic pursuits, has seen pivotal milestones like the Stockholm Declaration and the Single European Act, introducing principles such as the polluter-pays principle.[592] Central to this journey has been the role of the ECJ in bolstering the EU's environmental policy landscape. The ECJ's interpretation of existing provisions has enabled impactful environmental measures, balancing protection with integration.[593] For instance, in the *Danish Bottle case*. Furthermore, landmark cases like *Urgenda v State of the Netherlands* have set global precedents by holding governments accountable for their climate actions.[594]

The EGD's pursuit of carbon neutrality by 2050 assumes paramount importance. A holistic approach, the EGD encompasses various sectors and strategies to reduce emissions by at least 55% by 2030.[595] Supported by the EGDIP and the JTM, it illustrates a paradigm shift in governance and cooperation. The EU recognises the socio-economic complexities inherent in this transition, offering support to regions disproportionately affected by change.[596]

Renewable energy sources emerge as crucial drivers in achieving these goals, embodying the principles of sustainability and equitability.[597] However, alongside technological advances and policy implementation, the EU acknowledges the need to integrate human rights and societal considerations into the transition.[598] Indigenous and vulnerable communities must be protected from potential negative consequences, as the pursuit of climate goals should uplift rather than burden.[599]

As the world grapples with the recent conflict in Ukraine, energy security takes centre stage, and the EU's reliance on fossil fuels, particularly Russian gas, comes under

[592] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 685.
[593] Orlando, "The Evolution of EU Policy and Law in the Environmental Field", p. 5.
[594] *Ibid*.
[595] Wolf, Teitge, Mielke, Schütze, and Jaeger, "The European Green Deal - More Than Climate Neutrality", p. 100.
[596] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[597] Sanchez-Reaza, Ambasz and Djukic, "Making the European Green Deal Work for People: Role of Human Development in Green Transition", p. 7.
[598] Orsini, "Human Rights at the Center of the Energy Transition".
[599] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.

scrutiny.[600] The turmoil emphasises the urgency of diversifying energy sources, but it also introduces complexities regarding nuclear energy adoption. Balancing nuclear power's benefits with proliferation concerns, safety issues, and waste management challenges presents intricate decisions for the EU.[601] Staying committed to the desired transition is essential, this includes directing resources towards renewable and sustainable energy alternatives.[602]

Achieving carbon neutrality by 2050 is a herculean task that transcends national boundaries. It demands comprehensive strategies that integrate renewable energy, technological innovation, economic adjustments, and collaborative partnerships.[603] The EU's proactive stance in pursuing this goal solidifies its role as a global leader, setting an example for others to follow.[604]

The EU's resolute dedication to fostering international cooperation, embedding environmental concerns in governance, and taking the lead in climate action underscores its sense of global duty.[605] Despite imminent challenges such as economic fluctuations and technological impediments, the EGD emerges as a symbol of optimism, representing the potential for achieving a future defined by sustainable and reliable energy sources.[606] The interplay of environmental necessities, legal frameworks, and geopolitical dynamics emphasises the intricate journey towards attaining climate neutrality.[607] This initiative reflects the EU's unwavering commitment to addressing climate change amidst worldwide obstacles, showcasing the transformative impact of policy, technology, and global partnership.[608]

The EGD is more than a policy; it represents a transformative force driven by environmental stewardship, visionary leadership, and international collaboration.[609] Its principles emphasise the balance between human progress and planet preservation. As we

[600] Iacobuță and Onbargi, "The European Green Deal and the war in Ukraine", p. 9.
[601] Mufson and Parker, "War in Ukraine generates interest in nuclear energy, despite danger".
[602] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 7.
[603] *Ibid*., p. 9.
[604] "Taking the lead on climate change".
[605] Clark, Dennison and Engström, "Climate of cooperation: How the EU can help deliver a green grand bargain".
[606] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 5.
[607] Sikora, "European Green Deal – Legal and Financial Challenges of the Climate Change", p. 683.
[608] *Ibid*.
[609] "Delivering the European Green Deal".

enter a critical era, the EGD symbolises not just EU ambition, but a shared commitment to a greener and equitable future.[610] Navigating environmental protection, legal changes, geopolitical complexities, and energy shifts, the EGD becomes a beacon of hope.[611] It requires coordinated efforts, involving the public, stakeholders, and global cooperation. The EU's pursuit of carbon neutrality illustrates dedication to both environment protection and leading sustainable progress for all.[612]

[610] Filipović, Lior, and Radovanović, "The green deal – just transition and sustainable development goals Nexus", p. 3.
[611] Cifuentes-Faura, "European Union policies and their role in combating climate change over the years", p. 1336.
[612] "Taking the lead on climate change".

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